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JSC NAVOI MINING AND METALLURGICAL COMPANY

MINERAL RESOURCE AUDIT AND ORE RESERVE ESTIMATE

MURUNTAU CLUSTER GOLD DEPOSITS, UZBEKISTAN

Report of Stage 2 Substage 1 and Substage 2
as per Contract 10/2023-GRR of 19.09.2023

July 2024

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APPENDICES

APPENDIX 1: JORC Code, 2012 Edition - Table 1 Disclosure for the Muruntau, Mutenbai, Besapantau and Balpantau Deposits

EXECUTIVE SUMMARY

Overview

Wardell Armstrong International Limited ("WAI") was commissioned by Joint Stock Company Navoi Mining and Metallurgical Company ("NMMC" or "the Client") to complete an audit of Mineral Resources, estimation of Ore Reserves, and development of a unified mining schedule at Pre-Feasibility Study ("PFS") level for gold deposits in the Muruntau Cluster. As part of the mining schedule, WAI was also tasked with developing a conceptual strategy for inclusion of low-grade material into the Muruntau Cluster processing plants.

This report documents the Mineral Resource audit component and preparation of an Ore Reserve of the study. Mineral Resources and Ore Reserves have been reported in accordance with the guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 ("the JORC Code").

The Muruntau Cluster includes five gold deposits and three processing plants located in the Navoi region of Uzbekistan. The ore sources included within this study are as follows:

- Muruntau (operating mine);
- Mutenbai (operating mine);
- Besapantau (mining planned for 2024);
- Balpantau (mining commenced in 2023); and
- Low-grade stockpiles and heap leach tailings.

The Chukurkuduk deposit was excluded from this study pending the results of ongoing verification drilling. The processing facilities included within this study are as follows:

- GMZ-2 (50Mt/year production capacity, processing ore from all deposits);
- GMZ-7 (15Mt/year production capacity, processing heap leach tailings); and
- Heap leach plant (11Mt/year production capacity, processing low grade ore).

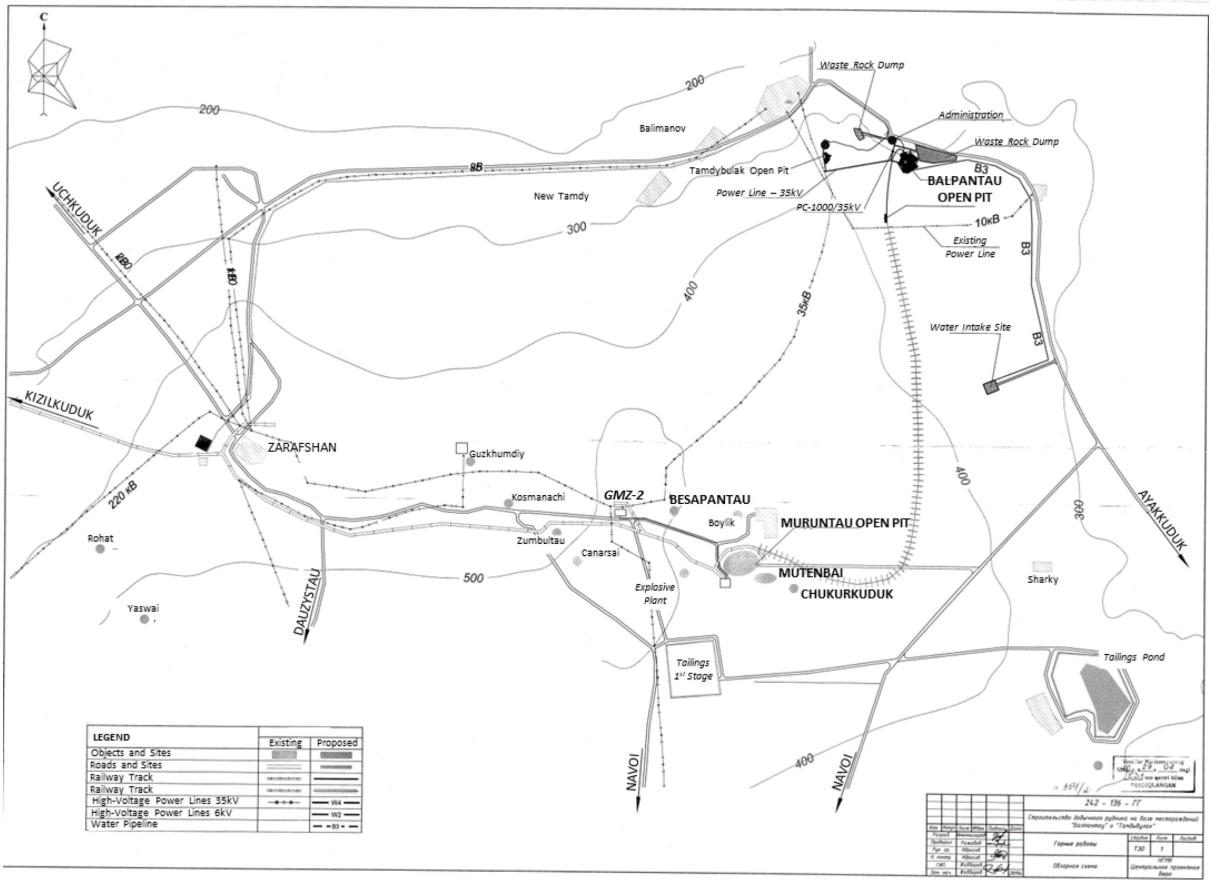
Property Location and Description

The Muruntau Cluster is located in the Kyzyl Kum Desert, approximately 360km northwest of Samarkand, the second largest city in Uzbekistan.

The area is characterised by a continental arid desert climate and mostly flat desert landscape, broken by the Tamdytau range approximately 30km to the northwest and the Aristantau mountains, around 50km to the south of the Muruntau deposit.

The Muruntau operation has a history dating back to 1967 and local infrastructure is well developed. The Muruntau and Mutenbai deposits are mined from the Muruntau open pit, situated approximately

30km east of the town of Zarafshan, connected to the town by both a paved road and railway. The GMZ-2 process plant site is located 5km west of the Muruntau open pit. The Besapantau deposit is located 4.5km to the northwest of the Muruntau open pit. The Balpantau open pit mine is located 26.5km north-northeast from Muruntau.



Location and Infrastructure Map of the Muruntau Cluster

Mining Licenses

NMMC hold the following licenses to use the subsoil for the purpose of extracting minerals at each Muruntau Cluster gold deposit:

- License number NY 0260 dated 09/24/2021, valid until 01/22/2074 for Muruntau and Mutenbai;
- License number NV 0259 dated 09/24/2021, valid until 01/09/2025 for Besapantau; and
- License number NV 0247 dated 09/24/2021, valid until 12/31/2033 for Balpantau.

The main conditions of the license agreements are to comply with the requirements established by the articles of the law "On Subsoil", develop and gain approval of annual mining development plans, provide mining and surveying services to the open pit, complete annual reporting to the State Geological Fund on the Mineral Resources and Ore Reserves, adjust the balance of extracted and lost Mineral Resources only after agreement with the Sanoatgeokontekhnazorat State Institution, organise suitable locations for refuelling equipment, complete reclamation work, complete dust monitoring and suppression procedures in the dry season, ensure annual production according to the detailed design and make an annual payment of tax for the use of the subsoil.

Providing the license holder meets licensing conditions and a deposit is being developed, the mining license can be extended at the request of the holder. WAI is not aware of any factors which may result in the Muruntau Cluster licenses not being extended as required.

Geology

The Muruntau Cluster is located within the Kyzyl Kum Gold District of Uzbekistan, in the western portion of the Southern Tien Shan orogenic belt. The basement of the Kyzyl Kum is composed of the Lower Palaeozoic Besapan Formation, which features carbon and sulphide rich clastic rocks, which were metamorphosed and deformed during the Lower Palaeozoic Caledonian orogeny. The Besapan Formation is unconformably overlain by Devonian to Early Triassic sediments, carbonates and volcanics.

Gold mineralisation is hydrothermal and controlled by complex quartz-sulphide vein arrays and stockworks, commonly developed sub-parallel to bedding in the folded and faulted Middle to Lower Besopan host metasedimentary sequence. Granite magmatism and gold mineralisation are broadly contemporaneous, but their direct link remains unproven. Mineralisation mainly occurs as native gold, with some present within disseminated pyrite and arsenopyrite.

The Muruntau, Mutenbai and Chukurkuduk deposits sit together on the eastern pericline of the large Tazgazgan anticline, complicated by smaller-scale folding. The Besapantau deposit is located on the northwestern flank of the Muruntau ore deposit. Balpantau is situated further north, within a volcano-tectonic graben.

Drilling and Sampling

The main sample types collected in exploration of the Muruntau Cluster have been drill core, drill chip and channel samples from surface trenches or underground development. NMMC sample and analyse all intervals, with the exception of barren quaternary sedimentary cover.

Diamond core is the dominant drilling method in all deposits and has been conducted on systematic grids, on orientations such that drill intersections are at a high angle to the dominant mineralised trend. Drilling has been supplemented by surface trenching and exploratory underground development. Whilst this is a high-cost approach, the extensive underground exposures will likely have provided stronger constraints on mineralised zone location, orientation, morphology and continuity, than would have been possible from drillhole data alone.

WAI considers that current drilling, core sample collection and sample preparation at the Muruntau cluster are undertaken by competent personnel using procedures that are consistent with standard industry practice. Increased risk of sampling bias exists for historic pre-2019 core drilling (lower average recovery) and non-core sampling (underground channel, trench, reverse circulation drilling).

Sample Preparation and Analysis

Sample preparation is the same for all deposits and sample types. This includes drying, crushing and grinding, with splitting between stages to produce a representative sub-sample for analysis. WAI consider the equipment, sample weights and particle size currently used in sample preparation to be in line with typical industry practices.

The two analytical methods used at Muruntau Cluster are fire assay and gamma activation analysis. Both sample preparation and fire assay have been mainly carried out by the geological laboratory of the Kyzylkum PGRE. Gamma activation analysis is completed at the NMMC Central Gamma Activation Analysis Laboratory.

Around 98% of samples from the Muruntau and Mutenbai deposits were analysed using the gamma activation method. A much higher proportion of fire assay data is available for the Besapantau and Balpantau deposits. In these deposits, gamma activation has typically been used as a preliminary analysis, where samples with grades above 0.5 g/t were then selected for fire assay.

Review of available quality assurance and quality control (“QAQC”) data highlights a range of data quality issues around analytical accuracy and precision, alongside incomplete QAQC coverage and protocols. QAQC results improve and data gaps reduce in recent drill programmes, allowing this data to be used to indirectly verify historic datasets.

Data Verification

Risks of sampling and analytical bias have been further assessed through a range of data verification checks.

For Muruntau and Mutenbai, NMMC conducted a visual comparison between the results of exploration and resource development drilling with overlapping grade control (“GC”) data. In cases where the presence or absence of a significant mineralised intersection was not confirmed by the high-resolution (6m x 6m) GC sampling, the drill holes were excluded from Mineral Resource estimation.

Drilling since 2019 has benefited from higher drill recoveries and a more complete QAQC protocol. Continued drilling allows NMMC to increase ‘recent’ drill coverage across all deposits and reduce the reliance on historic data. Whilst no twin drillholes are available, NMMC has infilled regions of historic drilling with recent drillholes as part of resource development. The comparison between historic drilling with adjacent recent drillholes provides some data verification, whereby dramatic changes in mineralisation grade and/or width over very short distances may indicate data quality issues. Like the GC drilling comparison, WAI considers this to be an effective check for the most significant errors.

WAI has completed an independent statistical comparison between datasets, to help detect any bias in the sample data due to differences in sample type or changes in sampling and/or analytical procedures over time. Overall, there is no evidence for material bias between different sample types at Muruntau-Mutenbai, which supports the NMMC decision to include diamond drilling, reverse circulation drilling and underground sampling in Mineral Resource estimation.

Statistical comparisons between historic and recent drilling show no material bias at Besapantau and potential for historic results to understate grade at Balpantau (-9% difference in average composite grade above 0.5g/t cut-off). Given the magnitude and downside nature of the differences at Balpantau, WAI accepts the decision to include historic data at both deposits.

Statistical comparisons between diamond drilling and trenching at Balpantau, show strong positive bias in the trenching results. To ensure this grade is not extrapolated to depth, WAI agrees with the decision to exclude all trenching from Balpantau Mineral Resource estimation.

Database verification procedures carried out by WAI confirmed the integrity of the data contained in the electronic databases provided. WAI considers that QAQC and data verification completed to date, have been used to select a subset of the drillhole databases deemed appropriate for Mineral Resource and Ore Reserve estimation.

Mineral Resources

Mineral Resource estimation was completed by NMMC using drillhole databases and geological models developed by the NMMC geology team and its subcontractors. The audit process included a feedback loop, whereby any issues or improvement opportunities identified by WAI, could be addressed by NMMC in the final models prior to reporting the audited Mineral Resource statement. Optimised pit shells used to constrain Mineral Resource reporting were generated by WAI based on parameters provided by NMMC.

Resource modelling primarily utilised Leapfrog Geo and Leapfrog Edge software. NMMC constructed mineralisation domain wireframes by compositing samples above specific cut-off grades and using implicit modelling to generate envelopes around the composites. Structural trends were constructed and applied to the envelopes, such that domain orientation and continuity reflects the interpreted orientation and continuity of the mineralisation.

Block models were constructed using the mineralisation domain wireframes to define the block model domain boundaries. A parent block size of 30m x 30m x 15m was used for the Muruntau-Mutenbai block model. The Besapantau and Balpantau models used parent block dimensions of 20m x 20m x 5m. To effectively represent domain volume, sub-cell splitting was enabled at domain boundaries.

Grade estimation was carried out by ordinary kriging of capped 2m composites. Domains were treated as hard boundaries and as such composites from an adjacent domain could not be used in the grade estimation of another domain. Estimation was run in a three-pass plan, the second and third passes using progressively larger search radii to enable the estimation of blocks unestimated on the previous pass. Dynamic anisotropy was employed to align search orientation to local domain orientation. The orientation of the dynamic ellipsoid was determined by the same structural trends used in the construction of domain wireframes.

Model validation methods included visual comparison of the composite and block model grades, a statistical grade comparison and a swath plot analysis. Globally no indications of significant over or under estimation were apparent in the block models nor were any obvious interpolation issues identified. From the perspective of conformance of the average model grades to the input data, WAI consider the grade estimation adequately represents the composite data used.

Limited density data is available for the Muruntau Cluster deposits. WAI has compared summary statistics for this data, against the density assumptions applied in the block model for each deposit. Current block model density assumptions appear to be conservative but reasonable given the limited amount of informing data.

Reconciliation is a key tool to assess the overall materiality of any residual database errors and estimation errors associated with the current estimation approach and data spacing. Comparison of the Resource and grade control models over annual production volumes for Muruntau and Mutenbai demonstrate that tonnage, grade and metal variance is typically significantly below the ±15% industry standard benchmark for Indicated Resources. The Besapantau and Balpantau deposits are characterised by more discrete mineralised zones with greater spatial complexity. Based on initial grade control drilling and reconciliation results, the closer drill spacing and higher proportion of recent drilling at these deposits appears sufficient to support Indicated Resources, however this should be re-evaluated as mining progresses and more grade control data becomes available.

Classification was set in the block models using a combination of data spacing, estimation pass and wireframe volume criteria. WAI considers the classification approach to reflect the confidence in the drillhole data, the geological interpretation, geological continuity, data spacing and orientation, spatial grade continuity, estimation method and reconciliation performance.

Mining, processing and long-term price assumptions were used to report the proportion of the block models that could reasonably be expected to be economically mined, using a 0.3g/t Au cut-off grade within the optimised pit shells.

The Mineral Resource estimates for the Muruntau Cluster gold deposits have been classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC 2012 Edition). The audited Mineral Resource statement is shown below. The effective date of the Mineral Resource estimates is January 1st, 2024.

The stated Mineral Resources are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, to the best knowledge of WAI. There are no known mining, metallurgical, infrastructure, or other factors that materially affect the Mineral Resource estimates, at this time.

Audited Mineral Resource Statement for the Muruntau Cluster Wardell Armstrong International, effective January 1, 2024					
Deposit	**Class**	**Tonnes (Mt)**	**Au Grade (g/t)**	**Contained Au**	
				(Moz)	**(t)**
Muruntau	*Indicated*	2,016	0.93	60.0	1,866
	Inferred	732	0.81	19.1	595
	Total	**2,747**	**0.90**	**79.1**	**2,461**
Mutenbai	*Indicated*	230	1.06	7.8	244
	Inferred	491	0.91	14.3	445
	Total	**721**	**0.96**	**22.2**	**689**
Besapantau	*Indicated*	131	0.88	3.7	115
	Inferred	133	0.90	3.8	119
	Total	**265**	**0.89**	**7.5**	**235**
Balpantau	*Indicated*	57	0.98	1.8	56
	Inferred	38	0.88	1.1	33
	Total	**95**	**0.94**	**2.9**	**90**
Stockpiles	*Indicated*	34	0.54	0.6	18
	Inferred	93	0.44	1.3	41
	Total	**127**	**0.46**	**1.9**	59
Total	*Indicated*	2,467	0.93	73.9	2,300
	Inferred	1,487	0.83	39.7	1,233
	Total	**3,955**	**0.89**	**113.6**	**3,533**

Notes:
1. Mineral Resources have been classified and reported in accordance with the guidelines of the JORC Code (2012);
2. The effective date of the Mineral Resource Estimates is January 1, 2024;
3. In-situ Mineral Resources have been reported at a cut-off grade of 0.3g/t gold. Stockpile Mineral Resources have been reported to a nominal cut-off grade of 0.0g/t Au;
4. Mineral Resources were limited to US$1,950/oz optimised open pit shells based on appropriate economic, mining and processing parameters;
5. Metal grade and content represents contained metal in the ground and have not been adjusted for metallurgical recovery or mining dilution;
6. Mineral Resources are not Ore Reserves until they have demonstrated economic viability based on a pre-feasibility study or feasibility study;
7. Mineral Resources have been reported inclusive of any Ore Reserves;
8. Mineral Resources have been reported at 100% ownership; and
9. All figures are rounded to reflect the relative accuracy of the estimate. Numbers may not add due to rounding.

Geotechnics

WAI was provided with geotechnical data by the Client that covers works undertaken by the VNIMI Institute and SRK Consulting during 2021 and 2022. Upon completion of a review of the geotechnical data WAI has provided geotechnical slope design recommendations to be used in ore reserve estimates for the main project areas.

The Navoi Project is located on the southern ridge of the Tamdytau Mountains on the Muruntau Ridge, 30km east of the town of Zarafshan in the southern central area of the Republic of Uzbekistan. Navoi consists of five open pits: Muruntau, Mutenbai, Chukurkuduk, Balpantau, and Besapantau.

WAI have reasonable confidence in the values produced as part of the SRK reports. Analysis of the available Besapantau wireframe model shows that the values of the slopes of the domains specified within the VNIMI Institute report are less than those recorded by VNIMI accounting for any uncertainty and increasing safety of the slopes. The value of 41° for the Balpantau open pit, upon comparison with the latest wireframe model, is considered a suitable value for ore reserve estimation until such time that geomechanical data can be determined for this open pit, on the understanding that the lack of background data specific to this deposit results in an elevated risk profile.

Hydrogeology

The majority of hydrology-related data recording has been undertaken at Muruntau with the most relevant study completed in 2018. The only study received for Besapantau, also covering Balpantau is based on data conducted over thirty years ago (1986-1998) which was carried out at the time of exploration. All data-sets are in need of updating with quality-controlled investigation and analysis as much of the information is now out of date and superseded.

The general findings for surface water management of the mine indicate a system of perimeter drainage within the upper 50m of the interior of the pit shell is performing adequately. This captures the low-level rainfall-run-off that occurs predominantly in Winter and Spring. No analysis or review of peak rainfall, hydraulic capacity and return periods has been undertaken and this should be considered. No reports of mine flooding or adverse surface water management issues have been reported however this is not a reliable metric to use for mine planning and flood defence. Climate change modifications should be applied and a rainfall-run-off analysis conducted to assess the resilience of the mine drainage infrastructure.

The hydrogeology (sub-surface hydrology) of the mine is controlled by discontinuities in the Taskazgan and Besapan sand-shale complex. These lithologies are characterised by relatively low primary hydraulic conductivity but relatively high secondary porosity where fractures exist. Because of the significant structural deformation along fold structures and associated faulting, the hydrogeology of the site comprises a series of separate flow zones, compartments (such as on either side of the Southern Fault) and at a local 100m block-scale and hydraulically isolated east and west zones in the pit. For several decades, the mine has relied on sub-surface drainage, on average at 42 l/s from the Shaft M and associated connecting tunnels. The level of characterisation of the mine's piezometry (groundwater levels and hydraulic heads), the interconnection between zones and hydraulic properties is very low.

From review of the most recent recorded work it appears that only one dedicated monitoring well has been installed. Water levels have been recorded in open resource boreholes but their completion details and hence the accuracy of what they are actually recording is highly uncertain. The majority of understanding of groundwater levels and behaviour is derived from limited results. The assessment of inflows has been undertaken using a simplified analytical technique term the 'Big Well' method. This requires over-simplification of the system with rendering the entire pit to a simplified geometry and applying single terms for hydraulic properties. A second calculation based on unit inflow per meter of tunnel length has also been used. Both calculations indicate deepening the mine to 700m will result in a near doubling of inflow rates from the current 42l/sec to between 75-85l/s.

It is recommended that a hydrogeological programme of investigation, testing, analysis and modelling using up-to-date methods (such as packer testing and numerical modelling) is undertaken to improve the assurance of hydrogeological data control and management.

Mine Planning & Methods

The Muruntau Cluster consists of three open pits for which an Ore Reserve Estimate has been prepared based upon various modifying factors such as gold price, process recoveries, geotechnical parameters, costs and estimates, dilution, ore loss, as well as additions and subtractions due to exploration and depletion.

The Ore Reserve has been defined by conducting a pit optimisation process, using defined parameters. This will provide a series of nested pit shells against which the existing open pit designs can be assessed for suitability as the basis of mine design and scheduling.

Pit optimisation is a recognised technique by which different open pit shells may be generated, based on a supplied geological resource block model and user-defined economic and operating parameters. WAI carried out the optimisation works using industry recognised Datamine NPV Scheduler software which offers various facilities for mine scheduling and optimisation of the pit shell extents.

The parameters utilised for optimisation result in a theoretical (calculated) ore cut-off grade for material sent to the CIL process plant of between 0.2-0.35g/t Au. Operationally, the mine uses a mill cut-off of **0.50g/t Au** and as such this operational CoG has been utilised to derive the Ore Reserve Estimate.

The mining schedules for the Muruntau cluster were created using Datamine Studio NPVS. The scheduling process consisted of developing a mine plan using WAI created pushback designs within the overall pit designs supplied by Navoi.

The mining schedule utilised to produce the Ore Reserve Estimate includes Measured, Indicated and Inferred Mineral Resources as plant feed, however the associated financial evaluation considers revenue only derived from Measured and/or Indicated (which are converted to Proven and Probable Reserves), and applies a waste mining cost to the Inferred material.

The Muruntau cluster open pit mines are operated as a conventional truck and shovel mine using face shovels and backhoe excavators to load ore and waste to a mixed fleet of 130t, 180t and 220t Class haul trucks of various manufacture. All ore and waste material requires drilling and blasting. At Muruntau, an inclined conveyor is also used for material movement in addition to haul trucks.

Ore is transported to ROM pads adjacent to open pits and either stockpiled for blending purposes or transported via railway to the crusher at the GM2, GM7 or Heap Leach facilities. Waste is transported to waste rock dumps (WRDs) which are extensive and located around the perimeter of the pits.

Working bench height varies between 15m at Muruntau-Mutenbai, and 5m-15m at Balpantau and Besapantau, whilst final benches are 30m in height.

The Muruntau-Mutenbai mine is currently operating at rate of 105Mm^3 total rock movement per annum. Besapantau is operating at a rate of 5Mtpa ore and 39Mtpa total rock, whilst Balpantau extracts some 3Mtpa ore from a maximum of 20Mtpa total rock.

Mineral Processing

The NMMC Muruntau-Mutenbai processing complex has been in continuous operation since 1969. Several phases of expansion have been completed since then and the oxide zones of ore are now all mined out, so only fresh ore is currently mined and processed from the main Muruntau-Mutenbai combined pit. The ore consists of complex stockworks with a head grade of circa 1.1 - 1.2 g/t Au.

Mined ore from the Muruntau-Mutenbai pit is transported by rail to the main processing plant, GMZ-2. GMZ-2 has a nominal design throughput of 50Mtpa, which is the largest gold processing plant in the world based on throughput. The flowsheet is based on cyanide leaching and Resin-in-Pulp (RIP) technology – this was the world's first commercial application of RIP technology.

In addition to GMZ-2, there are two other main processing facilities: GMZ-7 (nominal throughput 15Mtpa) which processes the old Newmont heap leach tailings material through a conventional Carbon-in-Pulp (CIP) flowsheet; and CKVZ, a dedicated and conventional Heap Leach operation for low grade ore (nominal throughput 11 Mtpa). There are other processing and treatment facilities within the general site complex treating material from other operations within the NMMC group, but discussion will be limited to these three main processing facilities, including the Tailings Storage Facilities (TSF).

Ore from Balpantau, located 40km away, is also fed to the GMZ-2 facility at the rate of 2.5Mtpa and at a similar head grade of circa 1.2 g/t Au.

It is also planned in 2024 to commence feeding ore from Besapantau, for which metallurgical testwork has been completed, at a rate of circa 3Mtpa. No additional site infrastructure is required for this ore, although the water supply system to the plant is being expanded.

Finally, there are considerable resources of low-grade stockpiles, although these are reportedly being processed through the GKZ-2 plant at a rate of 5Mtpa since 1974, with a reported constant tailings grade of 0.123 g/t Au. A scoping level assessment is included in this report on the best strategy for processing this resource.

Environmental, Social Performance, Health and Safety

In general, NMMC has good paper environmental and social policies and understanding of the importance of these aspects in relation to sustainability. NMMC has been publishing Sustainability reports starting from 2019. There are ESG specialists who are responsible for collecting and compilation of ESG data.

However, there are only two environmental specialists in the Central Mining Administration (CMA) who are responsible for all CMA's facilities. For efficient environmental management there should be on-site ecologists to handle ongoing monitoring and control of environmental aspects, timely identification of ecological violences and efficient contribution to the existing environmental management system.
Air monitoring is carried out on a monthly basis at the Sanitary Protection Zone, the provided monitoring results did not show any exceedance. In addition, air quality is monitored at the workplaces and at the sources of emissions, however, the results were not provided, except for the Gold HLP showing the efficiency of air treatment systems at the sources of air emissions. It is also a good practice to monitor the air quality at the nearest settlements considering the proximity.

Dust suppression is carried out at the CMA's facilities, but as a result of climatic features and high evaporation as well as shortage of water, the efficiency is low. WAI understands that CMA together with Central Laboratory have tested dust suppression reagents in addition to water irrigation with no positive results. High dust concentration causes the degradation of air quality at workplaces (i.e. Muruntau pit, access roads, tailings dusting, waste dumps, etc.) and affects working conditions and health of employees.

Based on the information provided water is recycled and not discharged into the environment. The Muruntau pit water monitoring data have been provided for the review. WAI is not aware of other water monitoring programmes carried out at the Muruntau Project facilities.

The provided Environmental Impact Assessment Designs for the Project facilities under consideration do not fully address social aspects. The documents reviewed contain only indication of nearest settlements and their proximity to the Project assets. However, socio-economic conditions are not studied, and social impacts are not assessed or addressed.

As a result of on-site discussions with H&S specialists and on-site review of presented documents, all required H&S procedures are in place and all necessary training is carried out in time. However, the cyanide handling procedures should be reviewed to ensure that the staff who work with cyanide fully understand the risks and measures that need to be taken in case of cyanide-related accidents.

Closure and reclamation plans have not been developed. In accordance with the best practices mine closure planning as early as possible is considered crucial because it outlines the strategies and procedures for safe closure as well as ensure mitigation of environmental impacts, address social concerns and responsible management of post-mining landscapes.

Economic Analysis

The Muruntau cluster has been analysed using Discounted Cash Flow (DCF) approach, with a 10% discount rate applied to future estimated cash flows throughout the life of the mine. The economic assessment generated a positive, post-tax NPV of US$7,842M. As there is no significant capital outlay, it was not possible to generate a significant IRR. A summary of the economic validity of the model, broken down on a pit-by-pit basis, is outlined in the following table. Note that the NPV of US$7,842M in the table below includes centralised costs that are not included in the equivalent calculations for the individual pits.

Summary of Economic Analysis		
	Discount Rate	**Value (US$M)**
Muruntau Cluster	10%	7,842
Muruntau	10%	6,670
Mutenbai	10%	524
Besapantau	10%	464
Balpantau	10%	382

Ore Reserves

The Ore Reserve Estimate, with an effective date of 01 January 2024 are presented in the following table.

Ore Reserve Estimate for the Muruntau Cluster, WAI, 01 January 2024					
Deposit	**Class**	**Tonnes (Mt)**	**Grade (g/t Au)**	**Contained Au**	
				(Moz)	**(t)**
Muruntau	*Proven*	-	-	-	-
	Probable	1,210	1.09	42.3	1,316
	Total	**1,210**	**1.09**	**42.3**	**1,319**
Mutenbai	*Proven*	-	-	-	-
	Probable	92.8	0.99	3.0	92.1
	Total	**92.8**	**0.99**	**3.0**	**92.1**
Besapantau	*Proven*	-	-	-	-
	Probable	62.1	0.98	2.0	61.0
	Total	**62.1**	**0.98**	**2.0**	**61.0**
Balpantau	*Proven*	-	-	-	-
	Probable	37.5	1.05	1.3	39.3
	Total	**37.5**	**1.05**	**1.3**	**39.3**
Stockpiles	*Proven*	-	-	-	-
	Probable	33.5	0.54	0.6	18.1
	Total	**33.5**	**0.54**	**0.6**	18.1
Total	*Proven*	-	-	-	-
	Probable	1,436	1.06	49.2	1,527
	Total	**1,436**	**1.06**	**49.2**	**1,527**

Notes:

1. Ore Resources have been classified and reported in accordance with the guidelines of the JORC Code (2012);
2. The effective date of the Ore Reserve Estimate is 01 January 2024;
3. Ore Reserves are reported at an operational cut-off grade of 0.5g/t Au for Besapantau, Balpantau, Muruntau and Mutenbai.
4. Ore Reserves are limited to US$1,650/oz optimised open pit shells based on appropriate economic, mining and processing parameters;
5. Mining, processing and administrative costs are estimated based on actual costs;
6. Ore Reserves have been reported at 100% ownership; and
7. All figures are rounded to reflect the relative accuracy of the estimate. Numbers may not add due to rounding.

The stated results are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, to the best knowledge of the authors. There are no known mining, metallurgical, infrastructure, or other factors that materially affect the preliminary Ore Reserve results, at this time.

1 INTRODUCTION

1.1 Purpose of Technical Report

Wardell Armstrong International Limited ("WAI") was commissioned by Joint Stock Company Navoi Mining and Metallurgical Company ("NMMC" or "the Client") to complete an audit of Mineral Resources, estimation of Ore Reserves, and development of a unified mining schedule at Pre-Feasibility Study ("PFS") level for gold deposits in the Muruntau Cluster. As part of the mining schedule, WAI was also tasked with developing a conceptual strategy for inclusion of low-grade material into the Muruntau Cluster processing plants.

This report documents the Mineral Resource audit and Ore Reserve estimate components of the study. Both Mineral Resources and Ore Reserves have been reported in accordance with the guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 ("the JORC Code").

The Muruntau Cluster includes five gold deposits and three processing plants located in the Navoi region of Uzbekistan. The ore sources included within this study are as follows:

- Muruntau (operating mine);
- Mutenbai (operating mine);
- Besapantau (mining planned for 2024);
- Balpantau (mining commenced in 2023); and
- Low-grade stockpiles and heap leach tailings.

The Chukurkuduk deposit was excluded from this study pending the results of ongoing verification drilling.

The processing facilities included within this study are as follows:

- GMZ-2 (50Mt/year production capacity, processing ore from all deposits);
- GMZ-7 (15Mt/year production capacity, processing heap leach tailings); and
- Heap leach plant (11Mt/year production capacity, processing low grade ore).

These assets generate the majority of NMMC's gold production and contain the majority of NMMC's Mineral Resources and Ore Reserves.

1.2 Navoi Mining and Metallurgical Company

Founded in 1958, NMMC is Uzbekistan's leading gold-mining company and one of the top four gold producers globally. NMMC's key area of focus is the Navoi region, which benefits from well-developed infrastructure and a strong mining tradition.

NMMC is a leading employer in Uzbekistan and is a significant contributor to the development of the country's economy. NMMC operations currently include three underground mines, seven open pit mines and seven hydrometallurgical plants.

1.3 Independent Consultants

WAI is part of Wardell Armstrong LLP, an independent British, partner-owned engineering and environmental consultancy, established in 1837. The company has 12 offices in the UK with around 500 staff.

WAI comprises over 50 staff and provides the mining industry with specialised geological, engineering, processing and environmental expertise from our main offices in Truro, UK, as well as Almaty, Kazakhstan. The office in Truro, at the historic Wheal Jane mine site, includes an extensive mineral assaying, processing and pilot plant testing facility. WAI's independence is ensured by the fact that it holds no equity in any project. This permits WAI to provide its clients with conflict-free and objective recommendations on crucial judgment issues.

WAI provides a wide range of services for minerals-related projects; these range from preliminary exploration planning and execution, through Mineral Resource and Reserve estimation to international reporting standards, scoping studies, mine design and financial appraisal, to pre-feasibility and feasibility studies.

WAI has a strong client list, including companies and organisations from the private and public sectors, as well as many major financial institutions. In addition, WAI has been involved in multiple LSE Main Board and AIM listings as well as NI 43-101 Technical Reports in line with TSX and Competent Person's Reports in line with ASX.

In summary, WAI has professionally qualified and experienced specialists whose expertise includes:

- Exploration and resource evaluation;
- Mineral Resource and Ore Reserve estimation;
- Geotechnical engineering;
- Hydrology and hydrogeology;
- Mine planning;
- Metallurgical testwork and process design;
- Financial and economic analysis;
- Environmental assessment and monitoring;
- Social and H&S issues; and
- Mine closure and reclamation.

WAI has a long track record of providing high quality technical services to the mining industry worldwide. This has involved projects in over 90 countries, with the principal expertise focused on Europe, CIS and Africa plus Central and South America.

Further company information, including project data, can be viewed on our website: http//www.wardell-armstrong.com.

1.4 Personal Inspections

This report has been prepared by a team of consultants sourced from the WAI offices in the UK and Kazakhstan over a six-month period.

The following consultants from WAI conducted personal inspections of the Muruntau Cluster assets between the 6th and 9th November 2023, covering aspects related to access and infrastructure, geology, exploration, QA/QC, mineralogy, resource estimation, mining, laboratory testwork, processing, and environmental and social issues:

- Ché Osmond, BSc, MSc (MCSM), FGS, EurGeol, CGeol, Technical Director (Geology), *Geology, Resources, Project Overview, Financials;*
- Ruslan Erzhanov, MSc, FGS, CGeol, PONEN RoK. General Director - WAI Kazakhstan, *Project Manager, Geology;*
- Frank Browning, MSci, MSc (MCSM), PGCert, MAIG, FGS, CGeol, Principal Resource Geologist, *Resource Modelling & Estimation;*
- Stuart Richardson, BEng, MSc, CEng, MIMMM, QMR; Technical Director (Mining), *Mine Design, Optimisation and Scheduling;*
- Jim Turner, ACSM, MCSM, BSc (Hons), MSc, CEng, MIMMM; Technical Director (Mineral Processing), *Mineral Processing;* and
- Olga Pichkurova, BA, MSc, Environmental & Social Specialist, *Environmental Review.*

Other WAI consultants who contributed to this report included:

- Alan Clarke, EurGeol, CGeol, BSc, MSc, MCSM, FGS, Technical Director & Resource Geologist, *Resource Modelling & Estimation;*
- Robin Kelly, BSc, MSc (MCSM), FIMMM, Principal Geologist, *Geology;*
- Colin Davies, BEng MSc CEng ACSM MIMMM QMR, Principal Mining Engineer, *Mine Design, Optimisation and Scheduling;*
- Michael Kelly, BEng ACSM MIMMM, Principal Mining Engineer, *Mine Design, Optimisation and Scheduling;*
- Harriet Pascoe, BSc (Hons), MSc, FGS, Senior Geotechnical Engineer, *Geotechnical Engineering*; and
- Phil Burris, BSc, MSc, CGeol, ASoBRA, Technical Director of Hydrogeology, *Hydrogeological Review.*

1.5 Study Strategy

The basic strategy for this study has been to examine and report on the existing information available on the Muruntau Cluster assets, which includes geology, mineral exploration, Mineral Resources, Ore Reserves, mining, metallurgical and environmental data, and basic economic parameters.

During the site visits conducted by WAI, further information was gathered across all technical disciplines. For all project sites, the data originates from on-going exploration, mining and processing activities, and data cut-off dates are provided where appropriate.

Any material issues identified during the audit of Mineral Resources were discussed with the Client and either addressed directly or via adjustments to resource classification, prior to Mineral Resource reporting and Ore Reserve estimation.

WAI has audited the Mineral Resources and estimated Ore Reserves using Seequent Leapfrog Geo and Edge, Snowden Supervisor, Datamine Studio RM, Datamine Studio OP, NPV Scheduler and Studio 5D Planner software, all in accordance with the guidelines of the JORC Code (2012).

1.6 Sources of Information

All information used in the production of this technical report has been supplied by NMMC. The authors have relied upon this information, alongside findings from the site inspection. Ms Liubov Egorova, Director of Mineral Resources at NMMC, coordinated the site visit and data provision.

1.7 Units and Currency

All units of measurement used in this report are metric unless otherwise stated. Tonnages are reported as metric tonnes ("t"), precious metal values in grams per tonne ("g/t") or parts per million ("ppm").

Unless otherwise stated, all references to currency or "US$" are to United States Dollars (US$).

1.8 Reliance On Other Experts

This technical report has been prepared by WAI on behalf of NMMC for which WAI has wholly relied upon the data presented by NMMC in formulating its opinion. The information, conclusions, opinions, and estimates contained herein are based on:

- Information made available to WAI by NMMC at the time of preparing this technical report including previous internal and external reports (on the varied disciplines) prepared by or for NMMC on these assets; and
- Assumptions, conditions, and qualifications as set forth in this technical report.

The competent persons have not carried out any independent exploration work, drilled any holes or carried out any sampling and assaying at the various project areas.

For the purposes of this report, WAI has relied on ownership information provided by NMMC. WAI has not researched property title or mineral rights for the licence area and expresses no opinion as to the ownership status of the property. The descriptions of the property, and ownership thereof, as set out in this technical report, are provided for general information purposes only.

The metallurgical, geological, mineralisation, exploration techniques and certain procedural descriptions, figures and tables used in this report are taken from reports prepared by others and provided to WAI by NMMC.

The observations, comments and results of this Mineral Resource audit and Ore Reserve estimation represent the opinion of WAI as of 30th May 2024 and are based on the work as stated in the report. Though WAI is confident that the opinions presented are reasonable, a substantial amount of data has been accepted in good faith. Whilst WAI has endeavoured to validate as much of the information as possible, WAI cannot be held responsible for any omissions, errors or inadequacies of the data received.

WAI has not conducted any independent verification or quality control sampling, or drilling. WAI has not undertaken any accounting, financial or legal due diligence of the asset or the associated company structures and the comments and opinions contained in this report are restricted to technical and economic aspects associated with the Muruntau Cluster assets.

WAI has not undertaken any independent testing, analyses or calculations beyond limited high-level checks intended to give WAI comfort in the material accuracy of the data provided. WAI cannot accept any liability, either direct or consequential for the validity of information that has been accepted in good faith.

Any use of this report by any third party are at that party's sole risk.

2 PROPERTY LOCATION & DESCRIPTION

2.1 Location and Accessibility

The Muruntau Cluster is located in the Kyzyl Kum Desert of Uzbekistan, Central Asia (Figure 2.1). This mining province is situated within the Tien Shan Mountain range, a region known for its significant gold mineral resources (Figure 2.3).

The Muruntau Cluster is approximately 360km drive northwest of Samarkand, the capital of the Samarqand Region and the second largest city in Uzbekistan, accessible by paved roads.

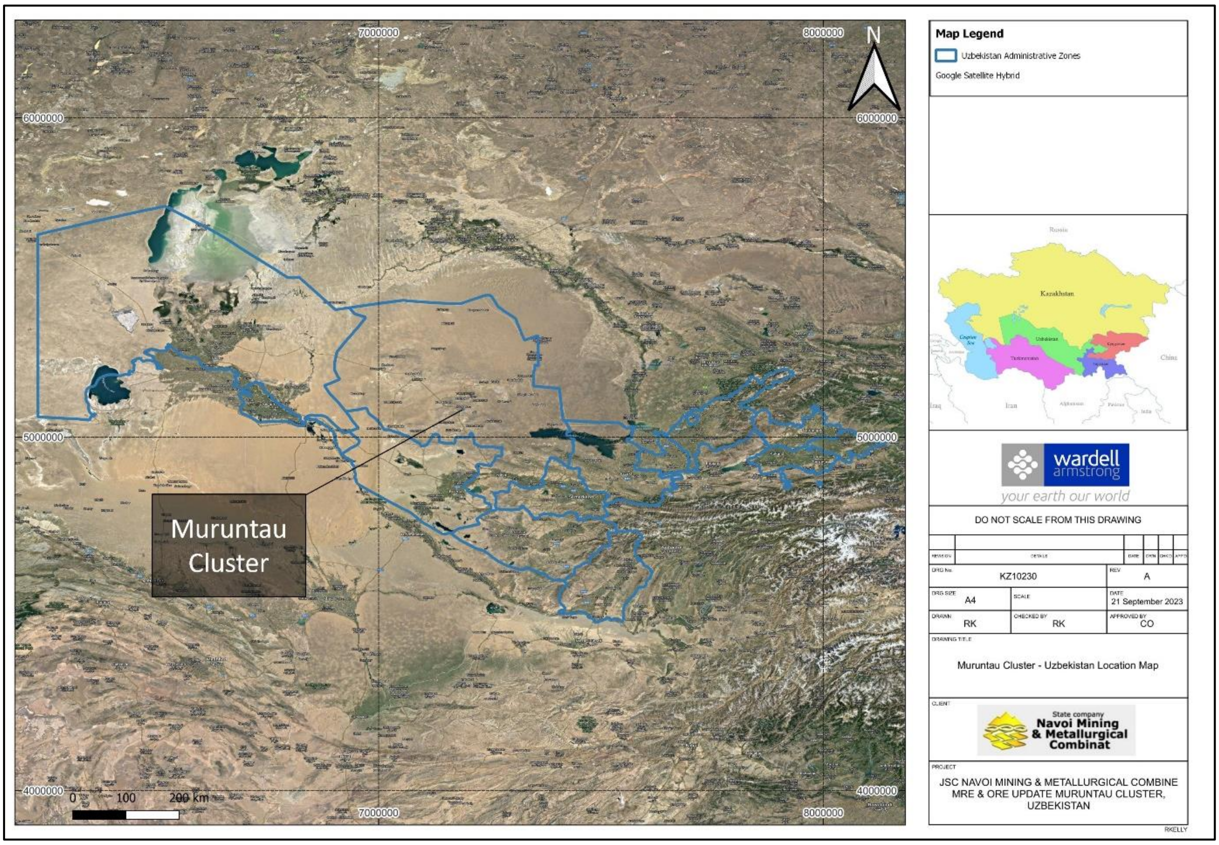


Figure 2.1: Regional Map of Uzbekistan and Location of Muruntau Cluster

2.2 Climate

The region experiences a continental arid desert climate, characterised by dry air and minimal precipitation, averaging around 110mm annually (Figure 2.2). Most of the precipitation occurs during the autumn and spring months. Winters are relatively cold, with an average temperature in January of -8°C, while summers are long and hot, with average July temperatures up to 30°C. The prevailing winds in the area come from the east and northeast.

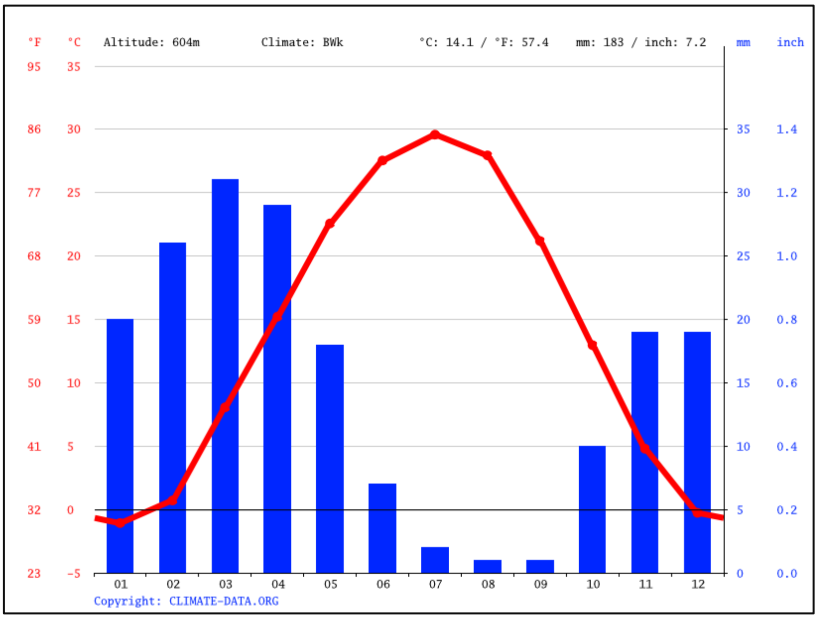


Figure 2.2: Temperature & Rainfall, Muruntau Area, After Climate-Data.org

2.3 Physiography

The Muruntau area is characterised by a mostly flat desert landscape, featuring altitudes ranging from 10 to 150m, with overall elevations spanning between 600 and 700m above sea level. The most prominent geographical features consist of the Tamdytau range, located approximately 30km to the northwest of the Muruntau deposit, and the Aristantau mountains, around 50km to the south. The surface terrain across the region comprises Mesozoic to Cenozoic platform clastic sediments. There are no perennial surface watercourses present in the area.

2.4 Local Resources & Infrastructure

The Muruntau Cluster has a history dating back to 1967 and local infrastructure is well developed (Figure 2.4).

The Muruntau and Mutenbai deposits are mined from the Muruntau open pit, situated approximately 30km east of the town of Zarafshan, connected to the town by both a paved road and a railway. The GMZ-2 process plant site is located 5km west of the Muruntau open pit. To the north of the open pit are the settlements of Solnechny and Muruntau. The primary supply routes for the area include railroads, such as the Navoi – Uchkuduk line, the Kyzylkuduk station – Zarafshan – Muruntau station, and the Kariernaya (Open pit) station, as well as roads including Navoi – Zarafshan – Uchkuduk – Nukus and Uchkuduk – Muruntau pit – Muruntau settlement.

The Besapantau deposit is located 4.5km to the northwest from the Muruntau open pit, forming a straight line between the Muruntau pit and the GMZ-2 plant of 2.5km in length. The Balpantau open pit mine is located 26.5km north-northeast from Muruntau.

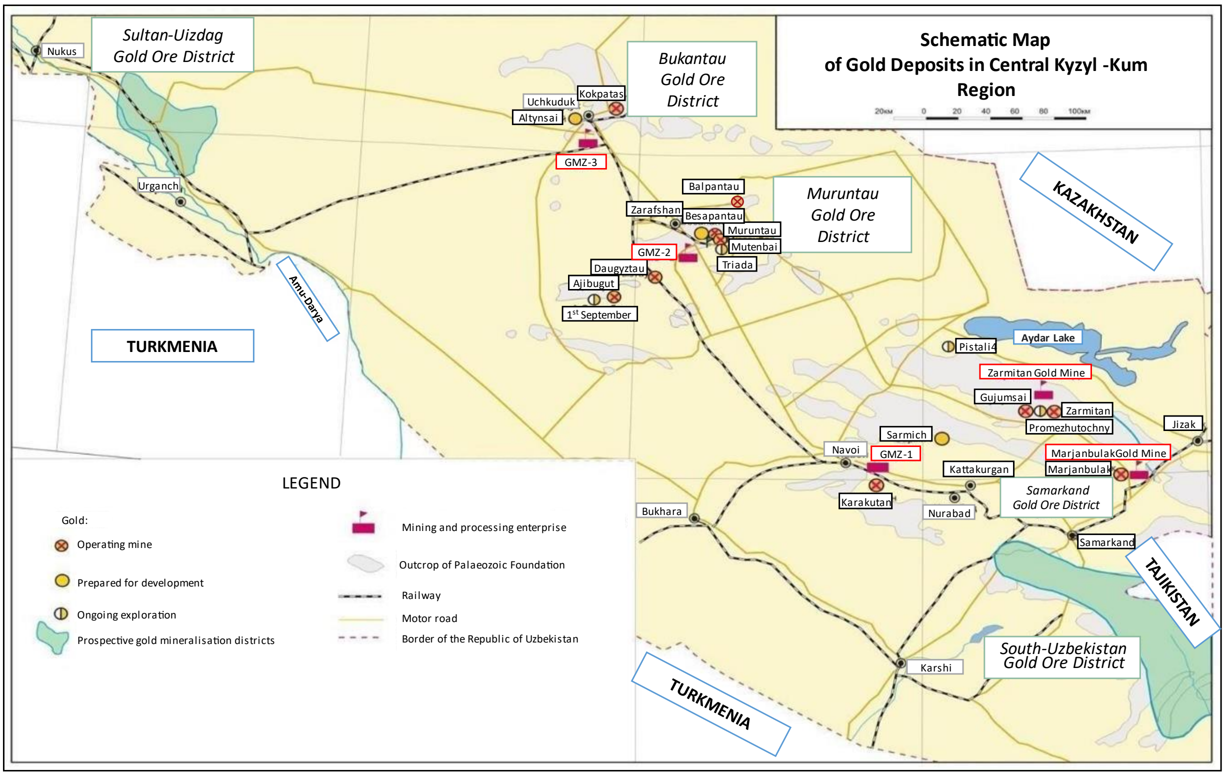


Figure 2.3: Location Map of the Kyzyl-Kum Gold District

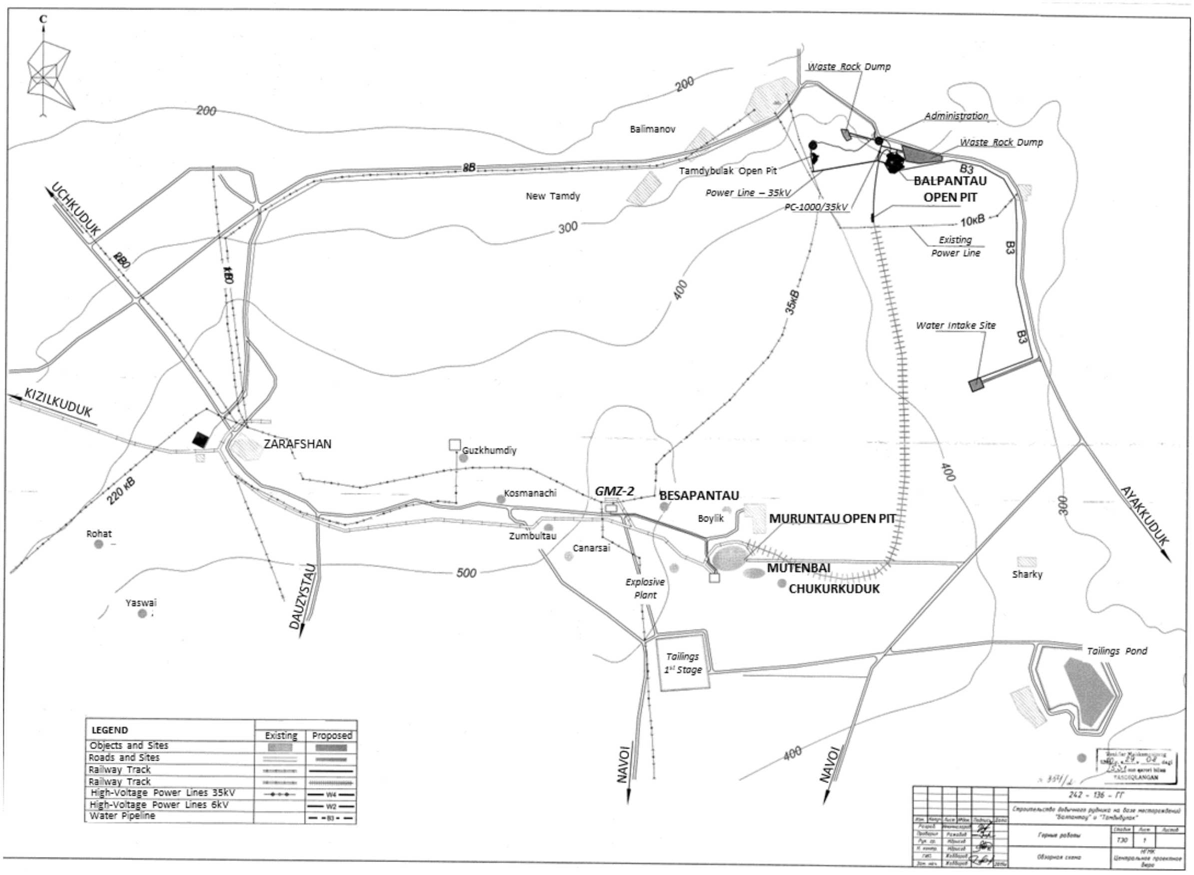


Figure 2.4: Location and Infrastructure Map of the Muruntau Cluster

2.5 Mining Licenses

2.5.1 Summary of Assets

An overview of the NMMC key mining assets (relevant to this study) is given in Table 2.1.

Table 2.1: Overview of NMMC's Muruntau Mining Assets

Project	Location	License	Status
Muruntau	Navoi	(License NY 0260)	Production
Mutenbai	Navoi	(License NY 0260)	Production
Besapantau	Navoi	(License NY 0259)	Planned Production
Balpantau	Navoi	(License NV 0247)	Production
Chukurkuduk	Navoi	(License NV 0268)	Planned Production

2.5.2 Muruntau and Mutenbai

NMMC are the holders of license NY 0260 dated 09/24/2021, valid until 01/22/2074, granting the right to use the subsoil for the purpose of extracting minerals at the Muruntau gold deposit in the Tamdinsky district of the Navoi region.

The main conditions of the license agreement are:

- During the exploitation of the deposit, compliance with the requirements established by the articles of the law “On Subsoil”;
- Development and approval of mining development plans for the next year;
- Provide mining and surveying services to the open pit;
- Annual reporting to the State Geological Fund on the mineral resources and reserves of the Muruntau deposit;
- Adjust the balance of extracted and lost mineral resources only after agreement with the Sanoatgeokontekhnazorat State Institution;
- Organise suitable locations for refuelling equipment;
- Complete reclamation work;
- Complete dust monitoring and suppression procedures in the dry season;
- Ensure the annual productivity of mineral resources according to the detailed design; and
- Make an annual payment of tax for the use of subsoil.

The license includes two areas allocated to the subsoil user by the administration of the Tamdinsky district. For Muruntau, the area is 26.5km^2, for Mutenbai 2.6km^2. The subsoil plot provided for use has the status of a mining allotment. Subsoil areas are limited by a contour, the geographical coordinates of the corner points are shown in Table 2.2 and Table 2.3.

Table 2.2: Muruntau (License NY 0260 F0) Corner Point Geographic Coordinates

Point	Northing			Easting		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	41	30	17	64	32	51
2	41	30	58	64	34	53
3	41	30	38	64	36	11
4	41	30	6	64	36	5
5	41	30	2	64	36	24
6	41	29	58	64	36	18
7	41	29	53	64	36	21
8	41	29	50	64	36	21
9	41	29	40	64	35	53
10	41	29	32	64	35	41
11	41	29	8	64	35	25
12	41	29	8	64	35	29
13	41	29	1	64	35	54
14	41	28	56	64	36	14
15	41	28	33	64	37	6
16	41	27	47	64	36	55
17	41	27	9	64	35	11
18	41	27	55	64	33	23
19	41	28	43	64	33	19

Table 2.3: Mutenbai (License NY 0260 F0) Corner Point Geographic Coordinates

Point	Northing			Easting		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	41	30	0	64	36	46
2	41	29	46	64	36	46
3	41	29	37	64	36	55
4	41	29	23	64	37	5
5	41	28	56	64	36	14
6	41	29	1	64	35	54
7	41	29	8	64	35	29
8	41	29	8	64	35	25
9	41	29	32	64	35	41
10	41	29	40	64	35	53
11	41	29	50	64	36	12
12	41	29	53	64	36	21
13	41	29	58	64	36	18
14	41	30	2	64	36	24

2.5.3 Besapantau

NMMC are the holders of license NV 0259 dated 09/24/2021, valid until 01/09/2025, granting the right to use the subsoil for the purpose of extracting minerals at the Besapantau gold deposit in the Tamdinsky district of the Navoi region.

The main conditions of the license agreement are:

- During the exploitation of the deposit, compliance with the requirements established by the articles of the law "On Subsoil";
- Development and approval of mining development plans for the next year;
- Provide mining and surveying services to the open pit;
- Annual reporting to the State Geological Fund on the mineral resources and reserves of the Besapantau deposit;
- Adjust the balance of extracted and lost mineral resources only after agreement with the Sanoatgeokontekhnazorat State Institution;
- Organise suitable locations for refuelling equipment;
- Complete reclamation work;
- Complete dust monitoring and suppression procedures in the dry season;
- Ensure the annual productivity of mineral resources according to the detailed design; and
- Make an annual payment of tax for the use of subsoil.

The boundaries of the future license are shown in Table 2.4

Table 2.4: Besapantau (License NV 0259 F0) Corner Point Geographic Coordinates

Point	Northing			Easting		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	41	31	30	64	31	9
2	41	32	9	64	31	9
3	41	32	10	64	32	22
4	41	31	31	64	32	23

2.5.4 Balpantau

NMMC are the holders of license NV 0247 dated 09/24/2021, valid until 12/31/2033, granting the right to use the subsoil for the purpose of extracting minerals at the Balpantau gold deposit in the Tamdinsky district of the Navoi region.

The main conditions of the license agreement are:

- During the exploitation of the deposit, compliance with the requirements established by the articles of the law "On Subsoil";
- Development and approval of mining development plans for the next year;

- Provide mining and surveying services to the open pit;
- Annual reporting to the State Geological Fund on the mineral resources and reserves of the Balpantau deposit;
- Adjust the balance of extracted and lost mineral resources only after agreement with the Sanoatgeokontekhnazorat State Institution;
- Organise suitable locations for refuelling equipment;
- Complete reclamation work;
- Complete dust monitoring and suppression procedures in the dry season;
- Ensure the annual productivity of mineral resources according to the detailed design; and
- Make an annual payment of tax for the use of subsoil.

The administration of the Tamdyn district of the Navoi region allocated an area of 2.3km^2 for Balpantau as part of the license. The subsoil plot provided for use has the status of a mining allotment. The subsoil area is limited by a contour; the geographic coordinates of the corner points are given in Table 2.5.

Table 2.5: Balpantau (License NV 0247) Corner Point Geographic Coordinates

Point	Northing			Easting		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
1	41	42	59.28	64	41	40.77
2	41	43	29.12	64	41	38.64
3	41	43	29.02	64	41	45.88
4	41	43	44.60	64	41	46.29
5	41	43	43.54	64	42	55.49
6	41	42	58.19	64	42	54.28

3 GEOLOGY AND MINERAL RESOURCES

3.1 Introduction

This section outlines the results of the WAI audit of geology and Mineral Resources for the Muruntau Cluster gold deposits. The objective of the audit was to independently assess whether the data and procedures used to the prepare the Mineral Resource estimates ("MRE") were fit for purpose, and that Mineral Resources have been classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC, 2012).

3.1.1 Competent Persons

Mineral Resource estimates for all deposits were completed by Lyubov Egorova, Director of Mineral Resources at NMMC, who is a Member of the Australasian Institute of Mining and Metallurgy and has sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken, to qualify as a Competent Person as defined by the JORC Code.

The Mineral Resource estimates for Muruntau and Mutenbai have been audited by Frank Browning, Principal Resource Geologist at WAI. Mineral Resource estimates for Besapantau and Balpantau have been audited by Alan Clarke, Technical Director and Resource Geologist at WAI. Both are Chartered geologists, Fellows of the Geological Society and have sufficient experience which is relevant to the style of mineralisation and type of deposits under consideration and to the activity being undertaken, to qualify as Competent Persons as defined by the JORC Code.

3.1.2 Input Data

The WAI audit of Mineral Resources was underpinned by independent checks on the raw data provided by NMMC for each deposit including:

- Key geological maps and sections;
- Mineral Resource and grade control drillhole databases;
- Available QAQC data;
- Resource domain, resource classification, depletion and topography wireframes; and
- Mineral Resource and grade control block models.

Two key supporting documents that WAI has relied upon for contextual information around project history, geological setting, data collection, modelling and estimation procedures are:

- December 2019 SRK report entitled "Re-Estimation of Ore Reserves for Muruntau, Mutenbai and Besapantau Deposits in Accordance with the JORC Code"; and
- December 2023 NMMC report entitled "Re-Estimation of Mineral Resources and Ore Reserves of Muruntau Cluster in accordance with the JORC Code".

3.2 Regional Geology

3.2.1 Central Asian Orogenic Belt

The geology of Uzbekistan is dominated by the Central Asian Orogenic Belt ("CAOB"), a vast tectonic collage that encompasses a significant portion of Central Asia (Figure 3.1). The CAOB is one of the world's largest Phanerozoic accretionary orogens, formed by ocean closures during the Neoproterozoic to the late Phanerozoic, from around 750 to 150Ma. As the ocean closed, volcanic island arcs formed along the subduction zone, which subsequently collided and then accreted onto the continental margin. Accretion and mountain building continued through the Mesozoic and Cenozoic eras; formed the Altaids and Tian Shan Mountains. The final stages of the CAOB formation were associated with the India-Eurasia Collision, 50Ma.

Similar to the majority of accretionary orogenic belts, the CAOB consists of abundant magmatic arcs, arc-related basins, accretionary complexes, seamounts, continental fragments and ophiolites. However, the lack of numerous collision-related foreland basins makes it distinctive.

The origins of the CAOB are intricate and a subject of intense debate within the academic scientific community. At present, two primary theories exist that could potentially explain the geological development of the CAOB:

- The CAOB's genesis is attributed to the amalgamation of numerous oceanic arcs and continental landmasses; or
- The CAOB took shape through the accumulation of subduction-accretion complexes along a magmatic arc.

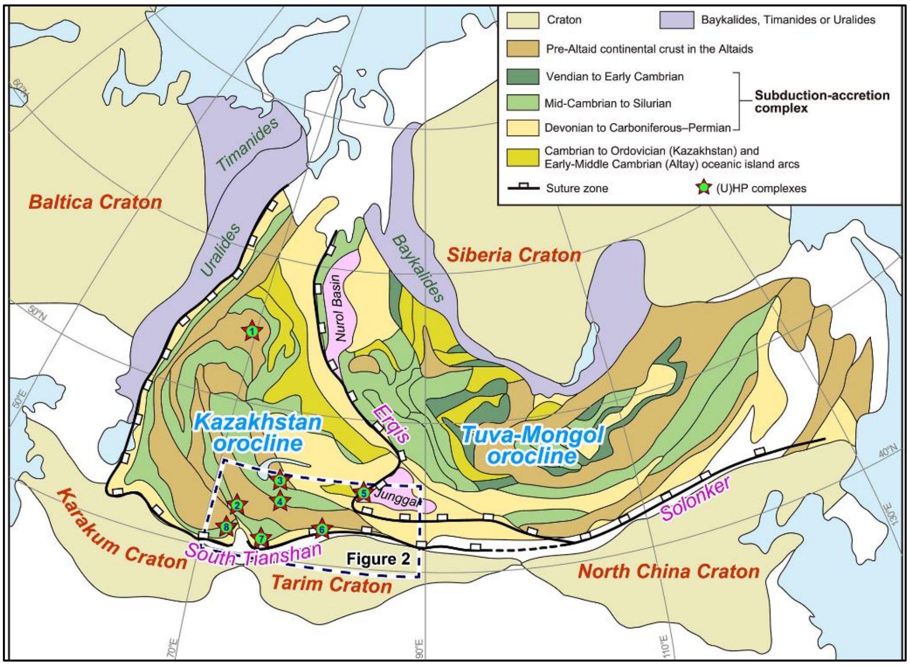


Figure 3.1: Central Asian Orogenic Belt Regional Geology, after Wang et al., 2018

3.2.2 Tian Shan Belt

Uzbekistan can be subdivided into two large tectonic regions; the orogenic region of the Tian Shan and the Turanian Plate (or Turan Platform), both of which extend beyond the borders of the country. The Muruntau Cluster is located in the southern Tian Shan belt, which represents the West of the CAOB (Figure 3.2). The Tian Shan extends for over 2500km, from western Uzbekistan, through Tajikistan, Kyrgyzstan and southern Kazakhstan to western China. Three tectonic zones are distinguished within the Tian Shan, with the latter two zones having favourable conditions for the formation of gold deposits:

- The northern zone, which consists of an Early Paleozoic arc and its Precambrian basement;
- The middle zone, consisting of a Late Paleozoic arc; and
- The southern zone, a complex fold-and-thrust belt with Late Paleozoic accretionary wedge and fore–arc complexes thrust southwards onto Paleozoic passive margin successions and Precambrian basement.

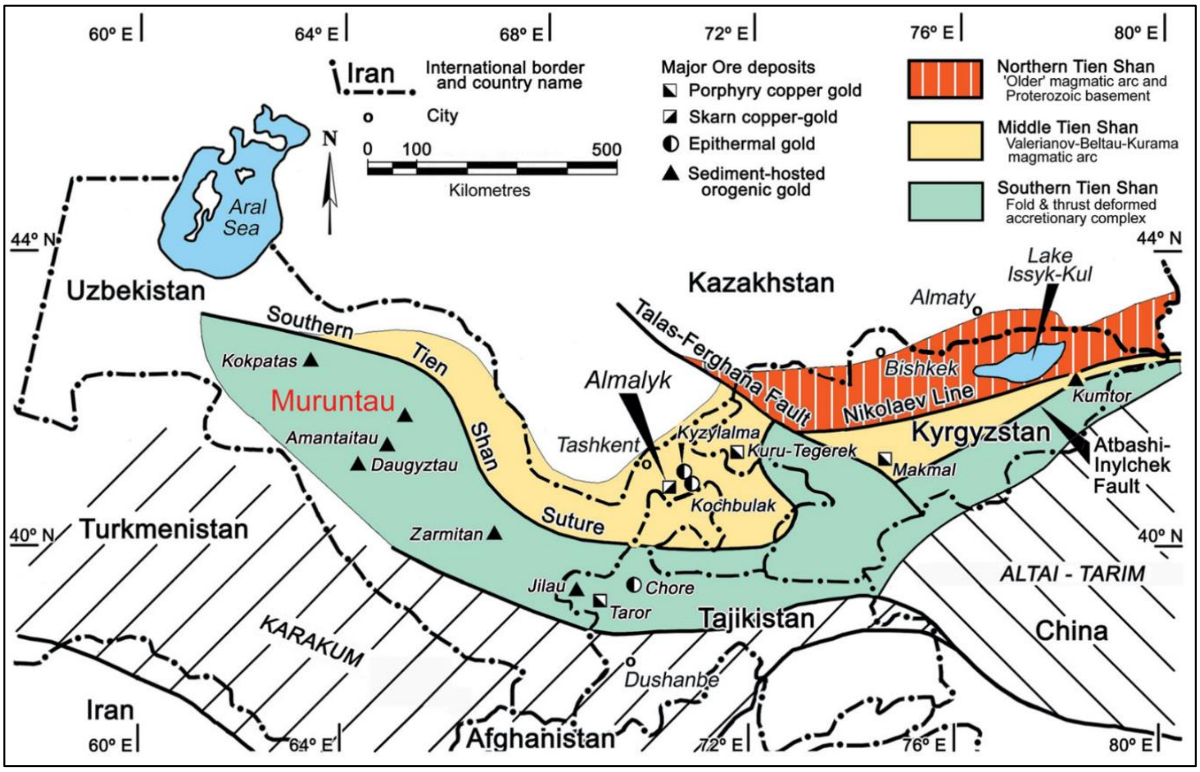


Figure 3.2: The Tian Shan Belt in Uzbekistan and the Distribution of Gold Ore Deposits After Seltman & Porter, 2005

Most of the gold deposits from Uzbekistan to southern Mongolia formed during a brief 10 – 20Ma period from the Middle to Late Carboniferous and Early Permian, when the Kazakhstan and Karakim-Tarim continental blocks converged and subsequently sutured. The closure of the Turkestan Ocean exerted a considerable influence on the spatial distribution of gold ores from the middle to late Palaeozoic era.

The southwestern part of the Tian Shan belt, in the Southern and Middle Tian Shan of Uzbekistan and Kyrgyzstan, exhibits the greatest concentration of substantial orogenic gold deposits. The Middle and Southern Tian Shan terranes are separated by the Southern Tian Shan Suture Zone, which controls the distribution of the gold deposits. The suture zone features ophiolites and deformed fold-and-thrust structures intruded by Permo-Carboniferous granitoids.

Gold mineralisation is known to occur in two main settings within the Tian Shan belt:

- Porphyry and epithermal systems established within magmatic arcs; and
- Orogenic-type gold deposits, which are structurally controlled, and spatially associated with Permian magmatic activity that took place during the final stages of orogenesis, extending into the early post-collisional phases. These intrusives are I-type granodioritic to monzonitic bodies found in fore- and back-arc terranes (Cole and Seltmann, 2000; Yakubchuk et al., 2002).

The genetic model for the orogenic deposits is still under investigation, with several key theories as to the origin of the mineralising fluids:

- Permian intrusives have been proposed as a source (e.g., Kotov and Poritskaya 1992);
- Synorogenic metamorphic devolatilisation (e.g., Bortnikov et al. 1996);
- Sedimentary origin of these fluids (e.g., Wilde et al. 2001); and
- Contribution from the mantle (e.g., Graupner et al. 2006).

The Southern Tien Shan is composed of carbonate platform sequences on the northwestern border of the Tarime-Karakum block and clastic sediments produced when the ocean basin to the south closed, along with minor felsic to intermediate volcanic rocks (Kempe et al. 2015).

The orogenic-type gold deposits in the Southern Tian Shan are hosted almost entirely by metamorphosed black shales, predominantly of Lower Paleozoic age (as in Muruntau, Amantaytau, Daugystau, and Vysokovoltnoe) and also of Carboniferous age (e.g., Kokpatas). This suggests that gold may have been enriched in these sedimentary units prior to deposit genesis. Due to the size and significance of the Muruntau deposit, this has been the greatest source of information for the region. A deep exploration drillhole has proven the existence of a large granite body beneath Muruntau, and results have suggested that at least a portion of the mineralisation and proximal magmatism were contemporaneous at ca. 285 to 280 Ma, which would imply a link (Graupner et al. 2006).

3.2.3 Kyzyl Kum Gold District

Muruntau is located within the Kyzyl Kum Gold District (Figure 3.3), in the western portion of the Southern Tien Shan belt. The basement of Kyzyl Kum is composed of the Lower Palaeozoic Besapan Formation, which features carbon and sulphide rich metamorphosed and folded clastic rocks, which were metamorphosed and deformed during the Lower Palaeozoic Caledonian orogeny. The Besapan Formation is unconformably overlain by Devonian to Early Triassic sediments, carbonates and volcanics.

According to Kempe et al. (2015), the Kyzyl Kum gold district is characterised by two circular outlines, distinct in satellite imagery (Figure 3.3), of the ore-bearing complexes, likely related to underlying anticlines. These anticlines are known as the Tamdytau anticlinorium hosting Muruntau and the Bukantau anticlinorium hosting Kokpatas (Kempe et al., 2015), within which granites aged 280-295Ma have been intruded. These relatively small oroclines are located at the conjunction of three significant orogenic complexes - the northerly striking Urals, the easterly striking Variscides and the Tian Shan (Kempe et al., 2015).

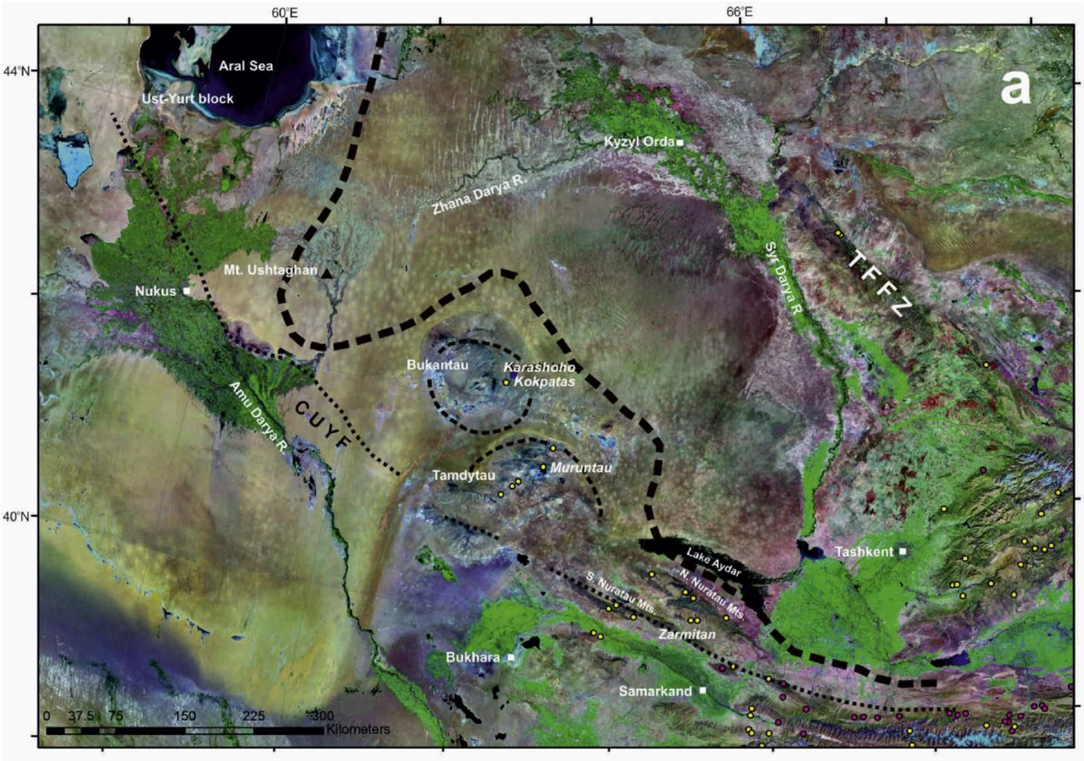


Figure 3.3: Overview of the Kyzyl Kum Region, after Kempe et al, 2015

Thick Dashed Line separates the high-frequency eastern part of the main Kyzyl Kum anomaly from the lower-frequency western part of the anomaly

Medium Dashed Line represents the annular outlines of the Muruntau and Kokpatas anomalies.

Thin Dashed Line represents the Central Ust Yurt Fault ("CUYF") whose trace is probably located along the southern margin of the South Nuratau range

Yellow dots represent gold deposits and purple dots represent mercury and mercury-antimony deposits. TFFZ is the Talas-Fergana Fault Zone.

3.2.3.1 Basement Besapan Formation

The basement of the Kyzyl Kum and Muruntau Cluster is the Lower Palaeozoic age Besapan Formation, with outcropping inliers making up ≈15% of Kyzyl Kum (Figure 3.4). Metamorphosed clastics dominate the Besapan Formation, which has been subdivided into four units, termed Besapan 1, 2, 3 and 4 (Wilde & Gilbert, 2000). Divisions have been made based on colour variation and the particle size of the clastics, with Besapan 1 being the oldest, and Besapan 4 the youngest.

Deformation due to isoclinal folding and major thrust faults (Drew et al., 1996) complicate the definition of the successions. The primary host of gold at Muruntau is Besapan 3, characterised by green to red, hematite-altered phyllites at surface which grade to strongly carbonaceous at depth.

Besapan 2 contains comparable lithologies to Besapan 3, specifically phyllite and meta-sandstone, the principal differences being the quantity of carbon and the sulphide minerals. Besapan 3 has a characteristic black siliceous layer a few metres thick, traceable as a discontinuous surface outcrop over at least 15km west from Muruntau (Wilde & Gilbert, 2000).

3.2.3.2 Cover Sequence 1

Cover Sequence 1 is described as Devonian to Carboniferous carbonates which unconformably overlie the Besapan Formation (Figure 3.4). This group is comparable to the Karatau Range of southern Kazakhstan, located 200km north of Muruntau (Figure 3.4). Cover Sequence 1 is believed to have been formed during fluctuating sea levels on a migrating shelf to platform transition.

To the north and east of the Muruntau deposit, this lower group is unconformably overlain by dolomite and limestone with an overall thickness of about 3000m (Marakushev and Khokhlov, 1992). Because the latter rocks show no strong tectonic deformation and are apparently not cut by intrusions, dikes or mineralised veins (although some quartz veins were reported by Kotov and Poritskaya, 1992), some workers assumed that this sequence may have acted as a low permeability “cap” sealing the underlying metamorphic rocks during Hercynian magmatism and extensive hydrothermal activity (Ezhkov and Rakhimov, 2012).

3.2.3.3 Cover Sequence 2

The Jurassic sediments of Cover Sequence 2 are composed of undeformed folded siliciclastics (hematitic siltstone, mudstone and conglomerate) along with minor coal, deposited in fluvial, alluvial and lacustrine environments (Burshtein, 1998).

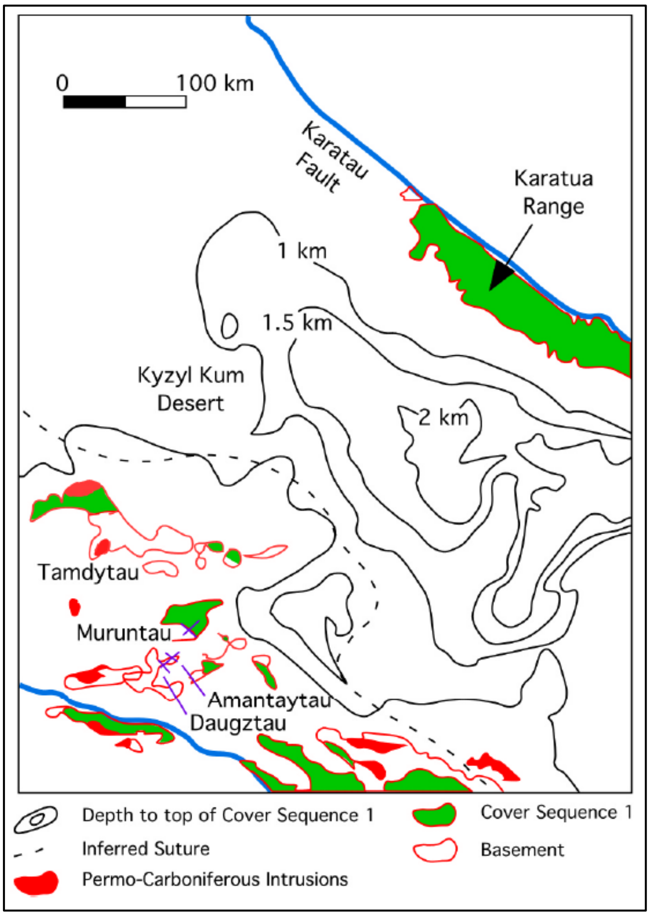


Figure 3.4: Regional Geological Setting of the Muruntau Deposit, based on Soviet Regional Metallogenic Mapping, after Wilde & Gilbert, 2000

3.2.3.4 Granites

Granites of the Kyzyl Kum region have been classified into two separate suites, the older Bokalinsk Suite and younger Nuratinsk suite (Savchuk et al., 1991). The Bokalinsk Suite has very few outcrops, whereas the Nuratinsk Suite, which is largely composed of granite and granodiorite, comprises 95% of exposed intrusions in the Kyzyl Kum region (Wilde & Gilbert, 2000). The Nuratinsk Suite has a spatial and likely temporal relationship with tin mineralisation, and commonly intrudes the Basement and Cover Sequence 1 deformed sedimentary units (Figure 3.4).

In the Muruntau area, varying composition dykes and two intrusive bodies of several compositions have been recorded. The two intrusions are known as the Sardarin and Murunski Plutons, with the buried Sardarin Pluton located 12km south of Muruntau having been revealed during drilling and regional aeromagnetic geophysics.

The Murunski Pluton (or “Murun Granite”) is a medium-grained leucogranite discovered under the Muruntau deposit during a deep exploration drillhole at a depth of 4km. Contact metamorphism around the pluton is prevalent and characterised by porphyroblasts of biotite and lesser andalusite and cordierite.

3.3 Deposit Geology

The Muruntau, Mutenbai, Chukurkuduk (previously known as Triada), Besapantau and Balpantau deposits are located within the Kyzyl Kum Gold District (Figure 3.3 & Figure 3.5), in the western portion of the Southern Tien Shan belt. The Lower Palaeozoic Besapan Formation forms the basement of the Kyzyl Kum, which is unconformably overlain by Devonian to Early Triassic sediments, carbonates and volcanics.

Formation of the gold deposits occurred through a multi-staged process involving sedimentation, regional metamorphism (thrusting and magmatism) and multiple phases of hydrothermal activity including phases associated with gold mineralisation (Kempe et al., 2015). Granite magmatism and gold mineralisation are broadly contemporaneous, but their link remains unproven.

All basement rocks are metamorphosed to greenschist facies and underwent hydrothermal quartz-feldspar metasomatism, which is especially evident in lithologically and structurally favourable blocks of lower and middle units of the Besapan suite. This formation hosts the main gold mineralisation in the region.

The Muruntau-Mutenbai-Chukurkuduk deposit is located on the eastern pericline of the large Tazgazgan anticline, complicated by smaller-scale folding. The Besapantau deposit is located on the northwestern flank of the Muruntau ore deposit. Balpantau is situated further north, within a volcano-tectonic graben.

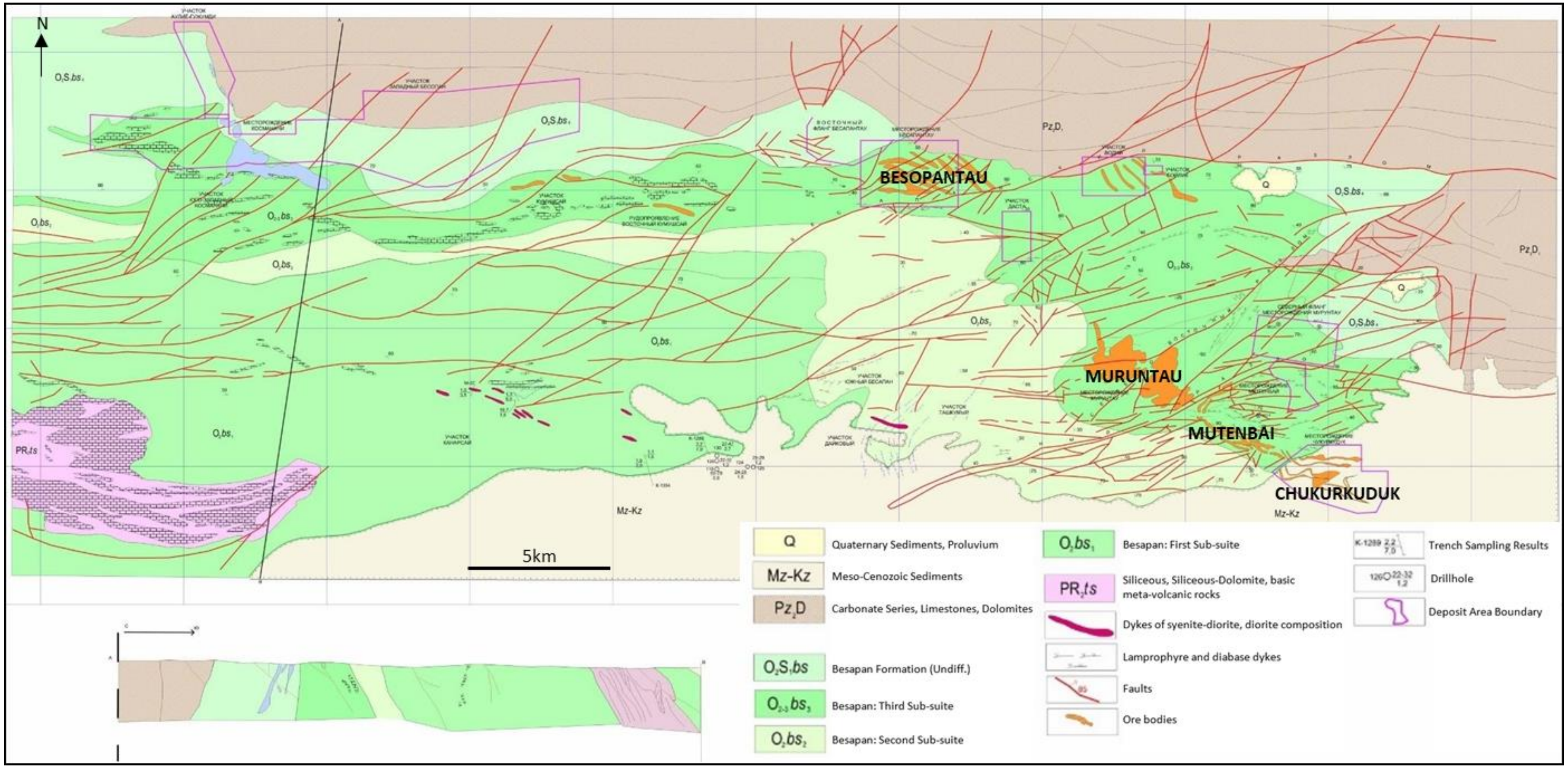


Figure 3.5: Geological Map of the Muruntau, Mutenbai, Chukurkuduk and Besapantau Gold Deposits (NMMC)

3.3.1 Muruntau, Mutenbai and Chukurkuduk

Table 3.1 gives a summary of Muruntau, Mutenbai and Chukurkuduk deposit geology. In Figure 3.6, open pit grade control sample data is presented to illustrate the broad-scale orientation, geometry and spatial distribution of mineralisation.

Table 3.1: Muruntau-Mutenbai-Chukurkuduk Deposit Summary	
Lithology	At a large scale, the Muruntau, Mutenbai and Chukurkuduk deposits form a continuous mineralised body. The geology of the deposits is dominated by the 2,500m thick, Ordovician-Silurian age Taskazgan and Besapan Formations. The Taskazgan Formation is composed of carbonaceous-mica-quartz shales and carbonaceous siltstones, whereas the Besapan Formation consists of sandstones and siltstones interbedded with quartz-chlorite, quartz-sericite and carbonaceous-mica shales. Carbon content reduces upwards, and feldspar-quartz sandstones and siltstones, quartz-mica and quartz-chlorite shales dominate the upper regions. Ordovician-Silurian units unconformably overlay Lower Devonian carbonate deposits in the northeastern part of the Muruntau area. Unconsolidated Mesozoic-Cenozoic rocks cover the southern portion. The ore grade mineralisation at Muruntau is developed within a distinctive massive, light pink to yellow, biotite-plagioclase-quartz-orthoclase rock. The compositional range of these rocks is generally: 25 to 50% orthoclase, 25 to 40% quartz, 15 to 25% plagioclase (albite and albite-oligoclase), and 20 to 40% biotite, representing an enrichment in alkali metals.
Alteration	The deposit host rocks have been intensely biotitised, amphibolitised, silicified, carbonated, and sulphidised, and metamorphosed to greenschist facies. Metasomatism is particularly strong in the favorable blocks of the lower-middle Besapan subformations and is strongly linked to gold mineralisation. Research indicates that the intensity of metasomatic processes and gold mineralisation is inversely proportional to the distribution of carbon-bearing rocks in the section, which is associated with their increased plasticity and reduced ability to fracture during deformation. Tourmaline and scheelite mineralisation is present; tourmaline often sits at the selvages of ore-bearing zones, whereas scheelite occurs in quartz veins.
Structure	Significant folding dominates the structure at Muruntau. The ore deposit is situated on the eastern pericline of the large Tazgazgan anticline, further complicated by smaller folded dislocations, one of which is associated with the Muruntau, Mutenbai and Chukurkuduk deposits. Faults crosscut the folds throughout the region, the most significant being the “Southern Fault”, which strikes NE-SW with a subvertical dip and forms a boundary between Muruntau and Mutenbai. The Southern Fault is a reverse fault, with a vertical displacement amplitude of about 400m and has extensive shearing and boudinage, 50-120m thick.

Table 3.1: Muruntau-Mutenbai-Chukurkuduk Deposit Summary	
	The second most significant structure is the "Structural Fault", which is parallel to the Southern Fault, also subvertical and located 2km north. The fault is characterised by a system of conjugate intermittent tectonic sutures, the amplitude of displacement along which does not exceed 50-100m. Between the Southern and Structural faults, several lower order, NE striking faults exist, the largest being the reverse-slip Northern fault. This fault has a displacement in the order of hundreds of meters and has a significant effect on the morphology of the lodes of the Muruntau deposit. The Murunatau deposit can be described as an asymmetrical, upturned saddle which occupies the axial part of the syncline formed by the top of the Taskazgan and the base of the upper subformation of the Besapan formation. The Muruntau block is bounded by the Structural (from the north) and Southern (from the south) Faults, with multiple lower order structures cross-cutting the area. The Muruntau and Mutenbai form two massive lodes (Figure 3.6), separated from each other by the Southern Fault zone, with Mutenbai located in the southern limb of the syncline. Gold mineralisation at the Muruntau-Mutenbai-Chukurkuduk deposit is hosted within subconformable shear zones. These shear zones have developed along carbonaceous horizons proximal to the boundary of the Taskazgan and variegated Besapan formations, along with the Lower-Middle subformations of the Besapan. Much of the gold is located within the axial zone of the syncline.
Mineralisation	The Muruntau deposit is a giant stockwork style deposit, hosted by the Besapan Formation, consisting of quartz-dominant veins plus associated quartz-albite-phlogopite and two generations of quartz sericite-chlorite-(K-feldspar)-carbonate alteration. The gold content of this alteration type is typically 1-3g/t, locally increasing to 20-30g/t Au. Mineralisation is strongest in psammopelite- and psammite-dominated, thin-to-medium bedded lithological packages. These zones have intense biotite-feldspar-quartz alteration. A larger envelope of carbon and biotite rich black banded rocks rich in carbon and biotite, surrounds the higher-grade zones, with low grade disseminated gold, typically at 1g/t. The mineral composition of the ores from the Muruntau, Mutenbai and Chukurkuduk deposits is both identical and relatively simple. The main ore mineral is native gold and is also found in pyrite and arsenopyrite. Gold mineralisation is irregularly dispersed in quartz and sulphides in the form of grains, clusters or thin veinlets, >1mm thick. Gold is typically very fine, with 96% classed as free gold.

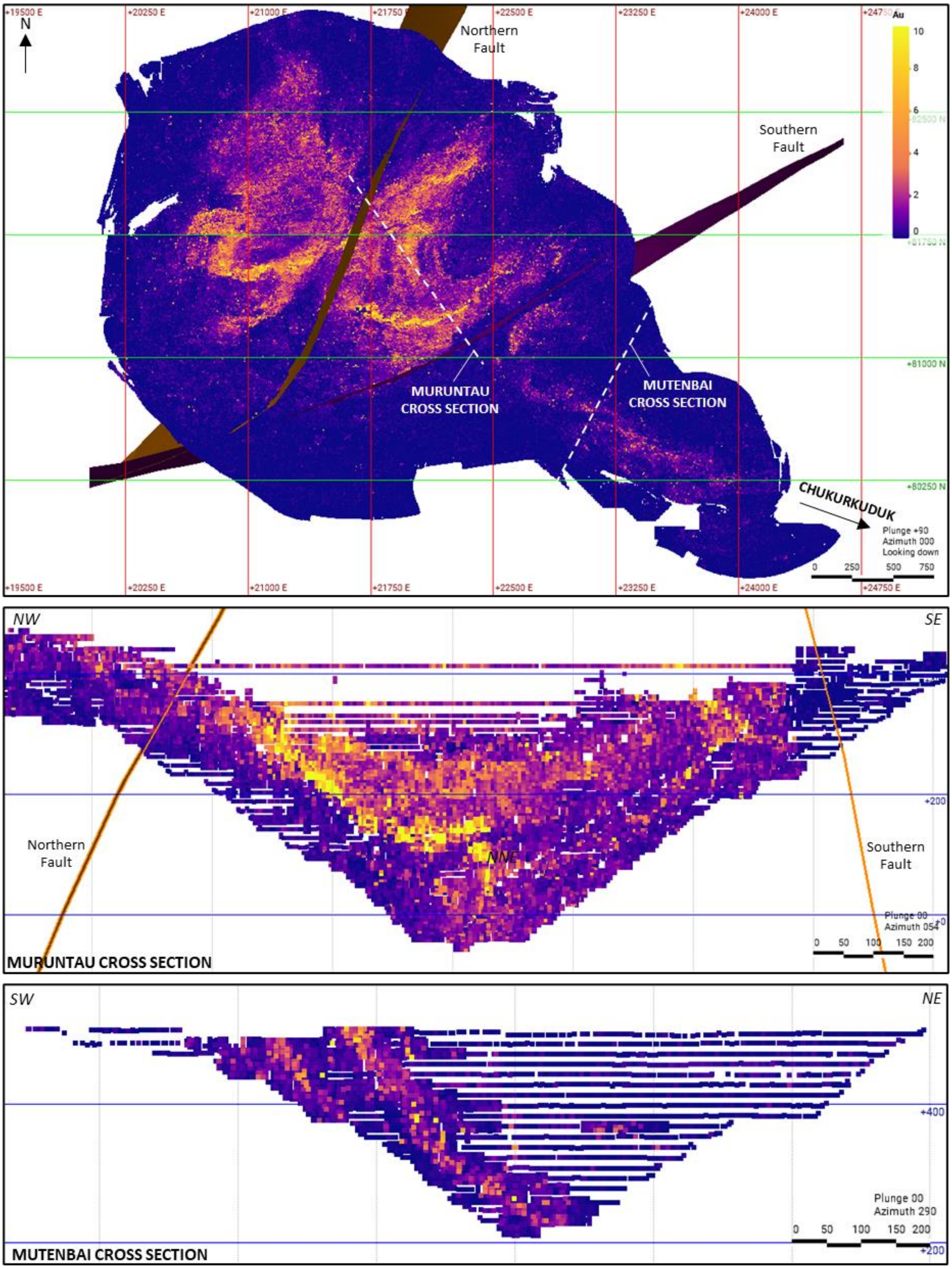


Figure 3.6: Muruntau-Mutenbai Open Pit Grade Control Sampling. Colour Ramps Adopted to Visualise High-Grade Mineralised Trends

3.3.2 Besapantau

Table 3.2 gives a summary of Besapantau deposit geology. A cross-section is provided in Figure 3.7.

Table 3.2: Besapantau Deposit Summary

Lithology	The Besapantau deposit is located on the western flank of the Muruntau ore deposit, and thus has a similar host lithology.
Alteration	The ore-hosting rocks at Besapantau are intensively biotitised, amphibolitised, silicified, carbonated, and sulphidised. The ore zones consist of quartz-feldspathic metasomatites, veining, silicification and pyrite-arsenopyrite mineralisation. Tourmaline and scheelite mineralisation is also present. Tourmaline mineralisation often gravitates toward the selvages of ore-bearing zones; scheelite occurs in quartz veins.
Structure	Structurally, the deposit is situated within the southern section of the Hercynian syncline, and has a complex structure due to prevalent fault structures running in sublatitudinal and northeastern directions. These faults collectively form extensive zones of considerable thickness characterised by shearing, and brecciation. The deposit's boundaries to the west and east are defined by steeply dipping (70-90°) faults. The ore-bearing zones, stretching from west to east, are cross-cut by multiple reverse-slip sublatitudinal faults, resulting in uplift of the eastern ore zone blocks from 10-20m to 200-250m. The northwestern section of Besapantau forms part of the intricate system of the Taskazgan anticline's pericline, which serves as the primary fold structure in the region.
Mineralisation	The distribution of gold at Besapantau is uneven and hosted by quartz and sulphide veinlets, along with the metasomatites. The gold is free and submicroscopic with a fineness from 315-920µ. Mineralogical and petrographic studies have classified the deposit as Low Sulphide Quartz-Gold type. The ore is similar to the Muruntau deposit and can be processed according to the GMZ-2 scheme (gravity, sorption leaching of gravity tailings). The predominant ore minerals are quartz, feldspar, scheelite, apatite, chlorite, molybdenite, biotite, pyrite, arsenopyrite, pyrrhotite and gold. Gold is found both native and present in disseminated pyrite and arsenopyrite. Silver, tungsten, zinc, lead, and copper are also present, as are the impurities of arsenic and antimony.

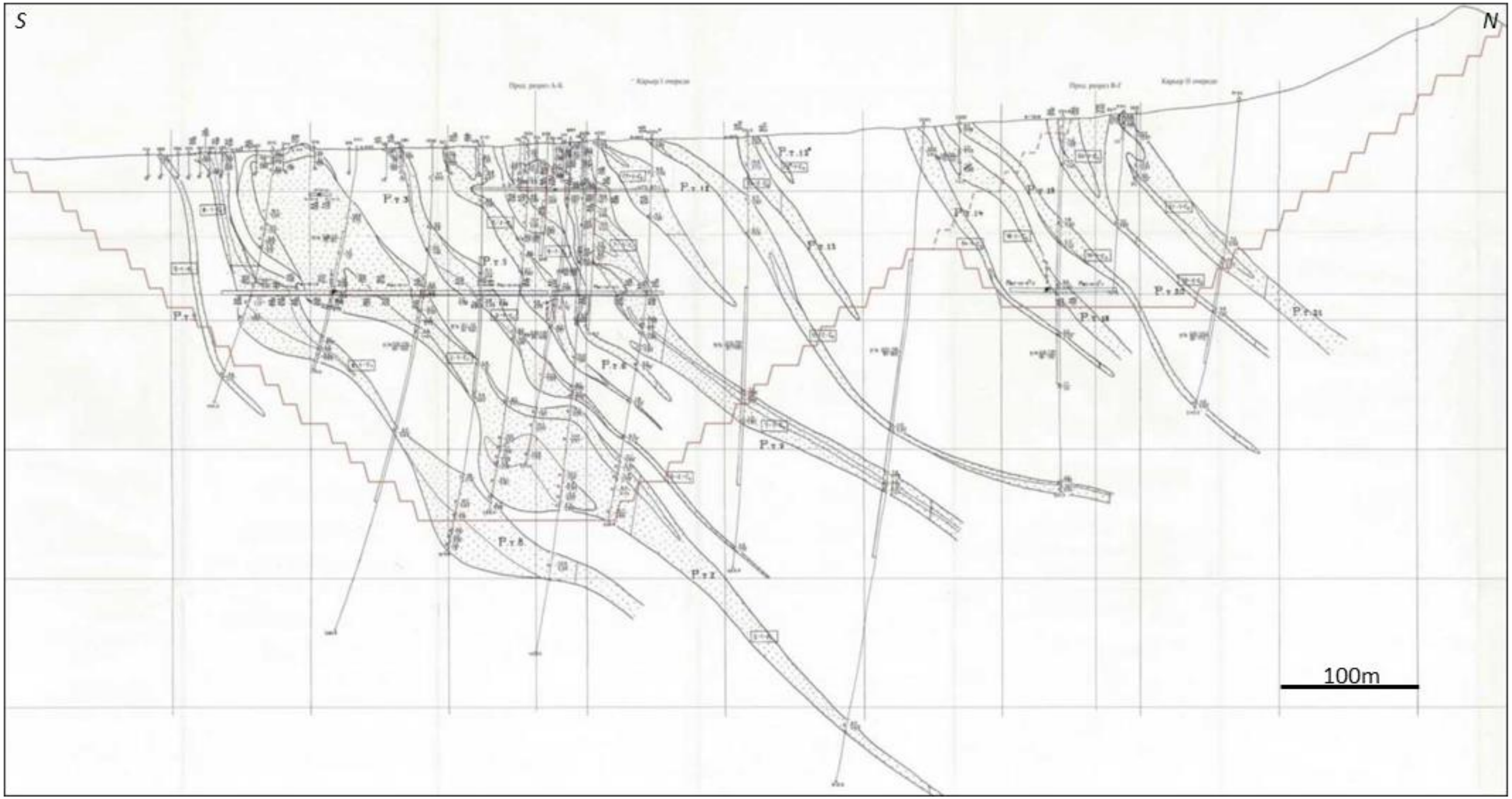


Figure 3.7: Besapantau Gold Deposit Type Cross Section (NMMC)

3.3.3 Balpantau

Table 3.3 gives a summary of Balpantau deposit geology. Type maps and sections are provided in Figure 3.8.

Table 3.3: Balpantau Deposit Summary	
Lithology	The Balpantau ore deposit is located in the Northern Tamdytau. The geology consists of: • Pre-carbonate deposits, represented by deposits of the Besapan suite; • Undivided carbonate deposits; and • Postcarbonate deposits. The sandstones and shales of the Besapan Formation are very limited. The carbonates are also limited in extent and their structural position is unclear. On the northern flank of the Balpantau deposit, limestones, limestone breccia, and carbonate-rich sandstones dominate the geology. The majority of the gold mineralisation at Balpantau is hosted within the volcanogenic-sedimentary, Middle Carboniferous andesite-basalts, which make up the majority of the Balpantau ore deposit, particularly at the contacts. Unaltered andesites and andesite-basalts, in various forms, contain only trace amounts of native gold. Overlying the platform are Paleogene and Neogene sediments (200-300m thick) and Quaternary unconsolidated material, which cover up to 95% of the area (0.5-20m thick).
Alteration	Hydrothermal-metasomatic alteration is prevalent across the deposit, characterised by quartz-sericite and quartz-carbonate-sericite with pyrite. Metasomatic alteration is typically limited to the fault zones, plus contacts between the subvolcanic and sill-like bodies with the host rocks. Propylitisation and beresitisation-listvenitisation alteration dominate, followed by silicification, sericitisation and carbonatisation with sulphide mineralisation. Oxidation is variable based on location, with the oxidation boundary on the northern flank averaging ≈60-66m, and ≈40m on the southern flank.
Structure	Balpantau is located within a 120-130 to 200-220km long volcano-tectonic graben, 25-30km wide. The graben is founded in a carbonate massif of Devonian-Middle Carboniferous age, predominantly covered by Meso-Cenozoic rocks. The upper part of the graben is characterised by highly mafic rocks (subalkaline picrites, picrobasalts, and buried mid-Carboniferous basalts of various facies). The margins of the graben contain a series of subparallel faults of varying scale, filled by small dyke-stock-shaped ultramafic bodies, completely altered to listvenites.
Mineralisation	The ores of the deposit belong to the gold-quartz low-sulphide type. The main gold-containing minerals are native gold, pyrite, and arsenopyrite. Genesis of the gold mineralisation is believed to hydrothermal and contemporaneous with Muruntau (Sayitov & Ruslan Pecherskiy, 2022).

Table 3.3: Balpantau Deposit Summary	
	The cut-off grade applied has a great effect on the morphology of the mineralisation. At a cut-off grade of 0.2g/t, the ore zones are thick, extensive and consistent along strike and dip. However, at a high cut-off of 0.5-1.0g/t, the mineralisation begins to break-up and form distinct, discontinuous, en-echelon lodes. Veins and veinlets range from 5cm to 2.0m thick, typically hosted in latitudinal striking faults. The boundaries of the vein zones are indistinct with a gradual grade reduction as distance increase from cross-cutting or conformable ore-bearing structures. Gold values within these zones are highly irregular and the limits of mineralisation are defined on grade data only.

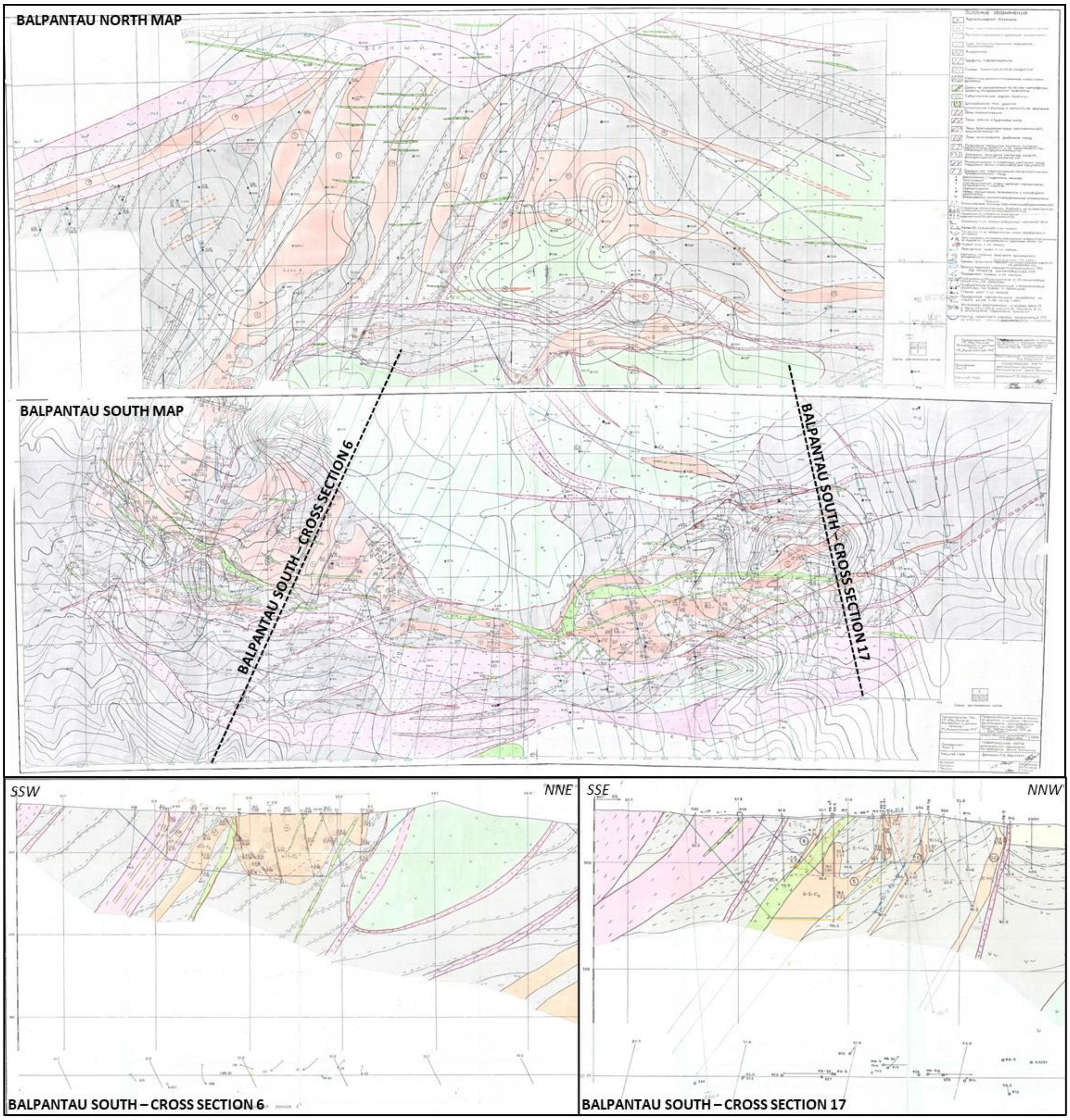


Figure 3.8: Geological Maps and Type Cross Sections for the Balpantau Gold Deposit (NMMC)

3.4 Exploration and Mine Development

For a full description of the discovery, development and production history of the Muruntau Cluster refer to the 2023 NMMC Mineral Resource report. Key milestones for each deposit are listed below.

Muruntau-Mutenbai:

- The Muruntau deposit was discovered in 1958 and has been in operation since 1967;
- The Mutenbai deposit has been explored since 1973;
- Exploration work is carried out by Muruntau Mine Exploration Team 1 and Kyzylkum Exploration Expedition of NMMC R&D Centre “Geology of Precious Metals and Uranium”;
- Production to date is estimated to be in the region of 700Mt @ 2.32g/t for 52.3Moz; and
- Current mining operations are within a joint Muruntau-Mutenbai pit developed according to limits defined by the Phase 4 mine design (base of pit at -75mRL / 670m from surface).

Chukurkuduk:

- The Chukurkuduk deposit was discovered by the Kyzylkum Exploration Expedition during the process of prospecting and assessment work carried out in 1988-1995;
- The deposit sits on the eastern flank of the Mutenbai deposit, overlain by Meso-Cenozoic sedimentary cover;
- The deposit can potentially be exploited via a separate open pit, which would eventually merge with the Muruntau-Mutenbai pit as mining progresses; and
- Chukurkuduk has been excluded from the Muruntau Cluster Resource and Reserve estimates pending the results of ongoing verification drilling.

Besapantau:

- The Besapantau deposit was discovered in 1964 during prospecting work in the northwestern part of the Muruntau ore field;
- Most of the exploration at Besapantau was carried out in the period 1986-1998 by the Kyzylkum party of Uzbekgeology Kidiruv (“Kyzylkum PGRE”); and
- Open pit production is planned for 2024.

Balpantau:

- The Balpantau deposit was discovered in 1984 based on the results of exploration in the Kynyrskaya area;
- Most of the geological exploration work was carried out by the Kyzylkum State Geological Survey in the period 1996-2003 and 2004-2009; and
- Open pit production commenced in 2023.

Most relevant to the estimation and reporting of Mineral Resources is the resulting composition of the exploration data available for each deposit. Table 3.4 provides a breakdown of exploration activities by period and type for each Muruntau Cluster deposit. The proportion of exploration (by length) completed in a given period is also listed.

Table 3.4: Exploration Summary for Muruntau Cluster Gold Deposits

Deposit	Period	Type	Quantity	Total Length (m)	% Length by Period per Deposit
Muruntau	Pre-2021	Core drilling	3,210	818,746	96.8%
		Roller drilling	1,509	83,338	
		Underground sampling	1,394	210,752	
	Post-2021	Core drilling	27	12,301	3.2%
		Advanced RC drilling	262	24,501	
Mutenbai	All	Core drilling	1,450	361,909	N/A
		Roller drilling	119	6,364	
		Underground sampling	461	567,788	
Chukurkuduk	Pre-2020	Core drilling	335	154,154	91.3%
	Post-2020	Core drilling	35	14,617	8.7%
Besapantau	1996-2009 Kyzylkum PGRE	Core drilling	267	79,582	64.4%
		Roller drilling	693	20,017	
		Underground sampling	166	16,093	
		Trenching	22	4,668	
	2011-2013 GRP-3 Exp Division (NMMC)	Core drilling	45	13,495	7.2%
	2019-2022 Kyzylkum PGRE	Core drilling	155	45,392	28.3%
		Roller drilling	133	5,034	
		Underground sampling	36	288	
		Trenching	22	2,223	
Balpantau	1996-2009 Kyzylkum State Geological Survey	Core drilling	166	29,620	86.9%
		RC drilling	68	5,912	
		Roller drilling	439	28,951	
		Underground sampling	3 shafts	3,969	
		Trenching	109	9,740	
	2020-2023 Kyzylkum PGRE	Core drilling	60	11,520	13.1%
		Underground sampling	1 shaft	262	

WAI considers one strength of the exploration history at Muruntau cluster to be the use of exploratory underground development early in the resource development process. For example, four shafts were sunk at the Muruntau and Mutenbai deposits, with lateral drives every 40-80m over the full width of identified mineralised zones. Whilst this is a high-cost approach, the extensive underground exposures will likely have provided stronger constraints on mineralised zone location, orientation, morphology and continuity, than would have been possible from drillhole data alone.

Whilst diamond drill core sampling has been dominant, a range of sampling methods and sample types have been used through the different phases of exploration, some of which have higher risks of sampling bias. WAI has evaluated each method (Section 3.5) and completed checks to assess which sample types are appropriate for inclusion in the MRE database (Section 3.6.3.3).

The separate exploration periods outlined in Table 3.4 have been defined by NMMC. Based on existing reports and on-site discussions, WAI understands that these periods represent two distinct generations of data in terms data quality. In general, pre-2019 'historic data' was susceptible to lower drill recoveries, had limited QAQC support and some legacy issues around sample preparation and analysis. Post-2019 a range of continuous improvement initiatives have been undertaken by NMMC to address these issues. Further details around exploration methodology are provided in Section 3.5.

Historic data forms a significant proportion of the data available for each deposit (Table 3.4) and a key aspect of the MRE audit has been to assess data reliability. To do this WAI has:

- Reviewed available QAQC data (Section 3.5.7);
- Reviewed data verification undertaken by NMMC (Section 3.6.2);
- Completed independent data verification checks (Section 3.6.3);
- Reviewed the NMMC approach to excluding data from the MRE database and the resulting composition and residual risk associated with the MRE database (Section 3.7.3);
- Reviewed available reconciliation data (Section 3.7.14); and
- Completed independent MRE to grade control ("GC") model comparisons (Section 3.7.14).

WAI considers the Muruntau Cluster to have significant potential for further Mineral Resource and Ore Reserve growth. To effectively unlock this potential, exploration drill planning should be driven by and synchronised with a strategic life of mine plan that integrates all available ore sources. WAI understands that this is one of the drivers behind the current phase of study.

3.5 Exploration Methodology

3.5.1 Drilling

3.5.1.1 Drill Types and Recovery

Diamond core drilling ("DD") has been the main drilling method at Muruntau cluster. WAI considers DD to be a high-quality drilling method if core recovery is high. Hole diameter was mostly 76mm NQ, with tungsten carbide and diamond drill bits. A wide range of drill rigs have been used across the five deposits over time. The main drill rigs per deposit for the period up until 2019 include: Muruntau-Mutenbai ZIF-650; Chukurkuduk XYDX-4, ZIF-650, ZIF-1200, ZMO-1500; Besapantau SKB-5, ZIF-650, ZIF-1200, ZMO-1500; and Balpantau ZIF-650.

Average core recoveries for most of this period are available in the 2023 NMMC Mineral Resource report and are reproduced in Table 3.5. Historic average recoveries were low (around 65-75%) but did improve over time to an average of around 80% from 1999 to 2015. Low recovery increases the risk that a sample is not representative of a given drillhole interval.

Table 3.5: Average Core Recovery by Period

Drilling Location	Period				
	1985	1986	1987	1988	1999-2015
Surface Drilling	66.8	68.7	74.4	77.5	79.5
Underground Drilling	66.5	68.4	73.0	71.8	81.3

Since 2020, Hanjin D&B (Korean), DBS-S15 and 21 (Turkish) drill rigs have been used and average core recovery over ore intersections is reported to have risen to above 90%. WAI has inspected the core from recent drilling during the site visit (e.g. MUR_072, MUR_033) and observed good drill recoveries, particularly given local zones of intense fracturing were present. Core recovery logging is mainly limited to recent drilling and demonstrates the improved core recovery (e.g. Figure 3.9).

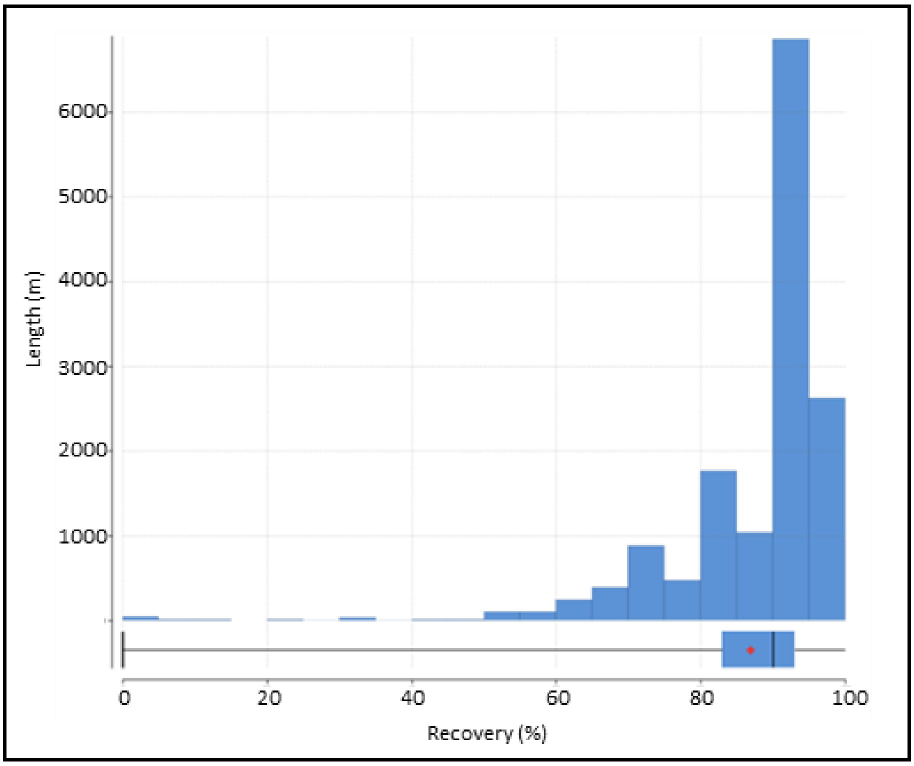


Figure 3.9: Core Recovery Histogram for Post-2019 Muruntau-Mutenbai-Chukurkuduk Drilling

Scatter plots between gold and core recovery do not show a clear grade-recovery relationship. However, given core recovery is only available for a small proportion of the drilling, this may not reflect the entire database.

Reverse Circulation ("RC") drilling was carried out at Muruntau as advance mine exploration using a KWL 1600 drill rig. RC drilling in 2002-2003 at Balpantau used a NEMEK rig with a compressor that delivered effective drilling and sample return to a depth of 120-140m. RC is an industry standard method and can deliver acceptable sample quality where sample recovery is good and sufficient steps are taken to combat contamination between sampled intervals. No recovery logging or sample weights were available to assess RC sample recovery and WAI recommends that this is incorporated into RC drilling procedures in future.

Roller-bit drilling, also referred to as full-hole non-core drilling, was carried out using spindle-type UKB-500S rigs driven by DES-60 with a PR-12 compressor (7-8 atm). Hole diameter was 76mm, with carbide roller bits. WAI considers this to be a lower quality drilling technique, given sample return is outside of the rod string and more susceptible to sample loss and contamination. WAI agrees with the NMMC decision to exclude this drill type from resource modelling and estimation.

Blast holes are sampled to inform GC modelling. This data has not been used in the MRE.

Table 3.6 is a modified version of Table 3.4, where only drilling data has been included, alongside the proportion of core drilling and post-2020 core drilling available for each deposit.

<table>
<tr><th colspan="7">Table 3.6: Drilling Statistics for Muruntau Cluster Gold Deposits</th></tr>
<tr><th>Deposit</th><th>Period</th><th>Type</th><th>Quantity</th><th>Total Length (m)</th><th>% Core Drilling per Deposit</th><th>% Core Drilling per Deposit post-2020</th></tr>
<tr><td rowspan="4">Muruntau</td><td rowspan="2">Pre-2021</td><td>Core</td><td>3,210</td><td>818,746</td><td rowspan="4">88.5%</td><td rowspan="4">1.3%</td></tr>
<tr><td>Roller</td><td>1,509</td><td>83,338</td></tr>
<tr><td rowspan="2">Post-2021</td><td>Core</td><td>27</td><td>12,301</td></tr>
<tr><td>RC</td><td>262</td><td>24,501</td></tr>
<tr><td rowspan="2">Mutenbai</td><td rowspan="2">All</td><td>Core</td><td>1,450</td><td>361,909</td><td rowspan="2">98.3%</td><td rowspan="2">N/A</td></tr>
<tr><td>Roller</td><td>119</td><td>6,364</td></tr>
<tr><td rowspan="2">Chukurkuduk</td><td>Pre-2020</td><td>Core</td><td>335</td><td>154,154</td><td rowspan="2">100%</td><td rowspan="2">8.7%</td></tr>
<tr><td>Post-2020</td><td>Core</td><td>35</td><td>14,617</td></tr>
<tr><td rowspan="5">Besapantau</td><td rowspan="2">1996-2009</td><td>Core</td><td>267</td><td>79,582</td><td rowspan="5">84.7%</td><td rowspan="5">27.8%</td></tr>
<tr><td>Roller</td><td>693</td><td>20,017</td></tr>
<tr><td>2011-2013</td><td>Core</td><td>45</td><td>13,495</td></tr>
<tr><td rowspan="2">2019-2022</td><td>Core</td><td>155</td><td>45,392</td></tr>
<tr><td>Roller</td><td>133</td><td>5,034</td></tr>
<tr><td rowspan="4">Balpantau</td><td rowspan="3">1996-2009</td><td>Core</td><td>166</td><td>29,620</td><td rowspan="4">54.1%</td><td rowspan="4">15.2%</td></tr>
<tr><td>RC</td><td>68</td><td>5,912</td></tr>
<tr><td>Roller</td><td>439</td><td>28,951</td></tr>
<tr><td>2020-2023</td><td>Core</td><td>60</td><td>11,520</td></tr>
</table>

Table 3.6 highlights that Muruntau, Mutenbai and Chukurkuduk drilling used a very high proportion of diamond core. However, much of this drilling is historic, with associated risk of lower core recovery and sampling bias. At Besapantau and Balpantau, the existence of substantial amounts of roller drilling would increase the risk of sampling bias and contamination if included in the MRE database. Both these risks have been further assessed by WAI as part of data verification checks (Section 3.6.3).

At Besapantau and Balpantau, NMMC has in-part mitigated these risks by completing a significant amount of recent diamond drilling and WAI recommends that similar work continues at Chukurkuduk.

Further verification drilling should be completed across any Muruntau Cluster Resources informed only by historic drilling, to check the reliability of this data. Areas should be prioritised / scheduled according to the LOM strategic plan.

The introduction of alternative drill rigs from international equipment suppliers has been highly effective and this type of equipment should be adopted for all future drill programmes. WAI also advises that roller drilling or other open hole sampling methods (e.g. air core, rotary etc.), are restricted to first pass reconnaissance programmes only.

3.5.1.2 Spacing and Orientation

Maps of each deposit are provided in Figure 3.10 to Figure 3.12 showing the location, spacing and orientation of drilling, underground sampling and trenching. Collars are coloured to show the spatial distribution of different sampling types, including a sub-division between historic and recent (post-2019) diamond drilling.

Drilling in all deposits has been conducted on systematic grids, on orientations such that drill intersections are at a high angle to the dominant mineralised trend.

At Muruntau, the nominal diamond drill spacing is 80m (between drill sections) by 40m (along section) across most of the deposit. Locally drill spacing increases to 80m by 80m and this becomes the dominant drill spacing at depths below ≈600m from surface. An advanced grade control RC programme has been completed in the north of the Muruntau pit on a 60m by 60m grid. WAI supports the use of advanced grade control drilling for improved ore body visibility and medium-term planning, however recommends that an 80m by 40m grid staggered midway between the existing diamond drill sections, would reduce data duplication and improve ultimate combined drill spacing to 40m by 40m. Current diamond drill coverage at Muruntau extends to ≈1000m below surface.

The top ≈250m of the Mutenbai deposit have been diamond drilled to a spacing of 40m (between drill sections) by 20-40m (along section). From approximately 250m to 550m from surface the drill spacing increases to a nominal 60m by 60m grid and up to 80m by 80m locally. Broader spaced exploration drill coverage extends to approximately 1200m below surface, whilst the deepest exploration holes intersect mineralisation at 1950m.

Blast hole grade control sampling has been completed over the Muruntau and Mutenbai deposits to a maximum depth of ≈550m and ≈300m below surface respectively (Figure 3.6). This is conducted on a staggered 6m by 6m grid.

At Chukurkuduk diamond drill spacing ranges from 40m by 40m to 80m by 80m, with systematic drill coverage extending to ≈550m from surface.

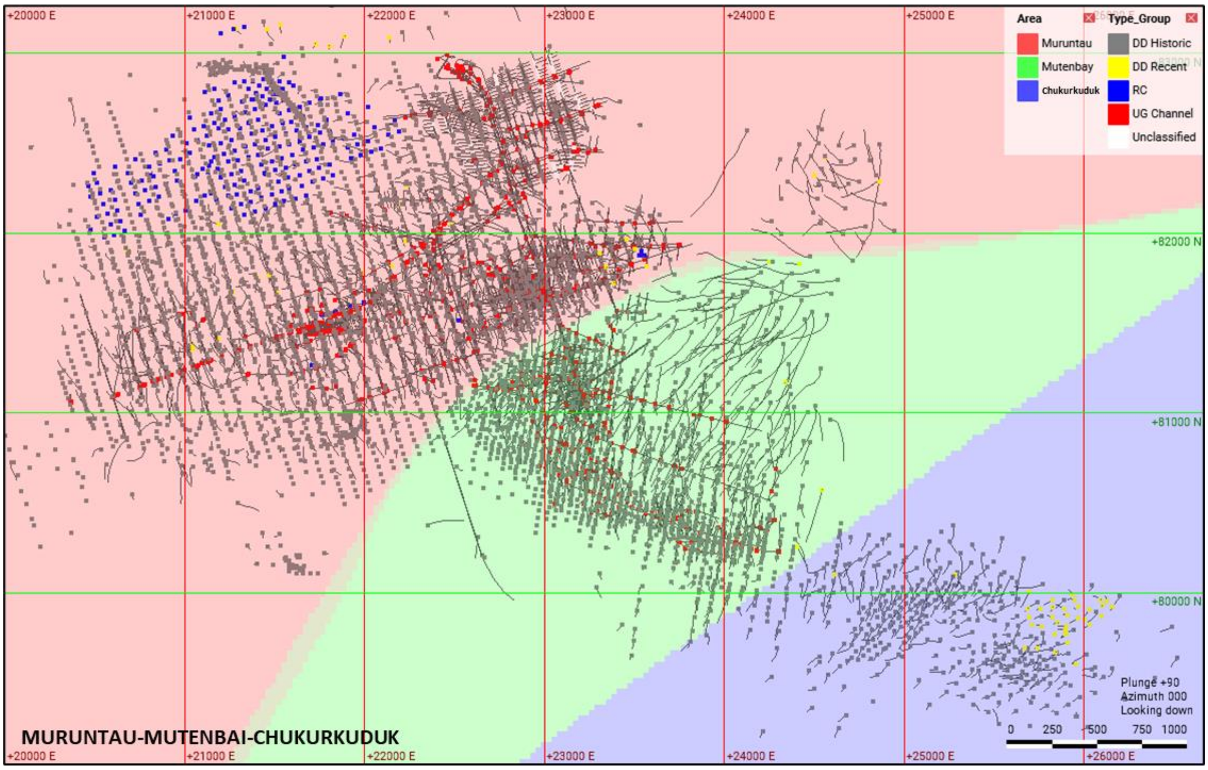


Figure 3.10: Map of Drilling and Underground Sampling at the Muruntau, Mutenbai and Chukurkuduk Deposits

At Besapantau contiguous regions of 60m by 60m spaced diamond drilling are present in the central/south and northeast of the deposit, with 80m by 40m to 80m by 80m spacing dominant elsewhere. Recent drilling is interspersed with historic drilling except in the central/south of the deposit, where historic data is dominant. A 100m by 100m RC grid covers part of this area.

At Balpantau, the nominal diamond drill spacing is 40m by 40m to 60m by 60m across the southern and northwestern flanks of the deposit. Diamond drill coverage is patchier in the northeast, with section spacing of 80m more typical. Recent drilling is interspersed with historic drilling in the north, whilst recent diamond drilling is the main drill type across the south Balpantau. Blast hole grade control sampling has been completed over the top ≈20m in the south of the deposit on a staggered 5m by 5m grid.

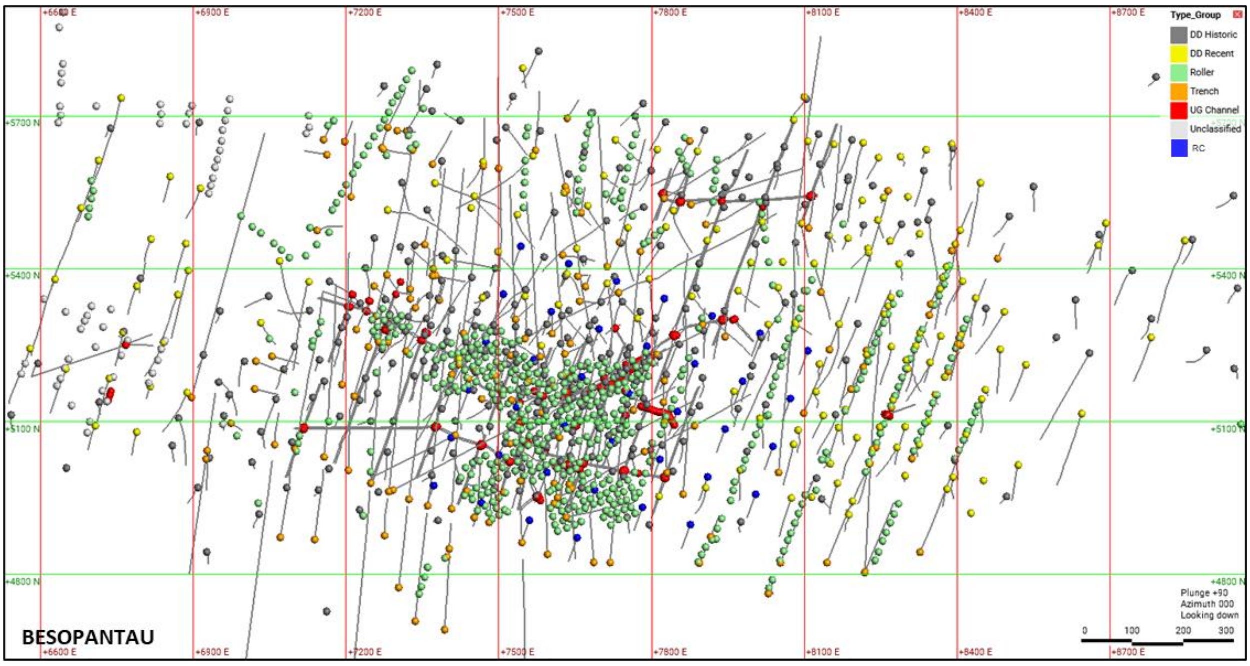


Figure 3.11: Map of Drilling, Underground Sampling and Trenching at the Besapantau Deposit

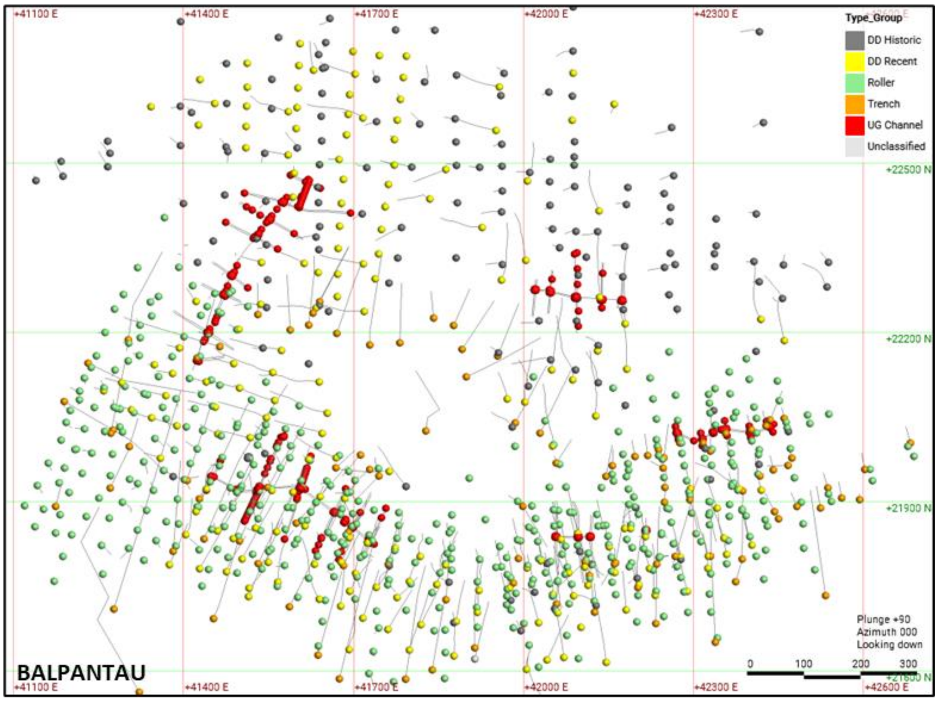


Figure 3.12: Map of Drilling, Underground Sampling and Trenching at the Balpantau Deposit

3.5.1.3 Location

A local coordinate system is used at each deposit. Topographic surveys are updated monthly using a 1m survey grid. Collar positions are surveyed manually, whilst downhole surveys have been carried out for all drill holes.

Survey practices were not assessed as part of the WAI site inspection. NMMC advises that equipment type and survey accuracy are suitable for resource estimation. WAI database checks have included a review of survey data for erroneous values.

3.5.1.4 Logging

All drillholes except for grade control blast holes are logged over their entire length. Review of hard copy drillhole 'passports' by WAI whilst on site, suggests that detailed drillhole logging is carried out by the Kyzylkum Exploration Expedition. WAI also completed spot checks on core mark-up and recovery logging and found them to be accurate. Electronic database tables provided to WAI, show that digital records are only available for recent drilling since 2019. This includes tables with fields describing lithology, alteration, oxidation, mineralisation and geotechnical parameters. No significant gaps are evident in the logging scheme for recent drilling.

Data coverage at Muruntau and Mutenbai is currently insufficient to support modelling based on logging data, however enough data is potentially available over parts of Chukurkuduk, Besapantau and Balpantau to allow geological modelling. Based on initial review of the raw logging codes in 3D, potential barriers to modelling include use of many lithology codes (e.g. 346 at Muruntau, Mutenbai and Chukurkuduk) and some local areas with poor correlation between drillholes. These are common challenges and could be aided by a streamlined lithology code library and review/validation of logging on a hole-by-hole basis against existing drilling and working geological models.

WAI notes that no electronic field data capture system is currently in place on site. Potential benefits include more secure and efficient data collection, in-built validation protocols, along with rapid database and model update.

Vein orientation can provide a key guide to domain orientation in vein controlled hydrothermal systems like the Muruntau Cluster deposits. WAI recommends that oriented structural data is collected in select drillholes to aid in modelling and drill planning.

3.5.2 Excavations

3.5.2.1 Surface Trenching

Two methods of trenching have been reported at the Muruntau Cluster. Manual excavation typically established a trench width of 0.7-0.8m, with depth extending at least 0.5m into bedrock. Mechanised trenching was carried out with an excavator with a bucket width of 1.3-1.4m. Before testing, the trench bottom was typically cleaned by hand.

Some broader bedrock exposures ('clearings') were developed in areas with established gold mineralisation or complex geological relationships. Clearings were dug using a C-130 bulldozer with a blade width of 4.1m.

Trenching location, orientation and extent are included in Figure 3.10 to Figure 3.12. Trenches were typically oriented across strike and are most extensive at Besapantau (6,891m) and Balpantau (9,740m). This comprises 40-50m spaced trenching across the centre of Besapantau and 40-80m spaced trenching across the southern zone of Balpantau.

3.5.2.2 Underground Development

Exploratory underground development with shaft access was completed at all deposits except for Chukurkuduk. The location, orientation and lateral extent of development is shown in Figure 3.10 to Figure 3.12. Underground development and associated channel sampling has been used most extensively at Muruntau and Mutenbai. Figure 3.13 provides further spatial context around this dataset.

Four shafts were sunk at the Muruntau and Mutenbai deposits. At Muruntau exploratory development has been completed on three main levels (+128mRL, +78mRL and 0mRL) around 400-530m from surface. Cross-cuts from strike parallel drives have typically been developed at 80m strike spacing. At Mutenbai exploratory development has been completed on four main ≈80m spaced levels at 140-380m from surface. Cross-cuts have typically been developed at 40m strike spacing. Cross-cut position has been aligned with the drilling cross sections to facilitate cross-corelation between underground sampling and drillhole data.

The Muruntau-Mutenbai open pit has mined over a significant proportion of the underground development (as shown in Figure 3.13), however underground channel sampling still informs Mineral Resource estimation across lateral extensions to Muruntau and depth extensions to Mutenbai. At both deposits underground development has also used as underground drill platforms for deep exploration and resource development drilling.

At Besapantau underground development and channel sampling is concentrated in the central/south of the deposit at 40m and 120m depth from surface. The development includes strike parallel ore drives and typically 80m spaced cross-cuts.

At Balpantau five distinct regions of underground sampling have been completed at 50m depth from surface, with cross-cut spacing ranging from 40 to 80m.

No wireframe representing the underground voids is available. Based on discussions with the client, WAI has used a 1.5m distance function to all underground channel samples, to approximate typical development dimensions and account for underground depletion.

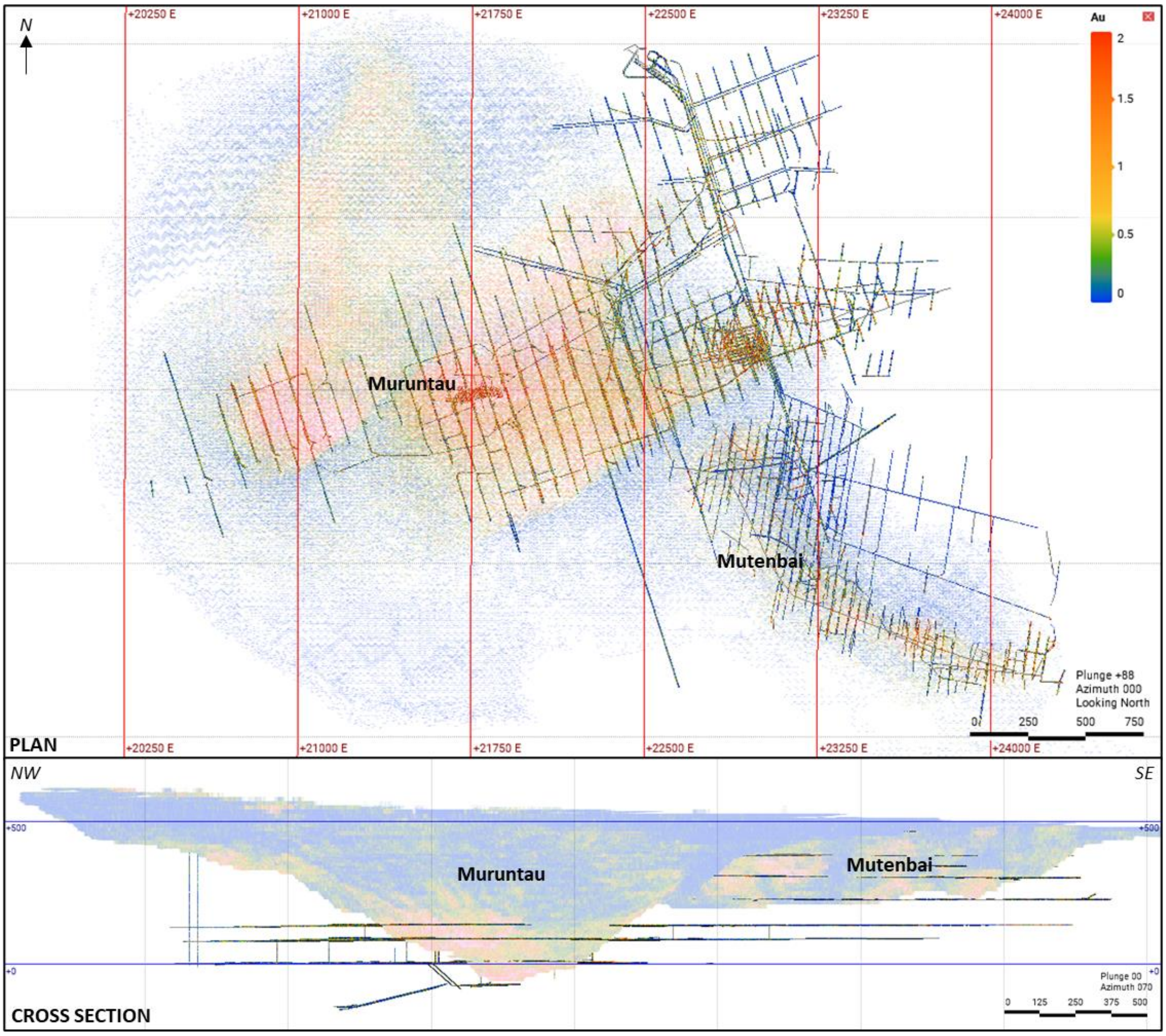


Figure 3.13: Plan and Cross Section Showing Muruntau-Mutenbai Exploratory Underground Development Relative to the Extent of Open Pit Grade Control Drilling

3.5.3 Sampling

The main sample types collected in exploration of the Muruntau Cluster have been drill core, drill chip and channel samples. Drill core review by WAI confirmed that boundaries of economic mineralisation cannot be reliably defined by visual characteristics, which justifies the NMMC approach to sample and analyse all intervals, with the exception of barren quaternary sedimentary cover.

3.5.3.1 Drill Core

Based on existing reports and observations on site, diamond drilling appears to have involved a mixture of half core and whole core sampling. WAI inspected core saws and cutting procedures at NMMC core processing facilities and observed good practice. Sample lengths typically range between 1-2m (see Section 3.7.7 for further details on sample length), with adjustments to length made to honour logged geological boundaries.

3.5.3.2 Drill Chips

RC drillholes were primarily sampled on 2.5m intervals. The sample was taken through a Metzke cone splitter to deliver a 5kg sub-sample.

Drill chips from roller drilling were primarily sampled every 2m using a cyclone. Bulk samples were quartered using a riffle splitter, with half of all chips collected as a sub-sample.

3.5.3.3 Channel

In trenches and underground, channel sampling was carried out manually with a channel cross-section of 5cm by 10cm. The length of the samples typically ranged from 0.5-5m with 1-2m samples most common. Sample length was adjusted according to geological boundaries and where possible, samples were taken across the expected extent of mineralised zones.

In trenches, channel sampling was carried out along the center line of the trench floor. Testing of development was carried out along one or two opposite walls at 1m height above the floor. To help establish the continuity of mineralisation, some of the drives along the strike of the mineralised zones were sampled face-to-face after 2-3m. To ensure reliable sampling results, the actual weight of each sample was compared with the theoretical weight.

NMMC has assessed the reliability of underground channel sampling by comparing sections of the main channel with a parallel channel made 5cm below. Results show a difference in average grade of around 5% (Table 3.7).

Table 3.7: Statistical Comparison between Main and Parallel Underground Channels at Different Channel Sizes

UG Channel Type	No. of Samples	Mean Au Grade (g/t)	Total Squared Deviation	Average Squared Deviation
Main Channel (10x5cm)	32	1.94	94.85	1.72
Parallel Channel (10x30cm)	34	1.90	165.41	1.76
Parallel Channel (5x3cm)	34	2.07	190.4	2.37
Parallel Channel (10x5cm, 0.5m)	30	2.04	341.96	3.38

3.5.4 Bulk Density

Current density assumptions have been guided by averaging small numbers of measurements from historic sources. No procedural information has been provided regarding these measurements and WAI understands that dry bulk density measurements are not routinely collected on site. WAI recommends that a formal procedure is developed for routine collection of dry bulk density measurements to better inform tonnage estimates (see Section 3.7.11 for recommendations specific to density modelling and estimation). For a comprehensive guideline regarding density data collection refer to Lipton & Hilton, 2014.

3.5.5 Sample Preparation

The fire assay sample preparation flow diagram shown in Figure 3.14 is the same for all deposits and sample types. This includes drying, crushing and grinding, with splitting between stages to ultimately produce a 0.5kg sub-sample with a particle size of 0.074mm. Gamma activation sample preparation follows a similar but shortened workflow, ending with a coarser 1mm particle size.

Sample weight at each stage of preparation has been reduced to minimum representative weight based on Richards-Chechott equation $Q = K*d^2$ (where Q = sample weight; d = maximum diameter of particles and k = coefficient of homogeneity (reflecting the irregularity of gold distribution).

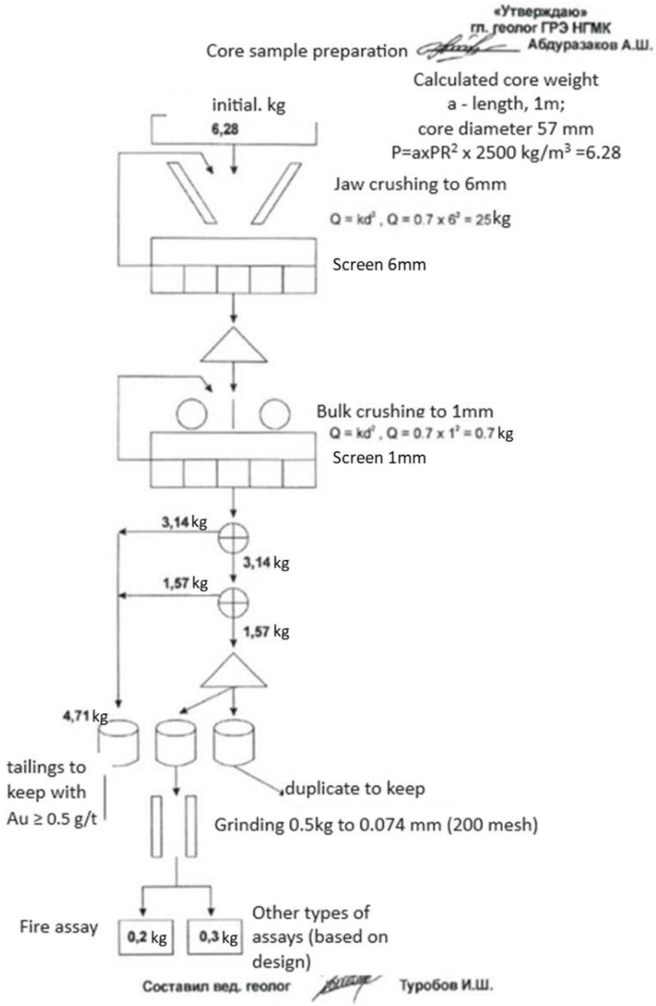


Figure 3.14: Sample Preparation Flow Diagram

WAI consider the equipment, sample weights and particle size used in sample preparation to be in line with typical industry practices. WAI visited NMMC laboratories where Muruntau Cluster sample preparation is undertaken and observed reasonable procedures to deliver a representative sub-sample, minimise contamination and meet particle size specifications. WAI noted some riffle splitters were in use at the Muruntau laboratory, where rotary splitters would provide improved performance.

3.5.6 Sample Analysis

The two analytical methods used at Muruntau Cluster are fire assay and gamma activation analysis. Table 3.8 lists the proportion of fire assay and gamma activation data available for each deposit.

Table 3.8: Proportion of Fire Assay and Gamma Activation Analysis per Deposit

Deposit	Fire Assay		Gamma Activation	
	Count	%	Count	%
Muruntau	10165	1.6	639135	98.4
Mutenbai	2276	1.2	184594	98.8
Besapantau	75789	87	11588	13
Balpantau	49077	82	11018	18

Around 98% of samples from the Muruntau and Mutenbai deposits were analysed using the gamma activation method. A much higher proportion of fire assay data is available for the Besapantau and Balpantau deposits. In these deposits, gamma activation has typically been used as a preliminary analysis, where samples with grades above 0.5 g/t were then selected for fire assay. Gamma activation is also used for all grade control samples.

The laboratories used for sample preparation and analysis have only state certification from the Republic of Uzbekistan and do not have independent international certification.

3.5.6.1 Fire Assay

Both historic and recent analytical work was mainly carried out by the geological laboratory of the Kyzylkum PGRE. Samples were analysed using 50g fire assay gold analysis with a gravimetric finish. Two 50g charges were taken from one sample with grade determined by the average of the two results. In case of serious discrepancies between samples, analysis was carried out on a third and fourth charge to obtain a value.

Results have been reported to a single decimal place. Discussions on site indicate this represents the analytical precision of the gravimetric finish. At the current mining cut-off grade of 0.5g/t this level of precision increases risk of ore-waste misclassification. WAI recommends the analytical precision is increased to 2 decimals by improvements in the existing gravimetric measurement technique (method detection limit in commercial laboratories is 0.01ppm) or introduction of an ICP-MS finish.

WAI walked through the sample preparation and fire assay procedure during their site visit. Other opportunities for improvement include implementation of a Laboratory Information Management System (LIMS) for electronic sample labelling and tracking, as well as optimisation of the flow of samples between laboratory stations to minimise sample movement. WAI recommends that a further independent laboratory audit is completed for all sample preparation and fire assay facilities by a commercial service provider.

3.5.6.2 Gamma Activation

Gamma activation analysis was introduced at the Muruntau Cluster in 1979 and is completed at the NMMC Central Gamma Activation Analysis Laboratory. WAI has not visited this facility and all information regarding this technique has been derived from NMMC reports. A summary of the gamma activation analysis method is provided below:

1. Activation of samples by high-energy gamma rays obtained as a result of deceleration of an electron beam with an electron energy of 8MeV, generated by a high-current linear electron accelerator and subsequent measurement of the sample activity;
2. As a result of the nuclear reaction: $^{197}Au \rightarrow {}^{197m}Au$, a metastable radioactive isomer of gold is formed with a half-life T½ = 7.7 seconds and gamma quanta energy Ey = 279KeV;
3. Interfering elements when analysing samples for gold are uranium, thorium, barium and hafnium. The influence of interfering elements is taken into account using the spectral ratio method (MSR). This method uses a spectral ratio matrix that is calculated by running matrix or tuning samples. These samples are the ones containing only one of the elements being determined (Au, U, Th, Ba, Hf) in high concentration;
4. The sample material is packed into a cuvette with a volume of 290cm^3. The standard in the form of standard material is also packaged in a cuvette;
5. The gold grade in samples is calculated using the formula:

$$C = \frac{X_1}{\eta \cdot m}[1 + (m - 425) \cdot 8 \cdot 10^{-4}]$$

   where *C* is the mass fraction of gold in the sample, 1x10^{-4} % (g/t, ppm);
   η is the reference coefficient used in further work to calculate the gold grade in samples;
   X_1 - accounts for gold in the standard, impulses;
   m - standard mass.
6. The reference coefficient is calculated using the formula:

$$\eta = \frac{{}^{Et}X_1}{{}^{Et}C \cdot {}^{Et}m}$$

   η - reference coefficient used in further work to calculate the grade
   $^{Et}X_1$ - accounts for gold in the standard, impulses;
   ^{Et}m is the mass of the standard, g;
   ^{Et}C - mass fraction of gold in the standard, 1x10^{-4} % (g/t, ppm).

NMMC reports that the gamma activation complex, designed for rapid mass quantitative analysis of ordinary geological samples, meets the requirements for NSAM category III laboratories. Analyses of geological samples in the conditions of the CGAAL are carried out in accordance with the methodology for measuring the mass fraction of gold in bulk materials of rocks, ores and products of their technological processing by the gamma activation method MVI O'zO'U 233:2004, approved by the State Enterprise "Uzbek National Institute" Metrology (SE UzNIM) of the Uzstandard Agency of the Republic of Uzbekistan as amended in 2019.

Advantages of gamma activation include reduced sample preparation requirements, analysis of a larger sub-sample (500g) and rapid turnaround of results. Whilst the technique is unique to NMMC, WAI notes similarities with the methodology reported for the PhotonAssay™ method, developed by Chrysos Corporation, now commercially available as an alternative to the fire assay method.

3.5.7 QAQC

3.5.7.1 Introduction

Quality assurance and quality control ("QAQC") are the key components to verify the validity of sample collection, security, preparation, and analytical methods. The aim of the QAQC programme should be to quantify and monitor any errors, and to provide information that might be used to improve sampling and analytical procedures to minimise any errors. A comprehensive QAQC programme should monitor the accuracy, precision and contamination of each stage of exploration from the sampling through to the final assay value produced by the laboratory.

Samples from historical exploration (going back to 1969) were subjected to internal and external control procedures. External control was carried out in the Samarkand geology laboratory.

Since 2019 the QAQC programme has expanded to include blank samples to measure potential contamination (Balpantau and Besapantau) and standard reference samples to measure analytical accuracy (Muruntau & Mutenbai, Balpantau and Besapantau). Pulp duplicate samples continue to be taken for assessment of precision.

A significant amount of primary data was not available for review. The following QAQC data or summaries were provided to WAI for review:

- Muruntau – Mutenbai summary of external control (1969-1971)
- Muruntau – Mutenbai summary of internal control (1978-1984)
- Muruntau – Mutenbai summary of internal control (2017-2019)
- Muruntau – Mutenbai summary of external control (2013-2016)
- Muruntau – Mutenbai raw sample data for external control (2019-2022)
- Muruntau – Mutenbai raw sample data for standard reference samples (2019-2022)
- Balpantau summary of internal and external control samples (1986-1996)
- Balpantau summary of internal and external control samples (1993-2000)
- Besapantau and Balpantau raw data for blank samples (2020-2023)
- Besapantau and Balpantau raw data for standard reference samples (2020-2023)
- Besapantau raw data for internal duplicate samples (2019-2022)
- Besapantau raw data for external duplicate samples (2019-2022)
- Balpantau raw data for internal duplicate samples (2021-2022)
- Balpantau raw data for external duplicate samples (2021-2022)

3.5.7.2 Review Methodology

For standard reference materials ("SRM") and blank samples, control charts such as Shewhart X (average) and R (range) charts are constructed for each element standard. The control charts plot process variability, with metal content on the Y-axis and sample number on the X-axis. The plotting of data on charts of this type allows for the easy recognition of samples that fall outside of the action limits applicable for each standard used.

For SRM samples, warning and control limits are established at mean ±2 and ±3 standard deviation limits respectively. Any analysis beyond the ±3 standard deviation limit is considered as a failure. For blank samples, failures are determined based on ±5 times the assay detection limit with significant failures determined based on ±10 times the assay detection limit.

For duplicate sample sets, the precision can be discussed in terms of the following statistical measures applied by WAI.

- **Summary Statistics** showing the mean, mode, standard error, range and standard deviation can be indictors if the data sets agree.
- **Rank HARD Plot** which is the ranked half absolute relative difference, ranks all assay pairs in terms of precision levels measured as half of the absolute relative difference from the mean of the assay pairs (HARD), used to visualise relative precision levels (typically 90%) and to determine the percentage of the assay pairs population occurring at a certain precision level (10%). It should be noted that as the HARD statistic uses an absolute difference, a ranked HARD plot does not revel bias in duplicate data, only the relative magnitude of differences (i.e. precision). The HARD values are sorted from lowest to highest and ranked accordingly, with the rank expressed as a percentage. The ranked HARD plot is then generated by plotting the percent rank on the X-axis against the HARD value on the Y-axis. A rank HARD plot is constructed that enables quick identification of the percentage of the sample pairs with a HARD value less than 10%.
- **Correlation Plot** is a simple plot of the value of the duplicate samples, assay 1 against assay 2. This plot allows an overall visualisation of precision and bias over selected grade ranges. Correlation coefficients are also good indicators to quantify the agreement between data sets. A correlation greater than 0.9 is generally described as strong, whereas a correlation less than 0.6 is generally described as weak.
- **Thompson and Howarth Plot** showing the mean relative percentage error of grouped assay pairs across the entire grade range, used to visualise precision levels by comparing against given control lines.
- **Mean vs. HARD Plot** used as another way of illustrating relative precision levels by showing the range of HARD over the grade range.
- **Mean vs. HRD Plot** is similar to the above, but the sign is retained, thus allowing negative or positive differences to be computed. This plot gives an overall impression of precision and shows whether there is significant bias between the assay pairs by illustrating the mean percent half relative difference between the assay pairs (mean HRD).

3.5.7.3 Historic QAQC

Muruntau & Mutenbai

No historic (pre-2019) raw sample data was provided to WAI for review for Muruntau and Mutenbai, no independent checks of data were therefore possible. Reviews of historic internal and external control results were made in the 2019 SRK MRE & ORE report, and these are summarised below.

Between 1969 and 1971, 4.7% of samples were selected for internal control, 5% for external control and 36% of external control samples were sent for arbitrage analysis at the Palevskaya laboratory in the Urals. Analysis were collated by quarter on five grade classes (0-1.4g/t, 1.4-1.9g/t, 1.9-3.7g/t, 3.7-7.9g/t and >7/9g/t Au). Whilst no significant problems are recorded, it is noted that the lowest grade class (0-1.4g/t Au) provides little detail around the current domaining cut-off and mining cut-off grades of 0.3g/t Au and 0.5g/t Au respectively.

Summaries of external control results for the 1978 to 1984 period for fire assay (to 1979) and gamma activation analytical methods, collated into five grade classes (0.6-0.99g/t, 1.0-1.5g/t, 1.5-2.0g/t, 2.0-4g/t and >4.0g/t Au) were reviewed by SRK. All results were stated to be within limits by SRK. WAI notes that no samples below 0.6g/t Au were selected for control analysis. Given the domaining cut-off grade for resource estimation is 0.3g/t Au, this presents a risk for understanding if lower grades than 0.6g/t Au are reliable. Internal control results for this period were not available for review.

SRK noted that no results for the period 1984-2016 were provided for review. It is reported that control analysis was carried out during this period but results were not properly stored.

SRK were provided with quarterly summary results for internal control of the CGAAL laboratory (gamma activation analysis) for the period 2017-2019. During this period, all samples above 0.3g/t assayed at CGAAL were sent for fire analysis at the Central Research laboratory. These results are shown in Table 3.9. WAI notes that the highest absolute and percentage errors are seen in the first-grade class, 0.0 to 0.5g/t Au. This indicates a high risk that samples at, or close to, the cut-off chosen for more detailed fire analysis are misclassified.

Table 3.9: Summary Results of CGAAL Internal Quality Control (2017-2019)
Gamma Activation Analysis

Grade Interval (g/t)	Number of Samples	Mean of Samples (g/t)	Mean Absolute Error (g/t)	Mean % Error
0.0 to 0.5	8,931	0.20	0.15	75.8
0.5 to 1.0	7,951	0.72	0.19	26.05
1.0 to 1.5	6,399	1.22	0.21	17.38
1.5 to 2.0	4,582	1.71	0.22	12.79
2.0 to 5.0	9,938	3.07	0.29	9.49
5.0 to 10.0	3,666	6.80	0.42	6.20
20.0 to 50.0	442	29.40	1.53	5.22
50.0 to 100.0	72	66.35	4.31	6.45

SRK noted that no external control analysis for the period 2017-2019 for the CGAAL laboratory (gamma activation) was provided for review. SRK noted that no internal or external control analysis results for the period 2017-2019 for the CRL (fire assay) laboratory was provided for review. WAI have not been provided with any data for this period for review.

Besapantau

Historic QAQC for Besapantau consists of internal and external duplicate analysis carried out in support of yearly drill programmes from 1986 through to 1996. WAI has not been able to review the raw sample data for these duplicates but has been provided with summary tables of results with the comparison of sample pairs combined on an annual or biannual basis into four grade brackets of 0.5g/t to 0.9g/t, 1.0g/t to 2.3g/t, 2.4g/t to 4.0g/t and >4.1g/t Au where the grade brackets measured grade of the primary sample. No samples of <0.5g/t Au were included in the duplicate analysis.

In the period under review 4.1% of all samples analysed (of any grade) were subjected to internal and external duplicate analysis (1,635 duplicate analyses carried out from 39,667 samples analysed). When only samples within the grade categories tested are counted (>0.5g/t Au), the insertion rate for internal and external analysis was 21.7% (1,635 duplicate analyses carried out from 7,523 samples analysed). The breakdown of number of samples tested by grade category is shown in Table 3.10.

Table 3.10: Number of Besapantau Duplicate Samples by Grade Category 1986-1996

Period Under Review	Grade Category	Total Samples Analysed	Total Duplicate Samples	% Duplicate Samples
1986 to 1996	0.5-0.9	3,809	470	12.3
	1.0-2.3	2,795	520	18.6
	2.4-4.0	537	352	65.6
	>4.1	382	293	76.7
	Total	**7,523**	**1,635**	**21.7**

Internal duplicates were assessed against a pass/fail criteria based upon an assessment of the relative mean squared error of sample pairs that varied for each grade category. In total, of the four grade categories for which comparisons were made spread across the 14 annual or bi-annual summary table, only three failures were noted; the >4.1g/t Au category for the first half of 1992, the 0.5-0.9g/t Au category for 1994 and the 2.4-4.0g/t Au category for 1996.

External duplicates were assessed against a pass/fail criteria based upon an assessment of three statistical tests; Student's T-Test (to determine if there is a significant difference between the mean of the two groups of data), Sign Test (to determine if there is a significant difference between the median of two groups of data) and a unknown process recorded as "negligible error". Failure rates are higher for external duplicates than internal duplicates. In total, of the four grade categories for which comparisons were made spread across the 14 annual or bi-annual summary table, 13 failures in Student's T-Test, 10 failures for Negligible Error and eight failures for Sign Test were noted. There appears to be no bias in instances of failure against grade with failures spread across the four grade categories. Results of the internal and external analysis are shown in Table 3.11.

Table 3.11: Results of Internal & External Duplicate Analysis for Besapantau 1986 - 1996

Date	Quality Class		Number of Samples overall	Check samples	% Check Samples	Relative Mean Squared Error		Student's T Test		Negligible Error		Sign Test		Navoi
	Lower Limit	Upper Limit				Limit	Actual	Limit	Actual	Limit	Actual	Limit	Actual	Conclusion
2nd Half 1986	0.5	0.9	315	38	12.1	30	21.9	2.04	2.31	0.33	0.31	9	10	OK
	1	2.3	300	52	17.3	28.5	17.2	2	2.59	0.33	0.21	15	14	Not OK
	2.4	4	83	38	45.8	27	14.3	2.03	1.87	0.33	0.13	10	11	OK
	4.1	Maximum	63	32	50.8	22.9	8.86	2.04	2.77	0.33	0.14	8	10	OK
1987	0.5	0.9	352	37	10.5	30	23	2.02	1.52	0.33	0.25	9	14	OK
	1	2.3	248	39	15.7	28.5	16.2	2.02	0.95	0.33	0.12	10	15	OK
	2.4	4	38	32	84.2	27	22	2.02	1.71	0.33	0.26	9	12	OK
	4.1	Maximum	35	27	77.1	22.9	8.95	2.05	2.76	0.33	0.15	7	5	OK
1988	0.5	0.9	495	55	11.1	30	28.5	2.02	2.88	0.33	0.32	15	17	OK
	1	2.3	400	68	17	28.5	18	2	0.13	0.33	0.06	21	32	OK
	2.4	4	61	61	100	27	14.8	2	0.23	0.33	0.17	21	28	OK
	4.1	Maximum	43	42	97.6	22.9	18.2	2.02	0.53	0.33	0.07	14	20	OK
1989	0.5	0.9	336	35	10.4	30	13.7	2.04	1.18	0.33	0.18	7	11	OK
	1	2.3	248	37	15	28.5	4.73	2.03	0.9	0.33	0.3	9	10	OK
	2.4	4	50	34	68	27	15.5	2.04	0.17	0.33	0.05	9	13	OK
	4.1	Maximum	39	32	72	22.9	11.7	2.04	0.62	0.33	0.16	9	12	OK
1990	0.5	0.9	437	32	7.3	30	14.5	2.04	0.23	0.33	0.04	7	10	OK
	1	2.3	316	28	8.9	28.5	14.8	2.05	3.34	0.33	0.29	8	11	OK
	2.4	4	65	32	49	27	13.1	2.04	3.6	0.33	0.53	8	7	OK
	4.1	Maximum	38	29	76	22.9	15.4	2.04	0.91	0.33	0.22	8	13	OK
1st Half 1991	0.5	0.9	138	22	15.9	30	20.9	2.07	3.18	0.33	0.84	4	5	Not OK
	1	2.3	69	22	31.9	28.5	12.9	2.08	3.77	0.33	0.84	5	3	Not OK
	2.4	4	15	15	100	27	19.5	2.13	1.21	0.33	0.33	2	5	Not OK
	4.1	Maximum	10	10	100	22.9	19.4	2.23	0.11	0.33	0.03	3	3	OK
2nd Half 1991	0.5	0.9	335	23	6.8	30	13.7	2.07	0.18	0.33	0.04	5	10	OK
	1	2.3	196	25	12.7	28.5	15.5	2.06	0.7	0.33	0.14	6	11	OK
	2.4	4	33	19	57.6	27	18	2.09	0.09	0.33	0.01	3	7	OK
	4.1	Maximum	24	20	83.3	22.9	5.2	2.09	1.42	0.33	0.26	5	5	OK
	0.5	0.9	306	27	8.8	30	29.8	2.05	1.19	0.33	0.24	7	10	OK
	1	2.3	191	27	14.1	28.5	16.4	2.05	0.87	0.33	0.28	6	11	OK

Table 3.11: Results of Internal & External Duplicate Analysis for Besapantau 1986 - 1996

Date	Quality Class		Number of Samples overall	Check samples	% Check Samples	Relative Mean Squared Error		Student's T Test		Negligible Error		Sign Test		Navoi
	Lower Limit	Upper Limit				Limit	Actual	Limit	Actual	Limit	Actual	Limit	Actual	Conclusion
1st Half 1992	2.4	4	41	20	48.8	27	17.3	2.09	2.87	0.33	0.43	5	3	Not OK
	4.1	Maximum	18	13	72.2	22.9	29.8	2.16	0.52	0.33	0.12	2	4	OK
2nd Half 1992	0.5	0.9	115	26	22.6	30	30	2.06	0.2	0.33	0.05	6	11	OK
	1	2.3	83	31	37.3	28.5	23	2.02	1.72	0.33	0.35	7	11	OK
	2.4	4	15	14	93.3	27	13.4	2.15	1.48	0.33	0.41	2	6	Not OK
	4.1	Maximum	17	14	82.3	22.9	11.5	2.15	1.99	0.33	0.18	3	4	OK
1st Half 1993	0.5	0.9	213	53	24.8	30	29.4	2	0.45	0.33	0.11	14	18	OK
	1	2.3	202	52	25.7	28.5	25.3	2.02	2.08	0.33	0.41	16	21	OK
	2.4	4	21	19	90.4	27	13.2	2.09	0.82	0.33	0.12	4	7	OK
	4.1	Maximum	23	23	100	22.9	9.4	2.07	1.52	0.33	0.26	6	9	OK
2nd Half 1993	0.5	0.9	180	35	19.4	30	20	2.04	1.31	0.33	0.2	8	11	OK
	1	2.3	146	37	25.3	28.5	18.6	2.04	0.82	0.33	0.01	11	14	OK
	2.4	4	35	23	65.7	27	11.6	2.07	1.48	0.33	0.16	4	8	OK
	4.1	Maximum	20	11	55	22.9	9.3	2.18	1.5	0.33	0.22	2	5	OK
1994	0.5	0.9	246	36	14.6	30	39	2.02	0.73	0.33	0.19	9	14	OK
	1	2.3	199	34	17.1	28.5	22.9	2.04	1.36	0.33	0.3	11	17	OK
	2.4	4	37	22	59.5	27	18.1	2.07	3	0.33	0.39	5	4	Not OK
	4.1	Maximum	28	17	60.7	22.9	6.37	2.07	2.15	0.33	0.35	3	4	OK
1995	0.5	0.9	161	33	20.5	30	20.5	2.04	0.9	0.33	0.23	9	8	Not OK
	1	2.3	51	38	74.5	28.5	23.8	2.02	0.81	0.33	0.17	10	15	OK
	2.4	4	8	6	75	27	13.1	2.45	0.53	0.33	0.12	0	3	OK
	4.1	Maximum	4	3	75	22.9	1.97	3.18	0.65	0.33	0.19		1	OK
1996	0.5	0.9	180	18	18.3	30	27	2.04	4.99	0.33	0.98	8	2	Not OK
	1	2.3	146	30	29.5	28.5	27.7	2.02	1.27	0.33	0.25	13	19	OK
	2.4	4	35	17	17.1	27	64.6	2.45	1.63	0.33	1.3	0	2	OK
	4.1	Maximum	20	20	20	22.9	10.3	2.78	0.19	0.33	0.15	0	1	OK

Balpantau

Historic QAQC for Balpantau consists of internal and external duplicate analysis carried out in support of drilling operations between 1993 and 2009.

WAI has not been able to review the raw sample data for these duplicates but has been provided with summary tables of results with the comparison of sample pairs combined on an annual or biannual basis grade brackets. Grade brackets are not identical for every year or for internal and external duplicates. External duplicates are only collated into categories of 0.5g/t to 0.9g/t, 1.0g/t to 2.3g/t, 2.4g/t to 4.0g/t and >4.1g/t Au where the grade brackets measured grade of the primary sample. Internal duplicates however are also collated for 0.0 to 0.4g/t Au (1993 and 1994 only) and also 1.0 to 2.0g/t Au (1993 only). No external duplicates are collated for 1993 and 1994 and it is thought those external duplicates collated for 1997 are samples from that time period. No samples of <0.5g/t Au were included in the external duplicate analysis.

Neither the number of samples nor the percentage of samples reviewed by time period are recorded. Both internal and external duplicate results are presented in terms of mean absolute discrepancy in mean assay value and mean percentage discrepancy in assay value with results presented as mean values by time period and grade category.

Results of the internal and external analysis are shown in Table 3.12 and Table 3.13 respectively.

Table 3.12: Internal Duplicate Results Balpantau 1993-2000

Time Period	Grade Category Lower Limit	Grade Category Upper Limit	Mean Gold Content (g/t)	Discrepancy in g/t	Discrepancy in %
1993	0	0.4	0.24	-0.16	-66.7
	0.5	0.9	0.64	-0.24	-37.5
	1	2	1.6	0.1	6.2
1994	0	0.4	0.2	-0.26	-130
	0.5	0.9	0.67	-0.23	-34.3
	1	2	1.37	-0.2	-14.6
	2	Maximum	6.85	-1.15	-16.8
1st half 1998	0.5	0.9	0.73	0.13	17.8
	1	2.3	1.29	0.1	7.75
	2.4	4	3.19	0.3	9.4
	4	Maximum	5.57	0.1	1.8
2nd half 1998	0.5	0.9	0.65	0.18	27.7
	1	2.3	1.46	0.21	14.4
	2.4	4	3.08	0.87	28.2
	4	Maximum	6.77	3.17	46.8
1st half 1999	0.5	0.9	0.66	0.1	15.2
	1	2.3	1.5	0.07	4.7
2nd half 1999	0.5	0.9	0.64	0.15	23.4
	1	2.3	1.66	0.3	18.1
	2.4	4	2.5	0.98	39.2
	4	Maximum	6.61	0.35	5.3
1st half 2000	0.5	0.9	0.8	0.2	25
	1	2.3	1.57	0.57	36.3
	2.4	4	3	0.34	11.3
	4	Maximum	4.52	0.74	16.3
2nd half 2000	0.5	0.9	0.68	0.21	30.2
	1	2.3	1.62	0.28	17.3
	2.4	4	3.2	0.61	19.1
	4	Maximum	6.84	0.53	7.7

Table 3.13: External Duplicate Results Balpantau 1997-2000					
Time Period	**Grade Category Lower Limit**	**Grade Category Upper Limit**	**Mean Gold Content (g/t)**	**Discrepancy in g/t**	**Discrepancy in %**
1997	0.5	0.9	0.33	0.28	84.8
	1	2.3	0.66	0.3	45.5
1998	0.5	0.9	0.76	-0.11	-14.5
	1	2.3	1.38	-0.05	-3.62
	2.4	4	3.2	0.01	0.31
	4.1	Maximum	8.2	0.12	1.46
1998	0.5	0.9	0.1	-0.01	-1.43
	1	2.3	1.5	0.16	10.7
	2.4	4	3.11	0.71	22.8
	4.1	Maximum	7.4	-0.45	-6.08
1st half 1999	0.5	0.9	0.67	-0.16	-23.9
	1	2.3	1.41	-0.01	-0.71
2nd half 1999	0.5	0.9	0.61	0.09	14.8
	1	2.3	1.62	0.1	6.17
	2.4	4	1.87	0.84	29.3
	4.1	Maximum	6.53	0.7	10.7
1st half 2000	0.5	0.9	0.72	-0.15	-20.8
	1	2.3	1.45	-0.12	-8.28
	2.4	4	2.99	-0.17	-5.69
	4.1	Maximum	4.88	0.56	11.5
2nd half 2000	0.5	0.9	0.66	-0.04	-6.06
	1	2.3	1.6	-0.02	-1.25
	2.4	4	3.09	0.25	8.09
	4.1	Maximum	6.8	-0.18	-2.65

Results are generally poor. Context is difficult to apply without knowledge of the number of samples subjected to duplicate analysis, however some conclusions can be drawn with a comparison of the mean values of results in the same grade categories across all reporting periods.

The internal duplicate results show an absolute percentage variation (ignoring sign) of >25% between primary and duplicate analysis although no clear bias is seen. Results by grade category are shown in Table 3.14.

Table 3.14: Internal Duplicates Analysis Balpantau 1993-2000				
Time Period	**Grade Category Lower Limit**	**Grade Category Upper Limit**	**Mean Absolute Discrepancy (g/t)**	**Mean Absolute Discrepancy (%)**
1993-2000	0.0	0.4	0.21	98
	0.5	0.9	0.18	26
	1.0	2.3	0.23	15
	2.4	4.0	0.79	35
	4.1	Maximum	0.98	19

The external duplicate results show an absolute percentage variation (ignoring sign) of >14% between primary and duplicate analysis although no clear bias is seen. Results by grade category are shown in Table 3.15.

Table 3.15: External Duplicates Analysis Balpantau 1997-2000				
Time Period	**Grade Category Lower Limit**	**Grade Category Upper Limit**	**Mean Absolute Discrepancy (g/t)**	**Mean Absolute Discrepancy (%)**
1997-2000	0.5	0.9	0.12	24
	1.0	2.3	0.11	11
	2.4	4.0	0.40	13
	4.1	Maximum	0.40	6

3.5.7.4 Standard Samples 2019-2023

Standard Reference Materials ("SRM") comprise samples that are used to measure the accuracy of analytical processes and are generally composed of material for which the grade is assumed to be within known error limits. SRM are referred to as Certified Reference Materials ("CRM") where evidence is gathered (generally from multiple laboratories) to provide both an expected grade and a statement of measurement uncertainty. SRM or CRM are inserted into the sample stream before dispatch and the expected value is usually concealed from the laboratory. By comparing the results of a laboratory's analysis of a SRM or CRM to its certified value, the accuracy of the results can be monitored.

Muruntau & Mutenbai

Between 2019 and 2022, a range of SRM were used covering various Au grades for analysis. A mixture of different SRM were used during this period. SRM results were recorded electronically with coding for the date upon which analysis took place. Standard deviation limits for the SRM were not provided and so WAI have reviewed the results by year by comparing mean analytical grades against target grades and reviewing the absolute difference and percentage difference of these mean grades against the target grades. The number of SRM samples analysed by year are shown in Table 3.17 and the mean grades of SRM samples by year are shown in Table 3.19.

Table 3.16: Number of SRM Samples Analysed by Year in Support of Muruntau-Mutenbai (2019-2022)						
SRM	**Target Grade (g/t Au)**	**Number of Samples Analysed**				
		2019	**2020**	**2021**	**2022**	**Total**
РКС-2ХФ	1.04	422	536			**958**
Р3-4	6.1	367	531			**898**
Р3-6	4.1	419	296			**715**
Р3С К-1	3.3		323	602	656	**1,581**
Р3С 3-1	3.6		340	602	636	**1,578**
ММ-1	0.92			418	666	**1,084**
ММ-2	1.46			453	671	**1,124**
ММ-3	2.87			596	665	**1,261**
ММ-4	8.74			602	671	**1,273**
Р3К МК	88.25			146		**146**
Total		**1,208**	**2,026**	**3,419**	**3,965**	**10,618**

Table 3.17: Mean Grade of SRM Samples Analysed by Year in Support of Muruntau-Mutenbai (2019-2022)						
SRM	**Target Grade (g/t Au)**	**Number of Samples Analysed**				
		2019	**2020**	**2021**	**2022**	**Total**
РКС-2ХФ	1.04	1.06	1.12			**1.09**
Р3-4	6.1	5.90	6.11			**6.03**
Р3-6	4.1	4.11	4.15			**4.13**
Р3С К-1	3.3		3.36	3.46	3.42	**3.42**
Р3С 3-1	3.6		3.71	3.72	3.69	**3.71**
ММ-1	0.92			0.86	0.87	**0.87**
ММ-2	1.46			1.35	1.37	**1.36**
ММ-3	2.87			2.82	2.86	**2.84**
ММ-4	8.74			8.78	8.78	**8.78**
Р3К МК	88.25			88.34		**88.34**

Absolute differences and percentage differences between the target grades and analytical results for the SRM by year are shown in Table 3.18 with the SRM ordered by target grade.

Table 3.18: Absolute and Percentage Differences between Actual and Target Grades of SRM by Year in Support of Muruntau-Mutenbai (2019-2022)

Code	Target Grade (g/t)	Absolute Difference (g/t Au)					Percentage Difference				
		2019	2020	2021	2022	All	2019	2020	2021	2022	All
MM-1	0.92			0.06	0.05	0.05			6.1%	5.8%	5.9%
РКС-2ХФ	1.04	0.02	0.08			0.05	2.0%	7.8%			5.2%
MM-2	1.46			0.11	0.09	0.10			7.5%	6.3%	6.8%
MM-3	2.87			0.05	0.01	0.03			1.8%	0.3%	1.0%
Р3С К-1	3.3		0.06	0.16	0.12	0.12		1.7%	4.9%	3.6%	3.7%
Р3С 3-1	3.6		0.11	0.12	0.09	0.11		2.9%	3.5%	2.6%	3.0%
Р3-6	4.1	0.01	0.05			0.03	0.2%	1.3%			0.7%
Р3-4	6.1	0.20	0.01			0.07	3.3%	0.2%			1.2%
MM-4	8.74			0.04	0.04	0.04			0.4%	0.4%	0.4%
Р3К МК	88.25			0.09		0.09			0.1%		0.1%

The results show no indication of bias in analysed grades against the target grades and no indication of variation on a yearly basis. Performance is reasonably consistent. Comparison of absolute differences and percentage differences between target and actual grades show a reasonable performance against expectations.

Whilst a range of SRM covering grades of 0.92g/t Au to 88.25g/t Au have been used, none of the SRM used for monitoring of analytical accuracy of Muruntau & Mutenbai samples were close to the grades used for domaining of mineralisation (0.3g/t Au and 0.5g/t Au). This creates a risk that the analytical accuracy of grades at the point of defining mineralised and unmineralised material is unknown.

Balpantau & Besapantau

At Balpantau and Besapantau, a range of CRM were used covering high and low grades for Au analysis. A mixture of different CRM samples were used during this time period and different CRM were inserted into the samples stream for analysis alongside the primary samples from the different deposit areas. CRM results were recorded electronically in separate Excel sheets for each deposit with coding for the year of analysis. A number of CRM were used only a small number of times and the number of analytical results available for review were small, these were omitted from the review.

The results of the CRM analysis were reviewed by WAI using control charts to monitor CRM performance in comparison to upper and lower standard deviation boundaries. Any trends and bias in the data over time were also considered in the control charts. A summary of results of the CRM submitted a significant number of times (generally >20 analytical results) by year and deposit are shown in Table 3.19 to Table 3.20.

Table 3.19: Summary of Certified Reference Material Assaying for Au - Balpantau

Standard	Grade Au (g/t)	Year	Number CRM Samples	Samples Outside ± 2 Standard Deviations		Samples Outside ± 3 Standard Deviations	
				Number Samples	% Samples	Number Samples	% Samples
B-1	0.97	2020	78	13	17%	5	6%
РЗС К-2	3.40	2020	28	23	82%	20	71%
		2021	6	0	0%	0	0%
Oreas 296	2.19	2021	42	15	36%	15	36%
Oreas 235	1.59	2021	28	12	43%	0	0%
		2022	8	2	25%	2	25%
РЗС КБ	1.89	2021	124	2	2%	1	1%
		2022	58	3	5%	2	3%
		2023	33	1	3%	1	3%
РЗС КД	1.29	2022	8	0	0%	2	25%
		2023	75	2	3%	1	1%

The performance for the CRM analysis for Au at Balpantau can be summarised as follows:

- Performance for B-1 and РЗС К-2 CRM in 2020 was generally poor. Results for РЗС К-2 initially showed a positive bias before results trended downwards to within the target range as time went on.
- Commercial CRM Oreas 235 showed only moderate performance although the two major fails are likely a result of mislabelling of CRMs with actual grades approximating other CRM.
- Commercial CRM Oreas 296 overall shows poor performance although the worst performance occurred early in 2021 with performance improving thereafter.
- A significant number of CRM РЗС КД were used in 2023 and show good performance.
- Performance of the most commonly used CRM, РЗС КБ, was good with a large number of analysis carried out in 2021 and 2022. Of the just four samples that failed ±3SD limits, two appear to be a result of sample mislabelling and no major bias in reporting was seen.
- None of the CRM used for monitoring of analytical accuracy of Balpantau samples were close to the grades used for domaining of mineralisation (0.3g/t Au and 0.5g/t Au).

Table 3.20: Summary of Certified Reference Material Assaying for Au - Besapantau

Standard	Grade Au (g/t)	Year	Number CRM Samples	Samples Outside ± 2 Standard Deviations		Samples Outside ± 3 Standard Deviations	
				Number Samples	% Samples	Number Samples	% Samples
РЗК К-1	3.30	2020	28	13	46%	12	43%
РЗС К-2	3.40	2020	40	27	68%	25	63%
РЗС 3-2	7.70	2020	23	17	74%	17	74%
РЗС КД	1.29	2021	9	0	0%	0	0%
		2022	130	2	2%	5	4%
РЗС КБ	1.89	2020	3	0	0%	0	0%
		2021	217	18	8%	1	0%
		2022	127	5	4%	2	2%
		2023	5	0	0%	0	0%

The performance for the CRM analysis for Au at Besapantau can be summarised as follows:

- Performance for the РЗК К-1, РЗС К-2 and РЗС 3-2 CRM in 2020 was poor. Results for these CRM initially showed a positive bias before results trended downwards to within the target range as time went on. None of these CRM were analysed after 2020.
- A significant number of CRM РЗС КД were used in 2023 and show good performance.
- Performance of the most commonly used CRM, РЗС КБ, was good with a large number of analysis carried out in 2021 and 2022. Whilst 6.5% of the samples failed the ±2SD limits (8% in 2021), <1% of the samples failed ±3SD limits and no major bias in reporting was seen.
- None of the CRM used for monitoring of analytical accuracy of Besapantau samples were close to the grades used for domaining of mineralisation (0.3g/t Au and 0.5g/t Au).

3.5.7.5 Blank Samples 2020-2023 (Besapantau & Balpantau)

Blank samples are composed of material that is known to contain grades that are less than the detection limit of the analytical method. Analysis of blank samples is a method used to monitor sample switching and cross-contamination of samples during the sample preparation or analysis processes.

Blank samples have been included with the sample stream since 2020 for analysis at the primary laboratory in support of Besapantau and Balpantau. The blank sample material was prepared by Uzbekgeology Kidiruv. WAI has been provided with results for 1,256 blank samples. No blank sample results were provided for review in support of Muruntau and Mutenbai sample analysis.

The results of the blank analysis were reviewed by WAI using control charts to monitor performance in comparison to an upper standard deviation boundary. Any trends and bias in the data over time were also considered in the control charts. The results of the blank performance are shown in Table 3.21 for Au separated by deposit. Failures were determined based on ±5 times the assay detection limit with significant failures determined based on ±10 times the assay detection limit.

Table 3.21: Summary of Blank Sample Results (Au)						
Deposit	**Year**	**Number of Blank Samples**	**Samples > 5 x Detection Limit**		**Samples > 10 x Detection Limit**	
			Number Samples	**% Samples**	**Number Samples**	**% Samples**
Besapantau	2020	134	1	<1	0	0
	2021	243	12	5	6	3
	2022	274	1	<1	1	<1
	2023	5	0	0	0	0
Balpantau	2020	191	1	<1	1	<1
	2021	211	0	0	0	0
	2022	95	0	0	0	0
	2023	103	0	0	0	0
Total	**2020**	**325**	**2**	**<1**	**1**	**<1**
	2021	**454**	**12**	**3**	**6**	**1**
	2022	**369**	**1**	**<1**	**1**	**<1**
	2023	**108**	**0**	**0**	**0**	**0**

Blank failures occur at a relatively low frequency and there does not seem to be systematic trends or bias indicative of pervasive cross contamination or sample switching. WAI does not consider the blank sample results to be an area of concern but would recommend that extreme results, be reviewed to ensure that transcription errors or sample switching has not taken place.

3.5.7.6 Duplicate Samples 2019-2023

Review Criteria

The precision of sampling and analytical results can be measured by re-analysing a portion of the same sample using the same methodology. The variance between the results is a measure of their precision. Precision is affected by mineralogical factors such as grain size, distribution and inconsistencies in the sample preparation and analysis processes. There are several different duplicate sample types which can be used to determine the precision of the sampling process, sample preparation and analyses. A description of the main duplicate types is shown in Table 3.22.

Table 3.22: Summary of Duplicate Types

Duplicate Type	Duplicate Description
Field Duplicate	Sample generated by another sampling operation at the same collection point. Includes a second channel sample taken parallel to the first or the second half of drill core sample and submitted in the same or separate batch to the same (primary) laboratory.
Preparation Duplicate	Second sample obtained from splitting the coarse crushed rock during sample preparation and submitted in the same batch by the laboratory.
Reject Assay	Second sample obtained from splitting the coarse crushed rock during sample preparation and submitted blind to the same or different laboratory that assayed the original sample.
Laboratory Duplicate	Second sample obtained from splitting the pulverised material during sample preparation and submitted in the same batch by the laboratory.
Duplicate Assay	Second sample obtained from splitting the pulverised material during sample preparation and submitted blind at a later date to the same laboratory that assayed the original pulp.
Check Assay	Second sample obtained from the pulverised material during sample preparation and sent to an umpire laboratory.

For the exploration completed between 2019 and 2023, WAI has been provided with results for check assays in support of the Muruntau and Mutenbai exploration data and duplicate assays and check assays in support of Besapantau and Balpantau exploration data.

Duplicate precision levels were assessed by WAI based on HARD acceptance criteria. To reflect inherent variability of the different sample types the HARD criteria used would typically vary based on the duplicate type. A summary of the HARD (and equivalent ARD) criteria used in the analysis by WAI is shown in Table 3.23.

Table 3.23: HARD Acceptance Criteria

Duplicate Type	Description
Field Duplicate	90% of the population being less than 20% HARD (0.4 ARD)
Preparation Duplicate	90% of the population being less than 15% HARD (0.3 ARD)
Reject Assay	90% of the population being less than 15% HARD (0.3 ARD)
Laboratory Duplicate	90% of the population being less than 10% HARD (0.2 ARD)
Duplicate Assay	90% of the population being less than 10% HARD (0.2 ARD)
Check Assay	90% of the population being less than 10% HARD (0.2 ARD)

Summary results for the different duplicate sample types are shown below.

Duplicate Assay Results (Internal Control)

WAI were supplied with duplicate assay results taken after the pulverisation stage of sample preparation (to 0.074mm) with division and selection of the duplicate sample carried out from reject material for submission in a later batch at the primary laboratory.

Since 2021, all duplicate sample results are recorded in a single database albeit coded by deposit. Samples results are coded by year and so performance over time can be tracked. Duplicate assay results prior to 2021 are separated by deposit. Summary results are shown in Table 3.24.

Table 3.24: Summary of Laboratory Duplicate Results for Au (Balpantau and Besapantau)

Deposit	Year	Number of Pairs	Mean Primary Samples	Mean Duplicate Samples	CV Primary Samples	CV Duplicate Samples	Correlation Coefficient	% of Pairs <10% HARD
Besapantau	**2019**	150	1.72	1.65	2.41	2.37	0.99	55.3
Besapantau	**2020**	129	0.91	0.99	1.02	1.28	0.94	26.4
Bes & Bal	**2021**	428	1.08	1.05	1.79	1.72	0.99	75.7
Bes & Bal	**2022**	691	1.52	1.43	2.26	2.08	0.99	60.9
Bes & Bal	**2023**	314	1.41	1.36	2.07	2.15	0.98	62.4

The level of repeatability and therefore the precision of the combined duplicate assay set appears moderate to poor although a general improvement is seen in results after 2020 when compared to the Besapantau results from 2019 and 2020.

Whilst correlation coefficients and comparison of overall means are generally good for all years, HARD analysis results are below the generally accepted target levels. WAI believes that failure rates against HARD acceptance criteria are potentially exaggerated by the fact that the primary laboratory reports Au grade to a single decimal figure. For example, in the 2022 combined data set, 270 of the 691 sample pairs failed the HARD acceptance criteria test (39% of sample pairs). A total of 105 of these 270 sample pairs (with an overall mean grade of 0.33g/t Au) have an absolute difference in grade of exactly 0.1g/t which combined with the low mean grade of the sample pairs leads to a large relative difference. With greater precision in reporting of grade these relative differences may be less then they currently appear.

Check Assay Results (External Control)

WAI were supplied with check assay results taken after the pulverisation stage of sample preparation (to 0.074mm) with division and selection of the duplicate sample carried out from reject material for submission in a later batch at an external laboratory.

Check assay results in support of Muruntau and Mutenbai exploration results are available for the period 2019-2022. A summary of the results of WAI analysis of these sample pairs is shown in Table 3.25.

Table 3.25: Summary of External Laboratory Duplicate Results for Au - Muruntau & Mutenbai

Deposit	Year	Number of Pairs	Mean Primary Samples	Mean Duplicate Samples	CV Primary Samples	CV Duplicate Samples	Correlation Coefficient	% of Pairs <10% HARD
Muruntau & Mutenbai	**2019**	533	3.49	3.57	0.99	1.00	0.99	87.1
	2020	728	3.63	3.68	1.00	1.00	1.00	91.9
	2021	730	3.69	3.72	1.00	0.99	1.00	93.6
	2022	571	3.90	3.85	0.99	0.98	0.96	86.5
	All	2,562	3.68	3.70	1.00	0.99	0.99	90.2

For Muruntau and Mutenbai, results indicate no overall bias between the primary and external laboratory grades. Correlation coefficients and comparison of overall means are generally good for all years. HARD analysis results are generally close to or above the accepted target levels.

Check assay results for Balpantau and Besapantau are available for 2019-2023. Since 2021, all duplicate sample results are recorded in a single database albeit coded by deposit. Samples results are coded by year and so performance over time can be tracked. Duplicate assay results prior to 2021 are separated by deposit. A summary of the results of WAI analysis of these sample pairs is shown in Table 3.26.

Table 3.26: Summary of External Laboratory Duplicate Results for Au - Besapantau & Balpantau

Deposit	Year	Number of Pairs	Mean Primary Samples	Mean Duplicate Samples	CV Primary Samples	CV Duplicate Samples	Correlation Coefficient	% of Pairs <10% HARD
Besapantau	**2019**	150	1.72	1.48	2.41	2.19	0.97	25.3
Besapantau	**2020**	161	1.30	1.23	1.22	1.36	0.99	57.8
All	**2021**	429	1.08	1.02	1.79	1.66	0.99	54.6
All	**2022**	691	1.52	1.44	2.26	2.18	0.98	63.1
All	**2023**	313	1.41	1.36	2.07	2.22	0.98	51.8

For Balpantau and Besapantau, the level of repeatability and therefore the precision of the combined duplicate assay set appears moderate to poor. A similar pattern is seen with the (internal) duplicate assay results in that whilst correlation coefficients and comparison of overall means are generally good for all years, HARD analysis results are below the generally accepted target levels. In addition, a consistent bias is seen with the external laboratory reporting lower grades than the primary laboratory. For the combined data set, this bias was 5.3% in 2021 and 2022 and 3.5% in 2023.

3.5.7.7 Conclusions and Recommendations

Conclusions

As is common with projects that have undergone exploration and production over a long period, QAQC procedures for the deposits under review have altered to reflect typical procedures carried out at the time and reporting requirements at national and international level.

Also as is common with such projects, primary data from early periods of exploration tends to be lost or hard copies of such data degrade over time. As such, not all QAQC data is available for review, even in a summary format. What data does exist has been reviewed and the following conclusions can be made.

Historic data is limited to internal (primary laboratory) and external (umpire laboratory) pulp sample duplicate checks. No primary data was available for review and some summary data was also unavailable (notably all internal & external analysis for Muruntau & Mutenbai fire assay analysis).

At Muruntau and Mutenbai, gamma activation duplicate results available for early programmes includes few or no samples below 0.6g/t Au. Given the domaining cut-off grade for resource estimation is 0.3g/t Au, this presents a gap in assessing analytical precision at this level.

For Besapantau historical fire assay duplicates, failure rates were higher for external than internal duplicates but there was no evidence of bias or increased rates of failure for certain grade brackets. Balpantau historical fire assay duplicate results are incomplete and difficult to put into context but do show increased absolute and percentage discrepancy between sample pairs at lower grades for both internal and external analysis. An issue common to both Besapantau and Balpantau is that no historical fire assay duplicate analysis is available for grades close to the current domaining cut-off of 0.3g/t Au, presenting a risk in assessing analytical precision at this level.

In more recent exploration programmes, reference samples, blank samples and internal & external pulp duplicate analysis has been carried out but these QAQC programmes are not consistent across deposits, nor is all data available for review.

For Muruntau and Mutenbai, a range of reference samples were used to assess assay accuracy. The results show no indication of bias in analysed grades against the target grades and no indication of variation on a yearly basis and comparison of absolute differences and percentage differences between target and actual grades show a reasonable performance against expectations. Whilst a range of SRM grades have been used, none of the SRM used for monitoring of analytical accuracy of Muruntau & Mutenbai samples were close to the grades used for domaining of mineralisation creating a risk that the analytical accuracy of grades at the point of defining mineralised and unmineralised material is unknown.

For Muruntau and Mutenbai gamma activation analysis duplicates carried out between 2017 and 2019, the highest absolute and percentage errors are seen in the first grade class, 0.0 to 0.5g/t Au. This indicates a high risk that samples at, or close to, the cut-off chosen for more detailed fire analysis are misclassified.

No internal fire assay duplicate analysis was available for Muruntau and Mutenbai from 2019 although external check sample results are available for review covering the period 2019-2022. These results indicate no overall bias between the primary and external laboratory grades. Correlation coefficients and comparison of overall means are generally good for all years. HARD analysis results are generally close to or above the accepted target levels.

A range of reference samples were used to assess assay accuracy for Balpantau and Besapantau data between 2020-2023. Results of certain reference samples were poor in the early stages of this programme although general improvement over time is seen. It is noted that none of the CRM used for monitoring of analytical accuracy of this set of sample data were close to the cut-off grades used for domaining of mineralisation.

Blank samples were used for monitoring contamination during Besapantau and Balpantau exploration between 2020 and 2023. Blank failures occurred at a relatively low frequency and there does not seem to be systematic trends or bias indicative of pervasive cross contamination or sample switching.

Internal fire assay duplicate samples were available for the 2019-2023 period for Balpantau and Besapantau. The level of repeatability and therefore the precision of the combined duplicate assay set appears moderate to poor although a general improvement is seen in results after 2020. External check assay results for Balpantau and Besapantau are available for 2019-2023. The level of repeatability and therefore the precision of the combined duplicate assay set appears moderate to poor.

For Besapantau and Balpantau a combination of issues is seen with SRM and duplicates in particular. These issues may impact on each other, i.e. the poor accuracy shown by SRM results may impact on assessing the results of precision monitoring using duplicate samples. However, an improvement is seen over time with SRM performance for Balpantau and Besapantau improving through 2022 and 2023 and duplicate analysis in the most recent programmes better than in 2019-2020. Problems still remain though and duplicate analysis results may be impacted by gravimetric reporting to 1 decimal place although this impact is impossible to quantify. In addition, the external laboratory used for checks against the primary laboratory for these deposits has a consistent negative bias against the primary laboratory.

Recommendations

It is recommended that the gamma activation threshold for choosing which samples to send forward for fire assay analysis is lowered to avoid misclassification at Muruntau & Mutenbai. At Besapantau and Balpantau, deposits with more discrete mineralised domains, the use of fire assay for all samples should be considered. At these deposits, modelling of mineralised domain volume is more sensitive to boundary changes and if samples are wrongly though to be below cut-off grade on the basis of gamma analysis then this could impact on the ability to accurately model the mineralisation.

All assay results from the primary laboratory should be reported to two decimal places. This is common for gravimetric analysis of gold at commercial laboratories. This would enable a better analysis of duplicate and standard reference material samples.

WAI would recommend that a comprehensive and consistent QAQC programme be implemented across all sites and all drill programmes. This would include the introduction of new types of QAQC samples. WAI recommend the use of the following QAQC sample types to form a balanced programme assessing accuracy, precision and contamination and determining at which stage of the sampling and sample preparation process problems may be introduced:

- Field duplicates: Taken as second halves of core from selected sample intervals, field duplicates would help assess the appropriateness of the sampling methodology in producing representative samples.
- Coarse duplicates: Taken from reject material after the crushing stage at the primary laboratory to help assess the ability of the laboratory to produce homogenous material for final sample preparation stages.
- Pulp duplicates: Taken from reject pulverised material to help assess the ability of the laboratory to produce homogenous material from which a final sub-sample for analysis can be taken.
- External duplicates: Pulp duplicates analysed at an external accredited umpire laboratory to assess the performance of the primary laboratory. WAI recommends using an external internationally accredited commercial laboratory.
- Coarse blank samples: Introduced alongside primary drill core samples to monitor potential sample contamination at the sample preparation stage.
- Fine blank samples: Introduced to the sample stream as pulverised material to monitor sample contamination at the assay stage. This could be a barren Certified Reference Material sample.
- Certified reference materials: Commercial CRM with known target grades and standard deviation should be included for a range of grades to monitor analytical accuracy.

It is important that a certified reference sample close to the domaining cut-off grade be included as standard. The lowest grade standard sample in regular use at Besapantau and Balpantau is currently 0.97g/t Au. Being able to determine the accuracy of analysis of material at or around the domaining cut-off grade is crucial to being able to state with confidence that mineralised material is not being misclassified as waste (or vice versa) during the domaining stage of the Mineral Resource estimate.

WAI recommend a QAQC "library" be developed including all QAQC data relevant to the ongoing operations, including historic and recent data. This data should be easy to access, analyse and provide upon request. Whilst the relevance of historic data will diminish over time with increasing depth of mining at Muruntau and increasing infill drilling, the data still acts as a basis for the confidence that can be placed in the current Mineral Resource estimates.

3.5.8 Adequacy of Procedures

WAI considers that current drilling, core sample collection and sample preparation at the Muruntau cluster are undertaken by competent personnel using procedures that are consistent with standard industry practice.

Increased risk of sampling bias exists for historic core drilling (lower average recovery) and non-core sampling (underground channel, trench, reverse circulation drilling). Review of available QAQC data highlights a range of data quality issues around analytical accuracy and precision, alongside incomplete QAQC coverage and protocols. QAQC results improve and data gaps reduce in recent drill programmes, allowing this data to be used to indirectly verify historic datasets.

Risks of sampling and analytical bias have been further assessed through a range of data verification checks outlined in the following section.

3.6 Data Verification

3.6.1 Database Cut-Off Dates

Drilling is on-going at all Muruntau Cluster gold deposits. Cut-off dates used to close the databases prior to Mineral Resource estimation were 15th November 2023 for Balpantau, 16th November 2023 for Besapantau and 29th November 2023 for Muruntau and Mutenbai.

3.6.2 Data Verification by NMMC

3.6.2.1 Summary

Data entry, validation, storage and database management is carried out by NMMC staff. All data are stored in an electronic database. The quality of the assay data contained within the databases is monitored by NMMC staff. Drillhole data is exported to csv files for subsequent import into Leapfrog modelling and estimation software.

3.6.2.2 Comparison with GC Drilling

For Muruntau and Mutenbai, NMMC conducted a visual comparison between the results of exploration and resource development drilling with overlapping GC data. In cases where the presence or absence of a significant mineralised intersection was not confirmed by the high-resolution (6m x 6m) GC sampling, the drill holes were excluded from Mineral Resource estimation.

Whilst WAI considers the GC data to be derived from lower quality sampling (blast hole) and analytical methods (gamma activation), the high density of information is believed to make this an effective tool for identifying significant errors in the drillhole data. Using this approach NMMC has excluded 135 drillholes for 49,730m. This represents a 2.8% failure rate.

3.6.2.3 Verification Drilling

Drilling since 2019 has benefited from higher drill recoveries and a more complete QAQC protocol. Continued drilling allows NMMC to increase 'recent' drill coverage across all deposits and reduce the reliance on historic data.

The maps in Figure 3.10 to Figure 3.12 outline the spatial distribution of recent and historic diamond drilling at each deposit. No twin drillholes have been completed and WAI advises that this is a key gap in the verification work completed to date. Twin drillholes provide a robust test of the reliability of historic data, by minimising the effects of spatial variation and isolating the impact of any differences in drilling, sampling or analytical methods. WAI recommends twin drilling is systematically conducted across all generations of drilling that form a significant proportion of the MRE drillhole database for each deposit.

Whilst no twin drillholes are available, NMMC has infilled regions of historic drilling with recent drillholes as part of resource development. The comparison between historic drilling with adjacent recent drillholes provides some data verification, whereby dramatic changes in mineralisation grade and/or width over very short distances may indicate data quality issues. Like the GC drilling comparison, WAI considers this to be an effective check for the most significant errors.

The Muruntau and Mutenbai deposits have the smallest proportion of recent drilling. Recent drillholes provide 'spot checks' across most of Muruntau but are limited in Mutenbai. Most show reasonable correlation with adjacent historic drillholes (e.g. Figure 3.15A).

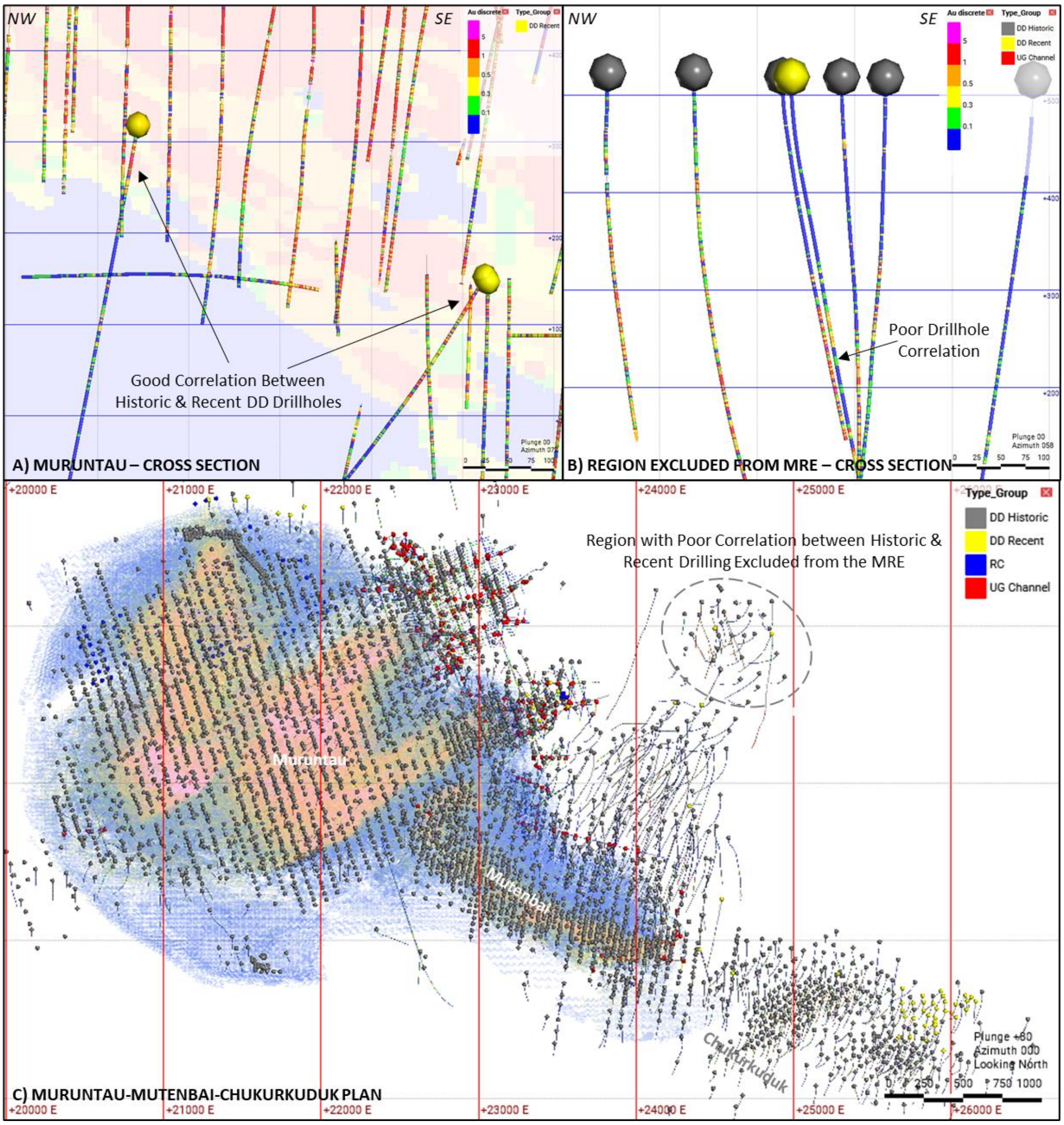


Figure 3.15: (A & B) Cross Sections Comparing Historic and Recent Drill Results and (C) Map of Region Excluded from the MRE

One exception is a cluster of historic drillholes with mineralised intersections NE of Mutenbai, where recent drilling has so far not confirmed the width or grade of the historic results (Figure 3.15B and C). Drilling in this area has been excluded from Mineral Resource estimation and highlights the risk associated with all Muruntau Cluster historic data. The Chukurkuduk deposit was excluded from this study pending the results of ongoing verification drilling.

At Besapantau and Balpantau there are large regions where recent drilling overlaps with or staggers between historic drillholes. In general, the recent drilling conforms well with the results in nearby historic drillholes and underground channel samples (Figure 3.16). There are cases of poor correlation, however these are infrequent, spatially isolated, and often cannot be confidently attributed to the presence of erroneous data rather than low continuity mineralisation (e.g. Figure 3.16A).

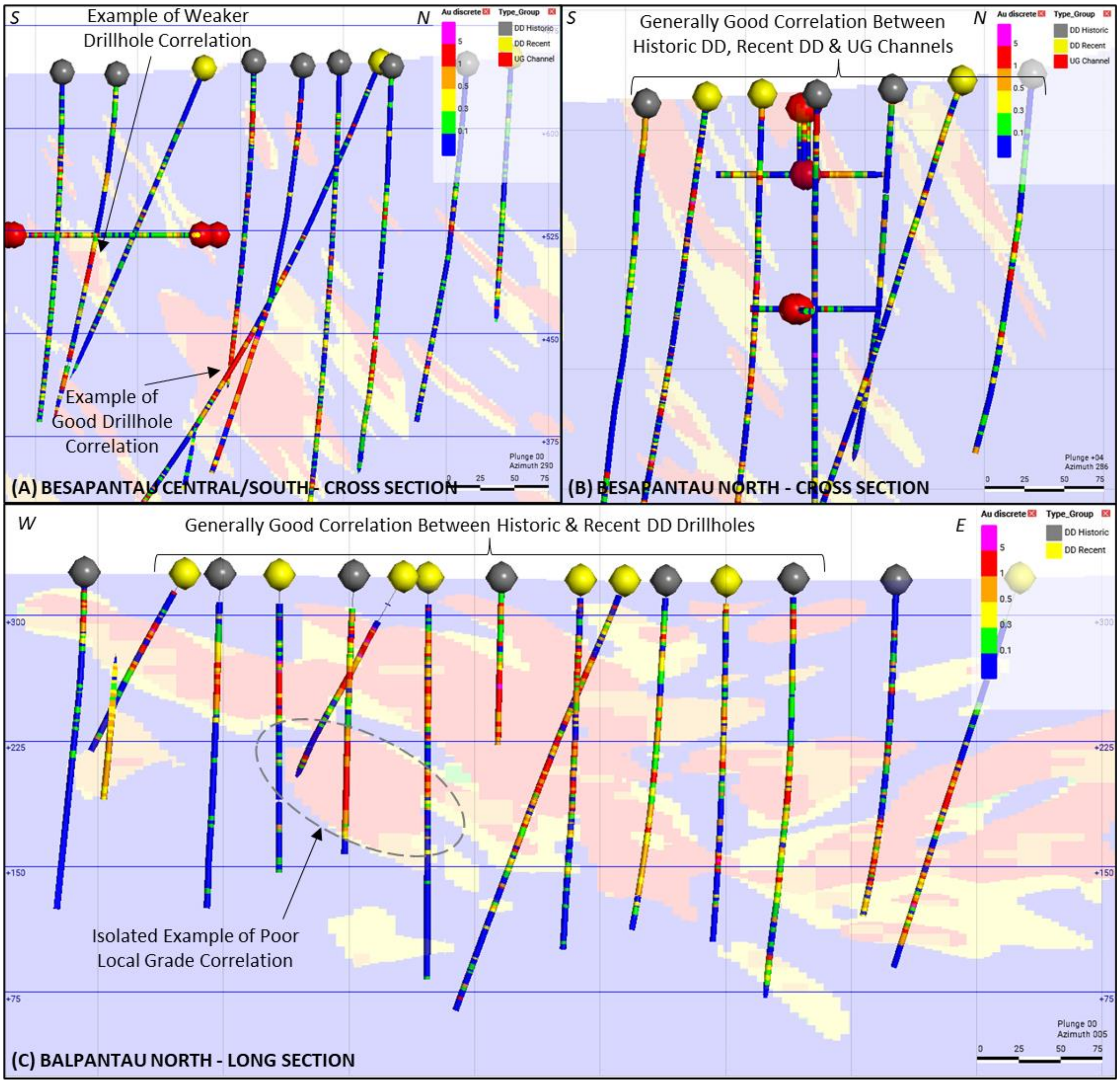


Figure 3.16: Sections Comparing Historic and Recent Drill Results at (A & B) Besapantau and (C) Balpantau

3.6.3 Data Verification by WAI

3.6.3.1 Site Visit

A site visit has been undertaken by WAI (6-9 November 2023) and included the following inspections:

- Extent of exploration work completed to date;
- Review of drill core logging, sampling, sample preparation, analysis and QAQC procedures;
- Inspection of the core logging, sampling and storage facilities;

- Inspection of selected drill core from all Muruntau Cluster deposits to confirm the nature of the mineralisation and the geological descriptions; and
- Inspection of geology and mining operations at the Muruntau and Balpantau open pits.

3.6.3.2 Database Review

A review of the Muruntau Cluster drillhole databases was carried out by WAI and included the following checks:

- Verification that collar coordinates coincide with topographic surfaces;
- Ensuring each drill hole collar recorded has valid XYZ coordinates;
- Ensuring collar coordinates are inside expected limits;
- Checking for the presence of any duplicate drill hole collar IDs or collars with duplicate collar coordinates;
- Ensuring all drillholes have a valid downhole survey;
- Verification that downhole survey azimuth and inclination values display consistency;
- Ensuring samples and down hole surveys do not exceed maximum depths of drill holes;
- Checking for missing samples and their location;
- Evaluation of minimum and maximum grade values;
- Evaluation of minimum and maximum sample lengths;
- Assessing for inconsistencies in spelling or coding (typographic and case sensitive errors); and
- Ensuring full data entry and that a specific data type (collar, survey, lithology and assay) is not missing and assessing for sample gaps or overlaps.

Overall, WAI found the drillhole databases to be in good condition, with only a small number of minor errors identified that would not have a material impact on Mineral Resource estimation.

3.6.3.3 Checks for Bias

WAI has completed an independent statistical comparison between datasets, to help detect any bias in the sample data due to differences in sample type or changes in sampling and/or analytical procedures over time. To isolate these factors from natural local variation in the mineralisation, distance functions have been used to limit comparisons to samples within a short distance (e.g. Figure 3.17). Compositing was also completed to standardise sample support between datasets and reduce the influence of volume-variance effects. Using this approach, any large differences between sample distributions provides a warning that one dataset may contain significant errors.

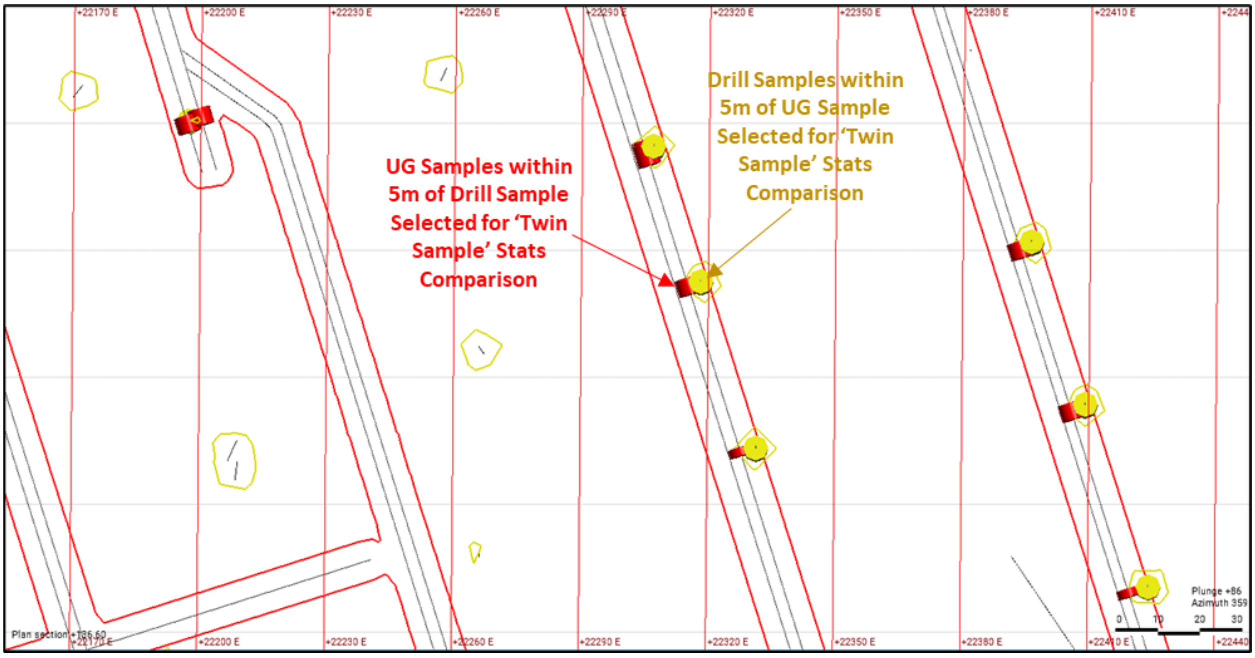


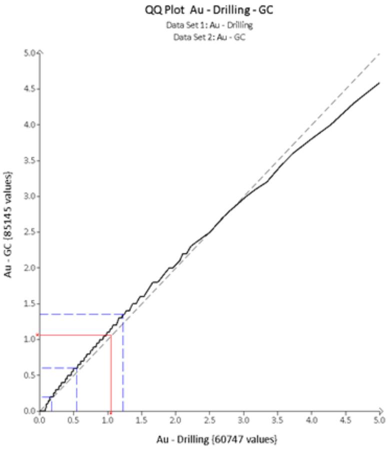
Figure 3.17: Muruntau Level Plan Demonstrating Approach for Restricting Statistical Comparisons to Closed Spaced Data

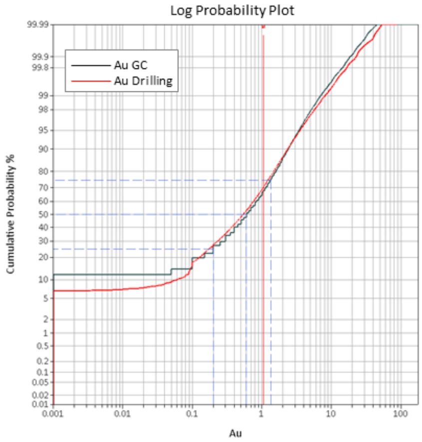
The large GC database at Muruntau and Mutenbai provides a useful check on the reliability of other data types. This check relies on the assumption that any errors in the GC sampling and analysis, are largely offset by the exceptional volume and density of the GC sample data. This is an important assessment given the limited amount of recent drilling and associated QAQC coverage at these deposits.

At Muruntau and Mutenbai, close spaced (<5m) drilling and GC data compare well (Figure 3.18A). Slight positive bias is evident in the plots comparing UG sampling with GC data (Figure 3.18B), however when average grades above resource (0.3g/t) and mining (0.5g/t) cut-offs are calculated, differences are typically around +5%. When compared directly, drilling and UG sampling data show similar distributions. Separating and comparing DD drilling with RC drilling, also generates a near 1:1 Q-Q plot (Figure 3.19).

Overall, there is no evidence for material bias between different sample types at Muruntau-Mutenbai, which supports the NMMC decision to include DD drilling, RC drilling and UG sampling in Mineral Resource estimation.

(A) Muruntau-Mutenbai: Drilling Vs. GC



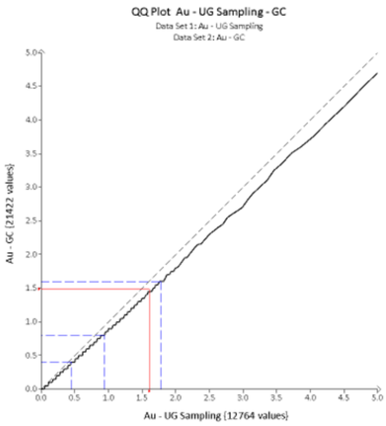


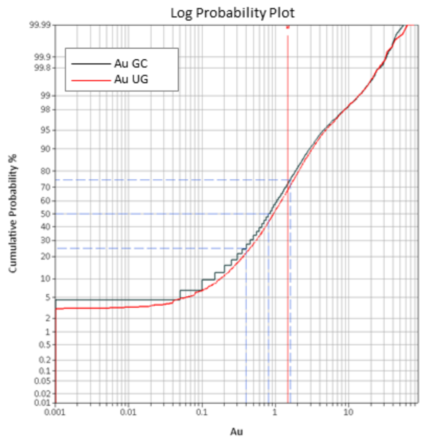
Mean Grade Comparison at a Range of Cut-Off Grades (COGs):

COG	GC	Drilling	Diff	% Diff
0	1.06	1.05	-0.01	-0.8%
0.3	1.47	1.55	0.09	5.6%
0.5	1.71	1.84	0.13	6.8%
1	2.34	2.57	0.23	9.0%

5m Composites, <5m Separation

(B) Muruntau-Mutenbai: UG Sampling Vs. GC



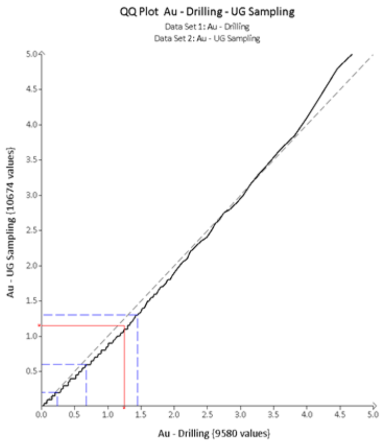


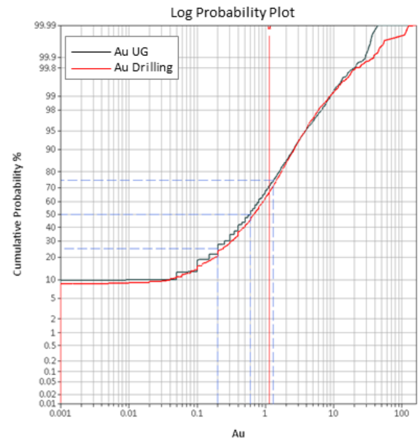
Mean Grade Comparison at a Range of Cut-Off Grades (COGs):

COG	GC	UG	Diff	% Diff
0	1.48	1.61	0.12	7.7%
0.3	1.79	1.90	0.11	5.7%
0.5	2.04	2.13	0.09	4.0%
1	2.86	2.86	0.00	0.0%

5m Composites, <5m Separation

(C) Muruntau-Mutenbai: Drilling Vs. UG Sampling





Mean Grade Comparison at a Range of Cut-Off Grades (COGs):

COG	UG	Drilling	Diff	% Diff
0	1.15	1.25	0.10	7.7%
0.3	1.61	1.70	0.09	5.1%
0.5	1.91	1.97	0.06	2.8%
1	2.72	2.68	-0.04	-1.5%

2m Composites, <5m Separation

Figure 3.18: Muruntau-Mutenbai Statistical Comparisons between a Range of Datasets

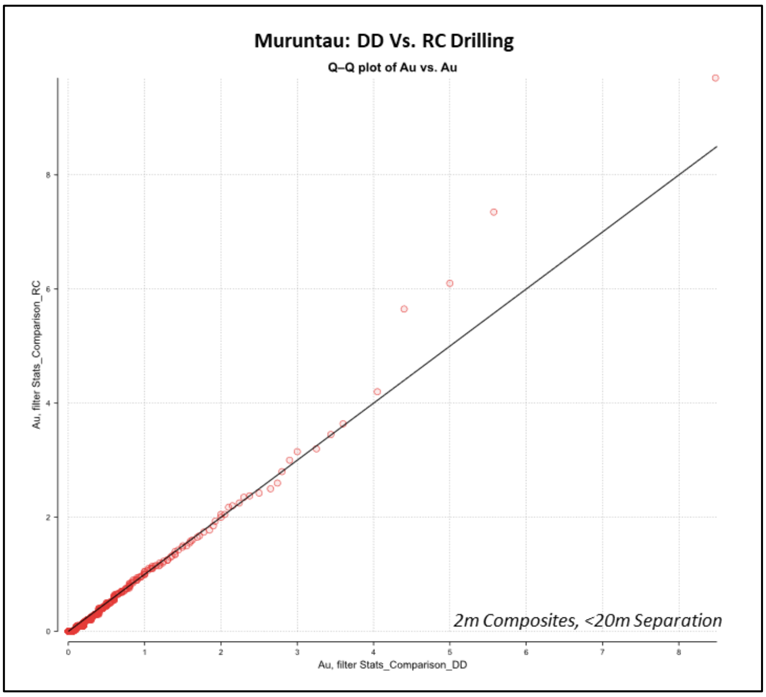


Figure 3.19: Muruntau Q-Q Plot between DD and RC Drilling

Besapantau and Balpantau have a much larger proportion of recent drilling with QAQC results, which can be used to compare with and help verify the historic drill data. Comparison between <10m spaced composites in Figure 3.20, shows no material bias at Besapantau and potential for historic results to understate grade at Balpantau (-9% difference in average composite grade above 0.5g/t cut-off). Given the magnitude and downside nature of the differences at Balpantau, WAI accepts the decision to include historic data at both deposits at this stage. This decision should be reviewed based on the results of twin hole drilling.

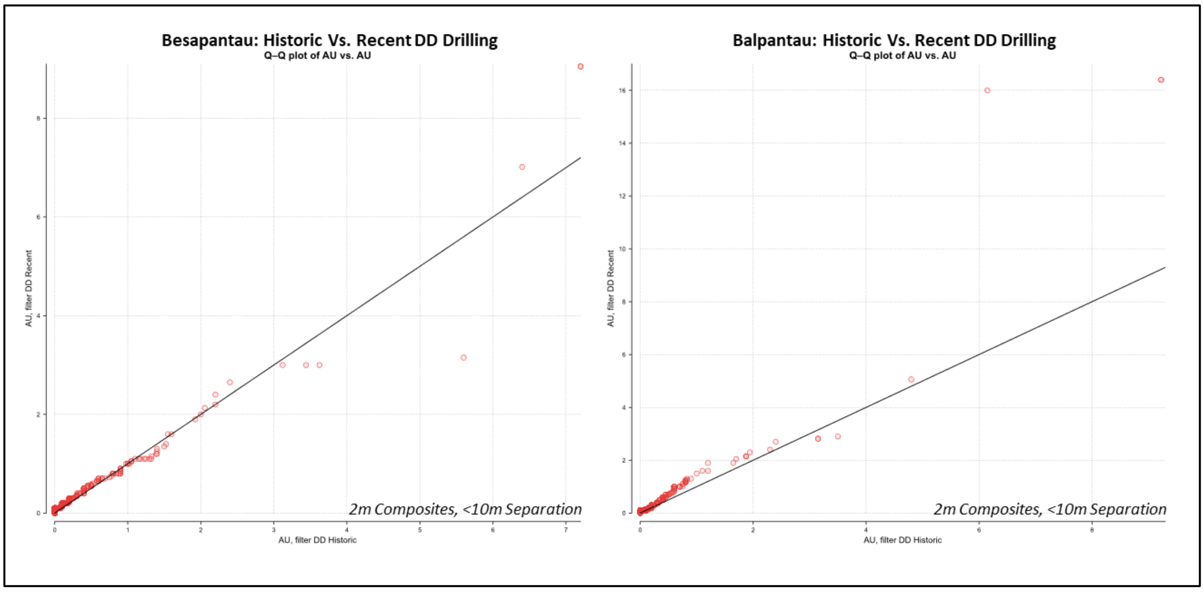


Figure 3.20: Q-Q Plots between Historic and Recent DD Drilling at Besapantau and Balpantau

Q-Q plots comparing close spaced (<10m) DD drilling and trenching at Balpantau, show strong positive bias in the trenching results (Figure 3.21). This may be due to the presence of near-surface supergene enrichment, over-represented in the surface trenching. To ensure this grade is not extrapolated to depth, WAI agrees with the decision to exclude all trenching from the Balpantau Mineral Resource estimation. At Besapantau, only the most recent trenching oriented orthogonal to the strike of mineralisation was included in the final resource model. This compromise appears to remove the most obvious trench related artifacts and inconsistencies in the mineralisation model.

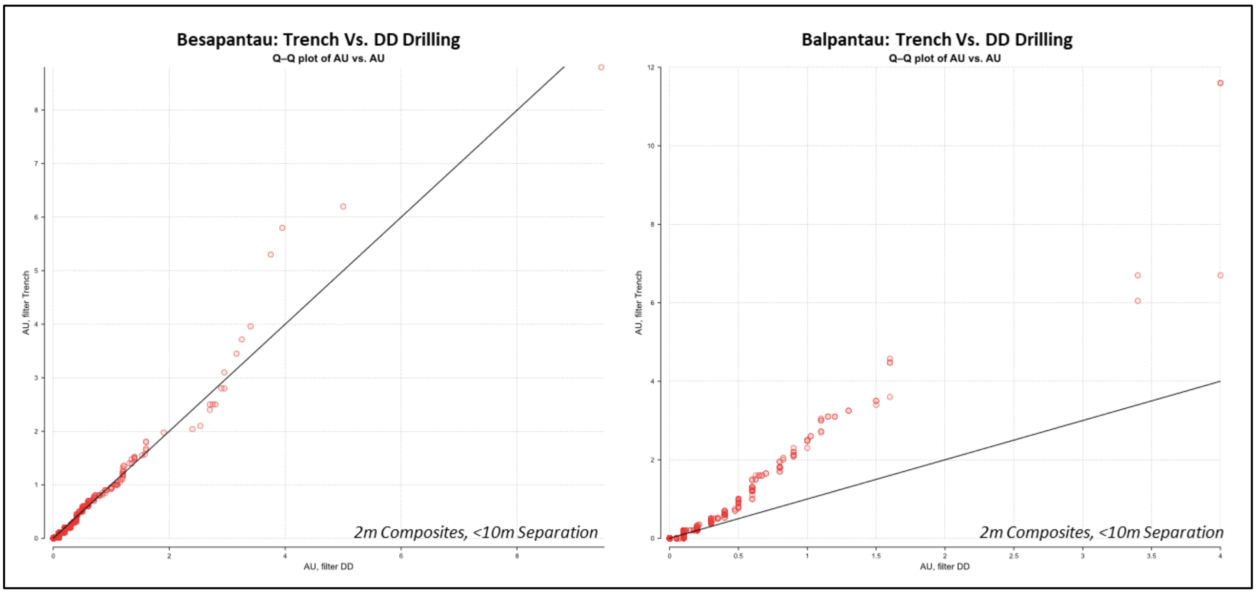


Figure 3.21: Q-Q Plots between Trenching and DD Drilling at Besapantau and Balpantau

3.6.4 Adequacy of Data

The verification procedures carried out by WAI confirmed the integrity of the data contained in the electronic databases. WAI considers that QAQC and data verification completed to date, have been used to select a subset of the drillhole databases deemed appropriate for Mineral Resource and Ore Reserve estimation.

3.7 Mineral Resource Estimate

3.7.1 Introduction

The Mineral Resource estimates discussed in this report are located within NMMC's Muruntau Cluster, contained in the Muruntau, Mutenbai, Besapantau and Balpantau gold deposits. The Chukurkuduk deposit was excluded from this study pending the results of ongoing verification drilling. Mineral Resource estimation was completed by NMMC using drillhole databases and geological models developed by the NMMC geology team and its subcontractors. Optimised pit shells used to constrain Mineral Resource reporting were generated by WAI based on parameters provided by NMMC.

The Muruntau, Mutenbai and Chukurkuduk deposits form a semi-contiguous mineralised volume that has been captured in a single block model. For this review, WAI have excluded the region of this model that covers Chukurkuduk from pit optimisation and Resource reporting. Individual block models have been generated separately for Besapantau and Balpantau.

The audit process completed by WAI included a feedback loop, whereby any issues or improvement opportunities could be addressed by NMMC in the final models prior to reporting the audited MRE statement. This section describes the methodology and parameters adopted in the final models. Any outstanding issues or opportunities are captured as recommendations.

3.7.2 Software

Database import, and preparation, wireframe modelling, statistical analysis, compositing, variographic analysis, block modelling and grade estimation were undertaken by NMMC primarily using Leapfrog Geo and Leapfrog Edge software. NMMC also completed some statistical analysis and block model validation checks in Micromine.

WAI audited the Mineral Resource estimates using a combination of Leapfrog Geo, Leapfrog Edge, Snowden Supervisor and Datamine Studio RM software. WAI completed pit optimisations on the audited block models using Datamine Studio OP and NPV Scheduler software.

3.7.3 Database

The database cut-off dates for each deposit are detailed in Section 3.6.1. Drillhole data used for Mineral Resource estimation was restricted to diamond core drilling, reverse circulation drilling and underground channel sampling, with limited trenching also included at Besapantau. Other drilling and sampling methods were excluded due to concerns over sample quality. A selection of diamond drillholes were also excluded that failed NMMC verification checks, as described in Section 3.6.2. A summary of the Mineral Resource databases is shown in Table 3.27.

Table 3.27: Summary of MRE Drillhole Database

Deposit	Type	Count	Sample Count	Sample Metres
Muruntau Mutenbai	DD	6,333	623,717	1,281,402
	RC	264	7,556	19,019
	UG Channel	1,831	222,739	251,363
	Sub-Total	8,428	854,012	1,551,784
Besapantau	DD	484	65,634	141,631
	RC	0	0	0
	UG Channel	262	8,740	16,442
	Trench	114	4,627	18,304
	Sub-Total	860	79,001	176,377
Balpantau	DD	351	30,844	66,307
	RC	68	5,901	5,914
	UG Channel	344	7,135	8,167
	Sub-Total	763	43,880	80,388

3.7.4 Geological Model

3.7.4.1 Oxidation

The boundary between oxidised and fresh rock has been modelled at Besapantau. This boundary sits approximately 40-70m below surface at Besapantau. Oxidation modelling enables the assignment of lower density values to this domain, as well as delineating zones with potentially different geometallurgical and/or geotechnical properties.

Oxidation logging is currently inconsistent, commonly showing limited continuity between adjacent drillholes. NMMC advises that this reflects a logging quality issue, rather than the actual geology and have generated models from a subset of holes with oxidation depths that coincide with historical reports. WAI considers oxidation modelling Besapantau to be preliminary in nature and recommends a programme of relogging to improve data quality and increased training / standardisation of oxidation logging procedures for NMMC subcontractors.

At Muruntau, Mutenbai and Balpantau no weathering profile has been modelled, with all material considered to be fresh rock. At Muruntau and Mutenbai this is largely driven by data availability and WAI recommends that oxidation models are generated for all deposits as logging coverage allows.

3.7.4.2 Lithology & Structure

Lithology and structural modelling have been informed by available drillhole data, geological interpretations (level plan and cross section) and underground / open pit mapping.

As part of 2022 geotechnical studies by SRK, detailed structural modelling was completed for Muruntau, Mutenbai and Chukurkuduk, alongside a conceptual model for bedding and lithology (Figure 3.22).

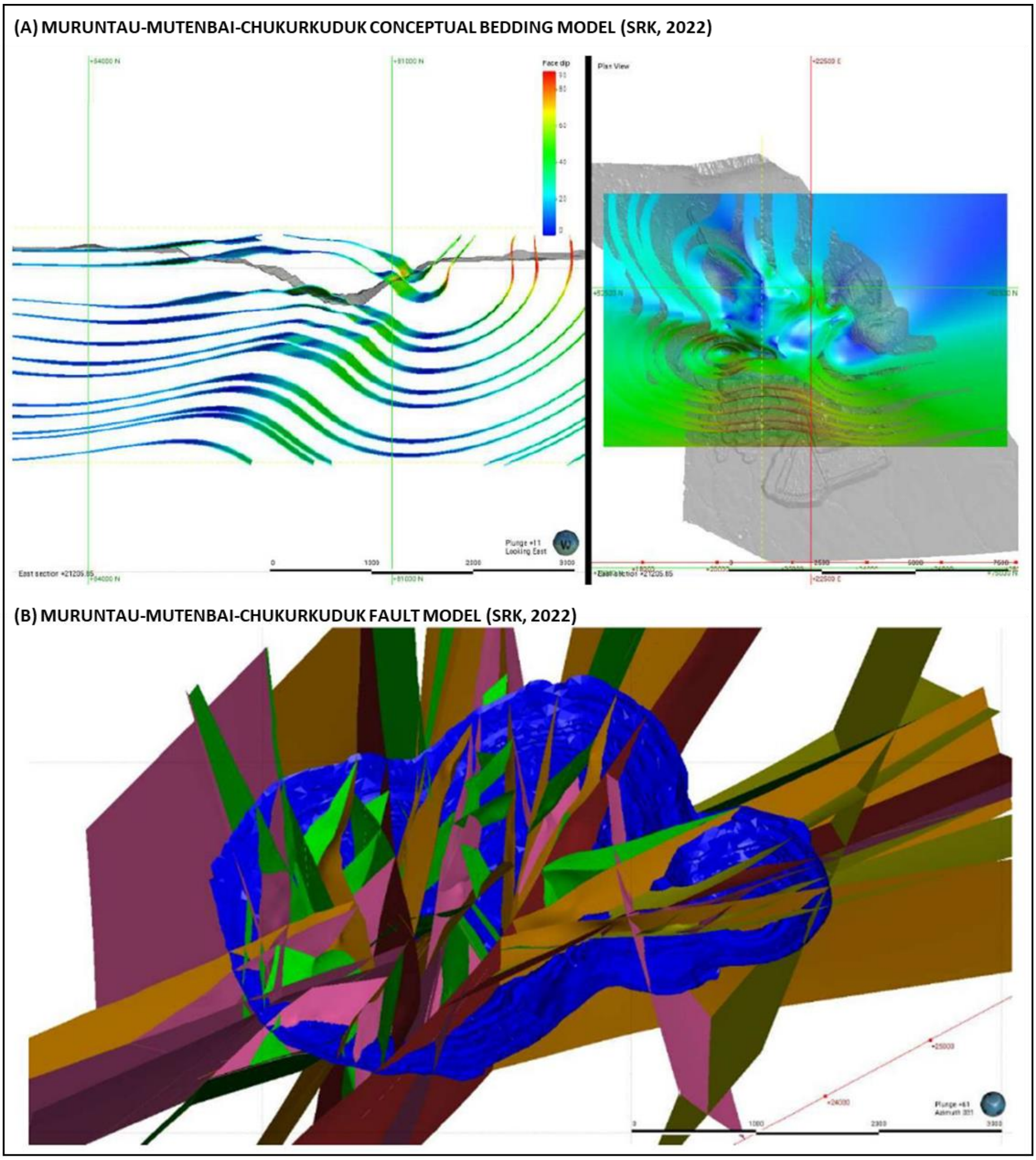


Figure 3.22: Muruntau-Mutenbai-Chukurkuduk Geological Modelling

A detailed integrated lithological and structural model has been generated for the Besapantau deposit (Figure 3.23). This model was developed as part of the 2019 SRK Mineral Resource estimate. Limited fault modelling has also been completed at Balpantau.

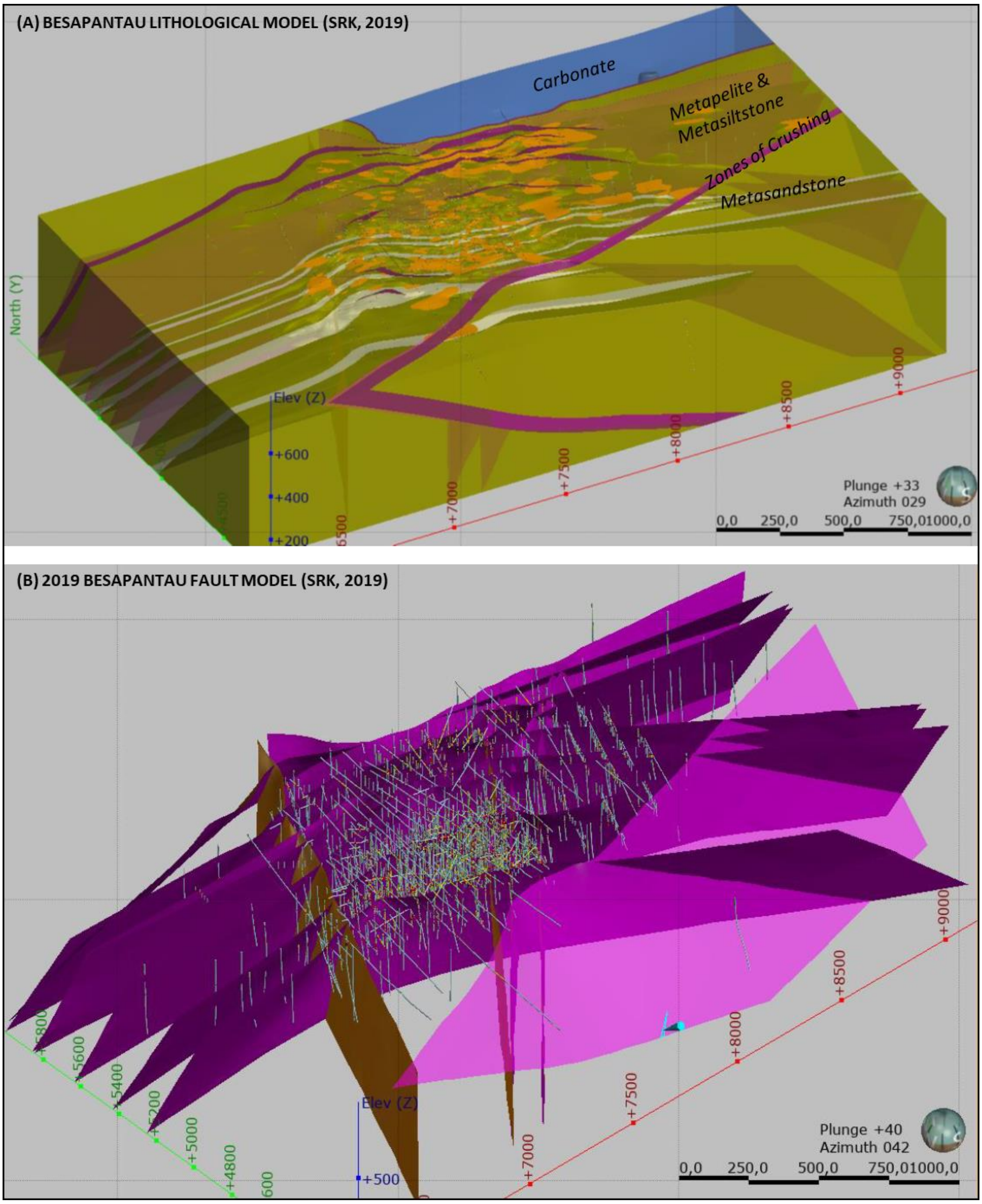


Figure 3.23: Besapantau Geological Modelling

Only the cover-basement interface and major structures that offset and/or truncate mineralisation, have been continually refined based on new drilling and carried forward into the development of the mineralisation domains that inform Mineral Resource estimation. WAI recommends that detailed geological models are developed and actively maintained for all deposits as logging coverage allows. Such models can potentially increase the resolution of density modelling, better constrain geological controls on mineralisation, and improve rock mass characterisation for other technical disciplines (e.g. active carbon risk).

3.7.5 Mineralisation Domains

3.7.5.1 Muruntau and Mutenbai

The Muruntau and Mutenbai deposits have diffuse grade architecture, controlled by complex mineralised vein arrays and stockworks. Mineralisation is commonly developed sub-parallel to bedding in the folded and faulted host sequence, resulting in mineralised zones with folded geometries at a range of scales and major fault-related discontinuities.

NMMC constructed mineralisation domain wireframes by compositing samples above specific cut-off grades and using implicit modelling (Leapfrog Intrusions) to generate envelopes around the composites. Structural trends were constructed and applied to the envelopes, such that domain orientation and continuity reflects the interpreted orientation and continuity of the mineralisation.

Wireframe boundary cut-off grades were selected based on inspection of sample histograms and a representative grade control level (350mRL) for pronounced grade breaks, alongside consideration of the existing mining cut-off grade (0.5g/t). Based on this analysis NMMC selected 0.3g/t, 0.5g/t and 1g/t to generate domain wireframes for Muruntau and Mutenbai.

WAI completed contiguous length analysis by plotting average drillhole intercept grade and length with increasing cut-off grade (Figure 3.24). Similar trends exist for the individual deposits. Intercept length rapidly decreases as cut-off grade increases, then begins to stabilise at 0.2-0.3g/t after which length drops more gradually. This inflection point is interpreted to represent the natural lower boundary cut-off grade of the mineralised zones and supports the lowest 0.3g/t wireframe boundary cut-off grade used by NMMC.

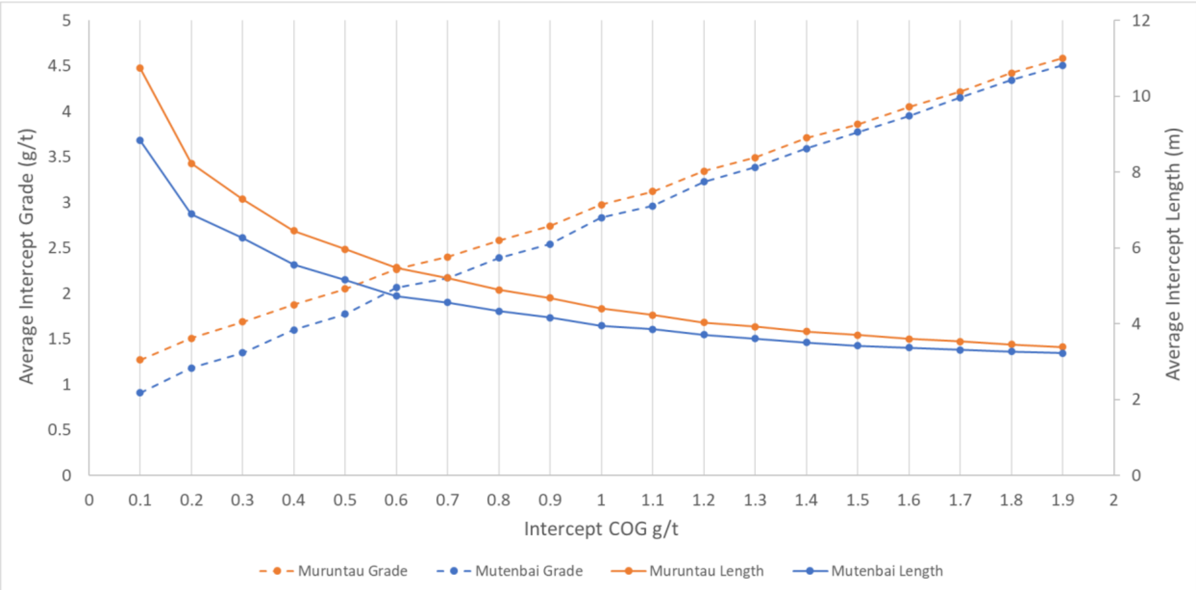


Figure 3.24: Contiguous Length Analysis for the Muruntau and Mutenbai Deposits

To assess natural breaks at higher grade ranges, WAI completed grade slope analysis for a test area on the 350mRL grade control level (Figure 3.25A). This technique converts grade control sample gold values within the test area to an elevation raster (where z = Au grade) (Figure 3.25B), from which a slope map is calculated using the GDAL DEM analysis utility in QGIS (Figure 3.25C). The slope parameter represents the rate of change in gold grade across the test area. Plotting average slope per Au grade class shows marked increases in gradient between the 0.2-0.3g/t, 0.6-0.7g/t, 0.9-1g/t and 1.6-1.7g/t classes (Figure 3.25D), suggesting boundaries may exist between mineralised domains around these grade ranges. These results align reasonably well with the 0.3g/t, 0.5g/t and 1g/t wireframe boundary cut-off grades adopted by NMMC.

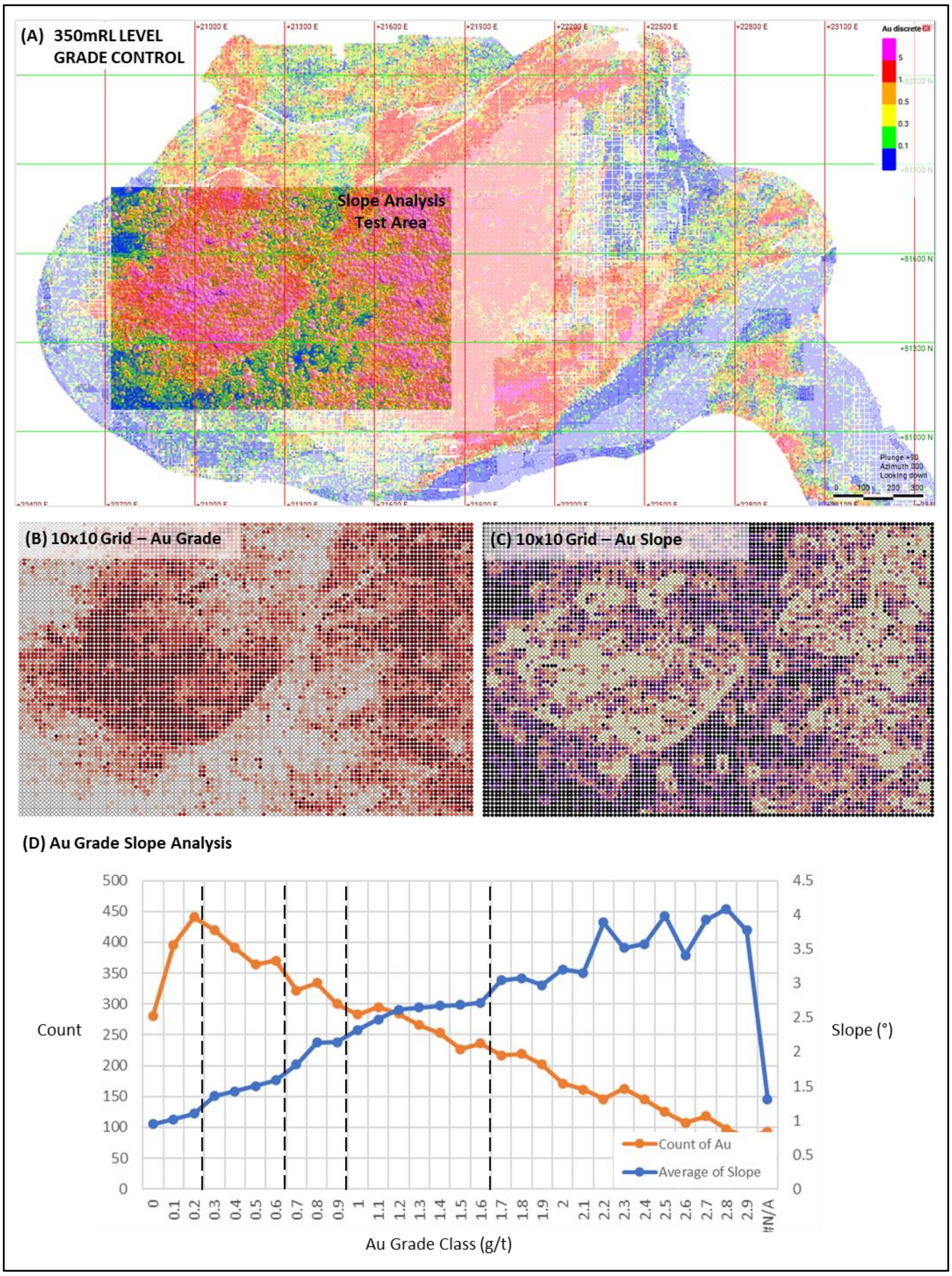


Figure 3.25: Grade Slope Analysis for the Muruntau 350mRL Grade Control Level

Compositing, interpolation and trend parameters were optimised to generate grade envelopes that reproduce the gold spatial distribution in the grade control block model, based solely on the MRE drillhole database (i.e. without using grade control sample data). Composite parameters used for Muruntau and Mutenbai domain modelling are listed inTable 3.28.

Table 3.28: Drillhole Compositing Parameters for Domain Modelling

Deposit	Cut-Off Grade (g/t)	Minimum Composite Length (m)	Maximum Included Waste (m)
Muruntau	1	15	15
	0.5	15	20
	0.3	30	30
Mutenbai	1	15	15
	0.5	15	15
	0.3	30	30

Trend modelling was informed by structural measurements digitised from underground plans for Muruntau deposit (Figure 3.26), as well as from 2015 pit mapping. The trend model was also refined based on orientations of continuity delineated by the high-resolution grade control data. WAI completed an independent interpretation of the dominant mineralised trends in the grade control data and defined similar orientations to those expressed in the NMMC domain wireframes. Orientations identified in the upper data rich part of the deposits have been projected to depth.

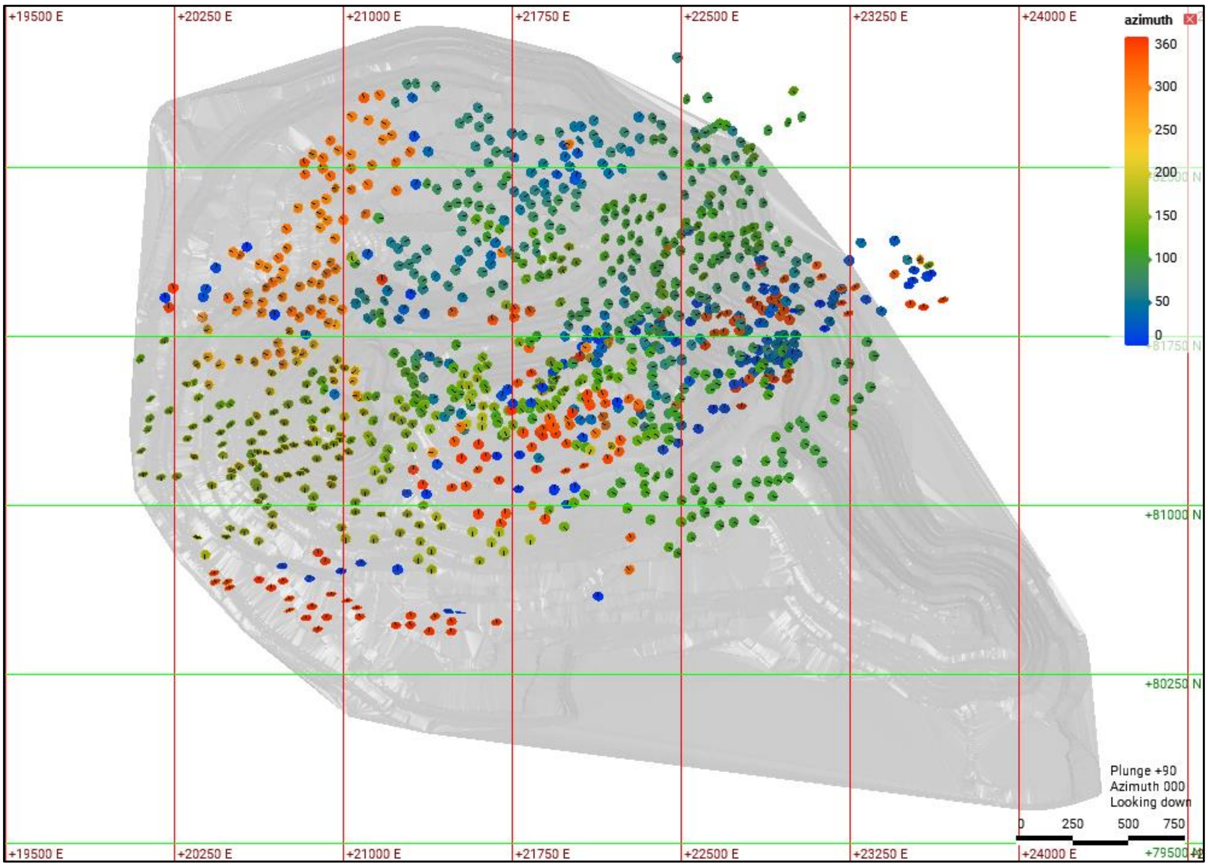


Figure 3.26: Muruntau Structural Data

Major faults have been constructed (Figure 3.27) and break the mineralisation wireframes up into fault blocks. The faults have been observed in the open pit and can also be inferred from planar discontinuities in the grade control assay data. Wireframes for the cover-bedrock interface have been used to terminate mineralised zones, where they sub-crop under cover.

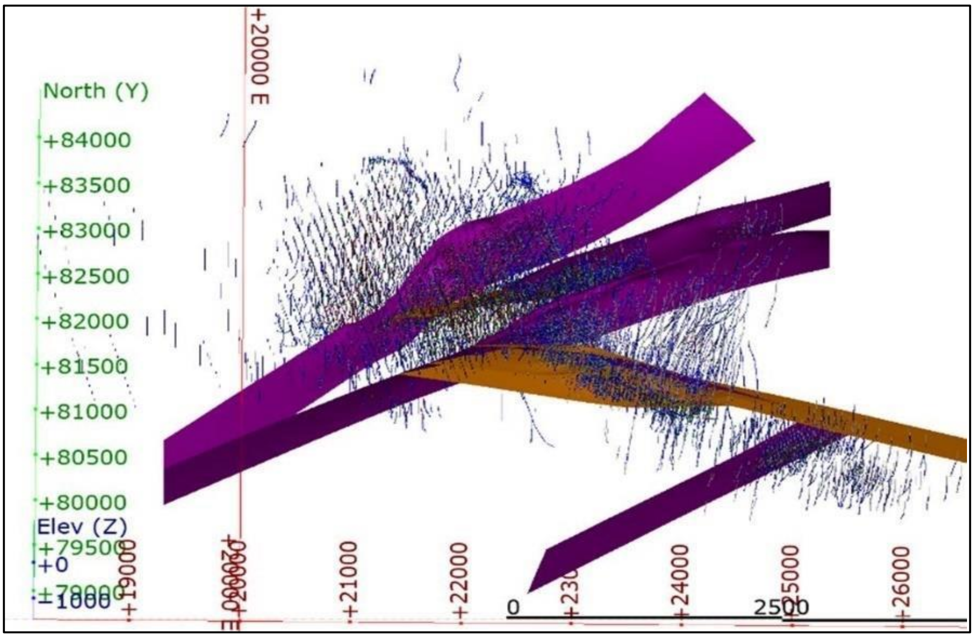


Figure 3.27: Fault Model for Muruntau and Mutenbai

Figure 3.28 compares the mineralisation domain wireframes used in resource estimation with the grade control block model. Both are colour coded to compare domain boundary location with corresponding grade ranges in the block model. Good spatial correlation indicates that the resource domains effectively represent the outline of Muruntau mineralisation at the cut-off grades applied.

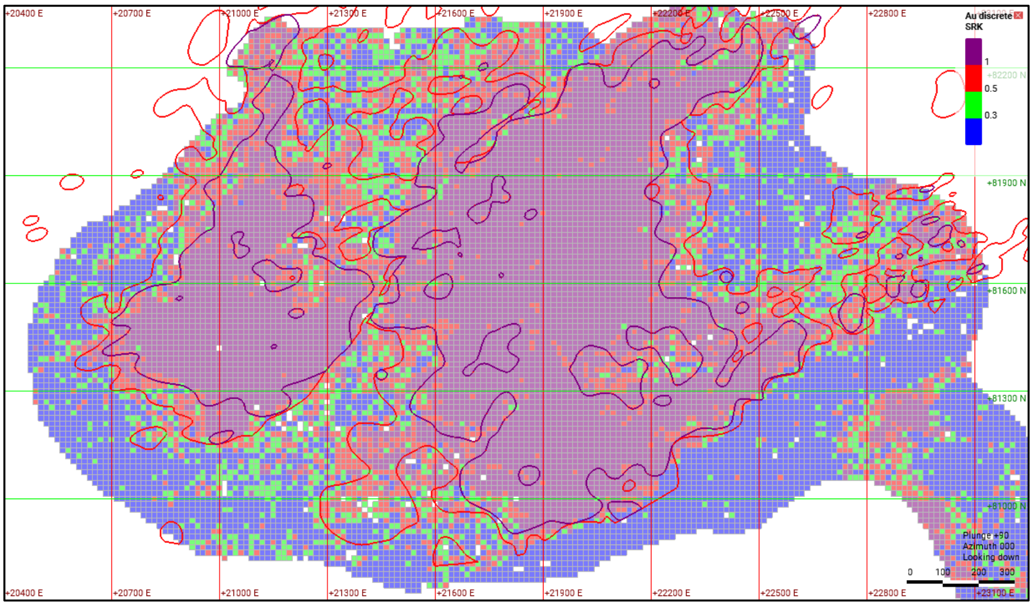


Figure 3.28: Muruntau Mineralisation Domains vs. Grade Control Block Model (350mRL Level Plan)

3.7.5.2 Besapantau

The Besapantau deposit is interpreted to comprise a series of stacked sub-parallel mineralised sheets and lenses. Mineralised zones are typically more discrete, narrower and lower continuity than at Muruntau and Mutenbai. The same general wireframing approach used for Muruntau and Mutenbai was applied to Besapantau, with parameters tailored to fit Besapantau geology by:

- Reducing minimum composite length (5m) and maximum internal waste (5m) to resolve narrower mineralised zones;
- Applying a strong approximately E-W striking and 60° north dipping structural trend consistent with the dominant orientation of mineralisation; and
- Construction of 0.3g/t and 0.5g/t grade envelopes only, reflecting the lack of continuity at higher wireframe boundary cut-off grades.

One risk associated with applying this methodology to Besapantau mineralisation, is that there can be limited separation between the nested 0.3g/t and 0.5g/t grade envelopes, resulting in poorly informed 0.3g/t 'skins' around the 0.5g/t wireframe. NMMC in part mitigated this risk by filtering out some 0.3g/t composites that extend less than 5m beyond the 0.5g/t composite intervals prior to wireframing.

A second risk is that block estimates are informed by composites from adjacent mineralised zones. This is potentially most problematic where blocks within low volume mesh parts can only meet minimum sample criteria in later estimation passes with expanded search ellipses. NMMC in part mitigated this risk by splitting the grade envelopes such that the largest volume mesh parts (i.e. major mineralised zones) are separate estimation domains. Furthermore, low volume mesh parts have been restricted to Inferred classification regardless of drill spacing.

The resulting domain wireframe configuration is outlined in Figure 3.29.

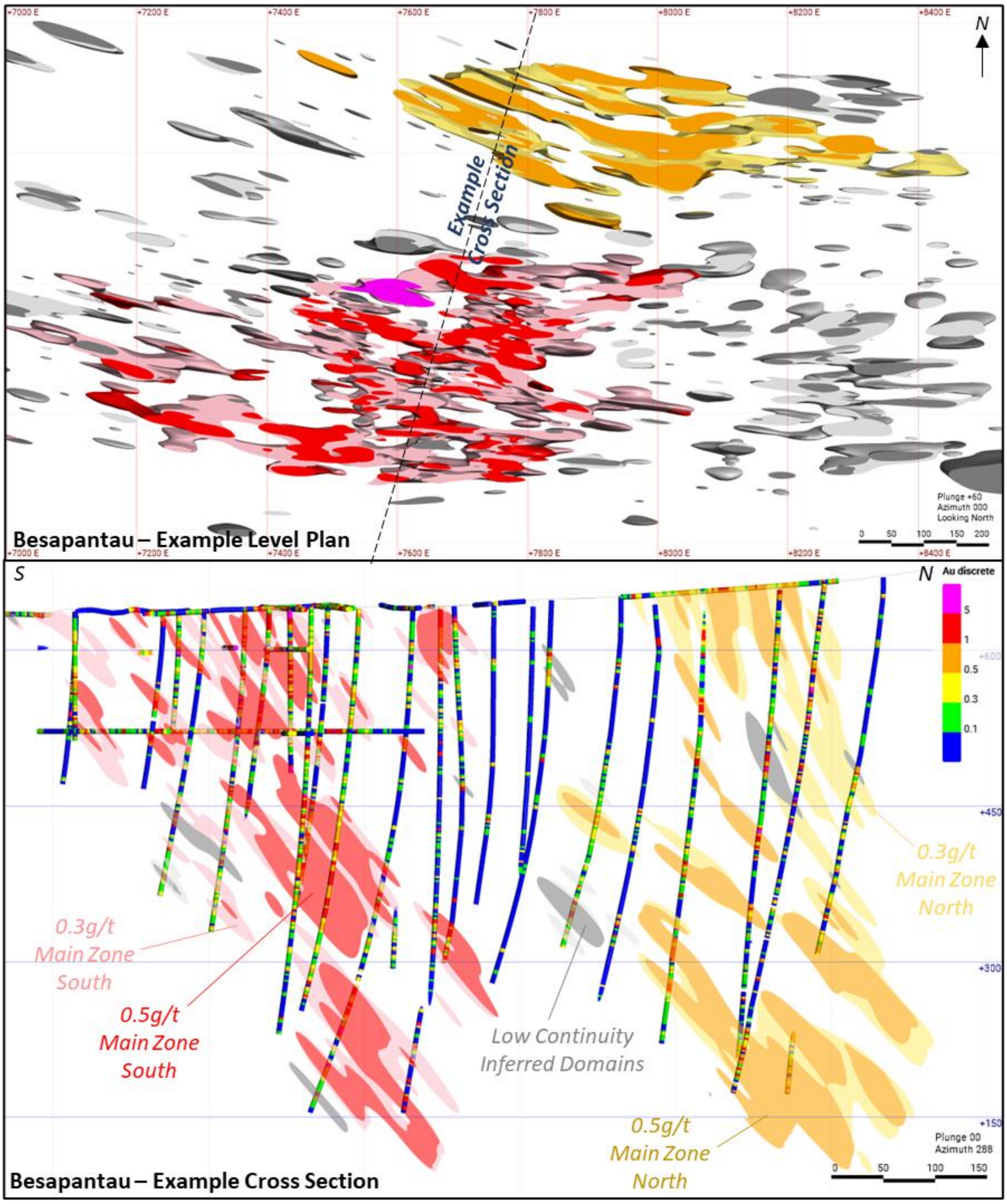


Figure 3.29: Plan View of Besapantau Mineralisation Domains

3.7.5.3 Balpantau

The Balpantau deposit shares similarities with Besapantau in that local deposit morphology is characterised by discrete sub-parallel semi-planar mineralised zones. One significant difference is that orientation is variable, whereby the dominant strike and dip wraps around a central volcanic dome, with mineralisation developed proximal to the contact between the volcanic rocks and overlying metasediments.

The same wireframing approach used for Besapantau was applied to Balpantau, with a trend model fitted to the variable mineralisation orientation. Again, steps were taken to limit the development of 0.3g/t wireframe 'skins' and the sharing of composites between spatially separate mineralised zones. The resulting domain wireframe configuration is outlined in Figure 3.30.

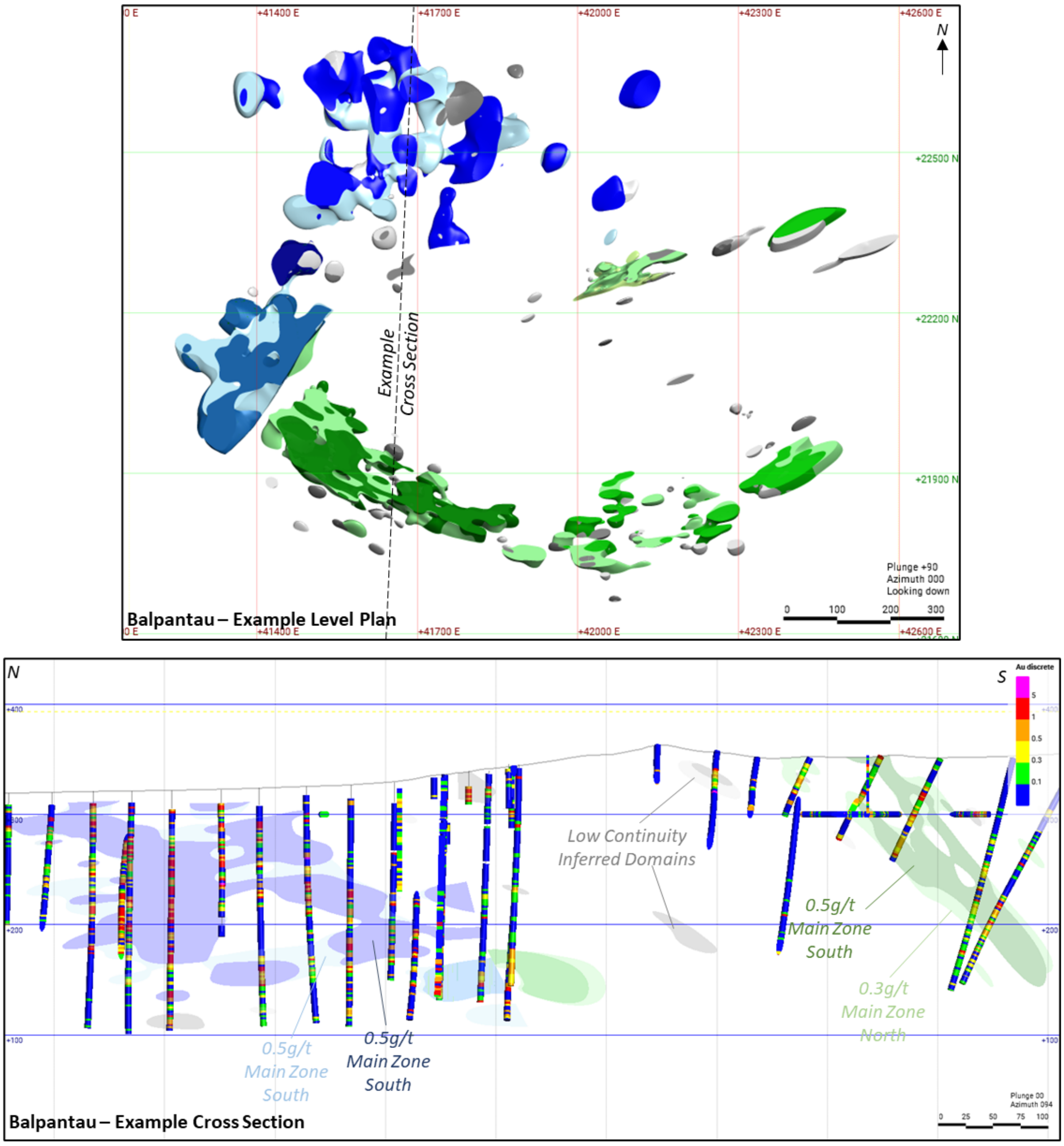


Figure 3.30: Plan View and Cross-section of Balpantau Mineralisation Domains

3.7.6 Boundary Analysis

Boundary analysis measures the rate of grade change across the contact between two domains. Plots generated by WAI show a sharp step change consistent with hard boundary conditions for Muruntau Cluster gold mineralisation. An example of boundary analysis across the Muruntau 1g/t domain boundary is provided in Figure 3.31.

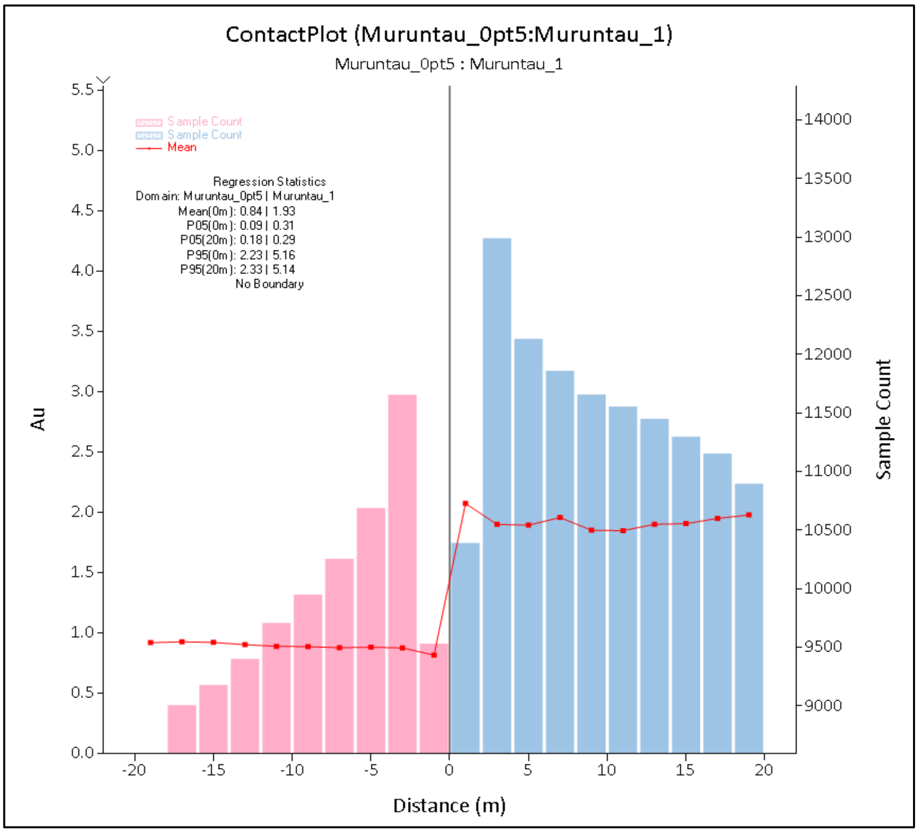


Figure 3.31: Example of Boundary Analysis for the Muruntau 1g/t Domain Boundary

3.7.7 Compositing

Downhole compositing of assay samples was completed to avoid bias introduced when interpolating grade from samples of varying length. A 2m downhole composite length was chosen for all deposits. Residual lengths below half the target composite length were distributed evenly throughout a given drillhole. Samples were not composited across domain boundaries.

WAI has reviewed sample length histograms for each deposit (Figure 3.32). A 2m composite length coincides with the modal sample length for all deposits and does not cause unnecessary manipulation of sample boundaries / grades or excessive decompositing of longer samples.

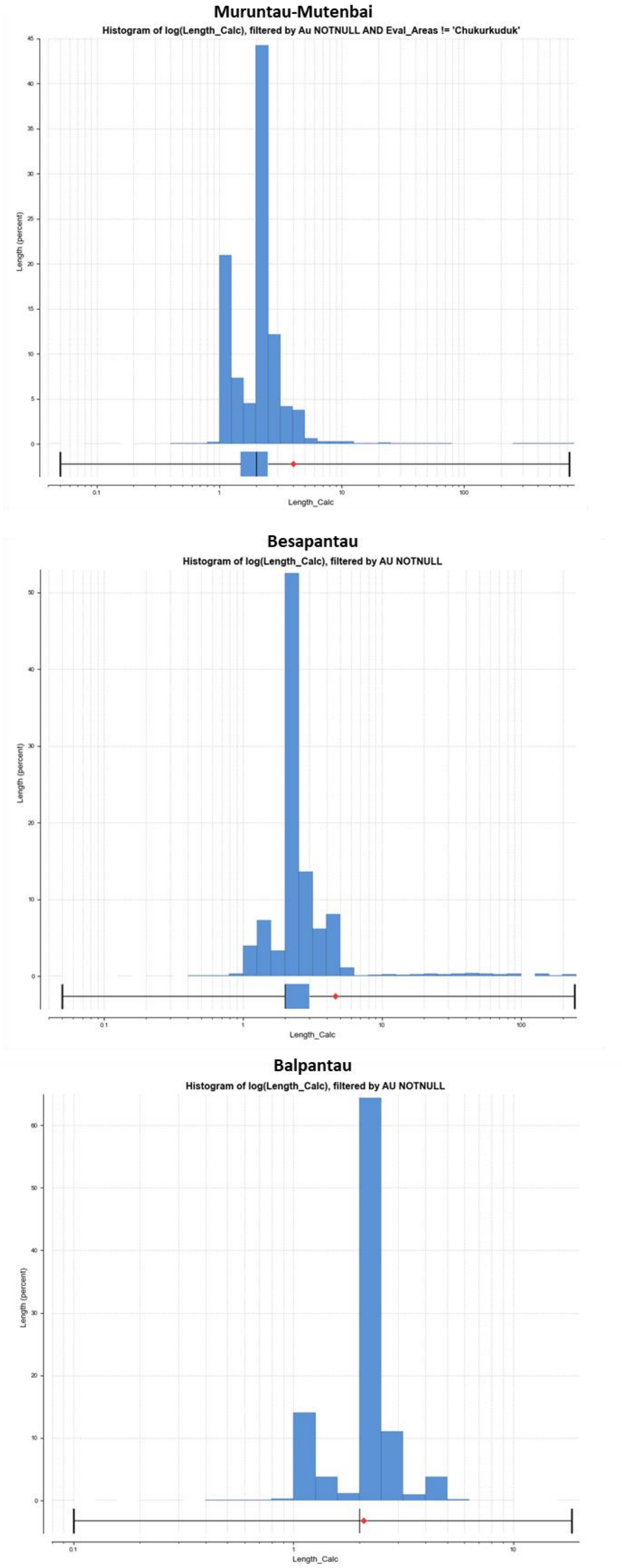


Figure 3.32: Sample Length Histograms by Deposit

3.7.8 Grade Capping

Capping has been applied to isolated outlier values prior to variography and grade estimation. The outlier values were not considered to be representative of the general grade population and capping mitigates their impact on block estimation. NMMC has assessed the presence of outliers on a domain-by-domain basis using composite histograms, cumulative probability plots and coefficient of variation. Based on this analysis two capping methods have been applied:

1. Capping – where all composite values that exceed a grade threshold are reduced to that threshold. A summary of grade capping thresholds and impact is shown in Table 3.29.
2. Distance-Based Capping – where composite values beyond a specified distance that exceed a grade threshold are reduced to that threshold (Table 3.30).

WAI considers this combined capping methodology to be a reasonable approach to limiting grade extrapolation, whilst retaining local accuracy.

Table 3.29: Composite Capping Statistics by Deposit & Domain

Deposit	Domain	No. Comp.	No. Capped	% Capped	Raw Stats			Capped Stats		
					Max	Mean	CV	Max (Cap)	Mean	CV
Muruntau	0.3	69470	4239	6.1	64	0.43	1.44	1	0.4	0.66
	0.5	113862	1367	1.2	100	0.85	1.32	West 6, East 4	0.82	0.9
	1	131526	3393		1381	2.42	2.1	10	2.2	0.92
Mutenbai	0.3	25378	1392	2.6	17	0.39	1.25	1	0.36	0.72
	0.5	36914	2001	5.5	84	1.06	1.78	5	0.98	0.98
	1	17525	527	5.4	150	2.36	1.6	10	2.12	1.0
Besapantau	0.3	2029	55	3.0	22	0.58	1.5	2	0.53	0.73
	0.3	7603	153	2.7	37	0.5	1.5	3	0.46	0.73
	0.5	2857	37	2.0	40	1.37	1.5	5-11	1.31	1.13
	0.5	9366	84	1.3	174	1.44	12	11	1.32	1.13
Balpantau	0.3	2907	18	0.9	12	0.41	0.88	2	0.40	0.7
	0.5	6667	128	0.6	51	1.25	1.52	8	1.16	0.92

Table 3.30: Composite Distance Based Capping Parameters by Deposit & Domain

Deposit	Domain	Distance Threshold	Distance Based Cap
Muruntau	0.3	30	0.5
	0.5	30	2
	1	30	6
Mutenbai	0.3	15	0.5
	0.5	15	2
	1	15	6
Besapantau	0.3	15	1
	0.5	15	6
Balpantau	0.3	15	1
	0.5	15	4

WAI has independently reviewed capping parameters using a combination of histogram, disintegration analysis and statistical analysis of composites. The review found NMMC capping thresholds to be relatively conservative but acceptable. Capping parameters should be routinely reviewed and optimised based on comparison with the grade control model and available production data.

3.7.9 Variography

Continuity analysis and variogram modelling was conducted using capped composites. Continuity analysis was undertaken prior to variography to determine the major, semi-major and minor axis of continuity based on spatial correlation between sample pairs. Directional variograms were created in the orientations defined by the continuity analysis. Nugget variances were derived from a down hole variogram. Variogram models typically comprised of a nugget and 2 spherical or exponential structures.

As part of the Mineral Resource audit, WAI independently derived Muruntau and Mutenbai variogram models. Results were largely comparable to the existing NMMC variogram parameters and selected by NMMC for use in the final Mineral Resource estimate. At Muruntau and Mutenbai, grade control data was used for variography due to the high number of sample pairs over a full range of lag distances. Grade control samples were composited to 5m lengths, selected within a 0.5g/t grade envelope and restricted to regions in each deposit where mineralisation has consistent orientation (Figure 3.33).

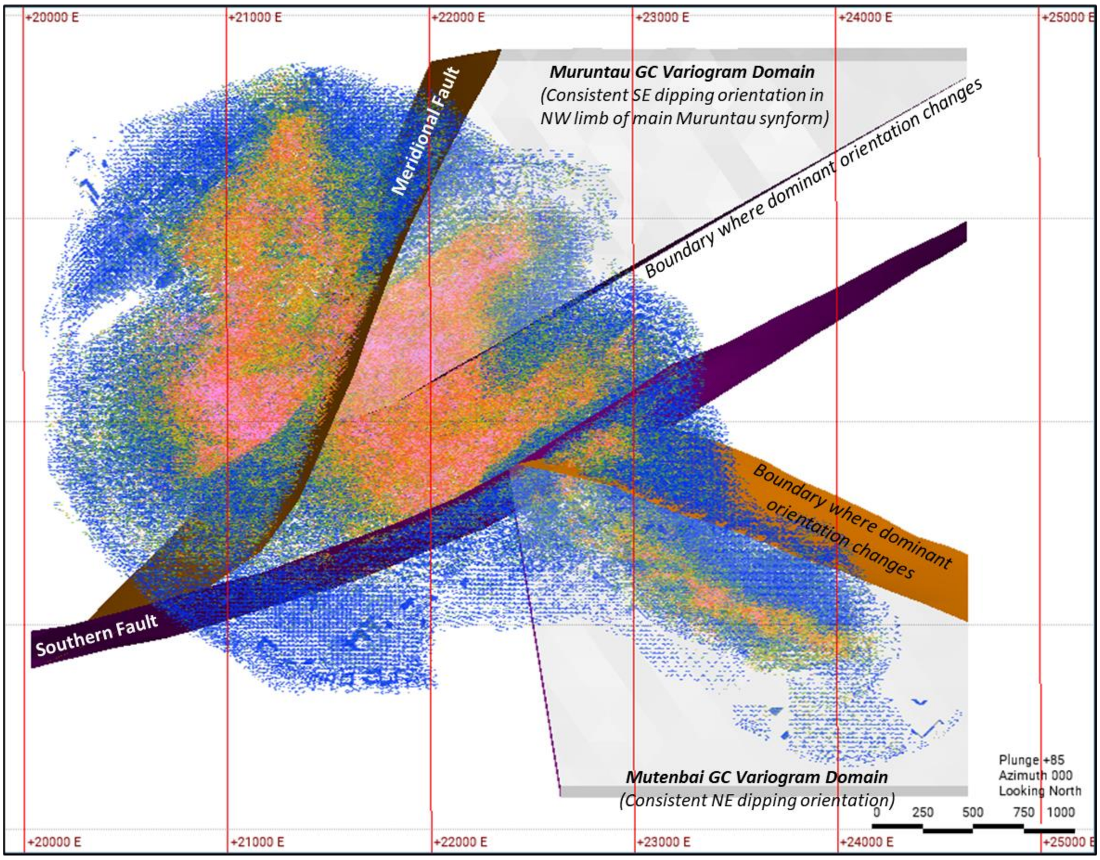


Figure 3.33: Regions at Muruntau and Mutenbai used to Limit GC Composites for Variography

Examples of the continuity analysis and modelled variograms are provided in Figure 3.34 for Muruntau and Figure 3.35 for Mutenbai. Shorter ranges at Mutenbai may reflect the highly folded nature of this part of the deposit. Whilst at a broad scale Mutenbai forms a consistent 'sheet' of mineralisation, grade control drilling delineates numerous internal smaller scale isoclinal folds, which control the local grade distribution.

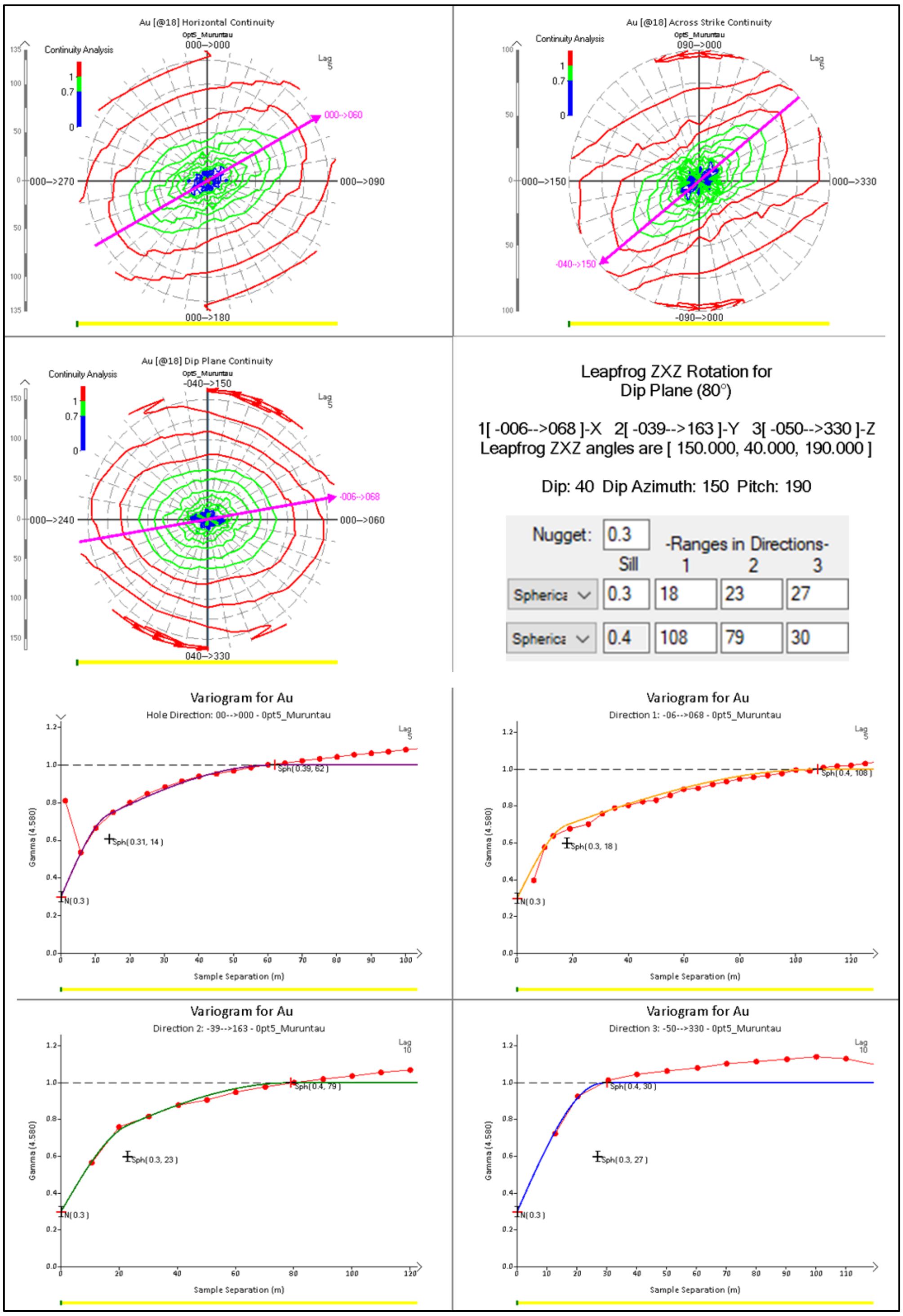


Figure 3.34: Muruntau Continuity Analysis and Variogram Modelling

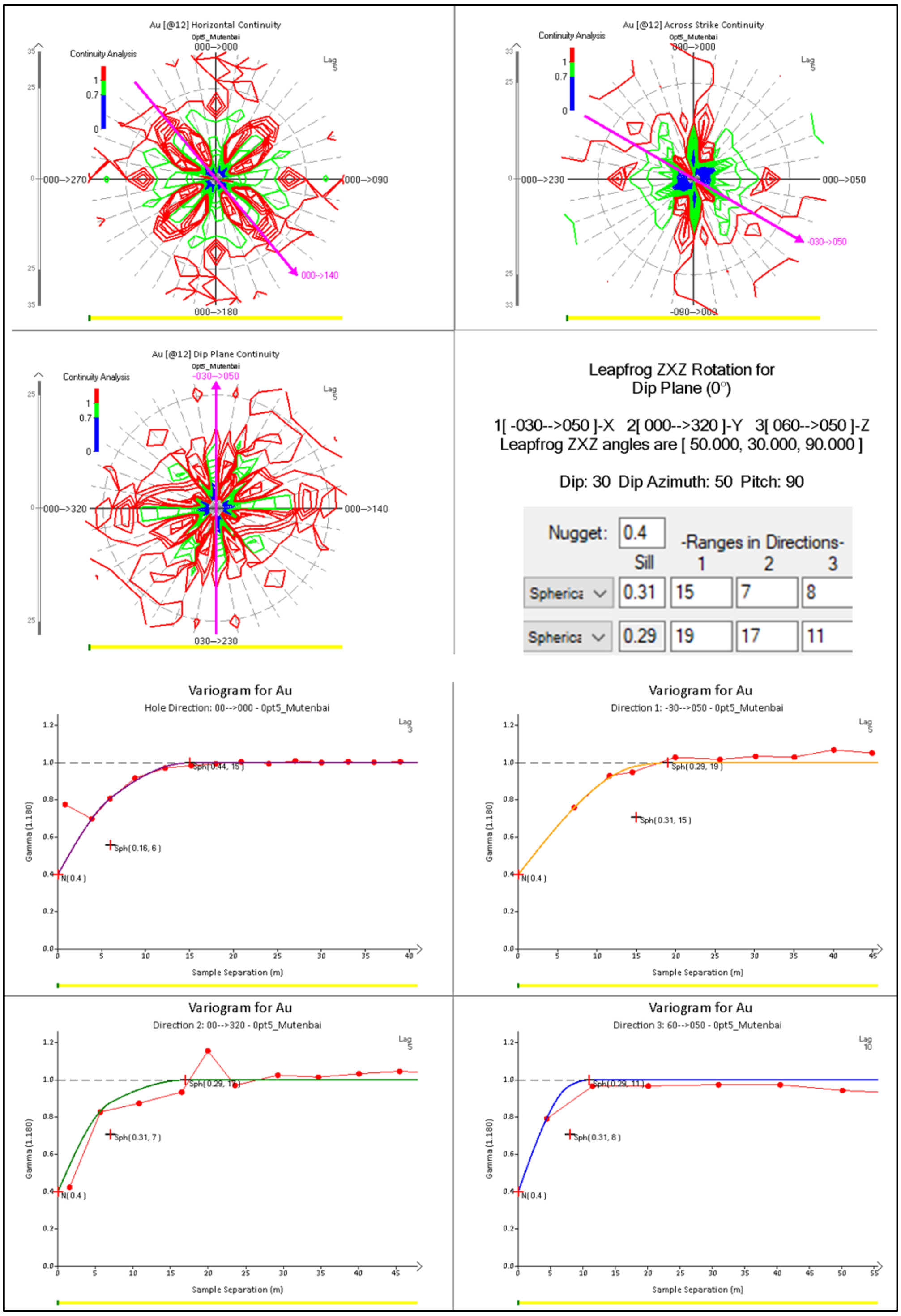


Figure 3.35: Mutenbai Continuity Analysis and Variogram Modelling

Restricting variogram modelling to regions with consistent orientation, helped reduce hole effects and other artifacts / interference from sample pairs without geological continuity. WAI recommends that this approach is further developed across all deposits, to develop a unique variogram model per grade envelope split within a given 'structural zone'.

Recommended criteria used to define structural zones include:

1. Consistent orientation of grade continuity;
2. Consistent geological characteristics e.g. potentially divide Mutenbai up-dip (high degree of internal isoclinal folding) from Mutenbai down-dip (less folding apparent); and
3. Split at fault block boundaries.

This process should increase variogram quality and make variogram models more locally representative of grade continuity. The current approach to variography involves a single variogram applied across each deposit as outlined in Table 3.31.

Table 3.31: Muruntau Cluster Variogram Model Parameters (Normalised Sills)

Deposit / Domain	Rotation (Degrees) (Dip/Dip Dir/Pitch)	Nugget Effect	Structure 1				Structure 2			
			Sill	Axis Distance (m)			Sill	Axis Distance (m)		
				Major	Semi-Major	Minor		Major	Semi-Major	Minor
Muruntau	40 / 150 / 190	0.3	0.3	18	23	27	0.4	108	79	30
Mutenbai	30 / 50 / 90	0.4	0.31	15	7	8	0.29	19	17	11
Besapantau	54 / 10 / 111	0.15	0.48	29.96	41.85	4.66	0.36	71.31	56.86	7.034
Balpantau	35 / 280 / 115	0.38	0.57	9.726	6.32	6.9	0.22	21.36	19.03	20.37

3.7.10 Block Modelling

Block models defining the mineralised zones were constructed in Leapfrog Edge using the mineralisation domain wireframes to define the block model domain boundaries. The upper limit of each block model was restricted by a topographic surface. A parent block size of 30m x 30m x 15m was used for the Muruntau-Mutenbai block model. The Besapantau and Balpantau models used parent block dimensions of 20m x 20m x 5m. To effectively represent domain volume, sub-cell splitting was enabled at domain boundaries. No model rotations were applied. Full block model parameters are outlined in Table 3.32.

Table 3.32: Muruntau Cluster Block Model Parameters

Deposit	Parameter	X (m)	Y (m)	Z (m)
Muruntau Mutenbai	Parent Block Size	30	30	15
	Sub-Block Count	3	3	3
	Minimum Sub-Block Size	10	10	5
	Base Point	78600	19200	675
Besapantau	Parent Block Size	20	20	5
	Sub-Block Count	8	8	2
	Minimum Sub-Block Size	2.5	2.5	2.5
	Base Point	6250.801	4510.299	820
Balpantau	Parent Block Size	20	20	5
	Sub-Block Count	4	4	5
	Minimum Sub-Block Size	5	5	1
	Base Point	41070	21370	410

3.7.11 Dry Bulk Density

Limited density data is available for the Muruntau Cluster deposits. A mixture of core and channel sample measurements have been provided for Besapantau and Balpantau. WAI has compared summary statistics for this data, against the density assumptions applied in the block model for each deposit (Table 3.33). Current block model density assumptions appear to be conservative but reasonable given the limited amount of informing data.

Table 3.33: Comparison Between Muruntau Cluster Density Data and MRE Assumptions

Deposit	Summary Statistics for Density Data Provided by NMMC					MRE Assumptions	
	Count	Mean	Median	Min	Max	Ore Type	Dry Bulk Density (g/cm^3)
Muruntau	No data provided					All	2.6
Mutenbai	No data provided					All	2.6
Besapantau	327	2.72	2.71	2.59	2.88	Oxide	2.6
						Fresh	2.69
Balpantau	254	2.79	2.79	2.66	2.98	All	2.6

WAI recommends that NMMC begin routine dry bulk density measurements to develop broad spatial coverage across all deposits. Measurements should be evaluated by oxidation, lithology and mineralisation models. Where material differences in density are identified, separate density assumptions should be assigned in the block model.

3.7.12 Grade Estimation

Estimation for gold was undertaken on the blocks defined within each domain. The domains were treated as hard boundaries and as such composites from an adjacent domain could not be used in the grade estimation of another domain. Ordinary kriging ("OK") was used as the estimation method for all deposits.

Grade estimation was run in a three-pass plan, the second and third passes using progressively larger search radii to enable the estimation of blocks unestimated on the previous pass. Search radii were guided by the variography and data spacing. Dynamic anisotropy was employed to align search orientation to local domain orientation. The orientation of the dynamic ellipsoid was determined by the same structural trends used in the construction of domain wireframes.

At Muruntau and Mutenbai, first pass block estimates were required to be informed by a minimum of 2 drillholes. Minimum sample and drillhole requirements were relaxed in higher estimation passes.

A summary of the estimation parameters is shown for Muruntau Cluster deposits in Table 3.34.

Table 3.34: Muruntau Cluster Grade Estimation Parameters

Deposit	Interpolant	Domain	Pass	Ellipsoid Ranges (m)			Number of Samples		
				Max.	Int.	Min.	Min.	Max.	Max. per Hole
Muruntau	OK	All	1	120	120	20	15	40	14
			2	240	240	30	10	20	9
			3	500	500	40	4	15	
Mutenbai	OK	All	1	110	110	15	15	40	14
			2	220	220	30	10	20	9
			3	500	500	40	4	15	
Besapantau	OK	All	1	85	85	20	10	25	
			2	160	160	25	8	15	
			3	200	200	25	2	5	
Balpantau	OK	All	1	70	60	25	15	35	
			2	140	120	30	10	25	
			3	240	200	25	2	10	

WAI identified a small volume of unestimated blocks at the margins of the Balpantau deposit and set these to 0 gold grade prior to optimisation and reporting.

WAI considers the estimation approach to be reasonable. Points to consider in refining parameters for future estimates includes aligning search anisotropic ratios with the geometric anisotropy identified in the variogram model, using Kriging Neighbourhood Analysis (KNA) to optimise minimum and maximum sample numbers and developing unique search parameters per estimation domain.

3.7.13 Block Model Validation

3.7.13.1 Introduction

Model validation methods included visual comparison of the composite and block model grades, a statistical grade comparison and a swath plot analysis. Globally no indications of significant over or under estimation were apparent in the block models nor were any obvious interpolation issues identified. From the perspective of conformance of the average model grades to the input data, WAI consider the grade estimation adequately represents the composite data used.

3.7.13.2 Visual Comparison

Visual validation was conducted by comparing drillhole composite and estimated grades in cross section, long section and level plan. The checks showed good agreement between drill hole composite values and block model values. Hard boundaries have constrained grades to their respective estimation domains and distance-based capping has minimised grade extrapolation in regions of sparse data. Representative cross sections are provided for Muruntau (Figure 3.36), Mutenbai (Figure 3.37), Besapantau (Figure 3.38) and Balpantau (Figure 3.39).

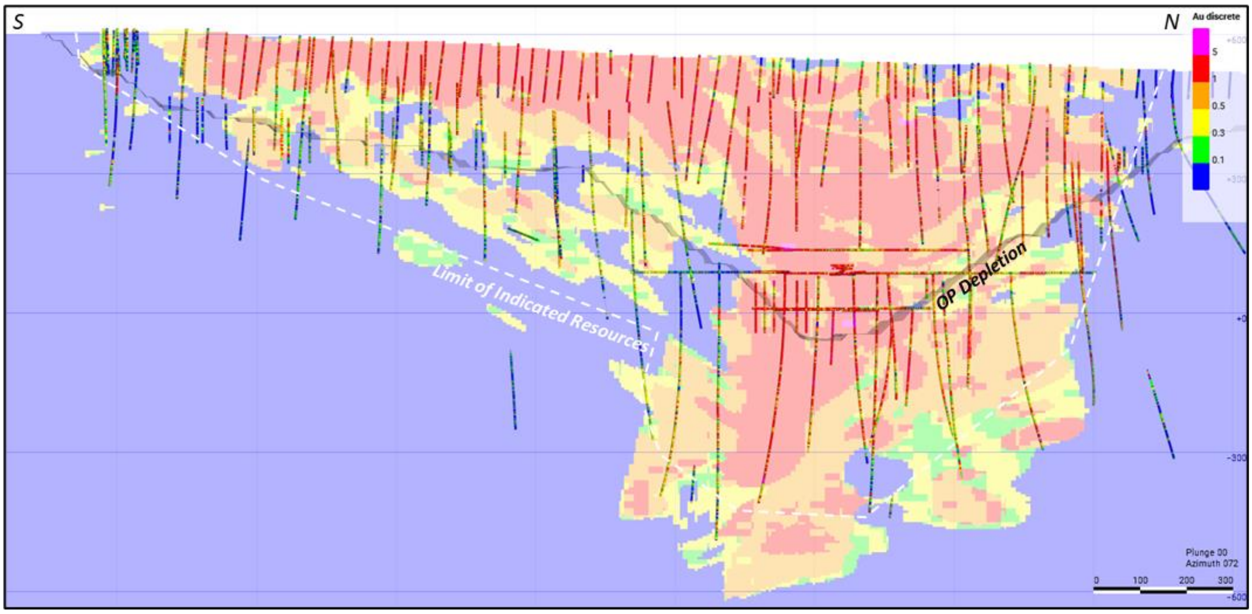


Figure 3.36: Muruntau Cross Section – Block Model vs. Composite Grades

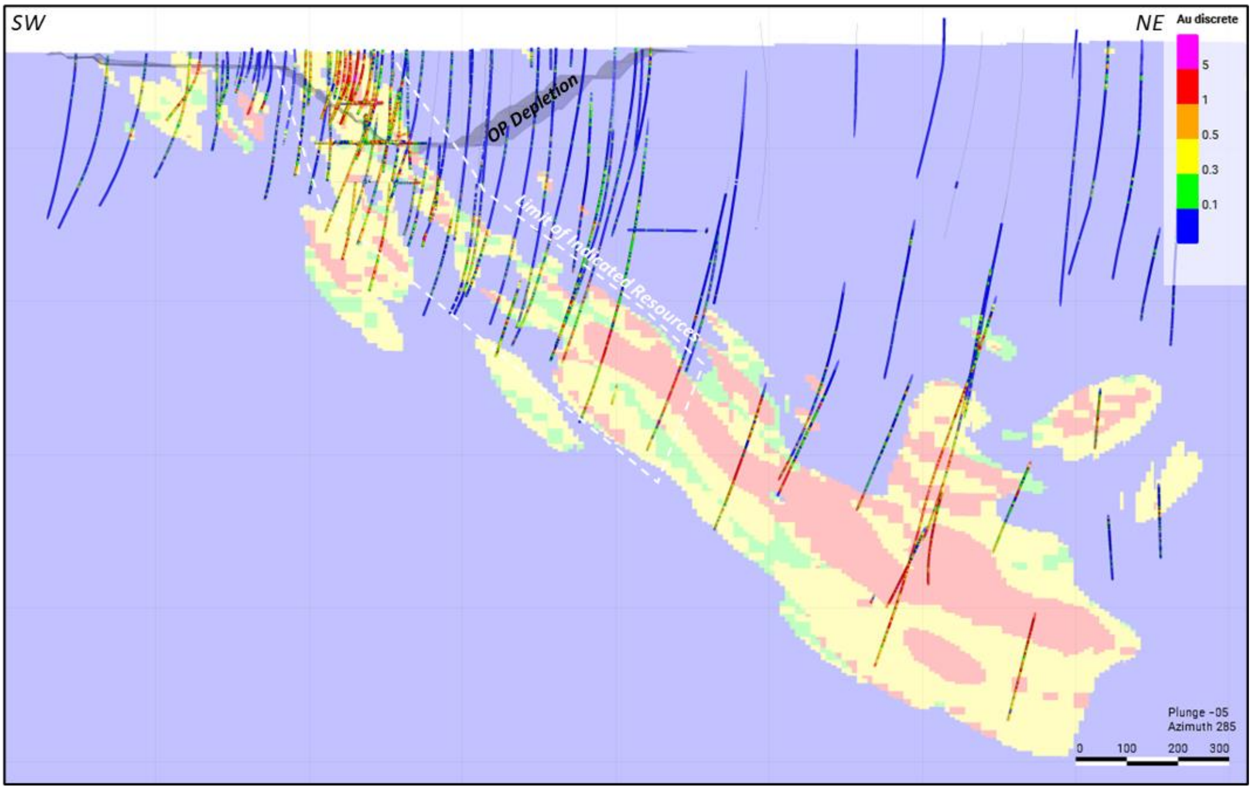


Figure 3.37: Mutenbai Cross Section – Block Model vs. Composite Grades

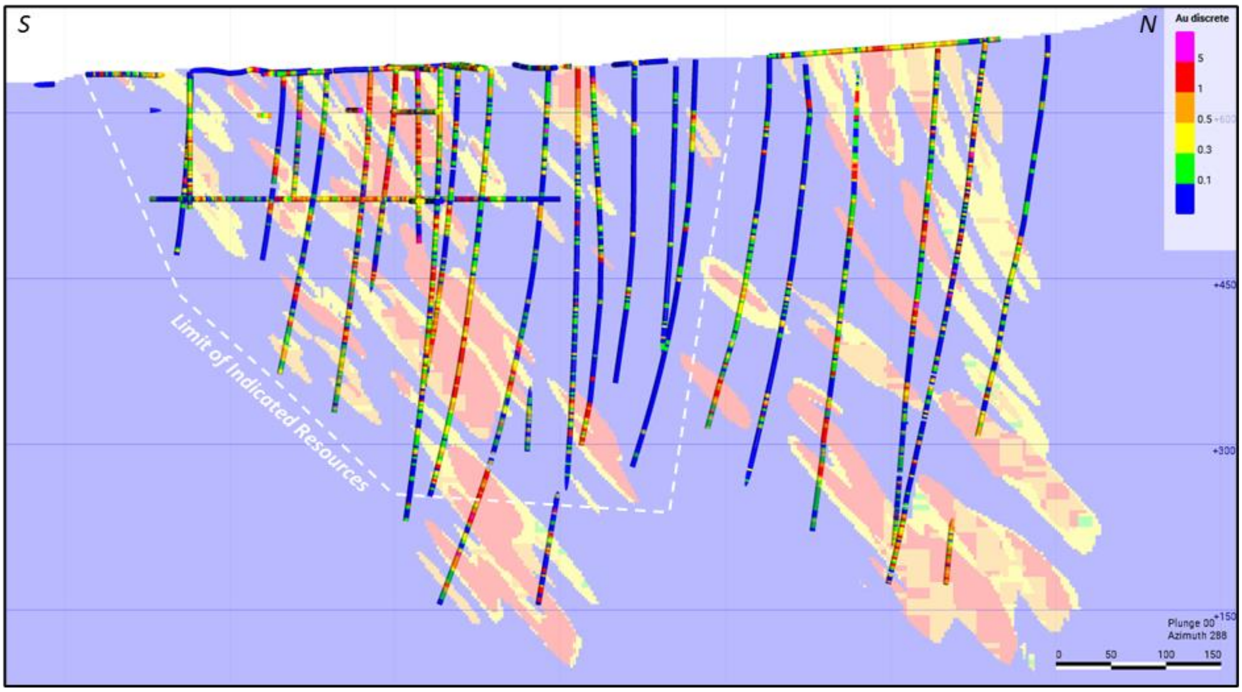


Figure 3.38: Besapantau Cross Section – Block Model vs. Composite Grades

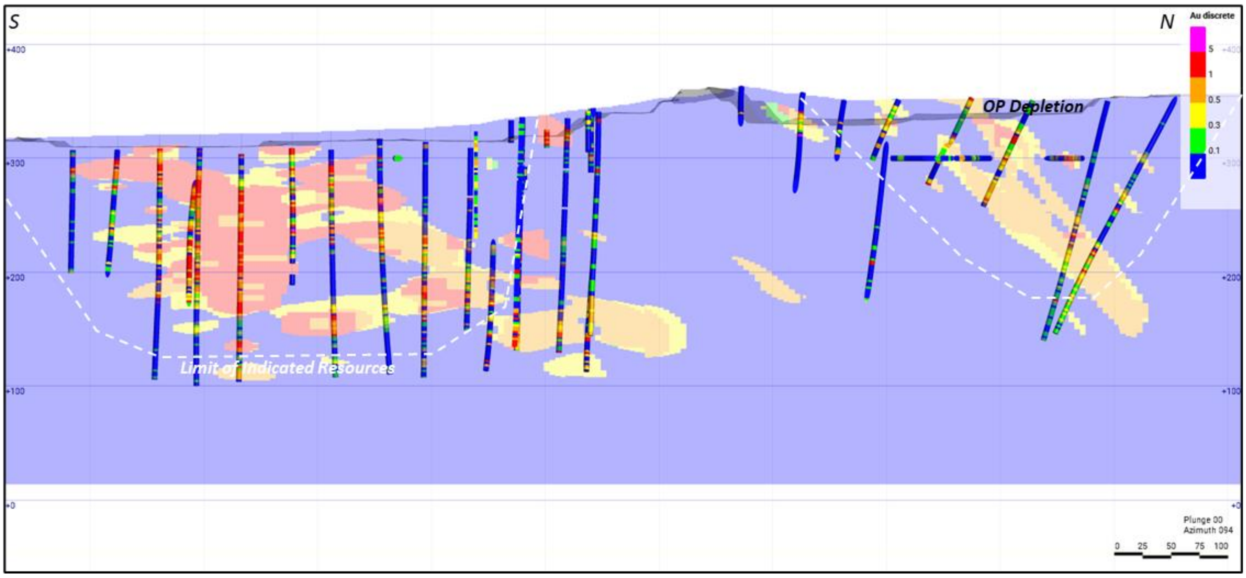


Figure 3.39: Balpantau Cross Section – Block Model vs. Composite Grades

3.7.13.3 Statistical Comparison

NMMC checked the block model estimates for global bias by comparing the average grades from the block model estimates with average sample grades. Results for each deposit are summarised in Table 3.35 and show no material global bias. WAI recommends that future statistical comparisons also include a declustered average grade.

Table 3.35: Muruntau Cluster Mean Grade Comparison by Domain				
Deposit	**Domain (g/t)**	**Sample Mean**	**Block Mean**	**Percentage Difference**
Muruntau	1	2.1	2.13	1.4%
	0.5	0.84	0.87	3.6%
	0.3	0.39	0.39	0.0%
Mutenbai	1	1.78	1.72	-3.4%
	0.5	1	0.96	-4.0%
	0.3	0.36	0.36	0.0%
Besapantau	0.5	1.31	1.34	2.3%
	0.3	0.44	0.41	-6.8%
Balpantau	0.5	1.15	1.13	-1.7%
	0.3	0.43	0.42	-2.3%

3.7.13.4 Swath Plots

WAI has generated swath plots that provide a spatial comparison of average grades from the block model estimates with average grades from input composites (e.g. Figure 3.40 to Figure 3.42). The model estimated mean should be smoother than the composite mean. The observed grade profiles behave as expected and show no significant local bias.

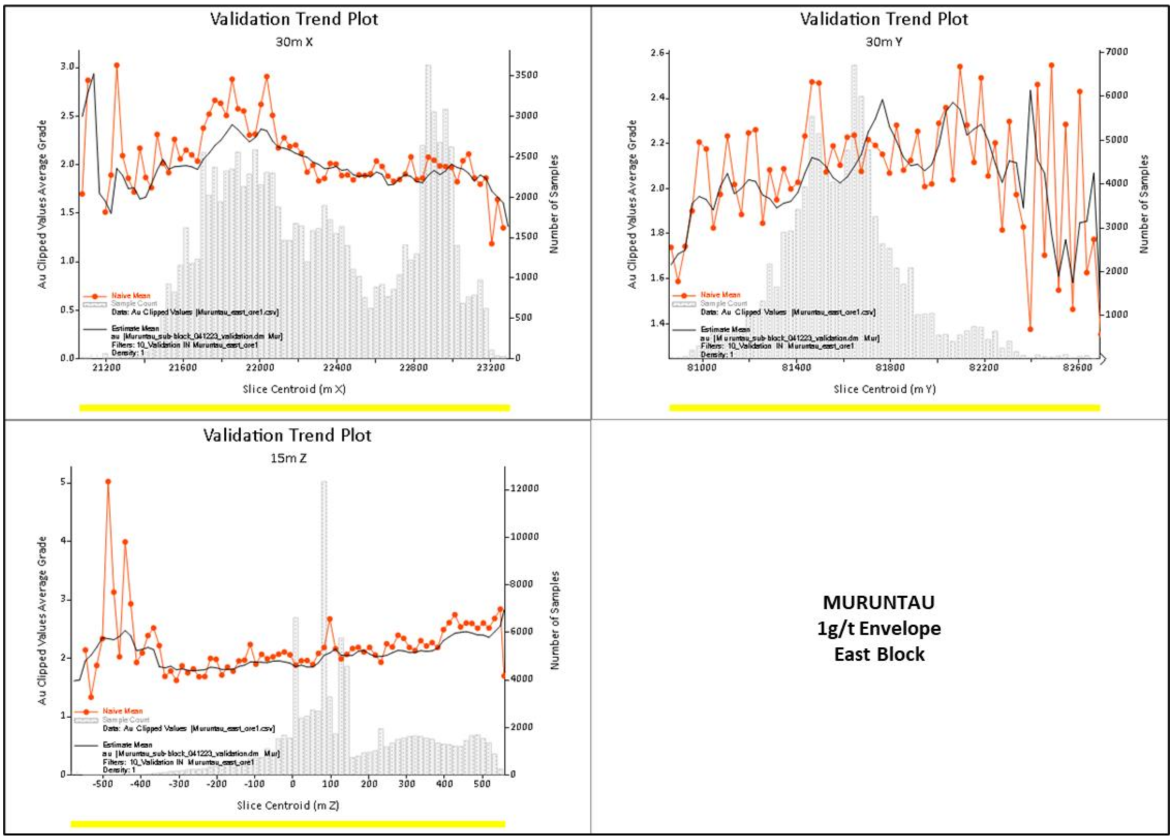


Figure 3.40: Example Swath Plot for Muruntau (OK Grade Profile in Black and Composite Grade Profile in Red)

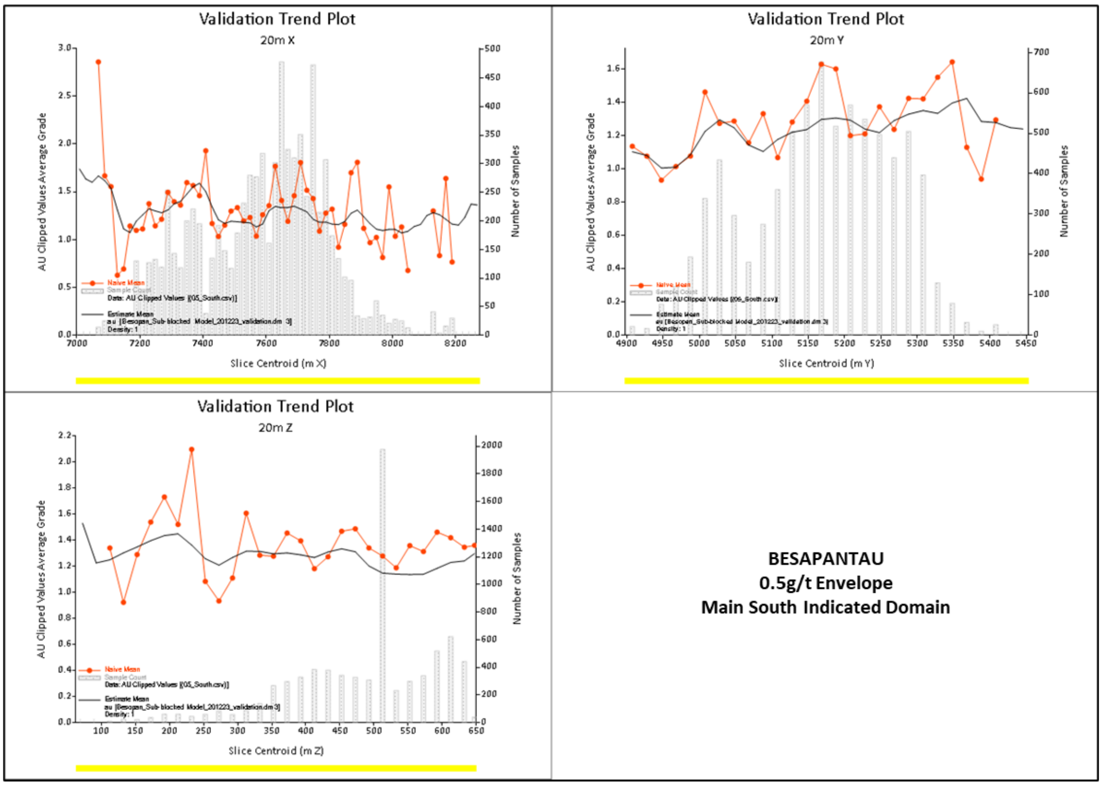


Figure 3.41: Example Swath Plot for Besapantau (OK Grade Profile in Black and Composite Grade Profile in Red)

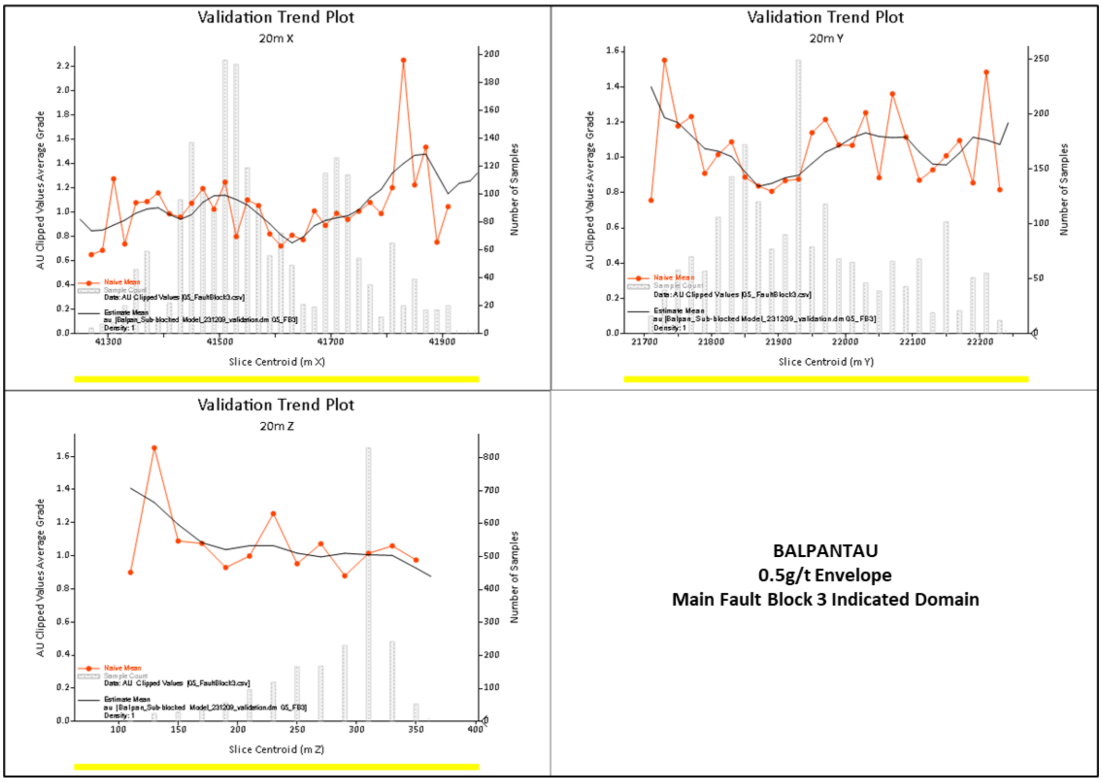


Figure 3.42: Example Swath Plot for Balpantau (OK Grade Profile in Black and Composite Grade Profile in Red)

3.7.14 Reconciliation

3.7.14.1 Introduction

The WAI audit has identified a range of data quality issues around analytical accuracy and precision, incomplete QAQC coverage and protocols, definition of dry bulk density and historic drill sample recovery. These issues have been in part mitigated by improved practices and performance in recent years, alongside the verification and selection of a subset of the drillhole databases deemed appropriate for modelling and estimation.

Reconciliation is a key tool to assess the overall materiality of any residual database errors and estimation errors associated with the current estimation approach and data spacing. A benchmark widely used in the mining industry for Resource classification and the evaluation of reconciliation data is the 90:15 rule whereby:

- Measured Resources have an error of ±15% at the 90% confidence limits for tonnes, grade and metal for quarterly production volumes;
- Indicated Resources have an error of ±15% at the 90% confidence limits for tonnes, grade and metal for annual production volumes; and
- Inferred Resources fail to meet the Indicated criteria.

3.7.14.2 Muruntau and Mutenbai

NMMC has compared the Resource and grade control models over annual production volumes for Muruntau and Mutenbai (Table 3.36). Tonnage, grade and metal variance is typically significantly below the ±15% Indicated benchmark. WAI considers that at the exceptionally large annual production volumes for both deposits, Resource model errors are likely within tolerance for the classification of Indicated Mineral Resources.

WAI has independently verified the NMMC reconciliation results by re-blocking the Muruntau-Mutenbai resource and grade control models to approximate annual production volumes. A scatter plot comparing contained metal above a 0.5g/t cutoff within a given panel, again shows that resource to grade control model variance is typically below ±15% (Figure 3.43).

WAI is mindful that the grade control model is also impacted to some extent by data quality issues and the reliability of the reconciliation results is dependent on these being largely offset by the resolution of grade control sampling. WAI recommends that a more comprehensive reconciliation system is developed across the mining value chain (e.g. Figure 3.44), prioritising the collection of data to compare models to plant production. In addition to annual comparisons, reconciliation results should be generated over quarterly and monthly production volumes.

Table 3.36: Muruntau-Mutenbai Resource to Grade Control Model Reconciliation										
Area	Period	Resource Model			Grade Control Model			Percentage Difference		
		Tonnage Mt	Grade g/t	Metal Moz	Tonnage Mt	Grade g/t	Metal Moz	Tonnage %	Grade %	Metal %
Muruntau	2008-2014	252.65	1.42	11.52	239.79	1.44	11.10	-5%	1%	-4%
	2015	78.69	1.42	3.59	79.2	1.43	3.63	1%	1%	1%
	2017	23.7	1.44	1.10	22.58	1.54	1.12	-5%	7%	2%
	2018	20.29	1.36	0.89	18	1.31	0.76	-11%	-3%	-14%
	2019	25.09	1.46	1.18	27.16	1.39	1.22	8%	-5%	3%
	2020	33.37	1.33	1.43	37.45	1.23	1.48	12%	-8%	3%
	2021	50.41	1.59	2.57	47.56	1.54	2.36	-6%	-3%	-8%
	2022	48.41	1.24	1.93	44.02	1.23	1.75	-9%	0%	-9%
	Total	**532.6**	**1.42**	**24.20**	**515.76**	**1.41**	**23.41**	**-3%**	**-1%**	**-3%**
Mutenbai	2008-2014	45.02	1.26	1.82	49.35	1.27	2.01	10%	1%	11%
	2015	19.71	1.16	0.74	28.57	1.12	1.03	45%	-4%	39%
	2017	14.57	1.27	0.59	15.82	1.25	0.63	9%	-2%	7%
	2018	21.85	1.38	0.97	23.43	1.25	0.94	7%	-9%	-3%
	2019	24.66	1.49	1.18	27.09	1.31	1.14	10%	-12%	-3%
	2020	21.44	1.35	0.93	20.03	1.34	0.86	-7%	-1%	-7%
	2021	3.94	1.39	0.18	2.74	1.33	0.12	-30%	-5%	-34%
	Total	**151.24**	**1.32**	**6.40**	**167.03**	**1.25**	**6.73**	**10%**	**-5%**	**5%**

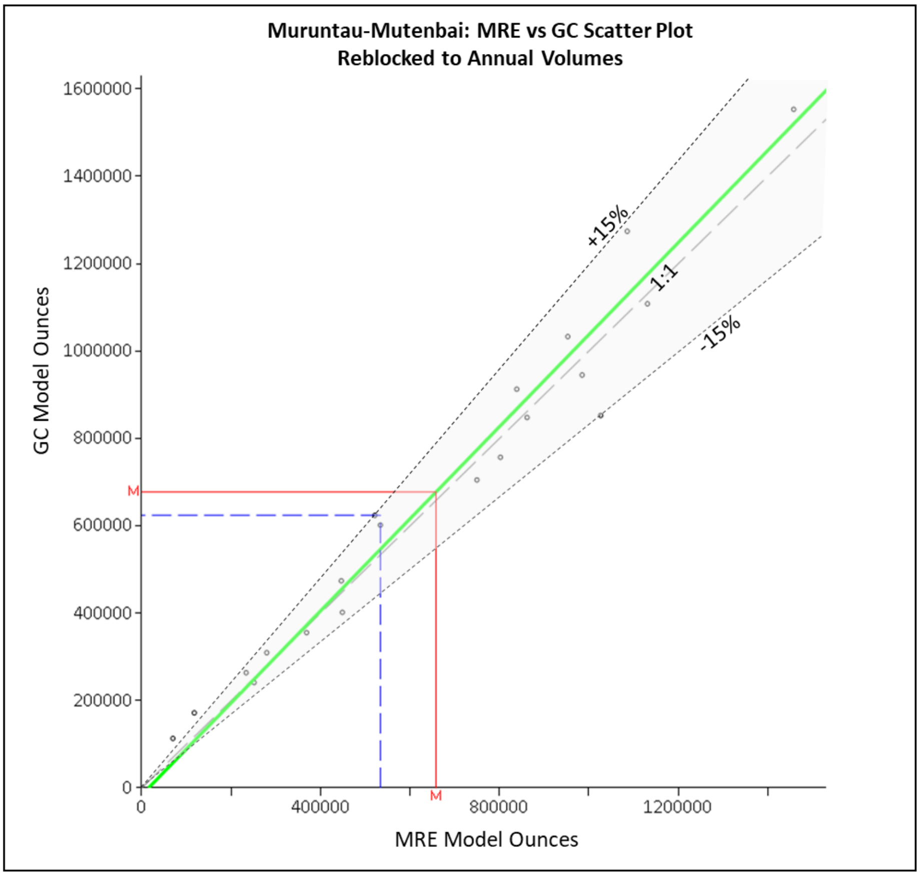


Figure 3.43: Scatter Plot Comparing Resource and Grade Control Model Contained Metal above 0.5g/t Cut-Off, when Reblocked to Approximate Annual Production Volumes

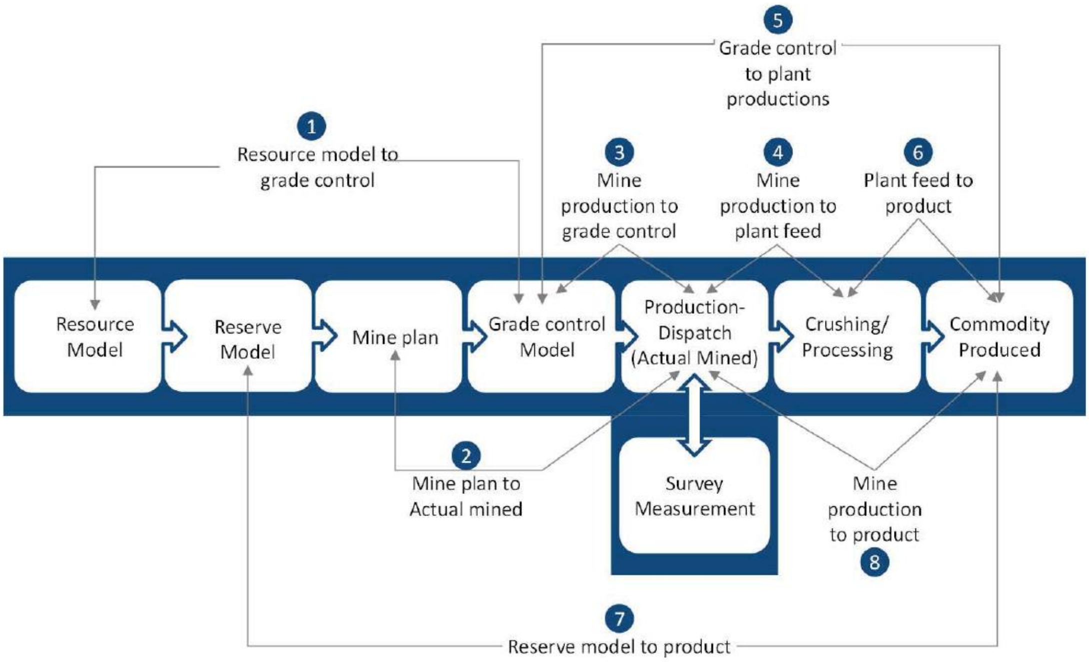


Figure 3.44: Reconciliation Across the Mining Value Chain Depicting a Range of Comparisons Common Across Mining Operations (Hargreaves & Morley, 2014)

3.7.14.3 Balpantau

Open pit mining commenced at the Balpantau deposit in 2023. Initial reconciliation metrics show acceptable variance between the Resource and grade control model over the first year of production (Table 3.37).

Table 3.37: Balpantau Resource to Grade Control Model Reconciliation

Area	Period	Resource Model			Grade Control Model			Percentage Difference		
		Tonnage Mt	Grade g/t	Metal Koz	Tonnage Mt	Grade g/t	Metal Koz	Tonnage %	Grade %	Metal %
Balpantau	2023	2.16	1.05	72.9	2.41	0.97	75.4	11%	-7%	3%

WAI completed a visual comparison between the Balpantau Resource and grade control model at the NMMC mining cut-off grade (0.5g/t) (Figure 3.45). Some of the principal orientations and mineralised zones are reproduced in both models, however blocks above cut-off are more extensive in the grade control model. Local spatial reconciliation could be improved and should be routinely reviewed to optimise the resource domaining.

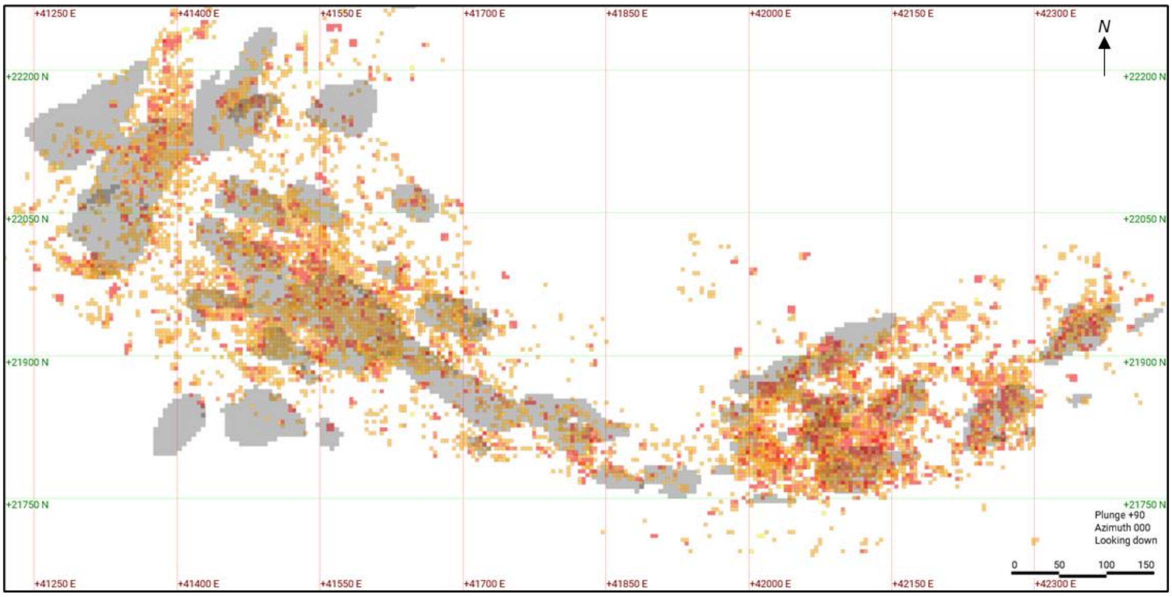


Figure 3.45: Plan View Comparing the Balpantau Resource (Grey) and Grade Control (Orange/Red) Model Blocks above 0.5g/t Cut-Off Grade

3.7.15 Mineral Resource Classification

Classification was set in the block models using a combination of data spacing, estimation pass and wireframe volume criteria. Specific criteria used to classify each Muruntau cluster deposit are listed in Table 3.38. Based on the results of the Mineral Resource audit, WAI considers the classification approach to reflect the confidence in the drillhole data, the geological interpretation, geological continuity, data spacing and orientation, spatial grade continuity, estimation method and reconciliation performance.

Table 3.38: Muruntau Cluster Resource Classification Criteria

Deposit	Measured	Indicated	Inferred
Muruntau	None assigned	• Contiguous regions with ≤ 100m by 100m data spacing; and • Blocks interpolated in the first estimation pass.	Estimated blocks that failed to meet the Indicated classification criteria
Mutenbai		• Contiguous regions with ≤ 80m by 80m data spacing; • Spacing requirement relaxed to ≤ 100m by 100m at the down-dip edge of the Indicated Resource, where geological / grade continuity is high; and • Blocks interpolated in the first estimation pass.	
Besapantau		• Contiguous regions with ≤ 60m by 60m data spacing; • Blocks interpolated in the first estimation pass; and • Blocks not within poorly informed, low volume / continuity mesh parts.	
Balpantau		• Contiguous regions with ≤ 60m by 60m data spacing; • Blocks interpolated in the first estimation pass; and • Blocks not within poorly informed, low volume / continuity mesh parts.	

WAI has reviewed the classified block models against distance functions, to ensure that classification has been effectively assigned according to the criteria listed in Table 3.38. Level plans showing examples of this analysis for each deposit are presented in Figure 3.46 to Figure 3.49. These demonstrate that the extent of Indicated blocks mostly conforms to the defined classification requirements.

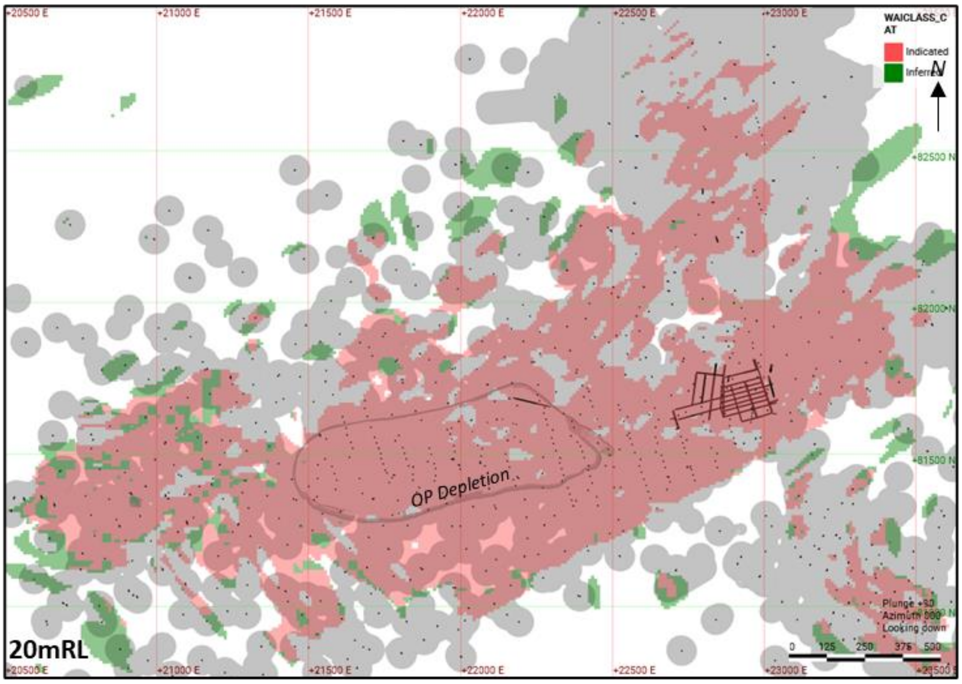


Figure 3.46: Level Plan Comparing Indicated Classification to 50m Distance Function for Muruntau (No Gaps at 100x100m Data Spacing)

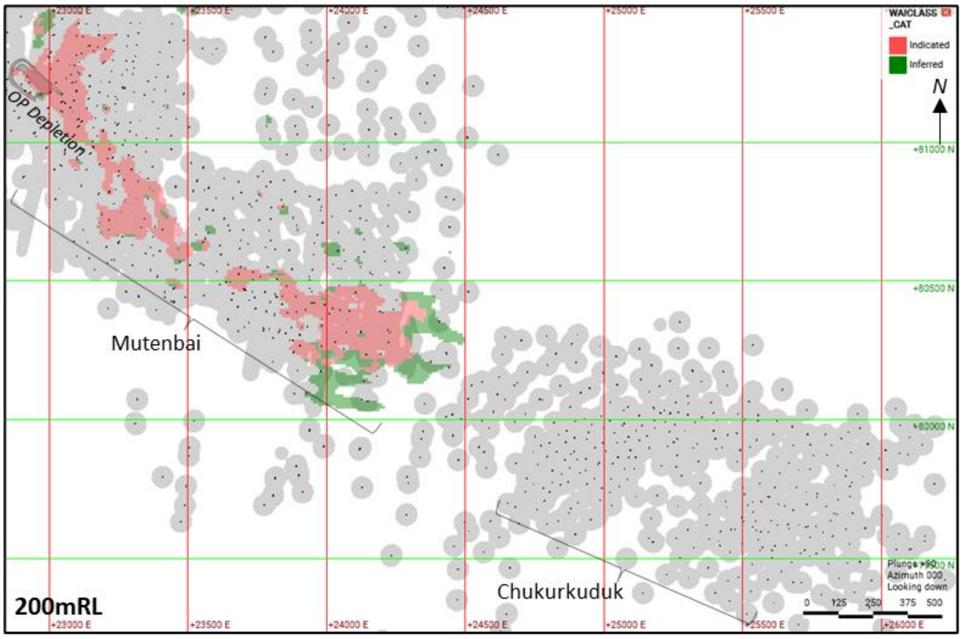


Figure 3.47: Level Plan Comparing Indicated Classification to 40m Distance Function for Mutenbai and Chukurkuduk (No Gaps at 80x80m Data Spacing)

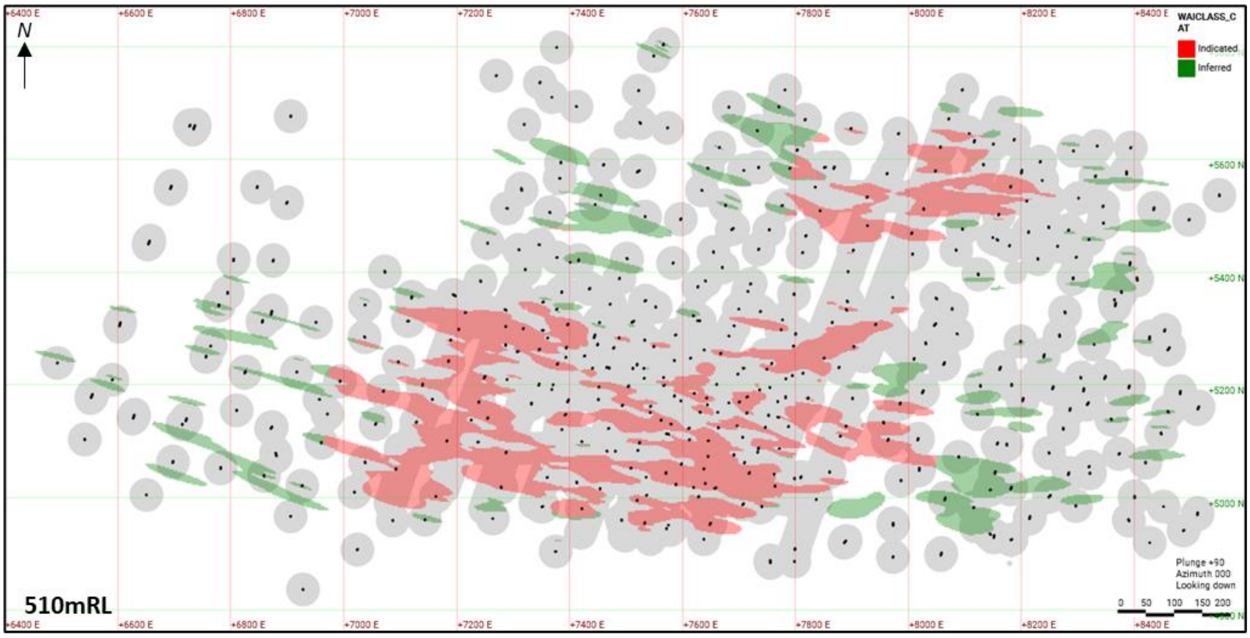


Figure 3.48: Level Plan Comparing Indicated Classification to 30m Distance Function for Besapantau (No Gaps at 60x60m Data Spacing)

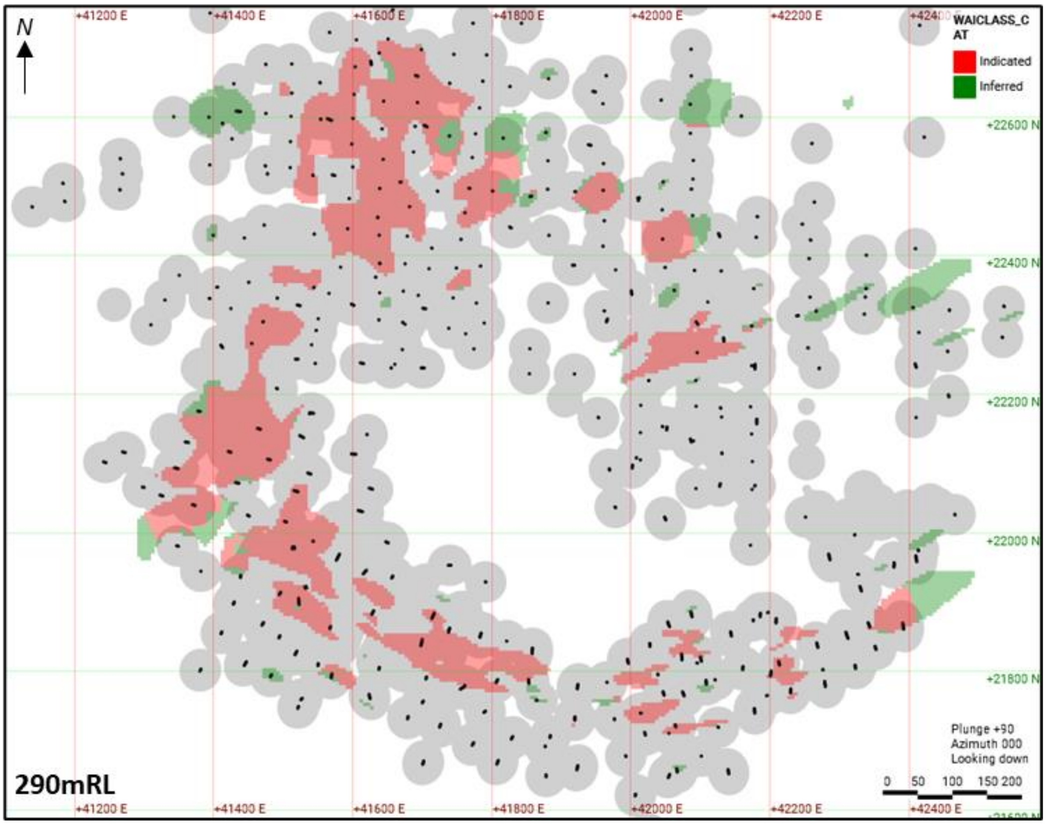


Figure 3.49: Level Plan Comparing Indicated Classification to 30m Distance Function for Balpantau (No Gaps at 60x60m Data Spacing)

Balpantau and Besapantau classification should be reviewed as mining advances and reconciliation data becomes available. Any areas where reconciliation is below 90:15 benchmarks, should be downgraded pending further infill drilling.

WAI recommends that further studies focus on Muruntau cluster resource classification to:

1. Investigate the impact and validity of classification approaches independent of estimation pass, to avoid the 'spotted dog' effect evident in some parts of the deposits (e.g. southwest of Muruntau in Figure 3.46); and
2. Complete a simulation-based drill spacing study to further test / optimise the existing classification approach and drill spacing requirements.

3.7.16 Depletion

WAI depleted the NMMC block models prior to pit optimisation and resource reporting. WAI used open pit depletion surveys provided by NMMC for Muruntau (01/01/2024), Mutenbai (01/01/2024) and Balpantau (27/12/2023). Underground depletion wireframes were generated by WAI using a 1.5m distance function to UG sampling to approximate the dimensions of exploratory shafts and development. WAI used the wireframes to generate a proportional block model field that captures the proportion of remaining in situ material within each block. WAI recommends that NMMC routinely code depletion into the Muruntau Cluster block models during each model update.

3.7.17 Stockpiles

3.7.17.1 Introduction

Low grade material previously considered uneconomic (below mining cut-off) has been stockpiled at Muruntau pit. The definition of low-grade material has changed over time.

Prior to 2009, the mining cut-off grade was 2.0g/t Au with material between 0.5g/t Au and 2.0g/t Au stockpiled. Between 2009 and 2016, the mining cut-off reduced to 1g/t Au with material between 0.5g/t and 1.0g/ Au stockpiled. Since 2016, the mining cut-off was reduced further to 0.5g/t Au and stockpiling of lower grade material to these original stockpiles ceased.

In recent years the material stockpiled prior to 2009 has been transferred for heap leach processing and material stockpiled between 2009 and 2016 has been partially processed alongside ROM material. Material that is now considered economic to process remains in three stockpiles known as 7Б, 7В and 7Г (the "on-balance" stockpiles). All three of these stockpiles have been subject to exploration drilling programmes and mining activity. 3D models have been created by NMMC for each of these stockpiles based upon volumetric surveys and exploratory drilling as a basis for Mineral Resource reporting.

Since 2019, four further stockpiles (Stockpiles 1 through to 4) have been constructed from material determined to be between 0.4 and 0.5g/t Au (the "off-balance" stockpiles). These stockpiles have not been drilled or mined since construction. 3D models have been created by NMMC for each of these stockpiles based upon volumetric surveys and grade assumptions as a basis for Mineral Resource reporting.

The NMMC methodology for estimating Muruntau stockpile Mineral Resources is described in the sections below.

3.7.17.2 Data Coverage and Spacing of On-Balance Stockpiles

Stockpile 7Б was constructed upon bedrock and whilst the stockpile has been drilled on a grid of 25 x 25m spacing to a maximum depth of 30m, the basal bedrock was not intersected in the central area. Stockpile 7В has been drilled on a grid of between 40m x 40m and 20m x 20m spacing to a maximum depth of 40m. The drilling did not intersect the base of the stockpile in some areas. Stockpile 7Г was constructed upon bedrock and has been drilled on a grid of 40 x 40m (north) to 20m x 20m (south) to a maximum depth of 40m. The drilling did not intersect the base of the stockpile in some areas. In areas where the base of the stockpile was not intersected, the modelled base was taken from the maximum depth of drilling.

3.7.17.3 Drilling, Sampling and Analysis of On-Balance Stockpiles

Drilling of the On-Balance stockpiles was carried out from 2018 using an Explorac 235 reverse circulation drill rig with an automatic sampler (cone-splitter) drilling 136mm diameter holes. Drilling produced chip material up to 1cm diameter for sample sizes of 4-5kg. Samples were crushed to 1mm and reduced to a 1kg sample by quartering from which two 500g sub-samples were taken with one sample subject to gamma activation analysis for Au at the NMMC Central Gamma Activation Analysis Laboratory and one sample retained as a duplicate.

3.7.17.4 Density Estimation of On-Balance Stockpiles

A mean value of 2.05g/cm^3 has been applied to stockpiled material for tonnage estimation. This density value is based upon bulk samples of approximately 500m^3 excavated from the stockpiles. The resultant excavations were surveyed and the excavated material weighed in a fully loaded train car using the mine's Weighline rail weighing scale. Studies are carried out several times yearly for each stockpile during dry weather. Measured values vary from 1.91g/cm^3 to 2.17g/cm^3.

3.7.17.5 Grade Estimation of On-Balance Stockpiles

On-balance stockpiles were constrained by wireframes limited on their lower extent to pre-stockpile topographic surveys or to the extent of drilling, and with upper boundaries based upon stockpile surveys. Drill samples were composited to 2m lengths and top-cut to 2g/t Au to reduce the influence of outlier samples during estimation. Block models were created within the wireframe limits of each stockpile using a parent cell size of 10m x 10m x 5m and sub-celled to 2m x 2m x 1m to provide definition against wireframe boundaries. Grade estimation for Au was carried out using inverse distance weighting using a search ellipse of 45m x 45m x 2m with a requirement of a minimum of two composite samples and a maximum of four composite samples.

For blocks that were not estimated using these parameters, a grade of 0.51g/t Au was assigned. This is below the mean sample grade of all three stockpiles and slightly above the 0.50g/t Au cut-off used for dispatch of material to the stockpiles during mining operations.

On-balance stockpiles were classified to an Indicated level where blocks were estimated with the 45m x 45m x 2m search ellipse described above. An Inferred classification was assigned to all other remaining on-balance material.

Stockpile block models were validated using graphical and statistical comparisons of estimated grades against composite sample data. All material within the on-balance stockpiles is assumed to meet the requirement for reasonable prospects for eventual economic extraction based on mean estimated grades against the mining cut-off grade for stockpiles of 0.3g/t Au, consequently all material within the three on-balance stockpiles has been reported as a Mineral Resource.

3.7.17.6 Reporting of Off-Balance Stockpiles

No drilling of the off-balance stockpiles has taken place. Grades of off-balance stockpiles have been set to 0.41g/t Au. This is slightly above the 0.40g/t Au cut-off used for dispatch of material to the stockpiles during mining operations. All off-balance stockpiles were assigned an Inferred classification. All material within the off-balance stockpiles is assumed to meet the requirement for reasonable prospects for eventual economic extraction based on estimated grades against the mining cut-off grade for stockpiles of 0.3g/t Au, consequently all material within the off-balance stockpiles has been reported as a Mineral Resource.

3.7.18 Reasonable Prospects for Eventual Economic Extraction

For a deposit, or portion of a deposit, to be classified as a Mineral Resource there must be reasonable prospects for eventual economic extraction ("RPEEE"). The classified model was therefore further limited by suitable economic and technical parameters prior to Resource reporting. WAI tested RPEEE by running open pit optimisations for each deposit based on parameters provided by NMMC (Table 3.39). The resultant optimised pit shells are shown in Figure 3.50.

Capital costs associated with relocating or replacing major infrastructure were accounted for in the pit optimisation procedure, including railway at Muruntau (US$17M) and Besapantau (US$3.5M).

WAI used the formula below to derive break-even cut-off grades for each deposit:

- Cut-off = Total cost per tonne / ((Au price per gram * recovery) – selling cost per gram))

NMMC chose a cut-off grade of 0.3g/t for reporting Mineral Resources within the optimised pit shells. Calculated breakeven cut-off grades range from 0.21 to 0.31g/t. WAI therefore consider blocks above 0.3g/t within the optimised pit shells to have reasonable prospects for eventual economic extraction.

Although the optimised pit shells were created with mining dilution and recovery accounted for via block model regularisation, resource tonnes and grade within the pit shell were reported in situ using the original sub-blocked model.

Table 3.39: Pit Optimisation Input Parameters (USD)

Parameter		Value			Comment
		Muruntau Mutenbai	Besapantau	Balpantau	
Gold Price		US$1,950/oz	US$1,950/oz	US$1,950/oz	
Mining	Dilution & Ore Loss	30x30x15m SMU	12x12x5m SMU	12x12x5m SMU	Accounted for by SMU regularisation
	Overall Slope Angles	Various	42°	41°	Muruntau approximate slope angles as per SRK 2019 report
Costs	*Mining*				
	Production	50,000ktpa	5,000ktpa	3,000ktpa	
	Mining	US $1.08/t	US $1.08/t	US $1.08/t	
	Truck Haulage Cost	US$0.325/(t*km)	US$0.148/(t*km)	US$0.148/(t*km)	
	Re-Handling	0.7	-	-	Stockpile rehandling Mining Cost Adjustment Factor
	Vertical Adjustment	US$0.061/15m	US$0.009/5m	US$0.009/5m	
	Total Mining Cost	US$1.08/t	US$1.08/t	US$1.08/t	Includes haulage cost but excludes vertical adjustment.
	Processing				
	Milling Costs	US$8.710/t (ore)	US$8.710/t (ore)	US$8.710/t (ore)	
	CPD Expenses	US$0.125/t (ore)	US$0.125/t (ore)	US$0.125/t (ore)	
	Railway Haulage	US$0.709/t (ore)	US$0.241/t (ore)	US$2.753/t (ore)	
	Overall Processing Cost	US$9.54/t (ore)	US$9.08/t (ore)	US$11.59/t (ore)	
	Selling				
	Royalty	US$5.399/g	US$5.425/g	US$5.425/g	10% Royalty Rate
	Period Costs	US$0.676/g	US$0.676/g	US$0.676/g	
	Overall Selling Costs	US$6.070/g	US$6.101/g	US$6.101/g	
Recovery	Process	87.9%	88.4%	88.4%	
	Refining	99.0%	99.0%	99.0%	
	Overall Process	87.1%	87.5%	87.5%	

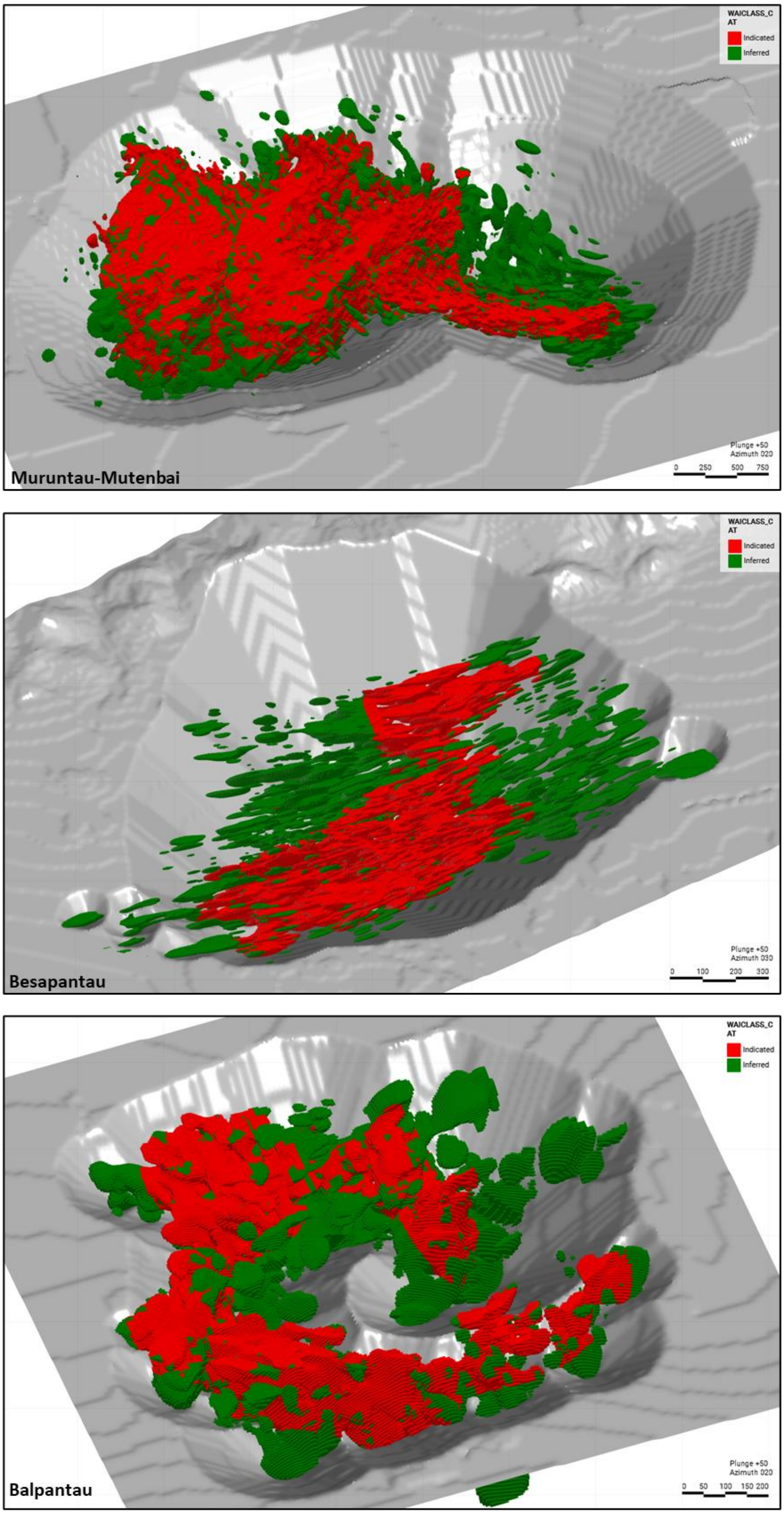


Figure 3.50: Optimised Pit Shells for Each Muruntau Cluster Deposit

3.7.19 Audited Mineral Resource Statement

The Mineral Resource estimates for the Muruntau Cluster gold deposits have been classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC 2012 Edition). The audited Mineral Resource statement is shown in Table 3.40. The effective date of the Mineral Resource estimates is January 1st, 2024.

The stated Mineral Resources are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, to the best knowledge of WAI. There are no known mining, metallurgical, infrastructure, or other factors that materially affect the Mineral Resource estimates, at this time.

Table 3.40: Audited Mineral Resource Statement for the Muruntau Cluster Wardell Armstrong International, effective January 1, 2024

Deposit	Class	Tonnes (Mt)	Grade (g/t Au)	Contained Au	
				(Moz)	(t)
Muruntau	*Indicated*	2,016	0.93	60.0	1,866
	Inferred	732	0.81	19.1	595
	Total	**2,747**	**0.90**	**79.1**	**2,461**
Mutenbai	*Indicated*	230	1.06	7.8	244
	Inferred	491	0.91	14.3	445
	Total	**721**	**0.96**	**22.2**	**689**
Besapantau	*Indicated*	131	0.88	3.7	115
	Inferred	133	0.90	3.8	119
	Total	**265**	**0.89**	**7.5**	**235**
Balpantau	*Indicated*	57	0.98	1.8	56
	Inferred	38	0.88	1.1	33
	Total	**95**	**0.94**	**2.9**	**90**
Stockpiles	*Indicated*	34	0.54	0.6	18
	Inferred	93	0.44	1.3	41
	Total	**127**	**0.46**	**1.9**	59
Total	*Indicated*	2,467	0.93	73.9	2,300
	Inferred	1,487	0.83	39.7	1,233
	Total	**3,955**	**0.89**	**113.6**	**3,533**

Notes:

1. Mineral Resources have been classified and reported in accordance with the guidelines of the JORC Code (2012);
2. The effective date of the Mineral Resource Estimates is January 1, 2024;
3. In-situ Mineral Resources have been reported at a cut-off grade of 0.3g/t gold. Stockpile Mineral Resources have been reported to a nominal cut-off grade of 0.0g/t Au;
4. Mineral Resources were limited to US$1,950/oz optimised open pit shells based on appropriate economic, mining and processing parameters;
5. Metal grade and content represents contained metal in the ground and have not been adjusted for metallurgical recovery or mining dilution;
6. Mineral Resources are not Ore Reserves until they have demonstrated economic viability based on a pre-feasibility study or feasibility study;
7. Mineral Resources have been reported inclusive of any Ore Reserves;
8. Mineral Resources have been reported at 100% ownership; and
9. All figures are rounded to reflect the relative accuracy of the estimate. Numbers may not add due to rounding.

3.7.20 Sensitivity Analysis

As part of the Resource pit optimisation WAI generated shells over a range of revenue factors, which can be used to assess sensitivity of the constraining shell to economic parameters such as metal price. A major step change in mined tonnes is evident between the 92% (i.e. $1794) and 94% (i.e. $1833) revenue factors for the Muruntau-Mutenbai MRE constraining shell (Figure 3.51).

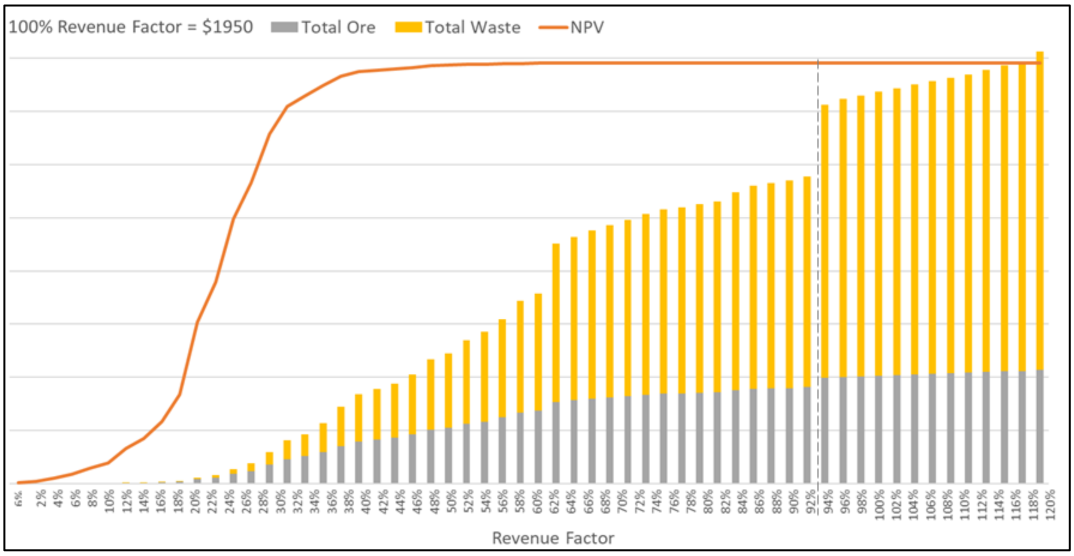


Figure 3.51: Lerchs-Grossman Phase Curve for the Muruntau-Mutenbai Resource Pit Optimisation

Visual comparison of the $1794 pit shell with the $1950 shell used in Resource reporting, shows that the main change is a significant push-back of the north-east wall at Mutenbai (Figure 3.52), which brings in an additional 8Moz of Inferred Resources at depth. This high sensitivity to relatively small changes in economic assumptions, combined with the Inferred classification, means WAI considers this to be a notably higher-risk portion of the Muruntau-Mutenbai Mineral Resource.

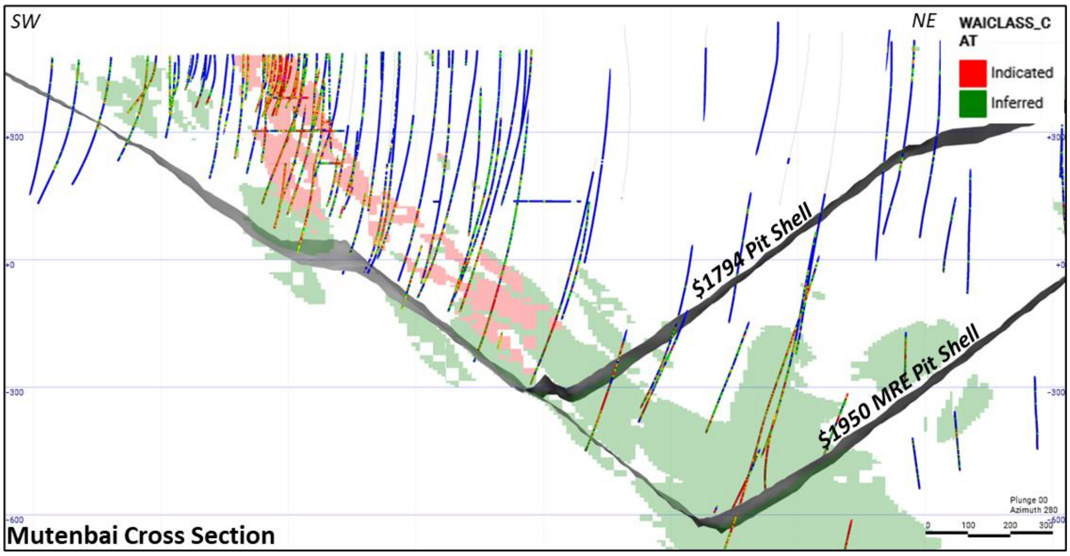


Figure 3.52: Cross Section Comparing $1794 and $1950 Pit Shells

4 ORE RESERVE ESTIMATION PROCESS

4.1 Introduction

4.1.1 Overview

This section outlines the Ore Reserve estimates for the Muruntau Cluster, prepared in accordance with the guidelines of the JORC Code (2012). The authors have reviewed the Ore Reserve estimation methodology, including mine design, operational factors, life of mine production scheduling, and confirmation of a positive financial analysis.

Ore Reserve Estimates are reported for the following pits:

- Muruntau
- Mutenbai
- Besapantau; and
- Balpantau.

Chukurkuduk was excluded from both the Mineral Resource Estimate and the Ore Reserve Estimate due to limited geological resource information.

The mining method used throughout the Muruntau cluster is standard drill and blast where necessary, combined with truck and shovel material movement. The methodology is well understood and used throughput the previous 60 years of mining life.

4.1.2 Ore Reserve Reporting Code, Standards and Definitions

The Ore Reserve Estimate completed as described in this report was carried out in accordance with the guidelines of the Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code 2012 Edition) prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, The Australasian Institute of Geoscientists and the Minerals Council of Australia ("The JORC Code").

Throughout this report, the Ore Reserve Estimate is described in terminology as laid out in the JORC Code as shown in Figure 4.1 which describes the relationship between Exploration Results, Mineral Resources and Ore Reserves.

The main principles governing the operation and application of the JORC Code (2012) are transparency, materiality and competence.

- **Transparency** requires that the reader of a Public Report is provided with sufficient information, the presentation of which is clear and unambiguous, to understand the report and is not misled;

- **Materiality** requires that a Public Report contains all the relevant information which investors and their professional advisers would reasonably require, and reasonably expect to find in the report, for the purpose of making a reasoned and balanced judgement regarding the Exploration Results, Mineral Resources or Ore Reserves being reported; and
- **Competence** requires that the Public Report be based on work that is the responsibility of suitably qualified and experienced persons who are subject to an enforceable professional code of ethics.

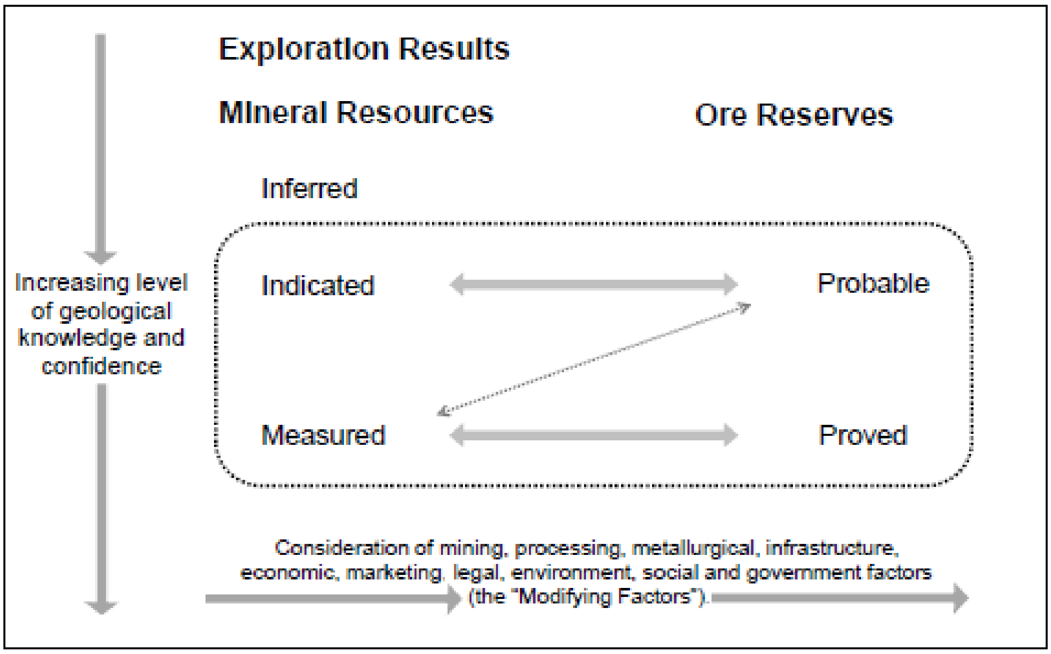


Figure 4.1: Relationship between Exploration Results, Mineral Resources and Ore Reserves (JORC 2012)

WAI has reviewed the applicable modifying factors associated with the Ore Reserve estimation, namely geotechnical and hydrogeological assessment, mineral processing and metallurgy, infrastructure review, environmental assessment, and market, governmental and other risk assessments.

4.1.3 Competent Persons

The information in this report that relates to Ore Reserves is based on information compiled and work carried out by Stuart Richardson (BEng, MSc, CEng, MIMM) and Colin Davis (BEng, MSc, CEng, MIMM). Mr. Richardson and Mr. Davies are full-time employees of WAI and have sufficient experience relevant to the style of mineralization and type of deposit under question and to the activity which is carried out and described in this report to qualify as Competent Persons as defined in the 2012 edition of the "Australasian Code for the Reporting of Exploration Results, Mineral Resources and Ore Reserves".

WAI is part of Wardell Armstrong LLP, an independent consultancy that has provided the mineral industry with specialised geological, mining, and processing expertise since 1837. Our experience is worldwide and has included all commodities. WAI provides a wide range of services for minerals-related projects. These range from preliminary exploration planning, through Mineral Resource and Ore Reserves estimation, mine design and financial appraisal, to bankable final feasibility study. WAI has professionally qualified and experienced specialists in mining geology, mining engineering, processing, rock mechanics and hydrogeology, mineral surveying, computing, financial evaluation, environmental and social assessments, and mineral economics.

WAI, its directors, employees and associates neither has nor holds:

- Any rights to subscribe for shares in NMMC either now or in the future;
- Any vested interests in any concessions held by NMMC;
- Any rights to subscribe to any interests in any of the concessions held by NMMC, either now or in the future;
- Any vested interests in either any concessions held by NMMC or any adjacent concessions; and
- Any right to subscribe to any interests or concessions adjacent to those held by NMMC, either now or in the future.

WAI's only financial interest is the right to charge professional fees at normal commercial rates, plus normal overhead costs, for work carried out in connection with the investigations reported here. Payment of professional fees is not dependent either on project success or project financing.

4.2 Open Pit Optimisation

4.2.1 Optimisation Process

Pit optimisation is a recognised technique by which different open pit shells may be generated, based on a supplied geological resource block model and user-defined economic and operating parameters. WAI carried out the optimisation works using industry recognised Datamine NPV Scheduler software which offers various facilities for mine scheduling and optimisation of the pit shell extents.

At the current stage of the Project, NPV Scheduler has been used for strategic long-term planning, including pit optimisation and the generation of different strategic scenarios.

The pit optimisation process generates nested pit shells using incremental revenue factors. WAI specified a range of revenue factors from 10% - 120%, with a 2% step size to generate. The Revenue Factor 1.00 shell represents the primary input metal prices (US$1,650/oz for gold).

4.2.2 Input Parameters

The Ore Reserve shell shall be defined by conducting a pit optimisation process, using defined parameters. This will provide a series of nested pit shells against which the existing open pit designs can be assessed for suitability as the basis of mine design and scheduling.

General parameters and modifying factors applicable to the open pits includes the assumed gold price, sales costs, mineral royalty and other fixed and variable costs are shown in the tables below.

The process recoveries and mining costs for optimisation have been provided based upon production actuals defined by the NMMC metallurgical and mining departments.

Table 4.1: List of Ore Reserve Optimisation Parameter Files

Pit	File Name
Muruntau-Mutenbai	*исх по оптимиз Мурунтау_ELA_04.10.2023_ESHZ*
Besapantau	*исх по оптимиз Бесапантау_ELA_ind_01.10.2023_ESHZ*
Balpantau	*исх по оптимиз Балпантау_ELA_ind_21.10.2023_ESHZ*
Note:	

Table 4.2: General Modifying Factors (Ore Reserves)

Parameter	Unit	Muruntau	Besapantau	Balpantau	Notes
Gold Price	US$/ oz	$1,650	$1,650	$1,650	
Period Costs	US$/ oz	$21.02	$21.02	$21.02	
Overall Recoveries	%	87.1%	87.5%	87.5%	Used for calculating royalty
Mineral Royalty	%	10%	10%	10%	
Mineral Royalty	US$/ oz	$141.80	$142.49	$142.49	See formula below
Total Selling Costs	US$/ oz	$162.82	$163.51	$163.51	
	US$/ g	$5.23	$5.26	$5.26	

Formulas within optimisation parameter files indicate that royalty costs are to be calculated using the following formula:

$$Royalty\ Cost = (Gold\ Price - Period\ Costs) * Recovery * 10\%$$

Table 4.3: Pit Optimisation Parameters (Ore Reserves)

	Units	Value	Notes
Discount Rate	%	10%	
Overall Slope Angles	Muruntau	As per NMMC Stage 5 design	See section 3
	Besapantau	As per NMMC design	See section 3
	Balpantau	As per NMMC design	See section 3
Base Mining Cost	US$/t mined	1.08	
Vertical Adjustment Muruntau	US$ per 15m bench	0.061	
Vertical Adjustment Balpantau and Besapantau	US$ per 5m Bench	0.009	
Muruntau Processing Cost	US$/ t (ore)	9.54	
Besapantau Processing Cost	US$/ t (ore)	9.08	
Besapantau Processing Cost	US$/ t (ore)	11.59	

Table 4.3: Pit Optimisation Parameters (Ore Reserves)			
	Units	**Value**	**Notes**
Overall Muruntau Sulphide Recovery	%	87.1	
Overall Besapantau Oxide Recovery	%	87.3	
Overall Besapantau Sulphide Recovery	%	87.5	
Overall Balpantau Oxide Recovery	%	87.7	
Overall Balpantau Sulphide Recovery	%	87.5	
Mining Dilution	%	12	See Section: 2.2
Ore Losses	%	5	See Section: 2.2

4.2.3 Process Recoveries and Costs

Process recoveries used in the optimisation process were derived from information supplied by NMMC and reviewed by technical specialists within WAI.

Table 4.4: Process Recoveries					
Categories	**Muruntau - Mutenbai**	**Besapantau**		**Balpantau**	
	Sulphide	Sulphide	Oxide	Sulphide	Oxide
Recovery	87.9%	88.4%	88.2%	88.4%	88.6%
Refining Recovery	99.0%	99.0%	99.0%	99.0%	99.0%
Overall Recovery	87.1%	87.5%	87.3%	87.5%	87.7%

Table 4.5: Processing Costs				
Categories	**Units**	**Muruntau - Mutenbai**	**Besapantau**	**Balpantau**
Milling	(US$/t)	8.710	8.710	8.710
CPD Expenses	(US$/t)	0.125	0.125	0.125
Railway Haulage	(US$/t)	0.709	0.241	2.753
Processing Costs	(US$/t)	9.54	9.08	11.59

4.2.4 Geotechnical Parameters

The overall pit constraining pit shells used for the ore reserve estimates have been produced by NMMC, and as such the geotechnical parameters, derived from the SRK work, have been maintained. For the pushback designs which incorporate sections of final pit walls, existing slope angles from the NMMC designs were used. For sections of pushback walls outside of the Stage 5 design slope angles and berm widths derived by WAI analysis have been used as shown in Table 4.6 to Table 4.9 Below.

Detailed geotechnical analysis has been carried out by WAI and is presented in Section 3 of this report.

Table 4.6: Muruntau Pushback Design – Slope Angles

Level	Zone	Slope Angle	Bench Height	Standard Bench Width	Catch Bench Width	IRA (Inter-ramp Angle)
RL -255 m – 100 m	0° - 98°	55°	30	12	24	42.3°
	98° - 116°	55°	30	12	24	42.3°
	116° - 216°	50°	30	12	24	38.9°
	216° - 263°	55°	30	12	24	42.3°
	263° - 330°	55°	30	12	24	42.3°
	330° - 360°	55°	30	12	24	42.3°
RL 100 m – 300 m	0° - 98°	55°	30	12	24	42.3°
	98° - 116°	55°	30	12	24	42.3°
	116° - 216°	45°	30	10	20	36.9°
	216° - 263°	50°	30	12	24	38.9°
	263° - 330°	45°	30	10	20	36.9°
	330° - 360°	55°	30	12	24	42.3°
RL 300 m -580 m	0° - 98°	50°	30	10	20	40.5°
	98° - 116°	55°	30	12	24	42.3°
	116° - 216°	45°	30	10	20	36.9°
	216° - 263°	50°	30	12	24	38.9°
	263° - 330°	45°	30	10	20	36.9°
	330° - 360°	50°	30	10	20	40.5°

Table 4.7: Mutenbai Pushback Design – Slope Angles

Level	Zone	Slope Angle	Bench Height	Standard Bench Width	Catch Bench Width	IRA
RL 20 m – 100 m	0° - 116°	60°	30 m	12°	24°	45.7°
	116° - 280°	50°	30 m	12°	24°	38.9°
RL 100 m – 300 m	0° – 116°	60°	30 m	12°	24°	45.7°
	116° – 280°	50°	30 m	12°	24°	38.9°
RL 300 m – 480 m	0° – 116°	55°	30 m	12°	24°	42.3°
	116° - 280°	45°	30 m	10°	20°	36.9°

Table 4.8 Besapantau Sectors and Corresponding Bench Face Slope Angles					
Domain	**Sub-Domain**	**BFA (Bench Face Angle) (°)**			**Inter-Ramp Angle (°) for FoS* = 1.5**
		FoS = 1.3	**FoS = 1.5**	**PoF = 25**	
D1	D1	55	65	65	44
D2	D2_N	65	65	65	51
		45	50	60	37
		60	65	65	48
	D2_S	45	45	50	37
D3	D3_N	65	65	65	51
		45	50	55	37
	D3_S	45	45	50	37
D5	D5_U	50	50	60	40
		55	55	65	44
		65	65	65	51
		45	50	55	37
		65	65	65	51
	D5_D	55	55	60	44
		65	65	65	51
		45	50	55	37
D6	D6	55	60	60	44

* Percentage of Failure

** Factor of Safety

Table 4.9: Balpantau Overall slope angle orientations and locations		
Location	**Azimuth (°)**	**Dip (°)**
1	106.8	38.1
2	177.8	51.1
3	208.4	50.3
4	211	51.9
5	286.8	48.3
6	305.7	45.3
7	335.3	35.2
8	31.0	44.2
9	319.5	40.0
10	30.6	51.2
11	128.0	45.7
12	358.5	49.3
13	101.8	50.9
14	139.5	40.0
15	211.0	44.2
16	31.0	37.8
AVERAGE		42.4

4.3 Dilution and Losses

For the purposes of assessing the Ore Reserve Estimation, NMMC used 12% and 5% for dilution and ore loss respectively for the Muruntau-Mutenbai Pit. For Besapantau and Balpantau, regularised block models were instead used to introduce dilution and ore loss during the estimation work.

The block models for Muruntau, Besapantau and Balpantau were regularised into different Selective Mining Unit (SMU) sizes listed in Table 4.10 below:

Table 4.10: Regularisation Cases

Categories	Case 1	Case 2	Case 3
Muruntau - Mutenbai	20 m x 20 m x 10 m	30m x 30m x 15m	40m x 40m x 20m
Besapantau	5 m x 5 m x 5 m	10m x 10m x 5m	12m x 12m x 5m
Balpantau	5 m x 5 m x 5 m	10m x 10m x 5m	12m x 12m x 5m

Pit shell optimisations were then run in Datamine NPVS for each of the regularised block models using the same parameters used during the open pit optimisation process for the Mineral Resource Estimate audit of the Muruntau Cluster. The operational cut-off grade (COG) of 0.5g/t was selected during the optimisation process. This process was also run for calculated economic cut off grades of 0.2g/t and 0.3g/t.

The models generated notional Net Present Values for each of the pits and the respective SMU size. The notional NPV values were then used to find the optimum SMU size whilst adhering to operational considerations. As shown in Table 4.11 to Table 4.13, the smaller SMU sizes generated the greatest NPV due to reduced dilution and losses.

Table 4.11: Muruntau Dilution and Loss Results

Muruntau	COG (g/t)	Notional NPV (US$M)	Dilution (Mt	Ore Tonnes	Grade	Cont. Gold (kg)	Cont. Gold
mod40x40x20	0.5	1,710	113	108%	90%	(50,765)	97%
mod30x30x15	0.5	2,289	84.3	106%	92%	(44,702)	97%
mod20x20x10	0.5	2,563	68.6	105%	94%	(18,329)	99%
mod_subblocked v2	0.5	4,101	-	100%	100%	-	100%

Table 4.12: Besapantau Dilution and Loss Results

Besapantau	COG (g/t)	Notional NPV (US$M)	Dilution (Mt)	Ore Tonnes	Grade	Cont. Gold (kg)	Cont. Gold
mod12x12x5	0.5	537	7.7	111%	84%	(5,067)	94%
mod10x10x5	0.5	562	7.3	110%	86%	(3,577)	95%
mod5x5x5	0.5	521	5.01	107%	92%	(1,083)	99%
mod_subblockedv2	0.5	757	-	100%	100%	-	100%

Table 4.13: Balpantau Dilution and Loss Results

Balpantau	COG (g/t)	Notional NPV (US$M)	Dilution (Mt)	Ore Tonnes	Grade	Cont. Gold (Kg)	Cont. Gold
mod12x12x5	0.5	921	2.56	106%	89%	(2,870)	94%
mod10x10x5	0.5	950	2.34	105%	91%	(1,986)	96%
mod5x5x5	0.5	984	1.60	104%	95%	(839)	98%
mod_subblockedv2	0.5	1,051	-	100%	100%	-	100%

Further analysis evaluated each of the regularised block models against the design pit shells for each deposit. WAI carried out analysis of the waste tonnes, ore tonnes and in-situ grades for each pit and block model. The results from this were then used to calculate the planned dilution and ore loss for each pit and SMU block model relative to the original sub blocked model.

Actual dilution and losses reported by NMMC for Muruntau-Mutenbai were higher than the WAI estimates (as shown in Table 4.14), and accordingly mathematical (unplanned) dilution and loss values of 6% and 2.3% respectively were added during the optimisation process in addition to the planned dilution and loss values of 6% and 2.3% achieved via the regularisation process for an overall dilution and loss of 12% and 5%.

Table 4.14: Planned and Actual Dilution and Loss

		WAI (Estimated)	WAI (Estimated)	NMMC (Reported)	NMMC (Reported)
Pit	SMU Size	Dilution	Loss	Dilution	Loss
Balpantau	12x12x5	5.8%	5.7%	N/A	N/A
Besapantau	12x12x5	10.9%	6.5%	N/A	N/A
Muruntau	30x30x15	6.0%	2.7%	12.0%	5.0%

4.4 Mining Cut-Off

The parameters quoted above result in a theoretical (calculated) ore cut-off grade for material sent to the CIL process plant of between 0.2-0.35g/t Au. Operationally, the mine uses a mill cut-off of **0.50g/t Au** and as such this operational COG has been utilised to derive the Ore Reserve Estimate.

4.5 Pit Design

4.5.1 Muruntau - Mutenbai Mine Design

4.5.1.1 Overview

As part of the Ore Reserve Estimation a mine design was required as a constraining shell to report reserves. The current design, also in current production, is the Stage 5 Pit Design (mu_stage_5_v2_upd). Following the 2024 audit of the MRE by WAI and in consultation with NMMC, it was decided to keep the existing *Stage 5 Pit Design (mu_stage_5_v2_upd)* provided by NMMC as the constraining shell for the Ore Reserve Estimate.

Initially, one, pushback design was completed within the Stage 5 pit. After running the schedule in Datamine NPVS it was found that significant amounts of waste stripping were required in years one and two, adversely affected the mining schedule. Therefore, a further two pushback shells were designed to introduce ore earlier and smooth the waste tonnes and stripping ratio in the first several years of the schedule. This method was partially successful, but still resulted in higher than ideal waste tonnes and lower than ideal mined ore tonnes in the first year, necessitating make up ore from stockpiles.

4.5.1.2 Pit Design Parameters

The pushbacks were designed with the following parameters:

- Dual lane haul ramp of 38.5 m width and an 8% gradient.
- Mining capacity of 105 m^3 total material mover per year. Based on current production of 103 m^3 with capacity to increase to 105 m^3 as advised by NMMC.
- 30 m bench height, with limited exceptions of 15 m, as per the existing Stage 5 design.
- For pushback designs, geotechnical parameters developed by WAI and detailed in Section 3 have been used. Whilst for the Stage 5 design and where pushbacks intersect the Stage 5 design, slope geotechnical parameters remain the same.
- Ramp designs for pushbacks were designed to mimic the Stage 5 design with similar or same entry / exit locations.

4.5.1.3 Designs

Mutenbai PB1

Mutenbai PB1 represents a starter pit for the Mutenbai orebody in order to provide early ore tonnes from this zone whilst waste stripping occurs from Muruntau, and to reduce overall Muruntau-Mutenbai stripping ratio during the first two years of the mining schedule. The pushback was designed using the auto design function within Datamine Studio OP software. Geotechnical parameters derived by WAI during geotechnical analysis were used for slope angles and berm widths. It should be noted that this pushback is not an operationally ready design and solely to develop a more realistic schedule, reducing the stripping ratio during the first two years.

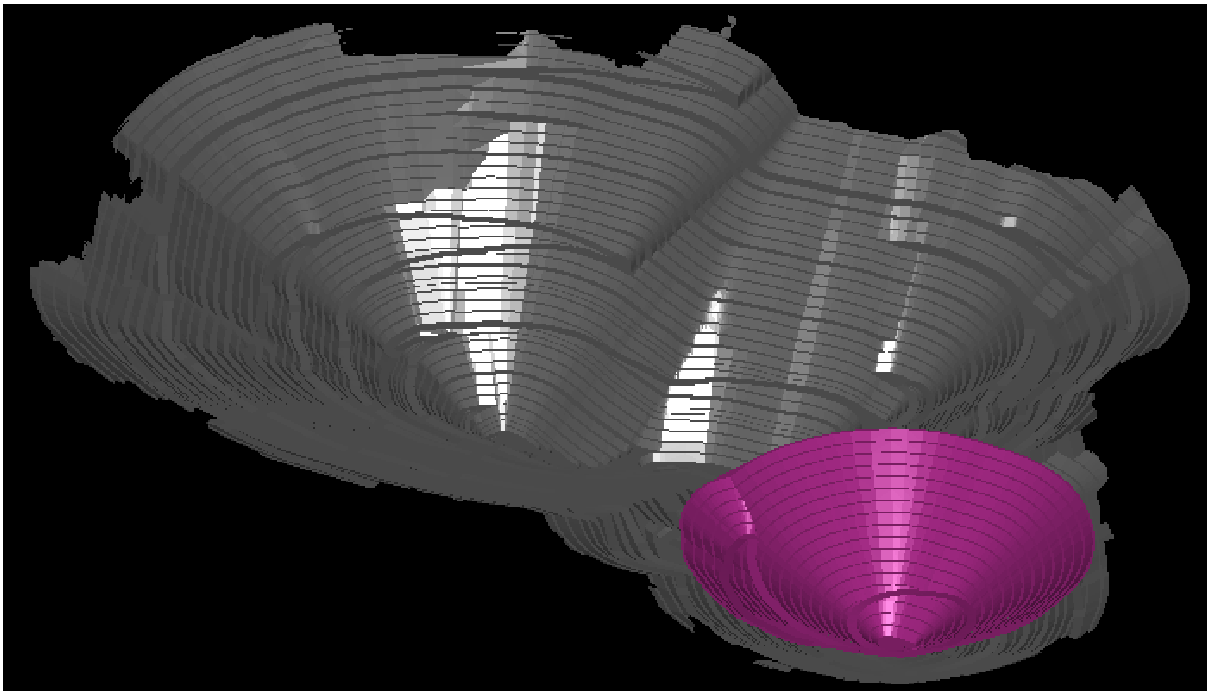


Figure 4.2: Mutenbai PB1 shown nested within Stage 5 design.

Muruntau PB1

This pushback was designed to access shallow lying ore in the northern area of the Muruntau Pit to reduce and smooth the waste tonnes/ stripping ratio during the first two years of the schedule. This design is detailed and replicates the NMMC Stage 5 design in the North and West walls in order to minimise final wall movement. WAI derived geotechnical parameters were used for the south and east walls. Whilst this design is more detailed than the Mutenbai pushback it is also not an operationally ready design.

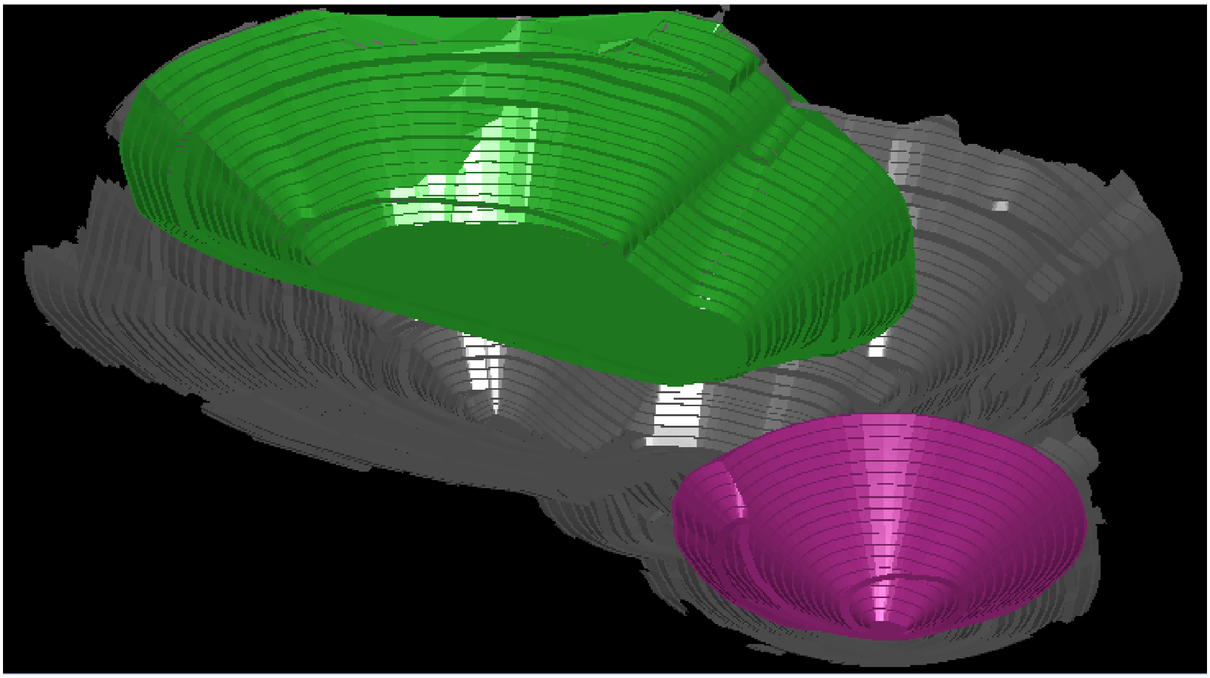


Figure 4.3 Muruntau PB1 shown nested within Stage 5 design.

Muruntau PB2

This pushback is a detailed design incorporating the NMMC Stage 5 pit design in the West and North Walls and was developed from an optimised pushback shell generated during the pit optimisation NPV Scheduler. The layout of the ramps mimics the Stage 5 design in the South and East walls with similar layout and exit/ entry points. Geotechnical parameters derived by WAI analysis have been used for the south and east walls.

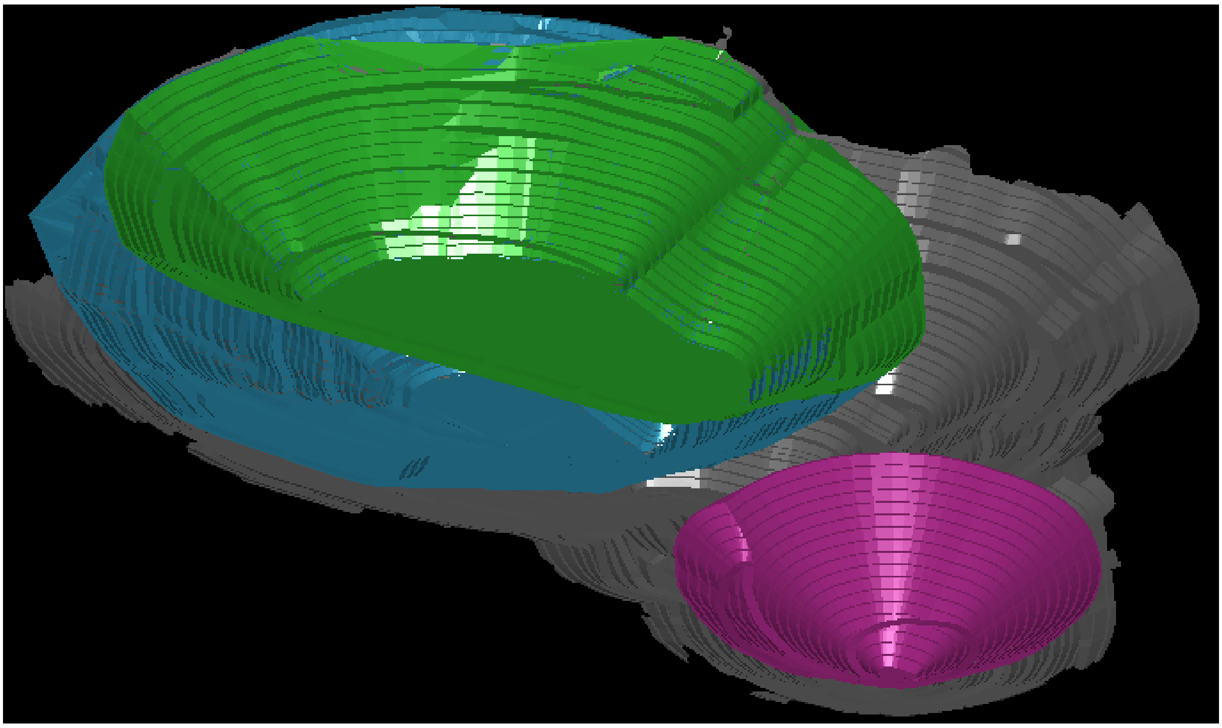


Figure 4.4 Muruntau PB2 shown nested with Stage 5 design.

Muruntau PB3 - Stage 5 Design

Pushback 3 (PB3) is the Muruntau Stage 5 design developed by NMMC. In consultation with NMMC following a review of the Mineral Resource Estimate, a decision was made to retain this design as the constraining shell for use during Ore Reserve Estimation. Therefore, the overall Ore Reserve Estimate reported numbers are based on this design.

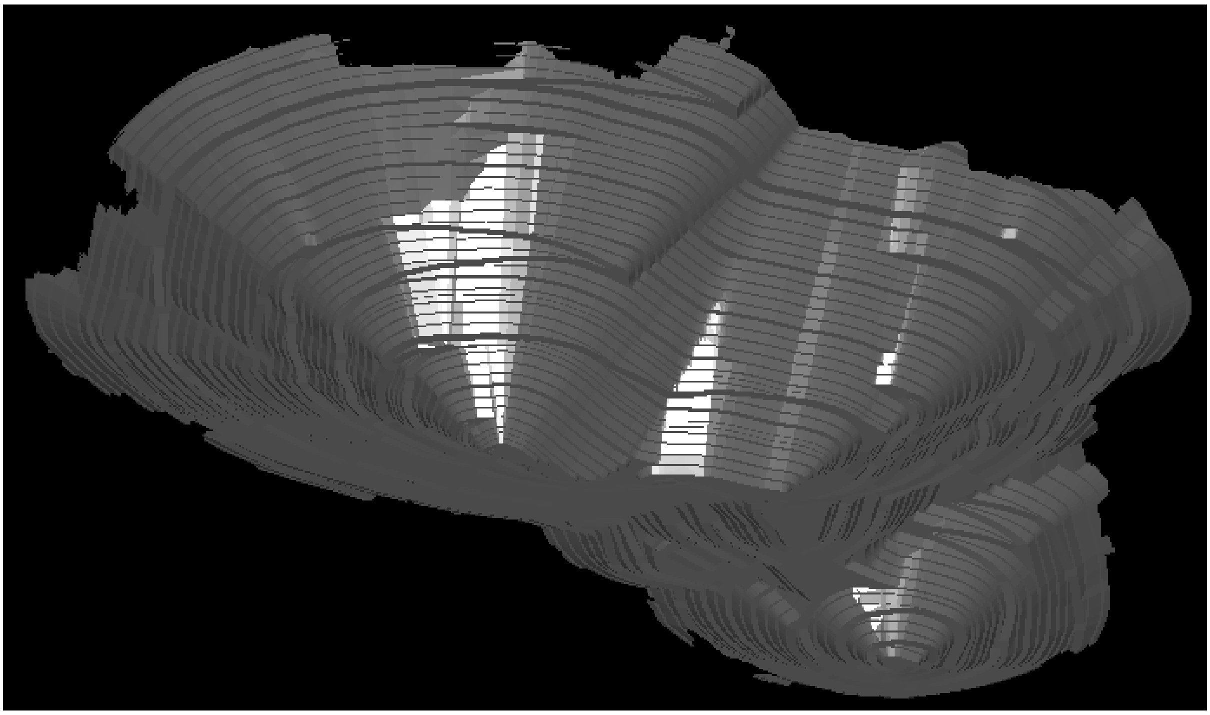


Figure 4.5 Muruntau PB3 Stage 5 design.

4.5.2 Besapantau Mine Design

4.5.2.1 Overview

The process of pit design for Besapantau is carried out by the technical services team at NMMC and includes the generation of a final pit design based on the most recent geotechnical constraints which give overall slope angles for each wall domain.

As such, the final pit which informs the LOM (Life of Mine) schedule and is subsequently used generate the Besapantau Ore Reserve Estimate (*officialdesign_besapantau.dxf)* has been prepared by NMMC and audited by WAI. The pit design is approximately equivalent to the optimised shell at a US$1,650/oz reference gold price.

Following completion of the final pit designs works, selection of interim pushback shells was made to provide guidance for pushback design works.

Selection of pushbacks must be carried out in order to identify how mining within the pit shall progress, and to generate a more accurate assessment of discounted cashflow for a given scenario. By considering a range of pushback selection options and scheduling methodologies, WAI three interim pushbacks for the Besapantau Open Pit.

These pushback shells were then used as the basis for pushback designs.

Pushback design incorporates haul roads/ramps, benches/berms and follows the geotechnical pit design requirements as described in Section 4.2.4. The pit design strings and wireframes have been produced in in Datamine Studio OP software, and output as .dxf files.

4.5.2.2 Pit Design Parameters

The pushbacks were designed with the following parameters:

- Dual lane haul ramp of 27.5m width and an 8% gradient.
- Maximum bench height of 30m, with flitches of 5-15m, as required to maintain appropriate ore/waste delineation on individual benches.
- Ramp designs for pushbacks were designed to maximise the final wall positions from the ultimate pit designs with identical entry/exit locations.
- Maximum vertical rate advance of 100m per year per stage.

4.5.2.3 Designs

Besapantau PB1

Mining within Pushback 1 (PB1) is focussed within a starter pit in the southern area of the final pit and incorporates benches from surface to a depth of approximately 100m below surface. Access to Pushback 1 is via a final haul road exiting the pit to the south-east.

Minor operational amendments have been made to the Pushback 1 design relative to the optimised pushback shell, specifically:

- Extension of pit rim to the final wall position in the south and east in order to utilise the primary final haul route in that location.

Figure 4.6 presents the Pushback 1 design shell and optimised pushback shell overlay.

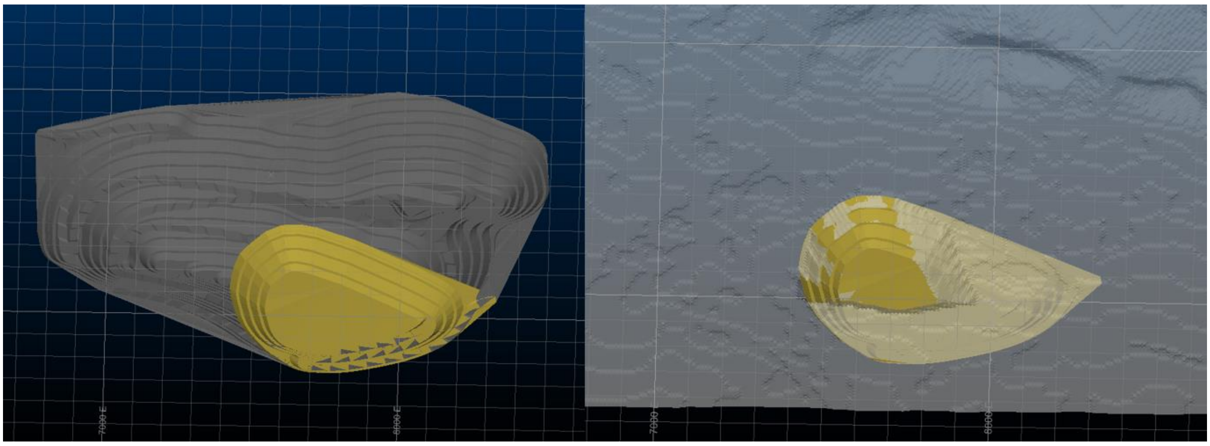


Figure 4.6: (Left) Pushback 1 Design vs Final Pit; (Right) Pushback 1 Design vs Optimised Shell

Besapantau PB2

Mining within Pushback 2 (PB2) is focussed in the central section of the open pit, encompassing the area covered by PB1 and extending to the north and west. PB2 incorporates benches from surface to the 400m RL (Reduced Level), mining to final depth in the northern area. Access to Pushback 2 is via a final haul road exiting the pit to the southeast.

Given the nonuniformity of the optimised pushback shell, operational amendments have been made to the Pushback 2 design relative to the optimised shell to provide consistency of design and to maintain operational viability. Significant extension of pit rim has been made on both the western and southeastern walls to maintain viable access routes to the northern extension of the pit.

Figure 4.7 presents the Pushback 2 design shell and optimised pushback shell overlay.

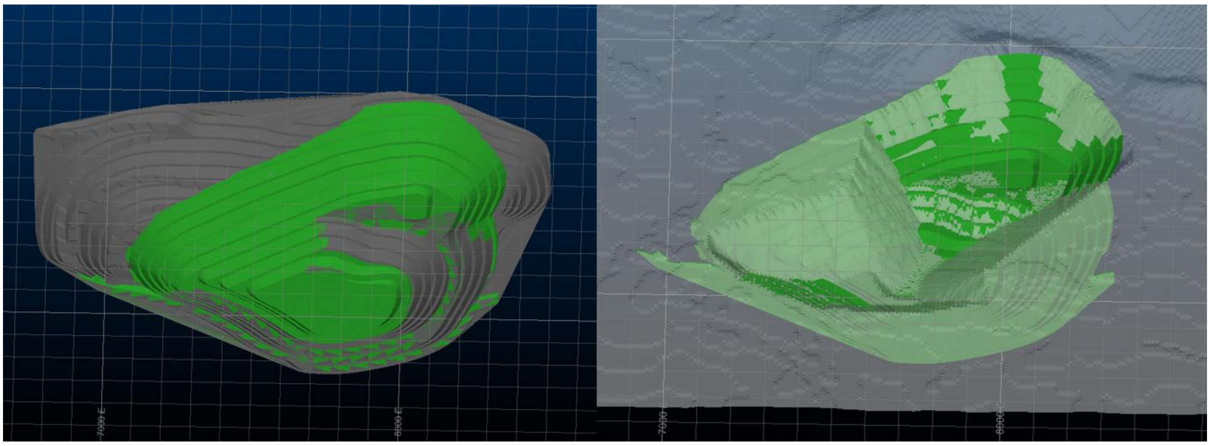


Figure 4.7: (Left) Pushback 2 Design vs Final Pit; (Right) Pushback 2 Design vs Optimised Shell

Besapantau PB3

Mining within Pushback 3 extends across the entire eastern extent of the final pit and incorporates benches from surface to the 400m RL. Pushback 3 includes a second access to the pit via a final haul road exiting the pit to the west, in addition to the south-east access point.

Operational amendments have been made to the Pushback 3 design relative to the optimised pushback shell, specifically:

- Extension of the pit to the final wall position in the north-east corner to maintain minimum mining width requirements.
- Exclusion of a western extension to the open pit in order ensure a viable strip ratio would be viable within Pushback 4.
- Reduction in pit depth to 400m RL to ensure average haulage distances are not prohibitive.

Figure 4.8 presents the Pushback 3 design shell and optimised pushback shell overlay.

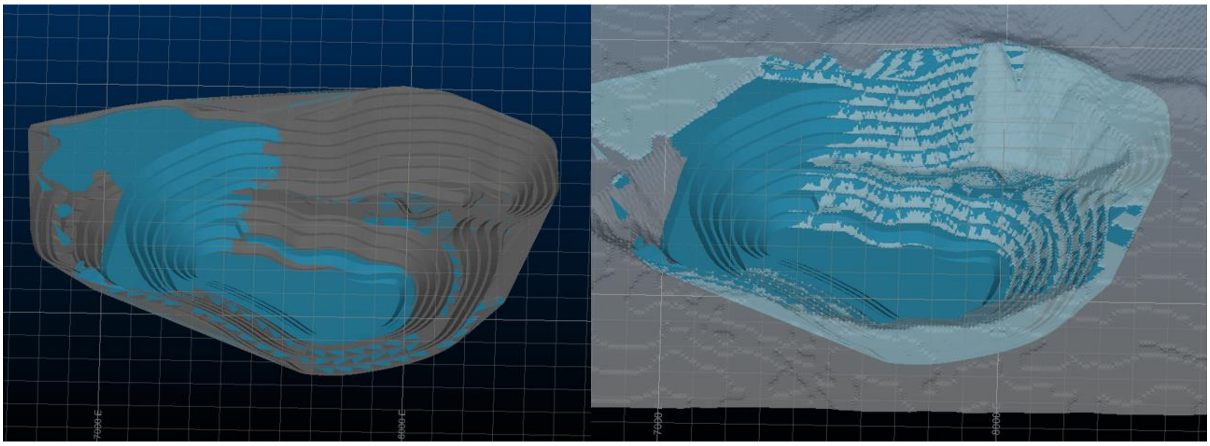


Figure 4.8: (Left) Pushback 3 Design vs Final Pit; (Right) Pushback 3 Design vs Optimised Shell

Besapantau Final Pit Design (PB4)

The current open pit design for Besapantau has been prepared by NMMC and is based upon the open pit design parameters outlined above. This pit design has then been utilised to determine the mining schedule and subsequently define the Ore Reserve Estimate.

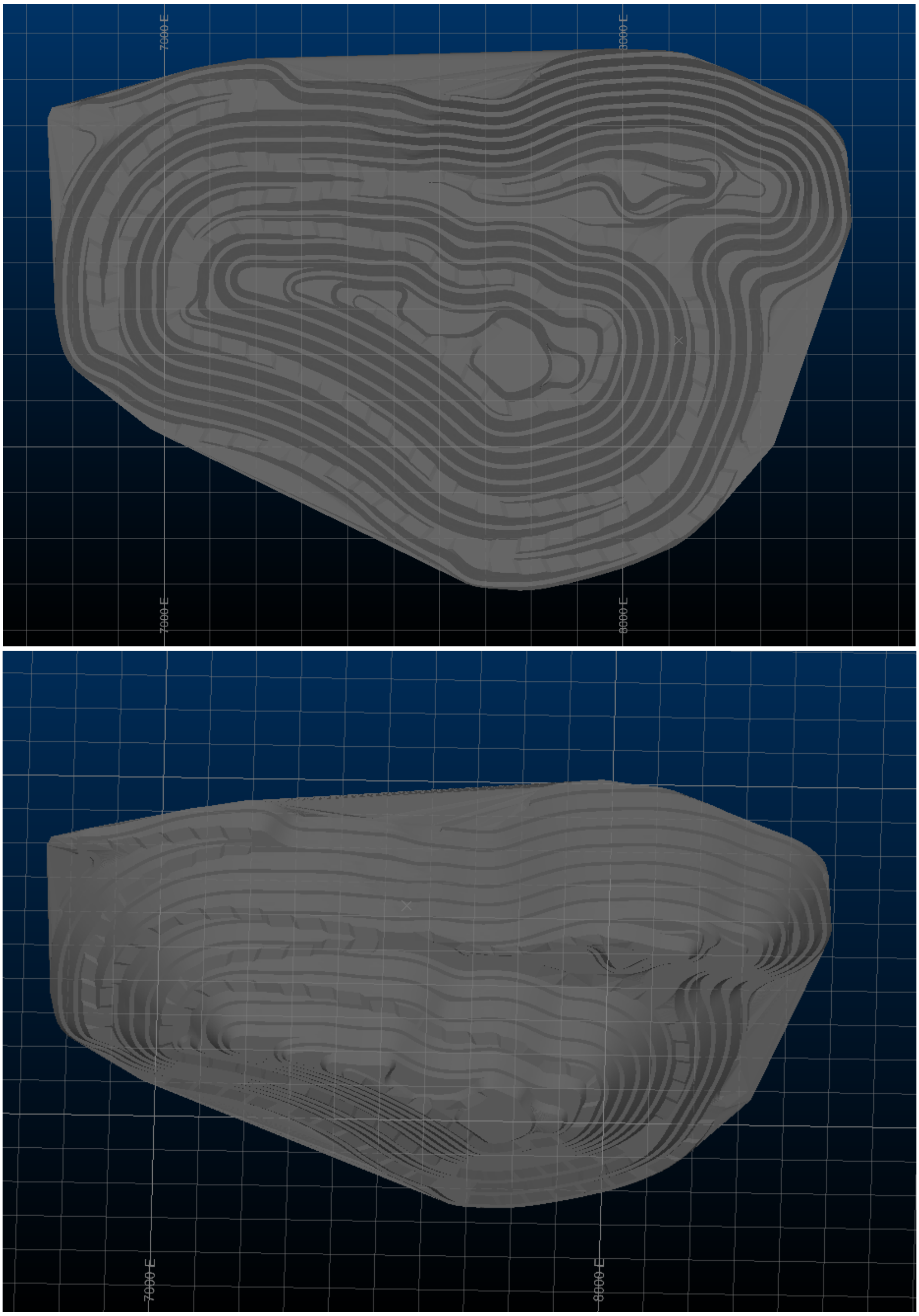


Figure 4.9 Besapantau Final Pit Design

4.5.3 Balpantau Mine Design

4.5.3.1 Overview

The process of pit design for Balpantau is carried out by the technical services team at NMMC and includes the generation of a final pit design based on the most recent geotechnical constraints which give overall slope angles for each wall domain.

As such, the final pit which informs the LOM schedule and is subsequently used generate the Balpantau Ore Reserve Estimate (*pro_balpantau_cpb.dxf)* has been prepared by NMMC and audited by WAI. The pit design is approximately equivalent to the optimised shell at a US$1,650/oz reference gold price.

Following completion of the final pit designs works, selection of interim pushback shells was made to provide guidance for pushback design works.

Selection of pushbacks must be carried out in order to identify how mining within the pit shall progress, and to generate a more accurate assessment of discounted cashflow for a given scenario. By considering a range of pushback selection options and scheduling methodologies, WAI three interim pushbacks for the Balpantau Open Pit.

These pushback shells were then used as the basis for pushback designs.

Pushback design incorporates haul roads/ramps, benches/berms and follows the geotechnical pit design requirements as specified in Section 4.2.4. The pit design strings and wireframes have been produced in in Datamine Studio OP software, and output as .dxf files.

4.5.3.2 Pit Design Parameters

The pushbacks were designed with the following parameters:

- Dual lane haul ramp of 27.5m width and an 8% gradient.
- Maximum bench height of 30m, with flitches of 5-15m, as required to maintain appropriate ore/waste delineation on individual benches.
- Ramp designs for pushbacks were designed to maximise the final wall positions from the ultimate pit designs with identical entry/exit locations.
- Maximum vertical rate advance of 100m per year per stage.

4.5.3.3 Designs

Balpantau PB1

Mining within Pushback 1 (PB1) is focussed in the north-west area of the final pit and incorporates benches from surface to the 190m RL. Access to Pushback 1 is via a final haul road exiting the pit to the north-west.

Minor operational amendments have been made to the Pushback 1 design relative to the optimised pushback shell, specifically:

- Extension of pit rim to the final wall position in the west and north in order to utilise the primary haul route in that location.
- Limiting the depth of the Pushback 1 pit to the 190m RL to maximize ore accessibility without compromising mining width.

Figure 4.10 presents the Pushback 1 design shell and optimised pushback shell overlay.

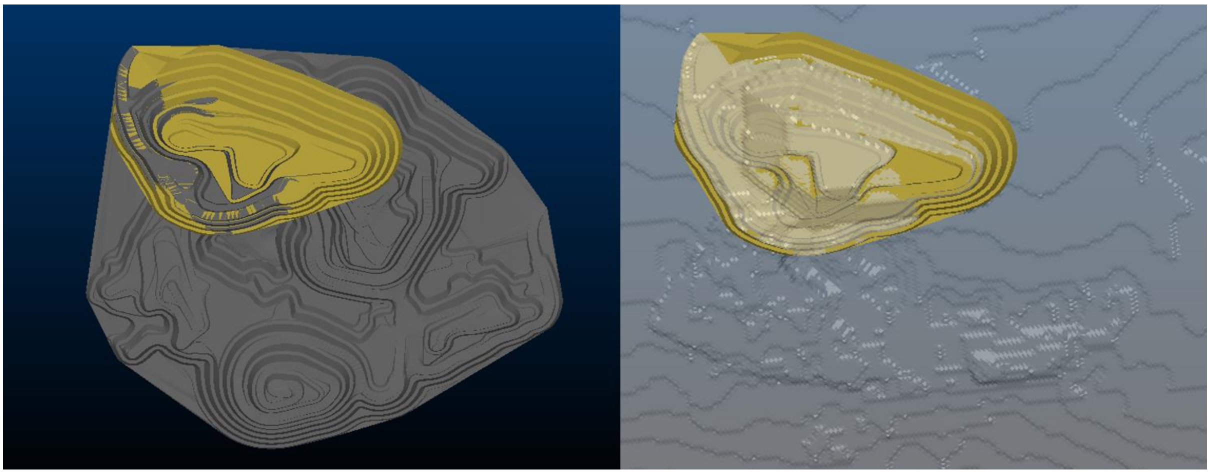


Figure 4.10: (Left) Pushback 1 Design vs Final Pit; (Right) Pushback 1 Design vs Optimised Shell

Balpantau PB2

Mining within Pushback 2 is focussed in the northern section of the open pit, encompassing the area covered by PB1 and extending to the east. PB2 incorporates benches from surface to the 180m RL, mining to final depth in the PB1 area. Access to Pushback 2 is via a final haul road exiting the pit to the north-west.

Operational amendments have been made to the Pushback 2 design relative to the optimised pushback shell in respect of a significant extension of pit rim to the east in order to increase both ore extraction waste stripping options in the mid-years of the life of mine, and to prepare access options for Pushback 3.

Figure 4.11 presents the Pushback 2 design shell and optimised pushback shell overlay.

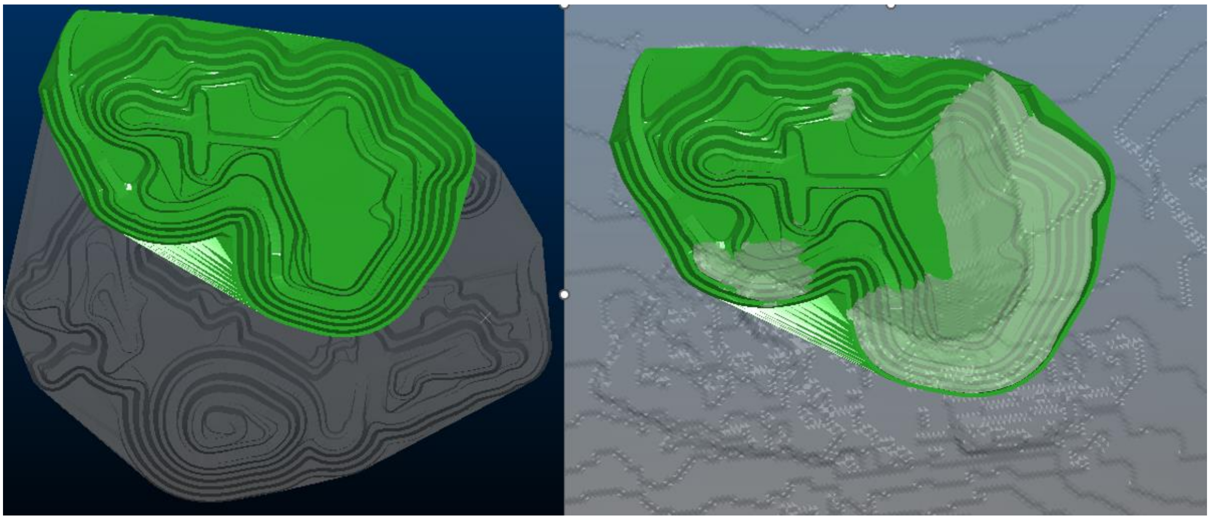


Figure 4.11: (Left) Pushback 2 Design vs Final Pit; (Right) Pushback 2 Design vs Optimised Shell

Balpantau PB3

Mining within Pushback 3 extends across the entire northern extent of the final pit and incorporates benches from surface to the 190m RL. Pushback 3 includes a second access to the pit via a final haul road exiting the pit to the east, in addition to the north-west access point

Significant operational amendments have been made to the Pushback 3 design relative to the optimised pushback shell, specifically:

- Large-scale extension of the pit to the final wall position in the north-west, north and north-east and small-scale extension in the east wall in order to provide a second means of access/egress.
- Exclusion of a southern extension to the open pit in order to ensure average haulage distances are not prohibitive and to maintain a viable strip ratio considering the extension in the north of PB3.

Figure 4.12 presents the Pushback 3 design shell and optimised pushback shell overlay.

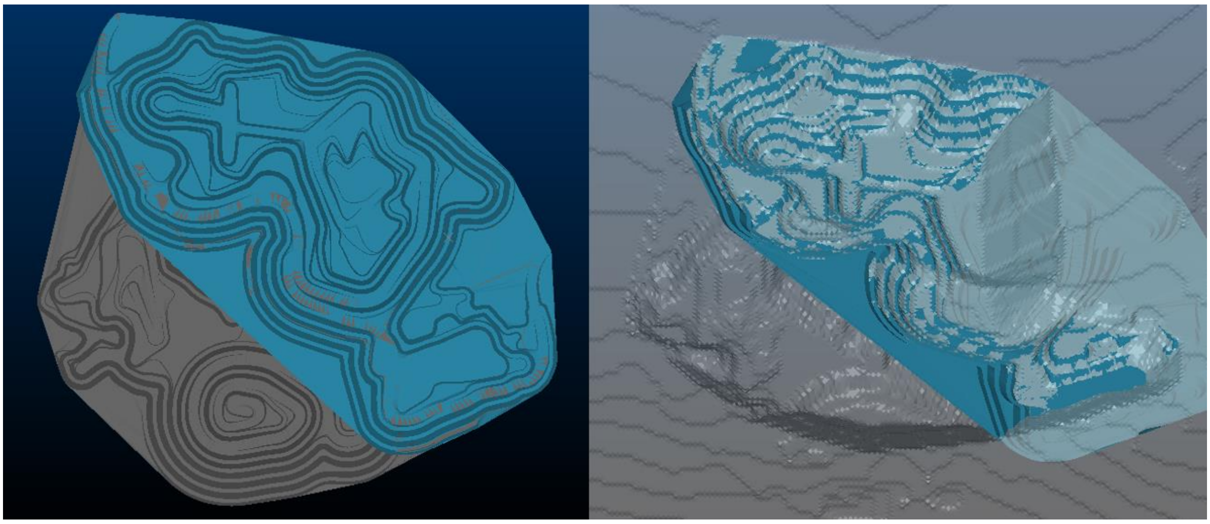


Figure 4.12: (Left) Pushback 3 Design vs Final Pit; (Right) Pushback 3 Design vs Optimised Shell

Balpantau Final Pit Design (PB4)

The current open pit design for Balpantau has been prepared by NMMC and is based upon the open pit design parameters outlined above. This pit design has then been utilised to determine the mining schedule and subsequently define the Ore Reserve Estimate.

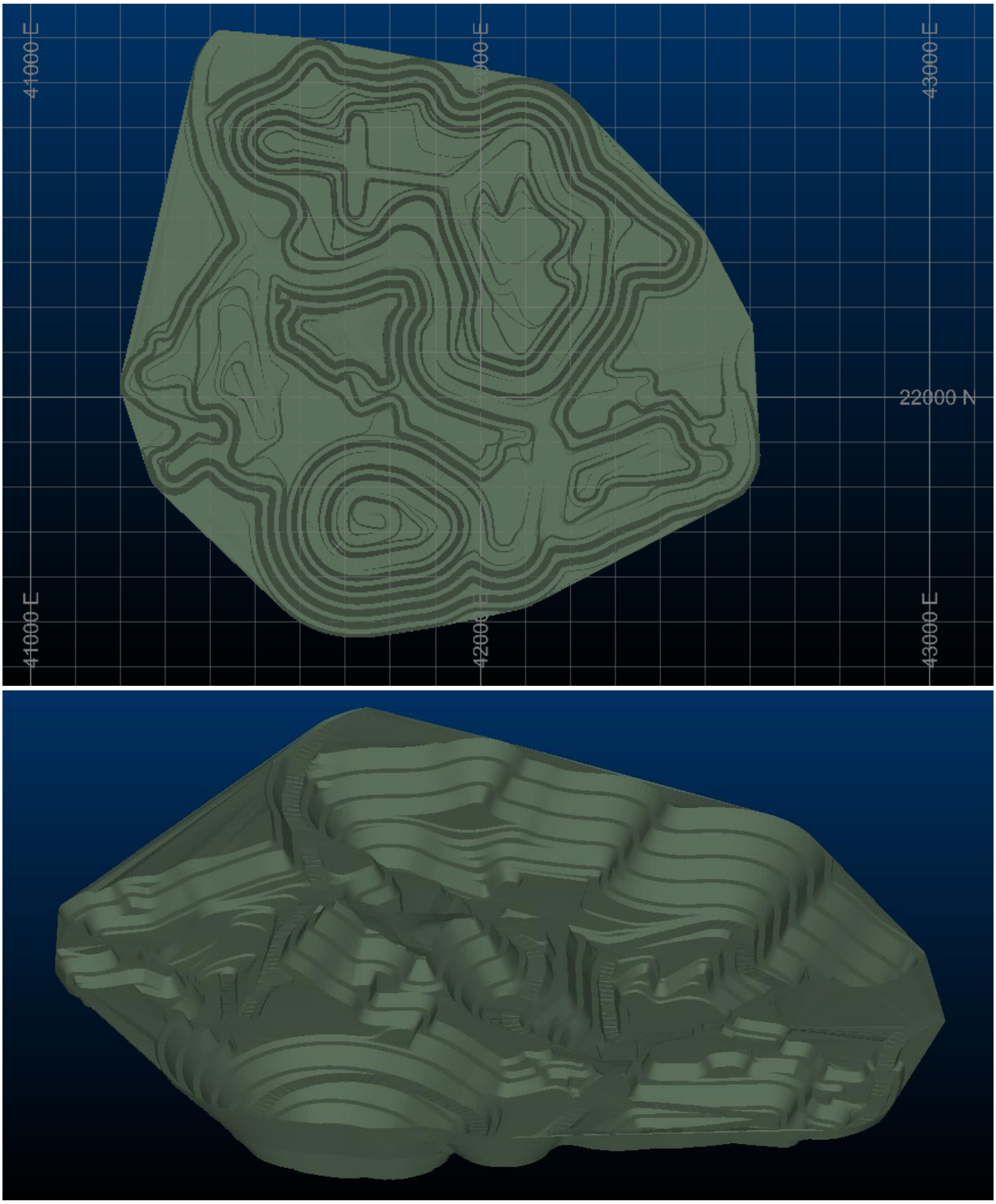


Figure 4.13 Balpantau Final Pit Design

4.6 Mining Schedules

4.6.1 Overview

The mining schedules for the Muruntau cluster were created using Datamine Studio NPVS. The scheduling process consisted of developing a mine plan using WAI created pushback designs within the overall pit designs supplied by NMMC.

The mining schedule utilised to produce the Ore Reserve Estimate includes Measured, Indicated and Inferred Mineral Resources as plant feed, however the associated financial evaluation considers revenue only derived from Measured and/or Indicated (which are converted to Proven and Probable Reserves), and applies a waste mining cost to the Inferred material.

4.6.2 Muruntau Schedule

The Muruntau schedule was developed using two primary constraints:

- Max. total mined ore: 47.0Mtpa.
- Max. total material moved: 105Mm^3 per annum.

Due to high levels of waste stripping required in the early years of mining, WAI designed two modified pushbacks (Mutenbai PB1 and Muruntau PB1) to provide greater access to ore in the Mutenbai zone, whilst carrying out waste stripping in the Muruntau zone. Waste stripping in Muruntau in years 1-4 of the LOM schedule will be critical to maintaining consistent strip ratios for the remainder of the mine Life.

The constraint of 105Mm^3 rock movement from the open pit limits total ore extraction in years 1 and 2 of the schedule, due to the high waste stripping required to access ore within the western extent of the Muruntau pit. Accordingly, WAI assumes that overall plant feed will be augmented with stockpiled material of which some 37.5Mt at a grade of 0.54g/t Au remains available at the Indicated Mineral Resource category.

Table 4.15: Muruntau-Mutenbai Life of Mine Schedule

Year	Rock (Mt)	Volume (Mm^3)	Plant Feed (Mt)	Plant Feed Grade (g/t Au)	Total Waste (Mt)	Strip Ratio (tw:to)	Indicated Resources (Mt)	Indicated Grade (g/t Au)
1	270	104	17.4	0.78	253	14.53	15.3	0.78
2	276	106	35.3	0.85	241	6.83	30.0	0.84
3	247	95.0	47.0	0.95	200	4.26	40.2	0.95
4	258	99.4	47.0	0.92	211	4.50	39.9	0.90
5	274	105	47.0	0.91	227	4.83	40.1	0.92
6	261	100	47.0	0.94	214	4.56	41.3	0.96
7	285	109	47.0	0.87	237	5.05	41.3	0.88

Table 4.15: Muruntau-Mutenbai Life of Mine Schedule

Year	Rock (Mt)	Volume (Mm³)	Plant Feed (Mt)	Plant Feed Grade (g/t Au)	Total Waste (Mt)	Strip Ratio (tw:to)	Indicated Resources (Mt)	Indicated Grade (g/t Au)
8	254	97.7	47.0	0.84	207	4.40	37.9	0.86
9	266	102	47.0	0.97	219	4.66	37.8	0.99
10	242	92.9	47.0	1.03	195	4.14	44.6	1.04
11	217	83.6	47.0	1.06	170	3.63	44.4	1.07
12	224	86.1	47.0	1.04	177	3.76	43.2	1.06
13	217	83.6	47.0	1.05	170	3.62	42.7	1.06
14	226	87.1	47.0	1.05	179	3.82	40.2	1.07
15	209	80.3	47.0	1.25	162	3.45	40.4	1.30
16	281	108	47.0	1.20	234	4.98	38.9	1.24
17	265	102	47.0	1.32	218	4.63	38.9	1.38
18	271	104	47.0	1.24	224	4.77	38.7	1.29
19	253	97.4	47.0	1.18	206	4.39	40.3	1.22
20	255	98.1	47.0	1.20	208	4.43	42.7	1.22
21	243	93.6	47.0	1.11	196	4.17	41.1	1.12
22	233	89.8	47.0	1.11	186	3.97	41.7	1.12
23	251	96.4	47.0	1.07	204	4.33	43.7	1.09
24	210	80.6	47.0	1.12	163	3.46	40.5	1.16
25	181	69.7	47.0	1.12	134	2.86	43.3	1.13
26	144	55.3	47.0	1.08	96.8	2.06	45.5	1.08
27	110	42.5	47.0	1.11	63.4	1.35	43.8	1.13
28	82.9	31.9	47.0	1.08	35.9	0.76	42.1	1.09
29	70.3	27.0	47.0	1.08	23.3	0.50	43.0	1.10
30	63.5	24.4	47.0	1.14	16.5	0.35	41.1	1.16
31	68.9	26.5	47.0	1.08	21.9	0.47	40.5	1.08
32	73.7	28.4	47.0	1.13	26.7	0.57	36.8	1.11
33	43.6	16.8	31.9	1.01	11.7	0.37	21.3	0.95
Total	**6,827**	**2,626**	**1,495**	**1.07**	**5,333**	**3.57**	**1,303**	**1.08**

4.6.3 Besapantau Schedule

WAI has developed a detailed production schedule driven by run-of-mine (ROM) tonnages from the open pit and operations to provide for a plant feed from Besapantau of 5.0Mtpa.

The mine development schedule for was created using Datamine NPV Scheduler software. The scheduling process consisted of developing a mine plan using the inventory included in the designed final pit shall and interim pushbacks. The schedule methodology was based on an “As Late As Possible” (ALAP) approach to waste stripping, and straightforward bench-by-bench extraction with a maximum sink rate of 100m per period. The use of ultra-selective mining was avoided.

Table 4.16 presents the LOM schedule.

Table 4.16: Besapantau Life of Mine Schedule

Year	Rock (Mt)	Plant Feed (Mt)	Plant Feed Grade (g/t Au)	Total Waste (Mt)	Strip Ratio (tw:to)	Indicated Resources (Mt)	Indicated Grade (g/t Au)
1	38.09	5.00	0.91	33.09	6.62	4.05	0.91
2	37.92	5.00	0.95	32.92	6.58	4.13	0.95
3	38.40	5.00	0.87	33.40	6.68	3.53	0.90
4	39.55	5.00	0.91	34.55	6.91	4.06	0.92
5	38.33	5.00	0.90	33.33	6.66	4.10	0.93
6	36.01	5.00	0.92	31.01	6.20	4.17	0.94
7	36.79	5.00	0.91	31.79	6.36	4.48	0.92
8	35.75	5.00	0.91	30.75	6.15	4.25	0.93
9	35.99	5.00	0.91	30.99	6.20	4.01	0.91
10	36.30	5.00	0.97	31.30	6.26	3.98	0.95
11	34.60	5.00	1.01	29.60	5.92	3.87	1.04
12	33.40	5.00	1.00	28.40	5.68	3.99	1.04
13	32.51	5.00	1.06	27.51	5.50	4.33	1.09
14	31.87	5.00	1.03	26.87	5.37	4.56	1.06
15	10.94	4.56	1.01	6.38	1.40	4.55	1.01
Total	**516.43**	**74.56**	**0.95**	**441.88**	**5.93**	**62.08**	**0.97**

4.6.4 Balpantau Schedule

WAI has developed a detailed production schedule driven by ROM tonnages from the open pit and operations to provide for a plant feed from Balpantau of 3.0Mtpa.

The mine development schedule for was created using Datamine NPV Scheduler software. The scheduling process consisted of developing a mine plan using the inventory included in the designed final pit shall and interim pushbacks. The schedule methodology was based on an “As Late As Possible” (ALAP) approach to waste stripping, and straightforward bench-by-bench extraction with a maximum sink rate of 100m per period. The use of ultra-selective mining was avoided.

Table 4.17 presents the LOM schedule.

Table 4.17: Balpantau Life of Mine Schedule							
Year	**Rock (Mt)**	**Plant Feed (Mt)**	**Plant Feed Grade (g/t Au)**	**Total Waste (Mt)**	**Strip Ratio (tw:to)**	**Indicated Resources (Mt)**	**Indicated Grade (g/t Au)**
1	22.94	2.55	1.20	20.39	7.99	1.95	1.23
2	19.82	2.97	1.19	16.86	5.68	2.65	1.21
3	19.30	3.00	1.10	16.30	5.43	2.65	1.12
4	19.08	3.00	1.07	16.08	5.36	2.62	1.09
5	18.29	3.00	1.01	15.29	5.10	2.53	1.03
6	19.10	3.00	1.05	16.10	5.37	2.16	1.07
7	17.25	3.00	1.06	14.25	4.75	2.04	1.08
8	17.06	3.00	1.03	14.06	4.69	2.30	1.07
9	15.06	3.00	0.99	12.06	4.02	2.41	1.01
10	14.57	3.00	1.00	11.57	3.86	2.53	1.01
11	15.52	3.00	0.96	12.52	4.17	2.75	0.97
12	15.77	3.00	0.96	12.77	4.26	2.61	0.97
13	14.66	3.00	0.95	11.66	3.88	2.82	0.95
14	15.05	3.00	0.99	12.05	4.02	2.73	1.00
15	15.42	3.00	0.98	12.42	4.14	2.60	0.99
16	0.72	0.28	1.09	0.44	1.54	0.19	1.13
Total	**259.62**	**44.81**	**1.04**	**214.82**	**4.79**	**37.53**	**1.05**

5 GEOTECHNICS

5.1 Introduction

WAI was provided with geotechnical data by the Client that covers works undertaken by the VNIMI Institute and SRK Consulting during 2021 and 2022. Upon completion of a review of the geotechnical data WAI has provided geotechnical slope design recommendations to be used in Ore Reserve Estimates for the main project areas.

Navoi is located on the southern ridge of the Tamdytau Mountains on the Muruntau Ridge, 30km east of the town of Zarafshan in the southern central area of the Republic of Uzbekistan. NMMC consists of five open pits: Muruntau, Mutenbai, Chukurkuduk, Balpantau, and Besapantau.

The Mining Geotechnical scope of work undertaken and detailed within this report includes a review of available data for Muruntau, Mutenbai, Besapantau and Balpantau open pit mines. It should be noted that the Muruntau and Mutenbai deposits are recognised as contiguous.

The Chukurkuduk deposit was removed from the scope of work following communication from the Client due to an uncertainty in the quality of data received.

5.2 Project Description

The Navoi Project is located in the Central KyzylKum mining province in the Tamdyn District of the Navoi Region of the Republic of Uzbekistan. The Mutenbai/Muruntau deposit is located 30km east of the town of Zarafshan and 200km north of the city of Navoi. The Besapantau deposit is in the north-western part of the Muruntau ore field, 32km south-east of Zarafshan.

According to the 2019 SRK report, approximately 1.2 billion cubic metres of rock has been extracted from the pits, equating to about 700 million tonnes of ore containing over 1,600 tonnes of gold.

The Muruntau deposit was first discovered in 1958 and has been in operation since 1967. Mutenbai has been explored since 1973 and deposit reserves registered in 1977. Since the start of deposit development, mine designs for Phases 1, 2, 3 and 4 and the introduction of permanent infrastructure have been developed and implemented.

The Besapantau deposit was discovered in 1964 in the north-western area of the Muruntau ore field. Detailed exploration from 1978 – 1980 justified its economic value, with further exploration in 1981 – 1984 and 1986 – 1995 allowing for more accurate representations of its reserves.

To date there has been a well-rounded collection of geotechnical data with the latest geotechnical data collected during the 2021-2022 programme. A report by SRK Consulting in 2019 included assumptions in their analysis due to the limitations of geotechnical data, and WAI has reviewed some additional data to improve upon this.

5.3 Geological Setting

5.3.1 Project Geology

5.3.1.1 Muruntau and Mutenbai

Metamorphosed rocks in the greenschist facies are captured by hydrothermal quartz-feldspathic metasomatism, within which the development of gold mineralisation is associated, and are especially widespread in the lower-middle Besapan sub-formation.

In the north-eastern part of the ore field, Ordovician-Silurian formations, totalling around 2,500m thick, are unconformably overlain by Lower Devonian carbonate deposits, and to the south covered by loose Meso-Cenozoic sediments.

The Besapan Formation is divided into three sub-formations: lower, middle, and upper. They lie without unconformities and include sandstones and siltstones interbedded with quartz-chlorite, quartz-sericite and carbonaceous-mica shales.

The sub-formations vary between 350m and 1,000m thick. The main ore deposits are contained within the middle sub-formation, represented by interbedded meta-terrigenous rocks with layers and lenses of gravels, cherts, and carbonate-bearing rocks. The rocks are greatly altered by the occurrence of metasomatism.

Igneous formations at near-surface are represented by granitoid dykes of the Middle Permian, with a potential granite massif greater than 4,000m below the surface with which the dykes may be associated.

5.3.1.2 Besapantau

Besapantau is a part of the Besapan Formation which composes the entire area of the ore field and is divided into four sub-formations based on quantitative relationships of metamorphosed sandstones, siltstones and shales. In this area, the Besapan Formation is around 3,000m thick and is formed of the following:

- SF1: sericite-quartz shales becoming deposits of carbon-bearing quartz in the upper part.
- SF2: the sediments are mainly represented by metasandstones and metasiltstones. The lower part of the sub-formation is composed of dark, coarse, massive rocks 200 to 300m thick; the upper part is alternating layers of the sediments and carbonaceous-chlorite-quartz-sericite shales.
- SF3: the lower member consists of metasiltstones interbedded with shales. The rocks of the middle member make up the main areas of the ore field and deposit. The upper member is composed of more homogeneous fine-grained rocks of mainly polymictic metasiltstones, shales and metasandstones.

- SF4: characterised by monotonous interbedded sandstones and chlorite-sericite shales. This sub-formation is typically found in the north-west part of the open pit.

The Besapan Formation is overlain by the Muruntau Ridge, a Devonian-Silurian carbonate sequence, and limestones with interbedded dolomites occur in the northern areas dipping mainly to the north at 50-80°. Metasomatites form along faults and rock bedding.

Zones of cataclastic rocks, of which approximately 30-40% of the deposit is, and within which the main ore bodies are localised, arc so the eastern ends rest on the Besapantau fault. The western end forms part of a sub-latitudinal strike beyond the deposit boundary.

The deposit is characterised by three types of faults: sub-conformable with bedding, characterised by large-scale structural complexity; sub-latitudinal, including the Besapantau Fault; and north-eastern, determined by the presence of a quartz-vein complex with a north-easterly strike. The Besapantau Fault has a horizontal displacement of more than 2,000m, dipping between 40-70° at about 360° azimuth. In the west the fault zone reaches up to 200m thickness and is represented by mylonites, phylonites, and sub-parallel break-off zones containing dykes.

5.3.2 Stratigraphy

Across the Besapantau, Muruntau and Mutenbai ore fields, the most common exposed formations are Ordovician-Silurian rocks divided into the Taskazgan and Besapan Formations totalling around 2,500m thickness. The Besapan Formation is sub-divided into lower, middle, and upper sub-formations.

The Taskazgan Formation is dominated by carbonaceous-micaceous-quartz schists and carbonaceous siltstone. It is divided into lower and upper sub-formations. The lower consists of irregularly alternating carbonaceous chert lenses, marbled limestones and dolomites, and metabasites regionally metamorphosed to greenschist facies. The upper is predominantly microcrystalline shales over sandstones, siltstones and pelites.

The Besapan Formation contains sandstones and siltstones interbedded with quartz-chlorite, quartz-sericite, and carbonaceous-micaceous schists, with the amount of carbon-bearing material gradually decreasing towards the top of the profile. The upper unit is mainly composed of feldspathic-quartz sandstone and siltstone, quartz-micaceous and quartz-chlorite schists.

5.3.3 Project Structural Setting

Muruntau ore field is defined by major ductile and brittle elements, generally associated with the eastern pericline of the Taskazgan anticline and complicated by smaller-scale folding. The Muruntau and Mutenbai deposits are associated with one of these folds.

The fold structures are cut through by a series of discontinuities. The Southern Fault, the natural boundary between the Muruntau and Mutenbai deposits, strikes north-east to east-west and dips sub-vertically. The fault is marked by zones of schistosity and boudinage 50 to 120m thick, with numerous mylonite bands and clay gouge.

The Strukturny (Structural) Fault is located 2km north of the Southern Fault, running parallel to it with a similar sub-vertical dip. The North-Eastern fault runs diagonal relative to the Southern and Structural faults with a displacement of several hundred metres, having a significant impact on the morphology of the Muruntau lodes.

In general, the Muruntau deposit is governed by its location in the core of a localised syncline and constrained by the Structural (to the north) and Southern (to the south) faults, complicated by associated diagonal discontinuities. The Mutenbai deposit is located on the south limb of the fold and separated by the Southern Fault. Sub-concordant schistosity zones developed within the carboniferous units near the contact of the Taskazgan and Besapan Formations plays an important role in Muruntau deposit mineralisation.

Brittle deformations are represented by three main types of discontinuities: early sub-concordant bedding, E-W structures, and N-E structures.

Locations of gold mineralisation are predetermined by structural and lithological factors, with tectonic faults playing a primary role.

The Besapantau deposit gold mineralisation is governed by three sets of jointing: a north-west network dipping at angles between 30-60°, an east-west network dipping at 50-65°, and a north-east network dipping between 60° and 70°. Ore-bearing zones are mostly contained in steeply dipping structures.

The Besapan Formation was noted to have fracturing of rocks represented mainly by bedding cracks characterised by a northern dip at an angle of 50-90°. Two systems of cracks – the dominant system dipping at 30° to an azimuth of 30-60°, and the secondary dipping at 20° at an azimuth of 260-290° (north-west) – were observed in the Lower Devonian dolomites alongside two crushing zones.

The shale formation consists of three fracture systems. All systems dip between 40° and 50° but vary in dip direction: the first most predominant system at 270-290°, the second also dipping at 60-90°, and the third at 330-340°.

The southern side of the deposit predominantly contains a large number of fractures dipping to the north at between 10° and 20°, with a smaller number dipping at steeper angles of 50° and greater in the same direction. The Besapan Fault dips in a northerly direction at a fairly steep angle.

The south-western area largely contains bedding fractures dip up to 50° at azimuths between 40-60° within the interbedded metasomatites and shales, with a second system dipping between 20-40° at 290-310°.

The north-west is characterised by elongated obliquely dipping (10-40°) cracks with an azimuth from western to northern. A fan-shaped fracture system of steeply dipping (40-50°) north-easterly dipping is also evident, alongside a system dipping to the south with a dip angle of around 50°.

5.3.4 Seismic Environment

The deposits are located in a seismic zone of magnitude 8-9 of the MSK-64 scale, which corresponds to the PGA_{max} of 0.2-0.4.

In the international practice, the pseudo-static coefficient, K (co-efficient of acceleration), is determined using empirical approaches and recommendations that define K as a range from ¼*PGA_{max} to ½*PGA_{max}. In a previous report by SRK in 2019, an average coefficient of K = 1/3*PGA_{max} was used. Seismic coefficients in the range of K = 0.07 – 0.13g correspond to the magnitude 8-9 zone, and a value of K = 0.13g was adopted.

5.3.5 Hydrogeology

Muruntau/Mutenbai: The deposits are characterised by the presence of fracture groundwater and fracture-vein water within the Palaeozoic Besapan Formation. Zones of crushing and tectonic faults were identified as the wettest structures. Overall, according to N.I Plotnikov's classification of deposits by water content, the Muruntau ore field is defined as moderately wet.

A dewatering system has been developed which comprises a shaft on the northern wall and underground development to intercept the main water-bearing features, called "Mine M". This system was not affected by the proposed mine designs and therefore SRK in their 2019 report considered that the impact of water on the slope stability and dewatering costs had been adequately considered.

Besapantau: The deposit is characterised by the presence of unconfined fracture water, and recharge occurs through leakage or hydrostatic squeezing of groundwater along zones of crushing and fracturing.

Up to a depth of 40m, the open pit was driven through dry rock and only in periods of intense precipitation and prolonged rains will water inflows form. The presence of drainage ditches in the sides of the quarries will ensure that drainage devices will not be needed in the open pits until the level of fissure water is open below 40m from surface.

Partial interception of groundwater by Mine M is possible, allowing for a decrease in water inflow (subject to mine drainage). In terms of the degree of influence of groundwater on the stability of rocks, especially in fault zones, Besapantau is classified as complex due to the reduced stability from intense dislocation and the presence of water in cracks, faults, and coalified areas.

5.4 Previous Studies

A report by SRK Consulting in 2019 covered a Mineral Resources and Ore Reserve estimate for Muruntau, Mutenbai, and Besapantau. As part of this report, a slope stability assessment was completed for the three open pits.

5.4.1 Muruntau/Mutenbai

The VNIMI Institute conducted long term (1970 – 1992) geomechanical studies and testing of exposed benches and core samples, and rock strength characteristics were determined from this. All the data was summarised in a geomechanical database. Significant variation was observed in the properties between directions relative to the bedding, and GSI (Geological Strength Index) was estimated by professional judgement.

Four main faults were identified from historical mapping, along with small scale tectonic joints that could be sub-divided into three types based on morphology: cleavage, rupture, and shear joints. Bedding orientations were determined based on historical data and was used to form the basis for structural domaining which was later used to set the anisotropy in the rock mass for estimating pit slope stability.

The Stage 5 pit design parameters were developed by INTEGRA GROUP (Preliminary TEO, 2014). The bench parameters from this report were estimated on a cylindrical sliding surface which SRK considered to be a significant assumption and determined that the stability analysis should be considered very approximate.

Due to insufficient geomechanical knowledge of the Muruntau deposit at depth, SRK used a maximum allowable extrapolation depth of 200m from the current pit surface. Before estimating slope stability, SRK calibrated the model based on the existing slopes, which allowed to account for historically identified failures.

The designed pit shell estimated by SRK had overall slope angles between 27° and 36°, however the following assumptions were acknowledged due to the uncertainty in geomechanical knowledge:

- Lithological and structural model – locations of faults of various orders, carbon shales, and shear zones in the pit slopes.
- Insufficient knowledge of the rock mass strength and structure on the lower levels; and
- Lack of statistical data joint set orientations (except for bedding).

5.4.2 Besapantau

The database included information on a total of 123,931.2m of drilling with a total of 49,628 samples collected. However, the drillholes and excavations lacked lithological descriptions and the geological model was based on the Muruntau geological map, projected orebodies of Besapantau, and estimation sections for the Besapantau deposit. The only exception to this was the metasomatite.

A total of 14 fault planes were identified and oriented according to available linear structural data.

Historical data was reviewed as part of SRK's stability analysis, and the following parameters were proposed for the development of the Besapantau deposit, taken from a technical-economic study ("TEO") of exploration standards for Besapantau open pit mining, 2016:

- Pit depth 336m.
- Overall slope angle 46°
- Bench parameters: H = 15m, α = 75°, b = 10m
- Ramp berm width 20m.

Three main joint sets were identified for the deposit: bedding joints, cleavage joints, and cleavage (rupture) joints.

Slope stability assessment determined overall pit slopes should be between 38° and 49°, and maximum overall slope angle between 42° and 50°. At the time of the SRK report, it was not possible to estimate bench and berm parameters as there was little jointing data and no data on contact strengths. It was noted that the southern benches were likely to be the least stable due to the undercutting 30° bedding, and therefore should have wider berms.

5.5 Muruntau/Mutenbai

Reports by SRK Consulting in October 2022 and August 2023 cover the creation of the geomechanical block model, bench berm analysis, and consequential verification calculations.

5.5.1 Stage 2.1: Creation of Lithological, Structural and Geomechanical Block Models

It was determined that all faults extend in a north-east direction, and the angle of incidence of the planes groups them into two main and two secondary systems: the main systems dip in a north-west south-east direction, and the secondary dip perpendicular to this.

Data from the 2021 – 2022 geomechanical drilling programme (GT-SRK-001 to GT-SRK-019) revealed steep open fractures when grouped together with Sirovision data. Samples taken for laboratory research identified six overall lithologies, including three groups of shales which were sub-divided by their strength:

- Quaternary/weathered (surface) deposits.
- Metaschist (up to 60 MPa).
- Carbonaceous Shales (Carbon Schist – up to 100 MPa).
- Slates (Schist – <100 MPa).
- Metasomatite.
- Silt and Schist – interbedded siltstones and shales.

Based on the analysis of the data, the main domains for construction of the geomechanical block model were determined. The SRK wireframes were created using Leapfrog software, and to build the model the following assumptions were made:

- The thickness is a frequent interlayering of rocks.
- 19 drillholes to build.
- Plicative deformations in the field;
- A granite batholith is located at depth and is not reflected in the model.
- Dykes were not intersected by the geomechanical drillholes and are not reflected in the model; and
- The main well database does not have a lithological description.

SRK recommended that the sides of the quarry and underground mine workings be mapped with measurements of layering and identified faults, describing rock, fracture and fault contacts which would significantly improve the detail of the block models. Bedding and fracturing should be measured to identify potential associated Mutenbai mineralisation from gently north-east plunging mineralisation.

5.5.2 Stage 2.2: Kinematic Analysis and Design of Benches and Berms

Fracture stereograms for each domain including Sirovision and drillhole data were designed using RocScience DIPS software as part of the kinematic analysis conducted by SRK. Crack system spacing was also analysed.

Based on laboratory testing carried out to determine the rock properties, including shear tests along fracture contacts (SOJ) and along the cutting plane (SCS), the following generalised residual strength characteristics of contacts were determined according to the Mohr-Coulomb criterion:

- For natural cracks (SOJ) – c’ = 0.08 MPa, ϕ’ = 18.7°
- Along the cutting plane (SCS) – c’ = 0.05MPa, ϕ’ = 29.4°

Kinematic analysis using the domains highlighted in Figure 5.1 was conducted as part of the SRK investigation. A stability analysis was carried out along the main slope directions of the benches, shown by the red arrows.

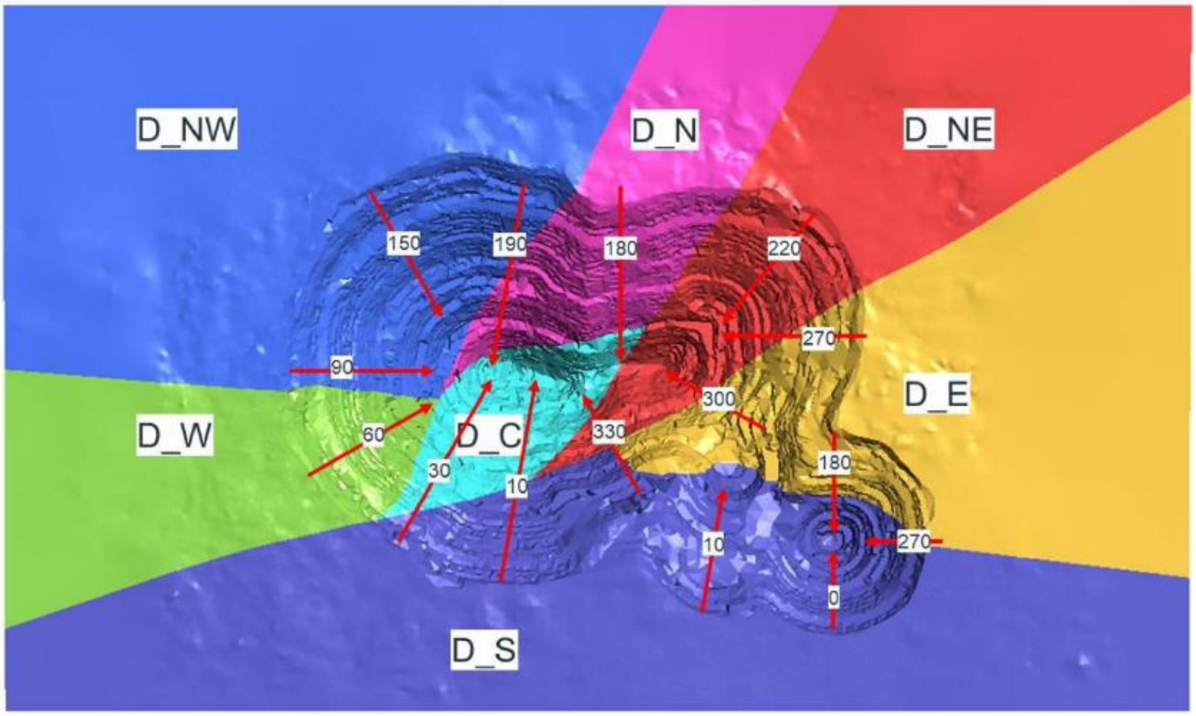


Figure 5.1 Structural Domains and Directions of Slope Decline for the Muruntau Deposit

The results of the kinematic analysis showed that planar failure was likely in the south, west, north-west, north-east, and east domains; wedge failure was likely in the south, north and east domains; and toppling failure was likely in the central, north-west, and north domains.

To determine the optimal parameters for benches and berms, calculations were carried out for benches of 30m in height at angles between 45° and 60°, increasing in 5° increments, for different azimuths of slope dip. The generalised bench parameters based on probabilistic calculations are shown in Table 5.1.

Table 5.1: Generalised Bench Parameters based on Results of Probabilistic Calculations

Domain	Slope Azimuth (°)	Bench Parameters			
		a (°)	B (m)	H (m)	IRA (°)
D_NW	90 – 150	45	30	10	36.9
	150 – 190	50	30	10	40.5
	90 – 150	55	30	12	42.3
	150 – 190	55	30	12	42.3
D_N	180	50	30	10	40.5
	180	55	30	12	42.3
D_NE	220	50	30	10	40.5
	220	55	30	12	42.3
	300	60	30	12	45.7
	300	50	30	12	38.9
D_E	180	55	30	12	42.3
	270	50	30	10	40.5
	270	55	30	12	42.3

Table 5.1: Generalised Bench Parameters based on Results of Probabilistic Calculations

Domain	Slope Azimuth (°)	Bench Parameters			
		a (°)	B (m)	H (m)	IRA (°)
	300	55	30	12	42.3
D_S	0 – 10	45	30	10	36.9
	10	45	30	10	36.9
	180	60	30	12	45.7
	270	55	30	12	42.3
	270	60	30	12	45.7
D_W	60	50	30	12	38.9
	60	55	30	12	42.3
D_C	10	50	30	12	38.9
	10	60	30	12	45.7
	30	45	30	10	36.9
	30	50	30	12	38.9
	30	60	30	12	45.7
	330	60	30	12	45.7

Based on the results of this analysis, optimal parameters of benches and berms were established for sectors of the open pit. These are shown in Figure 5.2.

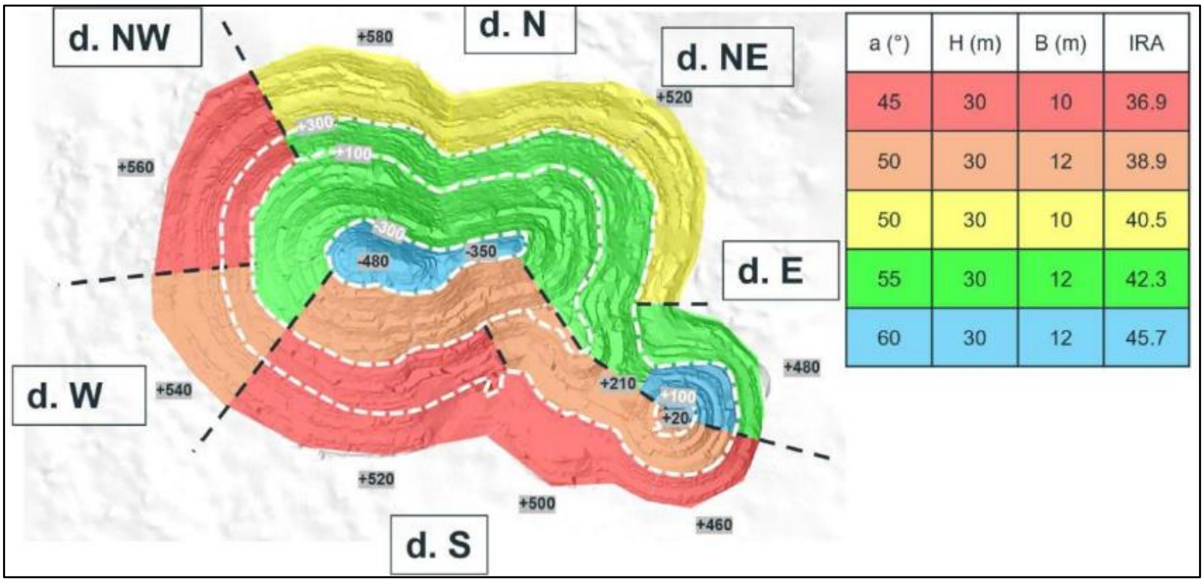


Figure 5.2 Optimal Parameters of Benches and Berms at Muruntau/Mutenbai

5.5.3 Stage 3: Verification Calculations of the Stability of the Slopes of the Muruntau and Mutenbai Open Pits

As part of the report SRK carried out verification calculations of slope stability through analysis of the physical and mechanical properties of the rock, analysis of the stability of the current state of slopes, and design of the final pit outline.

During the analysis of the rock properties of samples from the geomechanical drillholes, it was determined that the southern part of the open pit featured areas of weakened, lower strength rock. UCS (Unconfined Compression Test) testing showed a heterogeneity of properties across lithologies, with the metasomatites, shales and metaschists providing a more representative variety. Generalised values of the strength and deformation properties of the rocks of the Muruntau deposit were determined.

Generalised contact properties were adopted for contacts and used in stability calculations in the RocScience Slide2 programme which uses the Hoek-Brown destructive criterion with the anisotropy function. Anisotropic properties were calculated for different scales of slopes and sections of slopes (H = 500m and 200m), and for different types of contact: bedding, primary, and secondary crack systems.

Analysis of rockslide deformations showed contact rockslides manifested in layered rock masses falling towards the open pit, weakened at the base by gently dipping tectonic faults. The analysis showed the occurrence of large deformations associated with the Southern and Mutenbai faults with deformations actively occurring on the southern slope of the pit due to unfavourable planar bedding orientation.

SRK calculated the slope stability of the open pits using the limit equilibrium method in Slide2. The Morgenstern-Price method was applied, and Hoek-Brown fracture criterion with the anisotropy function used. Calculations were carried out for the overall slope and individual inter-ramp values. The results are presented in Table 5.3.

Table 5.2: Stability Analysis Results for Muruntau/Mutenbai Open Pit Slopes

Section	Overall Slope Angle (°)	Height (m)	Factor of Safety	
			Minimum	Result
S01	37.7	720	1.3	1.43
S02	32.3	840	1.3	2.81
S03	38.2	317	1.3	2.30
S04	29.1	398	1.3	1.36
S05	28.5	435	1.3	2.63
S06	24.1	269	1.3	1.86
S07	29.8	953	1.3	1.30
S08	30.5	1000	1.3	1.58
S09	33.3	1020	1.3	2.25
S10	35.8	945	1.3	2.49
S11	33.9	798	1.3	1.38

All factors of safety were shown to characterise the stable state of the slopes (FoS ≥ 1.30).

To manage risks during development of Muruntau, SRK recommended the following measures be undertaken:

- Where macroblocks formed due to unfavourable oriented large geological structures, visual and instrumental monitoring should be implemented. Where macroblocks formed by faults occur, a structural survey should be carried out with annual or frequent analyses to update the location of the main structures during mining of the open pit benches.
- To ensure bench stability, high quality off-slope work should be undertaken to minimise the impact of blasting and preserve the strength properties of the rock.
- Protection against rockfall and slides should be addressed through methods such as strengthening the slope and benches with mesh, catch barriers and nets. 25m wide safety berms were designed for Muruntau to catch rockfall and prevent rockfall onto the underlying benches.

An additional geomechanical study programme was proposed by SRK to further study the deposit which included 18 additional holes aimed at unfavourable locations around the pit: the southern slope, the western slope of the Mutenbai fault, and the Chukurkuduk area. These were designed to intercept deformation zones.

The report concluded that the actual state of stability of the slopes and deformations that have occurred had been considered. The largest deformations occurred in the southern slope of the Muruntau and Mutenbai open pits, as well as the western slope of the Muruntau pit. The main causes of deformation were bedding dipping inwards with undercutting of the toe of the slopes, as well as the presence of fault zones. To verify the accepted design properties, SRK conducted inverse and calibration calculations of the stability of the actual state of the slopes, accounting for the deformations that have occurred.

5.6 Besapantau

5.6.1 Stage 2

Six drillholes, GT-BES1 to GT-BES6, were drilled as part of the geotechnical investigation of the Besapantau deposit to determine the geological, structural, and lithological features of targeted areas of the pit and allow assessment of the bench and slope stability.

Data from the drilling programme revealed weathered siltstone typically underlain by sequences of metaschist and interbedded shales, metasomatites, and quartz-carbonaceous shales. This sequence was commonly found to be dipping between 20° and 50° at variable azimuths, causing favourable orientations in the north-east and south sectors, and unfavourable orientations in the north-west and south sectors in relation to the drillhole locations.

Dolomites were identified in the north-east sector in a favourable orientation with a predominant natural fracture system, and less often two systems. The Besapan fault was identified in GT-BES3 in the south sector and was identified as unfavourably dipping steeply north with a 30m wide crushing zone.

GT-BES2 and GT-BES5 in the eastern and western sectors showed an error in core orientation data shown by a circular distribution of measurements. Therefore, it was concluded by the VNIMI Institute that the orientation fractures did not seem acceptable. WAI has some uncertainty about the inclusion of this data.

5.6.2 Stage 3

A deterministic approach was undertaken for the initial stability analysis of the slopes of the Besapantau open pit. The structural sub-domains relating to the sides of the quarry are detailed below in Figure 5.3. Table 5.3 details the results of the deterministic approach for the main sectors of the quarry, applying a lower factor of safety (FoS) of 1.3 to the lower third of the quarry, and a FoS of 1.5 to the rest, assuming a minimum safety berm width of 10m.

A probabilistic approach for the main sectors was then conducted with an acceptable probability of collapse or failure (PoF) of 25% with a FoS of 1.1. The minimum safety berm width was again 10m, with the exception of three locations where it was increased to 12m.

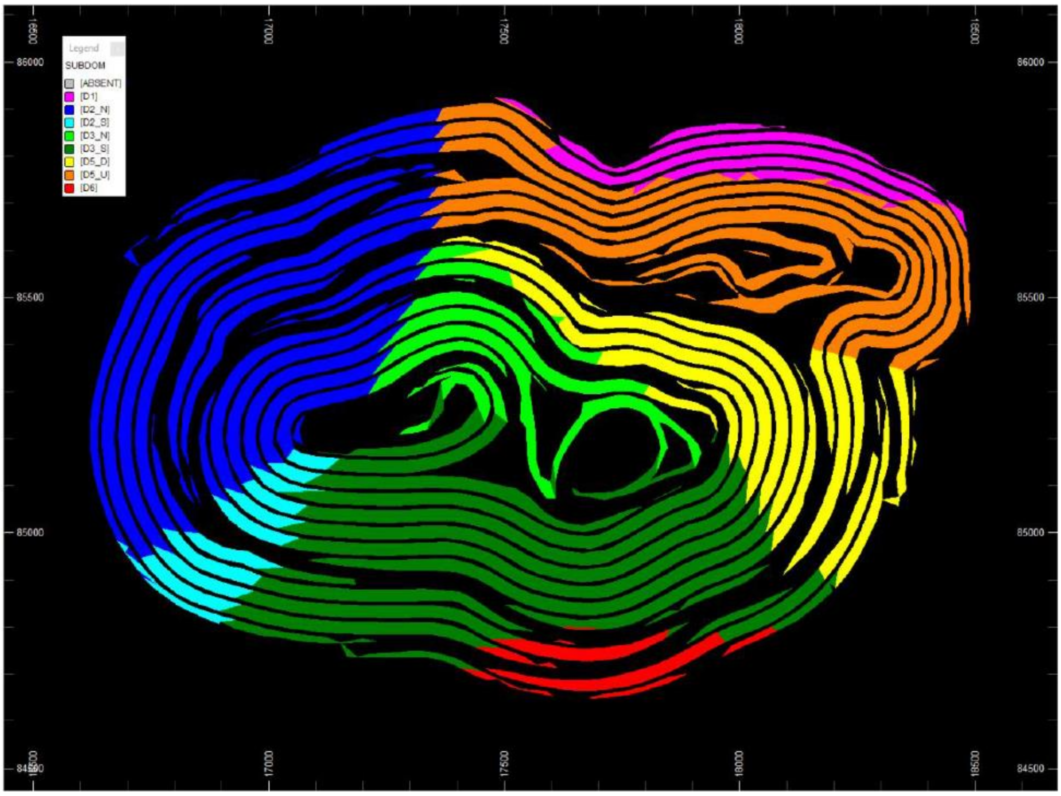


Figure 5.3: Subdomain Boundaries from VNIMI Institute Stage 3 Report

Table 5.3: Main Quarry Sectors and Corresponding Bench Face Slope Angles					
Domain	**Sub-Domain**	**BFA (Bench Face Angle) (°)**			**Inter-Ramp Angle (°) for FoS = 1.5**
		FoS = 1.3	**FoS = 1.5**	**PoF = 25**	
D1	D1	55	65	65	44
D2	D2_N	65	65	65	51
		45	50	60	37
		60	65	65	48
	D2_S	45	45	50	37
D3	D3_N	65	65	65	51
		45	50	55	37
	D3_S	45	45	50	37
D5	D5_U	50	50	60	40
		55	55	65	44
		65	65	65	51
		45	50	55	37
		65	65	65	51
	D5_D	55	55	60	44
		65	65	65	51
		45	50	55	37
D6	D6	55	60	60	44

Bench stability was carried out using Spencer's method in the RocScience Slide2 software, and rock strength properties specified by Hoek-Brown criterion. The results showed that the margin of stability of the pit sides was sufficient. The factors of safety ranged from 1.68 to 2.02, exceeding the recommended value of 1.3.

The following conclusions were drawn from the VNIMI Institute Stage 3 report:

- Bench parameters proposed account for actual fracture characteristics, and the proposed slope angles are steeper in places than previously accepted by up to 15°.
- Stability calculations showed the presented values for the stability margin of the slopes would be sufficient, with FoS ranging between 1.68 and 2.02 which is higher than the recommended 1.3.
- Numerical modelling confirmed the results of stability calculations by the limit equilibrium method. It also showed which slope sections may be least stable due to rock strength characteristics.

5.7 Balpantau

No geotechnical investigations have been conducted at Balpantau by the Client or on behalf of the Client at the time of this report. RQD (Rock-Quality Designation) values and structural joint and fracture information were provided from historical databases, but no details of slope stability or kinematic analyses.

An optimisation spreadsheet (dated 21.10.2023) was provided by the Client which stated an overall slope angle of 41°. An additional analysis was conducted by WAI on the most recent wireframe model provided by the Client to confirm the slope angle of the open pit. WAI found that the overall slope angle was steeper than the suggested 41° in most locations around the pit as listed in Table 5.4 for locations presented in Figure 5.4.

Table 5.4: Overall Slope Angle Orientations and Locations

Location	Azimuth (°)	Dip (°)
1	106.8	38.1
2	177.8	51.1
3	208.4	50.3
4	211	51.9
5	286.8	48.3
6	305.7	45.3
7	335.3	35.2
8	31.0	44.2
9	319.5	40.0
10	30.6	51.2
11	128.0	45.7
12	358.5	49.3
13	101.8	50.9
14	139.5	40.0
15	211.0	44.2
16	31.0	37.8
AVERAGE		42.4

The geotechnical design parameters have been inferred from the neighbouring Muruntau/Mutenbai and Besapantau open pits.

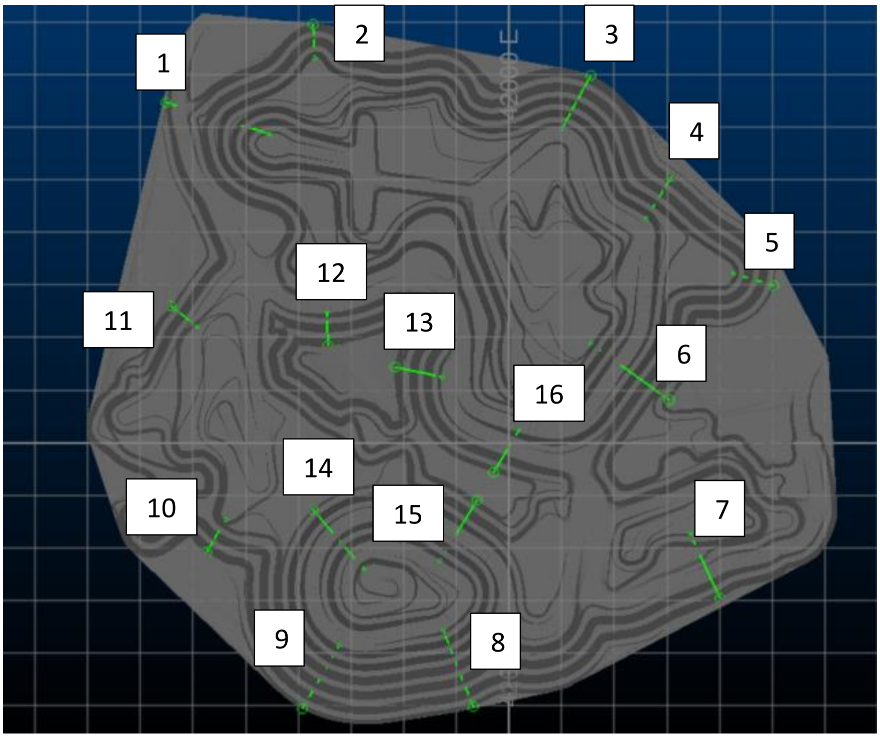


Figure 5.4: Balpantau Wireframe Model Showing Slope Measurement Locations

5.8 WAI Analysis

WAI has analysed the data provided by the Client and conducted an independent investigation of the results provided by both SRK Consulting in their reports on the Muruntau and Mutenbai open pits, and the VNIMI Institute in their reports on Besapantau.

5.8.1 Muruntau/Mutenbai

The Muruntau/Mutenbai area has been covered by the SRK Consulting report. The uncertainties acknowledged by SRK in the 2019 report were addressed in the later 2022/2023 report: statistical data was collected for joint set orientations, and the lithological and structural model was further developed. However, WAI identified limitations of the data provided within the later SRK report.

Orientation bias is the result of discontinuities of different orientation intersecting a linear or planar sampling method at different angles. The closer to parallel the discontinuity, the shallower the angle of intersection, and the less frequently intersected the plane will be. The angle between the sampling plane and discontinuity is also known as alpha, α. This can be corrected using Terzaghi weighting.

Blind zones can also form when mapping out structural orientations. This is when all planes formed are parallel to the sampling line and can be plotted as a line formed by the poles to all planes which parallel the sampling line. It generally extends 5 to 20° either side of the line and is observed in individual drillholes by a circular absence of structural data centred on the hole orientation.

Analysis of the drillhole data provided for GT-SRK-001 to GT-SRK-019 shows mirroring of results across a clear divide in the analysis as shown in Figure 5.5 to Figure 5.7. Results were recorded as alpha and beta angles from downhole discontinuity logging, so this is likely the result of beta smearing where the beta angle was incorrectly logged causing a skew of the data. Siroivision data was used during the SRK report analysis but was not provided by the Client. WAI therefore cannot confirm the reliability of the results due to the clear bias present in the data.

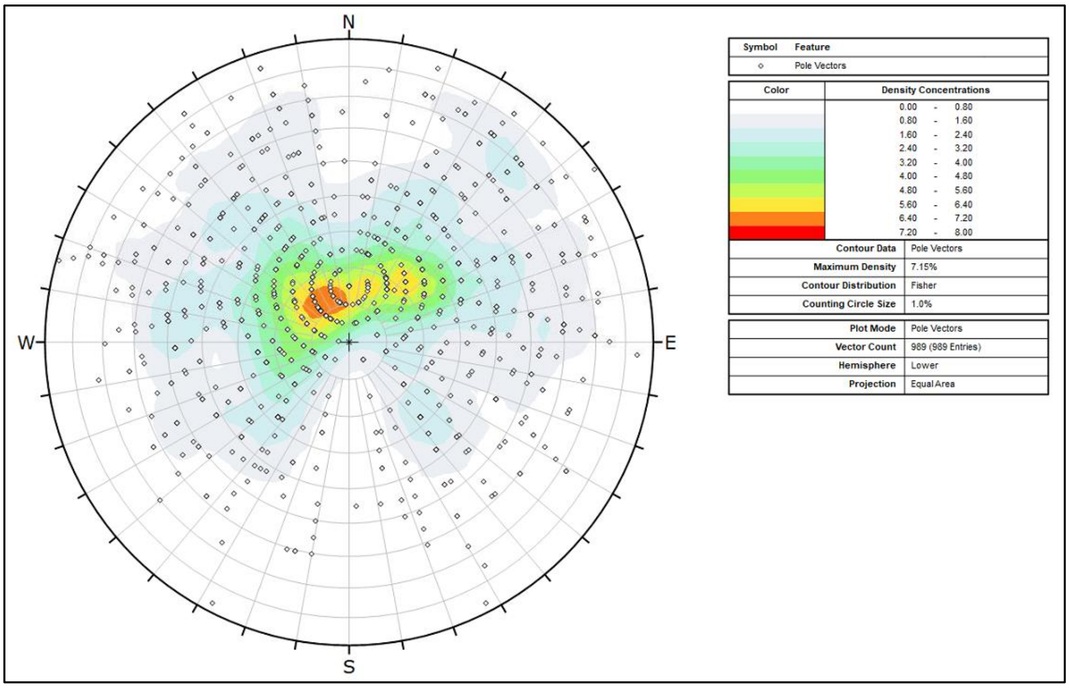


Figure 5.5: Stereographic Projection of GT-SRK-001 Showing Beta Smear (WAI)

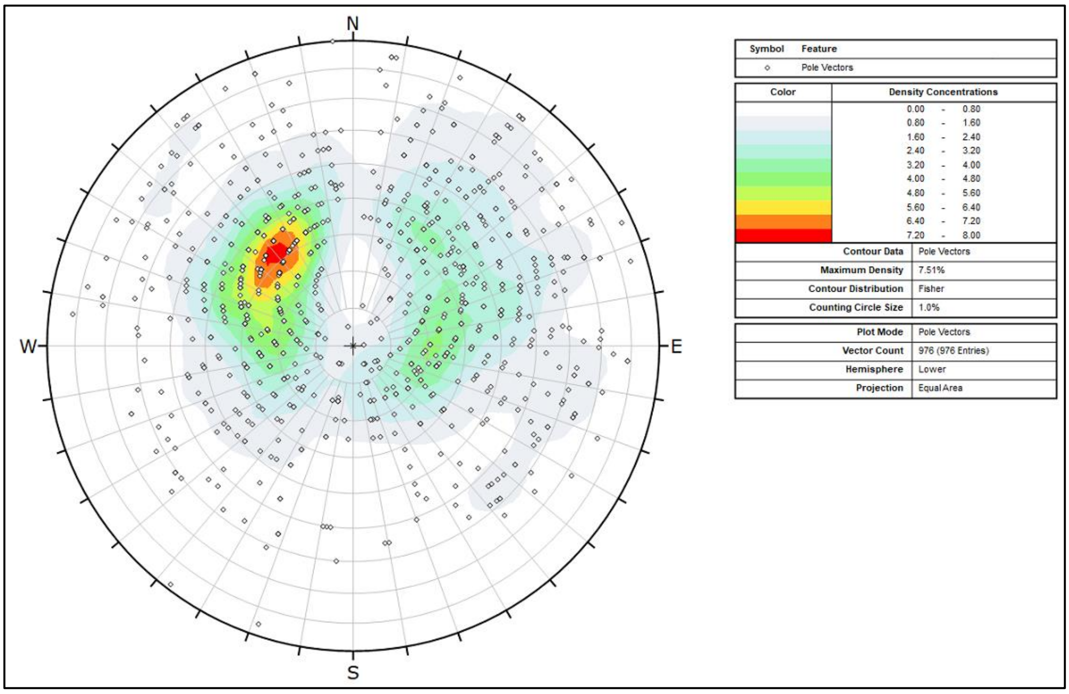


Figure 5.6: Stereographic Projection of GT-SRK-009 Showing Beta Smear (WAI)

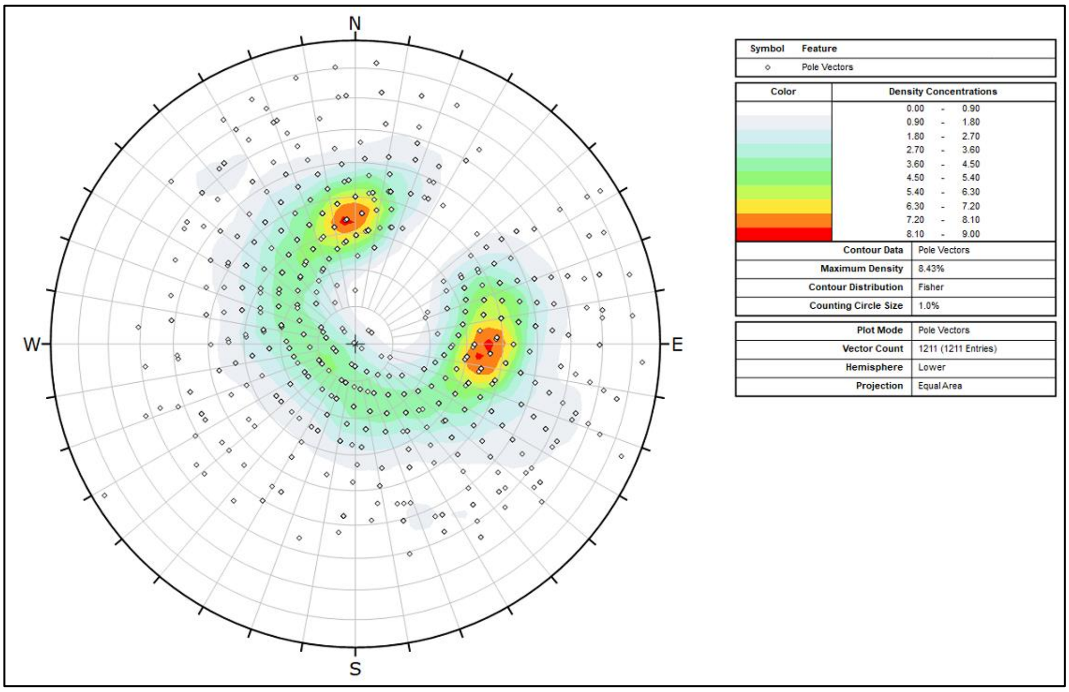


Figure 5.7: Stereographic Projection of GT-SRK-015 Showing Beta Smear (WAI)

The current geomechanical drillhole logging data does not reliably cover the entire pit and leaves large gaps missing for data on the southern edge of the pit. This has already been addressed by SRK in their Stage 3 report where they have proposed an additional geomechanical study that covers these blank areas. WAI supports this idea.

It should be noted that the Client has confirmed that the north-west wall of the Muruntau open pit is at a shallower angle than the optimal to account for the future presence of a conveyor system.

5.8.2 Besapantau

The area of Besapantau covered by the geotechnical analysis by the VNIMI Institute is limited but does provide lithological descriptions of the rocks at depth allowing for a more accurate wireframe model to be constructed compared to the 2019 SRK report.

Contact strength and jointing data were determined as part of the VNIMI Institute geomechanical investigation. An error in core orientation data was seen from two of the six drillholes, resulting in unreliable orientation data in the eastern and western areas of the pit. On plotting the available joint orientation data, Terzaghi weighting was used to reduce the chance of orientation bias. There was limited evidence of mirrored results from beta smearing across all drillholes.

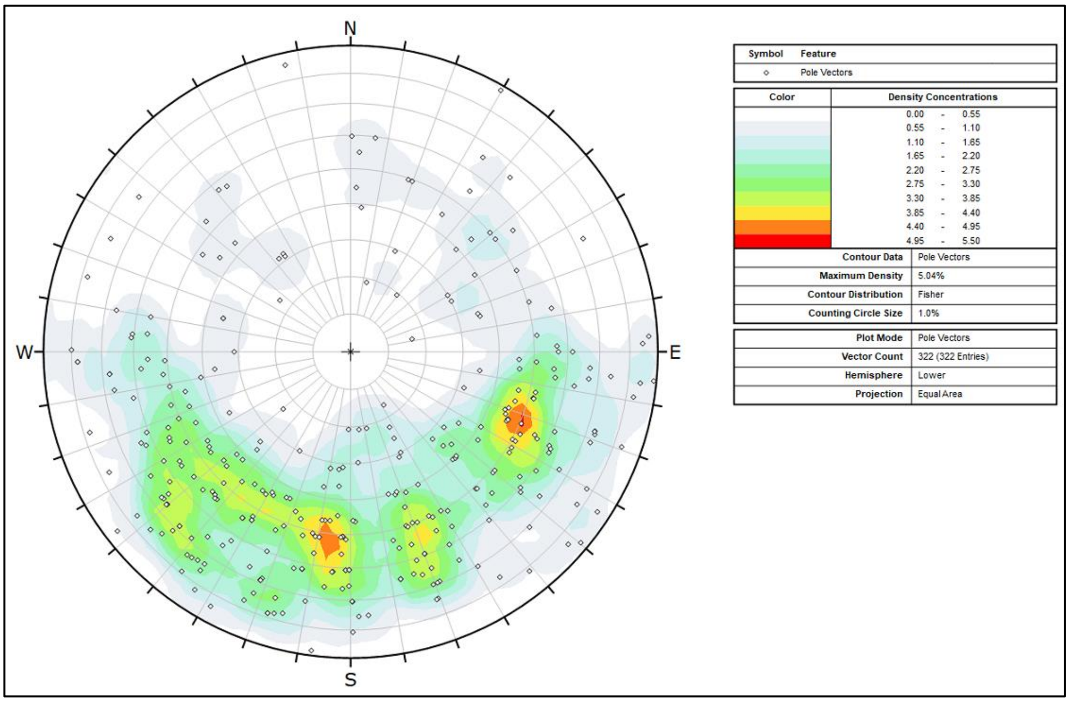


Figure 5.8: Stereographic Projection of GT-BES1 (WAI)

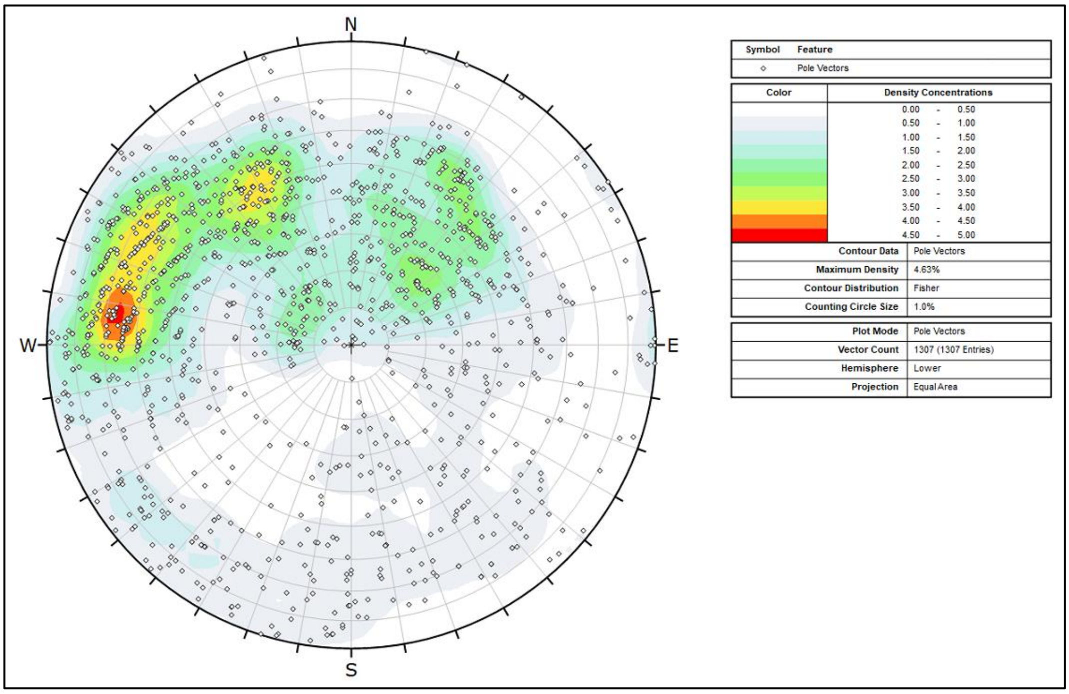


Figure 5.9: Stereographic Projection of GT-BES5 (WAI)

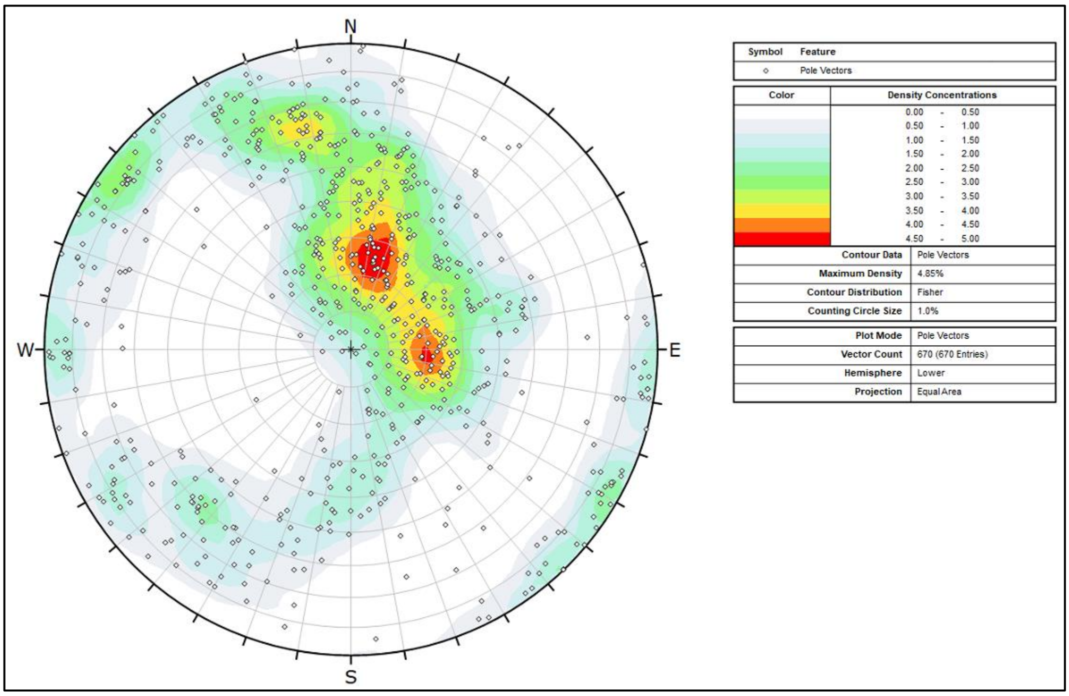


Figure 5.10 Stereographic Projection of GT-BES6 (WAI)

The SRK 2019 report was limited to a depth of 360m and recommended further investigation be undertaken to provide confident values for the lower half of the pit. The VNIMI report provided this information in all areas of the pit that when combined with historical mapping provided a more accurate wireframe model.

5.8.3 Balpantau

With a lack of geotechnical data available for this pit, WAI considers that the Clients estimate of 41° is suitable until such a time that further geotechnical investigation can be undertaken. This value is based on a detailed analysis of the neighbouring deposits and operational experience and is suggested to be a suitable slope angle for the entire pit. This does not account for any variations in lithology or any major/minor structural features that may impact the slope angle. No further data has been made available to WAI.

6 HYDROGEOLOGY

6.1 Introduction

6.1.1 Scope and Sources of Information

The hydrogeological scope of work undertaken comprises a review of provided data for Muruntau, Mutenbai, Besapantau and Balpantau open pit mines. The Muruntau and Mutenbai deposits are treated as one location for the purpose of this report. Refer to previous sections for general descriptions of the mine, deposits and geological context, where relevant mine design, lithology and structures are included.

The MRE / ORE analysis for hydrogeology for an operating mine about to commence a major new phase of development (Stage V transitioning from open pit to underground mining) is focussed on the following aspects:

- What is the level of characterisation and conceptualisation of the aquifer(s), water-bearing zones and groundwater control systems?
- Is there sufficient understanding to determine what the inflows to the operations will be?
- Are there any indications of likely adverse groundwater interactions with the mine?
- What will be the likely rates of inflows, and can this be managed by the available infrastructure?
- If interventions are required, what will these comprise?

The key sources of information that have been used are:

1. Hydrogeological and Geotechnical Conditions of the Muruntau Deposit (and Appendices), 2017-2018 State Enterprise Research And Development Center (principal author: R.A. Boltabaeva, issued Tashkent 2018).
2. Section 4. of an undated report provided by Navoi titled: 4. Hydrogeological and Geotechnical conditions at Besapantau (also includes Balpantau). It is derived from work carried out in 1986-1998 by the State Enterprise "Uzbekhydrogeology" (until 1988), then by the Kyzylkum State Exploration Institute.
3. The special water use operating water permit for Muruntau issued to the Central Mining Administration of NMMC in July 2023 and valid till July 2028.

6.1.2 Hydrological Setting

The climate is arid continental with low amounts of annual average precipitation. Data reported for the 2001-2013 period recorded by a weather station in Nurata showed the highest monthly precipitation is in December-May, with a range of 3 - 143mm and the lowest monthly precipitation is in June-September, with a range of 0 - 28mm. The reported annual precipitation is in the range 160-324mm in this period, Boltabaeva 2018 reports the annual amount of precipitation, depending on the terrain, is distributed unevenly and rarely exceeds 100 - 200mm.

The average temperature in January is -8°C with a strong intra-annual range. Open water potential evaporation was estimated, based on a simplified method[1] for the available data (temperature and humidity) to be 1,400mm in summer, 130mm in winter, and 2,170mm per year which is 18 times higher than the average annual precipitation. However, because the majority of annual precipitation falls in the winter period when evaporation rates are low it means there should be excess effective rainfall to provide infiltration to permeate soils and potentially recharge groundwater in underlying formations.

There are no permanent surface water bodies in the vicinity of the Muruntau Mine. There is ephemeral surface water runoff including mudflows during periods of high precipitation, such as during heavy rain in March, April and May. Boltabaeva 2018 reports the terrain of the Project area is undulating and dissected by a large number of small valleys formed by temporary watercourses.

6.1.3 Regional Hydrogeology

The region is located in the southeastern part of the Tambytau hydrogeological massif. The area has a fractured rock aquifer complex within metamorphosed sand-shale strata of Palaeozoic era formations. Water supply for the mine operations and potable water is obtained from a variety of sources including the Amudarya River (the main source) and abstraction of groundwater from the Dzhengeldy aquifer about 35km from the site supplies the Balpantau pit facilities, plus recirculation and use of dewatering from the Muruntau mine.

The special water use permit sets the following maximum annual water withdrawals for mine use:

- Groundwater including wells – 5,653,000 m^3/year (15.5 Mld[2]);
- Muruntau dewatering – 535,000 m^3/year (1,465 m^3/d);

The local regional groundwater gradient is from north to south. Water bearing zones, sometimes productive enough to be termed aquifers are located in structural units with a high density of discontinuities from fractures and faulting from depths of 44 to 97m (approximately 490mASL) to depths of more than 600m.

[1] The Ivanov Formula varies in format but may be as follows: Eo = 0.0018 x (25 + t)2 x (100 – f).
Eo = sum of potential evaporation (mm); t = air temperature (oC); f = relative humidity (%)
Source: Okoniewska, M. & Szuminska, D., February 2020. Changes in Potential Evaporation in the Years 1952–2018 in North-Western Poland in Terms of the Impact of Climatic Changes on Hydrological and Hydrochemical Conditions. Water, 2020, 12, 877.
[2] millions of liter per day or megaliters per day.

6.2 Hydrogeology Characterisation and Conceptualisation

6.2.1 General

Groundwater in the Muruntau Deposit is unevenly distributed due to a complex system of faults and fracturing. The aquifer of the Muruntau Deposit is a metamorphosed sand-shale complex, characterised by relatively low primary hydraulic conductivity but relatively high secondary porosity where fractures exist. This can create challenges to accurately representing groundwater flow processes and behaviours.

The meteorological conditions with high evaporation and low precipitation are not favourable to development of significant recharge and groundwater reserves. The current method of dewatering via “Shaft M” serves as a collective drainage system.

Groundwater levels in the vicinity of the Muruntau Deposit have been observed in open resource boreholes to be 370-550mASL, with the fluctuation due to the drainage of mine workings.

Hydrogeological and geotechnical studies at the Muruntau deposit were carried out between 2016 to 2018 (Boltabaeva, 2018). This report provides an overview of soviet-era water supply studies conducted from the 1930s to 1980’s. The studies classified the hydrogeological mining conditions as ‘simple’, based on low water abundance and insignificant inflows necessitating no prior advance dewatering or drainage before mining the ore deposits.

The general hydrogeological model of groundwater flow (recharge and connected units) refers to hydrogeological massifs: areas where recharge occurs on uplands through fracture and fissure-karst formations such as limestones, dolomites and shales, resulting in fresh and slightly brackish groundwater. Over longer flow-path distances from recharge areas, mineralization increases to between 3,000 and 4,000mg/l, along with composition changes and recharge into intermontane basins. These are younger aged (Mesozoic and Cenozoic) deposits with intergranular and fissure water held under pressure in artesian basins.

6.2.2 Boltabaeva, 2018 Results

Work completed at site over the two-year (Boltabaeva, 2018) programme comprised:

1. A review of background information (geology, resource drilling logs etc).
2. Examination of seep zones at +128m, +78m, +0m elevations and inspection of Shaft M with monthly visits to record flow rates and obtain water quality samples. The drainage ditch at horizon -75m was examined. A total of 10 inflow points were recorded.
3. Secondary information derived from reviewing 10 resource boreholes. Information reviewed was water strikes, drill fluid losses and core examination.
4. The intent was to convert the boreholes to hydrogeological monitoring installations, but this was not achieved. One borehole out of the ten (No. 12117) was tested for in-situ hydraulic conductivity. The other boreholes were not drilled or completed in a manner which enable

installation of piezometers and ex-situ guestimates of hydraulic properties were made from derived materials.

5. Information on rock fractures (width, length, density, angle, orientation and in-filling) was recorded at the -75m horizon.

The results from the work are:

1. A generic hydrogeological conceptual model for the region, factors such as precipitation and recharge are not defined in detail.
2. A description of the Muruntau locality comprising:
    a. A complex anticlinal fold structure with a number of faults elongated on one flank which predetermines the development of fissure and fracture controlled groundwater within the deposit.
    b. Identification of the water-bearing rocks as sandstones, siltstones and shales with rocks in the fault zone have the greatest fracturing and transmissivity.
    c. Reference to a flow modulus (Kovalev Yu.) of <0.2l/s/km^2 and a recharge rate *("a precipitation infiltration coefficient / groundwater runoff coefficient")* of 2-5%. This equates to a recharge rate of 6.3mm/year which would represent between 126 - 315mm total annual rainfall, which is therefore within the estimated precipitation range for the site.
3. A limited number of site-specific values:
    a. Observed water inflows 15 - 20 l/s at a depth of 200m. Short-term break-throughs with flow rates up to 20 - 30 l/s and a total for the Muruntau, Mutenbai ore field of up to 60 l/s. Individual thin fractures with a flow rate of up to 0.1 l/s on average.
    b. Shaft M inflows have stabilized to an average of 42 l/s in the period 2001 - 2002 which is down from the early stages of mining when inflows were 30-60 l/s (1974 - 78) and 45 l/s (1999).
    c. Groundwater levels are reported to be at a depth of 32 - 144m (which corresponds to absolute elevations of 370 - 550mASL. This is based on results from only two boreholes (5n, 3g). Shaft M is reported to have depressed water level locally by 100m or more corresponding to 261 - 525mASL (borehole 6g). It is not clear what the two mASL values refer to. A small annual fluctuation of about 1m is observed with highest levels in the spring recharge period.
    d. Hydraulic conductivity rates are reported to be 0.005 to 0.15 m/day. It is not clear how these rates have been derived and if they have been taken from an in-situ tests or from an approximation method associated with recorded specific inflow rates.
    e. Groundwater is brackish (3,600 – 6,300 mg/l) with elevated sulphate and some indications of elevated uranium (reported maximum of 200 µg/l as compared to a US EPA (United States Environmental Protection Agency) and WHO (World Health Organization) drinking water guideline value of 30 µg/l).
4. Inflows at different horizons were reported as:
    a. A jet of groundwater from an underground (jumbo drilled) borehole with a flow rate of 0.15 - 0.3 l/s.
    b. Average water inflows in Level +0m = 24 l/s.

   c. Average water inflows in Level +78m = 9 l/s.
   d. Average water inflows in Level +128m = 14 l/s.
   e. Average water inflows in All Levels (Total for Mine) = 40 l/s.
5. Reference to a Southern Fault zone which was intersected by Roadway 4-1 and resulted in a temporary increase of inflows by 124% to a maximum of 23.5 l/s before decreasing again. A conclusion that water inflows into mine-M have stabilized.
6. Water levels throughout the mine are 'scattered' as a result of accumulations of perched water, some of which is derived from mine service water, local fracture zones and compartments.
7. The report notes that the usual assumption of decreasing transmissivity with depth may not hold for Muruntau because flows are controlled by fractures and structural zones and based on RQD observations there is an alternation of weak fractured rocks with more stable ones throughout. The data establishes *"permeable rocks occur even at different depths, which is associated with the widespread development of crushing zones and increased fracturing"*.

6.2.3 Section 4 Besapantau Hydrogeological Work

The Besapantau deposit is a northwestern continuation of the Muruntau and Mutenbai deposits and a direct analogue. The Section describing hydrogeological conditions Besapantau is based on data and studies conducted over thirty years ago (1986-1998) which was carried out at the time of exploration with a plan, at the time to develop two adjacent open pits with depths of 120 and 350m. Groundwater was assessed in the pre-project 'natural' condition.

Monitoring was carried out in 10 boreholes and 6 dedicated hydrogeological wells were drilled and tested for hydraulic conductivity. The general hydrogeology is similar to Muruntau in that regional groundwater is controlled by hydrogeological massifs and basins, the Palaeozoic rocks are represented by limestones. The site is within the Tamdytau massif and is controlled from the south by the regional Besapan fault. The area is broken by numerous faults and the adjacent basins are filled with Mesozoic-Cenozoic sediments. Regional groundwater flow is from north to south. A generalised level of groundwater in the Besapantau open pit is assumed to be 40m.

Hydraulic conductivity tests were completed ('bailer' tests) and analysed in six boreholes in which drawdowns were induced to between 7 and 59m. The results showed low conductivity (≈0.001 m/d) in most holes with one recording 0.03 m/d (still a low value).

Inflow rates to Shaft 10 were reported as 720m^3/d and this was used to develop an average inflow per metre value of 0.1 l/s (even though it is known the inflows come from a few discreet areas). Similar brackish water quality as Muruntau was recorded 3,500 – 4,500 mg/l and radioactive content also reported. *"An increased content of elements of the lanthanide group and some other elements was noted"* and concluded that water can only be used for technical needs and irrigation, although the last water-use may require more risk assessment as it may still maintain an exposure route to receptors. The rest of the assessment and that for the accompanying Balpantau deposit conclude low inflows to the proposed pits.

6.3 Current Groundwater Control

Groundwater and surface water control for the four associated mines Muruntau, Mutenbai Besapantau and Balpantau comprises:

1. Near surface perimeter catch drains that collect and divert rainfall, these are located in the upper 50m of each pit shell (above the water table).
2. 'Shaft M' which operates as a dewatering sump which appears to exert a regionally local control over groundwater heads such that collectively the shaft draws-down groundwater from across the mine-sites with an abstraction rate as of 2018 of ≈42 l/sec.
3. 'Shaft M' is critical to groundwater control. Any aspect of open pit expansion or underground mine development has to evaluate feasibility of relocating or deepening Shaft M and it continuing to function as a dewatering point.
4. The 'Shaft M' dewatering system is located on the northern wall and has an underground network that intercepts water-bearing features, collectively called 'Mine M'. As of 2019, SRK considered the infrastructure to still be suitable for dewatering requirements.

Boltabaeva, 2018 stated that "development of deep horizons of the Muruntau deposit (underground mining) may be accompanied by difficulties due to possible breakthroughs of fissure waters from zones of tectonic fragmentation and an increase in water inflows, therefore further development of the deposit should be carried out under the drainage influence of Mine-M.

The individual inflows to Shaft M from levels +78m, +0m, -75m are recorded and overall the inflow rate has remained stable since early 2000's. The most marked change in inflow rate was between 1977 to 1978 when inflows doubled from 30 – 60 l/s due to expansion of the intersecting workings.

Boltabaeva, 2018 reports that flows are again increasing with the total water inflow into Mine-M changed from 33 to 45 l/s between 2016 to 2018. Current inflow rates are not known. Boltabaeva, 2018 also comments that *"over a long-term period of monitoring the water inflow into Mine-M, the increase at this stage occurs only due to the opening of water-flooded fault zones when excavating workings at a horizon of -75m."*

Shaft M is connected to a total length of ≈9,000m of mine workings. There is reference to a 2010 Hydrogeological Study of the deep horizons of the northern flank of the Mutenbai deposit carried out by "Institute of HIDROINGEO". This document has not been seen but should be located and reviewed to see the relevant hydrogeological descriptions of Shaft M. The general description of inflow (Boltabaeva, 2018) is of *"weak dripping, wetting of the walls and roof of the workings. From a number of boreholes drilled in underground workings, a jet of groundwater came out with a flow rate of 0.15 - 0.3 l/s. The most watered intervals are the zones of crushing and increased fracturing."* Elsewhere in the report there are references to *"concentrated outlets of groundwater were observed with flow rates of up to 1 l/s."*

6.4 Future Inflows

Although the Boltabaeva, 2018 report states that significant water inflows from fault zones should be expected the report does not include forward predictive information that identifies where such zones are. Furthermore, the report suggests that “When passing through zones of tectonic fragmentation and faults, it is necessary to advance drilling of inclined boreholes, through which statistical reserves of groundwater are drained and directed to reservoirs”. In other words, use probe relief holes drilled underground to dewater levels and capital workings from behind the tunnel wall. This is generally a pragmatic solution used in many underground mines, however in order to know that probe relief holes are going to be adequate to dewater and control formation pressures it is usual to precede this advice by modelling the groundwater flow and pressure fields that will be encountered.

Boltabaeva, 2018 also comments that the western part of the open pit has a compartmented groundwater system with a higher groundwater level (“mark +10m”) which has been unaffected by drainage into the Shaft / Mine-M drainage system. This is explained due to “a ‘meridian fault’ dipping in the opposite part from the eastern part of the open pit and prevents the flow of groundwater into the eastern part of the open pit, which is located in the drainage zone of the mine workings of Mine-M. Again this conceptualisation of groundwater compartments and drainage zones could be of significant importance, but it is not supported by any apparent data as there are no groundwater level measurements or preceding conceptualisation of this. The report states that groundwater control of the western part of the pit requires its own separate dewatering system.

7 MINING METHODS

7.1 Overview

The Muruntau cluster open pit mines are operated as a conventional truck and shovel mine using face shovels and backhoe excavators to load ore and waste to a mixed fleet of 130t, 180t and 220t Class haul trucks of various manufacture. All ore and waste material requires drilling and blasting. At Muruntau, an inclined conveyor is also used for material movement in addition to haul trucks.

Ore is transported to ROM pads adjacent to open pits and either stockpiled for blending purposes or transported via railway to the crusher at the GM2, GM7 or Heap Leach facilities. Waste is transported to waste rock dumps (WRDs) which are extensive and located around the perimeter of the pits.

Working bench height varies between 15m at Muruntau-Mutenbai, and 5m-15m at Balpantau and Besapantau, whilst final benches are 30m in height.

The Muruntau-Mutenbai mine is currently operating at rate of 105Mm^3 total rock movement per annum. Besapantau is operating at a rate of 5Mtpa ore and 39Mtpa total rock, whilst Balpantau extracts some 3Mtpa ore from a maximum of 20Mtpa total rock.

7.2 Load and Haul

All ore and waste from the pit are mined using conventional open-pit methods. The mine currently operates a fleet of between 15-20 loaders across a 15m^3, 17m^3 and 20m^3 class range and with both face-shovels and backhoe configuration. Currently, circa 110 haul trucks comprise the haulage fleet, with the total number of trucks ranging from 70 to 150 across the life of the mine.

The haulage fleet transports both ore and waste to various points on the pit rim where a system of overland conveyors and stacker moves waste material to the dumps, whilst ore is loaded into railway wagons and hauled in nine- to 11-car trains to the processing plants.

The operation is selective in terms of separating ore and waste, and the degree of selectivity is appropriate for the scale of mining equipment and the nature of the mineralisation. A SMU of 30m x 30m x 15m (XYZ) has been adopted for Muruntau-Mutenbai, and 12m x 12m x x5m at Besapantau and Balpantau.

The mining fleet includes the requisite ancillary equipment (track and wheel dozers, motor graders, front-end wheel loaders, service trucks, and water trucks) to maintain the pit haul roads, loading and tipping areas, for ROM pad operations.

Whilst ore and waste are visually distinct in certain areas of the pit, this is not always the case and ore and waste segregation is generally based upon RC (Reverse Circulation) drilling, sampling, and assays for definition of ore blocks. RC drilling has only recently been introduced as an advanced grade control step.

Waste is used for construction or is hauled to the mine waste dumps, located around the full extent of the Muruntau pit, to the west of the Besapantau pit, and south of the Balpantau pit.

7.3 Drill and Blast

All in-situ ore and waste require blasting with no free dig material. Production drilling is conducted at 5-15m benches while pre-split drilling is over 30m bench heights, production drills are electric powered rotary drills drilling 250mm diameter holes. There are variations to pattern size, hole diameter, and powder factor, depending on rock type, oxidation state, and structure, to ensure optimal fragmentation of the rock mass for mining operations.

The requirements for drilling equipment are determined by applying design burdens and spacings to the different rock types for effective fragmentation, and making provisions for available and utilised operating hours, sub-drill and re-drill requirements, and penetration rates. Provision is also made for reverse circulation (RC) drilling for close definition of ore for grade control, including an expectation of grade controlling 10% of waste mined.

Multiple blasts take place daily. Explosive and explosive accessories are supplied by an explosive contractor, they have their own facilities on-site to produce the required explosives as well as storing and issuing explosive accessories.

7.4 Auxiliary Information

Requirements for purchase of non-production and minor equipment such as graders, water trucks lighting plants, light vehicles, tyre handlers, man carriers and pumps are scaled according to variable production, production equipment and non-variable manning levels.

Haul roads are maintained by NMMC personnel. Waste dump slopes will be progressively battered down to their final profiles during construction.

Portable lighting towers, and trailer-mounted diesel generator sets are used to illuminate the working areas in the open-pit at night. Typically, lighting towers are used at the excavating face, dumping face and other locations around the pit perimeter to give overall illumination of working areas, and ramp intersections. Lighting towers are also required for night shift drilling crews. Permanent lighting for nighttime operation is installed at fixed locations close to mains power, such as the ROM pad.

Mining personnel requirements were estimated based on a 4-shift rotation and:

- Variable requirements for each scheduled unit of production equipment.
- Fixed (non-variable) numbers for managerial, technical, and certain ancillary functions, like dewatering and conveyor operations.
- Leave, absence and contingency coverage (5%).

8 MINERAL PROCESSING & TESTWORK

8.1 Introduction

The NMMC Muruntau-Mutenbai processing complex has been in continuous operation since 1969. Several phases of expansion have been completed since then and the oxide zones of ore are now all mined out, so only fresh ore is currently mined and processed from the main Muruntau-Mutenbai combined pit. The ore consists of complex stockworks with a head grade of circa 1.1-1.2 g/t Au.

Ore and waste at Muruntau-Mutenbai is blasted and excavated conventionally, and diesel trucks used to transport the ore either to in-pit crushing and conveying systems and/or to surface locations, from where the ore is transported by rail to the main processing plant, GMZ-2. Mined waste is dumped adjacent to the pit.

GMZ-2 has a nominal design throughput of 50Mtpa, which is the largest gold processing plant in the world based on throughput. The flowsheet is based on cyanide leaching and Resin-in-Pulp (RIP) technology – this was the world's first commercial application of RIP technology.

In addition to GMZ-2, there are two other main processing facilities: GMZ-7 (nominal throughput 15Mtpa) which processes the old Newmont heap leach tailings material through a conventional Carbon-in-Pulp (CIP) flowsheet; and CKVZ, a dedicated and conventional Heap Leach operation for low grade ore (nominal throughput 11Mtpa). There are other processing and treatment facilities within the general site complex treating material from other operations within the Navoi group, but discussion will be limited to these three main processing facilities, including the Tailings Storage Facilities.

Ore from Balpantau, located 40km away, is also fed to the GMZ-2 facility at the rate of 2.5Mtpa and at a similar head grade of circa 1.2 g/t Au.

It is also planned in 2024 to commence feeding ore from Besapantau, for which metallurgical testwork has been completed, at a rate of circa 3Mtpa. No additional site infrastructure is required for this ore, although the water supply system to the plant is being expanded.

Finally, there are considerable resources of low-grade stockpiles, although these are reportedly being processed through the GKZ-2 plant at a rate of 5Mtpa since 1974, with a reported constant tailings grade of 0.123 g/t Au. A scoping level assessment is included in this report on the best strategy for processing this resource.

8.2 GMZ-2

8.2.1 Recent Production Data

Table 8.1 summarises the production data since 2020, including the first 9 months of 2023.

Table 8.1: GMZ-2 Production Data

	2020	2021	2022	2023*
Mt	44.578	48.205	51.304	38.690
g/t Au	1.25	1.19	1.13	1.14
Recovery, %	89.14	89.61	89.86	89.75

*First 9 months

For the period 2013-2019, approximately 38.4Mtpa was processed annually at a head grade of 1.36 g/t Au and 89.5% recovery, for the production of approximately 46t Au metal annually (average tails grade 0.14 g/t Au).

For 2022 and 2023, the nominal throughput of 50Mtpa has been slightly exceeded. Gold recovery has been very consistent at circa 89-90% for a head grade of circa 1.1-1.2 g/t Au. This indicates that the ore is generally free-milling with good recovery for the head grade, although there are reportedly some problems with carbonaceous material, which can be preg-robbing. The head grade appears to be on a slight downward trend as throughput has increased.

8.2.2 Operating Costs

Operating costs were provided for the first 6 months of 2023 and for 2022.

In summary, the operating cost for H1 2023 was US$7.94/t ROM (run-of mine) ore and US$7.31/t for 2022. Table 8.2 summarises the breakdown for the H1 2023 operating cost.

Table 8.2: GMZ-2 Operating Cost Data

Item	US$/t ROM
Reagents & Consumables	3.55
Power	2.22
Labour	0.67
Maintenance	0.57
Other (incl. WIP & Depreciation)	0.93
Total	**7.94**

Clearly, the reagents & consumables costs are the highest contributor, followed by the power costs.

Of note is that, from the total of US$3.55/t for reagents & consumables, the highest contributor is steel ball grinding media at US$1.93/t, followed by cyanide at US$0.52/t and then thiourea at US$0.25/t.

8.2.3 Process Description

The plant was the first to employ RIP technology commercially and, since start-up in 1969 with an initial throughput of 12-15Mtpa, has progressively expanded since then to the current nominal design throughput of 50Mtpa. This has generally been achieved by simply adding more modules of the same size over the years to accommodate the various expansion phases. Whilst simpler in terms of operability and common spare parts from same-sized equipment, it is power-inefficient as throughput has increased due to the relatively small size of equipment (a smaller number of larger modules with larger equipment would be better), resulting therefore in high power costs.

The plant is located 10.5km from the west side of the pit, with a rail network transporting ore from the surface locations at the pit to the plant.

The unit operations generally consist of crushing, grinding, gravity, thickening, cyanidation/RIP and tailings disposal.

Approximately 3,500 people are employed at GKZ-2.

8.2.3.1 Crushing

ROM ore is delivered by rail to the crushing plant with a maximum size range of 1,200-1,800mm, although the average size is circa 300mm. The crushing circuit consists of two gyratory crushers operating in parallel and a single jaw crusher.

The first gyratory crusher (KKD No 1) was installed in 1969 with a design throughput of 1,840tph (actual achieved 3,000tph); the second gyratory crusher (KKD No 2) was installed in 1977, with the same design and actual achieved throughputs. The gyratory crushers crush the ROM ore from a maximum size of 1,200mm to minus 180mm. The jaw crusher is a C160 Nordberg crusher installed recently in 2020 and crushes ROM ore from a maximum size of 960mm to minus 150mm. The jaw crusher forms part of the Metso Minerals Crushing and Screening Complex and includes a 150mm screen prior to the jaw crusher.

Crushed ore from the gyratory crushers is transported by conveyors to the storage hopper (capacity 60,700t) of “A” Grinding Circuit and, for the jaw crusher circuit, via Receiving Unit No 4 for transportation to the storage hopper (capacity 24,000t) of “B” Grinding Circuit. KLP conveyors (1969 & 2020) and KL conveyors No’s 1 & 2 (2020) are used as mobile belt conveyors for crushed ore transportation, together with other belt conveyors. With an actual capacity of 6,000tph from the two gyratory crushers and a design capacity of 1,750tph for Receiving Unit No 4 for the jaw crusher circuit, the total capacity is therefore 7,750tph. This provides the required design throughput of 50Mtpa at a typical crushing plant availability of 75%.

The distribution of crushed ore among the feeders of the storage bins is constantly monitored by the department operators.

For H2 2022, liner consumption is stated as 0.0073kg/t, water consumption at 0.0164 m^3/t and power consumption at 0.45 kWh/t ROM ore.

8.2.3.2 Milling

The milling plant consists of 23 mill blocks (circuits) plus the MShR-73 circuit. The mill blocks have progressively been added since 1969 as the GKZ-2 plant has been expanded, as noted below:

- Mill blocks 1-10 (1969);
- Mill blocks 11-13 (1973);
- Mill blocks 14-16 + 19-20 (1975);
- Mill blocks 17-18 (1974);
- Mill block 21 (1981);
- Mill block 22 (1986);
- Mill block 23 (1996);
- Mill blocks 24-25 (2001);
- Mill block 26 (2002);
- Mill block 27 (2003);
- Mill block 28 (2007);
- Mill blocks 29-30 (2020);
- Mill blocks 31-32 (2021); and
- MShR-73 (2020).

The nominal design capacity of all the combined mill blocks is 50Mtpa.

The general description for each of the mill blocks is very similar and consists of a two-stage circuit, the first stage with an open circuit SAG (semi-autogenous grinding) Mill and the second stage with a closed-circuit Ball Mill with a central discharge. Spiral and hydrocyclone classifiers are used for the first and second stages respectively and each mill block incorporates a gravity circuit based on jigs. The overall design grind size is 80% passing 74 microns.

Figure 8.1 summarises the general circuit for a mill block.

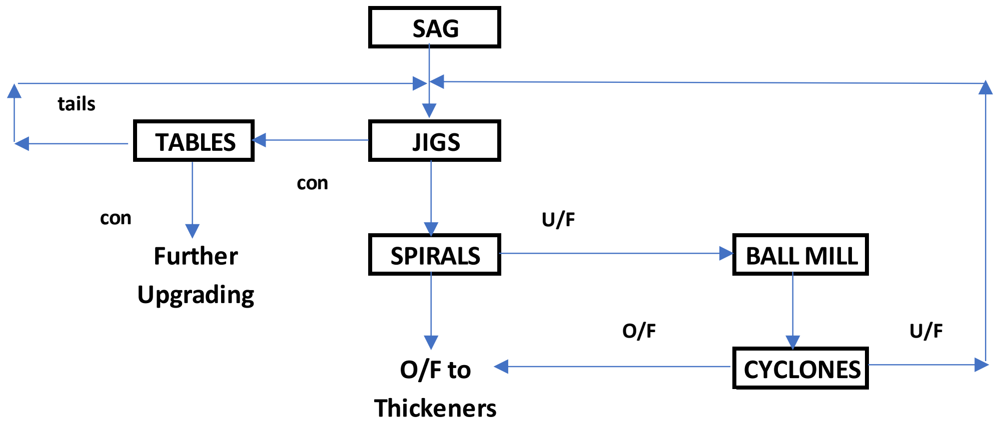


Figure 8.1: **Mill Block General Flowsheet**

Each Mill Block generally contains one primary SAG Mill and one secondary Ball Mill. However, a number of Mill Blocks also contain an additional regrind Ball Mill. In total, there are installed 32 SAG Mills and 45 Ball Mills (includes 13 additional regrind Ball Mills). The total installed power is reported as 210MW for the SAG Mills and 182MW for the Ball Mills.

The majority of the SAG Mills are sized at 7.0m x 2.3m except for Mill Blocks 22 and 28-32 which are 9.0m x 3.0m. Block MShR-73 does not have a SAG Mill.

The majority of the Ball Mills are sized at 4.5m x 6.0m, although other sizes include 3.6m x 5.0m and 5.5m x 6.5m.

For H2 2022, average consumptions are reported as follows:

- Grinding Media 40mm: 0.275kg/t;
- Grinding Media 60mm: 0.97kg/t;
- Grinding Media 100mm: 0.91kg/t;
- Grinding Media 120mm: 0.41kg/t;
- Mill Liners: 0.21kg/t;
- Power: 27,550kWh/t; and
- Water: 0.84m^3/t ROM ore.

8.2.3.3 Gravity

As noted in the Mill Block general flowsheet, a gravity circuit is incorporated into each of the milling circuits. Jigs are used to treat the SAG Mill discharge, with the jig concentrate upgraded in shaking tables to produce a final concentrate which is sent for further upgrading in a separate process. The table tails are returned to the jig circuit (some Mill Blocks incorporate additional regrinding of the table tails). The jig tails report to the spiral classifiers.

Overall gravity gold recovery is reported to exceed 20%.

The table concentrate is further upgraded by screening at 0.5mm (oversize is reground) and the -0.5mm fraction then dewatered for magnetic separation. The magnetic concentrate is then tabled in three stages with the final concentrate reporting to the Finished Product Shop. The table tails are dewatered and reground. The non-magnetic tails report to cleaner magnetic separation and the non-magnetic tails report back to the head of the upgrading circuit. The cleaner magnetic concentrate is cycloned with the overflow reporting to the primary jig tails stream. The cyclone underflow reports to a separate magnetic fraction processing site for further treatment.

8.2.3.4 Thickening

The thickening circuit (pre-leach thickening) increases the slurry density of the slurry from the milling circuit to 50% solids w/w for cyanide leaching. A total of 28 thickeners are employed, which have been gradually installed as expansion phases have been completed as shown below:

- Thickeners 1-6 (1969);
- Thickeners 7-11 (1973);
- Thickener 12 (2021);
- Thickeners 13-14 (1974);
- Thickeners 15-16 (1975);
- Thickeners 17-18 (1977);
- Thickeners 19-20 (1983);
- Thickeners 21-22 (1989);
- Thickeners 23-24 (2007);
- Thickeners 25-26 (2010); and
- Thickeners 27-28 (2022).

A total of 22 thickeners have a central drive, type Ts-50, 3 with a peripheral drive, type P-50, 2 with a central drive, type Ts-36 and 1 with a central drive, type Ts-12.

Slaked lime is added to the milling circuit for pH control. A polyacrylamide flocculant (PAA) is added to the thickener feed. Thickener underflow at 50% solids is pumped to 2mm drum screens for trash removal (returned to the milling circuit) with the screened slurry pumped to the sorption pump sump, where sodium cyanide is added to maintain an average concentration of 300ppm cyanide (but can vary from 0.5-2g/l as required).

Thickener overflow solution is returned as process water.

A separate lime slaking plant is used to produce the required slaked lime from quicklime for pH control. The quicklime is produced from a separate roasting circuit which converts a limestone feed ($CaCO_3$) to quicklime (CaO), the quicklime serving as feed to the lime slaking plant. The limestone is sized to -40+5mm and 11 roasting furnaces are used, installed over the period 1983-2022.This section of the plant also includes the Acid and Alkalis Warehouse where sulphuric acid, hydrochloric acid, nitric acid, caustic soda and ammonium hydroxide are stored.

Sodium Cyanide (NaCN) is delivered as both a solution and solid and stored in the NaCN Warehouse.

The respective reagent preparation circuits are also included in the thickening area for sodium cyanide, caustic soda (sodium hydroxide) and flocculant mixing and dosing.

For H2 2022, the reagent consumptions are reported as follows:

- NaCN (100%): 0.34kg/t
- Quicklime (70%): 1.95kg/t
- Caustic Soda (100%): 0.125kg/t
- H_2SO_4 (100%): 0.20kg/t
- HCl: 0.0035kg/t
- HNO_3: 0.017kg/t
- PAA: 0.024kg/t
- (ammonia water NH_4OH not standardised)
- Process Water: 0.13m^3/t
- Power: 1,466kWh/t

8.2.3.5 Cyanide Leaching & RIP

The RIP process (first commercial use at NMMC) utilises an ion exchange resin, AM-2B, which is an anionic strong base resin, with a typical consumption rate of 8.7 g/t. RIP, similar to the CIL (Carbon in Leach) process, can be more effective compared with CIL for preg-robbing ores and it is reported that, at Muruntau, there is preg-robbing due to the presence of carbonaceous material. While more expensive compared to activated carbon, the resin does not require thermal reactivation, significantly lowering capital and operating costs, and better gold recovery can be achieved on preg-robbing ores due to higher resin loading rates and consequent lower required residence times.

The RIP process takes place in Pachuca Tanks, of which there are currently 210 after successive expansions, each of 450m^3 volume. The tanks are 17m high with a diameter of 5.5m. The tanks are air-agitated with internal air lifts to transfer the resin and pulp to externally mounted stainless steel 0.5mm woven-wire screens. The loaded resin is thereby separated from the slurry, which is returned to the tank, and transported counter-currently to the flow of pulp to the next upstream tank, the resin progressively loading more gold. The pH is maintained at 10.8-11.2 required for protection of the cyanide used for gold dissolution (cyanide dissociates to HCN gas at low pH).

The loaded resin (the cyanide-dissolved gold is adsorbed onto the resin) is then eluted by stripping for 8 hours with acidic thiourea solution. The resin is subsequently regenerated using caustic soda at atmospheric pressure and a temperature of 55-60°C and returned to the last tank in the RIP circuit.

The pregnant thiourea solution then proceeds to conventional electrowinning and smelting for gold doré production.

The exact configuration and number of the Pachuca Tanks and associated stripping, electrowinning and regeneration circuits in relation to each Mill Block and the contact residence time was not available.

For 2022, the relevant reagent consumptions were as follows:

- AM-2B: 0.01kg/t
- CN (100%): 0.5-2 g/t
- Power: 0.245kWh/t

8.2.3.6 Final Products Department

The finished products department was commissioned in 1979. Specific to the GMZ-2 plant, commercial regenerate, cathode deposits, gravity concentrates, as well as Doré gold, are further refined to produce gold bars of 99.99 % purity, plus silver bars of 99.99% purity and palladium powder of 99.90% purity.

In addition to refining the products specifically from the GMZ-2 plant, there is also a central metal recovery plant, operated by GMZ-2, which treats loaded resin, electrowinning sludge, cathodes and precipitates from Merrill-Crowe circuits from other gold processing plants within the NMMC group, also producing separate refined gold and silver bullion and palladium powder.

Processing and production of the finished silver products are carried out at the silver production site within the Final Products Department.

The main refining operation for the gold and silver is electrolysis using soluble base metal cathodes. The resulting cathode gold, after acid dissolution, is smelted to produce 99.99% gold ingots. Crude silver is obtained from the gold electrolysis sludge and solutions from the acid treatment of products and is further refined at the silver production site. Palladium concentrate is extracted from the spent gold electrolyte using the ammonia-acid deposition method to obtain refined palladium powder.

Commercial regenerate refers to the gold-containing thiourea sulphate solution from the resin regeneration department. The final product is a hydrate sludge, based on the method of precipitation of metals from solutions of their salts using caustic soda at pH 9.5-11.5 with air mixing. The hydrate sludge is then roasted and acid treated, with further processing of the resulting solids and solutions for the production of crude gold and silver respectively for further refining.

Gravity concentrates are also treated with acid, with the resulting solutions processed for crude silver production as for the hydrate sludge and the solids further treated after roasting for crude gold production and further refining.

8.3 Heap Leach Plant (CKVZ)

8.3.1 Recent Production Data

Table 8.3 summarises the recent heap leach production data since 2020, including the forecast for 2023.

Table 8.3: CKVZ Production Data				
	2020	**2021**	**2022**	**2023***
Stacked, Mt	11.378	11.485	11.339	11.222
g/t Au	0.74	0.66	0.59	0.56
Recovery, %	58.07	56.00	50.63	53.33

*Forecast

For the period 2020 - 2023, the nominal throughput of 11Mtpa has been slightly exceeded. Gold recovery has generally decreased with decreasing head grades over this period, from 58% at a head grade of 0.74 g/t Au in 2020 to 51% at a head grade of 0.59 g/t Au in 2022.

The gold recovery achieved is reasonable for the head grades, considering that the ore is finely crushed fresh rock.

8.3.2 Operating Costs

Operating costs were provided for the first 6 months of 2023 only.

In summary, the operating cost for H1 2023 was US$5.68/t ROM ore. Table 8.4 summarises the breakdown for the H1 2023 operating cost.

Table 8.4: CKVZ Operating Cost Data	
Item	**US$/t ROM**
Reagents & Consumables	1.95
Power	0.82
Labour	0.91
Maintenance	2.60
Other (incl. WIP & Depreciation)	-0.60
Total	**5.68**

The maintenance cost is the highest cost contributor, followed by reagents & consumables. The power and labour costs are relatively low. Of the total reagents & consumables cost, the highest cost contributor is cyanide at US$1.04/t, followed by HDPE liners at US$0.26/t.

8.3.3 Process Description

The plant was started in 1995 with a design capacity of 2,300tph with a feed consisting of off-balance ores with a maximum feed size of 1,200mm.

8.3.3.1 Crushing

The ore is fed by bulldozers to the receiving hopper of an apron feeder which feeds the mobile crushing and screening unit. For the first stage of crushing, the ore is screened at 140mm, with the oversize crushed in a C160 jaw crusher. The screened and crushed ore is then transported via conveyors to a stockpile. A rock breaker is included in the circuit.

In the second stage of crushing, the ore is screened at 50mm and the oversize crushed in MP1000 cone crushers. In the third stage of crushing, the ore is screened at 12.5mm and the oversize crushed in 2 x MP1000 cone crushers. In the final fourth crushing stage, the ore is screened at 3.35mm and the oversize crushed in 16 impact crushers operating in closed circuit (Barmac and Cemco V-96 crushers). The final crushed ore product is 97% passing 3.35mm.

8.3.3.2 Reagent Dosing, Agglomeration & Stacking

Quicklime and Portland Cement are the principal reagents added for pH control (cyanide leaching) and agglomerate production respectively. The two reagents are delivered to site by rail and truck into receiving bins. The lime is additionally impact crushed to -3.35mm to a receiving bin. Rotary feeders with pneumatic transportation and dust collection circuits are used to transport the cement and crushed lime to separate lime and cement storage bins. The reagents are then fed via compressed air to the overland conveyor OL-1 at maximum rates of 4.5tph and 2.4tph for the cement and lime respectively. The conveyor OL-1 has a capacity of 2,228tph.

Belt agglomeration, rather than a drum agglomerator, is used to agglomerate the crushed fresh ore and five mixers are installed on conveyor OL-1 to assist with the mixing of the ore with the lime and cement. In addition, 25-30m^3/h of barren solution (containing cyanide) is added to the hoppers of the later mobile conveyors to complete the agglomeration process.

The partially agglomerated ore from OL-1 reports to conveyors OL-2 and OL-3, the latter including a mobile reloading trolley for feeding the lifting conveyors, of which up to 15 are used. The last lifting conveyor transfers the ore to the mobile conveyors, then to a transverse mobile conveyor. From the transverse conveyor, the ore reports to a self-propelled horizontal conveyor and from there to the stacker. The stacker has a 6m retractable conveyor and is 42m in length.

The stacker and conveyor system allows for a stack height of 10.5m with a cell (panel) width of 85m. The length of the cell is 950m for the first lift and decreases as the number of lifts is increased. The maximum number of lifts is nine, for a total heap height of 94.5m.

The surface of the stacked agglomerated ore is levelled with a bulldozer before irrigation commences. The pH is maintained at 10-11 and the quicklime (70%) and cement consumptions for the years 2017-2019 were 1.50kg/t and 2.30kg/t respectively.

8.3.3.3 Irrigation

The heap leach pad (HLP) is conventionally lined with 1.5mm HDPE on compacted clay with a slope of 1.5-2.0%. The drainage layer consists of perforated polyethylene pipes covered with sized gravel.

Irrigation is conducted using drip emitters, rather than wobblers, with an initial solution application rate of 18-20L/h/m^2, decreasing to 8-10L/h/m^2 in the final stages of irrigation.

Concrete collectors with sluice valves control the gravity flow of solution in pipelines to the various ponds, sumps and pumping stations.

Leaching is conducted in four distinct cycles with a total leach time of generally 240-300 days (typically 60 + 90 + 60 + 60 = 270 days). The resulting solutions are the Pregnant, Enriched, Recirculating and Barren solutions. Details of these solutions are summarised in Table 8.5.

Table 8.5: Details of Leach Solutions

Solution	Au, g/t	NaCN, ppm	pH	m^3/h	Pond, m^3
Pregnant	>0.35	150-170	10.3-10.5	1,660	35,500
Enriched	≥0.08	>170	10.3-10.5	3,100	66,685
Recirculating	0.15-0.30	>220	10.3-10.5	3,100	178,835
Barren	≤0.03	>150	10.3-10.5	1,660	2,624

In addition, there is a Storm Pond with a volume of 126,000m^3.

Enriched Solution is initially irrigated onto the newly stacked ore for a period of 60 days and at a higher solution application rate of 18-20L/h/m^2. The resulting leach solution then reports to the Recirculating Solution Pond.

Recirculating Solution is then irrigated onto the freshly leached ore (and partially leached ore as required) for a period of 90 days and with a lower solution application rate of 12-15L/h/m^2. Solution from the freshly stacked ore reports to the Pregnant Solution Pond. Solution from the partially leached ore reports to the Enriched Solution Pond (or back to the Recirculating Solution Pond).

The Pregnant Solution reports to the Merrill-Crowe plant for gold recovery and the resulting Barren Solution reports to the Barren Solution Pond.

Enriched Solution, as well as newly stacked ore, is also used to further irrigate partially leached ore for 60 days at a solution application rate of 10-12L/h/m^2. The resulting solution reports either to the Enriched or Recirculating Solution Ponds.

Finally, Barren Solution is used to irrigate the leached ore for a further 60 days at a solution application rate of 8-10L/h/m^2. The resulting solution reports either to the Enriched or Recirculating Solution Ponds.

The use of several leach cycles as described above using solution already partially loaded with gold results in a higher gold concentration to the pregnant solution and therefore capital cost savings from a smaller required Merrill-Crowe plant.

8.3.3.4 Merrill-Crowe Plant

The plant treats 1,550-1,660m^3/h of pregnant solution from the Pregnant Solution Pond. The plant is a conventional Merrill-Crowe plant. Caustic and cyanide are added as required to the feed, following which clarification of the solution is conducted using four filters coated with diatomaceous earth as a 5% suspension. After clarification, the solution is de-aerated with the removal of oxygen using vacuum pumps. Zinc dust is then added to precipitate out the gold from the clarified, de-oxygenated solution and with the addition of lead nitrate solution. The gold-loaded zinc dust is then filtered from the solution, also with the use of diatomite, to produce a zinc sludge.

Finally, the loaded zinc sludge is calcined at 750°C for 12-15 hours, the relevant fluxes are added (borax, nitrate and salt) and the mixed charge smelted in an electric arc furnace. The resulting Doré bars are further refined as described previously in the GMZ-2 plant (Final Products Department).

8.3.3.5 Local Sorption Unit (OPU LSU)

In addition to the Merrill-Crowe plant, Pregnant Solution from Stack No. 1 (HLP-1) is also treated in a separate Local Sorption Unit (LSU) at the rate of 950m^3/h. This solution can also be recirculated to HLP-2. This plant is a conventional carbon-in-solution (CIS) circuit with associated stripping and elution circuits for gold Doré production.

8.4 GMZ-7

8.4.1 Recent Production Data

Table 8.6 summarises the recent production data since 2020, including the forecast for 2023.

Table 8.6: GMZ-7 Production Data

	2020	2021	2022	2023*
Mt	3.306	12.110	15.881	15.871
g/t Au	0.53	0.47	0.47	0.45
Recovery, %**	60.0	68.7	75.6	78.8

*Forecast
**Recalculated Recovery

The plant was commissioned in 2020 and, since then, the throughput has ramped up to slightly exceed the design of 15Mtpa by 2022. Over the period, the head grade has slightly decreased from 0.53 g/t Au to 0.45 g/t Au in 2023.

The recovery has increased every year and averages 77.2% for the last two years of operation at the design throughput. This recovery is reasonable based on the head grades for previously heap leached tailings material.

8.4.2 Operating Costs

Operating costs were provided for the first 6 months of 2023 only.

In summary, the operating cost for H1 2023 was US$6.11/t ROM ore. Table 8.7 summarises the breakdown for the H1 2023 operating cost.

Table 8.7: GKZ-7 Operating Cost Data

Item	US$/t ROM
Reagents & Consumables	2.44
Power	1.35
Labour	0.67
Maintenance	0.83
Other (incl. WIP & Depreciation)	0.82
Total	**6.11**

Reagents & Consumables are the largest cost contributor, followed by power. The maintenance and labour costs are relatively low. For the Reagents & Consumables, steel grinding media is the largest cost contributor at US$0.93/t followed closely by cyanide at US$0.92/t.

8.4.3 Process Description

The plant was commissioned in 2020 and is based on conventional CIP technology. The plant feed consists of the old heap leach tailings material from when Newmont Gold previously operated the mine and in excess of 200Mt of material is reportedly available for processing.

The tailings material is initially bulldozed down towards the plant site and loaded via Front-End Loaders to a screening plant, where the +20mm oversize material is removed and transported to the waste dump. The -20mm fraction is then conveyed to a stockpile for feeding to the milling circuit. Lime (CaO at 70%) is added to achieve the correct pH for cyanidation.

The first stage of milling consists of six Ball Mills (MSC 55 x 75), each with a 4MW motor, operating in closed circuit with hydrocyclones. The second stage of milling consists of two Ball Mills (MSC 40 x 70), also operating in closed circuit with hydrocyclones.

A portion of the first stage cyclone underflow reports to the second stage cyclone feed. Second (and first) stage cyclone overflow is combined as final milled product, sizing 80% passing 74 microns. The remaining first stage cyclone underflow reports back to the first stage mills; the second stage cyclone underflow reports as the second stage mill feed, with the mill discharge combining with the first stage cyclone underflow portion to feed the second stage cyclones.

The grinding media used is 68mm and 40mm diameter steel balls.

The milled product slurry is then screened to remove trash (wood chips, plastic etc) and then reports to the pre-leach thickener circuit. This consists of six thickeners, each of 36m diameter, with flocculant added to achieve a thickener underflow density of 50% solids w/w.

NaCN is added to the pulp as a 20-30% solution for initial cyanide leaching with a cyanide concentration of circa 600ppm. The pulp then reports to the adsorption (CIP) circuit. There are three parallel trains of leaching/adsorption, with a residence time of 14 hours for each train. Each train consists of one (1) 1,500m^3 leach tank and eighteen (18) 400m^3 adsorption tanks (vats).

Tailings from the last adsorption tanks, after safety screening for carbon recovery, reports as final tailings to the TSF (Tailings Storage Facility).

Loaded carbon from the first adsorption tanks is treated in a conventional Pressure Zadra elution circuit, using caustic only (no cyanide) for stripping. The cathodes produced from electrowinning are sent to the GMZ-2 plant for further refining. The barren carbon after stripping is acid treated with a 31-33% HCl solution and then thermally regenerated before return to the adsorption circuit.

Return water from the TSF and thickener overflow water is returned to the process water tank for plant use.

Additionally, the TSF return water is pre-treated by CIS (carbon-in-solution) adsorption columns for additional gold recovery (local sorption unit). The spent electrolyte after electrowinning is also treated via column adsorption leaching for additional gold recovery.

8.5 Tailings Storage Facility (TSF)

There are two TSFs that have been constructed. TSF-1 is 1.8km from the GMZ-2 processing facility but is essentially full, although it is still reportedly used for one month every year as an emergency facility.

The currently used TSF is TSF-2, located 25km east of TSF-1 (35km south-east of GMZ-2), and consists of two cells, Cell 1 and Cell 2. Cell 2 is the newest cell and has gradually replaced Cell 1 for current tailings storage.

However, it is proposed that both TSF 1 and TSF 2 (both cells) will be expanded and constructed to accommodate tailings storage from GMZ-2 and GMZ-7 until at least 2034.

The current expansion works for raising the Southern wall of TSF 2 Cell 2 to a crest elevation of 323m were due to be completed by the end of 2023 at a cost of circa US$84k (they were on-going at the time of the site visit). This work includes construction of the southern dam raise to a crest elevation of 323m, construction of a berm on the downstream slope of the southern dam at an elevation of 320m, construction of the distribution slurry pipelines, construction of four emergency tanks for receiving tailings slurry when the tailings line is required to be drained and expansion of the water decant system for the supernatant water in the water intake area.

The design report for the TSF expansion project to 2034 indicates a total capital cost of circa US$134M and includes construction of Cell 7-8 for TSF-1 (with minor works for Cells 3-4 and 5-6), construction for the cut-off, northern, eastern, southern and dividing dams of TSF-2 Cell 1 and, for TSF-2 Cell 2, construction for the western, northern and southern dams.

Within the design document, it is stated that "due to the acceleration of the commissioning of the processing capacities of GMZ-2 and GMZ-7, a shortage of useful capacities has formed at the existing tailings dumps of GMZ-2. ***By mid-2024, the currently created capacities will be completely exhausted***."

TSF-2 itself is located in an unpopulated desert area and reportedly employs an upstream construction method for additional raises.

The GMZ-2 plant elevation is at 600m, whereas the TSF-2 crest elevation is 323m, so that only gravity flow is required for tailings deposition, i.e., no pumping requirement. Tailings from both GMZ-2 and GMZ-7 are currently deposited into TSF-2 Cell 2.

The two cells of TSF-2 occupy a very large surface area of 22km^2 for Cell 1 and 23km^2 for Cell 2, for a total surface area of 45km^2.

In general, a 12m minimum beach distance is reportedly maintained from the embankment walls and monitoring is undertaken on a 24/7 basis.

There are two tailings pipelines in use to transport tailings slurry from GMZ-2 and GMZ-7 to TSF-2. There is an additional tailings line for use as a back-up when required. The tailings lines have a total length of 35km, and the steel pipelines are of 1,020mm diameter, supported on concrete blocks. The slurry flow of tailings is reported as 6,000m^3/h per line.

While the water requirements for GMZ-2 and GMZ-7 are provided by two water abstraction plants from the river, it is only in the last three years that actual TSF return water has been used to supplement the supply of water to the GMZ-7 plant only. A second return water pipeline is being constructed to supply return water to GMZ-2. It is reported that the high level of evaporation of the supernatant water prevented return water being pumped back to the process plants previously. The low level of return water has therefore been a consistent issue and impacted the importance of the water abstraction plants.

The water return system uses two pumps with a capacity of 700m^3/h. Approximately 15kg of gold monthly is produced from a dedicated RIP plant (Local Sorption Unit, or LSU) treating the dam return water. This plant is located before the second pumping station of Cell 1.

Spigots are used for slurry deposition into the Cells. The distribution pipelines are located along the Northern, Southern, Western and Eastern dams, as well as the dividing wall between Cells 1 and 2.

8.6 Besapantau Metallurgical Testwork

A report, dated April 19 2023, summarises testwork conducted on three samples from Besapantau. The samples are identified as TP K 810-1, TP K 7019-2 and TP K 385-3. The source, location and representativeness of these samples is not indicated. The assays for the three samples were 1.05 g/t, 0.95 g/t and 2.7 g/t Au respectively.

Diagnostic leach tests indicated the cyanide-leachable gold in the range of 88.6% to 91.1% and therefore can be considered as free-milling.

Gravity testwork on a laboratory Knelson Concentrator gave gravity recoveries ranging from 14.3% to 40.4%.

Cyanide leaching of the gravity tails gave extractions ranging from 82.4% to 89.6%.

In summary, the total gold recoveries achieved via gravity concentration and cyanide leaching of the gravity tails were as follows:

- TP K 810-1: 90.8%
- TP K 7019-2: 86.4%
- TP k 385-3: 91.1%

8.7 Low Grade Stockpiles

As of 1 January 2024, it is reported that there are **127Mt** of low grade stockpiled Mineral Resources (indicated and inferred) at an average grade of **0.46 g/t Au**, containing 1.9Moz of gold.

This section of the report briefly investigates possible processing options for these low-grade stockpiles.

8.7.1 Heap Leaching

Based on the regression equation developed from the existing Heap Leach plant production data, the gold recovery = (35.582 x Head Grade) + 31.882. Therefore, for the head grade of **0.46 g/t Au**, the estimated forecast recovery calculates as **48.3%.**

For a conceptual throughput of **11Mtpa** (the same as the current Heap leach operation for simplicity), the same operating cost can be assumed, i.e. **US$5.68/t** processed. This would provide a LOM of **11.5 years** based on the resource tonnes of 127Mt.

Using WAI benchmark data, the capital cost for an 11Mtpa Heap leach plant is estimated as **US$141M**.

8.7.2 CIL

Based on the reported "constant tail" value of 0.123 g/t Au for GMZ-2 (no regression equation was developed from the production data for GMZ-7 (CIL) due to the extended ramp up phase), for a head grade of 0.46 g/t Au, the estimated recovery calculates as 73.3% (GMZ-2 is an RIP process). The 2023 forecast recovery for GMZ-7 (CIL process) was 78.8% for a 0.45 g/t Au head grade. The GMZ-2 plant uses an RIP process, whereas the GMZ-7 plant uses the CIL process and was commissioned recently in 2020, although treating old heap leach tailings.
Therefore, for the head grade of **0.46 g/t** Au, an average of **76%** recovery is considered reasonable to use for comparative purposes.

For the conceptual throughput of **11Mtpa**, to compare with the Heap Leaching option above, the 2023 operating cost for GMZ-7 was **US$6.11/t,** based on the throughput of 15Mtpa. Therefore, for the throughput of 11Mtpa, a 5% increase in unit cost to US$6.41/t is assumed (based on benchmark data). However, an additional cost of US$1.0/t is applied to allow for the additional crushing circuit required for treating ROM ore, rather than heap leach tailings. Therefore, the total estimated operating cost is **US$7.11/t**. The same LOM of **11.5 years** applies.

Using benchmark data, the capital cost for an **11Mtpa CIL plant** is estimated as **US$334M**. It is assumed that the current TSF would be used for tailings storage. Based on the current plan to expand the existing TSFs to accommodate the tailings from GMZ-2 and GMZ-7 from 2024 to 2032 at a combined 65Mtpa and a LOM capital cost of circa US$134M, then for 127Mt of additional capacity and using the 6/10ths rule, a capital cost for the required TSF expansion of circa **US$54M** has been estimated. Therefore, the total estimated capital cost is **US$388M.**

8.7.3 Comparative NPV calculation

A simple comparative NPV calculation has been conducted to compare a new Heap Leach and CIL plant for treating the low-grade stockpiles using the parameters as described above. This simply considers the revenue for each option calculated from the respective tonnes, grade and recovery, using a gold price of US$1,650/oz. The operating cost is simply the tonnes multiplied by the respective $/t operating cost. The simplified annual cashflow is then calculated as process revenue minus process operating cost. A conceptual throughput of 11Mtpa applies to both options for a LOM of 11.5 years (the 12th year treats 7Mtpa for the total resource of 127Mt).

The ore rehandling cost is not applied as this is considered the same for both options (typically circa US$1/t). No other project costs are included as they are also assumed to be the same for both options.

A discount rate of 10% is assumed for both options.

Table 8.8 summarises the results of the simple comparative NPV calculation.

Table 8.8: **Comparative NPV Calculation**

	Heap Leach	CIL
Discount Rate	10%	10%
Total Capex	US$141.0M	US$388.0M
NPV	US$590.9M	US$1,231M

The result clearly indicates that a new CIL plant is a significantly better option than a new Heap Leach plant for processing the Low-Grade Stockpiles, based on the assumptions discussed above.

9 INFRASTRUCTURE

Muruntau and Mutenbai deposits have been developed since the 1960s, and as such all critical infrastructure facilities are in situ. Besapantau deposit is located close to GMZ-2 plant, on a direct line between Muruntau deposit and the plant and no additional infrastructure construction is needed for Besapantau development.

The Balpantau, whilst being located some 40km from Muruntau-Mutenbai and the GMZ-2 process plant, is operated as a satellite deposit with ore being direct-shipped to GMZ-2 via railway. Railway infrastructure at Balpantau is already in situ. Additional limited infrastructure facilities (workshops, storage, administration buildings) are also in place.

10 ENVIRONMENTAL, SOCIAL PERFORMANCE AND HEALTH AND SAFETY

10.1 Introduction

10.1.1 Scope of Chapter

This chapter reviews the Environmental, Social, Health & Safety aspects (ESHS) of the Muruntau Project, that includes several facilities listed below, operated by the Central Mining Administration, a division of Navoi Mining and Metallurgical Complex (NMMC JSC) 100% state enterprise. The context of this chapter is based upon a review of existing documentation, and site visit carried out by WAI in November 2023. The site visit included reconnaissance and meetings with some relevant on-site management and staff.

The Muruntau Project under consideration includes the following facilities that have been reviewed both separately and together in cases when either Central Mining Administration policies and procedures refer all facilities, or NMMC JSC policies and procedures address all units and departments of the NMMC:

- Muruntau deposit – open pit, mined since 1967;
- Mutenbai operating mine;
- Balpantau mine, commenced in 2023;
- Besapantau mine, awaiting commissioning;
- Low-grade stockpiles and heap leach tailings;
- Hydrometallurgical Plant No 2 (GMZ-2) located within the Bessopan industrial area;
- Hydrometallurgical Plant No 7 (GMZ-7) that processes the Heap Leach tailings; and
- Heap leach plant (HLP).

The review of environmental and social aspects has been completed to the extent of the data provided, as well as based on the information received during the site visit. Discussions were held with NMMC's ESG specialist; head of Central Laboratory for monitoring of working condition and environmental protection; H&S heads, and other personnel from various departments as well as publicly available data. The principal environmental engineer and environmental engineer from the Central Mining Administration were not available for discussions on site when WAI visited the Project facilities. The site visit included NMMC headquarters, Central Mining Administration, Muruntau pit, GMZ-2, HLP and Central Laboratory for monitoring of working conditions and environmental protection.

In general, this chapter briefly describes and addresses:

- Environmental setting;
- The status of current permits;
- Social context and community development;
- Waste and water management;

- Energy consumption and GHGs management; and
- Mine closure, remediation and reclamation.

10.1.2 Information Sources

The documents reviewed for the preparation of this chapter include:

- State Ecological Expertise Conclusion for the Maximum Permissible Emissions Design developed for Bessopan site dated 03.03.2021.
- State Ecological Expertise Conclusion for the Environmental Impact Assessment for the mine construction on the basis of the Balpantau and Tamdybulak deposits dated 02.04.2020.
- State Ecological Expertise Conclusion for the Environmental Impact Assessment for the construction of crushing and sorting plant and commercial mining of limestone at Bessopan for NMMC dated 08.04.2020.
- State Ecological Expertise Conclusion for the Environmental Impact Assessment for Mining of the Chukurkuduk Deposit dated 07.09.2020.
- State Ecological Expertise Conclusion for the Environmental Impact Assessment based on Technical and Economic Justification (TEO) for Chukurkuduk Deposit Mining, dated 19.06.2020.
- Statistical Reporting. Environmental Protection Report for 2022. Generation, use and disposal of waste.
- State Ecological Expertise Conclusion for the Environmental Impact Assessment for the Muruntau Open Pit Mining (Stage V) dated 15.10.2020.
- Information for Quarter I of 2023 of the 2021-2025 Environmental Monitoring Program Implementation based on the Provision to the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated 03.06.2021.
- Report for Quarter I on the Implementation of Environmental Protection Measures and Rational Use of Natural Resources as part of the Core Activity of the Central Mining Administration dated 02.04.2023.
- Report of the Environmental Protection Department of the Central Mining Administration for 2022.
- State Ecological Expertise Conclusion for Environmental Standards Design for the generation and disposal of waste, developed for the Besapan industrial site of the Central Mining Administration of the Navoi Mining and Metallurgical Combine. Dated 17 August 2018.
- State Ecological Expertise Conclusion for Environmental Standards Design for the generation and disposal of waste, developed for the Muruntau industrial site of the Central Mining Administration of the Navoi Mining and Metallurgical Combine. Dated 17 August 2018.
- Environmental Protection Measures and Rational Use of Natural Resources Plan of Central Mining Administration dated 07.01.2023.
- Schedule for checking compliance with legislative and regulatory requirements for environmental protection, waste management and ecology in the divisions of the Central Mining Administration for 2023 dated 07.01.2023.

- "Environmental Management System" Process Map dated 16.12.2022 and valid to 16.12.2027.
- Policy of the Central Mining Administration of JSC NMMC in the field of quality, ecology, health protection and occupational safety dated 03.10.2023.
- Sustainability GRI Report for 2021.
- SRK Re-Estimation of Ore Reserves for Muruntau, Mutenbai and Besapantau Deposits in Accordance with JORC Code, December 2019.
- Muruntau_JORC_2911 – Reclassification of Mineral Resources and Ore Reserves of Muruntau Ore Cluster in Accordance with JORC Code.
- Explanatory Note. Environmental Impact Statement Design. Chukurkuduk Deposit Development. Technical and Economic Justification, Book II, Central Mining Administration, NMMC, 2020.
- Explanatory Note. Environmental Impact Statement Design. Construction of the Mine on the Basis of Balpantau and Tamdybulak Deposits. Technical and Economic Justification, Book II, Central Mining Administration, NMMC, 2020.
- Condensed interim financial statements for the six months ended 30 June 2023 (unaudited).
- State Ecological Expertise Conclusion for the Environmental Impact Assessment from the construction of the HLP mineral waste mining and processing complex No. 18/1265z dated 9 November 2017.
- Central Mining Administration of the NMMC. Construction of Mineral Waste Processing Complex, Gold Heap Leach Pad. Chapter Environmental Impact Assessment. Environmental Impact Statement Design. Explanatory Note 12-M-PT-86742-PZ, 2018.
- Muruntau Pit Water Monitoring data on monthly basis from January to December 2023.
- GMZ-2 Air Monitoring Covering Letter.
- Air Monitoring Data (inorganic dust) for HLP on monthly basis from January to December 2023.
- Air, Noise and Vibration Monitoring Data at the Boundary of the Sanitary Protection Zone of Muruntau Mine on monthly basis from January to December 2023.
- ARO Calculation for NMMC Sites. SRK Consulting (Russia), 2020.
- TKOP_1.3_ARO_2023 vA_GMZ-2_GMZ-7_TSkvz Excel Spreadsheet.
- Final report on compliance of NMMC JSC with the Principles of Responsible Gold Mining and the International Cyanide Management Code, Navoi, Uzbekistan, SRK Consulting (Russia) Ltd, January, 2024.

10.2 Environmental Setting

10.2.1 Location and Access

Administratively, the Project including three gold deposits, three processing plants and a low-grade stockpile and heap leach tailings is located in Tamdymskiy district of the Navoi Region (Oblast). The area has a well-developed road network, and the sites are accessible all year round.

The Muruntau Mine is located 31km to the east of Zarafshan city with Navoi city 170km to the south-east. The nearest village to the mine is Muruntau located 2km to the north.

GMZ-2 is located 6 km to the west of the Muruntau mine at Bessopan industrial area. The nearest residential houses of Zarafshan city are within 21km to the west of Bessopan industrial area.

Navoi – Uchkuduk – Nukus highway passes 7km southwest of the Muruntau pit. And the nearest railway station is within 2.1km to the west of the combined Muruntau and Mutenbai operating pits. Besapantau deposit is located 6.5km to the north-east of Muruntau pit.

Gold heap leach plant is located to the south-west of the Muruntau pit and borders with the GMZ-2 stage I tailings dam in the south and GMZ-2 pulp line as well as with Navoi-Zarafshan road in the west, and the nearest settlement – Muruntau village – is within 8km to the north-east.

The Balpantau deposit is located 8km to the south-east of Tamby village and 27km to the north of Muruntau pit. The nearest settlements are Taiman village and Kiziktash village located 2km and 2.3km respectively from the Balpantau deposit.

There is an international airport in Navoi city and Zarafshan domestic airport located near Zarafshan city.

10.2.2 Historic Content

The Muruntau Project has a long history starting from the discovery of the Muruntau gold deposit in 1958.

The village of Muruntau appeared in 1959 as a settlement associated with the geological exploration at Muruntau deposit.

The city of Navoi was founded in 1958. It was created as a center of the mining industry for the extraction of rare earth elements, precious metals and uranium with the Navoi Mining and Metallurgical Combine HQ located there.

The Central Mining Administration and Zarafshan city were founded as a result of the Muruntau ore field discovery. The Central Mining Administration was founded in 1964. The construction of Zarafshan city began in the early 1960s, with 1965 considered the official founding year of the city. Initially, the city was built as the mine camp-town for workers servicing industrial gold mining facilities located at the Muruntau deposit and the Bessopan industrial area where the construction of the Hydrometallurgical Plant No. 2 (GMZ-2) started in 1967. In 1969 the GMZ-2 produced the first gold bar.

The Hydrometallurgical Plant No. 7 (GMZ-7) was commissioned in 2020 to process the tailings form the Gold Heap Leach Plant.

Now Muruntau cluster includes: Muruntau, Mutenbai, Balpantau, Besapantau and Chukurkuduk deposits and other nearest mines, hydrometallurgical plants, heap leach plant, Amudarya-Zarafshan water pipeline, and a railway.

Environmentally and socially, the area of the Cluster location has undergone significant changes for these 65 years, the details are provided in the relevant sections below.

10.2.3 Climate

The climate of the area is sharply continental, desert-arid with dry air and low amounts of precipitation (on average up to 110mm per year) with a predominance of winds from the northern and northeastern directions with an average speed of 2.4 – 3.6m/s. Strong winds in the desert are accompanied by dust and sandstorms. Winter is relatively cold, the average temperature in January is minus 8°C, summer is long and hot, the average temperature in July is plus 28-30°C. The mean annual temperature is +13.5°C with the absolute minimum of -26°C and maximum of +48°C. The duration of frost-free period is 200 days.

Mean annual amount of precipitation is 141mm that mainly falls during the cold period as a rain. The snow cover is variable with an average thickness of 4cm. Sometimes winters are snowless. The humidity levels are low. The evaporation exceeds the precipitation by 18 to 20 times in summer period.

Thus, the Project area is characterised by average wind velocity, low precipitation, and high warm season temperatures together with ground level inversion leading to increased natural dustiness.

10.2.4 Topography, Land Use and Land Cover

The Project facilities are located in the Central Kyzylkum mining region in the southern part of the Tamdytau mountains. The relief is a desert type with elevations from 10 to 150m at absolute elevations of 300 to 700m for different areas. Currently, the topography of the area has undergone significant changes as a result of anthropogenic impact. The main relief-forming units are the artificial pits of the Muruntau and Mutenbai. Dumps of waste rock, low-grade balance material, as well as other mining facilities also have a great influence on the formation of the relief.
In general, the Project facilities are located within the desert area, the surface is represented by typical soils of this region, namely highly gypsum-rich, saline, desert, sandy and gray-brown soils, poor in fertility elements, such as humus, nitrogen and phosphorus. The soil is structureless and loose. The natural conditions of the area are characterized by extreme aridity, which leads to the development of a very thin and vulnerable biological layer. The soil in the area of the Muruntau pit and relevant facilities are disturbed as a result of mining operations, including the storage of host rocks, low-grade material and the impact of vehicles.

The soil is used to a limited extent due to low fertility and lack of water. Thus, the lands are not suitable for agricultural use. Nevertheless, the lands around the Projects facilities are used as pastures by local people despite the lack of vegetation cover and water.

NMMC has provided the land use licenses for additional land withdrawn from the reserved pasture areas for the expansion of Muruntau and Mutenbai operations, dated 2017, in addition to historic land use licenses dated 1966 issued for NMMC that are considered to be valid as the validity timeframe is not identified.

10.3 Environmental Disturbance

10.3.1 Ambient Air Quality and Atmospheric Emissions

The main pollutants of the mining and processing activities are inorganic dust, SO_2, CO, NO_2. The national standards (maximum permissible concentrations) of the air quality are specified in SanPiN 0293-11 and shown below in comparison with international standards (WHO standards).

Table 10.1 Uzbekistani National vs WHO International Qir Quality Standards

Parameter	National Standards	International (WHO Guidelines)
Nitrogen Dioxide	40 µg/m^3 annual mean 60 µg /m^3 24-hour mean	10 µg/m^3 annual mean 25 µg/m^3 24-hour mean
Carbon Monoxide	3,000 µg/m^3 annual mean 4,000 µg/m^3 24-hour mean	4,000 mg/m^3 24-hourly mean
Sulphur Dioxide	50 µg/m^3 annual mean 200 µg/m^3 24-hour mean	40 µg/m^3 24-hour mean
$PM_{2.5}$	-	5µg/m^3 annual mean 15µg/m^3 24 hour mean
PM_{10}	50 µg/m^3 annual mean 300 µg/m^3 24-hour mean	15µg/m^3 annual mean 45µg/m^3 24 hour mean

Uzbekistan now is in the process of establishing legal limits of both $PM_{2.5}$ and PM_{10} with SanPiN 0293-11, which already includes standards for $PM_{10.}$ $PM_{2.5}$ standards have yet to be developed.

Considering the long history of mining operations within the Muruntau Project area, the air environment is deemed to have degraded over the life of mine. In addition, one more significant factor that affects the air quality is the short-term dust storms of the Kyzuylkum desert causing high concentration of solid particles in the air.

WAI has reviewed the provided information in relation to air quality and air emissions for the Project facilities with the details presented below.

Muruntau

The main sources of air pollution are drilling and blasting operations, mine fleet, low grade ore unloading area, area of the crushed ore unloading into conveyer, stripped waste loading sites, crusher chute (waste from the waste dam), loading and unloading areas, etc. as stated in the State Ecological

Expertise Conclusion. In total, there are 73 sources of emissions to air and 35 types of pollutants recorded at the Muruntau mine.

Balpantau

During Balpantau development and operation 19 types of pollutants from 11 emission sources (of which 9 are fugitive and 2 stationary) have been predicted. The main contribution will be made by emissions of inorganic dust (containing 20-70% SiO_2), nitrogen dioxide, sulphur dioxide, carbon monoxide, inorganic dust (containing less than 20% SiO_2), hydrocarbons, soot and nitrogen oxide.

Besapantau

The Environmental Impact Statement provides for the pit, stripping dumps, loading areas, a petrol station, a diesel generator as main sources of air pollution. The main pollutants are inorganic dust (containing 20-70% SiO_2), nitrogen dioxide, sulphur dioxide, carbon monoxide, inorganic dust (containing less than 20% SiO_2), hydrocarbons, soot and nitrogen oxide.

Hydrometallurgical Plant No. 2 (GMZ-2)

The GMZ-2 is located at the Bessopan industrial area that also holds the central repair workshop, central supply base, central instrumentation laboratory (instrumentation, control, and automation), quality control department, fleet storage and repair facility No.7, as well as tailings dam No.1 and tailings dam No.2.

The GMZ-2 comprises of six main processes, including:

- Coarse crushing,
- Ore-preparation,
- Grinding,
- Gravity,
- Sorption and regeneration, and
- Thickening with lime preparation and final product units.

The emissions to air are calculated and reported in the State Ecological Expertise Conclusion for all facilities of the Bessopan industrial area. The Conclusion indicates 33 types of emissions from 190 sources at the Bessopan industrial area, including 69 stationary sources of emissions and 121 fugitive that emit both gaseous and particulate emissions. The largest contribution to gross emissions comes from lime dust (53.7%), ore dust (21.6%), CO (6.1%), NO_2 (6.1%), SO_x (1.3%), inorganic dust (1.2%), and HCN (0.93%). The total amount of emissions into air from all sources is 6,926.204tpa.

Gold Heap Leach Plant and Hydrometallurgical Plant No.7 (GMZ-7)

In accordance with the Environmental Impact Assessment Design the main sources of emissions to air and air pollutants are as follows:

- Intermediate storage, where tailings dust and exhaust fumes emit into the air as a result of loading operations (from conveyor and into the vehicle);
- Cyanidation and sorption department – emissions of hydrogen cyanide and ferrous sulphate;
- Ferrous sulphate and polyacrylamide preparation units – emissions of ferrous sulphate and polyacrylamide;
- Desorption department – emissions of hydrochloric acid vapor;
- Lime milk preparation unit – emissions of lime dust;
- Express laboratory – emissions of hydrogen cyanide during analyses; and
- Analytical laboratory – emissions of acid and ammonia vapors and tailings dust.

Air Monitoring

Air quality is monitored at the sources of emissions and at the monitoring points of the sanitary protection zone.

There are 8 monitoring points at the sanitary protection zone of the Muruntau mine where dust (SiO_2 10-70%), NO and CO are measured and monitored. The 2023 monitoring reports at the SPZ provided for review showed no exceedances for 2023.

At the heap leach plant there are 7 inorganic dust emission sources that are monitored on the monthly basis. The 2023 monitoring reports were provided for review.

At Bessopan industrial area in total, there are 29 dust and gas treatment stations, some emission sources are equipped with scrubbers (18) for capturing ore and limestone dust, other sources – with froth gas treatment systems (3) to capture ammonia, sulfuric acid vapor, hydrogen cyanide, carbon monoxide, nitrogen dioxide, sulfur oxides and hydrochloric acid, and with cyclones for catching wood and lime dust (8). The maximum permissible emissions have been calculated for each source and approved by the Conclusion of the State Ecological Expertise. WAI understands that additional air treatment systems are proposed to be installed at Bessopan and air monitoring is carried out both at the sources of emissions and at workplaces. However, WAI was not provided with the air monitoring data to conclude on the efficiency of the implemented measures at GMZ-2.

Based on the discussions during on-site interviews air emission exceedances sometimes occur at the sources of emissions. These are dealt with through payments for emissions above limit values in accordance with the legislation requirements. Air quality monitoring at the low-grade stockpiles and GMZ-7 were not available for review. The Central Mining Administration does not monitor the air quality within Muruntau village.

10.3.2 Noise and Vibration

Noise monitoring is undertaken in accordance with the Sanitary standards for permissible noise levels in workplaces (SanPiN RUz No. 0325-16) and vibration is monitored in accordance with Sanitary standards for general and local vibration at workplaces (SanPiN RUz No. 0326-16).
The measurements of noise and vibration are carried out by the Navoi Laboratory for monitoring of working conditions and environmental protection.

The permissible limits for noise and vibration at the SPZ are 80dB and 84dB respectively. The monthly reports provided for the noise and vibration measurements at the SPZ (8 monitoring points) did not show exceedance of these levels.

In accordance with the information discussed during the site visit, the noise and vibration does not exceed 40dB within and outside the SPZ. Personnel working at the sources of noise and vibration are the main recipients of the impact. PPE is provided for all workers and visitors and mandatory to wear.

10.3.3 Water Resources

10.3.3.1 Surface water

The hydrographic network of the district area is very poor, there is no surface water within the Project areas and no irrigation networks or irrigated lands. However, short-term flows of water can be observed in spring.

10.3.3.2 Underground water

Hydrogeologically the region is located in the southeastern part of the Tambytau hydrogeological massif. The area has a developed free-flow aquifer complex of fissure-vein waters, confined to the metamorphosed sand-shale strata of Paleozoic rocks, complicated by numerous tectonic disturbances, fractured zones and faults. The depth of occurrence of fissure-vein water levels under natural conditions, depending on the relief, ranges from 44 to 97m (absolute elevations from +486 to +490m). The direction of movement is from north to south. The aquifer complex of fissure-vein waters is developed to a depth of more than 600m.

Favorable conditions for the accumulation of groundwater in Paleozoic rocks are the strong crushing of rocks into folds and the development of faults in them. In addition, the greatest amount of precipitation falls during the period of minimal evaporation, ensuring intensive filtration into fractured Paleozoic rocks. There is no groundwater within the site area. However, as a result of condensation of evaporation and filtration of losses from water-borne communications of industrial sites of the mining and metallurgical complex, the appearance of groundwater such as “perched” water is observed.

10.3.3.3 Water Supply and Disposal

Amudarya River is the main source of water supply of Muruntau Mine facilities and Bessopan industrial area facilities as well as Zarafshan city and Muruntau village. The water intake is carried out at the Dal' – Dal' point of Amudarya located in Sarymai village of Khorezmskaya Oblast 210km from Zarafshan city. This water is used for processing, irrigation, firefighting and drinking purposes.

Additional sources of water supply are Karak-ata, Zhingeldy, Yangikazgan ground water abstraction wells, Muruntau shaft water and Muruntau pit water that is collected and used as a process water. The water abstracted from wells is fully used by Bessopan industrial area facilities for dust suppression, bench faces irrigation, irrigation of dumps, and other domestic needs.

The source of water supply for the Balpantau pit facilities is the underground water of the Dzhengeldy aquifer; the distance from the pit to the water intake is about 35km. Part of the water from the Dzhengeldy underground water intake is supplied to a water treatment plant to produce drinking quality water. Drinking water is used for sanitary, household and drinking purposes.

WAI understands from the site visit discussions that there is a recirculated water supply system, no water/effluents are discharged into the environment.

There are no wastewater discharges into the water bodies, irrigation fields or other cesspools from the Central Mining Administration units.

The process water and effluents of all Bessopan industrial area facilities except for GMZ-2 TSF are discharged into the GMZ-2 effluent disposal line where in accordance with the Process Design Criteria the water is added to tailings pulp to facilitate the pulp transportation through the pulp pipeline and its spreading over the cells. This water accumulates in the settling ponds and then is pumped to the tailing's dams.

Effluents from the GMZ-2 TFS are pumped to an accumulation pond, the amounts of water are insignificant and evaporate due to the intensive evaporation. Thus, in accordance with the local legislation there is no need to approve the maximum permissible limits for such amounts of effluents.

Mine water from Muruntau shaft is pumped to an 'accumulation lake' followed by supplying Gold Heap Leach Plant with process water. Gold Heap Leach Plant effluents are also discharged to this accumulation lake for further use by Gold HLP and GMZ-7. The limits of water amounts used for the Project facilities are presented below in Section 10.6.

10.3.4 Biodiversity and Ecosystem Services

10.3.4.1 Protected Areas

The Project does not lie within a conservation area or National Park. Long mining history has already precipitated changes to the environment including landscape, flora and fauna.

10.3.4.2 Flora & Fauna

At Muruntau, including the Muruntau and Mutenbai pits, and the Chukurkuduk pit, the fauna is represented by species of mammals, birds and insect's characteristic of the Navoi region, adapted to the conditions of this region.

At the area of Balpantau deposit the fauna is represented by desert species, among which reptiles, rodents and birds predominate. The exploration carried out at Balpantau has a local impact on the fauna of the area and does not affect the number of species on a regional scale in accordance with the information derived from the State Ecological Expertise Conclusion for the Balpantau deposit. However, this should be monitored once mining operations progress. The predominant type of vegetation in the desert area is a community of gypsophytic subshrubs and shrubs - wormwood and saltwort. In addition, a significant role in the formation of soil cover and the degree of its fixation belongs to ephemerals and ephemeroids. There are no tree plantations.

Based on the data provided, there are no plant species listed in the Red Book of the International Union for Conservation of Nature and the Republic of Uzbekistan within the project area, and there are no measures aimed at preserving and protecting plants. No rare species of wild animals that are in danger of extinction or sensitive to the results of human activity have been recorded.

WAI is not aware of any Biodiversity Action Plans in place. However, in accordance with 2021 Sustainability GRI Report data NMMC developed a programme in accordance with the President's national initiative to safe the natural resources and environmental diversity "Yashil Makon" to make a significant contribution to the conservation of biodiversity and land restoration. As part of the project NMMC prepared an action plan for planting seedlings of trees and shrubs as part of the "Dolzarb 40 days" initiative.

10.3.5 Waste Management

Muruntau

During the development and operation of Muruntau pits the following types of waste are generated; overburden, ferrous scrap, oil wastes, worn-out conveyor belts, Hg-lamps, scrap tires, waste batteries, spent electrolyte, greased rags, scrap wood, worn-out overalls, domestic waste, and others. The design of environmental standards for waste generation and disposal states that in total there are 35 types of waste generated at the Muruntau mine including 2 types of the first class of hazard including spent Hg-lamps and fluorescent lamp; 5 types of the second class of hazard; 5 types of the third class of hazard; 9 types of the fourth class of hazard; and 14 types of the fifth class of hazard. In accordance with the data provided all wastes generated as a result of Muruntau mine operation are well managed and properly disposed. There is a landfill containing eight cells, six of them are for industrial waste disposal and 2 of them are for domestic waste disposal and serves Muruntau and Bessopan.

Balpantau

During Balpantau development and operation 20 types of waste will be generated from the 2nd to 5th classes of hazard. The waste of different types of hazards is temporarily collected within the Balpantau mine area and then sent for further disposal. The design does not envisage the collection of waste beyond the mine area. Thus, impact on soil and landscape is not expected.

Mutenbai and Besapantau

The State Ecological Expertise Conclusion for the Environmental Impact Assessment of Muruntau pit mining that also includes the development of Mutenbai and Besapantau pits as part of Stage V, summarises the requirements for NMMC to develop an Environmental Effects Statement separately for both Mutenbai and Besapantau including in relation to waste generation and disposal.

Hydrometallurgical Plant No. 2 (GMZ-2)

At the Bessopan industrial area where GMZ-2 plant is located there are 45 types of waste generated as a result of operations, including 6 types of the first class of hazard; 5 types of the second class of hazard; 5 types of the third class of hazard; 15 types of the fourth class of hazard; and 14 types of the fifth class of hazard. The State Ecological Expertise Conclusion identifies that waste is managed and disposed of in accordance with the requirements of the legislation in amounts calculated for a particular type of waste.

Gold Heap Leach Plant and Hydrometallurgical Plant No. 7 (GMZ-7)

The Heap Leach Plant and GMZ-7 produce the following types of waste:

- Final tailings;
- Treatment facilities residue;
- Screening waste (+10mm);
- Ferrous and non-ferrous scrap;
- Waste conveyor belt;
- Reagents containers;
- Waste PPE;
- Oily rags;
- Waste lamps;
- Food and household waste; and
- Sweepings.

Central Mining Administration submits the annual waste generation, reuse, and disposal statistical reports to the relevant authorities that includes the amounts of hazardous and non-hazardous wastes generated as a result of operation of CMA facilities. A copy of 2022 report was provided to WAI for review. The report contains information on amounts of waste stored, reused, and/or disposed both at the own CMA's waste storage/disposal facilities and transferred to specialist contractors.

WAI is not aware of any significant violations related to the accounting, storage and/or disposal of waste.

10.3.6 Cyanide Management

WAI did not conduct a cyanide audit as part of this study. Thus, this section briefly considered the information provided by NMMC in relation to environmental and H&S review. NMMC is not a signatory of the ICMC and, accordingly, has not undertaken any obligations to comply with the requirements of the ICMC.

However, NMMC commissioned SRK Consulting to prepare a Report on compliance of NMMC JSC with the Principles of Responsible Gold Mining and the International Cyanide Management Code with the final report issued in January 2024. SRK's report contains the findings related to cyanide handling, transportation, and management and concludes that the existing cyanide management systems are not effective enough to prevent all potential accidents, including:

- Insufficient volume of secondary containment tanks around the cyanide reservoirs;
- Insufficient training of workers;
- Insufficient safety procedures implemented for cyanide transportation;
- Lack of understanding of cyanide concentrations in various tailings zones; and
- Deficiencies in the performance of safety systems.

10.4 Social Setting

10.4.1 Communities and Livelihoods

The nearest settlement to the Project facilities is Muruntau village located 2 km to the north of the Muruntau pit.

Muruntau village was founded in 1960s firstly as a village of geologists and miners. There is small Solnechniy village close to Muruntau village. Now Muruntau village with about 5000 citizens is administratively subordinate to the town of Zarafshan, connected by bus service. Within the village there is a station on the railway line from the Kyzylkuduk station. The majority of local residents of both villages are Uzbeks; Russians, Kazakhs, Ukrainians and other nationalities also live in the village. Muruntau village has a music and secondary school, a medical centre, libraries, and a sports centre. Lands around the Project facilities are used as pastures by local people.

Notwithstanding general support of NMMC activities by people, there are some publicly available complaints posted by Muruntau village residents regarding the dust generated during blasts at the Muruntau pit.

Photo 10.1: Muruntau Village Viewing to the Muruntau Pit[3]

The other nearest settlements are Tamby, Taiman and Kiziltash located 8km, 2km and 4.8km respectively from the Balpantau deposit. However, neither Environmental Impact Assessment Designs nor public sources contain information on these settlements.

10.5 Energy Consumption and GHG Emissions Management

WAI understands that the Central Energy Operational Dispatch Service manages all energy supply facilities and monitors their operating modes. The energy departments and the Central Energy Operational Dispatch Service are accountable to the Chief Energy Engineer of the Company. The Company monitors the implementation of energy efficiency measures on an ongoing basis.

Using favourable climatic conditions and the potential of solar energy in Uzbekistan, NMMC has developed and implemented projects for the use of solar energy to provide hot water supply through solar power plants.

[3] Photo has been derived from the open source: https://commons.wikimedia.org/wiki/Category:Uzbekistan_photographs

Solar plants are used at NMMC facilities, in particular, they are operated by the Central Mining Administration being certified by ISO 50001 – Energy Management.

The NMMC uses solar power plants to generate energy. The energy generated from renewable energy sources is used only for the company's own needs.

In addition, NMMC has been monitoring the greenhouse gas emissions and conducting the qualitative evaluation of Scope 1 emissions from facilities of the company.

The main sources of direct GHG emissions (CO_2) are:

- Power plants that emit greenhouse gases when burning hydrocarbon fuels; and
- Engines of used vehicles that emit greenhouse gases during the internal combustion of gasoline, diesel fuel, compressed natural gas and liquefied gas.

In accordance with the 2021 GRI Sustainability Report Central Mining Administration of NMMC reported 626,930.4t of CO_2 with the reduction of 14,391t of CO_2 for all business units of NMMC comparing with 2020 data. Although CO_2 emissions are significant, WAI understands that NMMC is making efforts to reduce its carbon footprint.

Based on the information provided in the medium term NMMC plans to assess climate risks separately for each business unit with the consideration of climate change trends in the regions of its presence as well as estimate Scope 2 greenhouse gas emissions and is also conducting an inventory of suppliers and their greenhouse gas emissions records to calculate Scope 3 emissions.

10.5.1 General Housekeeping, Fire Safety & Security

General housekeeping at the visited areas is good and all the production facilities well maintained. The main problem is dust, especially at the pits, tailings dams and waste dumps. Dust suppression is carried out on a regular basis. However, due to the high evaporation and regional specific features described above, this does not address the dust issue much.

During the site visit the chief of the Central laboratory for monitoring of working conditions and environmental protection, informed that sulphate alcohol stillage was being tested as a dust suppression reagent in addition to water irrigation. However, the results showed negative efficiency. Moreover, in general there is a lack of water in the described area that can be sustainably used.

Fire safety at the Project is ensured by firefighting and emergency response personnel. There are fire trucks and all necessary firefighting equipment. All working premises at the Project facilities have primary firefighting devices such as dry powder fire extinguishers.

The security staff are in place to guard the facilities on a permanent basis; the security is provided by a contractor company.

10.6 Permitting

10.6.1 Environmental Impact Assessments (EIA)

The Project is subject to laws, regulations, guidelines, and standards of the Republic of Uzbekistan. The EIA procedure in Uzbekistan is carried out in accordance with Laws, Resolutions of the President of the Republic of Uzbekistan, Resolutions of the Cabinet of the Republic of Uzbekistan, guiding documents, standards, building codes and regulations, industry regulations, orders of the State Committee of Ecology of the Republic of Uzbekistan and regulated by:

- Law on the Ecological Expertise; and
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan, No. 541 dated 09.07.2020, 'On further improvement of the environmental impact assessment mechanism'.

In accordance with the Resolution indicated above, all facilities that have negative impact on the environment are divided into four categories based on level of impact:

- I category – high risk;
- II category – medium risk;
- III category – low risk; and
- IV category – local impact.

The majority of mining operations, including exploration, are referred to as I Category. Environmental impact assessments are carried out on a staged basis, where stage I is the Environmental Impact Statement Design. Stage II is the Environmental Impact Statement (carried out in cases when the Environmental Impact Statement Design does not fully reflect all possible effects on the environment and requires additional studies to allow the State Ecological Expertise make a conclusion on the impacts of the proposed activities). Stage III – Ecological Effect Conclusion is the final stage of the Environmental Impact Assessment (OVOS) for the proposed operations.

In accordance with the legislation of Uzbekistan Environmental Impact Statement Designs are developed for the facilities under construction and renovation; Ecological Effect Statement Designs are developed for the constructed facilities; and Ecological Standard Designs (MPEs, MPDs, MPWs) are developed for the facilities under operation.

NMMC has provided the Environmental Impact Statement Designs Balpantau and Chukurkuduk prepared in 2020, for Gold Heal Leach Plant (including Hydrometallurgical Plant No.7) dated 2018 and Muruntau Stage V dated 2018, as well as State Ecological Expertise Conclusions for the Environmental Impact Assessments and Ecological Standard Designs for the required Project assets under consideration as listed in 10.1.2.

The documents provided for review have been approved by the State Ecological Expertise and are valid, indicating the additional requirements to be completed by NMMC for compliance with the legislation, including the development of the mine liquidation and reclamation designs and more effective waste management.

10.6.2 Special Environmental Permits and Licenses

Central Mining Administration of NMMC has a special water use permit to consume water from the natural water sources, issued in July 2023 and valid till July 2028. Water sources listed in the permit are Amudarya river and hydro well to extract ground water. The water is used by the Central Mining Administration department as well as Zarafshan city and Solnechniy and Muruntau villages. The water from Amudarya is used for process, irrigation, fire-fighting and domestic and drinking purposes. The ground water from hydro wells is used for process needs including, ore processing, drilling muds in the pits, irrigation of in-pit roads, bench faces, waste dumps and loading sites as well as for domestic and drinking purposes of Bessopan area.

The special water use permit provides for the following maximum estimated amounts of water used by the Central Mining Administration by sources:

- Main surface water source (Amudarya river) – 105,173.11 thousand m^3;
- Underground water including wells total – 5,653.09 thousand m^3;
- Mine water total – 896.0 thousand m^3;
- Muruntau pit bottom water (ground water) – 535.0 thousand m^3; and
- Recycled water total (tailings dams, sewage systems) – 13,219.0 thousand m^3.

The total amount of water used from surface and underground water sources is 110,826.5 thousand m^3. The total amount of water in the recycling water systems is 113,123.0 thousand m^3, and proposed water amount used from surface and underground sources including the reuse of treated sewage water is 124,045.8 thousand m^3.

10.7 Environmental Management

10.7.1 Management Procedures & Staff

It is understood that environmental aspects of the assets under consideration are currently managed by Central Mining Administration located in Zarafshan city. The environmental department consist of a principal environmental engineer and an environmental engineer as well as two environmental specialists located at GMZ-2. There are no separate environmental specialists/ecologists at the mines.

Environmental engineers at the CMA are responsible for:

- Prevention, identification and control of violations of legislative requirements in the field of environmental protection and irrational use of natural resources;
- Monitoring the state of the environment, identifying situations that could lead to environmental pollution and irrational use of natural resources;

- Ensuring the effectiveness of environmental protection activities and determining compliance with environmental requirements of planned or ongoing economic and other activities; and
- As well as compliance with the rights and legitimate interests of the mine management, their fulfillment of responsibilities in the field of environmental protection and rational use of natural resources.

Air quality, groundwater, and soil quality monitoring is carried out by the Central laboratory for monitoring of working conditions and environmental protection opened in 1990 and accredited based on the legislation requirements of Uzbekistan.The laboratory measures noise and vibration, provides chemical analysis for 15 elements, conducts comprehensive and targeted testing as well as monitoring of groundwater, wastewater and other emissions.

The Project would benefit from employing more environmental specialists/ecologists who will be able to ensure ongoing day to day management, control and reporting of environmental issues at the sites.

10.7.2 Environmental Policy and Company Approach

Central Mining Administration Policy in respect of quality, environment and health and safety has been provided for review. The Policy presents the mission of the CMA, political, economic, social, and environmental priorities, strategic goals, particularly in the field of EHS to comply with the ISO international standards (e.g. ISO 14001:2015; ISO 45001:2018). The latest update of the Policy was made in 2022.

There is an Environmental Management System implemented at the Central Mining Administration of NMMC. WAI reviewed the Integrated Management System of Quality, Environmental Protection, and Health and Safety dated March 2023. The purpose of this integrated management system is to reduce the adverse impact of CMA’s activities on the environment; preserve biodiversity in the locations of CMA’s facilities and assets and conduct remedial and preventive measures to ensure the preservation of the regenerative abilities of the environment under the impact of mining activities.

All divisions of the Central Mining Administration are required to comply with legislative requirements for the protection of atmospheric air and soil, as well as for discharges, conduct environmental monitoring, adhere to waste generation standards, discharge, and emissions standards, and, in accordance with established plans and schedules, submit reports on the completed activities and carry out waste, discharges and emissions inventory.

WAI has reviewed the CMA’s Environmental Action Plan for 2023 that includes the list of measures for prevention of impacts on the environment including such aspects as water resources, air, land and soils, and industrial and domestic waste. In addition to the EAP, an environmental monitoring schedule is in place. This schedule lists the divisions of CMA and dates for the scheduled environmental control to be conducted.

10.7.3 Environmental Monitoring, Compliance & Reporting

Environmental monitoring, compliance and reporting is an integral part of international best practice standards. The Environmental Legislation of Uzbekistan provides for the users of natural resources to undertake industrial environmental monitoring to obtain environmental quality indicators and ensure the compliance with the environmental requirements.

WAI has reviewed the provided QI 2023 Environmental monitoring report. The program includes monthly monitoring of air (including dust content, pollutants, radiation), quarterly monitoring of discharged water, monitoring of soil twice a year, and monthly ground water monitoring. The QI 2023 report confirms that the facilities of the Project do not exceed established emission limits.

In addition, WAI has reviewed an internal 2022 Environmental Control Report describing the activities carried out for 2022 in the field of environmental protection, namely the measures implemented to reduce emissions to the air, water treatment improvements, dust suppression. WAI is in opinion that satisfactory work is conducted, however, some violations related to the environmental protection, such as proper waste distribution and disposal, timely elimination of spills, etc. can be avoided by hiring additional on-site environmental specialists (ecologists).

10.7.4 Training, Emergency Preparedness and Response

The Central Mining Administration holds a formalised policy on Emergency Preparedness and Response. Emergency department develops and updates the Emergency Response Plan for containment and elimination of accidents, conducts trainings and examines employees, as well as carried out the emergency risk assessment. The Emergency Response Plan for containment and elimination of accidents is developed for the period of 3 years and amended immediately if required in accordance with the legislation requirements or any updates implemented to the production processes.

Emergency training is conducted according to an approved schedule to meet the objectives of building capacities and preventing accidents at the site. WAI reviewed the personnel records during the site visit and there are sound reasons to believe that the training has been carried out at a high level.

10.8 Social and Community Management

10.8.1 Stakeholder Dialogue and Grievance Mechanisms

WAI understands that NMMC activities are well accepted by the communities that surround the operations. The NMMC operations are considered to be major employers and taxpayers.

The stakeholders are mapped and engaged to the extent required by the legislation of Uzbekistan.

Broadly, a grievance mechanism is implemented at NMMC. The Community Appeals Department of NMMC is responsible for handling the complaints, requests and appeals from the local communities. The following ways of the community outreach are implemented:

- Community outreach at the sites of operation;
- Office meetings;
- Virtual reception; and
- Doors Open Day.

There are monthly meetings with the general director and/or specialists of the Corporate Social Responsibility department carried out for the representatives of the local communities to inform on the updates of the NMMC operations as well as to address the concerns and queries.

The individual and collective appeals submitted are handled within 15 days with the answers published on the NMMC website or provided via telephone as required by the Uzbekistani legislation.

The NMMC has a Gender Council responsible for gender equality awareness building. There are meetings held separately for women. Based on the information provided during the on-site discussions, a program aimed at female employees of the company was drawn up at the beginning of 2023.

There are no known social or community relations issues that would adversely impact the NMMC.

10.8.2 Social Initiatives and Community Development

NMMC and Central Mining Administration supports the adjacent communities by providing jobs and vocational training as well as contributes to maintenance of the local infrastructure and the welfare of its employees, including contributions to development and maintenance of housing, hospitals, transport services, recreation and other social needs in the geographical areas in which it operates.

The total amount of social commitments of the Company July – November 2023 comprised USD 17 million, all of which have been paid in accordance with the data presented on the website of the NMMC.

10.9 Health and Safety

Health and Safety culture at the visited facilities is to a good standard, as witnessed by WAI. All facilities are equipped with the appropriate signage, employees wear appropriate PPE. All new employees and visitors of the facilities complete a health and safety induction. Refresh trainings take place every week for technical engineering personnel and mine workers.

Health and safety aspects are controlled by a H&S department as well as the Central laboratory for monitoring of working conditions and environmental protection. The H&S department is responsible for training on probation, H&S aspects trainings, annual knowledge checks of employees, daily inductions, PPE requirement compliance, accreditation of employees, fire safety inductions, risk assessments, development and implementation of safety measures. And the Central laboratory for monitoring of working conditions and environmental protection controls healthy workplace conditions and measures noise, vibration, radiation levels, emissions to air at the workplaces, as well as other parameters required by the legislation of Uzbekistan.

Accidents and incidents are recorded in accordance with the legislative requirements.

10.10 Mine Closure and Rehabilitation

The Unified Rules for Mineral Deposits Development of Uzbekistan indicate general requirements for closure or care and maintenance of mining facilities with the development of “Special Design” developed by the subsoil user that should be prepared once mining is completed or considered impractical or impossible, and prior closure or care and maintenance activities, and approved by the relevant authorities.

Subsoil Use Law of the Uzbekistan No. 2018-XII also stipulates the requirement for Mine Closure or Care and Maintenance activities to be completed in the following cases (Article 31):

- “expiration of the terms of subsoil use;
- early termination of the right to use subsoil;
- depletion of on-balance resources of minerals in the absence of prospects for their increase and the impossibility of involving off-balance resources into exploitation;
- economic inexpediency of further development of the deposit or its section; and
- the emergence of a threat of flooding or destruction of mine workings, as well as underground structures not related to the extraction of mineral resources, the prevention of which is technically impossible or economically infeasible, etc.”

Environmental Protection Law of Uzbekistan No.754-XII provides for the reclamation of lands distributed during mineral resource development (Article 18).

In addition, State Ecological Expertise Conclusion for Muruntau Stage V OVOS contains the requirement to develop a program for disturbed lands reclamation and approve it with the Ecological and Environmental Department of Navoi Oblast as well as submit it to the State Ecological Expertise as part of an Environmental Impact Statement.

In 2020 NMMC commissioned SRK Consulting to develop the Asset Requirement Obligations (ARO) cost estimates for the NMMC assets. In addition, there is a separate ARO cost excel spreadsheet developed for GMZ-2 and GMZ -7 and the Gold Heap Leach Plant that includes the 2023 updated closure costs for these three assets.

However, in accordance with best practice in mine closure, planning as early as possible is considered crucial because it outlines the strategies and procedures for safe closure as well as ensures mitigation of environmental impacts, addresses social concerns and responsible management of post-mining monitoring. In addition, this process contributes to regulatory compliance and provides framework for effective communication with stakeholders, fostering transparency and accountability. Mine Closure and Rehabilitation plans for the facilities under consideration have not been developed yet.

11 ECONOMIC ASSESSMENT

11.1 Foreword

The economic evaluation undertaken by WAI is based on the limited capital expenditure (both sustaining and developmental) data provided by the Client. As such, all presented conclusions are based on the financial results generated by the data accessible to WAI at the time of writing.

11.2 Methodology

A Discounted Cash Flow (DCF) economic analysis has been undertaken to estimate Net Present Value (NPV) on invested capital, and annual cash flows. The majority of the costs were provided by the Client in Uzbekistani Som (UZS), with all financial results being reported in US Dollars (US$ or USD) at a conversion rate of 12,000 UZS/USD.

The results of this economic analysis are derived from forward looking information. The results depend on inputs that are subject to unknown risks, uncertainties, and other factors that may cause actual results to differ materially from those presented in this analysis. Information that is forward looking includes Ore Reserve Estimates, commodity prices, the proposed production schedule, projected recovery rates, and proposed capital and operating cost estimates. Although total costs are inclusive of total mined tonnage, revenues have been generated based on indicated ore reserves only, owing to a current lack of geological confidence in the inferred ore reserves.

The Financial Model has been developed on a post-tax basis, and covers 33 operational years for the Muruntau pit, 27 years for Mutenbai, 15 years for Besapantau and 16 operational years for the Balpantau pit. Currently, no years have been included for closure and reclamation following asset depletion.

In line with industry standards, the DCF analysis has been undertaken using a discount rate of 10%.

11.3 Summary of Production Schedule

The total LOM production across the four analysed pits is 1,614Mt of (Probable) Ore Reserves, with an average fresh ore grade of 1.08g/t Au and an average oxide ore grade of 0.91g/t Au. Based on an estimated average metallurgical recovery rate of 89.02% for fresh ore and 62.6% for oxide ore, and WAI's updated LOM production schedule, the total estimated contained indicated Au recovered is 48.8Moz of which some 83% is attributable to the Muruntau pit.

11.4 Commodity Prices

WAI has used a flat (real) gold price of US$1785/oz. This long-term real price has been derived from an average of market sources (Table 11.1). The gold price has risen by 13% since the start of the calendar year at the time of writing. Coupled with the recent price hike, long-term gold price forecasts, such as the forecasts published by Edison Investment Research (Table 11.1), also appear to be trending higher. As such, WAI is confident that the pricing used in the economic analysis is conservative.

Table 11.1: Long term Gold Price Forecasts (Source: Edison Investment Research)

Year	Unit	Forecast Real 2023 US$ terms	Forecast Nominal US$ terms
2024e	US$/oz	1,822	1,896
2025e	US$/oz	1,851	2,004
2026e	US$/oz	1,869	2,105
2027e	US$/oz	1,912	2,239
2028e	US$/oz	1,722	2,098
2029e	US$/oz	1,596	2,023
2030e	US$/oz	1,725	2,274

11.5 Economic Evaluation

The Muruntau cluster has been analysed using Discounted Cash Flow (DCF) analysis, with a 10% discount rate applied to future estimated cash flows throughout the life of the mine. The economic assessment generated a positive, post-tax NPV of US$7,842M. As there is no significant capital outlay, it was not possible to generate a significant IRR. A summary of the economic validity of the model, broken down on a pit-by-pit basis, is outlined in Table 11.2. Note that the NPV of US$7,842M in the table below includes centralised costs that are not included in the equivalent calculations for the individual pits.

Table 11.2: Summary of Economic Analysis

	Discount Rate	Value (US$M)
Muruntau Cluster	10%	7,842
Muruntau	10%	6,670
Mutenbai	10%	524
Besapantau	10%	464
Balpantau	10%	382

12 ORE RESERVE STATEMENT

The Ore Reserve Estimates for the Muruntau Cluster gold deposits have been classified and reported in accordance with the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code 2012 Edition).

The Ore Reserve Estimates, with an effective date of 01 January 2024 are listed in Table 12.1. The stated results are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, to the best knowledge of the authors. There are no known mining, metallurgical, infrastructure, or other factors that materially affect the preliminary Ore Reserve results, at this time.

Table 12.1: Ore Reserve Estimate for the Muruntau Cluster, WAI, 01 January 2024

Deposit	Class	Tonnes (Mt)	Grade (g/t Au)	Contained Au	
				(Moz)	(t)
Muruntau	*Proven*	-	-	-	-
	Probable	1,210	1.09	42.3	1,316
	Total	**1,210**	**1.09**	**42.3**	**1,319**
Mutenbai	*Proven*	-	-	-	-
	Probable	92.8	0.99	3.0	92.1
	Total	**92.8**	**0.99**	**3.0**	**92.1**
Besapantau	*Proven*	-	-	-	-
	Probable	62.1	0.98	2.0	61.0
	Total	**62.1**	**0.98**	**2.0**	**61.0**
Balpantau	*Proven*	-	-	-	-
	Probable	37.5	1.05	1.3	39.3
	Total	**37.5**	**1.05**	**1.3**	**39.3**
Stockpiles	*Proven*	-	-	-	-
	Probable	33.5	0.54	0.6	18.1
	Total	**33.5**	**0.54**	**0.6**	18.1
Total	*Proven*	-	-	-	-
	Probable	1,436	1.06	49.2	1,527
	Total	**1,436**	**1.06**	**49.2**	**1,527**

Notes:

1. Ore Resources have been classified and reported in accordance with the guidelines of the JORC Code (2012);
2. The effective date of the Ore Reserve Estimate is 01 January 2024;
3. Ore Reserves are reported at an operational cut-off grade of 0.5g/t Au for Besapantau, Balpantau, Muruntau and Mutenbai.
4. Ore Reserves are limited to $1,650/oz optimised open pit shells based on appropriate economic, mining and processing parameters;
5. Mining, processing and administrative costs are estimated based on actual costs;
6. Ore Reserves have been reported at 100% ownership; and
7. All figures are rounded to reflect the relative accuracy of the estimate. Numbers may not add due to rounding.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 Overview

The Muruntau Cluster comprise three open pit operations with a combined Ore Reserve Estimate in excess of 1.5Bt of ore containing some 49Moz of gold metal, and with an estimated NPV_{10} in excess of US$7B.

The Muruntau-Mutenbai mine is a large-scale modern mine and includes a low grade, bulk tonnage open pit using CIL and Heap Leach processing.

Accordingly, based on both the audit of available data and site visit, WAI is of the opinion that appropriate systems are in place in terms of mine optimisation, design, scheduling and modifying factors to allow an Ore Reserve Estimate to be declared for the Muruntau Cluster.

13.2 Geology & Mineral Resources

13.2.1 Conclusions

WAI has audited Mineral Resource estimates for the Muruntau, Mutenbai, Besapantau and Balpantau gold deposits, located within NMMC's Muruntau Cluster. The Chukurkuduk deposit was excluded from this study pending the results of ongoing verification drilling.

The Muruntau Cluster is located within the Kyzyl Kum Gold District of Uzbekistan, in the western portion of the Southern Tien Shan orogenic belt. Gold mineralisation is hydrothermal and controlled by complex vein arrays and stockworks, commonly developed sub-parallel to bedding in the folded and faulted Middle to Lower Besopan host metasedimentary sequence.

Mineral Resource estimation was completed by NMMC using drillhole databases and geological models developed by the NMMC geology team and its subcontractors. The audit process included a feedback loop, whereby any issues or improvement opportunities identified by WAI, could be addressed by NMMC in the final models prior to reporting the audited Mineral Resource statement. Optimised pit shells used to constrain Mineral Resource reporting were generated by WAI based on parameters provided by NMMC.

The WAI audit identified a range of data quality issues around analytical accuracy and precision, incomplete QAQC coverage and protocols, definition of dry bulk density and historic drill sample recovery. These issues have been in part mitigated by improved practices and performance in recent years, alongside the verification and selection of a subset of the drillhole databases deemed appropriate for modelling and estimation.

Mineral Resource estimates were primarily based on diamond drilling, with lesser amounts of reverse circulation drilling, underground sampling and trench sampling. Grades were estimated into a block model representing each mineralised domain. Grade estimation was carried out by ordinary kriging, with estimated grades validated globally, locally and visually. Mining, processing and long-term price assumptions were used to report the proportion of the block models that could reasonably be expected to be economically mined, using a 0.3g/t Au cut-off grade within the optimised pit shells.

Reconciliation is a key tool to assess the overall materiality of any residual database errors and estimation errors associated with the current estimation approach and data spacing. Comparison of the Resource and grade control models over annual production volumes for Muruntau and Mutenbai demonstrate that tonnage, grade and metal variance is typically significantly below the ±15% industry standard benchmark for Indicated Resources. The Besapantau and Balpantau deposits are characterised by more discrete mineralised zones with greater spatial complexity. Based on initial grade control drilling and reconciliation results, the closer drill spacing and higher proportion of recent drilling at these deposits appears sufficient to support Indicated Resources, however this should be re-evaluated as mining progresses and more grade control data becomes available.

The global audited Muruntau Cluster Mineral Resource stands at 3,995Mt at 0.89g/t for 113.6Moz. All deposits are open for expansion along strike and/or at depth.

WAI makes the following recommendations:

13.2.2 Exploration and Drilling

- Continue investment in exploration and resource development drilling to unlock the significant potential for further Mineral Resource and Ore Reserve growth;
- Align the drill plan and schedule with a strategic life of mine plan that integrates all available ore sources;
- Investigate the use of wedge holes to reduce drilling costs and increase drilling efficiency at depth;
- Restrict roller drilling or other open hole sampling methods to first pass reconnaissance drilling only; and
- Stagger Muruntau advanced grade control drilling between existing diamond drill sections to reduce data duplication and increase the density of the ultimate combined drill grid.

13.2.3 Logging, Sampling and Analysis

- Complete recovery logging and/or collect sample weights to monitor RC drill sample recovery;
- Improve logging consistency by introducing a simplified/streamlined logging code library (where appropriate) and validating logs on a hole-by-hole basis against existing drillholes and geological models;
- Complete targeted re-logging campaigns in regions where oxidation, lithology or structural modelling is inhibited by conflicts in the existing drillhole logs;
- Introduce an electronic field data capture system for more secure and efficient data collection, in-built validation protocols and rapid database and model updates;

- Trial systems (e.g. televiewer vs. core orientation) to collect oriented structural data for select drillholes to aid mineralisation modelling and exploration drill planning;
- Collect routine dry bulk density measurements to develop a density database that captures the spatial and geological variability across all deposits;
- Increase fire assay precision to 2 decimals via improvements in the existing gravimetric measurement technique or introduction of an ICP-MS finish;
- Reduce risk of misclassification at the domaining and reporting cut-off grade, by lowering the gamma activation analysis grade threshold for completion of Muruntau-Mutenbai fire assays. Consider analysing all Besapantau and Balpantau samples via fire assay;
- Introduce a certified reference material close to the domaining and reporting cut-off grade. The lowest grade certified reference material in regular use is currently 0.97g/t Au;
- Expand the QAQC protocol to include a field duplicate, coarse duplicate and coarse blank;
- Complete external check assays (pulp duplicates) at a certified commercial laboratory;
- Optimise QAQC insertion rates such that CRM, blank and duplicate samples have individual insertion rates around 5%;
- Routinely monitor and investigate any QAQC failures. Batches where a QAQC failure cannot be attributed to a sample switch or mislabelling, should be reanalysed until it passes QAQC checks;
- Introduce a Laboratory Information Management System for electronic sample labelling and tracking;
- Review and optimise the flow of samples between laboratory stations to minimise sample movement; and
- Complete a further independent laboratory audit using a commercial service provider.

13.2.4 Data Verification

- Complete the ongoing verification programme for Chukurkuduk, to enable the definition of additional Mineral Resources and Ore Reserves within a combined Muruntau-Mutenbai-Chukurkuduk open pit;
- Further verification drilling should also be completed across any Muruntau Cluster Resources informed only by historic drilling, to check the reliability of this data. Areas should be prioritised / scheduled according to the strategic life of mine plan;
- Complete twin drillholes across all generations of drilling that form a significant proportion of the drillhole database for each deposit; and
- Include results of QAQC and data verification in the NMMC Mineral Resource report.

13.2.5 Mineral Resource Estimation

- Generate and actively maintain oxidation models for all deposits as logging coverage allows;
- Generate and actively maintain detailed lithological-structural models for all deposits as logging coverage allows;
- Use geological models and expanded density database to refine block model density assignment;

- Routinely review and optimise mineralisation domains based on comparison with the grade control data;
- Routinely review and optimise capping parameters by estimation domain, informed by comparisons with grade control modelling and production data where available;
- Develop unique variogram models per grade envelope split within a given ‘structural zone’ i.e. regions with consistent orientation, consistent geological characteristics and split at fault block boundaries;
- Consider refining kriging parameters by aligning search anisotropic ratios with the geometric anisotropy identified in the variogram model, using Kriging Neighbourhood Analysis (KNA) to optimise minimum and maximum sample numbers and developing unique search parameters per estimation domain;
- Include domain coding in all model exports to assist independent validation checks;
- Include declustered average grade in domain statistical comparisons;
- Develop a reconciliation system across the mining value chain, prioritising the collection of data to compare models to plant production. In addition to annual comparisons, reconciliation results should be generated over quarterly and monthly production volumes;
- Balpantau and Besapantau classification should be reviewed as mining advances and reconciliation data becomes available. Areas where reconciliation is below benchmarks, should be downgraded pending further infill drilling;
- Investigate the impact and validity of classification approaches independent of estimation pass, to avoid the ‘spotted dog’ effect evident in some parts of the deposits;
- Complete a simulation-based drill spacing study to further test / optimise the existing classification approach and drill spacing requirements; and
- Routinely survey and code depletion, stockpiles and waste dumps into the Muruntau Cluster block models during each model update.

13.3 Mine Planning & Methods

The Muruntau Cluster consists of three open pits for which an Ore Reserve Estimate has been prepared based upon various modifying factors such as gold price, process recoveries, geotechnical parameters, costs and estimates, dilution, ore loss, as well as additions and subtractions due to exploration and depletion.

The Ore Reserve has been defined by conducting a pit optimisation process, using defined parameters. This will provide a series of nested pit shells against which the existing open pit designs can be assessed for suitability as the basis of mine design and scheduling.

Pit optimisation is a recognised technique by which different open pit shells may be generated, based on a supplied geological resource block model and user-defined economic and operating parameters. WAI carried out the optimisation works using industry recognised Datamine NPV Scheduler software which offers various facilities for mine scheduling and optimisation of the pit shell extents.

The parameters utilised for optimisation result in a theoretical (calculated) ore cut-off grade for material sent to the CIL process plant of between 0.2-0.35g/t Au. Operationally, the mine uses a mill cut-off of **0.50g/t Au** and as such this operational CoG has been utilised to derive the Ore Reserve Estimate.

The mining schedules for the Muruntau Cluster were created using Datamine Studio NPVS. The scheduling process consisted of developing a mine plan using WAI created pushback designs within the overall pit designs supplied by Navoi.

The mining schedule utilised to produce the Ore Reserve Estimate includes Measured, Indicated and Inferred Mineral Resources as plant feed, however the associated financial evaluation considers revenue only derived from Measured and/or Indicated (which are converted to Proven and Probable Reserves), and applies a waste mining cost to the Inferred material.

The Muruntau Cluster open pit mines are operated as a conventional truck and shovel mine using face shovels and backhoe excavators to load ore and waste to a mixed fleet of 130t, 180t and 220t Class haul trucks of various manufacture. All ore and waste material requires drilling and blasting. At Muruntau, an inclined conveyor is also used for material movement in addition to haul trucks.

Ore is transported to ROM pads adjacent to open pits and either stockpiled for blending purposes or transported via railway to the crusher at the GM2, GM7 or Heap Leach facilities. Waste is transported to waste rock dumps (WRDs) which are extensive and located around the perimeter of the pits.

Working bench height varies between 15m at Muruntau-Mutenbai, and 5m-15m at Balpantau and Besapantau, whilst final benches are 30m in height.

The Muruntau-Mutenbai mine is currently operating at rate of 105Mm^3 total rock movement per annum. Besapantau is operating at a rate of 5Mtpa ore and 39Mtpa total rock, whilst Balpantau extracts some 3Mtpa ore from a maximum of 20Mtpa total rock.

13.4 Geotechnics

The below figures and tables detail an independent analysis by WAI, comparing the overall slope angle of the most up-to-date wireframe of each open pit provided by the Client with data extracted from the 2021/2022 SRK Consulting report for Muruntau/Mutenbai, and the 2020 VNIMI Institute report for Besapantau.

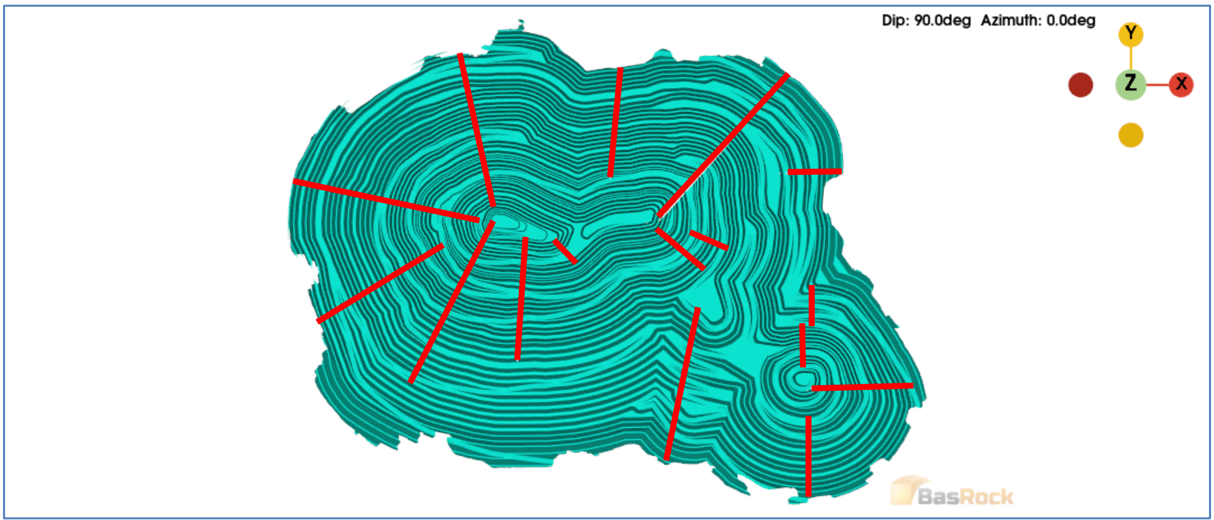


Figure 13.1: Muruntau/Mutenbai Wireframe Model with Domain Measurement Locations

Table 13.1: Inter-Ramp Angles taken from GEM4D			
Domain	**Slope Azimuth (°)**	**IRA VNIMI (°)**	**IRA GEM4D (°)**
D_NW	168 (150-190)	40.5	34.9
	103 (90-150)	36.9	33.9
D_N	184 (180)	40.5	37.7
D_NE	222 (220)	40.5	29.6
	300 (300)	38.9	36.8
D_E	180 (180)	42.3	26.0
	269 (270)	40.5	29.0
	294 (300)	42.3	28.3
D_S	0 (0-10)	36.9	29.0
	12 (10)	36.9	21.2
	179 (180)	45.7	39.5
	269 (270)	42.3	29.5
D_W	60 (60)	38.9	32.2
D_C	5.5 (10)	38.9	33.2
	28 (30)	36.9	32.6
	324 (330)	45.7	42.6

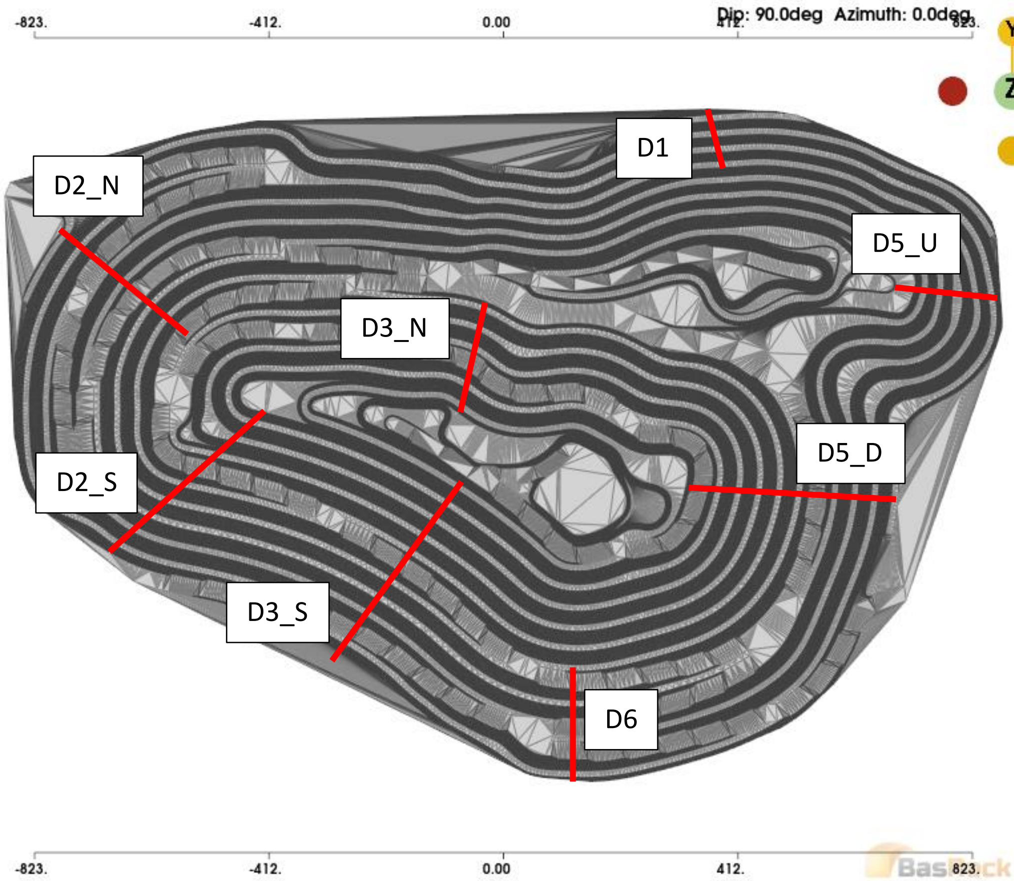


Figure 13.2: Besapantau Wireframe Model with Domain Measurement Locations

Table 13.2: Inter-Ramp Angle Comparison from VNIMI and GEM4D			
DOMAIN	**SUB-DOMAIN**	**IRA (FoS = 1.5) °**	**IRA GEM4D °**
D1	D1	44	43.97
D2	D2_N	37 – 51	32.09
	D2_S	37	34.31
D3	D3_N	37 – 51	34.3
	D3_S	37 – 51	36.45
D5	D5_U	37 – 51	36.56
	D5_U	33 – 51	43.55
D6	D6	33 - 51	28.14

In conclusion, considering the amount of detail within the SRK Consulting study of the Muruntau/Mutenbai deposits, WAI has reasonable confidence in the values produced as part of the SRK reports. Analysis of the available Besapantau wireframe model shows that the values of the slopes of the domains specified within the VNIMI Institute report are less than those recorded by VNIMI accounting for any uncertainty and increasing safety of the slopes. The value of 41° for the Balpantau open pit, upon comparison with the latest wireframe model, is considered a suitable value for ore reserve estimation until such time that geomechanical data can be determined for this open pit, on the understanding that the lack of background data specific to this deposit results in an elevated risk profile.

13.5 Hydrogeology

13.5.1 Hydrogeology Characterisation and Conceptualisation

The data quality is poor by modern mining standards. The key issues being:

1. The level of characterisation is weak, at Muruntau one dedicated groundwater well has been installed. The last water wells to be drilled were at Besapantau were put in before mining began, approximately 30 years ago and may no longer exist. Only one well was installed in the 2016-2018 hydrogeological programme at Muruntau although this was a stated objective of the work.
2. Although recorded inflow rates in Shaft M so far have proved manageable and the overall hydrogeology of the region appears to be of low to moderate conductivity and recharge, the absence of effective monitoring means that the ability to make predictive assessments is very limited. For example, the absence of piezometers means the drawdown influence from Shaft M is unknown. In the Boltabaeva, 2018 report this is referred to as a 100m drawdown and in the Besamptau report it is referred to as a 300m drawdown. It is concluded that both are speculative and actual groundwater compartments, hydrostatic heads, pressures and inflows to the underground mine are at the moment unknown and uncertain.
3. Recent work by Boltabaeva, 2018 is derivative based on secondary data. Typically for a mine of this scale with moderate groundwater potential it would be expected to see a minimum QA/QC set of packer test results, piezometry, water level monitoring, down hole geophysics, installation of Vibrating Wire Piezometers (VWP), and where conditions permit, longer-term pumping and recovery tests with observation networks.
4. The treatment of risk-drivers associated with water chemistry, radionuclides and other hydrogeochemical elements is inadequate.

13.5.2 Current Groundwater Control

The dewatering system is currently effective but as to whether it will be suitable for future expansion or mine deepening stages is unknown. The reporting is ambiguous in that it says flows are stable but also state flows have increased 36% in the two years 2016 to 2018. Detailed up-to-date records of inflows have not been seen.

The shape of the drawdown influence zone induced by Shaft M is unknown. A more thorough analysis of Shaft M would seem advisable to determine its zone of influence. Boltabaeva, 2018 comments that ".. tectonic zones with a sublatitudinal strike (i.e. east to west) with a dip to the north, have the highest degree of water conductivity. Such zones are located predominantly across the direction of movement of groundwater flow (north to south) and cannot serve as transit routes from the recharge area (watershed of the Tamdytau Mountains) to the discharge area (artesian basin); most likely, overflow can occur along them into deeper zones of fragmentation of the Palaeozoic aquifer complex. Thus, when developing the Muruntau deposit to deeper horizons, significant water inflows from fault zones and interfault rock blocks are possible (up to 10 l/s)."

This statement is a concern because the source of the data to substantiate this model is not provided although it states clearly that significant water inflows from fault zones are possible.

13.5.3 Future Inflows

The suggested model and approaches to groundwater control (the anticipation of high flow zones, use of probe relief holes and a separate western system to account for compartments) may be correct but is not sufficiently substantiated by data recordings, analysis and modelling to be taken as reliable. There needs to be a carefully considered programme of hydrogeological investigation, analysis and modelling in order to be able to design a system with suitable capacity for the range of future flows that could be encountered.

The last three evaluation points in Section 6.1.1. cannot be verified at present without further testwork and analysis.

Also importantly is the view by Boltabaeva (2018), that water quality will likely deteriorate with deepening and expanding of the mine. This means that the potential water management infrastructure should undergo review as the change in water quality may mean that current water re-use options are not necessarily possible in future.

13.6 Mineral Processing & Testwork

13.6.1 GMZ-2

The GMZ-2 processing complex is the largest in the world based on throughput (50Mtpa) and was the first to commercially apply the RIP process. Overall gold recoveries are relatively consistent at circa 89-90% for a head grade of circa 1.1-1.2 g/t Au and these recovery levels are considered reasonable for the relatively low head grade and allowing for preg-robbing characteristics due to the presence of carbonaceous material. The use of RIP compared to CIL is an advantage in this respect. The modular flowsheet is relatively straight-forward and conventional and includes a gravity circuit which contributes a significant amount of the overall gold production.

The process operating cost of US$7.94/t ROM ore for H1 2023 appears reasonable for the throughput of 50Mtpa based on benchmarked data.

The progressive expansion of the facility over the years since 1969 has generally been based on repeating the original modular sized equipment and this is understandable in terms of easier operability and standardisation of spare parts etc. However, in terms of power efficiency, it is not optimal and this contributes to the relatively high-power cost and associated high steel grinding media cost. However, the overall processing cost is reasonable for the throughput.

In terms of gravity recovery, it may be worth considering, depending on the amount and size range of the GRG (Gravity Recoverable Gold) present in the various ore types, the use of centrifugal gravity concentrators, such as the Knelson Concentrator and Falcon Concentrator. Jigs are perfectly reasonable, but do not generally recover well any gold in the finer size ranges. Maximising gravity recovery and production over a finer size range within the Mill blocks may potentially reduce reagent consumptions and hence operating costs in the downstream circuits.

The production data indicates recovery has marginally improved at slightly lower head grades, which could be indicative of continued optimisation efforts.

13.6.2 Heap Leach Plant

The overall gold recovery in H1 2023 of circa 53% from a 0.56 g/t Au head grade is considered reasonable based on fine crushing to -3.35mm of fresh rock. This agrees well with similar benchmarked operations. As fresh rock is generally non-porous, the gold recovered is limited to the gold available on the grain boundaries of the crushed rock and hence the requirement to crush as fine as possible for maximum gold recovery (subject to economics). This also generally results in fast leaching of the available surface gold.

While the process is clearly working well, the leach cycle operation (4 cycles) appears to be relatively complex and the actual leach time of circa 270 days is also relatively long, which is perfectly reasonable to obtain maximum gold recovery. However, it may be worth investigating, based on the assumption that the fresh rock is non-porous and that the available gold on the grain boundaries is fast leaching, whether the leach cycle time and/or the number of leach cycles can be reduced to potentially lower the operating costs and increase production. Any remaining gold from a lower leach cycle time could be recovered as leaching continues on the lower lifts (assuming no inter-lift liners are used). In other words, the focus would be to recover the easily leachable gold as quickly as possible to increase production through lower cycle times, and not to initially focus on maximising the gold recovery – this can be achieved over time through continued percolation and leaching through the lower lifts (subject to the economics and whether inter-lift liners would be beneficial).

While the operating cost is reasonable for the throughput of 11Mtpa, it is slightly higher than indicated from benchmarked operations. In particular, the maintenance cost appears to be high relative to the other costs and the reasons for this should be investigated. However, this is only based on the operating costs for the first 6 months of 2023, as other historical cost data from earlier years was not provided, so this high maintenance cost may not be representative.

As is typical for competent crushed fresh rock, only a limited amount of cement agglomeration is required (compared to oxide ores for example) and the use of belt agglomeration, rather than a dedicated drum agglomerator, is reasonable and appropriate.

While impact crushers are used for the final fourth stage of crushing, it may be worthwhile investigating the use of HPGR crushers to achieve an even finer crush size to achieve potentially higher gold recovery. There is a theory that, with HPGR crushing, micro-fractures can be generated in the essentially non-porous rock to improve overall leach gold extractions, although a higher amount of fines is also generated.

Figure 13.3 shows a plot of Recovery v Head Grade from the production data supplied.

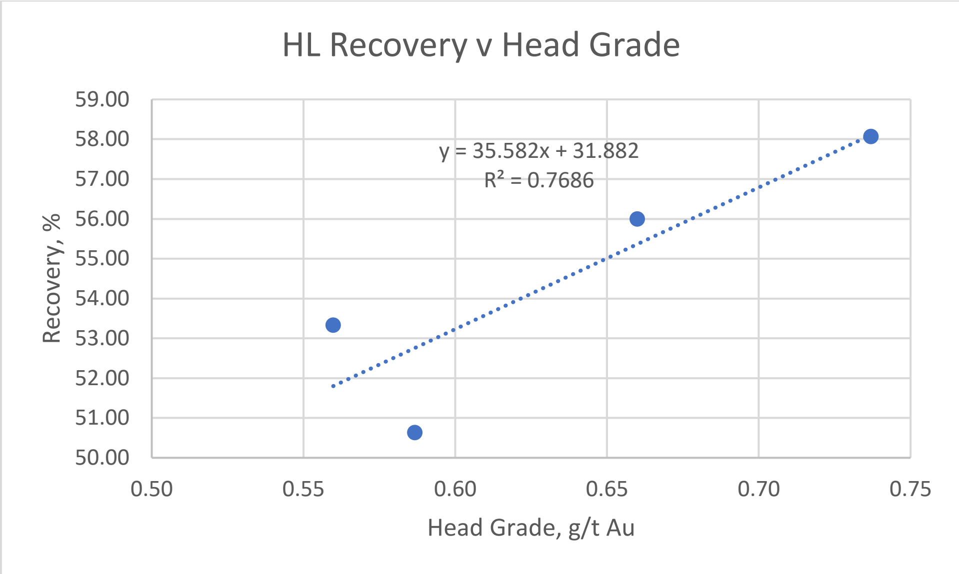


Figure 13.3: HL Recovery v Head Grade

This (limited) data shows a reasonable and typical increase in gold recovery with increasing head grade and vice-versa. The resulting regression equation, as shown on the graph, can be used to estimate the expected gold recovery for different head grades.

13.6.3 GMZ-7

The current gold recovery of circa 79% from a head grade of 0.45 g/t Au is considered very reasonable for a feed consisting of old heap leach tailings and based on CIP technology. It has taken several years for the throughput to ramp up to the design of 15Mtpa and, during this time, the gold recovery has significantly increased to the current level of circa 79%. The head grade has, however, slightly decreased during this ramp-up period.

The current operating cost of US$6.11/t ROM ore is considered reasonable and appropriate for the throughput of 15Mtpa and is slightly below industry benchmarked values (only H1 2023 data was provided).

The milling circuit configuration of two-stage ball milling and classification is slightly unusual, although clearly operating successfully. A more conventional circuit is shown in Figure 13.4 and this may be worthy of investigation to potentially increase overall circuit efficiency and lower operating costs.

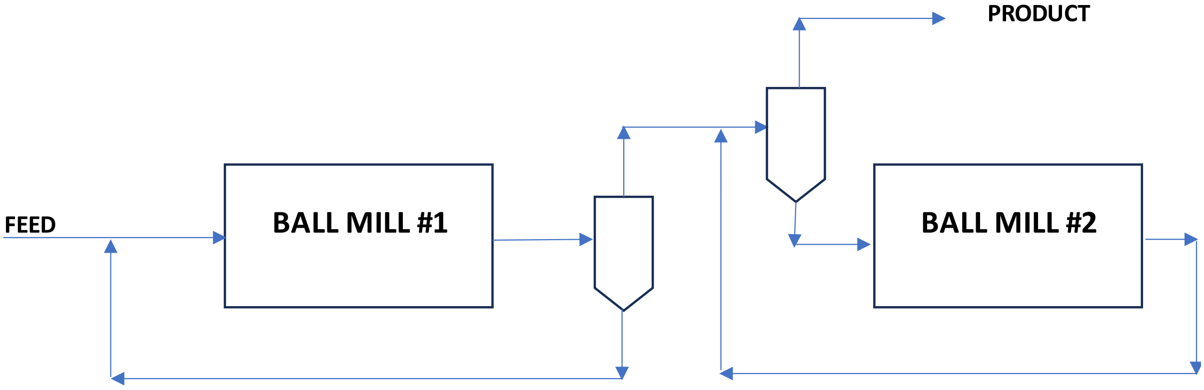


Figure 13.4: Alternative Milling Circuit

In this proposed circuit, Ball Mill #1 operates conventionally in closed circuit with classifiers but the classifier overflow (the classifier can be hydrocyclones or potentially spiral classifiers) is classified in a second stage of hydrocyclones with the second stage overflow as final product from the milling circuit. The second stage underflow is then milled in Ball Mill #2, also operating in closed circuit with the second stage cyclone classifiers.

In the current circuit, first and second stage classifier overflow is combined as final product, with a portion of the first stage underflow reporting to the second stage classifiers.

13.6.4 Tailings Storage Facility

TSF design documentation was provided for review, plus numerous engineering design drawings, but it was not within WAI's scope of works to interrogate the engineering design of the LOM TSF expansion project and confirm whether it meets international standards.

The current LOM plan appears to include construction and expansion of both TSF-1 (principally Cell 7-8) and TSF-2 (both Cells 1 & 2).

It was reported that construction of the Southern dam of Cell 2 in TSF-2 was on-going and, according to the design report reviewed, should have been completed by end-2023 to a crest elevation of 323.0m.

It is important to note that the documentation states that, due to the accelerated expansion of both GMZ-2 and GMZ-7, the **TSF storage capacity will be fully utilised by mid-2024**. Hence, the construction and expansion programme within the required time frame for the proposed dams at TSF-1 and TSF-2 is absolutely critical for the continued successful operation of the mine.

The lack of supply of supernatant return water to the process plants until just three years ago, reportedly due to the high rate of evaporation, seems unusual. However, return water is now being pumped back to GMZ-7, with a second pipeline being constructed to return water to GMZ-2. This will reduce demand from the river water abstraction systems.

The use of concrete supports for the steel tailings pipeline is not ideal and should be monitored, as temperature variations can cause expansion and contraction of the metal pipe and therefore potentially wear from abrasion.

13.6.5 Besapantau Metallurgical Testwork

The source, location and representativeness of the three samples tested is unknown but, from the results, the samples are free-milling with gold recoveries and head grades comparable to current ore being processed through GMZ-2.

Testwork should be conducted on a larger number of representative samples with source and location of the samples clearly defined.

However, based on these preliminary results, the Besapantau ore appears amenable for processing through the GMZ-2 plant.

13.6.6 Low Grade Stockpiles

An initial recommendation is that samples (as representative as possible and likely to include a comprehensive drilling programme) be conducted on the Low-Grade Stockpiles, although this will reasonably only be at scoping level due to the large tonnage and volume of the available stockpiles to be drilled. Following production of the required samples, simple bottle roll testwork can be conducted on site to determine the potential gold recoveries obtainable at the grind size of typically 80% passing 75 microns. If required, comparative coarse ore bottle roll tests to simulate heap leaching can also be conducted at the same time. The bottle roll results would be used to generate a regression equation of gold recovery vs. head grade.

The low-grade stockpiles could potentially be processed at either of the three existing processing plants. However, it does not make economic sense to replace higher grade ore with lower grade ore at GMZ-2 (unless potentially at the end of the LOM for GMZ-2 when the current ore supply has run out).

Similarly, the average resource grade at 0.46 g/t is less than the current grade being processed at the existing Heap Leach plant, so it also does not make economic sense to replace higher grade ore with lower grade ore, unless also potentially at the end of the LOM.

For the existing GMZ-7 CIL plant, the head grade is very similar to the current grades being processed. It is noted that there has been a gradual decline in head grades over the last few years. If the Heap Leach head grades continue to decline to below 0.46 g/t, then it could make sense to replace the CIL feed with Low Grade Stockpiled ore and/or at the end of the LOM. However, it should be noted that, with the GMZ-7 CIL plant design for processing heap leach tailings, there would need to be a significant upgrade to the crushing plant to process essentially ROM ore instead of old heap leach tailings.

The comparative NPV results would appear to indicate that a new and dedicated CIL plant should be investigated for the Low-Grade Stockpiled ore, pending results of a future comprehensive drilling and metallurgical testwork programme.

13.7 Environmental, Social Performance, Health and Safety

In general, NMMC has good paper environmental and social policies and understanding of the importance of these aspects in relation to sustainability. NMMC has been publishing Sustainability reports starting from 2019. There are ESG specialists who are responsible for collecting and compilation of ESG data.

However, there are only two environmental specialists in the Central Mining Administration who are responsible for all CMA's facilities. For efficient environmental management there should be on-site ecologists to handle ongoing monitoring and control of environmental aspects, timely identification of ecological violences and efficient contribution to the existing environmental management system. Air monitoring is carried out on a monthly basis at the Sanitary Protection Zone, the provided monitoring results did not show any exceedance. In addition, air quality is monitored at the workplaces and at the sources of emissions, however, the results were not provided, except for the Gold HLP showing the efficiency of air treatment systems at the sources of air emissions. It is also a good practice to monitor the air quality at the nearest settlements considering the proximity.

Dust suppression is carried out at the CMA's facilities, but as a result of climatic features and high evaporation as well as shortage of water, the efficiency is low. WAI understands that CMA together with Central Laboratory have tested dust suppression reagents in addition to water irrigation with no positive results. High dust concentration causes the degradation of air quality at workplaces (i.e. Muruntau pit, access roads, tailings dusting, waste dumps, etc.) and affects working conditions and health of employees.

Based on the information provided water is recycled and not discharged into the environment. The Muruntau pit water monitoring data have been provided for the review. WAI is not aware of other water monitoring programmes carried out at the Muruntau Project facilities.

The provided Environmental Impact Assessment Designs for the Project facilities under consideration do not fully address social aspects. The documents reviewed contain only indication of nearest settlements and their proximity to the Project assets. However, socio-economic conditions are not studied, and social impacts are not assessed or addressed.

As a result of on-site discussions with H&S specialists and on-site review of presented documents, all required H&S procedures are in place and all necessary training is carried out in time. However, the cyanide handling procedures should be reviewed to ensure that the staff who work with cyanide fully understand the risks and measures that need to be taken in case of cyanide-related accidents.

Closure and reclamation plans have not been developed. In accordance with the best practices mine closure planning as early as possible is considered crucial because it outlines the strategies and procedures for safe closure as well as ensure mitigation of environmental impacts, address social concerns and responsible management of post-mining landscapes.

13.8 Economic Evaluation

The Muruntau cluster has been analysed using Discounted Cash Flow (DCF) analysis, with a 10% discount rate applied to future estimated cash flows throughout the life of the mine. The economic assessment generated a positive, post-tax NPV of US$7,842M. As there is no significant capital outlay, it was not possible to generate a significant IRR. A summary of the economic validity of the model, broken down on a pit-by-pit basis, is outlined in Table 13.3. Note that the NPV of US$7,842M in the table below includes centralised costs that are not included in the equivalent calculations for the individual pits.

Table 13.3: Summary of Economic Analysis

	Discount Rate	Value (US$M)
Muruntau Cluster	10%	7,842
Muruntau	10%	6,670
Mutenbai	10%	524
Besapantau	10%	464
Balpantau	10%	382

13.9 Ore Reserve Statement

The final summary of the Muruntau Cluster Ore Reserve is presented in Table 13.4.

Table 13.4: Ore Reserve Estimate for the Muruntau Cluster, WAI, 01 January 2024

Deposit	Class	Tonnes (Mt)	Grade (g/t Au)	Contained Au (Moz)	Contained Au (t)
Total	*Proven*	-	-	-	-
	Probable	1,436	1.06	49.2	1,527
	Total	**1,436**	**1.06**	**49.2**	**1,527**

Notes:

1. Ore Resources have been classified and reported in accordance with the guidelines of the JORC Code (2012);
2. The effective date of the Ore Reserve Estimate is 01 January 2024;
3. Ore Reserves are reported at an operational cut-off grade of 0.5g/t Au.
4. Ore Reserves are limited to $1,650/oz optimised open pit shells based on appropriate economic, mining and processing parameters;
5. Mining, processing and administrative costs are estimated based on actual costs;
6. Ore Reserves have been reported at 100% ownership; and
7. All figures are rounded to reflect the relative accuracy of the estimate. Numbers may not add due to rounding.

The stated results are not materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues, to the best knowledge of the authors. There are no known mining, metallurgical, infrastructure, or other factors that materially affect the preliminary Ore Reserve results, at this time.

APPENDIX 1:

JORC Code, 2012 Edition - Table 1 Disclosure for the Muruntau, Mutenbai, Besapantau and Balpantau Deposits

Section 1: Sampling Techniques and Data

Criteria	JORC Code explanation	Commentary
Sampling techniques	• *Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.* • *Include reference to measures taken to ensure sample representativity and the appropriate calibration of any measurement tools or systems used.* • *Aspects of the determination of mineralisation that are Material to the Public Report.* • *In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.*	• The main sample types collected in exploration of the Muruntau Cluster have been drill core, drill chip and channel samples. Drill core review by WAI confirmed that boundaries of economic mineralisation cannot be reliably defined by visual characteristics, which justifies the NMMC approach to sample and analyse all intervals, with the exception of barren quaternary sedimentary cover. • Diamond drilling involves a mixture of half core and whole core sampling. Sample lengths typically range between 1-2m, with adjustments to length made to honour logged geological boundaries. • RC drillholes were primarily sampled at 2.5m intervals. The sample was taken through a Metzke cone splitter to deliver a 5kg sub-sample. • Drill chips from roller drilling were primarily sampled every 2m using a cyclone. Bulk samples were quartered using a riffle splitter, with half of all chips collected as a sub-sample. • In trenches and underground, channel sampling was carried out manually with a channel cross-section of 5cm by 10cm. The length of the samples typically ranged from 0.5-5m with 1-2m samples most common. Sample length was adjusted according to geological boundaries and where possible, samples were taken across the expected extent of mineralised zones. • In trenches, channel sampling was carried out along the center line of the trench floor. Testing of development was carried out along one or two opposite walls at 1m height above the floor. To help establish the continuity of mineralisation, some of the drives along the strike of the mineralised zones were sampled face-to-face after 2-3m. To ensure reliable sampling results, the actual weight of each sample was compared with the theoretical weight. • NMMC has assessed the reliability of underground channel sampling by comparing sections of the main channel with a parallel channel made 5cm below. Results show a difference in average grade of around 5%.
Drilling techniques	• *Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).*	• Diamond core drilling ("DD") has been the main drilling method at Muruntau cluster. Hole diameter was mostly 76mm NQ, with tungsten carbide and diamond drill bits. A wide range of drill rigs have been used across the five deposits over time. The main drill rigs per deposit for the period up until 2019 include: Muruntau-Mutenbai ZIF-650; Chukurkuduk XYDX-4, ZIF-650, ZIF-1200, ZMO-1500; Besapantau SKB-5, ZIF-650, ZIF-1200, ZMO-1500; and Balpantau ZIF-650. • Since 2020, Hanjin D&B (Korean), DBS-S15 and 21 (Turkish) drill rigs have been used. • Reverse Circulation ("RC") drilling was carried out at Muruntau as advance mine exploration using

Criteria	JORC Code explanation	Commentary
		a KWL 1600 drill rig. RC drilling in 2002-2003 at Balpantau used a NEMEK rig with a compressor that delivered effective drilling and sample return to a depth of 120-140m. • Roller-bit drilling, also referred to as full-hole non-core drilling, was carried out using spindle-type UKB-500S rigs driven by DES-60 with a PR-12 compressor (7-8 atm). Hole diameter was 76mm, with carbide roller bits. WAI considers this to be a lower quality drilling technique, given sample return is outside of the rod string and more susceptible to sample loss and contamination. WAI agrees with the NMMC decision to exclude this drill type from resource modelling and estimation. • Blast holes are sampled to inform GC modelling only.
Drill sample recovery	• *Method of recording and assessing core and chip sample recoveries and results assessed.* • *Measures taken to maximise sample recovery and ensure representative nature of the samples.* • *Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.*	• Historic average recoveries were low (around 65-75%) but did improve over time to an average of around 80% from 1999 to 2015. • Since 2020, average core recovery over ore intersections is reported to have risen to above 90%. WAI has inspected the core from recent drilling during the site visit (e.g. MUR_072, MUR_033) and observed good drill recoveries, particularly given local zones of intense fracturing were present. Core recovery logging is mainly limited to recent drilling and demonstrates this improved core recovery. • Scatter plots between gold and core recovery do not show a clear grade-recovery relationship. However, given core recovery is only available for a small proportion of the drilling, this may not reflect the entire database. • No recovery logging or sample weights were available to assess RC sample recovery. • Muruntau and Mutenbai drilling used a very high proportion of diamond core. However, much of this drilling is historic, with associated risk of lower core recovery and sampling bias. At Besapantau and Balpantau, the existence of substantial amounts of roller drilling with increased risk of sampling bias and contamination has been mitigated by excluding this sample type from the Mineral Resource database.
Logging	• *Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.* • *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* • *The total length and percentage of the relevant*	• All drillholes except for grade control blast holes are logged over their entire length. • Detailed drillhole logging is primarily carried out by the Kyzylkum Exploration Expedition. • Digital records are only available for recent drilling since 2019. This includes tables with fields describing lithology, alteration, oxidation, mineralisation and geotechnical parameters. • Data coverage at Muruntau and Mutenbai is currently insufficient to support modelling based on logging data, however enough data is potentially available over parts of Besapantau and Balpantau to allow geological modelling.

Criteria	JORC Code explanation	Commentary
	intersections logged.	
Sub-sampling techniques and sample preparation	• *If core, whether cut or sawn and whether quarter, half or all core taken.* • *If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.* • *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* • *Quality control procedures adopted for all sub-sampling stages to maximise representativity of samples.* • *Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling.* • *Whether sample sizes are appropriate to the grain size of the material being sampled.*	• Diamond drilling has primarily involved half core and whole core sampling. WAI inspected core saws and cutting procedures at NMMC core processing facilities and observed good practice. • RC samples were processed through a Metzke cone splitter to deliver a 5kg sub-sample. • Roller drilling bulk samples were quartered using a riffle splitter, with half of all chips collected as a sub-sample. • No sub-sampling is recorded for trench and underground channel samples. • Fire assay sample preparation included drying, crushing and grinding, with splitting between stages to ultimately produce a 0.5kg sub-sample with a particle size of 0.074mm. Gamma activation sample preparation follows a similar but shortened workflow, ending with a coarser 1mm particle size. • WAI consider the equipment, sample weights and particle size used in sample preparation to be in line with typical industry practices. WAI visited NMMC laboratories where Muruntau Cluster sample preparation is undertaken and observed reasonable procedures to deliver a representative sub-sample, minimise contamination and meet particle size specifications.
Quality of assay data and laboratory tests	• *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* • *For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.* • *Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.*	Analytical Techniques: • The two analytical methods used at Muruntau Cluster are fire assay and gamma activation analysis. • Fire assay analysis was mainly carried out by the geological laboratory of the Kyzylkum PGRE. Samples were analysed using 50g fire assay gold analysis with a gravimetric finish. Results have been reported to a single decimal place due to the current precision of the gravimetric finish. • Gamma activation analysis was introduced at the Muruntau Cluster in 1979 and is completed at the NMMC Central Gamma Activation Analysis Laboratory. WAI has not visited this facility and all information regarding this technique has been derived from NMMC reports. A summary of the gamma activation analysis method is provided below: 1. Activation of samples by high-energy gamma rays obtained as a result of deceleration of an electron beam with an electron energy of 8MeV, generated by a high-current linear electron accelerator and subsequent measurement of the sample activity; 2. As a result of the nuclear reaction: 197Au -> 197mAu, a metastable radioactive isomer of gold is formed with a half-life T½ = 7.7 seconds and gamma quanta energy Ey = 279KeV; 3. Interfering elements when analysing samples for gold are uranium, thorium, barium and hafnium. The influence of interfering elements is taken into account using the

Criteria	JORC Code explanation	Commentary
		spectral ratio method (MSR). This method uses a spectral ratio matrix that is calculated by running matrix or tuning samples. These samples are the ones containing only one of the elements being determined (Au, U, Th, Ba, Hf) in high concentration; 4. The sample material is packed into a cuvette with a volume of 290cm3. The standard in the form of standard material is also packaged in a cuvette; 5. The gold grade in samples is calculated using the formula: $$C = \frac{X_1}{\eta \cdot m}[1 + (m - 425) \cdot 8 \cdot 10^{-4}]$$ *where C is the mass fraction of gold in the sample, 1x10-4 % (g/t, ppm);* *η is the reference coefficient;* *X1 - accounts for gold in the standard, impulses;* *m - standard mass.* 6. The reference coefficient is calculated using the formula: $$\eta = \frac{^{Et}X_1}{^{Et}C \cdot ^{Et}m}$$ *η - reference coefficient used in further work to calculate the grade* *EtX1 - accounts for gold in the standard, impulses;* *Etm is the mass of the standard, g;* *EtC - mass fraction of gold in the standard, 1x10-4 % (g/t, ppm).* • Reported advantages of gamma activation include reduced sample preparation requirements, analysis of a larger sub-sample (500g) and rapid turnaround of results. Whilst the technique is unique to NMMC, WAI notes similarities with the methodology reported for the PhotonAssayTM method, developed by Chrysos Corporation, now commercially available as an alternative to the fire assay method. • Around 90% of samples from the Muruntau and Mutenbai deposits were analysed using the gamma activation method. A much higher proportion of fire assay data is available for the Besapantau and Balpantau deposits. In these deposits, gamma activation has typically been used as a preliminary analysis, where samples with grades above 0.5 g/t were then selected for fire assay. Gamma activation is also used for all grade control samples.

Criteria	JORC Code explanation	Commentary
		QAQC Procedures: • Historical QAQC data is limited to internal (primary laboratory) and external (umpire laboratory) pulp sample duplicate checks. No primary data was available for review and some summary data was also unavailable (notably all internal & external analysis for Muruntau & Mutenbai fire assay analysis). • Since 2019 the QAQC programme has expanded to include blank samples to measure potential contamination (Balpantau and Besapantau) and standard reference samples to measure analytical accuracy (Muruntau & Mutenbai, Balpantau and Besapantau). Pulp duplicate samples continue to be taken for assessment of precision. Pulp Duplicates: • For Muruntau-Mutenbai Gamma activation analysis (2017-2019), the highest absolute and percentage errors are seen in the first grade class, 0.0 to 0.5g/t Au. This indicates a high risk that samples at, or close to, the cut-off chosen for more detailed fire analysis are misclassified. For earlier programmes available for review, few or no samples below 0.6g/t Au were selected for control analysis. Given the lower domaining cut-off grade for resource estimation is 0.3g/t Au, this presents a gap in assessing analytical precision at this level. • No internal duplicate analysis was available for Muruntau and Mutenbai from 2019, although external check sample results are available for review covering the period 2019-2022. These results indicate no overall bias between the primary and external laboratory grades. • For Besapantau historical fire assay, failure rates were higher for external than internal duplicates but there was no evidence of bias or increased rates of failure for certain grade brackets. • Balpantau historical fire assay duplicate results are incomplete and difficult to put into context but do show increased absolute and percentage discrepancy between sample pairs at lower grades for both internal and external analysis. • An issue common to both Besapantau and Balpantau is that no historical duplicate analysis is available for grades close to the current lower domaining cut-off of 0.3g/t Au, presenting a risk in assessing analytical precision at this level. • Internal duplicate and external check samples were available for the 2019-2023 period for Balpantau and Besapantau. The level of repeatability and therefore the precision of the combined

Criteria	JORC Code explanation	Commentary
		duplicate assay set appears moderate to poor although a general improvement is seen in results after 2020. Standards: • For Muruntau and Mutenbai, a range of reference samples were used to assess assay accuracy. The results show no indication of bias in analysed grades against the target grade, but none of the SRM used were close to the grades used for domaining of mineralisation. • A range of reference samples were used to assess assay accuracy for Balpantau and Besapantau data between 2020-2023. Results of certain reference samples were poor in the early stages of this programme although general improvement over time is seen. None of the CRM used for monitoring of analytical accuracy of this set of sample data were close to the cut-off grades used for domaining of mineralisation. Blanks: • Blank samples were used for monitoring contamination during Besapantau and Balpantau exploration between 2020 and 2023. Blank failures occurred at a relatively low frequency and there does not seem to be systematic trends or bias indicative of pervasive cross contamination or sample switching.
Verification of sampling and assaying	• *The verification of significant intersections by either independent or alternative company personnel.* • *The use of twinned holes.* • *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* • *Discuss any adjustment to assay data.*	• Data entry, validation, storage and database management is carried out by NMMC staff. All data are stored in an electronic database. The quality of the assay data contained within the databases is monitored by NMMC staff. Drillhole data is exported to csv files for subsequent import into Leapfrog modelling and estimation software. • For Muruntau and Mutenbai, NMMC conducted a visual comparison between the results of exploration and resource development drilling with overlapping GC data. In cases where the presence or absence of a significant mineralised intersection was not confirmed by the high-resolution (6m x 6m) GC sampling, the drill holes were excluded from Mineral Resource estimation. • No twin drillholes have been completed and WAI recommends twin drilling is systematically conducted across all generations of drilling that form a significant proportion of the MRE drillhole database for each deposit. • NMMC has infilled regions of historic drilling with recent drillholes as part of resource development. The comparison between historic drilling with adjacent recent drillholes provides some data verification, whereby dramatic changes in mineralisation grade and/or width over very

Criteria	JORC Code explanation	Commentary
		short distances may indicate data quality issues. WAI considers this to be an effective check for the most significant errors. In general, the recent drilling conforms well with the results in nearby historic drillholes and underground channel samples. • The Chukurkuduk deposit was excluded from this Mineral Resource estimate pending the results of ongoing verification drilling. • WAI has completed an independent statistical comparison between datasets, to help detect any bias in the sample data due to differences in sample type or changes in sampling and/or analytical procedures over time. To isolate these factors from natural local variation in the mineralisation, distance functions were used to limit comparisons to samples within a short distance. • Overall, there is no evidence for material bias between different sample types at Muruntau-Mutenbai, which supports the NMMC decision to include DD drilling, RC drilling and UG sampling in Mineral Resource estimation. • Besapantau and Balpantau have a much larger proportion of recent drilling with QAQC results, which can be used to compare with and help verify the historic drill data. Comparison between <10m spaced composites, shows no material bias at Besapantau and potential for historic results to understate grade at Balpantau (-9% difference in average composite grade above 0.5g/t cut-off). Given the magnitude and downside nature of the differences at Balpantau, WAI accepts the decision to include historic data at both deposits at this stage. • Q-Q plots comparing close spaced (<10m) DD drilling and trenching at Balpantau, show strong positive bias in the trenching results. To ensure this grade is not extrapolated to depth, WAI agrees with the decision to exclude all trenching from Balpantau Mineral Resource estimation. At Besapantau, only the most recent trenching oriented orthogonal to the strike of mineralisation was included in the final resource model. This compromise appears to remove the most obvious trench related artifacts and inconsistencies in the mineralisation model. • The verification procedures carried out by WAI confirmed the integrity of the data contained in the electronic databases. WAI considers that QAQC and data verification completed to date, have been used to select a subset of the drillhole databases deemed appropriate for Mineral Resource estimation.
Location of data points	• *Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.* • *Specification of the grid system used.*	• A local coordinate system is used at each deposit. • Topographic surveys are updated monthly using a 1m survey grid. • Collar positions are surveyed manually, whilst downhole surveys have been carried out for all core drill holes and for non-core holes greater than 100m deep.

Criteria	JORC Code explanation	Commentary
	• *Quality and adequacy of topographic control.*	• Survey practices were not assessed as part of the WAI site inspection. The types of survey equipment and accuracy reported by NMMC are considered appropriate for resource estimation.
Data spacing and distribution	• *Data spacing for reporting of Exploration Results.* • *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* • *Whether sample compositing has been applied.*	• At Muruntau, the nominal diamond drill spacing is 80m (between drill sections) by 40m (along section) across most of the deposit. Locally drill spacing increases to 80m by 80m and this becomes the dominant drill spacing at depths below ≈600m from surface. Current diamond drill coverage at Muruntau extends to ≈1000m below surface. • The top ≈250m of the Mutenbai deposit have been diamond drilled to a spacing of 40m (between drill sections) by 20-40m (along section). From approximately 250m to 550m from surface the drill spacing increases to a nominal 60m by 60m grid and up to 80m by 80m locally. Broader spaced exploration drill coverage extends to approximately 1200m below surface, whilst the deepest exploration holes intersect mineralisation at 1950m. • Blast hole grade control sampling has been completed over the Muruntau and Mutenbai deposits to a maximum depth of ≈550m and ≈300m below surface respectively. This is conducted on a staggered 6m by 6m grid. • At Besapantau contiguous regions of 60m by 60m spaced diamond drilling are present in the central/south and northeast of the deposit, with 80m by 40m to 80m by 80m spacing dominant elsewhere. Recent drilling is interspersed with historic drilling except in the central/south of the deposit, where historic data is dominant. A 100m by 100m RC grid covers part of this area. • At Balpantau, the nominal diamond drill spacing is 40m by 40m to 60m by 60m across the southern and northwestern flanks of the deposit. Diamond drill coverage is patchier in the northeast, with section spacing of 80m more typical. Recent drilling is interspersed with historic drilling in the north, whilst recent diamond drilling is the main drill type across the south Balpantau. Blast hole grade control sampling has been completed over the top ≈20m in the south of the deposit on a staggered 5m by 5m grid. • Drill data spacing and distribution are sufficient to establish the geological and grade continuity to a level consistent with the Mineral Resource classification applied. • No compositing has been applied during sample collection.
Orientation of data in relation to geological structure	• *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* • *If the relationship between the drilling orientation and the orientation of key mineralised structures is considered*	• Drilling in all deposits has been conducted on systematic grids, on orientations such that drill intersections are at a high angle to the dominant mineralised trend. • There is no evidence that drilling orientation has resulted in a sampling bias that could materially impact the accuracy and reliability of the results.

Criteria	JORC Code explanation	Commentary
	to have introduced a sampling bias, this should be assessed and reported if material.	
Sample security	• *The measures taken to ensure sample security.*	• All sample collection, transport, preparation and analysis is conducted by NMMC and its state affiliates. • Samples are under security observation from collection at the rig to delivery at the laboratory. Samples are bagged, sealed, numbered, and delivered to the laboratory from the core processing facility. A hard copy sample submission form is sent with the samples. • Upon receipt at the laboratory, the submission is sorted and checked against the sample submission form and with any missing and/or additional samples identified and investigated.
Audits or reviews	• *The results of any audits or reviews of sampling techniques and data.*	• SRK completed an independent review of sampling techniques and data quality as part of their 2019 Mineral Resource and Ore Reserve estimate for Muruntau, Mutenbai and Besapantau. SRK concluded that input data quality was sufficient to declare Mineral Resources. • As part of this Mineral Resource and Ore Reserve update, WAI has also reviewed the practices employed by NMMC with respect to drilling, sampling, assaying, QA/QC, and data verification, and believe that the processes have been sufficient to deliver a drillhole database that is appropriate for Mineral Resource estimation.

Section 2: Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	• *Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.* • *The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.*	• The Muruntau Cluster is located in the Kyzyl Kum Desert of Uzbekistan, Central Asia. This mining province is situated within the Tien Shan Mountain range, a region known for its significant gold mineral resources. • NMMC are the holders of license NY 0260 dated 09/24/2021, valid until 01/22/2074, granting the right to use the subsoil for the purpose of extracting minerals at the Muruntau gold deposit in the Tamdinsky district of the Navoi region. The license includes two areas allocated to the subsoil user by the administration of the Tamdinsky district. For Muruntau, the area is 26.5km2, for Mutenbai 2.6km2. The subsoil plot provided for use has the status of a mining allotment. • NMMC are the holders of license NV 0259 dated 09/24/2021, valid until 01/09/2025, granting the right to use the subsoil for the purpose of extracting minerals at the Besapantau gold deposit in the Tamdinsky district of the Navoi region. • NMMC are the holders of license NV 0247 dated 09/24/2021, valid until 12/31/2033, granting the right to use the subsoil for the purpose of extracting minerals at the Balpantau gold deposit in the Tamdinsky district of the Navoi region.
Exploration done by other parties	• *Acknowledgment and appraisal of exploration by other parties.*	• All exploration work has been conducted by the Muruntau Mine Exploration Team, Kyzylkum Exploration Expedition of NMMC or Kyzylkum State Geological Survey.
Geology	• *Deposit type, geological setting and style of mineralisation.*	• The Muruntau, Mutenbai, Chukurkuduk (previously known as Triada), Besapantau and Balpantau deposits are located within the Kyzyl Kum Gold District, in the western portion of the Southern Tien Shan belt. The Lower Paleozoic Besapan Formation forms the basement of the Kyzyl Kum, which is unconformably overlain by Devonian to Early Triassic sediments, carbonates and volcanics. • Formation of the gold deposits occurred through a multi-staged process involving sedimentation, regional metamorphism (thrusting and magmatism) and multiple phases of hydrothermal activity including phases associated with gold mineralisation. Granite magmatism and gold mineralisation are broadly contemporaneous, but their link remains unproven. • All basement rocks are metamorphosed to greenschist facies and underwent hydrothermal quartz-feldspar metasomatism, which is especially evident in lithologically and structurally favourable blocks of lower and middle units of the Besapan suite. This formation hosts the main gold mineralisation in the region.

Criteria	JORC Code explanation	Commentary
		• The Muruntau-Mutenbai-Chukurkuduk deposit is located on the eastern pericline of the large Tazgazgan anticline, complicated by smaller-scale folding. The Besapantau deposit is located on the northwestern flank of the Muruntau ore deposit. Balpantau is situated further north, within a volcano-tectonic graben.
Drill hole Information	• *A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes:* ○ *easting and northing of the drill hole collar* ○ *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* ○ *dip and azimuth of the hole* ○ *down hole length and interception depth* ○ *hole length.* • *If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.*	• No exploration results are reported. • Given the number of drill holes at Muruntau Cluster and the scale of operations, it is not considered practical or material to report drill hole collar details in this section. • Figures showing the location of drillholes, underground channels and surface trenches at each Muruntau Cluster deposit are contained in the main body of the report.
Data aggregation methods	• *In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.* • *Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* • *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	• No exploration results are reported. • No metal equivalents have been used in the Mineral Resource estimates.
Relationship between	• *These relationships are particularly important in the reporting of Exploration Results.*	• No exploration results are reported.

Criteria	JORC Code explanation	Commentary
mineralisation widths and intercept lengths	• *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* • *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').*	
Diagrams	• *Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	• Appropriate maps, sections and data tabulations are included in the main body of the report.
Balanced reporting	• *Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	• No exploration results are reported. • The accompanying document is considered to represent a balanced report.
Other substantive exploration data	• *Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.*	• There is no other exploration data which is considered material to the results disclosed in the report.
Further work	• *The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).* • *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	• Exploration and infill drilling will continue to target projected lateral and depth extensions of the mineralisation and to increase the confidence in the Mineral Resource.

Section 3: Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary

Database integrity	• *Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*
	• *Data validation procedures used.*
		• Logging is completed on paper and subsequently captured digitally.
		• Data entry, validation, storage and database management is carried out by NMMC staff.
		• All data are stored in an electronic database. The quality of the data contained within the databases is monitored by NMMC staff.
		• Drillhole data is exported to csv files for subsequent import into Leapfrog modelling and estimation software.
		• A review of the Muruntau Cluster drillhole databases was carried out by WAI and included the following checks:
		  ○ Verification that collar coordinates coincide with topographic surfaces;
		  ○ Ensuring each drill hole collar recorded has valid XYZ coordinates;
		  ○ Ensuring collar coordinates are inside expected limits;
		  ○ Checking for the presence of any duplicate drill hole collar IDs or collars with duplicate collar coordinates;
		  ○ Ensuring all drillholes have a valid downhole survey;
		  ○ Verification that downhole survey azimuth and inclination values display consistency;
		  ○ Ensuring samples and down hole surveys do not exceed maximum depths of drill holes;
		  ○ Checking for missing samples and their location;
		  ○ Evaluation of minimum and maximum grade values;
		  ○ Evaluation of minimum and maximum sample lengths;
		  ○ Assessing for inconsistencies in spelling or coding (typographic and case sensitive errors); and
		  ○ Ensuring full data entry and that a specific data type (collar, survey, lithology and assay) is not missing and assessing for sample gaps or overlaps.
		• Overall, WAI found the drillhole databases to be in good condition, with only a small number of minor errors identified that would not have a material impact on Mineral Resource estimation.

Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• Mineral Resource estimates for all deposits were completed by Lyubov Egorova, Director of Mineral Resources at NMMC. Ms Egorova regularly visits all Muruntau Cluster sites. • The Mineral Resource estimates for Muruntau and Mutenbai have been audited by Frank Browning, Principal Resource Geologist at WAI. Mineral Resource estimates for Besapantau and Balpantau have been audited by Alan Clarke, Technical Director and Resource Geologist at WAI.

Criteria	JORC Code explanation	Commentary
		• The following consultants from WAI conducted personal inspections of the Muruntau Cluster assets between the 6th and 9th November 2023: ○ Ché Osmond, BSc, MSc (MCSM), FGS, EurGeol, CGeol, Technical Director (Geology), *Geology, Resources, Project Overview, Financials;* ○ Ruslan Erzhanov, MSc, FGS, CGeol, PONEN RoK. General Director - WAI Kazakhstan, *Project Manager, Geology*; ○ Frank Browning, MSci, MSc (MCSM), PGCert, MAIG, FGS, CGeol, Principal Resource Geologist, *Resource Modelling & Estimation*; ○ Stuart Richardson, BEng, MSc, CEng, MIMMM, QMR; Technical Director (Mining), *Mine Design, Optimisation and Scheduling*; ○ Jim Turner, ACSM, MCSM, BSc (Hons), MSc, CEng, MIMMM; Technical Director (Mineral Processing), *Mineral Processing Review*; and ○ Olga Pichkurova, BA, MSc, Environmental & Social Specialist, *Environmental Review*. • Activities specific to the WAI Mineral Resource audit included: ○ Review of exploration work completed to date; ○ Review of drill core logging, sampling, sample preparation, analysis and QAQC procedures; ○ Inspection of the core logging, sampling and storage facilities; ○ Inspection of selected drill core from all Muruntau Cluster deposits to confirm the nature of the mineralisation and the geological descriptions; and ○ Inspection of geology and mining operations at the Muruntau and Balpantau open pits.
Geological interpretation	• *Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.* • *Nature of the data used and of any assumptions made.* • *The effect, if any, of alternative interpretations on Mineral Resource estimation.* • *The use of geology in guiding and controlling Mineral Resource estimation.* • *The factors affecting continuity both of grade and geology.*	• The Muruntau and Mutenbai deposits have diffuse grade architecture, controlled by complex mineralised vein arrays and stockworks. Mineralisation is commonly developed sub-parallel to bedding in the folded and faulted host sequence, resulting in mineralised zones with folded geometries at a range of scales and major fault-related discontinuities. • NMMC constructed mineralisation domain wireframes by compositing samples above specific cut-off grades (0.3g/t, 0.5g/t & 1g/t) and using implicit modelling (Leapfrog Intrusions) to generate envelopes around the composites. Structural trends were constructed and applied to the envelopes, such that domain orientation and continuity reflects the interpreted orientation and continuity of the mineralisation.

Criteria	JORC Code explanation	Commentary
		• Comparison of the domain wireframes used in resource estimation with the grade control block model shows good spatial correlation, indicating that the resource domains effectively represent the outline of Muruntau mineralisation at the cut-off grades applied. • The Besapantau deposit is interpreted to comprise a series of stacked sub-parallel mineralised sheets and lenses. Mineralised zones are typically more discrete, narrower and lower continuity than at Muruntau and Mutenbai. • The Balpantau deposit shares similarities with Besapantau in that local deposit morphology is characterised by discrete sub-parallel semi-planar mineralised zones. One significant difference is that orientation is variable, whereby the dominant strike and dip wraps around a central volcanic dome, with mineralisation developed proximal to the contact between the volcanic rocks and overlying metasediments. • For Besapantau and Balpantau the same general wireframing approach used for Muruntau and Mutenbai was applied, with parameters tailored to fit deposit geology by reducing minimum composite length and maximum internal waste, applying unique structural trends and removing the 1g/t grade shell due to the lack of continuity at higher wireframe boundary cut-off grades. • No grade control data is currently available to verify the Besapantau domain definition. • The limited grade control modelling currently available for the upper levels of Balpantau, confirms some of the principal orientations and mineralised zones in the resource model, however blocks above cut-off are generally more spatially extensive in the grade control model.
Dimensions	• *The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	• Muruntau deposit is 2.5km by 1.2km in plan. Current drill coverage extends to 1000m below surface. • Mutenbai 1.5km by 1.3km in plan. Broader spaced exploration drill coverage extends to 1200m below surface, whilst the deepest exploration holes intersect mineralisation at 1950m. • The Besapantau deposit is 2.5km by 1.1km in plan. The deposit was explored to a depth of 600m below surface. • The Balpantau deposit is 1.5km by 1.2km in plan. Current drill coverage extends to 250m below surface.
Estimation and modelling techniques	• *The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted*	• Database import, and preparation, wireframe modelling, statistical analysis, compositing, variographic analysis, block modelling and grade estimation were undertaken by NMMC primarily using Leapfrog Geo and Leapfrog Edge software. • WAI audited the Mineral Resource estimates using a combination of Leapfrog Geo, Leapfrog Edge, Snowden Supervisor and Datamine Studio RM software. WAI completed pit optimisations on the

Criteria	JORC Code explanation	Commentary
	estimation method was chosen include a description of computer software and parameters used. • *The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.* • *The assumptions made regarding recovery of by-products.* • *Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).* • *In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.* • *Any assumptions behind modelling of selective mining units.* • *Any assumptions about correlation between variables.* • *Description of how the geological interpretation was used to control the resource estimates.* • *Discussion of basis for using or not using grade cutting or capping.* • *The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.*	audited block models using Datamine Studio OP and NPV Scheduler software. • A 2m downhole composite length was chosen for all deposits. • Grade capping has been applied to isolated outlier values prior to variography and grade estimation, based on a combination of histogram, disintegration analysis and statistical analysis of composites. • Distance based capping was applied to restrict extrapolation of high grades during interpolation. • Block models defining the mineralised zones were constructed in Leapfrog Edge using the mineralisation domain wireframes to define the block model domain boundaries. The upper limit of each block model was restricted by a topographic surface. A parent block size of 30m x 30m x 15m was used for the Muruntau-Mutenbai block model. The Besapantau and Balpantau models used parent block dimensions of 20m x 20m x 5m. To effectively represent domain volume, sub-cell splitting was enabled at domain boundaries. No model rotations were applied. • Estimation for gold was undertaken on the blocks defined within each domain. The domains were treated as hard boundaries and as such composites from an adjacent domain could not be used in the grade estimation of another domain. Ordinary kriging (“OK”) was used as the estimation method for all deposits. • Grade estimation was run in a three-pass plan, the second and third passes using progressively larger search radii to enable the estimation of blocks unestimated on the previous pass. Search radii were guided by the variography and data spacing. Dynamic anisotropy was employed to align search orientation to local domain orientation. The orientation of the dynamic ellipsoid was determined by the same structural trends used in the construction of domain wireframes. • At Muruntau and Mutenbai, first pass block estimates were required to be informed by a minimum of 2 drillholes. Minimum sample and drillhole requirements were relaxed in higher estimation passes. • Model validation methods included visual comparison of the composite and block model grades, a statistical grade comparison and a swath plot analysis. Globally no indications of significant over or under estimation were apparent in the block models nor were any obvious interpolation issues identified.
Moisture	• *Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	• Mineral Resource tonnages have been reported on a dry basis.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td>Cut-off parameters</td><td>The basis of the adopted cut-off grade(s) or quality parameters applied.</td><td>NMMC selected a cut-off grade of 0.3g/t for reporting Mineral Resources within optimised pit shells.
Calculated breakeven cut-off grades range from 0.21 to 0.31g/t.</td></tr>
<tr><td>Mining factors or assumptions</td><td>Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.</td><td>WAI has limited the Mineral Resource to optimised pit shells based on NMMC parameters:
<table>
<tr><th colspan="6">Pit Optimisation Input Parameters (USD)</th></tr>
<tr><th colspan="2" rowspan="2">Parameter</th><th colspan="3">Value</th><th rowspan="2">Comment</th></tr>
<tr><th>Muruntau Mutenbai</th><th>Besapantau</th><th>Balpantau</th></tr>
<tr><td colspan="2">Gold Price</td><td>$1,950/oz</td><td>$1,950/oz</td><td>$1,950/oz</td><td></td></tr>
<tr><td rowspan="2">Mining</td><td>Dilution & Ore Loss</td><td>30x30x15m SMU</td><td>12x12x5m SMU</td><td>12x12x5m SMU</td><td>SMU regularisation</td></tr>
<tr><td>Overall Slope Angles</td><td>Various</td><td>42°</td><td>41°</td><td>As per SRK 2019 report</td></tr>
<tr><td rowspan="17">Costs</td><td colspan="5">Mining</td></tr>
<tr><td>Production</td><td>50,000ktpa</td><td>5,000ktpa</td><td>5,000ktpa</td><td></td></tr>
<tr><td>Mining</td><td>$1.08/t</td><td>$1.08/t</td><td>$1.08/t</td><td></td></tr>
<tr><td>Truck Haulage</td><td>$0.325/t</td><td>$0.148/(t*km)</td><td>$0.148/(t*km)</td><td>Assumed 10km for Bal and Bes</td></tr>
<tr><td>Re-Handling</td><td>$0.984/t</td><td></td><td></td><td>Rehandling MCAF of 0.7</td></tr>
<tr><td>Vertical Adjustment</td><td>$0.061/15m</td><td>$0.009/5m</td><td>$0.009/5m</td><td></td></tr>
<tr><td>Total Mining</td><td>$1.08/t</td><td>$1.08/t</td><td>$1.08/t</td><td>Excludes vertical adjustment</td></tr>
<tr><td colspan="5">Processing</td></tr>
<tr><td>Milling Costs</td><td>$8.710/t (ore)</td><td>$8.710/t (ore)</td><td>$8.710/t (ore)</td><td></td></tr>
<tr><td>CPD Expenses</td><td></td><td>$0.125/t (ore)</td><td>$0.125/t (ore)</td><td></td></tr>
<tr><td>Railway Haulage</td><td></td><td>$0.709/t (ore)</td><td>$0.709/t (ore)</td><td></td></tr>
<tr><td>Total Processing</td><td>$8.710/t (ore)</td><td>$9.543/t (ore)</td><td>$9.543/t (ore)</td><td></td></tr>
<tr><td colspan="5">Selling</td></tr>
<tr><td>Royalty</td><td>$5.399/g</td><td>$5.425/g</td><td>$5.425/g</td><td>10% Royalty Rate</td></tr>
<tr><td>Period Costs</td><td>0.676/g</td><td>$0.676/g</td><td>$0.676/g</td><td></td></tr>
<tr><td>Total Selling</td><td>$6.070/g</td><td>$6.101/g</td><td>$6.101/g</td><td></td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="3">Recovery</td><td>Process</td><td>87.9%</td><td>88.4%</td><td>88.4%</td><td></td></tr>
<tr><td>Refining</td><td>99.0%</td><td>99.0%</td><td>99.0%</td><td></td></tr>
<tr><td>Overall Process</td><td>87.1%</td><td>87.5%</td><td>87.5%</td><td></td></tr>
</table>
Although the optimised pit shells were created with mining dilution and recovery accounted for</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
		via block model regularisation, Resource tonnes and grade within the pit shell were reported in situ using the original sub-blocked model.
Metallurgical factors or assumptions	• *The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	• For Muruntau and Mutenbai the 87.1% metallurgical recovery factor is based on historic GMZ-2 plant performance. The 87.5% recovery for Besapantau and Balpantau was informed by available test work.
Environmental factors or assumptions	• *Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	• WAI is not aware of any waste storage, environmental or permitting issues that prevent the reporting of a Mineral Resource Estimate.

Bulk density	• *Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.* • *The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.* • *Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	• Limited dry bulk density data is available for the Muruntau Cluster deposits. A mixture of core and channel sample measurements have been provided for Besapantau and Balpantau. WAI has compared summary statistics for this data, against the density assumptions applied in the block model for each deposit. Current block model density assumptions appear to be conservative but reasonable given the limited amount of informing data.

Comparison Between Muruntau Cluster Density Data and MRE Assumptions

Deposit	Summary Statistics for Density Data Provided by NMMC					MRE Assumptions	
	Count	Mean	Median	Min	Max	Ore Type	Dry Bulk Density (g/cm³)
Muruntau	No data provided					All	2.6
Mutenbai	No data provided					All	2.6
Besapantau	327	2.72	2.71	2.59	2.88	Oxide	2.6
						Fresh	2.69
Balpantau	254	2.79	2.79	2.66	2.98	All	2.6

Classification	• *The basis for the classification of the Mineral Resources into varying confidence categories.* • *Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).* • *Whether the result appropriately reflects the Competent Person's view of the deposit.*	• Classification was set in the block models using a combination of data spacing, estimation pass and wireframe volume criteria:

Muruntau Cluster Resource Classification Criteria

Deposit	Measured	Indicated	Inferred
Muruntau	None assigned	• Contiguous regions with ≤ 100m by 100m data spacing; and • Blocks interpolated in the first estimation pass.	Estimated blocks that failed to meet the Indicated classification criteria
Mutenbai		• Contiguous regions with ≤ 80m by 80m data spacing; • Spacing requirement relaxed to ≤ 100m by 100m at the down-dip edge of the Indicated Resource, where geological / grade continuity is high; and • Blocks interpolated in the first estimation pass.	
Besapantau		• Contiguous regions with ≤ 60m by 60m data spacing; • Blocks interpolated in the first estimation pass; and • Blocks not within poorly informed, low volume / continuity mesh parts.	

		Balpantau | | • Contiguous regions with ≤ 60m by 60m data spacing; • Blocks interpolated in the first estimation pass; and • Blocks not within poorly informed, low volume / continuity mesh parts. |
Audits or reviews	• *The results of any audits or reviews of Mineral Resource estimates.*	• The WAI audit identified a range of data quality issues around analytical accuracy and precision, incomplete QAQC coverage and protocols, definition of dry bulk density and historic drill sample recovery. These issues have been in part mitigated by improved practices and performance in recent years, alongside the verification and selection of a subset of the drillhole databases deemed appropriate for modelling and estimation. • Based on the results of the Mineral Resource audit, WAI considers the NMMC classification approach to reflect the confidence in the drillhole data, the geological interpretation, geological continuity, data spacing and orientation, spatial grade continuity, estimation method and reconciliation performance.

Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*
	• *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*
	• *These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*
		• Reconciliation is a key tool to assess the overall materiality of any residual database errors and estimation errors associated with the current estimation approach and data spacing. A benchmark widely used in the mining industry for Resource classification and the evaluation of reconciliation data is the 90:15 rule whereby:
		  ○ Measured Resources have an error of ±15% at the 90% confidence limits for tonnes, grade and metal for quarterly production volumes;
		  ○ Indicated Resources have an error of ±15% at the 90% confidence limits for tonnes, grade and metal for annual production volumes; and
		  ○ Inferred Resources fail to meet the Indicated criteria.
		• NMMC has compared the Resource and grade control models over annual production volumes for Muruntau and Mutenbai. Tonnage, grade and metal variance is typically significantly below the ±15% Indicated benchmark. WAI considers that at the exceptionally large annual production volumes for both deposits, overall model errors are likely within tolerance for the classification of Indicated Mineral Resources.
		• The Besapantau and Balpantau deposits are characterised by more discrete mineralised zones with greater spatial complexity. Based on initial grade control drilling and reconciliation results (single year of production at Balpantau), the closer drill spacing and higher proportion of recent drilling at these deposits appears sufficient to support Indicated Resources, however this should be re-evaluated as mining progresses and more grade control data becomes available.

Section 4: Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	• *Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.* • *Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.*	• The Ore Reserve Estimate for the Muruntau Cluster has been based on the 01 January 2024 Mineral Resource estimate prepared by NMMC and audited by WAI. • The Mineral Resources are reported inclusive or Ore Reserves
Site visits	• *Comment on any site visits undertaken by the Competent Person and the outcome of those visits.* • *If no site visits have been undertaken indicate why this is the case.*	• The following consultants from WAI conducted personal inspections of the Muruntau Cluster assets between the 6th and 9th November 2023: ○ Ché Osmond, BSc, MSc (MCSM), FGS, EurGeol, CGeol, Technical Director (Geology), *Geology, Resources, Project Overview, Financials;* ○ Ruslan Erzhanov, MSc, FGS, CGeol, PONEN RoK. General Director - WAI Kazakhstan, *Project Manager, Geology*; ○ Frank Browning, MSci, MSc (MCSM), PGCert, MAIG, FGS, CGeol, Principal Resource Geologist, *Resource Modelling & Estimation*; ○ Stuart Richardson, BEng, MSc, CEng, MIMMM, QMR; Technical Director (Mining), *Mine Design, Optimisation and Scheduling*; ○ Jim Turner, ACSM, MCSM, BSc (Hons), MSc, CEng, MIMMM; Technical Director (Mineral Processing), *Mineral Processing Review*; and ○ Olga Pichkurova, BA, MSc, Environmental & Social Specialist, *Environmental Review*.
Study status	• *The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.* • *The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.*	• The Muruntau Cluster site is an active mining operation comprising four open pit mines. • PFS equivalent project designs have been prepared for the operations and WAI consider the mine plan to be technically achievable. • The project is economically viable when considering the expected revenues and costs.
Cut-off parameters	• *The basis of the cut-off grade(s) or quality parameters applied.*	• Operationally, the mine uses a mill cut-off of **0.50g/t Au** and as such this operational COG has been utilised to derive the Ore Reserve Estimate. • Calculated break-even ore cut-off grade for material sent to the process plants

Criteria	JORC Code explanation	Commentary
		ranges between 0.2-0.35g/t Au.
Mining factors or assumptions	• *The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design).* • *The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.* • *The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.* • *The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).* • *The mining dilution factors used.* • *The mining recovery factors used.* • *Any minimum mining widths used.* • *The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.* • *The infrastructure requirements of the selected mining methods.*	• Ore Reserves have been estimated by optimization followed by evaluation of the mining designs for the planned open pit against the optimization results and mineral resource block model. • **Inferred** Mineral Resources have been included within the life of mine schedules as plant feed in order to replicate the operational situation at the mine, however none of the Inferred material has been monetized in the financial modelling and effectively treated as a waste tonnage. • The majority of the open pits which constitute the Muruntau Cluster mine sites are currently in production and the mine schedule therefore assumes no ramp up, however the Muruntau Mine schedule does show a reduction in ore tonnage in 2024-5 due to waste stripping requirements. Current production from Muruntau-Mutenbai is 47Mtpa, with a further 3Mtpa from Besapantau and 5Mtpa from Balpantau. • Mining dilution has been applied within the block model, regularised to the mining block size. • Open pits have been designed to final slope angles based upon the approved geotechnical reporting.
Metallurgical factors or assumptions	• *The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.* • *Whether the metallurgical process is well-tested technology or novel in nature.* • *The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.* • *Any assumptions or allowances made for deleterious elements.* • *The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.* • *For minerals that are defined by a specification, has the ore reserve*	• The NMMC Muruntau-Mutenbai processing complex has been in continuous operation since 1969. Several phases of expansion have been completed since then and only fresh ore is currently mined and processed from the main Muruntau-Mutenbai combined pit. The ore consists of complex stockworks with a head grade of circa 1.1-1.2 g/t Au. • GMZ-2 has a nominal design throughput of 50Mtpa, which is the largest gold processing plant in the world based on throughput. The flowsheet is based on cyanide leaching and Resin-in-Pulp (RIP) technology. • GMZ-7 (nominal throughput 15Mtpa) which processes the old Newmont heap leach tailings material through a conventional Carbon-in-Pulp (CIP) flowsheet. • CKVZ is a dedicated and conventional Heap Leach operation for low grade ore (nominal throughput 11Mtpa). There are other processing and treatment

Criteria	JORC Code explanation	Commentary
	estimation been based on the appropriate mineralogy to meet the specifications?	facilities within the general site complex treating material from other operations within the Navoi group. • The mineralogy of the ore is relatively straightforward and no deleterious elements are found in the ore that makes processing problematic.
Environmental	• *The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	• In general, NMMC has good paper environmental and social policies and understanding of the importance of these aspects in relation to sustainability.
Infrastructure	• *The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	• The Muruntau Cluster mine sites are currently operational, and all necessary infrastructure required for the processing and mining, or ore is deemed to be in place.
Costs	• *The derivation of, or assumptions made, regarding projected capital costs in the study.* • *The methodology used to estimate operating costs.* • *Allowances made for the content of deleterious elements.* • *The source of exchange rates used in the study.* • *Derivation of transportation charges.* • *The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.*	• Capital and costs have been based upon operational data provided by the mine operator. • No contingency has been provided for within these estimates. • Operating costs have been based upon operational data provided by the mine operator. • Taxes and royalties have been applied as appropriate at the levels outlined by the state.

Process Recoveries

Categories	Muruntau - Mutenbai	Besapantau		Balpantau	
	Sulphide	Sulphide	Oxide	Sulphide	Oxide
Recovery	87.9%	88.4%	88.2%	88.4%	88.6%
Refining Recovery	99.0%	99.0%	99.0%	99.0%	99.0%
Overall Recovery	87.1%	87.5%	87.3%	87.5%	87.7%

Criteria	JORC Code explanation	Commentary
	• *The allowances made for royalties payable, both Government and private.*	
Revenue factors	• *The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.* • *The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.*	• Financial analysis and mine optimization works use a gold price of US$1,650/oz and are constant for the life of the project.
Market assessment	• *The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.* • *A customer and competitor analysis along with the identification of likely market windows for the product.* • *Price and volume forecasts and the basis for these forecasts.* • *For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.*	• The supply and demand situation for gold is affected by a wide range of factors, and consumption changes with economic development and circumstances. Dore bars are securely shipped and delivered to refineries in accordance with demand and market conditions on an ongoing basis.
Economic	• *The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.* • *NPV ranges and sensitivity to variations in the significant assumptions and inputs.*	• Discount rate has been applied at 10% for both the determination of NPV in the Financial Analysis, and as an input to open pit shell optimization. • Price inflation has not been considered. • NPV_{10} for the Muruntau Cluster exceeds US$7B
Social	• *The status of agreements with key stakeholders and matters leading to social licence to operate.*	• In general, NMMC has good paper environmental and social policies and understanding of the importance of these aspects in relation to sustainability.
Other	• *To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:* • *Any identified material naturally occurring risks.* • *The status of material legal agreements and marketing arrangements.* • *The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable*	• n/a

Criteria	JORC Code explanation	Commentary
	grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.	
Classification	• *The basis for the classification of the Ore Reserves into varying confidence categories.* • *Whether the result appropriately reflects the Competent Person's view of the deposit.* • *The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).*	• *Measured* Mineral Resources convert to *Proved* Ore Reserves. • *Indicated* Mineral Resources convert to *Probable* Ore Reserves. • *Inferred* Mineral Resources regarded as waste the for optimisation and evaluation purposes. • The project and Ore Reserve estimate appropriately reflect the Competent Person's views.
Audits or reviews	• *The results of any audits or reviews of Ore Reserve estimates.*	• WAI is not aware of the findings of any audits or reviews that may have been carried out.
Discussion of relative accuracy/ confidence	• *Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.* • *The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.* • *Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* • *It is recognised that this may not be possible or appropriate in all*	• The mine designs, schedule and financial model on which the Ore Reserve is based has been completed to a PFS equivalent standard with a corresponding level of confidence. • All modifying factors have been applied to design the open pit mining blocks on a project-wide scale. • The Ore Reserve estimate is based upon the Mineral Resource estimate carried out by NMMC and audited by WAI with an effective date of 01 January 2024 • The Mineral Resources are reported inclusive of Ore Reserves

Criteria	JORC Code explanation	Commentary
	circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	

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