Technical Report Summary of

Mineral Reserves and Mineral Resources

for

Grasberg minerals district

Papua, Indonesia

Effective Date: **December 31, 2021**
Report Date: **January 31, 2022**

IMPORTANT NOTE

This Technical Report Summary (TRS) has been prepared for Freeport-McMoRan Inc. (FCX) in support of the disclosure and filing requirements of the United States (U.S.) Securities and Exchange Commission (SEC) under Subpart 1300 of Regulation S-K. The quality of information, conclusions, and estimates contained herein apply as of the date of this TRS. Events (including changes to the assumptions, conditions, and/or qualifications outlined in this TRS) may have occurred since the date of this TRS, which may substantially alter the conclusions and opinions herein. Any use of this TRS by a third-party beyond its intended use is at that party's sole risk.

CAUTIONARY STATEMENT

This TRS contains forward-looking statements in which potential future performance is discussed. The words "anticipates," "may," "can," "plans," "believes," "estimates," "expects," "projects," "targets," "intends," "likely," "will," "should," "could," "to be," "potential," "assumptions," "guidance," "aspirations," "future" and any similar expressions are intended to identify those assertions as forward-looking statements. Forward-looking statements are all statements other than statements of historical facts, such as plans, projections, forecasts or expectations relating to business outlook, strategy, goals, or targets; ore grades and processing rates; production and sales volumes; unit net cash costs; net present values; economic assessments; capital expenditures; operating costs; operating or Life-of-Mine (LOM) plans; cash flows; PT-FI's development, financing, construction and completion of new domestic smelting capacity in Indonesia in accordance with the terms of its special mining license (IUPK); FCX's commitments to deliver responsibly produced copper, including plans to implement and validate all of its operating sites under The Copper Mark, and to comply with other disclosure frameworks; improvements in operating procedures and technology innovations; potential environmental and social impacts; exploration efforts and results; development and production activities, rates and costs; future organic growth opportunities; tax rates; export quotas and duties; impact of price changes in the commodities FCX produces, primarily copper; mineral resource and mineral reserve estimates and recoveries; and information pertaining to the financial and operating performance and mine life of the Grasberg minerals district mines.

Readers are cautioned that forward-looking statements in this TRS are necessarily based on opinions and estimates of the Qualified Persons (QPs) authoring this TRS, are not guarantees of future performance, and actual results may differ materially from those anticipated, expected, projected or assumed in the forward-looking statements. Material assumptions regarding forward-looking statements are discussed in this TRS, where applicable. In addition to such assumptions, the forward-looking statements are inherently subject to significant business, economic and competitive uncertainties, and contingencies. Important factors that can cause actual results to differ materially from those anticipated in the forward-looking statements include, but are not limited to, supply of and demand for, and prices of, the commodities FCX produces, primarily copper; changes in cash requirements, financial position, financing or investment plans; changes in general market, economic, tax, regulatory, or industry conditions; reductions in liquidity and access to capital; the ongoing COVID-19 pandemic and any future public health crisis; political and social risks; operational risks inherent in mining, with higher inherent risks in underground mining; availability and increased costs associated with mining inputs and labor; fluctuations in price and availability of commodities purchased, including higher prices for fuel, steel, power, labor, and other consumables contributing to higher costs; constraints on supply and logistics, including transportation services; mine sequencing; changes in mine plans or operational modifications, delays, deferrals, or cancellations; production rates; timing of shipments; results of technical, economic, or feasibility studies; potential inventory adjustments; potential impairment of long-lived mining assets; the potential effects of violence in Indonesia generally and in the province of Papua; the Indonesia government's extension of PT-FI's export license after March 15, 2022; satisfaction of requirements in accordance with PT-FI's IUPK to extend mining rights from 2031 through 2041; the Indonesia government's approval of a deferred schedule for completion of new domestic smelting capacity in Indonesia; expected results from improvements in operating procedures and technology, including innovation initiatives; industry risks; financial condition of FCX's customers, suppliers, vendors, partners, and affiliates; cybersecurity incidents; labor relations, including labor-related work stoppages and costs; compliance with applicable environmental, health and safety laws and regulations; weather- and climate-related risks; environmental risks and litigation results; FCX's ability to comply with its responsible production commitments under specific frameworks and any changes to such frameworks; and other factors described in more detail under the heading "Risk Factors" contained in Part I, Item 1A. of FCX's Annual Report on Form 10-K for the year ended December 31, 2021, filed with the SEC.

Investors are cautioned that many of the assumptions upon which the forward-looking statements are based are likely to change after the date the forward-looking statements are made, including for example commodity prices, which FCX cannot control, and production volumes and costs or technological solutions and innovation, some aspects of which FCX may not be able to control. Further, FCX may make changes to its business plans that could affect its results. FCX and the QPs who authored this TRS caution investors that FCX undertakes no obligation to update any forward-looking statements, which speak only as of the date made, notwithstanding any changes in the assumptions, changes in business plans, actual experience, or other changes.

This TRS also contains financial measures such as site cash costs and unit net cash costs per pound of metal and free cash flow, which are not recognized under U.S. generally accepted accounting principles.

Qualified Person Signature Page

Mine: Grasberg minerals district
Effective Date: December 31, 2021
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/s/ Andrew Issel

Andrzej (Andrew) H. Issel, P.Geo., RM-SME
Director Resource Estimation and Reporting- PT-FI

/s/ Tim Casten

Tim Casten, P.E.
Vice President Underground Planning

/s/ Ari Partanen

Ari Partanen, P.E., RM-SME
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1 EXECUTIVE SUMMARY

This Technical Report Summary (TRS) is prepared by Qualified Persons (QPs) for Freeport-McMoRan Inc. (FCX), a leading international mining company with headquarters located in Phoenix, Arizona, United States (U.S.). The purpose of this TRS is to report mineral reserve and mineral resource estimates at the Grasberg minerals district using estimation parameters as of December 31, 2021.

1.1 Property Description, Current Status, and Ownership

The Grasberg minerals district is a copper, gold, and silver porphyry skarn deposit located in the remote highlands of the Sudirman Mountain Range in the eastern province of Papua, Indonesia, on the western half of the island of New Guinea. The district includes the following operating underground mines: Grasberg Block Cave (GBC), Deep Mill Level Zone (DMLZ), and Big Gossan (BG). The Grasberg minerals district also includes Kucing Liar (KL), which began development in 2021. The Deep Ore Zone (DOZ) ceased production at the end of 2021 and Grasberg open-pit (GRS_OP) in 2019.

The mine operates 365 days per year on a 24 hour per day schedule. Mining and ore processing operations are currently in production and the mineral district is considered a production stage property.

PT Freeport Indonesia (PT-FI) is a limited liability company, organized under the laws of the Republic of Indonesia. PT-FI operates the mines in the Grasberg minerals district. On December 21, 2018, FCX completed the transaction with the Indonesia government regarding PT-FI's long-term mining rights and share ownership. Following the transaction, FCX has a 48.76 percent share ownership in PT-FI and the remaining 51.24 percent share ownership is collectively held by PT Indonesia Asahan Aluminum (Persero) (PT Inalum, also known as MIND ID), an Indonesia state-owned enterprise, and PT Indonesia Papua Metal Dan Mineral (formerly known as PT Indocopper Investama), which is expected to be owned by PT Inalum and the provincial/regional government in Papua, Indonesia. The arrangements related to the transaction also provide for FCX and the other pre-transaction PT-FI shareholders to initially retain the economics of the revenue and cost sharing arrangements under the former unincorporated joint venture with Rio Tinto plc (Rio Tinto). As a result, FCX's economic interest in PT-FI is expected to approximate 81 percent through 2022 and 48.76 percent thereafter.

Since 1967, PT-FI has been the only operator of exploration and mining activities in the approximately 24,600-acre operating area under a Special Mining Business Permit "Ijin Usaha Pertambangan Khusus" (IUPK). Under the terms of the IUPK, PT-FI has been granted an extension of mining rights through 2031, with further extension of mining rights through 2041. PT-FI committed to construct new domestic smelting capacity totaling 2 million metric tons of concentrate per year and fulfilling its defined fiscal obligations to the Indonesia government.

1.2 Geology and Mineralization

The ore bodies are located within and around two main igneous intrusions: the Grasberg monzodiorite and the Ertsberg diorite. The host rocks of these ore bodies include both carbonate and clastic rocks that form the ridge crests and upper flanks of the Sudirman Range and the igneous rocks of monzonitic to dioritic composition that intrude them. The igneous-hosted ore bodies (GBC, and portions of the DMLZ) occur as vein stockworks and disseminations of copper sulfides, dominated by chalcopyrite and to a lesser extent bornite. The sedimentary-rock hosted ore bodies (portions of the DMLZ, KL and all of the BG) occur as magnetite-rich, calcium/magnesian skarn replacements, whose location and orientation are strongly influenced by major faults and by the chemistry of the carbonate rocks along the margins of the intrusions.

Grasberg minerals district economic copper, gold, and silver mineralization is hosted in porphyries and skarns. The primary sulfide mineralization is chalcopyrite, with lesser bornite, chalcocite, and covellite. Gold concentrations usually occur as inclusions within the copper sulfide minerals, although in some parts of deposits gold can also be strongly associated with pyrite.

1.3 Mineral Reserve Estimate

Mineral reserves are summarized from the Life-of-Mine (LOM) plan, which is the compilation of the relevant modifying factors for establishing an operational, economically viable mine plan.

Mineral reserves have been evaluated considering the modifying factors for conversion of measured and indicated resource classes into proven and probable reserves. Inferred resources are considered as waste in the LOM plan. The details of the relevant modifying factors included in the estimation of mineral reserves are discussed in Sections 10 through 21.

The LOM plan includes the planned production to be extracted from the mine designs.

As a point of reference, the mineral reserve estimate reports the ore inventories from the LOM plan containing copper, gold, and silver metal and reported as commercially recoverable metal.

Table 1.1 summarizes the mineral reserves reported on a 100 percent property ownership basis. The mineral reserve estimate is based on commodity prices of $2.50 per pound copper, $1,200 per ounce gold, and $15 per ounce silver.

Table 1.1 – Summary of Mineral Reserves

100% Basis

PT FREEPORT INDONESIA	Tonnage[b]	Cut-off	Average Grade			Average Recovery[d]			Recoverable Metal[b]		
Summary of Mineral Reserves[a]	Metric	Grade[c]	Copper	Gold	Silver	Copper	Gold	Silver	Copper	Gold	Silver
As of December 31, 2021	M Tons	%EqCu	%	g/t	g/t	%	%	%	M lbs	kozs	kozs
GBC (Underground)											
Proven	316		1.15	0.76	3.61	83.7	63.9	55.7	6,694	4,927	20,450
Probable	541		1.01	0.69	3.87	83.7	63.9	55.7	10,051	7,636	37,486
Total	**857**	**0.63**	**1.06**	**0.71**	**3.78**	**83.7**	**63.9**	**55.7**	**16,746**	**12,563**	**57,936**
DMLZ (Underground)											
Proven	91		0.89	0.79	4.21	84.9	78.7	64.1	1,527	1,825	7,922
Probable	321		0.84	0.71	4.03	84.9	78.7	64.1	5,032	5,794	26,620
Total	**412**	**0.71**	**0.85**	**0.73**	**4.07**	**84.9**	**78.7**	**64.1**	**6,559**	**7,619**	**34,542**
BG (Underground)											
Proven	17		2.50	1.02	15.56	91.3	67.7	64.0	835	368	5,312
Probable	34		2.14	0.94	12.72	91.3	67.7	64.0	1,467	701	8,909
Total	**51**	**1.70**	**2.26**	**0.97**	**13.65**	**91.3**	**67.7**	**64.0**	**2,302**	**1,069**	**14,221**
KL (Underground)											
Proven	88		1.06	0.96	5.64	83.1	52.2	39.2	1,706	1,419	6,236
Probable	263		1.02	0.89	4.98	83.1	52.2	39.2	4,901	3,919	16,528
Total	**351**	**0.70**	**1.03**	**0.91**	**5.15**	**83.1**	**52.2**	**39.2**	**6,607**	**5,338**	**22,764**
Total Mineral Reserves											
Proven	512		1.13	0.81	4.45	84.3	64.6	54.3	10,763	8,540	39,921
Probable	1,159		1.00	0.75	4.43	84.3	64.6	54.3	21,451	18,051	89,543
Total	**1,671**		**1.04**	**0.77**	**4.44**	**84.3**	**64.6**	**54.3**	**32,214**	**26,590**	**129,464**

Notes

a) Reported as of December 31, 2021 using metal prices of $2.50 per pound copper, $1,200 per ounce gold, and $15 per ounce silver.

b) Amounts shown may not foot because of rounding.

c) Equivalent Copper (EqCu).

d) Average recoveries are reduced by smelter payable factors.

The mineral reserve estimate has been prepared using industry accepted practice and conforms to the disclosure requirements of the U.S. Securities and Exchange Commission (SEC) under Subpart 1300 of Regulation S-K (S-K1300). Mineral reserve and mineral resource estimates are evaluated annually, providing the opportunity to reassess the assumed conditions. All the technical and economic issues likely to influence the prospect of economic extraction are anticipated to be resolved under the stated assumed conditions.

1.4 Mineral Resource Estimate

Mineral resources are evaluated using the application of technical and economic factors to a geologic resource block model to generate digital surfaces of mining limits, using specialized geologic and mine planning computer software. The resulting surfaces volumetrically identify material as potentially economical, using the assumed parameters. Mineral resources are the resultant contained metal inventories.

The mineral resource estimate is the inventory of material identified as having a reasonable likelihood for economic extraction inside the mineral resource economic mining limit, less the mineral reserve volume, as applicable. The modifying factors are applied to measured, indicated, and inferred resource classifications to evaluate commercially recoverable metal. As a point of reference, the in-situ ore containing copper, gold, and silver metal are inventoried and reported by ore body.

The reported mineral resource estimate in Table 1.2 is exclusive of the reported mineral reserve, on a 100 percent property ownership basis. The mineral resource estimate is based on commodity prices of $3.00 per pound copper, $1,200 per ounce gold, and $20 per ounce silver.

Table 1.2 – Summary of Mineral Resources

100% Basis

PT FREEPORT INDONESIA Summary of Mineral Resources[a] As of December 31, 2021	Tonnage[b] Metric M Tons	Cut-off Grade[c] In-Situ %EqCu	Cut-off Grade[c] Overpull %EqCu	Average Grade Copper %	Average Grade Gold g/t	Average Grade Silver g/t	Contained Metal[b,d] Copper M lbs	Contained Metal[b,d] Gold kozs	Contained Metal[b,d] Silver kozs
GBC (Underground)									
Measured	154			0.64	0.50	3.68	2,167	2,479	18,181
Indicated	678			0.63	0.52	3.52	9,343	11,325	76,669
Subtotal	**831**			**0.63**	**0.52**	**3.55**	**11,510**	**13,804**	**94,850**
Inferred	24			0.23	0.34	2.85	122	268	2,213
Total	**855**	**0.51**	**0.36**	**0.62**	**0.51**	**3.53**	**11,632**	**14,072**	**97,063**
DMLZ (Underground)									
Measured	21			0.63	0.65	3.29	288	437	2,199
Indicated	525			0.67	0.57	3.45	7,787	9,654	58,190
Subtotal	**546**			**0.67**	**0.57**	**3.44**	**8,075**	**10,091**	**60,389**
Inferred	74			0.66	0.42	3.05	1,088	999	7,291
Total	**620**	**0.58**	**0.43**	**0.67**	**0.56**	**3.39**	**9,163**	**11,090**	**67,681**
BG (Underground)									
Measured	7			1.45	0.64	9.27	213	137	1,987
Indicated	15			1.20	0.67	7.99	392	322	3,818
Subtotal	**22**			**1.28**	**0.66**	**8.39**	**605**	**459**	**5,805**
Inferred									
Total	**22**	**1.04**		**1.28**	**0.66**	**8.39**	**605**	**459**	**5,805**
KL (Underground)									
Measured	112			0.87	0.74	4.68	2,156	2,691	16,916
Indicated	820			0.90	0.79	4.96	16,182	20,794	130,648
Subtotal	**932**			**0.89**	**0.78**	**4.92**	**18,338**	**23,484**	**147,563**
Inferred	55			0.37	0.40	2.36	447	704	4,178
Total	**987**	**0.57**	**0.42**	**0.86**	**0.76**	**4.78**	**18,785**	**24,188**	**151,742**
GB (Open-Pit)									
Measured	2			1.24	0.33	4.56	61	23	329
Indicated	12			0.78	0.29	3.48	199	107	1,287
Subtotal	**14**			**0.86**	**0.29**	**3.65**	**260**	**130**	**1,615**
Inferred									
Total	**14**	**0.15**		**0.86**	**0.29**	**3.65**	**260**	**130**	**1,615**
GBT (Open-Pit)									
Measured	7			0.46	0.98	1.69	69	214	371
Indicated	41			0.45	0.77	1.63	408	1,030	2,167
Subtotal	**48**			**0.45**	**0.80**	**1.63**	**477**	**1,243**	**2,538**
Inferred									
Total	**48**	**0.50**		**0.45**	**0.80**	**1.63**	**477**	**1,243**	**2,538**
DOM (Open-Pit)[e]									
Measured	7			1.71	0.37	10.73	281	89	2,562
Indicated	25			1.59	0.36	9.64	869	284	7,662
Subtotal	**32**			**1.62**	**0.36**	**9.89**	**1,149**	**372**	**10,225**
Inferred	1			0.86	0.08	2.88	11	2	55
Total	**33**	**1.07**	**0.57**	**1.61**	**0.35**	**9.76**	**1,161**	**374**	**10,280**
DOM (Underground)[e]									
Measured	9			1.37	0.34	8.80	265	96	2,489
Indicated	20			1.13	0.30	7.24	498	196	4,669
Subtotal	**29**			**1.20**	**0.32**	**7.72**	**763**	**292**	**7,158**
Inferred									
Total	**29**	**0.72**	**0.37**	**1.20**	**0.32**	**7.72**	**763**	**292**	**7,158**
Total Mineral Resources									
Measured	319			0.78	0.60	4.39	5,501	6,166	45,033
Indicated	2,136			0.76	0.64	4.15	35,678	43,710	285,110
Subtotal	**2,454**			**0.76**	**0.63**	**4.18**	**41,178**	**49,877**	**330,143**
Inferred	154			0.49	0.40	2.77	1,668	1,972	13,738
Total	**2,608**			**0.75**	**0.62**	**4.10**	**42,846**	**51,849**	**343,881**

Notes

a) Reported as of December 31, 2021 using metal prices of $3.00 per pound copper, $1,200 per ounce gold, and $20 per ounce silver.
Mineral Resources are exclusive of Mineral Reserves.

b) Amounts shown may not foot because of rounding.

c) Equivalent Copper (EqCu).

d) Estimated expected recoveries are consistent with those for mineral reserves but would require additional work to substantiate.

e) Cut-off grades for DOM (Open-Pit) are scheduled and low grade; DOM (Underground) scheduled and overpull.

The mineral resource estimate has been prepared using industry accepted practice and conforms to the disclosure requirements of S-K1300. Mineral reserve and mineral resource estimates are evaluated annually providing the opportunity to reassess the assumed conditions. Although all the technical and economic issues likely to influence the prospect of economic extraction of the resource are anticipated to be resolved under the stated assumed conditions, no assurance can be given that the estimated mineral resource will become proven and probable mineral reserves.

1.5 Capital and Operating Cost Estimates

The capital and operating costs are estimated by the property's operations, engineering, management, and accounting personnel in consultation with FCX corporate staff, as appropriate. The cost estimates are applicable to the planned production, mine schedule, and equipment requirements for the LOM plan. The capital costs are summarized in Table 1.3.

Table 1.3 – Capital Costs

	$ billions
Mine	$7.5
Concentrator	3.9
Supporting Infrastructure	2.3
Total Capital Expenditures	$13.7

Capital costs include development and sustaining projects for the production of the scheduled reserves. Capital cost estimates are derived from current capital costs based on extensive experience gained from many years of operating the property and do not include inflation. FCX and the PT-FI mine staff review actual costs periodically and refine cost estimates as appropriate.

The operating costs for the LOM plan are summarized in Table 1.4.

Table 1.4 – Operating Costs

	$ billions
Mine	$15.9
Processing	13.5
Balance	12.4
Total site cash operating costs	41.9
Freight	2.2
Treatment charges	9.4
Royalties & export duties	4.8
By-product credits ($1,200 Au price)	(33.9)
Total net cash costs	$24.4
Unit net cash cost at $1,200 Au price ($ per pound of copper)	$0.76
Unit net cash cost at $1,800 Au price ($ per pound of copper)	$0.29

The operating cost estimates are derived from current operating costs and practices based on extensive experience gained from many years of operating the property and do not include inflation.

1.6 Permitting Requirements

In the QP's opinion, the Grasberg minerals district has adequate plans and programs in place, is in good standing with Indonesian environmental regulatory authorities, and no current conditions represent a material risk to continued operations. The Grasberg minerals district staff has a high level of understanding of the requirements of environmental compliance, permitting, and local stakeholders in order to facilitate the development of the mineral reserve and mineral resource estimates. The periodic inspections by governmental agencies, FCX corporate staff, third-party reviews, and regular reporting confirm this understanding.

In 2020, PT-FI initiated a new environmental impact analysis Analisis Mengenai Dampak Lingkungan (AMDAL) in preparation for the proposed extension of the east and west levees to maintain the tailings within the Modified Ajkwa Deposition Area (ModADA) deposition area. PT-FI continues to work with the Indonesian Ministry of Environment and Forestry (MoEF) to address full approval of the Environmental and Social Impact Assessment (ESIA), which is currently estimated to be received in 2022. PT-FI is currently undergoing regulatory review of technical approvals, the next stage of the overall permitting process.

1.7 Conclusions and Recommendations

FCX and the QPs believe that the geologic interpretation and modeling of exploration data, economic analysis, mine design and sequencing, process scheduling, and operating and capital cost estimation have been developed using accepted industry practices and that the stated mineral reserves and mineral resources comply with SEC regulations. Periodic reviews by third-party consultants confirm these conclusions.

No recommendations for additional work are identified for the reported mineral reserves and mineral resources as of December 31, 2021.

2 INTRODUCTION

This TRS is prepared by QPs for FCX, a leading international mining company with headquarters located in Phoenix, Arizona, U.S. The purpose of this TRS is to report mineral reserve and mineral resource estimates at the Grasberg minerals district using estimation parameters as of December 31, 2021.

2.1 Terms of Reference and Sources of Information

FCX owns and operates several affiliates or subsidiaries. This TRS uses the name "FCX" interchangeably for Freeport-McMoRan Inc. and its consolidated subsidiaries.

FCX operates large, long-lived, geographically diverse assets with significant proven and probable reserves of copper, gold, and molybdenum. FCX has a dynamic portfolio of operating, expansion, and growth projects in the copper industry and is the world's largest producer of molybdenum.

FCX maintains standards, procedures, and controls in support of estimating mineral reserves and mineral resources. The QPs annually review the estimates of mineral reserves, mineral resources, supporting documentation, and compliance to internal controls. Based on their review, the QPs recommend approval of the mineral reserve and mineral resource statements to FCX senior management.

The reported estimates and supporting background information, conclusions, and opinions contained herein are based on company reports, property data, public information, and assumptions supplied by FCX employees and other third-party sources including the reports and documents listed in Section 24 of this TRS, available at the time of writing this TRS.

Unless otherwise stated, all figures and images were prepared by FCX. Units of measurement referenced in this TRS are based on local convention in use at the property and currency is expressed in U.S. dollars.

The effective date of this TRS is December 31, 2021. FCX has previously reported mineral reserves and mineralized material for the Grasberg minerals district but has not filed a TRS with the SEC.

The estimates in this TRS supersede any previous estimates of mineral reserves and mineral resources for the Grasberg minerals district.

Mineral reserves and mineral resources are reported in accordance with the requirements of S-K1300.

2.2 Qualified Persons

This TRS has been prepared by the following QPs:

- Andrzej (Andrew) H. Issel, Director Resource Estimation and Reporting - PT-FI
- Timothy Casten, Vice President Underground Planning
- Ari Partanen, Vice President Technical Services

Andrew Issel is employed by FCX and has visited the site regularly, at various times throughout his career. He is a Registered Member of the Society of Mining, Metallurgy and Exploration (RM-SME) and a Professional Geoscientist (P.Geo.) of the Association of Professional Geoscientists of Ontario, Canada. He has numerous years of direct and supervisory experience in mineral resource estimation and reserve reporting, geology evaluation, exploration, and ore body modelling. His experience includes: 16 years - porphyry copper and gold deposits in Papua, Indonesia; 4 years Carlin type gold deposits in Nevada; 8 years - Abitibi type gold deposits in Canada; 4 years - iron ore in South Africa; and 1 year coal in South Africa. He has a master's degree from the Faculty of Natural Sciences in the field of Geology from Wroclaw University in Poland. In his role as Director Resource Estimation and Reporting - PT-FI, he provides expert technical support for the geologic effort in Papua, Indonesia, with a focus on characterization, evaluation, and quantification of mineral deposits and other ore body attributes. He has a leading role and responsibility for resource estimation and reserve reporting. His most recent visit to PT-FI was in November 2019.

Tim Casten is employed by FCX and worked at the site in Papua, Indonesia from 1997 to 2002 in a variety of roles. Mr. Casten has a bachelor's degree in mining engineering from the Camborne School of Mines, UK and a Master of Science degree in Mining Engineering from the Mackay School of Mines, University of Nevada-Reno, U.S. He is a registered Professional Engineer (P.E.) in Mining in the State of Arizona and a member of the Society of Mining, Metallurgy and Exploration. He has worked in the mining industry for over 30 years, primarily in metalliferous underground operations. Since 2002, he has managed a team of engineers and technicians who support the PT-FI underground operations. His team has responsibility for mine planning, mine design, feasibility level studies, and underground reserves. Since 2002, he has been based in the FCX corporate office. Mr. Casten regularly visits the site with his most recent visit to PT-FI in December 2019.

Ari Partanen is employed by FCX and has visited the site regularly, at various times throughout his career. He is a RM-SME and a member of Engineers Australia with chartered P.E. status. He has a doctoral degree from the Australian National University in Systems Engineering, a Bachelor of Engineering degree in Electrical and Electronic Engineering from James Cook University of North Queensland, and a Graduate Certificate in Mineral Economics from Curtin University of Technology in Western Australia. He has worked in the mining industry for over 30 years primarily with processing of copper-gold, copper-cobalt, and iron ore deposits. He has worked at Grasberg minerals district in Papua, Indonesia from 2000 to 2004 in a variety of roles in the concentrator area. Since 2008, he has been based in the FCX corporate office leading a team of metallurgists who support the PT-FI oreflow, concentrator, and dewatering plant operations. His team collaborates with the site personnel on operational improvements. He also has responsibility for strategic metallurgy, including metallurgical ore characterization of future ores, process design of future facilities and mill forecasting, including metal recoveries and concentrate grades for reserve reporting. His most recent visit to PT-FI was in February 2020.

The QPs reviewed the reasonableness of the background information for the estimates. The details of the QPs' responsibilities for this TRS are outlined in Table 2.1.

Table 2.1 – Qualified Person Responsibility

Qualified Person	Responsibility
Andrew Issel	Sections 2 through 9, 11, 17, 21 through 26, and corresponding sections of the Executive Summary
Tim Casten	Sections 2, 12, 13, 15, 16, 18 through 26, and corresponding sections of the Executive Summary
Ari Partanen	Sections 2, 10, 14, 21 through 26, and corresponding sections of the Executive Summary

3 PROPERTY DESCRIPTION AND LOCATION

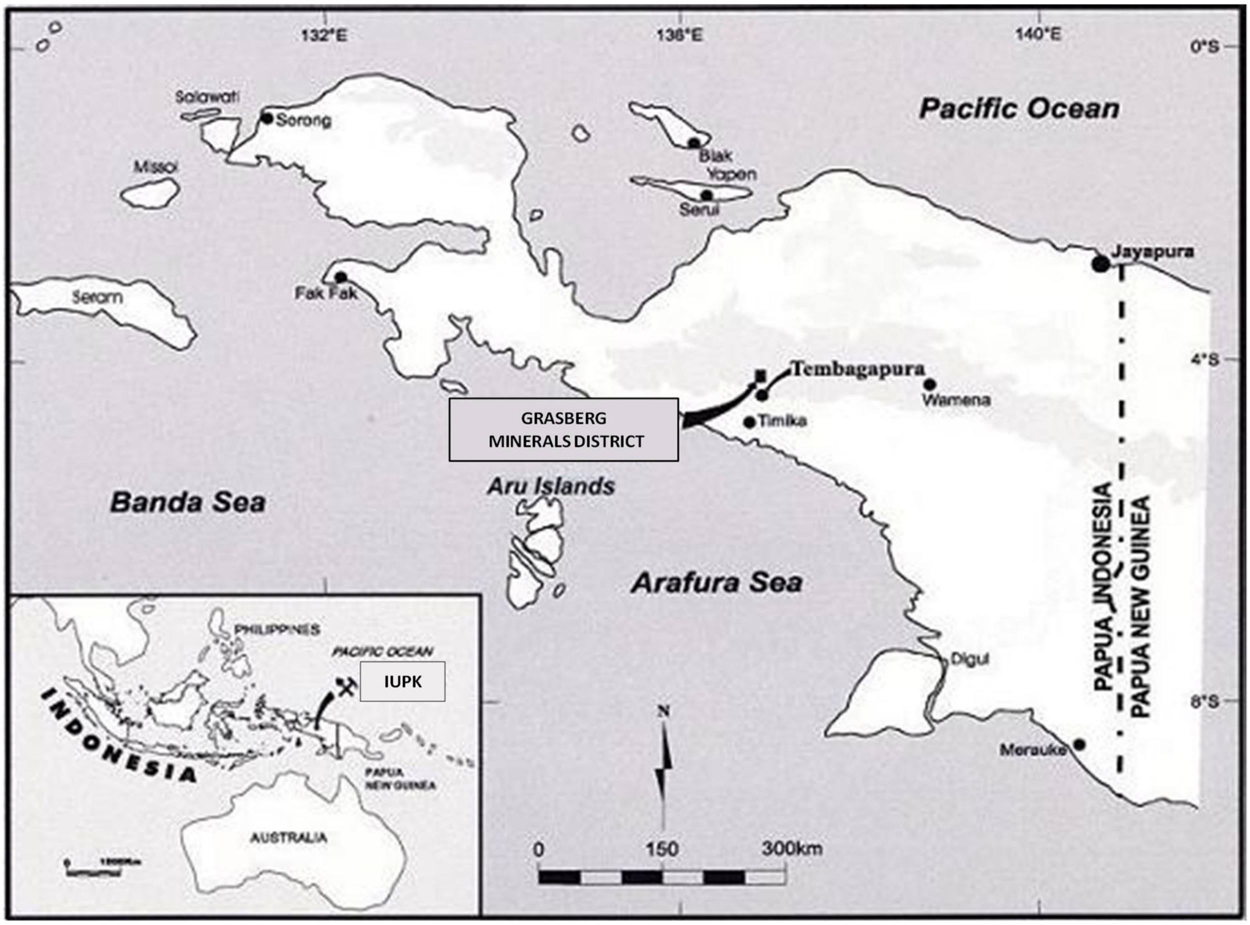
The Grasberg minerals district is a copper, gold, and silver porphyry skarn deposit located in the remote highlands of the Sudirman Mountain Range in the eastern province of Papua, Indonesia, on the western half of the island of New Guinea. The district includes the following operating underground mines: GBC, DMLZ, and BG. The Grasberg minerals district also includes Kucing Liar (KL), which began development in 2021. The Deep Ore Zone (DOZ) ceased production at the end of 2021 and Grasberg open-pit (GRS_OP) in 2019.

The mine operates 365 days per year on a 24 hour per day schedule. Mining and ore processing operations are currently in production and the mineral district is considered a production stage property.

3.1 Property Location

The property location map is illustrated in Figure 3.1.

Figure 3.1 – Property Location Map



The property is located at latitude 4.08 degrees south and longitude 137.12 degrees east using the World Geodetic System 84 coordinate system.

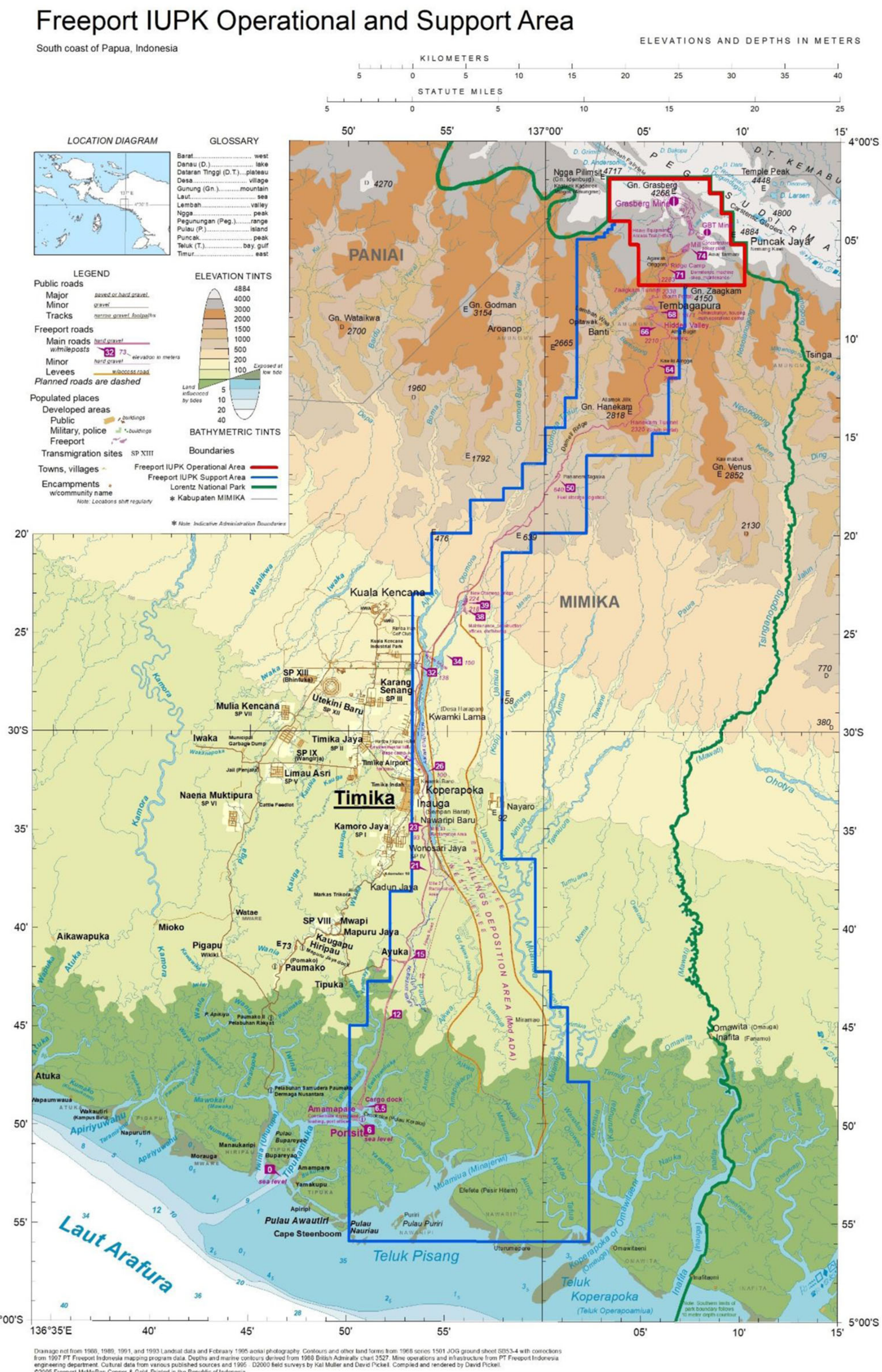
3.2 Ownership

PT-FI is a limited liability company, organized under the laws of the Republic of Indonesia. PT-FI operates the mines in the Grasberg minerals district. On December 21, 2018, FCX completed a transaction with the Indonesia government regarding PT-FI's long-term mining rights and share ownership. Following the transaction, FCX has a 48.76 percent share ownership in PT-FI and the remaining 51.24 percent share ownership is collectively held by PT Inalum, an Indonesia state-owned enterprise, and PT Indonesia Papua Metal Dan Mineral (formerly known as PT Indocopper Investama), which is expected to be owned by PT Inalum and the provincial/regional government in Papua, Indonesia. The arrangements related to the transaction also provide for FCX and the other pre-transaction PT-FI shareholders to initially retain the economics of the revenue and cost sharing arrangements under the former unincorporated joint venture with Rio Tinto plc (Rio Tinto). As a result, FCX's economic interest in PT-FI is expected to approximate 81 percent through 2022 and 48.76 percent thereafter.

3.3 Land Tenure

Since 1967, PT-FI has been the only operator of exploration and mining activities in the approximately 24,600-acre operating area under the IUPK. Figure 3.2 shows a map of the land claim status.

Figure 3.2 – Map of the IUPK Project Area



3.4 Mineral Rights and Significant Permitting

The Indonesian government granted PT-FI an IUPK replacing its former Contract of Work (COW) with the Government of Indonesia (GOI) enabling PT-FI to conduct operations in the Grasberg minerals district through 2041. Under the terms of the IUPK, FCX has been granted an extension of mining as an operator through 2031, with rights to extend mining rights through 2041, subject to, among other things, PT-FI completing the construction of additional domestic smelting capacity in Indonesia (the schedule for which is under discussion) and fulfilling its defined fiscal obligations to the Indonesia government. The IUPK, and related documentation, contain legal and fiscal terms and is legally enforceable through 2041. The IUPK may not be extended through 2041 if PT-FI fails to abide by the terms and conditions of the IUPK and applicable laws and regulations.

In connection with PT-FI's 2018 agreement with the Indonesia government to secure the extension of its long-term mining rights, PT-FI committed to construct additional domestic smelting capacity totaling 2 million metric tons of concentrate per year by December 21, 2023 (an extension of which has been requested due to COVID-19 mitigation measures subject to approval of the Indonesia government). During 2020, PT-FI notified the Indonesia government of schedule delays resulting from the COVID-19 pandemic and continues to review with the government a revised schedule for satisfying its commitment.

The IUPK also requires PT-FI to pay duties on concentrate exports of 5 percent, declining to 2.5 percent when smelter development progress exceeds 30 percent, and eliminated when smelter development progress exceeds 50 percent.

The Indonesian government regulations address the export of unrefined metals including copper concentrate and anode slimes and other matters related to the mining sector. PT-FI's export license for copper concentrate is valid for 1-year periods, subject to review and approval by the Indonesian government every 6 months, depending on smelter construction progress.

PT-FI's concentrate export license expires on March 15, 2022. Regulations include a permit to export anode slimes which is necessary for PT Smelting (PT-FI's 39.5-percent-owned copper smelter and refinery located in Gresik, Indonesia) to continue operating. PT Smelting's export license for anode slimes expires on December 9, 2022.

3.5 Comment on Factors and Risks Affecting Access, Title, and Ability to Perform Work

FCX and PT-FI believe all major permits and approvals are in place to support operations at the Grasberg minerals district. Based on the LOM plan, additional permits will become necessary in the future for river diversion out of the tailings management area as discussed in Section 17. Such processes to obtain these permits and the associated timelines are understood and similar permits have been granted in the past. FCX and PT-FI have environmental, land, water, and permitting departments that monitor and review all aspects of property ownership and permit requirements so that they are maintained in good standing and any issues are addressed in a timely manner.

The mineral district has a partially unionized workforce and has been subject to various lawsuits and work stoppages over the operating history of the mine. FCX and PT-FI understand the importance of the workforce and work in good faith to resolve conflicts.

As of December 31, 2021, FCX and PT-FI believe the mine's access, payments for titles and rights to the mineral claims, and ability to perform work on the property are all in good standing. Further, to the extent known to the QPs, there are no significant encumbrances, factors, or risks that may affect the ability to perform work in support of the estimates of mineral reserves and mineral resources.

4 ACCESSIBILITY, CLIMATE, PHYSIOGRAPHY, LOCAL RESOURCES, AND INFRASTRUCTURE

PT-FI is located at 4 degrees south latitude in Papua, Indonesia and covers a range of environmental and physiographic zones.

4.1 Accessibility

The PT-FI project area lies within the highlands of the Jayawijaya Mountain Range. Access to the project area is from either the portsite in Amamapare on the Tipeoka River or the international airport in Timika approximately 43 kilometers north of the portsite. An all-weather gravel access road connects the portsite to the site and it is the primary access point for people and materials to enter the operations area. The access road spans from the portsite to the mill site while passing the city of Timika, the PT-FI town of Kuala Kencana, and the PT-FI town of Tembagapura in the Mimika Regency. The mill site is at milepost (MP) 74. A bus service is provided for transporting workers. Helicopters service day-to-day operations. Planes out of Timika are operated by a privatized partner and commercial flights provide routine transportation to and from Jakarta and other Indonesia cities.

4.2 Climate

The climate in the project area can be categorized as a tropical monsoon climate; however, climate conditions are highly variable due to changes in elevation. In general, the lowland and coastal areas exhibit a hot, wet, and humid climate, whereas the highlands have a wet, moderate to cool climate.

Annual rainfall ranges from less than 300 centimeters in the highest elevations to 500 centimeters in Tembagapura. Temperatures at the portsite are warm with a range from 19 to 38 degrees Celsius. Temperatures at the mine site are cool with a range from minus 2 degrees Celsius to 22 degrees Celsius. It is typical for part of the project area to be under cloud cover daily.

4.3 Physiography

The terrain between the southern portsite in the lowlands to the northward mining area ranges from mangrove swamp and jungle to extremely rugged mountains. The main PT-FI town of Tembagapura is in a temperate mountain valley at an elevation of roughly 1,900 meters.

The deposits are located approximately 96 kilometers north from the coast among elevations ranging between 2,900 to 4,200 meters above sea level.

4.4 Local Resources and Infrastructure

Infrastructure is in place to support mining operations. Section 15 contains additional detail regarding site infrastructure.

The mine maintains company-owned townsites at the operation. The primary accommodations for project workers are in Tembagapura, its suburbs Hidden Valley and Ridge Camp in the highlands and Kuala Kencana in the lowlands. Tembagapura houses many of the workers and management associated with mining and processing operations. North of Tembagapura, Ridge Camp is another on-site major housing facility for the mine along with office buildings, remote control mining and maintenance facilities. Ridge Camp is the primary access point to the underground ore bodies.

Supplies are delivered by truck up the main access road to storage facilities across the operations. PT-FI has sole control of ships to transport fuel, supplies, and general cargo to the project area. PT-FI maintains purchasing offices in Jakarta and Surabaya in Indonesia and in Australia, Singapore, and the U.S.

Water sources for the project are a combination of naturally occurring mountain streams and water derived from our underground operations. FCX and PT-FI believe it has sufficient water resources to support current and future operations.

PT-FI is currently powered by an on-site coal-fired power plant, with installed capacity of 198MW, built in 1998. Diesel generators, installed starting on the 1970s through the1990s, with an installed capacity of 130MW, currently supply peaking and backup electrical power generating capacity. To support the additional energy requirements as result of the ramp-up of the underground mines, PT-FI is constructing a new 129MW dual-fuel power plant (DFPP) at the portsite to provide an additional 129MW of firm capacity to support the increased power requirements as the underground mine ramp-up. The DFPP is designed using high-efficiency dual fuel reciprocating engines on a flexible platform that can operate on either diesel fuel or natural gas, providing PT-FI future optionality to adjust the fuel type and increase plant capacity.

Site operations are adequately staffed with experienced operational, technical, and administrative personnel. FCX and PT-FI believe all necessary supplies are available as needed.

5 HISTORY

The Grasberg minerals district hosts two copper-gold-silver rich porphyry and skarn hosted systems.

The Ertsberg/Gunung Bijih (GB) “Ore Mountain” ore body was exposed at surface and mapped by the Colijn Expedition in 1936. GB was rediscovered many years later in 1960 by the Freeport Sulfur Company. In 1967, PT-FI entered into an initial 30-year COW with the GOI to mine the GB ore body. PT-FI drilled the GB in the late 1960s and mined it in the 1970s using open-pit techniques.

Following the GB finding was the discovery of the Gunung Bijih Timur (GBT) “Ore Mountain East” ore body 1 kilometer east of the GB open-pit. GBT was discovered by geologists mapping outcrops in the early 1970s during the evaluation of the GB. Exploration drilling in 1975 showed the potential for GBT and it was mined as a block cave from 1981 to 1994. GBT was the beginning of the upper portion of the Ertsberg East Skarn System (EESS), starting block cave operations in 1981. GBT open-pit was part of the GBT discovery but the GBT block cave was prioritized, and the open-pit portion was moved to resource classification.

The Dom ore body was discovered by geologists mapping outcrops in the early 1970s during the evaluation of the GB. Exploration drilling for Dom occurred from 1976 to 1977. Extensive drilling continued in the mid-1980s showing Dom has both open-pit and block cave potential. The geomechanical studies of rolling rock and slope stability issues related to mining of the Dom identified unacceptable levels of risk to mill Amole Ridge facilities below. In 2007, Dom was moved in the schedule to post-KL mining and reported as a mineral resource.

Discovery of the Intermediate Ore Zone (IOZ) was followed by DOZ situated beneath in the late 1970s. DOZ began mining as an open stope mine in 1989 and was converted to block caving techniques in 2000 and was depleted by the end of 2021.

The Grasberg deposit was discovered in 1988. The size and geology of the ore body allowed for open-pit mining from 1990 to 2019 and subsequent block cave mining beginning in 2019.

Since 1990, additional ore bodies have been discovered and delineated, namely DMLZ, BG, and KL. BG is located on the southwest side of the Ertsberg Diorite and started mining with open stope techniques in 2014. DMLZ is the lowest portion of the EESS deposit and has been mined as a block cave since 2015. KL was discovered southwest of the Grasberg deposit and started development in 2021.

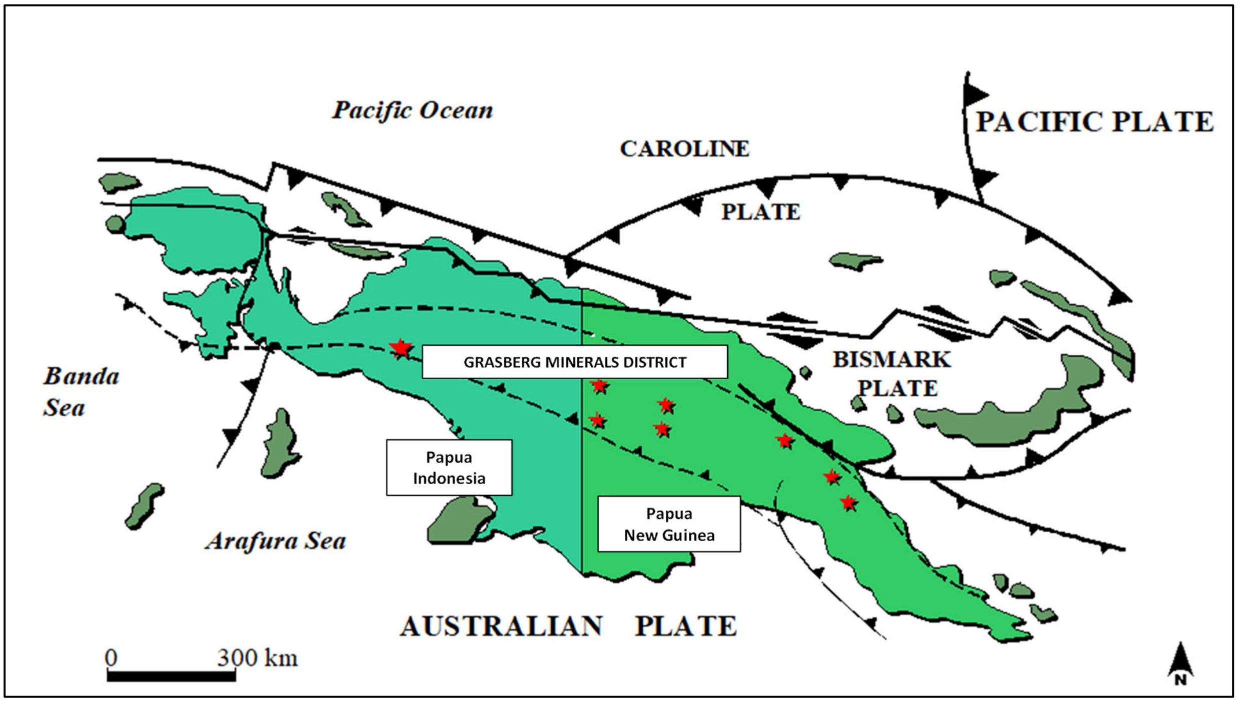
The Grasberg minerals district is a well-developed property currently in operation and all previous exploration and development work has been incorporated where appropriate in the access and operation of the property. Exploration or development work is included in the data described in Sections 6 through 11 of this TRS.

6 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Regional Geology

The Grasberg minerals district lies adjacent to the boundary of the Australian and Indo-Pacific plates as shown in Figure 6.1. The geology of the region relates to the collisional delamination tectonics when the Australian and Indo-Pacific mega plates collided along the Derewo zone, located approximately 35 kilometers north of the Grasberg minerals district. This impact caused the continental plate break-off, folded the Jayawijaya mountain range and upwelled magma into the Grasberg minerals district. The ascension of magma from the upper mantle and differentiation into a calc-alkaline type of intrusion triggered copper and gold mineralization.

Figure 6.1 – Tectonic Map in Relation to Grasberg Minerals District



6.2 Deposit Geology

The Grasberg minerals district is situated on the crest of the Jayawijaya mountain range at elevations over 2,000 meters with the highest peak, Puncak Mandala at 4,760 meters. Ore deposits in the Grasberg minerals district have economic copper, gold, and silver mineralization in porphyries and skarns. The primary sulfide mineralization is chalcopyrite, with lesser bornite, chalcocite, and covellite. Gold concentrations usually occur as inclusions within the copper sulfide minerals although in some parts of deposits gold can also be strongly associated with pyrite. The district geology map is shown in Figure 6.2.

Figure 6.2 – Grasberg Minerals District Geologic Map (Plan View)

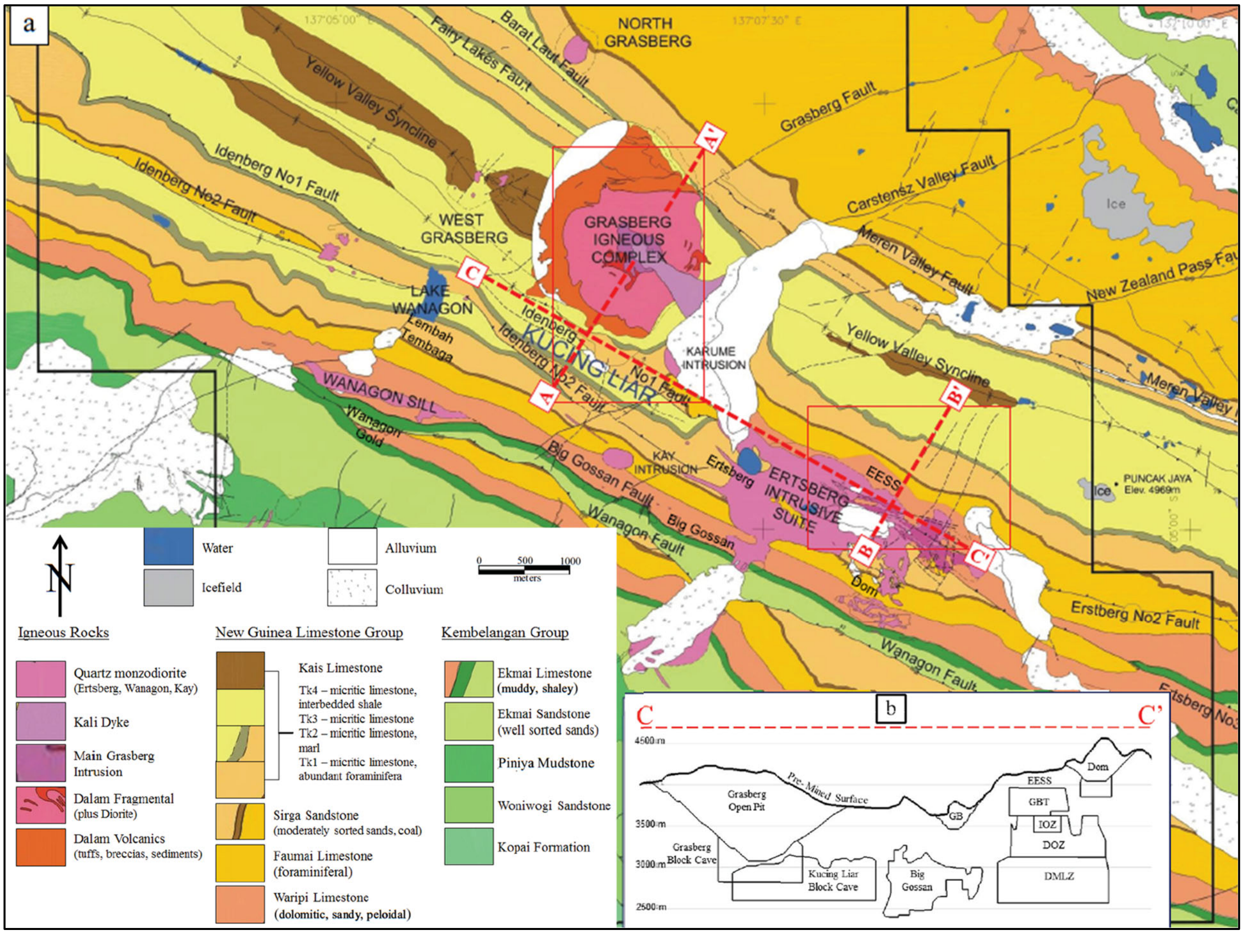


Figure 6.3 and Figure 6.4 provide a location reference for the stratigraphy, intrusions, and mineralized deposits.

Figure 6.3 – Grasberg Minerals District Geologic Map and Cross Section

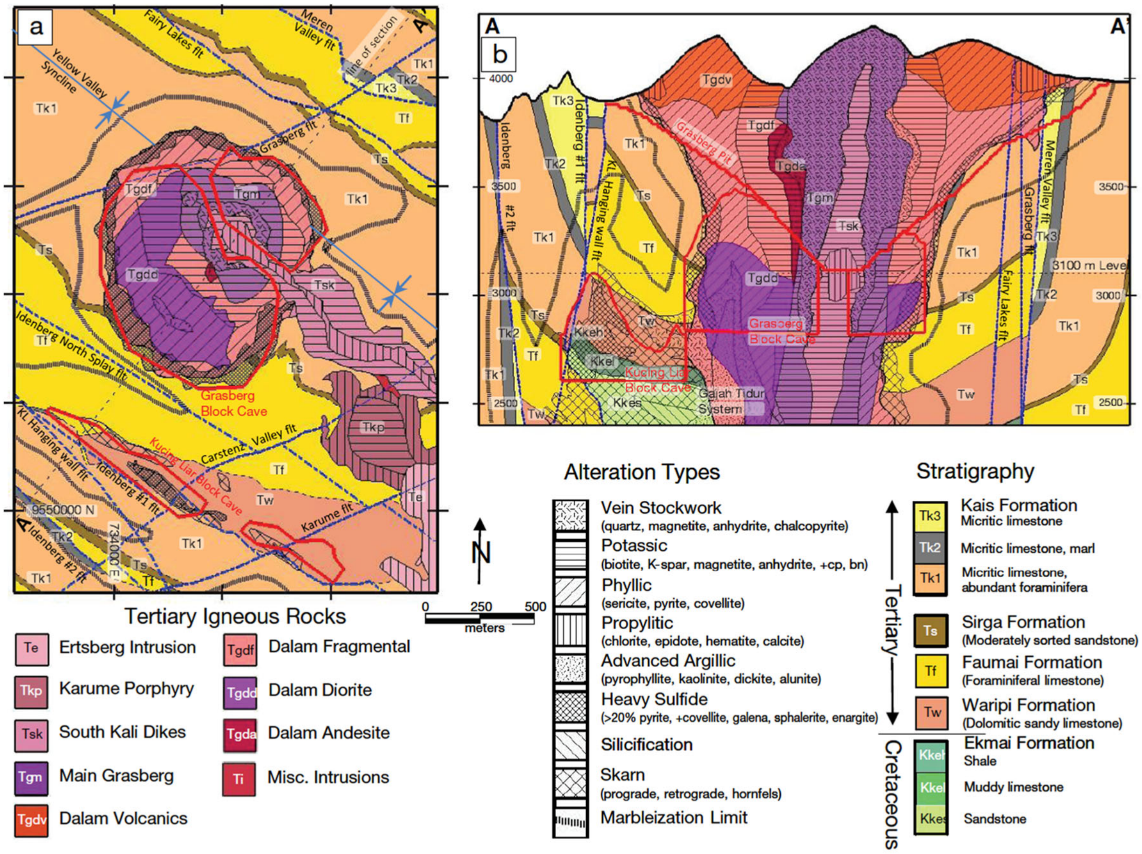
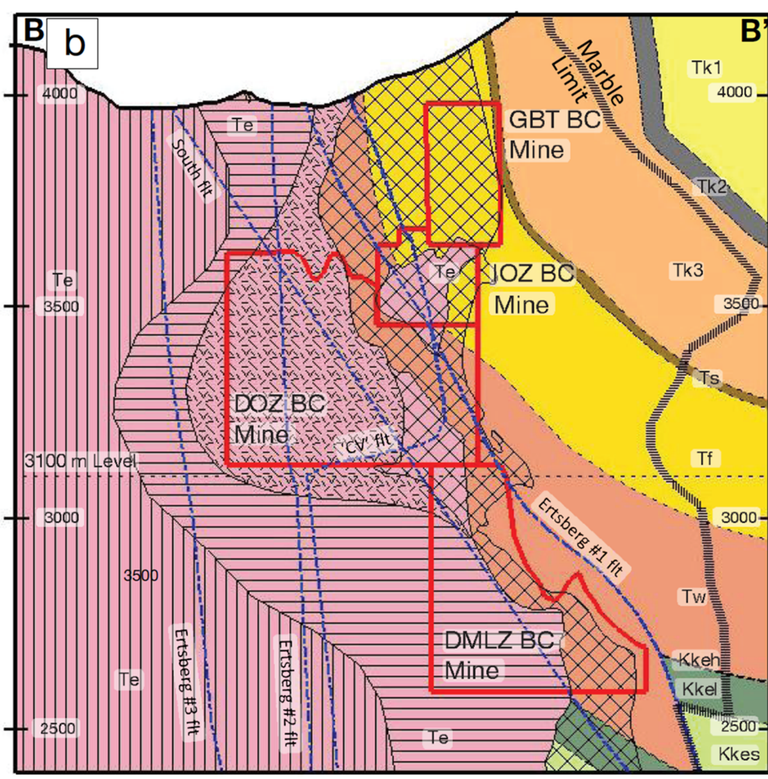


Figure 6.4 – EESS Geologic Cross Section



There are five major ore bodies in the district, all occurring within the center of the Grasberg minerals district:

- Grasberg Intrusive Complex (GIC) includes the GBC and the depleted GRS_OP.
- EESS includes DMLZ and depleted GBT, IOZ, DOZ.
- BG.
- KL (development stage mineral reserve).
- Dom (classified as mineral resource).

The ore bodies are located within and around two main igneous intrusions: the Grasberg monzodiorite and the Ertsberg diorite. The host rocks of these ore bodies include both carbonate and clastic rocks that form the ridge crests and upper flanks of the Sudirman Range and the igneous rocks of monzonitic to dioritic composition that intrude them. The igneous-hosted ore bodies (GBC and portions of the DMLZ) occur as vein stockworks and disseminations of copper sulfides, dominated by chalcopyrite and to a lesser extent bornite. The sedimentary-rock hosted ore bodies (portions of the DMLZ, KL and all of the BG) occur as magnetite-rich, calcium/magnesian skarn replacements, whose location and orientation are strongly influenced by major faults and by the chemistry of the carbonate rocks along the margins of the intrusions.

6.2.1 Structural Geology

The compressional regime played a fundamental role in the structural geometry of the Grasberg minerals district. The collision of Australian and Pacific plates that occurred approximately 8 million years ago caused folding and uplift in the central range of the Jayawijaya Mountains causing rock units to shorten, forming the west-northwest by east-southeast oriented syncline/anticline systems including the Yellow Valley Syncline (YVS) with peaks up to 5,000 meters. The movement of west-northwest trending left lateral faults paired with the northeast striking faults formed pull-apart structures that facilitated magma emplacement.

Ductile and brittle deformation contributed to folding reverse-thrust faults and bedding slip faults in the district. The reverse fault structures occur parallel to the regional fold trend, some with kilometer-scale offsets followed with later strike-slip left-lateral movement. These regional west-northwest by east-southeast structures are cut in places by northeast-southwest trending strike-slip faults which have left-lateral offsets ranging from a few meters to more rarely a few hundred meters.

Chemically reactive sedimentary host rocks combined with pre-conditioned structural zones, enabled fluid to pass through and minerals to precipitate within. The combination of the magma chemical composition, the magma cupola forcing its way to the surface and the reactivation of structures which hydrofractured surrounding rocks, subsequently formed stock-work veined, porphyry copper and gold ore bodies. The GIC was emplaced in the pull-apart basin generated by the Riedel system of west-northwest by east-southeast striking faults and the northeast-southwest trending Grasberg Fault movements that occurred within the YVS axis. The Ertsberg intrusive complex was emplaced along the opening of west-northwest by east-southeast faults.

6.2.2 Rock Types

The sedimentary rock units of the Grasberg minerals district are classified into the two main groups of formations from oldest to youngest as described below and shown in Figure 6.5:

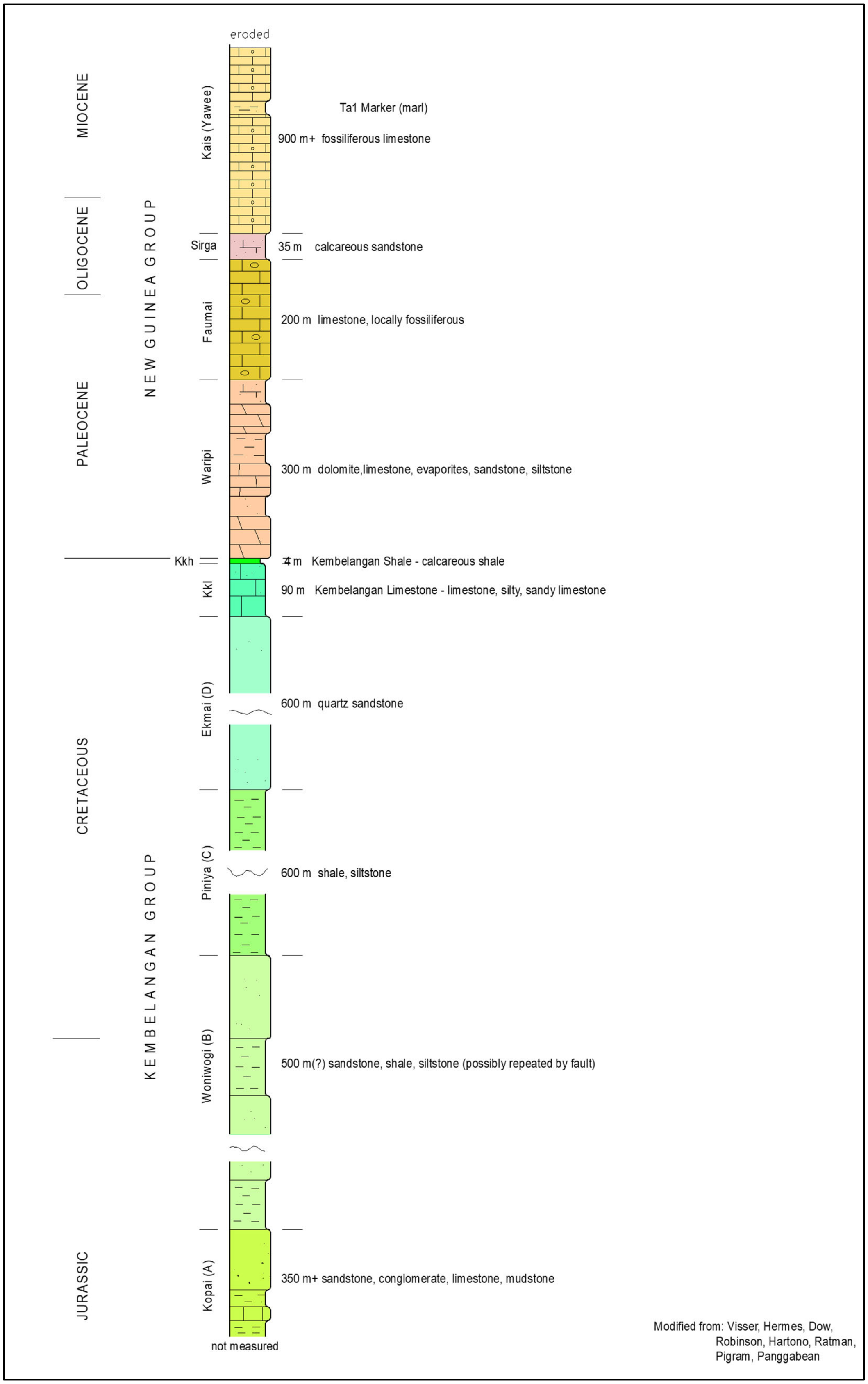
Kembelangan Group is approximately 3,400 meters thick, consists largely of siliciclastic rocks, and is divided into four formations:

- Middle to Upper Jurassic Kopai.
- Upper Jurassic to Lower Cretaceous Woniwogi.
- Lower to Middle Cretaceous Piniya.
- Upper Cretaceous Ekmai.

New Guinea Limestone Group is approximately 1,700 meters thick, is carbonate-dominated, and divided into four formations:

- Paleocene Waripi.
- Eocene Faumai.
- Oligocene Sirga.
- Upper Oligocene to Middle Miocene Kais.

Figure 6.5 – Stratigraphy of Grasberg Minerals District



The northern and central portions of the district are dominated by the 1.7 kilometer thick, largely carbonate rocks of the Lower to Middle Cenozoic New Guinea Limestone Group. Kais is the uppermost part of the New Guinea Limestone Group and is a 1.2 kilometer thick fossiliferous limestone. The Kais limestone is underlain by the 30-meters-thick quartz-carbonate sandstone of the Sirga formation, a district stratigraphic marker. Below the Sirga formation is the 150-meters-thick, massive-bedded, clean limestone of the Faumai formation. The lowermost New Guinea Limestone Group and Cenozoic unit is the Waripi formation, a 300-meters-thick anhydrite nodule-bearing dolomitic limestone, containing thin but laterally continuous quartz sandstone beds. All New Guinea Limestone Group carbonate formations can host high-grade copper and gold skarn mineralization, but the most susceptible unit is the lower part of the Waripi formation.

The New Guinea Limestone Group is underlain by predominantly siliciclastic rocks of the Cretaceous-Jurassic Kembelangan Group, the upper part of which comprises the Ekmai formation, which has three members. In increasing age, these are the 3 to 5-meters-thick Ekmai shale, the 100-meters-thick Ekmai Limestone (a calcareous mudstone), and the 600-meters-thick Ekmai sandstone. The shale member forms an important marker horizon which contains hornfels within the district and is seldom mineralized, even where units above and below have high-grade copper and gold skarn. The Ekmai limestone is altered to skarn and hornfels. The Ekmai sandstone is arkosic in nature. Both units commonly host disseminated to fracture-controlled, ore-grade mineralization where they underlie the larger skarn ore bodies.

There are two main intrusive bodies in the district: the GIC and the Ertsberg diorite.

The GIC is comprised of three major and several subordinate, distinct igneous phases. The Main Grasberg Intrusive (MGI) monzodiorite stock intruded through the center of the early formed dioritic fragmental rocks of the Dalam diatreme. Volcanic pyroclastic and flow-dome rocks of Dalam age outcrop and covered much of the pre-mining surface of the GIC. An erosional window in the south-central portion of the deposit exposed MGI-related quartz stockwork hosted copper and gold mineralization at the surface. The late stage intrusion of the South Kali dykes (monzonites), truncated the ore body and signaled the close of the igneous system. These dykes are post-mineralization and are structurally controlled, tabular units which intrude the complex from a separate stock southeast of the GIC.

All intrusions in the Ertsberg District are potassium rich, alkalic intrusions. These rocks are classified as monzodiorites, quartz monzodiorites, monzonites, trachyandesites, and trachydacites. The location, size, and shape of the intrusions in the district varies with time. Older intrusions (4 to 5 million years old) such as the South Wanagon Suite and the Utikinogon Suite are small sills, ranging from meters to hundreds of square meters in area, on the south side of the district. Intermediate intrusions (3 to 4 million years old) such as the Kay, Idenberg, and Lembah Tembaga stocks are “plug-like” in shape and measure hundreds of square meters in area. The younger intrusions (2.6 to 3.5 million years old) like Grasberg and Ertsberg are large composite intrusions or stocks (kilometer scale) and occur further to the north.

6.2.3 Alteration and Mineralization

Mineralization occurred in a short timeframe between 2.5 to 3.5 million years, shortly after the emplacement of the metal-laden associated igneous rocks. All the porphyry and skarn copper ore bodies in the area contain gold and silver as additional metals. The structurally controlled porphyry systems in the district are derived from potassium-rich magmas, dioritic to monzonitic in composition. Exoskarn and associated mineralization is mainly present in the New Guinea Limestone Group rocks, particularly within the dolomite of the Waripi formation, but also within the Cretaceous Ekmai limestone and sandstone.

The bulk of the mineralization in the district occurs within potassic-altered intrusive rocks or within prograde skarn assemblages. Chalcopyrite is the dominant ore mineral in all ore bodies. Bornite prevalence increases with depth in both the Grasberg porphyry and the Ertsberg skarns, but rarely dominates. Covellite is a common constituent in phyllic-altered (sericite-pyrite) zones. It is the dominant copper-bearing mineral in distal portions of KL and is common in the very local, argillic alteration zones at Grasberg and KL, along with other high sulfidation state sulfides. Supergene chalcocite was a minor constituent of the low-grade Grasberg ores to as much as 300 meters below original topography within the highly permeable, anhydrite-depleted “poker chip” zone. Oxide copper minerals are insignificant in all ore bodies, except for Dom where malachite and chrysocolla are abundant.

In the EESS, approximately 80 percent of gold in the prograde skarn and potassic alteration-hosted ores in the deposits occurs as free inclusions in chalcopyrite, bornite, and digenite; the remainder occurs in pyrite and silicate gangue minerals. In zones with intense phyllic and/or advanced argillic alteration, early formed, gold bearing chalcopyrite is converted to covellite with pyrite and gold is taken up in the pyrite lattice. This is especially the case in the highly altered ores in parts of KL and at the deeper margins of the Grasberg deposit. Gold is typically fine grained and not visible. Silver appears to be contained largely within the crystal lattice of the copper-bearing sulfides.

Lead (as galena), zinc (as sphalerite), and arsenic (as arsenopyrite and enargite) generally occur in low concentrations and limited locations. These accessory sulfide minerals are most common at margins of mineralization (BG and KL) and in distal fault-fracture systems, commonly accompanied by anomalous gold values and generally in areas of elevated pyrite and/or pyrrhotite. Pyrite (and lesser pyrrhotite) is relatively uncommon in the potassic alteration and prograde skarn-hosted ores, but can reach high concentrations in the lower grade phyllic and retrograde skarn alteration zones at ore body margins, such as the Heavy Sulfide Zone at GBC, KL, and on margins of DMLZ and BG. Thermal metamorphism of the carbonate rocks is evident in the occurrence of marble aureoles around all the intrusions in the district. Marbleization extends outward from the contact between 50 and 1,000 meters. The inner boundary is commonly sharp, beginning at either the igneous/sedimentary rock contact or at the skarn front. The shale member of the Ekmai formation tends to alter to hornfels outward from the igneous contacts (Leys et al., 2012).

7 EXPLORATION

The exploration history at the Grasberg minerals district is extensive, starting in the late 1960s and continuing through today. The data, methods, and historical activities presented in this section document actions that led to the initial and continued development of the mine, but are not intended to convey any discussion or disclosure of a new, material exploration target as defined by S-K1300.

The Grasberg minerals district hosts two copper-gold-silver rich porphyry and skarn hosted systems. Using a non-economic cutoff grade of 0.1 percent copper, the Grasberg-related system contains approximately 7.5 billion metric tons grading on average 0.70 percent copper and 0.64 parts per million gold in two main deposits, the Grasberg porphyry system, and the KL skarn. The Ertsberg-related system contains roughly 3.6 billion metric tons grading on average 0.60 percent copper and 0.44 parts per million gold (Leys et al., 2012).

Exploration potential exists below mineral reserves as extensions of current mineralization trend. Current operation of the Grasberg minerals district includes routine drilling programs focusing on delineation of deposits, hydrology, metallurgy, and geomechanical programs.

Major exploration summary:

- GRS_OP (Depleted) – Exploration began in 1988. The Grasberg and Kucing Liar (GRSKL) model contains 5,265 drill holes with 1,943 assayed holes containing 95,655 samples totaling 324,290 meters within the final pit. The average drill hole spacing was less than 50 meters in the late LOM. Currently, there are no drilling activities in the open-pit. The GRS_OP produced over 27 billion pounds of copper and 46 million ounces of gold in the 30-year period from 1990 through 2019.
- GBC – Exploration began in 1996. The GRSKL model contains 5,265 drill holes with 838 assayed holes containing 61,844 samples totaling 184,668 meters within the GBC reserve. The average drill hole spacing is 49 meters within the reserve. Current drilling includes infill, dewatering, and geomechanical drill programs.
- DMLZ – Exploration began in 2003. The EESS model contains 5,360 drill holes with 1,278 assayed holes containing 76,717 samples totaling 170,338 meters within the DMLZ reserve. The average drill hole spacing is within the reserve is 54 meters. Current drilling activities include: infill delineation, hydrofracking, and dewatering holes.
- BG – Exploration began at the end of 1991. The BG model contains 1,306 drill holes with 1,017 assayed holes containing 25,542 samples totaling 70,818 meters within the 1 percent Equivalent Copper Grade (EqCu) mineralized envelope. The average drill hole spacing is 30 meters within the reserve. Current drilling includes infill programs to assist with grade control.
- DOZ – Exploration began in the late 1980s. The EESS model contains 5,360 drill holes with 979 assayed holes containing 45,728 samples totaling 111,036 meters within the DOZ reserve. The average drill hole spacing is 42 meters within the reserve. Currently, DOZ does not have any active drilling and is mined out.
- KL – Exploration began in 1994. The GRSKL model contains 5,265 drill holes with 167 assayed holes containing 10,809 samples totaling 31,482 meters within the KL reserve. The average drill hole spacing is 61 meters within the reserve. Current drilling includes infill, metallurgy, and geomechanical programs.

7.1 Drilling and Sampling Methods

The majority of exploration activity in the district was drilled from underground with some historical surface core drilling. All drilling used for geologic modelling at PT-FI has utilized diamond core drilling methods since the initial development of the GB deposit.

Current drilling diameters are generally HQ-size diameter (63.5mm) and may reduce to NQ-size (47.6mm) for holes deeper than 600 meters. The drill hole database at PT-FI consists of a variety of drill core sizes ranging from BQ size (36.4mm) to PQ-size (85.0mm). Earlier drill programs often collared NQ holes and reduced to BQ for deeper drilling. Most of the material estimated with BQ diameter drilling has already been mined out.

The exploration programs completed at PT-FI (drilling, sampling, and logging) are appropriate and up to industry standard. Drill hole intervals are on average 3 meters but can range from 0.5 to 6 meters. Drilling sample quality and core recovery is good over the project area.

7.2 Collar / Downhole Surveys

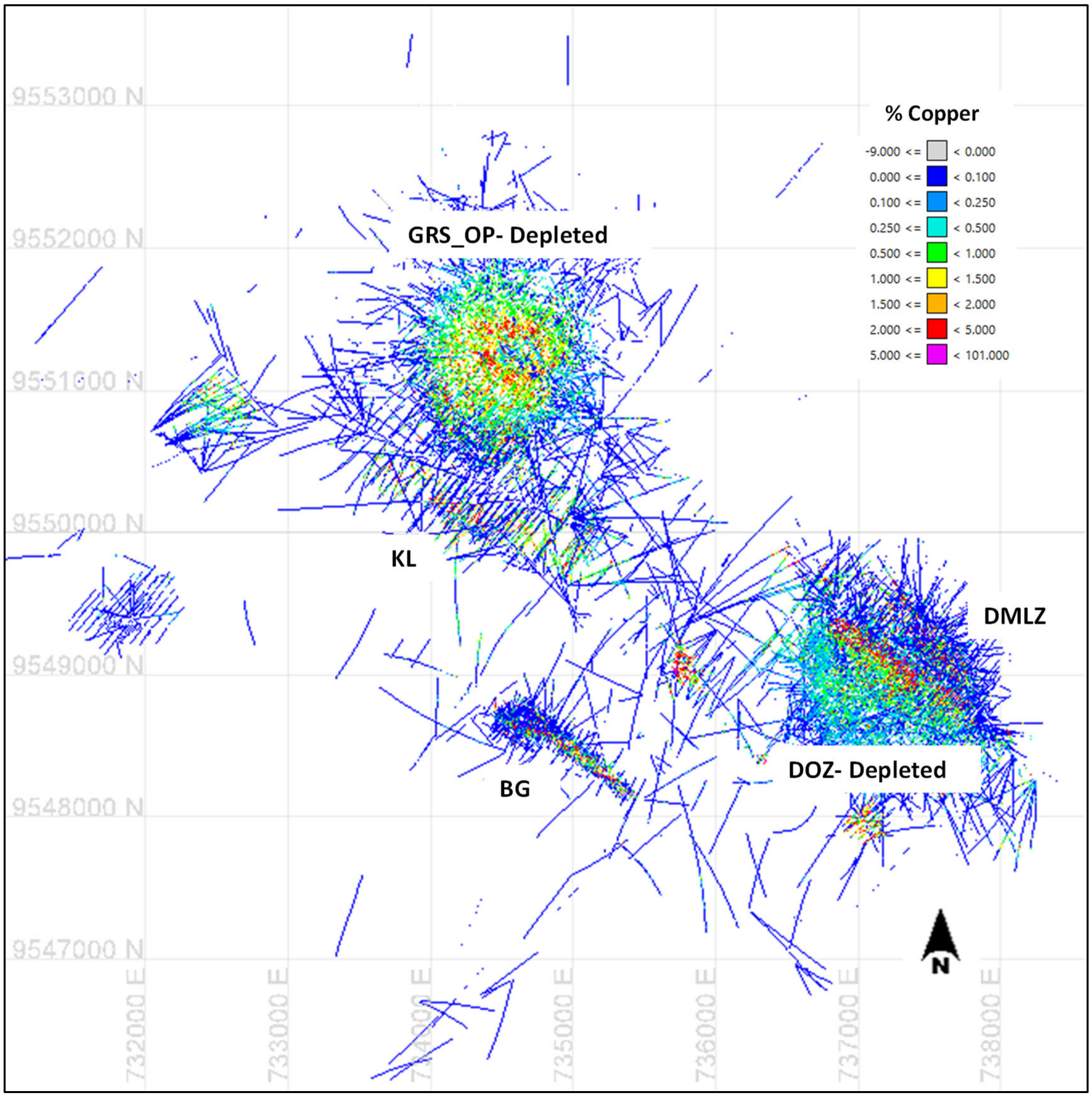
All drill hole collar locations are measured by the mine survey department and stored in the drill hole database. Downhole surveys are collected using the Reflex Gyro, which is not affected by the local magnetic field.

Historically, downhole surveys used the Acid Tube method and occasionally Sperry Sun surveys, but the highly magnetic terrain rendered this latter technique subject to inaccuracy. During the mid-1990s downhole survey methods transitioned to the more reliable Maxibor survey tool and transitioned to the currently method of Reflex Gyro. The earliest drilling programs had only collar surveys with the downhole survey projected in a straight line to the end of hole.

7.3 Drill Hole Distribution

The Grasberg minerals district drill hole database ending in 2021 contains 11,698 drill holes including exploration, geological, delineation, geomechanical, and hydrological data. Assay data is available for 9,057 holes containing 793,053 copper assays, 756,568 gold assays, and 765,741 silver assays. Drilling outside of mineralized domains is reviewed on a case by case basis and are generally not assayed. Figure 7.1 is a map illustrating assayed diamond drill holes (DDH) within the IUPK project area.

Figure 7.1 – Assayed DDHs within Grasberg Minerals District (Plan View)



7.4 Sample Quality

To maintain sample quality PT-FI has an established a Chain-of-Custody system. The database houses a reporting program used to track sample location and progress. Documentation is prepared prior to DDH core transportation from the drill rig to an intermediate handling facility where samples are subsequently loaded into secured transport containers for delivery to the centralized core handling facility in Timika. Shipment and arrival of samples is confirmed using Chain-of-Custody paperwork and a web-based confirmation system. The whole system is checked annually by a third-party reviewer.

7.5 Sample Logging

DDH core is logged in two phases: a quick log at the drill rig and a more detailed geologic log at the core handling facility by site personnel. A quick log of majority rock type takes place by the project geologist after the driller stores the core in a box. The whole core is then transported to the centralized core logging facility where a number of tasks are completed including core photos, detailed geologic logging, geomechanical logging, density measurements, magnetic susceptibility recording, and core splitting.

The core is washed and photographed prior to logging. Point load tests are completed on selected whole core from each assay interval with the broken core being returned to the core tray prior to sampling. A whole core specimen (10 to 15 centimeters long) is selected from each sample interval for density determination and is subsequently stored as skeleton for future reference.

7.6 Hydrogeology

PT-FI conducts field testing for hydrogeologic parameter determination used for groundwater modeling. Secondary permeability (mainly fractured rock and structure) is the main control on water movement. The hydrogeology monitoring program includes:

- Surface and underground piezometer monitoring of water table position and pore pressure.
- Measurements of rainfall and water flow in catchments as an indication of groundwater recharge rates from precipitation.
- Sampling for water chemistry analysis.

Data collected is analyzed and used to support groundwater movement interpretation. Rock type, alteration and structure, combined with water level measurements, flow interception during drilling, hydraulic testing using pumping, airlift or gravity drains, water sampling and recharge estimation are used for hydrogeology boundary characterization and interpretation within a conceptual hydrogeologic model. Characterization determines the ability of the hydrologic units to produce flow based upon their hydraulic properties.

Numerical models are constructed to simulate water flow using the geologic features in the conceptual model including regional faults, structure, alteration, karstification, rivers, surface water, along with past and future mining areas. Where hydraulic testing is not possible, a model calibration process for water level and flow is used to give the best estimate of hydraulic properties.

7.7 Geomechanical Data

Geomechanical logging is performed at the centralized core logging facility in Timika. All DDH core is systematically and uniformly geomechanically logged and tested unless otherwise instructed. Logging procedures follow industry-standard methods agreed upon between PT-FI and its consultants. Geomechanical logging is carried out as soon as possible after drilling, taking care that the core is disturbed as little as possible. Geomechanical measurements are taken using the following methods:

- Rock Quality Designation (RQD)/Fracture Frequency – measures the fracture spacing/density on which rock mass strength partly depends, with other principal factors being fracture orientation and joint condition logging.
- Point Load – measurements are intended as an index test for the strength classification of rock materials. Measurements are taken at 15-meters intervals while recording failure types, structures, and vein descriptions. The selected sample must have length at least equal to the core diameter measured along the core axis.

- Televiewer – provides high-resolution oriented images of drill hole wall capturing geomechanical data including: lithology, structure, and fracture stress orientation.

In general, rock mass strength is defined spatially based on the laboratory strength testing and distributions of vein intensities. Rock strengths are determined for intact failure types (where the sample test breaks only through intact rock) and combined failure types (where the sample fails through both intact rock and structure).

7.8 Comment on Exploration

In the opinion of the QP:

- The exploration programs completed at PT-FI (drilling, sampling, and logging) are appropriate for geologic resource modeling.
- The data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for mineral reserve and mineral resource estimation.
- The geomechanical core testing and hydrogeologic records are appropriate to support mine designs.

8 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Sampling Techniques and Sample Preparation

DDH core is collected by the core handling crew from the drill rig and taken to Kasuang Yard for transport packing by loading into secured transport containers. Core is given a modified drill hole identification number in Kasuang prior to arrival in Timika. PT-FI personnel use a dedicated core transport truck to deliver core to a facility in Timika for logging, storage, and sample preparation. The arrival of DDH's from Kasuang to the Timika is confirmed using a dispatch system and the modified drill hole identification number is replaced with the original.

The Core Processing Facility in Timika is operated and controlled by PT-FI. The Data Administration team tracks the movement of core samples across the project site. The location of every drill hole sample and its status in the system is reported to management.

The logging geologist marks the beginning and end points for each sample interval. Sample intervals are 3 meters, although the geologist may choose a shorter interval if the geology or deposit-specific protocols indicate otherwise.

The core is split longitudinally using conventional splitters. A unique sample number is assigned to each sample and logged into the database. Half of the core is returned to the core box while the other half is bagged for shipment to PT Sucofindo Kuala Kencana (SFKK) laboratory for assays with transfer documentation.

The samples are transferred to the SFKK laboratory, checked in, prepared for assay, and assayed. The assay results are reported, and the PT-FI and SFKK analysis of quality assurance and quality control (QA/QC) are compared and reported.

Exploration holes are stored permanently while hydrology holes and other holes outside the reserve are stored temporarily and discarded after 6 months.

8.2 Assaying Methods

Copper is initially assayed using a 0.2-gram aliquot with 3-acid digest and flame atomic absorption spectroscopy (AAS). If the initial assay is greater than 0.50 percent copper, the assay is rerun as an “ore grade” sample. Ore grade samples are a 0.5-gram sample run using the same methods as above. If the initial assay is greater than 2 percent copper, the sample is rerun by titration with a 1.0-gram aliquot.

Gold is fire assayed using a 30-gram aliquot with AAS finish unless the overlimit of plus 15 gram per metric ton is reached, in which case a gravimetric finish is used.

Reject splits are retained for future metallurgical work and for duplicate coarse reject analysis.

8.3 Sampling and Assay QA/QC

PT-FI geologists provide assay instructions to the current primary laboratory, SFKK. After assaying, all pulps are returned to the core shed in Timika. Historically, the primary assay laboratory has changed over time. Laboratories are internationally and/or domestically certified as follows:

- SFKK is an external laboratory located in Kuala Kencana. The laboratory is ISO 9001:2015, ISO 17020:2012, ISO 17025:2017 and SMKS PP50:2012 certified.
- PT Geoservices-GeoAssay (GA) is an external laboratory located in Jakarta. GA is ISO 17025:2018 accredited and has a KAN LP-463-IDN certification.
- SGS-Indoassay is an external laboratory located in Jakarta. The laboratory has ISO 17025:2008 and SNI ISO/IEC certifications.
- The Mill 74 laboratory is a company-owned laboratory located in the highlands that supports production sampling and is used for production reconciliation at PT-FI. The assay results are not used in the resource modeling estimation process.

The procedures used by PT-FI and SFKK for QA/QC on core samples are as follows:

- Duplicate assays are inserted on a 1 in 10 basis completed by SFKK as a precision or repeatability check on the assay result with duplicate prepared pulps.
- Duplicate rejects are inserted on a 1 in 25 basis completed by SFKK as a precision or repeatability check on the sample pulp preparation process by re-pulping coarse rejects and submitting for assay. Coarse reject samples are also screen analyzed to confirm the size is 95 percent passing 4 millimeters.
- Standard Certified Reference Materials (CRM) are inserted on a 1 in 15 to 20 basis by PT-FI for assay by SFKK and/or the check labs. CRM values are blind to the laboratory.
- Blanks are inserted on a 1 per batch basis by PT-FI. The blank material is currently made up from barren limestone half core from dewatering drill holes. The purpose of blank insertions is to confirm that there is no contamination between samples due to sample preparation errors at the laboratory.
- QA/QC data is located in the drill hole database. All QA/QC check assays are examined for acceptability using QA/QC tools in the database software. Assays that meet QA/QC requirements are accepted into the database; those that did not are rejected and reruns are ordered.

SFKK maintains internal and independent QA/QC procedures in addition to the PT-FI mandated procedures above.

- Standards are also inserted by SFKK on a 1 in 20 basis as an internal laboratory control.
- Blanks are also inserted by SFKK as an internal control.
- A reagent blank is inserted into the AAS sample stream by SFKK as an internal control.

Secondary laboratory checks are performed as part of the QA/QC procedures. Pulps are sent to a third-party laboratory as check assays on a 1 in 15 basis. The current external secondary check laboratory is Intertek in Jakarta. Historically GA and SGS-Indoassay had been used as secondary labs.

PT-FI analyzes the results of the QA/QC sampling regularly and generates reports to management as well as sharing the results during monthly meetings between PT-FI and the SFKK laboratory. In addition, QA/QC performance is independently verified by a third-party consultant annually.

8.4 Bulk Density Measurements

Drill core is skeletonized by retaining 10 to 15 centimeter samples selected every 3 meters. These samples are used for density determinations. Specific gravity (SG) is measured by drying the sample, weighing in air, and weighing while immersed in water. SG is calculated using the formula below:

SG = weight in air / (weight in air – weight in water)
Assumes water has an SG of 1 and surface tension is not a factor.

Weighing crushed rock or highly altered rock is difficult, so only solid core is weighed. A factor is applied to the bulk measurement to compensate for fractured samples and considers RQD, broken, and crushed measurements. QA/QC checks are conducted every 50 meters using the water-air weight method and caliper method after the ends of the samples are cut perpendicular to the core axis with a diamond saw.

8.5 Comment on Sample Preparation, Analyses and Security

In the QP’s opinion, sample preparation, analytical methods, security protocols, and QA/QC performance are adequate and supports the use of these analytical data for mineral reserve and resource estimation.

9 DATA VERIFICATION

9.1 Data Entry and Management

PT-FI has a team dedicated to data administration and QA/QC. The Data Administration team manages the master drill hole database and provides QA/QC services for PT-FI. The database is physically housed on a secure server and is automatically backed up. The database is protected by restricting user access and permissions on both the server and within the program. Permissions are assigned by a designated database administrator.

Pre-configured rules are used to maintain data integrity for all stages of data entry within the program. These rules are incorporated for drill hole planning, collar, downhole surveys, geological and geomechanical logging, sampling, assay results, and QA/QC. The program has importers and data entry objects with built-in validation that can be used to produce reports and graphs to inform the database managers of unusual data. The Data Administration team verifies that data in the master database is complete and quality control is performed regularly.

The primary laboratory SFKK utilizes a commercially available Laboratory Information Management System (LIMS) to control, store, and transfer analytical results electronically. Data entry errors are reduced in comparison to past systems because assay results from instrumentation report directly to the LIMS software package.

Annual checks of the database are performed by the PT-FI resource geology team in addition to the Data Administration team at the site. These checks include:

- Identifying new drilling added since prior year and comparing summary statistics to the previous year's database.
- Identifying database values that have changed since prior year and verifying that any changes can be explained and justified. This includes checking the collar, survey, and assay data.

9.2 Comment on Data Verification

As confirmation of the mineral reserve and resource process, third-party consultants are hired annually to perform verification studies. This study includes the database, geological models, and estimation verification. A third-party analysis of PT-FI data confirmed there are no issues in the mineral resource estimation and reporting and complies with mining industry standards.

Starting in November 2009, the consultant developed a Data Acquisition and Maintenance checklist for PT-FI. This checklist incorporates a review of the data acquisition tasks required for the reserve and resource reporting. The verification process is completed by the consultant during the annual technical review.

In summary, data verification for PT-FI has been performed by FCX personnel and external consultants contracted by FCX. Based on reviews of this work, it is the QP's opinion that the PT-FI drill hole database and other supporting geologic data align with accepted industry practices and are adequate for use in mineral reserve and mineral resource estimation.

10 MINERAL PROCESSING AND METALLURGICAL TESTING

Mineral reserves and mineral resources are evaluated to be processed using hydrometallurgy and/or concentrating (mill) operations. The applicable processes and testing are discussed below.

10.1 Hydrometallurgical Testing and Recovery

Hydrometallurgical processes are not in use at the Grasberg minerals district.

10.2 Concentrating Metallurgical Testing and Recovery

Geometallurgical testwork for PT-FI has been performed at FCX's Technology Center facilities (TCT) laboratory (ISO 9001:2015 certified) in Tucson, Arizona since 2009. Prior to that, testwork was performed by Crescent Technology at their laboratory in Belle Chasse, Louisiana. Additionally, geometallurgical testwork has been completed by SGS Mineral Services (SGS) in Lakefield, Ontario. The QA/QC procedures for the hardness testing include repeats, duplicates, and periodic round robin testing with internal and external laboratories. For flotation testing and associated assays the main QA/QC methodology is by use of repeats and duplicates.

Geometallurgical testing has been conducted to characterize the response of ore samples to comminution and flotation processes and to develop predictive models to forecast recovery and concentrate grades by ore type. The geometallurgical tests are conducted at the scale of a laboratory bench, or in the case of comminution testing with equipment of a laboratory scale. The testwork includes flotation tests and associated assays, JK Ore Hardness Drop Weight testing, Bond Work Index (BWI) testing, and mineralogical analysis including quantitative evaluation of minerals by scanning electron microscopy, known as QEMScan and x-ray diffraction. Testing has been extended beyond the bench scale to either large-scale batch testing or operating a pilot plant facility to generate additional data required for the design of facilities needed to treat the ore.

Table 10.1 summarizes the current modeled LOM overall recovery. These recoveries are a tonnage-weighted summation of modeled recoveries by ore type for each of the deposits.

Table 10.1 – Modeled LOM Recovery

Ore body	Copper Recovery (%)	Gold Recovery (%)	Silver Recovery (%)	Final Concentrate Grade (%Copper)
GBC	86.7	65.9	72.4	25.3
DMLZ	87.9	81.2	83.4	27.7
BG	94.6	69.8	83.2	29.0
KL	86.1	53.8	50.9	21.5

Fluorine is present in the ore, with higher levels in DMLZ and GBC ores, and therefore the mill and dewatering plant operations are managed with the objective to maintain fluorine levels in the copper concentrate shipments to less than 1000 parts per million.

10.3 Comment on Mineral Processing and Metallurgical Testing and Recoveries

The comminution and flotation response of GBC, DMLZ, and BG have been characterized and are well understood and spatially representative.

Significant drilling has been undertaken on the KL low pyrite ore body to understand flotation and comminution response on the existing concentrator facilities. Additional drilling is ongoing to further define the KL low pyrite ore body. Flotation testwork on drill hole core samples continued through 2021 at the TCT laboratory, while flotation pilot plant testing planned for 2022 will be conducted by SGS in Lakefield, Ontario.

In the opinion of the QP, the geometallurgical testwork completed on representative samples is appropriate to establish reasonable processing estimates for the different copper-gold porphyry and skarn style mineralization encountered in the deposits. The mill and dewatering plant processes and associated recovery factors are considered appropriate to support mineral reserve and mineral resource estimation and mine planning.

11 MINERAL RESOURCE ESTIMATE

Mineral resources are evaluated using the application of technical and economic factors to a geologic resource block model to generate digital surfaces or solids of mining limits, using specialized geologic and mine planning computer software. The resulting surfaces or solids volumetrically identify material as potentially economical, using the assumed parameters. Mineral resources are the resultant contained metal inventories.

11.1 Resource Block Model

Relevant geologic and analytical information is incorporated into a three-dimensional digital representation referred to as a geologic resource block model. Mineral resources at PT-FI are based on block models for each of the following mining areas:

- GRSKL including GBC and the depleted GRS_OP.
- EESS incorporating DMLZ, GBT open-pit, Dom and depleted GBT, IOZ, DOZ.
- BG.

The resource block models for PT-FI were updated in August 2021 and contain all drilling results available by mid-July 2021. Each block model is discussed in the following subsections with a focus on major metals.

11.1.1 Compositing Strategy

PT-FI uses 15-meter length composites starting at the collar for GRSKL and EESS. Several items are composited including metals, SG, and magnetic susceptibility. A minimum recovered length of 4.5-meter intact core within a 15-meter composite is required for the composite to be used for grade estimation. Composites with poor core recovery are rejected during the estimation process. Composites are not split or broken at geologic boundaries.

BG has a smaller selective mining unit and therefore a shorter, 5-meter length composite broken by geologic boundaries.

Prior to estimation, composites are flagged by rock type and alteration. Composites are also capped at a maximum value with differing caps for copper, gold, and silver for each estimation domain for each ore body.

11.1.2 Statistical Evaluation

Industry standard geostatistical approaches are used in addition to ore body knowledge from PT-FI geologists in evaluating the geologic model.

Geostatistical analysis of drill hole data is evaluated using classical statistical parameters (mean, standard deviation, number of samples, etc.). Histograms and cumulative frequency plots are used to conduct detailed analyses of sample population data. Assay and composite statistics are compared for each domain.

Outlier evaluations are performed using log probability plots as well as visual checks to determine capping levels. In many cases, a second level of outlier restriction is applied during estimation where composite values above a certain “high-yield threshold” cannot influence a block estimate beyond a distance which is smaller than the full distance specified by the search ellipse. Contact plots are used to analyze boundaries between the various domains.

Geologic continuity is determined using correlograms, pair-wise-relative, and/or variogram models. Drill hole data is assessed along multiple orientations for each estimation domain for copper, gold, and silver. The nugget is derived from downhole variogram models. Search ellipse anisotropy ratios in most cases conform directly to the anisotropy ratios of the correlogram/variogram models for the respective estimation domain. As a general rule, the search distances conform to 2/3 of the variogram in mineralized estimation zones.

11.1.3 Block Model Setup

The GRSKL and EESS block models have 15 by 15 by 15 meter block sizes, providing adequate resolution for engineering and production. This block size is appropriate for porphyry copper mineralization, drill hole spacing, and block cave mining. The mineralization of the BG ore body is narrow and requires a smaller 5 by 5 by 5 meter block size to accommodate more selective stope mining.

Details of the block model setup are shown in Table 11.1.

Table 11.1 – Grasberg Minerals District Block Model Dimensions

Model Name :	GRSKL			EESS			Big Gossan		
Total Number of blocks :	11,265,100			8,593,904			6,023,700		
Origin (X,Y,Z) UTM :	722,500	9,547,825	10	722,500	9,547,825	10	722,500	9,547,825	10
Bearing/Dip/Plunge :	128	0	0	128	0	0	128	0	0
Offset minimum :	5670	8085	1500	8625	8445	1845	8745	7910	2340
maximum :	9345	11715	4350	12420	11085	4740	10095	8395	3490
Block minimum :	15	15	15	15	15	15	5	5	5
maximum :	15	15	15	15	15	15	5	5	5
No of blocks :	245	242	190	253	176	193	270	97	230

UTM= Universal Transverse Mercator

Each block model is rotated following the major stratigraphy direction of the district as shown in Figure 11.1 and Figure 11.2.

Figure 11.1 – Block Model Extents with Reserve Shapes (Plan View)

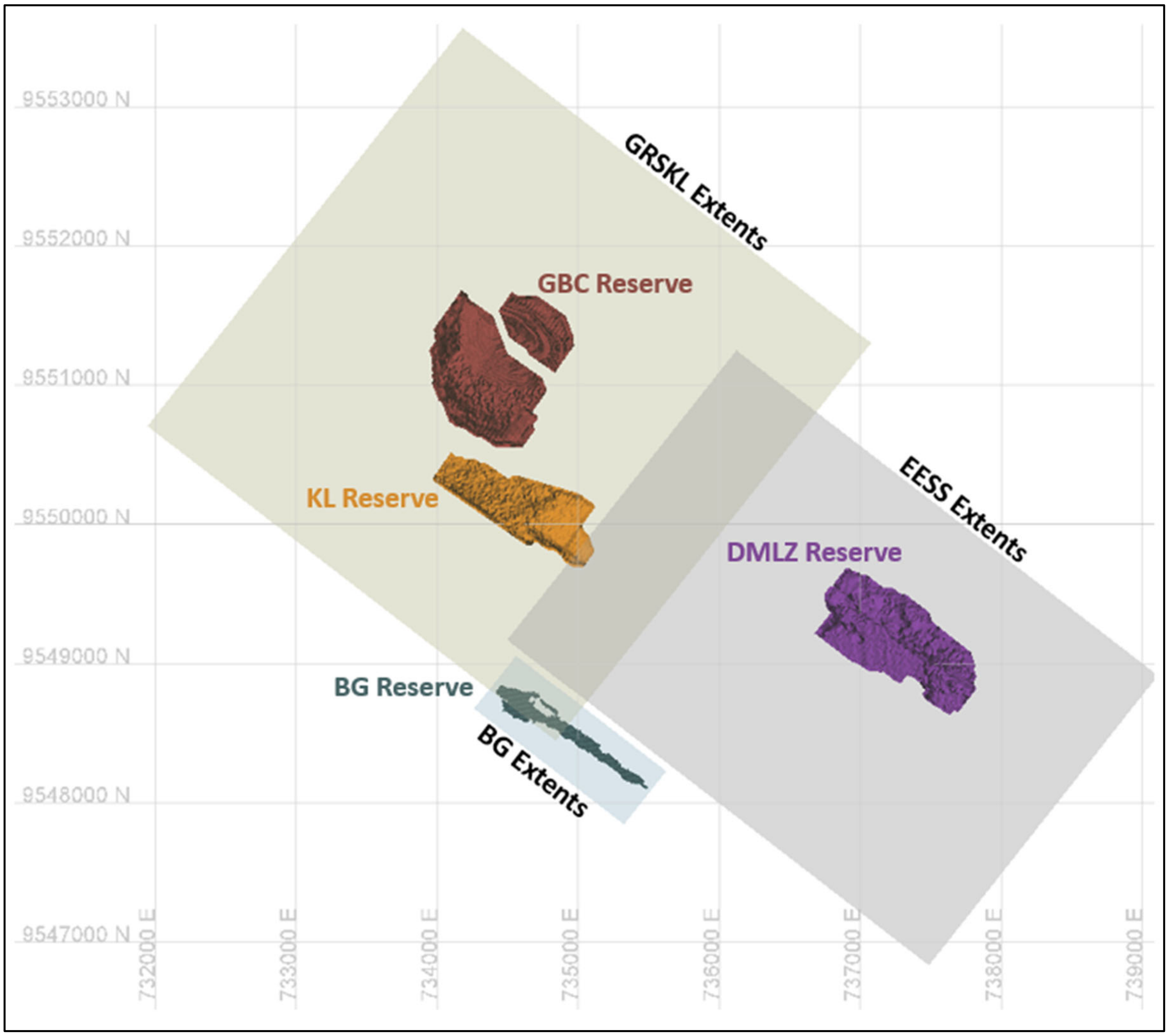
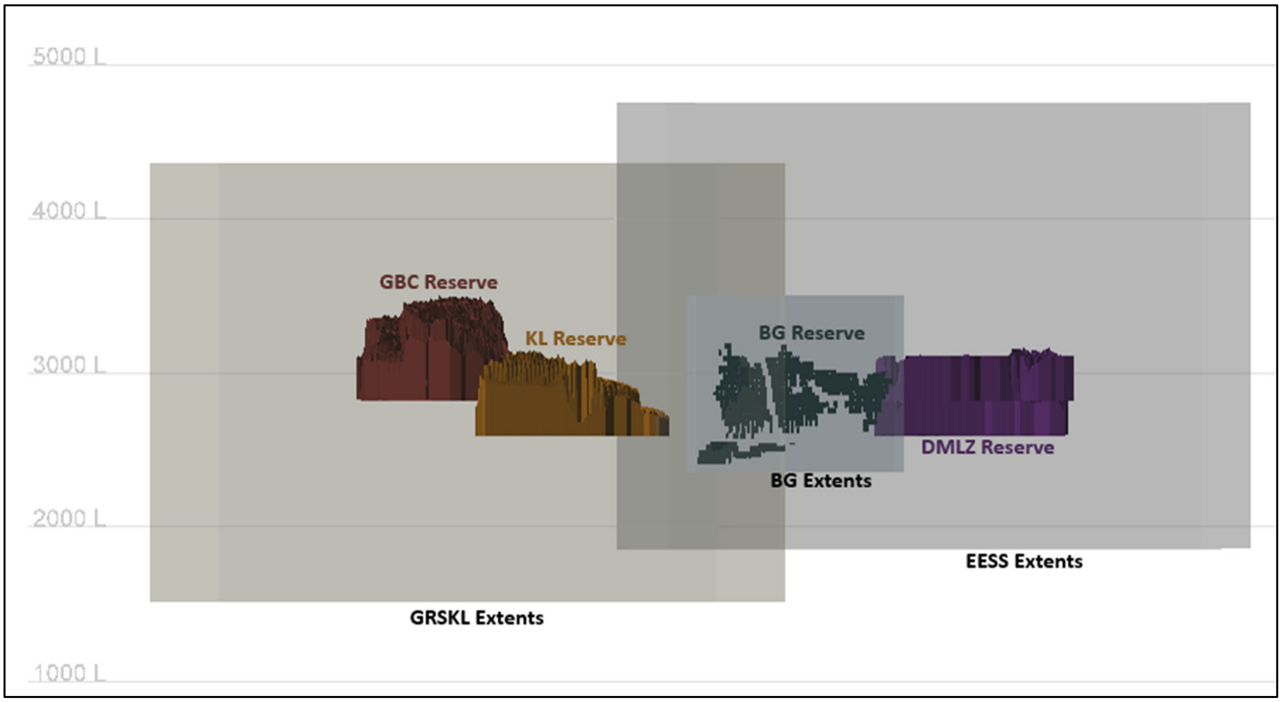


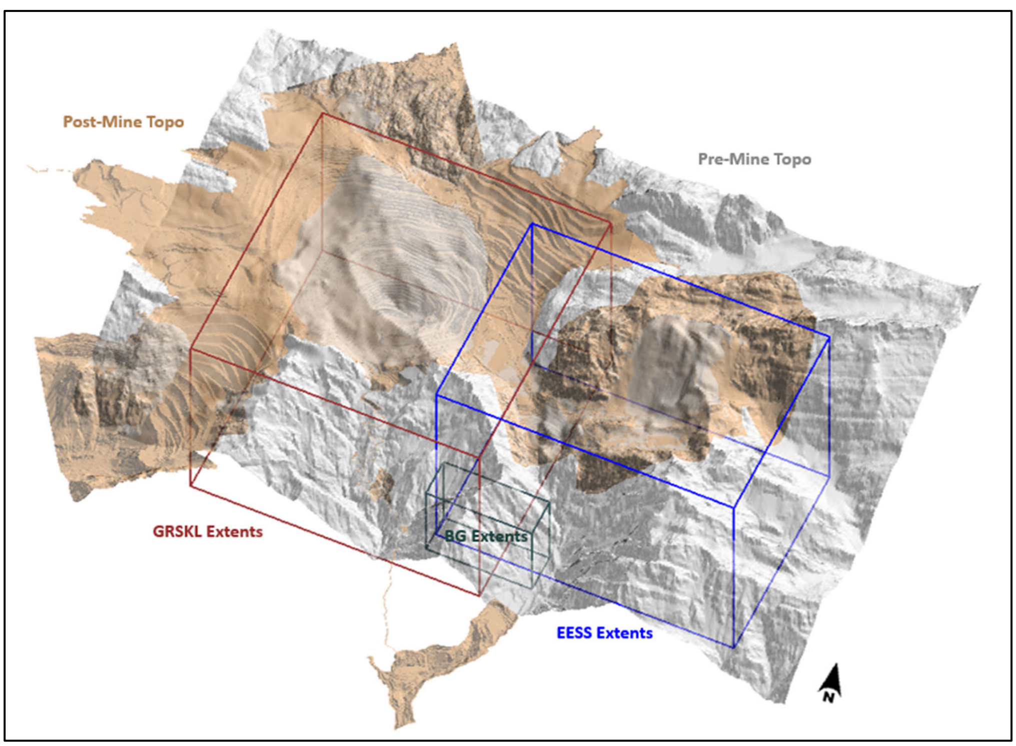
Figure 11.2 – Block Model Extents with Reserve Shapes (Looking NE)



11.1.4 Topography

Topography for the original pre-mine and estimated end of year (including the depleted open-pit mining and expected block cave subsidence zones) topographic surfaces are coded in the block model, as shown in Figure 11.3.

Figure 11.3 – Topography and Block Model Limits



11.1.5 Geologic Model Interpretation

The regional geologic model is maintained by the Geologic Data Management group at the PT-FI jobsite and is updated on a quarterly basis. Annual resource model updates require the geologic model that is provided to the resource estimation group includes updated interpretations based on the latest data available.

The three-dimensional model covers the Grasberg minerals district and uses drill hole logs and underground mapping to construct wireframes for the following:

- Stratigraphy.
- Intrusions.
- Alteration.
- Faults.

Geology interpretation is done on cross sections perpendicular to the regional strike and are guided by level-plan contours. Cross section spacing varies depending on the level of detail required for each wireframe.

11.1.6 Grade Estimates

Structural, lithological, and mineralized/unmineralized wireframes are combined to create estimation domains. Cutoffs reflecting mineralization boundaries are low enough to not interfere with the continuity of the grade distribution at the economic cutoff grade and high enough to demarcate a reasonable limit of potential economic mineralization.

Estimation for copper, gold, and silver are interpolated using Ordinary Kriging (OK) and include a high-yield restriction to manage high-grade outliers in addition to capping. GRSKL additionally uses Locally Varying Anisotropy within the main intrusive units to better capture the “horseshoe-like” geometry of the ore body.

The following are general parameters used for the OK estimation of copper, gold, and silver:

- Minimum of 3 and maximum of 10 composites.
- Maximum of 4 composites per drill hole.
- Search ellipse radius along major directions of continuity reduced to 2/3 of the variogram range.
- High-yield samples ranges are additionally restricted using a smaller search radius, further limiting the influence of high-grade samples.

In general, hard boundaries are used for mineralized/unmineralized domains and between sedimentary and intrusive units. Soft boundaries are used in certain circumstances, such as in BG between the shale/limestone units due to the thin bedding of the shale unit.

A background detection limit grade is assigned for copper, gold, and silver for unestimated blocks. Models are validated using both visual and geostatistical methods.

11.1.7 Bulk Density

Bulk density or in-place dry density is estimated based on the measured density values for each drill hole interval. SG is composited to 15 meters for block caves and 5 meters for open stope mines separated by estimation zones and values are then converted to final bulk density. The procedures applied are identical in all PT-FI deposits. The main steps for the bulk density process are:

- The uncorrected density and bulk density factor are estimated by OK method.
- A factor is developed from geomechanical data which incorporates RQD, percent broken, and percent crushed to approximate the voids ratio in the rock mass.
- The final bulk density for mineral reserve and mineral resource estimation is the reduced density by the correction factor.

11.1.8 Mineral Resource Classification

Mineral resources are classified into categories of measured, indicated, and inferred. Each category represents a decreasing level of confidence in the estimation of grade values. Measured, indicated, and inferred blocks are classified according to geological continuity, distance to the closest sample, number of drill holes, and the Kriging variance derived during the estimation of copper grades for each ore body.

- Measured requires a minimum of 2 drill holes contributing data to the estimate, statistically established distance to the nearest composite and Kriging variance below a defined measured threshold.
- Indicated requires a minimum of 2 drill holes contributing data to the estimate, statistically established distance to the nearest composite and Kriging variance below a defined indicated threshold.
- Inferred requires only 1 drill hole, beyond indicated distance and a Kriging variance threshold.

Inferred blocks have their grades set for the final reported variables used in the determination of mineral reserve to the analytical detection limit (near zero). Detailed classification parameters are shown in Table 11.2.

Table 11.2 – Summary of Resource Classification Criteria for Mineralized Domains

Model	Domain	Domain Code(s)	Classification	Kriging Variance	Minimum Distance (meters)	Minimum Drillholes
GRSKL (GBC and KL)	Pebble Dikes	20	Measured	≤ 0.30	≤ 30	≥ 2
			Indicated	≤ 0.85	≤ 120	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Kais, Sirga, Faumai, Waripi, Ekmai and Piniya Formations (Structure Zone 1 &2)	111,112, 121, 122, 123, 124	Measured	≤ 0.26	≤ 30	≥ 2
			Indicated	≤ 0.72	≤ 120	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Kais, Sirga and Faumai Formations (Structure Zone 4)	141	Measured	≤ 0.35	≤ 30	≥ 2
			Indicated	≤ 0.62	≤ 100	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Waripi Formation (Structure Zone 4)	142	Measured	≤ 0.25	≤ 20	≥ 2
			Indicated	≤ 0.61	≤ 120	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Ekmai Formation (Structure Zone 3)	143	Measured	≤ 0.25	≤ 20	≥ 2
			Indicated	≤ 0.60	≤ 105	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Ekmai and Piniya Formations (Structure Zone 4)	144	Measured	≤ 0.25	≤ 20	≥ 2
			Indicated	≤ 0.82	≤ 110	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Kais, Sirga and Faumai Formations (Structure Zone 5)	151	Measured	≤ 0.40	≤ 30	≥ 2
			Indicated	≤ 0.72	≤ 120	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Kais, Sirga, Faumai and Waripi Formation (Structure Zone 5 & 6)	152, 161	Measured	≤ 0.35	≤ 30	≥ 2
			Indicated	≤ 0.72	≤ 120	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	Ekmai and Piniya Formations (Structure Zone 5)	153, 154	Measured	≤ 0.30	≤ 30	≥ 2
			Indicated	≤ 0.82	≤ 120	≥ 2
			Inferred	≤ 0.82	≤ 150	≥ 1
	Kali Intrusive	176	Measured	≤ 0.20	≤ 30	≥ 2
			Indicated	≤ 0.60	≤ 100	≥ 2
			Inferred	≤ 0.80	≤ 150	≥ 1
	East Intrusives	156	Measured	≤ 0.18	≤ 30	≥ 2
			Indicated	≤ 0.60	≤ 100	≥ 2
			Inferred	≤ 0.80	≤ 100	≥ 1
	Dalam Intrusives	166, 186	Measured	≤ 0.185	≤ 25	≥ 2
			Indicated	≤ 0.55	≤ 120	≥ 2
			Inferred	< 0.75	≤ 150	≥ 1
	Heavy Sulfide Zone	335	Measured	≤ 0.20	≤ 30	≥ 2
			Indicated	≤ 0.62	≤ 120	≥ 2
			Inferred	< 0.80	≤ 150	≥ 1
EESS (DMLZ)	Diorite	5	Measured	≤ 0.20	≤ 20	≥ 2
			Indicated	≤ 0.64	≤ 100	≥ 2
			Inferred	≥ 0.64	>100	≥ 1
	Skarn and Marble	8, 9	Measured	≤ 0.15	≤ 20	≥ 2
			Indicated	≤ 0.62	≤ 100	≥ 2
			Inferred	≥ 0.62	>100	≥ 1
BG	Mineralized	1	Measured	≤ 0.20	≤ 12.5	≥ 2
			Indicated	≤ 0.76	≤ 50	≥ 2
			Inferred	≤ 0.86	> 105	≥ 1

11.1.9 Model Validation and Performance

The geologic resource model is evaluated by visual inspection, statistical analyses, comparison to previous models and to production data. Block model values and drill hole data are visually examined. The review verifies that areas of high-grade and low-grade blocks and samples align with ore body knowledge. These inspections have shown that block model values compare well with the drill hole composites.

Statistical analyses such as mean, standard deviation, minimum, maximum, and coefficients of variation along with cumulative frequency plots are used to validate the interpolated blocks against drill hole composites, grade-tonnage curves, and reconciliation to production. Block model OK results are compared with the composite data and nearest neighbor estimates. Variable estimations are compared to previous years estimates. Models are exchanged with other members of the resource group for peer review.

A third-party consultant conducts an annual review of the resource models and estimation processes and provides a verification report. The review concluded that the methods and procedures used by PT-FI for mineral resource and reserve evaluation are performed in a manner consistent with good engineering and geologic practice.

FCX corporate standards are that the resource model should be within 10 percent of production for tonnage, grade, and contained or recoverable metal over a 12-month period. The models for PT-FI meet FCX standards.

11.1.10 Comment on Geologic Resource Model

In the opinion of the QP:

- The resource model has been completed using accepted industry practices.
- The model is suitable for estimation of mineral reserves and mineral resources.
- The model is adequate to provide reliable inputs to mine planning, geomechanics and metallurgy.
- The PT-FI geology staff has a good understanding of the lithology, structure, alteration, and copper mineral types in the district. The understanding of the controls on mineralization are adequate to support estimation of mineral reserves and mineral resources.
- The understanding and interpretation of ore types based on copper-gold mineralogy is a key component to supporting classification of mineral reserves and mineral resources by process method.

11.2 Resource Evaluation

Mineral resource estimates are developed by applying technical and economic modifying factors to the geologic block model to identify material with potential for economic extraction. The process of evaluation is iterative involving an initial draft using the assumptions, understanding the implications of the resulting economical mining limits, and adjusting the assumptions as warranted for subsequent evaluations.

Mineral resource estimates are determined using measured, indicated, and inferred classified materials as viable ore sources during evaluations with the modifying factors.

11.2.1 Economic Assumptions

FCX executive management establish reasonable long-term metal pricing to be used in determining mineral reserves and mineral resources. These prices are based on reviewing external market projections, historical prices, comparison of peer mining company reported price estimates, and internal capital investment guidelines. The long-term sale prices align the company’s strategy for evaluating the economic feasibility of the mineral reserves and mineral resources.

Unit costs are derived from current operating forecasts benchmarked against historical results and other similar operations. Additional input from appropriate internal FCX departments such as Global Supply Chain, Sales and Marketing, and Finance and Accounting are considered when developing the economic assumptions.

To recognize the relationship between commodity prices and principal consumable cost drivers, FCX scales unit costs to reflect the cost environment associated with the reported metal prices. This is evidenced in the differences in economic assumptions between mineral reserves and mineral resources.

The metal price and cost assumptions are used over the timeframe of the expected life of the mine and reflect steady state operating conditions in the metal price cost environment. Details of the economic assumptions are outlined in Table 11.3.

11.2.2 Processing Recoveries

Processing recoveries are outlined in Section 10.

11.2.3 Physical Constraints

The evaluation of the resource is within the IUPK boundary and there are no physical constraints considered.

11.2.4 Cutoff Grades

A cutoff grade is used to determine whether material should be mined and if that material should be processed as ore or left unmined.

The mine planning software evaluates the revenue and cost for each block in the block model to determine the value, using the provided assumptions. The following formula demonstrates how the cutoff grades are determined.

> Internal cutoff grade = Sum of [processing costs + general site and sustaining costs] / Sum of [payable recoverable metal * (metal price – metal refining and sales costs)]

A break-even cutoff grade calculation is similar to the internal cutoff grade formula but includes mining costs. Blocks with grades above the break-even cutoff grade generate positive value, while blocks with grades above the internal cutoff grade minimize negative value. The cutoff grades reported for mineral resources reflect the internal cutoff grades based on the software results.

Input parameters are applied to individual deposits and distinct ore types as appropriate. Unique parameters can result in distinct cutoff grades. Cutoff grades are reported in terms of EqCu defining the relative value of all commercially recoverable metals in terms of copper by ore processing methods.

An internal cutoff grade is used as the lower limit for consideration for ore/waste selection when there is incremental ore processing capacity available and the incremental feed can be accessed without any incremental capital input.

In the block caves, a similar situation arises for incremental ore that can be produced from an existing drawpoint. In this case, the assumption is that as long as there are no additional costs associated with maintaining the drawpoint, then lower grade increments can be pulled and processed as long as they fill spare capacity and provide a marginal benefit to the project. For the block caves, it is unreasonable to expect that continued draw from depleted drawpoints can be sustained before repair and redevelopment costs begin to arise. Therefore, overpull of significant incremental tonnages cannot be justified at the internal cutoff beyond the expected life of the drawpoint. Delineation of an incremental “overpull” resource, above a block cave’s planned height of draw must recognize the incremental costs associated with maintaining the draw infrastructure beyond its planned life.

This approach provides realistic economic criteria for defining overpull resources. Overpull resources represent an opportunity to the operation should circumstances allow for its production. As a block cave’s production level is abandoned, the overlying portion of the overpull resource is extinguished.

Conceptually the cutoff grade for overpull should be higher than the internal cutoff grade for each mine, but smaller than the breakeven cutoff grade for determining resources outside of already developed mining areas.

- The assumption is that there would be higher mining costs associated with producing ore from these overpulled drawpoints.
- These higher costs would include more extensive drawpoint and panel repair, increased wet muck production, possibly requiring a minimum economic recovery and other factors that result from mining of very high, mature draw columns in an aging production block.

11.2.5 Economic and Technical Assumptions

The economic and technical assumptions used for the generation of potentially economical mining limits for mineral resources are summarized in Table 11.3.

Table 11.3 – Economic and Technical Assumptions for Mineral Resource Evaluation

Mineral Resource Cutoff Grade Summary	GBC		DMLZ		BG	KL	
As of December 31, 2021	Insitu	Overpull	Insitu	Overpull	Insitu	Insitu	Overpull
Mining Rate (000's t/d)							
Ore	129.6	129.6	79.4	79.4	7.0	90.0	90.0
Waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Strip Ratio (Waste:Ore)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Milling Rate (000's t/d)							
100% Operations	224.5	224.5	224.5	224.5	224.5	230.6	230.6
Deposit	129.6	129.6	79.4	79.4	7.0	90.0	90.0
Costs							
Total, $/metric ton ore	23.86	16.64	27.79	20.48	53.09	26.14	19.12
Mill Recovery (%)							
Copper	87.0	87.0	89.4	89.4	94.9	86.5	86.5
Gold	65.5	65.5	81.5	81.5	69.6	60.2	60.2
Silver	74.2	74.2	83.9	83.9	83.2	55.6	55.6
Concentrate grade (% Cu)	24.6	24.6	26.9	26.9	28.1	24.2	24.2
Metal Prices							
Copper ($/lb)	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Gold ($/oz)	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Silver ($/oz)	20.00	20.00	20.00	20.00	20.00	20.00	20.00
TC/RCs & Freight							
Treatment charge ($/dmt)	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Copper refining ($/lb)	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Gold refining ($/oz)	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Silver refining ($/oz)	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Freight ($/dmt)	37.00	37.00	37.00	37.00	37.00	37.00	37.00
Smelter Payable (%)							
Copper	96.5	96.5	96.5	96.5	96.5	96.5	96.5
Gold	97.0	97.0	97.0	97.0	97.0	97.0	97.0
Silver	76.9	76.9	76.9	76.9	76.9	76.9	76.9
Copper Equivalent Factors							
Gold Multiplier	0.5017		0.6018		0.4826	0.4647	
Silver Multiplier	0.0074		0.0081		0.0075	0.0056	
Cutoff Grade (% EqCu)	0.51	0.36	0.58	0.43	1.04	0.57	0.42
Value per one Unit							
Copper ($/%/t)	46.40	46.40	48.07	48.07	51.25	46.02	46.02
Gold ($/g/t)	23.28	23.28	28.93	28.93	24.73	21.39	21.39
Silver ($/g/t)	0.34	0.34	0.39	0.39	0.39	0.26	0.26

It is noted in comparison of current metal prices, mineral reserve and mineral resource price estimates reported by peer mining companies, and market analyst forecasted long-term prices that the assumed price of copper could be considered conservative. Although these sources serve as reference points, higher metal prices and associated costs indicate that additional mineral resources would be profitable in higher metal price environments thus extending the projected life of the mine. As such, the copper price assumptions are considered appropriate for determining mineral reserves and mineral resources.

11.3 Mineral Resource Statement

The mineral resource estimate is the inventory of material identified as having a reasonable likelihood for economic extraction inside the mineral resource economical mining limit, less the mineral reserve volume, as applicable. The modifying factors are applied to measured, indicated, and inferred resource classifications to evaluate commercially recoverable metal. As a point of reference, the in-situ ore containing copper, gold, and silver metal are inventoried and reported by ore body.

The reported mineral resource estimate in Table 11.4 is exclusive of the reported mineral reserve, on a 100 percent property ownership basis. The mineral resource estimate is based on commodity prices of $3.00 per pound copper, $1,200 per ounce gold, and $20 per ounce silver.

Table 11.4 – Summary of Mineral Resources

100% Basis

PT FREEPORT INDONESIA Summary of Mineral Resources[a] As of December 31, 2021	Tonnage[b] Metric M Tons	Cut-off Grade[c] In-Situ %EqCu	Overpull %EqCu	Average Grade Copper %	Gold g/t	Silver g/t	Contained Metal[b,d] Copper M lbs	Gold kozs	Silver kozs
GBC (Underground)									
Measured	154			0.64	0.50	3.68	2,167	2,479	18,181
Indicated	678			0.63	0.52	3.52	9,343	11,325	76,669
Subtotal	**831**			**0.63**	**0.52**	**3.55**	**11,510**	**13,804**	**94,850**
Inferred	24			0.23	0.34	2.85	122	268	2,213
Total	**855**	**0.51**	**0.36**	**0.62**	**0.51**	**3.53**	**11,632**	**14,072**	**97,063**
DMLZ (Underground)									
Measured	21			0.63	0.65	3.29	288	437	2,199
Indicated	525			0.67	0.57	3.45	7,787	9,654	58,190
Subtotal	**546**			**0.67**	**0.57**	**3.44**	**8,075**	**10,091**	**60,389**
Inferred	74			0.66	0.42	3.05	1,088	999	7,291
Total	**620**	**0.58**	**0.43**	**0.67**	**0.56**	**3.39**	**9,163**	**11,090**	**67,681**
BG (Underground)									
Measured	7			1.45	0.64	9.27	213	137	1,987
Indicated	15			1.20	0.67	7.99	392	322	3,818
Subtotal	**22**			**1.28**	**0.66**	**8.39**	**605**	**459**	**5,805**
Inferred									
Total	**22**	**1.04**		**1.28**	**0.66**	**8.39**	**605**	**459**	**5,805**
KL (Underground)									
Measured	112			0.87	0.74	4.68	2,156	2,691	16,916
Indicated	820			0.90	0.79	4.96	16,182	20,794	130,648
Subtotal	**932**			**0.89**	**0.78**	**4.92**	**18,338**	**23,484**	**147,563**
Inferred	55			0.37	0.40	2.36	447	704	4,178
Total	**987**	**0.57**	**0.42**	**0.86**	**0.76**	**4.78**	**18,785**	**24,188**	**151,742**
GB (Open-Pit)									
Measured	2			1.24	0.33	4.56	61	23	329
Indicated	12			0.78	0.29	3.48	199	107	1,287
Subtotal	**14**			**0.86**	**0.29**	**3.65**	**260**	**130**	**1,615**
Inferred									
Total	**14**	**0.15**		**0.86**	**0.29**	**3.65**	**260**	**130**	**1,615**
GBT (Open-Pit)									
Measured	7			0.46	0.98	1.69	69	214	371
Indicated	41			0.45	0.77	1.63	408	1,030	2,167
Subtotal	**48**			**0.45**	**0.80**	**1.63**	**477**	**1,243**	**2,538**
Inferred									
Total	**48**	**0.50**		**0.45**	**0.80**	**1.63**	**477**	**1,243**	**2,538**
DOM (Open-Pit)[e]									
Measured	7			1.71	0.37	10.73	281	89	2,562
Indicated	25			1.59	0.36	9.64	869	284	7,662
Subtotal	**32**			**1.62**	**0.36**	**9.89**	**1,149**	**372**	**10,225**
Inferred	1			0.86	0.08	2.88	11	2	55
Total	**33**	**1.07**	**0.57**	**1.61**	**0.35**	**9.76**	**1,161**	**374**	**10,280**
DOM (Underground)[e]									
Measured	9			1.37	0.34	8.80	265	96	2,489
Indicated	20			1.13	0.30	7.24	498	196	4,669
Subtotal	**29**			**1.20**	**0.32**	**7.72**	**763**	**292**	**7,158**
Inferred									
Total	**29**	**0.72**	**0.37**	**1.20**	**0.32**	**7.72**	**763**	**292**	**7,158**
Total Mineral Resources									
Measured	319			0.78	0.60	4.39	5,501	6,166	45,033
Indicated	2,136			0.76	0.64	4.15	35,678	43,710	285,110
Subtotal	**2,454**			**0.76**	**0.63**	**4.18**	**41,178**	**49,877**	**330,143**
Inferred	154			0.49	0.40	2.77	1,668	1,972	13,738
Total	**2,608**			**0.75**	**0.62**	**4.10**	**42,846**	**51,849**	**343,881**

Notes

a) Reported as of December 31, 2021 using metal prices of $3.00 per pound copper, $1,200 per ounce gold, and $20 per ounce silver. Mineral Resources are exclusive of Mineral Reserves.

b) Amounts shown may not foot because of rounding.

c) Equivalent Copper (EqCu).

d) Estimated expected recoveries are consistent with those for mineral reserves but would require additional work to substantiate.

e) Cut-off grades for DOM (Open-Pit) are scheduled and low grade; DOM (Underground) scheduled and overpull.

Extraction of the mineral resource may require significant capital investment, specific market conditions, expanded or new processing facilities, additional material storage facilities, changes to mine designs, or other material changes to the current operation.

In the opinion of the QP, risk factors that may materially affect the mineral resource estimate include (but are not limited to):

- Metal price and other economic assumptions.
- Changes in interpretations of continuity and geometry of mineralization zones.
- Changes in parameter assumptions related to the mine design evaluation including geotechnical, mining, processing capabilities, and metallurgical recoveries.
- Changes in assumptions made as to the continued ability to access and operate the site, retain mineral and surface rights and titles, maintain the operation within environmental and other regulatory permits, and social acceptance to operate.

Uncertainty in geological resource modeling is monitored by reconciling model performance against actual production results, as part of the FCX geologic resource model verification process.

11.4 Comment on Mineral Resource Estimate

The mineral resource estimate has been prepared using industry accepted practice and conforms to the disclosure requirements of S-K1300. Mineral reserve and mineral resource estimates are evaluated annually providing the opportunity to reassess the assumed conditions. Although all the technical and economic issues likely to influence the prospect of economic extraction of the resource are anticipated to be resolved under the stated assumed conditions, no assurance can be given that the estimated mineral resource will become proven and probable mineral reserves.

12 MINERAL RESERVE ESTIMATE

Mineral reserves are summarized from the LOM plan, which is the compilation of the relevant modifying factors for establishing an operational, economically viable mine plan. The LOM plan incorporates:

- Scheduling material movements for ore and waste from designed final mining excavation plans with a set of internal development sequences, based on the results of the resource evaluation process.
- Planned production from scheduled deliveries to processing facilities, considering metallurgical recoveries, and planned processing rates and activities.
- Capital and operating cost estimates for achieving the planned production.
- Assumptions for major commodity prices and other key consumable usage estimates.
- Revenues and cash flow estimates.
- Financial analysis including tax considerations.

Mineral reserves have been evaluated considering the modifying factors for conversion of measured and indicated resource classes into proven and probable reserves. Inferred resources are considered as waste in the LOM plan. The details of the relevant modifying factors included in the estimation of mineral reserves are discussed in Sections 10 through 21.

The LOM plan includes the planned production to be extracted from the in-situ mine designs.

12.1 Cutoff Grade Strategy

The cutoff grade strategy is a result of the mine plan development, determined by the economic evaluation of the mineral reserves via strategic long-range mine and business planning. Economic cutoff grades are determined from the LOM planning results and can vary based on processing throughput expectations, ore availability, future ore and overburden or waste requirements, and other factors encountered as the mine operates. This approach is consistent with accepted mining industry practice. Cutoff grades reported are the minimum grades expected to be delivered to a processing facility.

12.2 Economic and Technical Assumptions

The economic and technical assumptions used in the generation of economical mining limits for mineral reserves are summarized in Table 12.1. Economic reserve assumptions are developed in the same manner as the resource evaluation described in section 11.2.1.

Table 12.1 – Economic and Technical Assumptions for Mineral Reserve Evaluation

Mineral Reserve Cutoff Grade Summary As of December 31, 2021	GBC	DMLZ	BG	KL
Mining Rate (000's t/d)				
Ore	129.6	79.4	7.0	90.0
Waste	0	0	0	0
Strip Ratio (Waste:Ore)	0.00	0.00	0.00	0.00
Milling Rate (000's t/d)				
100% Operations	224.5	224.5	224.5	230.6
Deposit	129.6	79.4	7.0	90.0
Costs				
Total, $/metric ton ore	23.77	27.69	52.90	26.04
Mill Recovery (%)				
Copper	87.0	89.4	94.9	86.5
Gold	65.5	81.5	69.6	60.2
Silver	74.2	83.9	83.2	55.6
Concentrate grade (% Cu)	24.6	26.9	28.1	24.2
Metal Prices				
Copper ($/lb)	2.50	2.50	2.50	2.50
Gold ($/oz)	1,200	1,200	1,200	1,200
Silver ($/oz)	15.00	15.00	15.00	15.00
TC/RCs & Freight				
Treatment charge ($/dmt)	100.00	100.00	100.00	100.00
Copper refining ($/lb)	0.10	0.10	0.10	0.10
Gold refining ($/oz)	5.00	5.00	5.00	5.00
Silver refining ($/oz)	0.35	0.35	0.35	0.35
Freight ($/dmt)	37.00	37.00	37.00	37.00
Smelter Payable (%)				
Copper	96.5	96.5	96.5	96.5
Gold	97.0	97.0	97.0	97.0
Silver	76.9	76.9	76.9	76.9
Copper Equivalent Factors				
Gold Multiplier	0.6190	0.7411	0.5937	0.5737
Silver Multiplier	0.0068	0.0074	0.0069	0.0052
Cutoff Grade (% EqCu)	0.63	0.71	1.27*	0.70
Value per one Unit				
Copper ($/%/t)	37.60	39.03	41.65	37.28
Gold ($/g/t)	23.28	28.93	24.73	21.39
Silver ($/g/t)	0.26	0.29	0.29	0.19

*BG uses an elevated cut-off grade of 1.70% EqCu for mineral reserves.

12.3 Mineral Reserve Statement

As a point of reference, the mineral reserve estimate reports ore inventories from the LOM plan containing copper, gold, and silver metal and reported as commercially recoverable metal.

Table 12.2 summarizes the mineral reserves reported on a 100 percent property ownership basis. The mineral reserve estimate is based on commodity prices of $2.50 per pound copper, $1,200 per ounce gold, and $15 per ounce silver.

Table 12.2 – Summary of Mineral Reserves

100% Basis

PT FREEPORT INDONESIA	Tonnage[b]	Cut-off	Average Grade			Average Recovery[d]			Recoverable Metal[b]		
Summary of Mineral Reserves[a]	Metric	Grade[c]	Copper	Gold	Silver	Copper	Gold	Silver	Copper	Gold	Silver
As of December 31, 2021	M Tons	%EqCu	%	g/t	g/t	%	%	%	M lbs	kozs	kozs
GBC (Underground)											
Proven	316		1.15	0.76	3.61	83.7	63.9	55.7	6,694	4,927	20,450
Probable	541		1.01	0.69	3.87	83.7	63.9	55.7	10,051	7,636	37,486
Total	**857**	**0.63**	**1.06**	**0.71**	**3.78**	**83.7**	**63.9**	**55.7**	**16,746**	**12,563**	**57,936**
DMLZ (Underground)											
Proven	91		0.89	0.79	4.21	84.9	78.7	64.1	1,527	1,825	7,922
Probable	321		0.84	0.71	4.03	84.9	78.7	64.1	5,032	5,794	26,620
Total	**412**	**0.71**	**0.85**	**0.73**	**4.07**	**84.9**	**78.7**	**64.1**	**6,559**	**7,619**	**34,542**
BG (Underground)											
Proven	17		2.50	1.02	15.56	91.3	67.7	64.0	835	368	5,312
Probable	34		2.14	0.94	12.72	91.3	67.7	64.0	1,467	701	8,909
Total	**51**	**1.70**	**2.26**	**0.97**	**13.65**	**91.3**	**67.7**	**64.0**	**2,302**	**1,069**	**14,221**
KL (Underground)											
Proven	88		1.06	0.96	5.64	83.1	52.2	39.2	1,706	1,419	6,236
Probable	263		1.02	0.89	4.98	83.1	52.2	39.2	4,901	3,919	16,528
Total	**351**	**0.70**	**1.03**	**0.91**	**5.15**	**83.1**	**52.2**	**39.2**	**6,607**	**5,338**	**22,764**
Total Mineral Reserves											
Proven	512		1.13	0.81	4.45	84.3	64.6	54.3	10,763	8,540	39,921
Probable	1,159		1.00	0.75	4.43	84.3	64.6	54.3	21,451	18,051	89,543
Total	**1,671**		**1.04**	**0.77**	**4.44**	**84.3**	**64.6**	**54.3**	**32,214**	**26,590**	**129,464**

Notes

a) Reported as of December 31, 2021 using metal prices of $2.50 per pound copper, $1,200 per ounce gold, and $15 per ounce silver.

b) Amounts shown may not foot because of rounding.

c) Equivalent Copper (EqCu).

d) Average recoveries are reduced by smelter payable factors.

In the opinion of the QP, risk factors that may materially affect the mineral reserve estimate include (but are not limited to):

- Metal price and other economic assumptions.
- Changes in interpretations of continuity and geometry of mineralization zones.
- Changes in parameter assumptions related to the mine design evaluation including geotechnical, mining, processing capabilities, and metallurgical recoveries.
- Changes in assumptions made as to the continued ability to access and operate the site, retain mineral and surface rights and titles, maintain the operation within environmental and other regulatory permits, and social acceptance to operate.

As confirmation of the mineral reserve and resource process, third-party consultants reviewed and verified the mineral reserve estimate for the Grasberg minerals district concluding that the consultant "has formed the opinion that the PT-FI reserve estimates are within the limits of acceptable engineering error and that the estimated reserves conform to the definitions within S-K1300".

The positive economics of the financial analysis of the LOM plan demonstrate the economic viability of the mineral reserve estimate.

12.4 Comment on Mineral Reserve Estimate

The mineral reserve estimate has been prepared using industry accepted practice and conforms to the disclosure requirements of S-K1300. Mineral reserve and mineral resource estimates are evaluated annually, providing the opportunity to reassess the assumed conditions. All the technical and economic issues likely to influence the prospect of economic extraction are anticipated to be resolved under the stated assumed conditions.

Mineral reserve estimates consider technical, economic, and environmental, and regulatory parameters containing inherent risks. Changes in grade and/or metal recovery estimation, realized metal prices, and operating and capital costs have a direct relationship to the cash flow and profitability of the mine. Other aspects such as changes to environmental or regulatory requirements could alter or restrict the operating performance of the mine. Significant differences from the parameters used in this TRS would justify a re-evaluation of the reported mineral reserve and mineral resource estimates. Mine site administration and FCX dedicate significant resources to managing these risks.

13 MINING METHODS

The Grasberg minerals district has a long operational history and mining conditions are well understood by jobsite and FCX corporate staff. All of the currently active operations are underground mines. The mining method for each reserve is as follows:

- GBC: block/panel cave mine.
- DMLZ: block/panel cave mine.
- BG: open stope mine.
- KL: block/panel cave mine.

13.1 Mine Design

Many mine method parameters are applied at PT-FI to prepare mine designs, based on over 40 years of underground production experience. A few generalities exist, such as undercut placement over the production drifts, production level layouts, ore pass locations, chute cutouts, general ventilation requirements, and drain level locations. However, most of the final design involves numerous iterations, with input from operations, in order to best meet operational and cost objectives. Once the final design is approved, minor changes can occur without disruption to the operational development process, as development mining of the infrastructure and main levels is executed several years ahead of placing the initial portion of the ore panels into active production.

Mine designs are developed using specialized mine design computer software.

13.1.1 Mine Design Parameters

Geomechanical recommendations for each of the operating mines are determined and reviewed by FCX engineers and third-party consultants. These recommendations are based on comprehensive geomechanical testing, studies, and the geomechanical monitoring procedures in the field.

The geomechanical properties of the rock determine the rock parameters for the panel cave design and all other underground facilities. The rock mass response of these properties to the mining process are considered when designing the mining method and setting the reserves at each mine.

13.1.2 Geomechanical and Hydrological Modeling

The rock stability of the underground mines is monitored with a variety of geomechanical piezometer instrumentation and sensors. The geomechanical instruments measure the movement in the rock and the measurements are used to monitor and manage any movement and stability concerns. Typical instrumentation includes time-domain reflectometry, open-hole camera monitoring, radar units, scanning units, and seismic monitoring. Groundwater is monitored to check flow and pressure to help manage any safety and stability concerns.

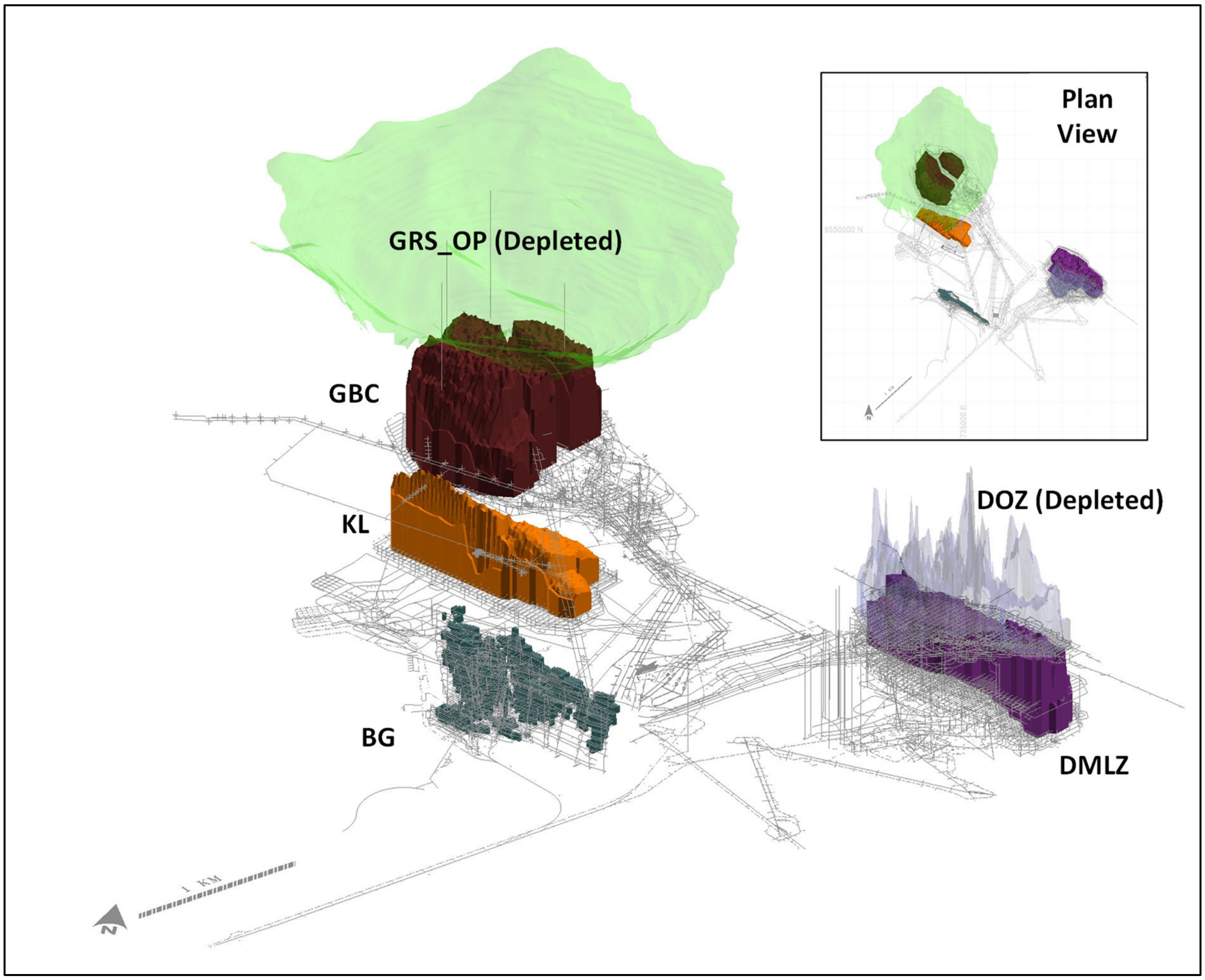
13.1.3 Final Mine Design

Using specialized computer software, mine designs are developed with key considerations that include:

- Compliance with the geomechanical recommendations.
- Implementation of geomechanical model data, including general geology, in-situ rock properties, structural data, and mass classification.
- Proper geometric dimensioning for underground structures, such as pillars, stopes, and openings.
- Access for entry and egress.
- Underground roadways design.
- Mechanization and efficiencies, such as matching equipment and fleets.
- Ventilation requirements.
- Dilution considerations.
- Infrastructure and supplies.

Mine designs are reviewed for compliance to key parameters and reasonableness with comparison to historical and current operating practices. Figure 13.1 is a three-dimensional perspective view of the Grasberg minerals district showing the layout and mineral reserve shapes of the mines.

Figure 13.1 – Perspective View of the Grasberg Minerals District Underground Mines



During 2021 there were four active underground mining operations in the Grasberg minerals district: GBC (ultimately targeting 135,000 metric tons of ore per day), DMLZ block cave mine (ultimately targeting 80,000 metric tons of ore per day), and BG open stoping operation (targeting 7,000 metric tons of ore per day), and DOZ block cave mine (targeting 20,000 metric tons of ore per day). The KL ore body is another large caving operation that started development in 2021 and PT-FI anticipates will begin ore production in 2028. The GRS_OP was in production from 1990 to 2019. The concentrating plant has a planned peak capacity of approximately 240,000 metric tons of ore per day.

13.2 Mine Plan Development

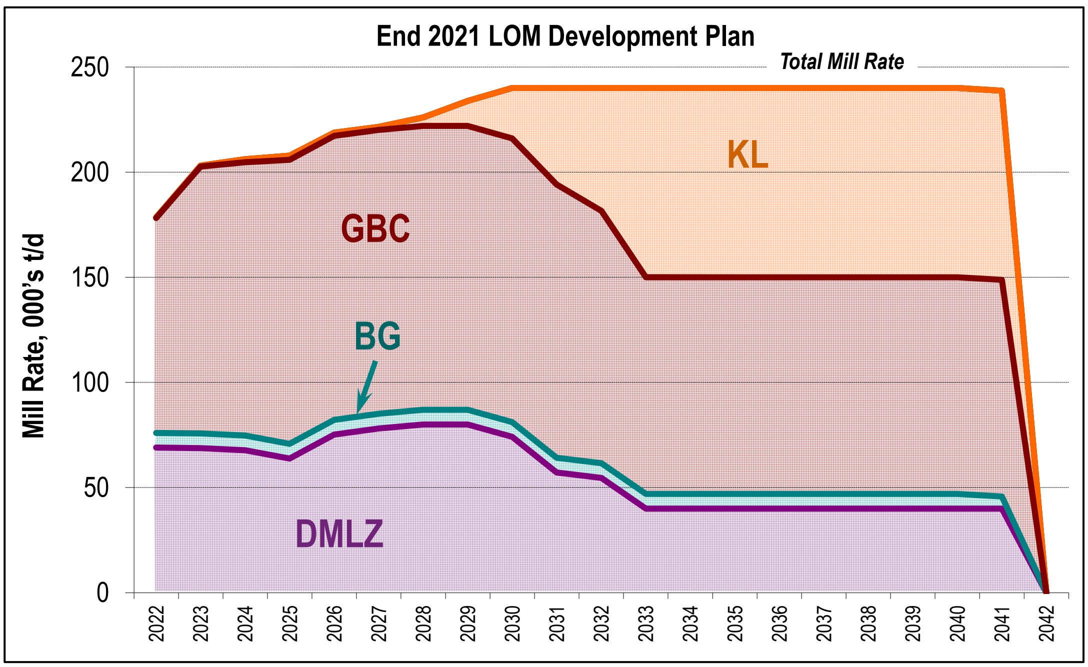
The mine plan is developed based on supplying ore to the processing facilities. The mine production schedule is produced using specialized industry software. The software evaluates the block model and applies various mixing mechanisms such as fines migration, rilling, toppling, and vertical movement of material. The algorithms that control this mixing are proprietary to the software, based on over 30 years of development and standard practice in the industry. Numerous inputs allow customization of the mixing properties and calibration to actual cave performance. With the mixing model created, the software produces a production schedule based on planned production rates, drawpoint opening sequence, estimated draw rates, and other inputs. The production schedule reports the tonnage and grade per time period and is used for the metal forecasting process.

The Grasberg minerals district is one of the largest producing underground operations in the world. No stripping is required as all production is generated from underground mining. Underground mine development is typically between 35 and 40 kilometers of tunneling annually. The BG mine uses an open stoping with paste backfill method and typically emplaces between 600,000 to 700,000 cubic meters of paste per year.

Dilution of the reserve is accounted for by modeling the entry of material into the mixing model from previously caved zones and open-pit failures. The mine plan is scheduled to achieve a total of 240,000 metric tons of ore per day as the different mining operations ramp-up. This is expected to be achieved from four operating mines supplying ore to the mill: GBC, DMLZ, BG and KL.

The mine production rate and expected mine life are illustrated in Figure 13.2.

Figure 13.2 – Tonnage Per Day by Operating Mine



13.3 Mine Operations

Mine unit operations include drilling, blasting to develop access, undercuts, drawbell development, ore raise development, drawpoint development, cave initiation, as well as loading and hauling. Support equipment is used for maintaining underground access roads, underground crushers, conveyors, and other mine services.

Required underground mining equipment varies by individual operation and includes that equipment required to develop and construct the mines as well as production support. The primary mining fleet consists of load-haul-dump loaders with 11 metric ton capacity and haul trucks with 55 to 60 metric ton capacity.

The site is in operation with experienced management and sufficient personnel. The mine operates 365 days per year on a 24 hour per day schedule. Operational, technical, and administrative staff are on-site to support the operation. As of December 31, 2021, the underground mine division has approximately 5,200 employees.

14 PROCESSING AND RECOVERY METHODS

The process facilities operate 365 days per year with exceptions for maintenance. The facilities have a long operating history. FCX and PT-FI anticipate that the site will have adequate energy, water, process materials, and permits to continue operating throughout the LOM.

14.1 Concentrator Processing Description

The concentrator facilities located at MP74 are at an elevation of 2,800 to 2,900 meters above sea level and approximately 110 kilometers from the portsite dewatering and shipping facilities. The concentrators treat primary crushed ore conveyed from underground mines to surface stockpiles at MP74.

The first processing facilities treating Ertsberg pit ores were commissioned in 1973 and have seen incremental capacity enhancements over the years. Ore is processed in the mill, which produces a copper concentrate by flotation. Ore is delivered from the mine to an underground primary crusher where it is crushed and then conveyed to coarse ore mill stockpiles that feed the concentrators. Ore is conveyed from the mill stockpiles to the copper concentrators.

Ore enters the C1/C2 concentrator, where the secondary crushers accept scalped feed and are followed by a tertiary crushing circuit operating in closed circuit with vibrating screens, which provide the initial size reduction. Scalped screen undersize slurry, known as crusher slurry, is fed to hydrocyclones ahead of the C1/C2 ball mill circuit, with the classified fines fraction reporting directly to flotation, bypassing ball milling, and the classified coarse fraction to ball mill feed. A portion of the crusher slurry can also be transferred to the C3/C4 ball mill grinding circuit. Tertiary crusher screen undersize is fed to the High-Pressure Grinding Roll (HPGR). HPGR product is delivered to fine-ore storage bins for ultimate feed to the ball mill circuit. Ball mill discharge slurry is pumped to hydrocyclones where it is classified. The hydrocyclone underflow (coarse fraction) returns to ball mills for further grinding. A slipstream of the hydrocyclone underflow reports to the Knelson gravity circuit to improve coarse gold recovery. The hydrocyclone overflow (fine fraction) reports to rougher flotation for copper and gold recovery. Rougher concentrate advances to regrind mills and cleaner flotation to produce a final concentrate. A slipstream of regrind hydrocyclone underflow reports to a Knelson gravity circuit to improve gold recovery. Knelson concentrate is combined with the final flotation concentrate.

For the C3/C4 concentrator, ore enters the primary grinding circuit, where it is processed through a semi-autogenous grinding (SAG) mill. SAG mill product discharges onto vibrating screens. The screen oversize is conveyed to cone crushers, where pebbles are crushed before being recycled back to the SAG mill feed. An option exists to direct the crushed pebbles to the vibrating screens. The screen undersize is pumped to hydrocyclones where it is classified. The majority of hydrocyclone underflow (coarse fraction) reports to ball mills for further grinding. A slipstream of the hydrocyclone underflow reports to the Knelson gravity circuit to improve coarse gold recovery. The ball mill discharge mixes with Knelson wet screen undersize before being pumped back to the hydrocyclones. The hydrocyclone overflow (fine fraction) reports to rougher flotation for copper and gold recovery. Rougher concentrate advances to regrind mills and cleaner flotation to produce a final copper and gold concentrate. A slipstream of regrind hydrocyclone underflow reports to a Knelson gravity circuit to improve gold recovery. Knelson concentrate is combined with the final flotation concentrate.

The nominal processing rate used in the LOM plan is provided in Table 14.1.

Table 14.1 – Summary of Processing Facilities

Facility	Purpose / Comments / Capacity
Concentrators 1 and 2	Commonly referred to as C1/C2 or the North/South concentrators. Size reduction is achieved with 2 secondary crushers on scalped feed, followed by 8 tertiary crushers in closed circuit with screens, then 2 HPGRs in quaternary crushing duty, followed by 8 ball mills prior to rougher and then cleaner flotation. Combined milling capacity is approximately 65k dmt per day.
Concentrator 3	Commonly referred to as C3 or the SAG1 concentrator. SAG mill in closed circuit with a pebble crusher followed by 2 parallel ball mills for size reduction prior to rougher and cleaner flotation. Milling capacity is approximately 34k dmt per day.
Concentrator 4	Commonly referred to as C4 or the SAG2 concentrator. SAG mill in closed circuit with 2 pebble crushers followed by 4 parallel ball mills for size reduction prior to rougher and cleaner flotation. The C3 and C4 concentrators share a common cleaner circuit located in the C3 concentrator building. Milling capacity is approximately 75k dmt per day.
Concentrate Pumphouse and Pipeline	Thickeners, storage tanks, positive displacement pumps and carbon steel slurry pipeline (3x 6” diameter, 1x 5” diameter) to deliver copper concentrate to dewatering plant facilities at portsite. Nominal capacity is approximately 3.0M dmt per year.
Dewatering Plant	3 vacuum and 2 pressure filtration systems to reduce moisture content from 65% solids to less than 9.8% moisture. Nominal capacity is approximately 2.7M dmt per year.
Ship Loading	Storage barns, conveyors, loading dock and lightering barge to load copper concentrate to bulk cargo vessels for sale globally. Nominal capacity is approximately 3.0M dmt per year.

Copper concentrate from all concentrators is thickened before it advances to the pumphouse to be delivered by pipeline to the port facilities. At the portsite, the dewatering plant filters and stores the final product in a concentrate storage building. Copper concentrate is then loaded onto bulk cargo ships for global sale to off-site smelters.

Milled material that does not float is called tailings and has a low-value mineral content. Flotation tailings advance to tailings thickeners where process water is recovered and recycled back to the concentrators. Thickened tailings flow by gravity to the tailings storage facility known as the ModADA. Limestone is added to the mill feed as needed to maintain the neutral geochemistry of the mill tailings.

Figure 14.1 provides a simplified schematic of the C1 and C2 concentrators. Figure 14.2 provides a simplified schematic of the C3 and C4 concentrators.

Figure 14.1 – Current C1 and C2 Concentrators Schematic

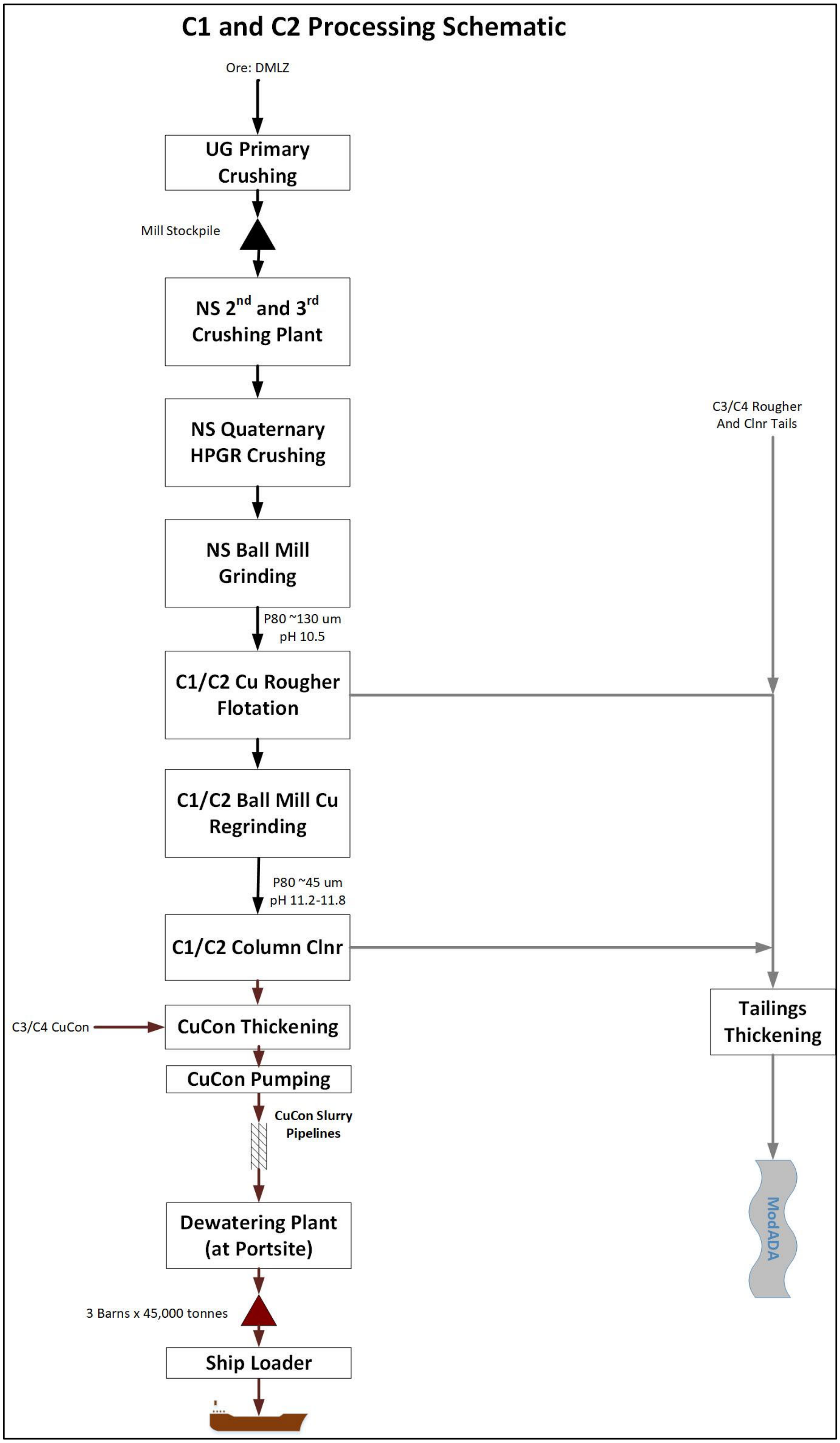
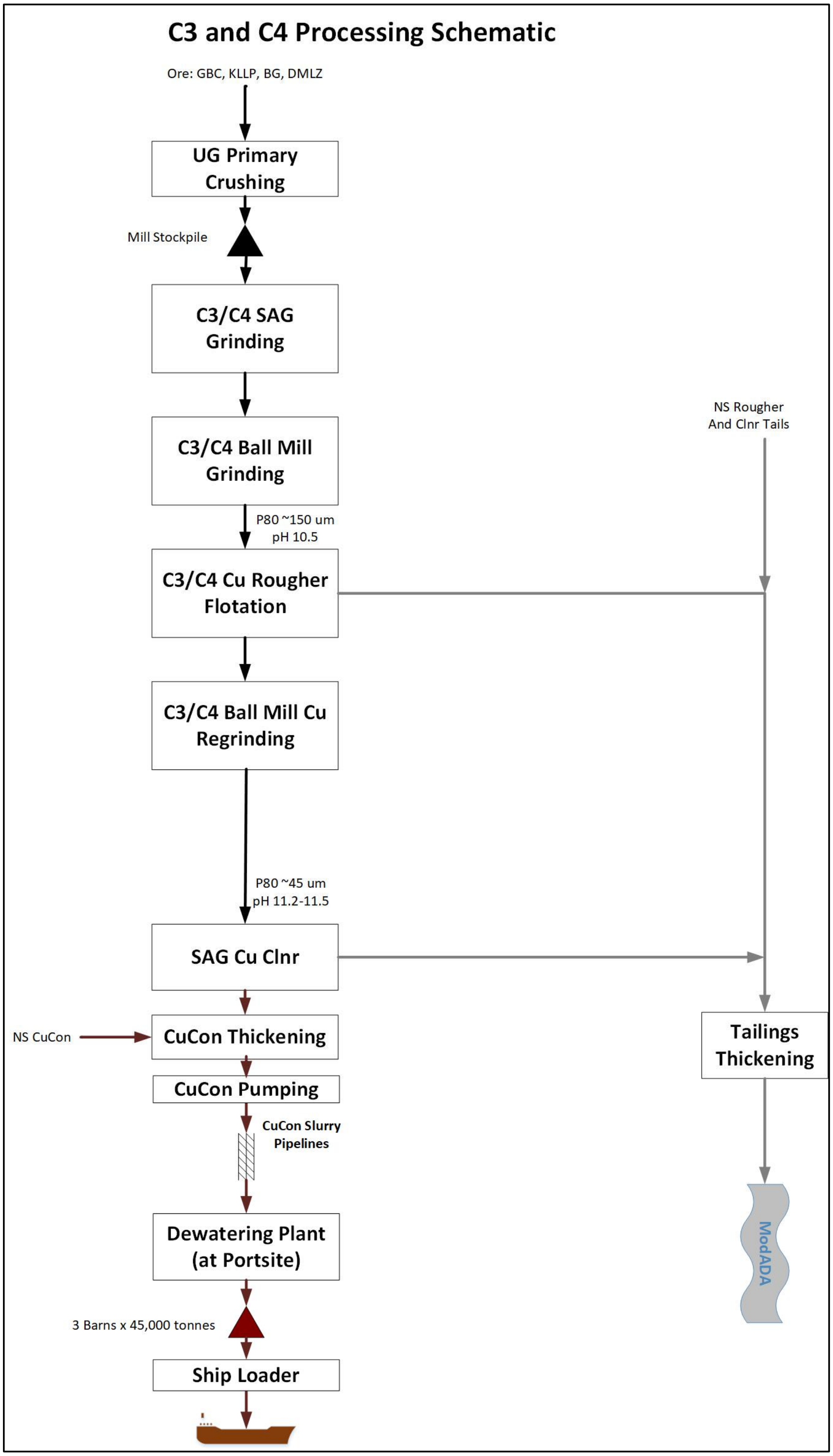


Figure 14.2 – Current C3 and C4 Concentrators Schematic



The processing facility performance is reviewed regularly, and adjustments are made as necessary to improve performance and reduce costs.

14.2 Processing Requirements

The PT-FI mill has been operating since 1973 and all equipment and processes are proven in an industrial application. Adequate supplies for energy, water, process materials, and sufficient personnel are currently available to maintain operations and are anticipated throughout the LOM plan. Process materials are provided to the jobsite on an as-needed basis through the FCX and PT-FI global supply chain departments. The actual consumption of key processing supplies varies depending on ore feed and operating conditions in the plants. Table 14.2 includes the typical ranges of consumption for key processing requirements.

Table 14.2 – Processing Facilities Consumables

Parameter	Typical Value
Energy for Process (kWh/t ore)	24
Fresh Water (gpm)	31,000
Process Water Recycle (gpm)	77,700
Mill Liners (kg steel/t ore)	0.06
Grinding Balls (kg steel/t ore)	1.1
Primary Collector (g/t ore)	40
Secondary Collector (g/t ore)	15
Frother (g/t ore)	20
Lime (kg/t ore)	1.0
Flocculant (g/t ore)	13
Diesel (gal/t copper concentrate)	2.3

Consumable and personnel requirements for the processing facilities are expected to be near current levels in the near-term with variation dependent on production levels in the various unit operations. As of December 31, 2021, the MP74 concentrating area and portsite dewatering plant had 631 PT-FI employees and 1,121 contractors for a total staffing of 1,752.

14.3 Future Processing Capital Projects

The projects listed below are included in the LOM plan and are necessary to achieve the stated mill tonnages, recoveries, and concentrate grades. The process design criteria is informed by data from laboratory testing at bench scale and if necessary, at the pilot plant scale:

SAG3

- SAG3 is required to maintain total mill capacity in line with the historical nominal value of 240,000 metric tons of ore per day. This is because the underground ore is not transferred to the mill via ore passes of 600-meter vertical height which naturally provides a significant amount of gravity assisted comminution, as was the case for the now depleted Grasberg open-pit ore. SAG3 is expected to be operational in 2023.

Copper Cleaner

- The current SAG concentrator copper cleaner circuit is undersized for the higher rougher concentrate production volumes associated with GBC and KL ore due to higher pyrite levels than previously experienced with open-pit ores.
- The new copper cleaner will improve concentrate grade and recovery by increasing rougher flotation capacity, adding regrind power with the use of high intensity grinding mill technology to improve mineral liberation, and installing a new 2-stage cleaner using staged flotation reactor cell technology. The new GBC copper cleaner is planned to be operational in 2024.
- The GBC cleaner is planned to be expanded for 2026 and again in 2032 in order for it to be able to treat additional volume of rougher concentrate generated by KL ore.

Pyrite Cleaner and Pyrite Tailings Storage

- In order to maintain the mill tailings at neutral geochemistry with a 50 percent factor of safety during the mine life, a pyrite flotation circuit is planned to be online in 2029. This circuit will treat copper cleaner tailings to float a stream known as pyrite tailings. The pyrite tailings will be pumped to the lowlands via slurry pipelines to a pyrite tailings storage facility. The balance of the cleaner tailings will report to the normal mill tailings stream.

Vertical Pressure Filter #3 (VPA3)

- The current filtration capacity of the dewatering plant at portsite is 2.7 million dry metric tons per annum.
- A third pressure filter is in progress to provide capacity up to and beyond the in-country smelting constraint of 3.0 million dry metric tons per annum. VPA3 is expected to be operational in 2023.
- A fourth VPA (VPA4) is planned for 2032 to treat increased levels of concentrate production. The VPA3 layout allows for the installation of VPA4.

Makaha Lime Plant:

- A 200 tpd expansion of the Makaha lime plant that produces milk-of-lime, a reagent, used for pH adjustment in flotation is planned for operation in 2029.

15 SITE INFRASTRUCTURE

The site infrastructure at PT-FI has been established over the history of the project and supports the current operations. The current major mine infrastructure includes: waste rock storage facilities, temporary stockpiles, riverine tailings management system, power and electrical systems, water usage systems, various on-site warehouses and maintenance shops, and offices required for administration, engineering, maintenance and other related mine and processing operations. The communication system at PT-FI includes internet and telephone access connected by hard-wire, fiberoptic, and mobile networks. Access to the property is discussed further in Section 4 of this TRS. The general location of the site infrastructure is shown in Figure 15.1 and Figure 15.2.

Figure 15.1 – Site Infrastructure Plan View

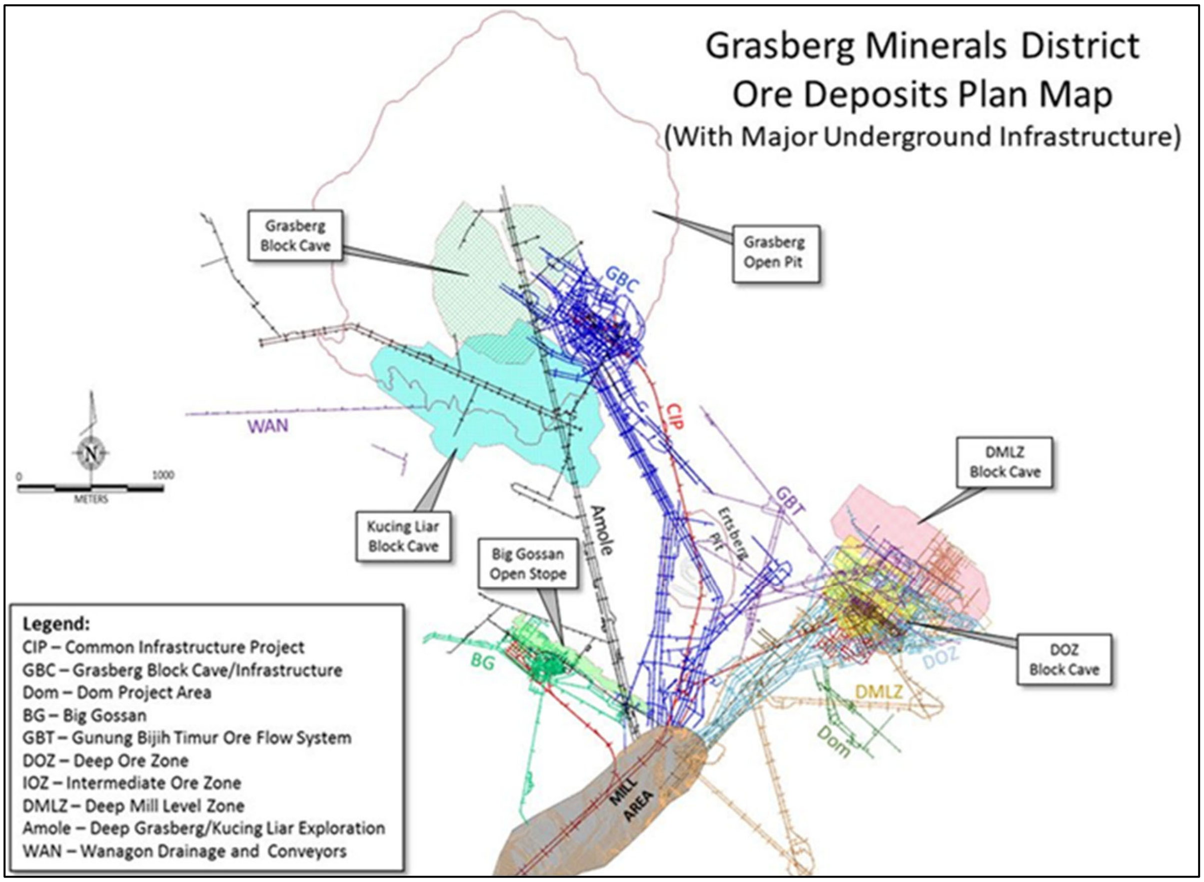
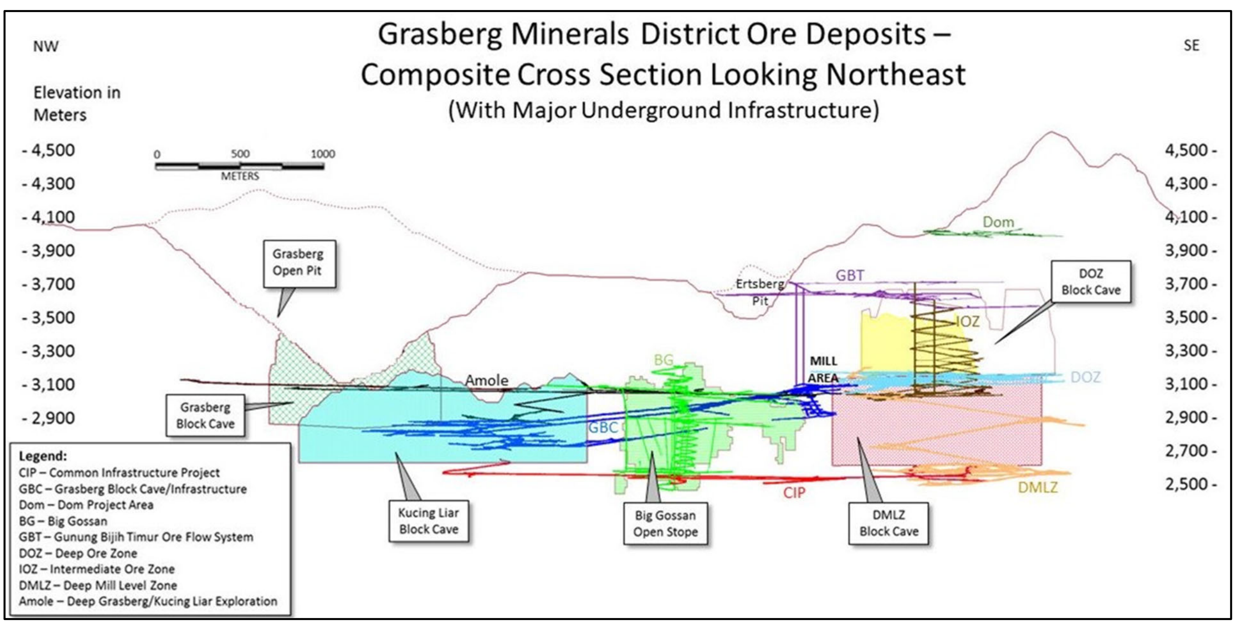


Figure 15.2 – Site Infrastructure Cross Section



15.1 Waste Rock Storage Facilities

Waste rock stockpiles are used to store overburden and other waste rock materials that was produced during the development and production of the now depleted open-pit mine. The transition to underground mining was completed in 2019, eliminating the need for new overburden stockpiles. As of December 31, 2021, PT-FI continues to work to cap the Wanagon overburden stockpile with limestone which is expected to be completed in the 2025 to 2029 timeframe. Other highlands stockpiles are being regraded and the top surface capped with limestone. Monitoring of the stockpiles and storm water runoff will continue through the life of operations.

15.2 Mill Stockpiles

Ore is delivered from the mine to an underground primary crusher where it is crushed and then conveyed to coarse ore mill stockpiles that feed the concentrators. Ore is conveyed from the mill stockpiles to the copper concentrators.

15.3 Controlled Riverine Tailings Management

PT-FI operates a controlled riverine tailings management system called the ModADA located on the southern coastal plain of the island of Papua, Indonesia. Tailings produced at the mill in the highlands are transported roughly 45 kilometers downstream to the ModADA in the lowlands with an elevation of 0 to 150 meters by way of a steep, unnavigable river that originates near the mill. Deposited sediments in the ModADA comprise tailings from the mill and other mine-derived sediments, as well as naturally occurring sediment produced from erosive processes typical for the area. Engineered levees to the east and west of the ModADA running a total length of approximately 120 kilometers laterally contain depositing sediments in the land and estuary portions of the permitted deposition area.

The current ModADA levee system has been constructed over a period of many years and will continue to be constructed in future years for mill tailings management and flood protection. Trained site engineers and construction quality assurance crews conduct inspections of the levee system.

15.4 Power and Electrical

The Grasberg minerals district electrical power is supplied by a 198MW coal-fired plant at portsite and 130MW of diesel generator capacity located at the mill. A twin circuit 230kV transmission line connects the portsite area and main power plants to the mill and mine operations areas.

There is 30MW of installed power generating capacity (25MW of firm capacity) and a 20kV distribution system that provides power for the lowlands support areas including MP38, Lowlands Industrial Park and Kuala Kencana.

One of PT-FI's partners provides expertise in the area of maintaining and operating its power plants.

To support the additional energy requirements as result of the ramp-up of the underground mines, PT-FI is constructing a new 129MW DFPP at the portsite to provide an additional 129MW of firm capacity to support the increased power requirements as the underground mine ramp-up, and will allow the existing diesel generators to be transitioned to provide only back up and peaking requirements. The DFPP is designed using high-efficiency dual fuel reciprocating engines on a flexible platform that can operate on either diesel fuel or natural gas, providing PT-FI future optionality to adjust the fuel type and increase plant capacity.

15.5 Water Usage

Water sources for the project are a combination of naturally occurring mountain streams and water derived from our underground operations.

Potable and domestic use water is sourced from the fresh water supply and distributed using a network of pipelines. Process facilities operate using a combination of fresh and recycled water from the concentrator dewatering system and outflows from the underground mines. The underground mines utilize water sourced from dewatering activities.

15.6 Product Handling

Steel pipelines are used to transport copper concentrate from the mill to the dewatering and storage barn facilities at portsite. The concentrate is pumped in these pipelines to a ridge above the Tembagapura townsite from which it flows by gravity to the portsite. The pipelines are buried or laid on the shoulder of the access road.

Ship loading facilities transport the dried concentrate (dried to 9 percent moisture for dust control) from the storage barns to the dock at the portsite facilities in Amamapare, Papua. Incoming freight and fuel are also unloaded at a separate cargo dock at portsite for delivery to their ultimate destinations in the lowlands, Tembagapura, the mill area, or the mines.

15.7 Logistics, Supplies, and Site Administration

The operation has common management and services, as well as a logistics network that includes warehouses, vehicles, and personnel required to distribute and store the large quantity of supplies used by the operation and its workforce. A bus service is provided to the workplaces. Helicopters service day-to-day operations and the exploration activities.

Planes operated by a privatized partner and commercial flights provide routine transportation to Jakarta and other Indonesian cities.

PT-FI has ships under PT-FI control to transport fuel, supplies, and general cargo to the site. PT-FI maintains a number of purchasing offices in Indonesia as well as in Singapore and the U.S. Warehouses are maintained at various locations throughout the site.

The remote location of the project requires that the operation be completely self-sufficient with an infrastructure capable of sustaining over 20,000 employees and contractors, along with many of their dependents. As such, supporting infrastructure has been built, improved, and expanded over the life of the project, including townsites providing employees with services ranging from retail stores, restaurants, residential facilities, schools, libraries, banks, postal services, training and recreational facilities, and health service facilities.

16 MARKET STUDIES

The Grasberg mine produces copper in a concentrate, with gold and silver also contained in the concentrate.

16.1 Market for Mine Products

Copper is an internationally traded commodity and its prices are determined by the major metal exchanges. Prices on these exchanges generally reflect the worldwide balance of copper supply and demand and can be volatile and cyclical. In general, demand for copper reflects the rate of underlying world economic growth, particularly in industrial production and construction. FCX believes copper will continue to be essential in these basic uses as well as contribute significantly to new technologies for clean energy, to advance communications and to enhance public health.

Gold and silver are used for jewelry, coinage, and bullion as well as various industrial and electronic applications. Gold and silver can be readily sold on numerous markets throughout the world. Benchmark prices are generally based on London Bullion Market Association (London) quotations.

FCX owns smelting, refining, and product conversion facilities for copper products, operated as separate business segments. Sales between FCX's business segments are based on terms similar to arms-length transactions with third-parties at the time of the sale.

PT-FI sells its copper concentrates at market rates to major copper smelters worldwide as well as to major trading companies with whom FCX has built and maintained long-term relationships. PT-FI's sales agreements with major trading companies are generally established annually, although some extend unless or until terminated with 1-year notice. The pricing provisions in PT-FI's concentrate sales agreements are consistent with international terms and conditions for the sale of copper concentrates and are relatively standardized. The underlying copper price is determined by and fluctuates with, the commodity exchange price while the treatment and refining charges and premiums are negotiated annually based on market conditions.

16.2 Commodity Prices Forecast and Contracts

Long-term metal price projections for reserve estimation are:

- $2.50 per pound copper
- $1,200 per ounce gold
- $15 per ounce silver

All contracts currently necessary for supplies and services to maintain the Grasberg minerals district facilities and production are in place and are renewed or replaced within timeframes and conditions of common industry practices.

FCX and the QPs believe that the marketing and metal price assumptions for metal products are suitable to support the financial analysis of the mineral reserve evaluation. Further information regarding the sale and marketing of the mine's metal products are discussed in FCX's Annual Report on Form 10-K for the year ended December 31, 2021.

17 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL IMPACT

The Grasberg minerals district adheres to FCX environmental and sustainability programs, including policies and management systems regarding environmental, permitting, and community issues. The Grasberg minerals district has implemented an Environmental Management System that is certified to the internationally recognized ISO-14001:2015 standard. FCX's programs are based on policies and systems that align with the International Council on Mining and Metals Sustainable Development Framework and the Copper Mark. FCX routinely evaluates implementation of these policies through internal and external independent assessments and publicly reports on its performance.

Further discussion regarding environmental, permitting, and social or community impacts is available in the latest FCX Annual Report on Sustainability.

17.1 Environmental Considerations

Environmental monitoring is ongoing at Grasberg and will continue over the life of the operations and beyond through closure. Key monitoring areas include air, water, waste management, reclamation, and biodiversity including terrestrial and aquatic ecosystems. PT-FI continues to monitor these baselines and impact studies regularly at compliance points and report to required agencies.

Various changes in mining techniques and processing options have been implemented as a result of the depletion of the Grasberg open-pit in 2019. Updated environmental impact studies, environmental management and monitoring plans have been completed and are currently under review by the GOI.

PT-FI is currently in the process of completing an ESIA for facilities and activities associated with the transition from open-pit mining to underground operations, including the addition of a new SAG unit at the mill, construction of additional power facilities at the port, and southern extension of the east and west levees to safely maintain the tailings within the ModADA deposition area, as approved by the 300k AMDAL.

17.2 Permitting

FCX and PT-FI believe that all major permits and approvals are in place to support operations at the Grasberg minerals district, however additional permits will likely be necessary in the future. PT-FI holds multiple permits from national, provincial, and regency regulatory agencies, including groundwater use permits, effluent and air discharge permits, solid and hazardous waste storage and management permits and protected forest borrow-to-use permits. Where permits have specific terms, renewal applications are made to the relevant regulatory authority as required, prior to the end of the permit term.

PT-FI routinely reports monitoring results to the Mimika Regency and provincial Papua Government as well to the MoEF. The MoEF issued to PT-FI Borrow to Use of Forest Area Permits (IPPKH), and the Determination of Planting Locations for Watershed Rehabilitation. Under conditions of the IPPKH issuance, PT-FI is legally required to revegetate an equal area of previously degraded land.

In 2020, PT-FI initiated a new AMDAL in preparation for the proposed extension of the east and west levees to maintain the tailings within the ModADA deposition area. PT-FI continues to work with the MoEF to address full approval of the ESIA, which is currently estimated to be received in 2022. PT-FI is currently undergoing regulatory review of technical approvals, the next stage of the overall permitting process.

17.3 Waste and Tailings Storage, Monitoring, and Water Management

PT-FI has developed and continues to implement detailed, comprehensive mine waste and tailings management programs to meet regulations and FCX environmental management practices. PT-FI also follows FCX's tailings management and stewardship program.

PT-FI operates a controlled riverine tailings management system implemented based on methods approved and permitted by the GOI. Tailings are transported from the concentrating facility along with water and a small quantity of concentrating reagents. Reagents added as part of the concentrating process have been demonstrated to dissipate within a short distance of the concentrating facility.

The PT-FI tailings management system uses an unnavigable river to transport the tailings and other mine-derived sediments from the concentrator area in the highlands along with natural sediments to a large engineered and managed deposition area in the lowlands, called the ModADA. The river is not used for potable water, agriculture, fishing or other domestic or commercial uses. Levees have been constructed on both the east and west sides of the ModADA to laterally contain the depositional footprint of the tailings and natural sediment within the designated area. Quantities of finer tailings and other sediments deposit in the estuary and the sea to the south.

PT-FI is also actively engaged with the MoEF's Tailings RoadMap Task Force, which is engaging third-party expertise to examine the viability of additional management techniques and activities, which may increase sediment retention, prevent future erosion, create new habitat, and identify beneficial uses of tailings as a resource for local communities.

17.4 Mine Closure Plans

A detailed Mine Closure Plan and 5-year reclamation plan have been approved by GOI regulators as required by Indonesian law. The plans are reviewed annually and revised every 5 years. Required reclamation bonds are in place. In the future, additional approval will be required for the diversion of the Aghawagon/Otomona River out of the ModADA at the end of mine life.

PT-FI completed an updated Mine Closure Plan in June 2019 to reflect PT-FI production operations until 2041. On July 2, 2019, PT-FI obtained approval for changes to the Mine Closure Plan through the Decree of the Directorate General of Mineral and Coal. The total closure cost estimate in the LOM plan is approximately $1.2 billion based on a cash flow schedule for the implementation of closure and post closure tasks. PT-FI has complied with the annual renewal of the financial guarantees corresponding to the closure plan.

17.5 Local Stakeholder Considerations and Agreements

As part of the ongoing permitting and compliance obligations with the regional and national agency authorizations and as part of the mine's commitment to local stakeholder engagement, PT-FI is dedicated to local community and social matters. PT-FI seeks to conduct its activities in a transparent manner that promotes proactive and open relationships with the local community, government, and other stakeholders to maximize the positive impacts of its operations and mitigate potential adverse impacts throughout the LOM plan.

PT-FI recognizes the rights of the Indigenous Peoples living within its project area and works with local stakeholders to address these rights on an ongoing basis. This can include land rights agreements, provision of community development programs involving the construction of housing, places of worship, community centers and other infrastructure, as well as provision of employment opportunities.

In 1996, PT-FI established the Freeport Partnership Fund for Community Development and completed the conversion of the fund into an Indonesian Foundation (YPMAK) during 2019. Leaders from the local indigenous groups, churches and the local government manage this fund with minority representation from FCX. PT-FI is contributing 1 percent of its gross revenues annually to this fund. In addition, PT-FI has established land rights trust funds administered by local representatives and PT-FI focusing on socio-economic resources, human rights, and environmental issues.

PT-FI seeks to prioritize local and regional purchases and hiring with the additional objectives to promote community development through the prioritization of acquisition of local and regional goods and services, according to its requirements and technical specifications.

17.6 Comment on Environmental Compliance, Permitting, and Local Engagement

In the QP's opinion, the Grasberg minerals district has adequate plans and programs in place, is in good standing with Indonesian environmental regulatory authorities, and no current conditions represent a material risk to continued operations. The Grasberg minerals district staff has a high level of understanding of the requirements of environmental compliance, permitting, and local stakeholders in order to facilitate the development of the mineral reserve and mineral resource estimates. The periodic inspections by governmental agencies, FCX corporate staff, third-party reviews, and regular reporting confirm this understanding.

18 CAPITAL AND OPERATING COSTS

The capital and operating costs are estimated by the property's operations, engineering, management, and accounting personnel in consultation with FCX corporate staff, as appropriate. The cost estimates are applicable to the planned production, mine schedule, and equipment requirements for the LOM plan. The capital costs are summarized in Table 18.1.

Table 18.1 – Capital Costs

	$ billions
Mine	$7.5
Concentrator	3.9
Supporting Infrastructure	2.3
Total Capital Expenditures	$13.7

Estimates are derived from current costs and adjusted to the reserve price environment. The estimates are not adjusted for escalation or exchange rate fluctuations. Actual realized costs are reviewed periodically and estimates are refined as required.

Capital costs include development and sustaining projects for the production of the scheduled reserves. Capital cost estimates are derived from current capital costs based on extensive experience gained from many years of operating the property and do not include inflation. FCX and the PT-FI mine staff review actual costs periodically and refine cost estimates as appropriate.

Mine capital costs include development of the KL ore body as well as sustaining development for the GBC and DMLZ deposits. Concentrator capital costs include sustaining capital for the mill complex as well as capital expenditures at the processing facilities to optimize the handling of underground ore from the GBC, DMLZ and KL deposits. Increases in power loads at these processing facilities and the underground mines are expected to require additional power generation with capital expenditures for new power generation, upgrades to existing transmission lines, and refurbishment of the existing three coal units.

The operating costs for the LOM plan are summarized in Table 18.2.

Table 18.2 – Operating Costs

	$ billions
Mine	$15.9
Processing	13.5
Balance	12.4
Total site cash operating costs	41.9
Freight	2.2
Treatment charges	9.4
Royalties & export duties	4.8
By-product credits ($1,200 Au price)	(33.9)
Total net cash costs	$24.4
Unit net cash cost at $1,200 Au price ($ per pound of copper)	$0.76
Unit net cash cost at $1,800 Au price ($ per pound of copper)	$0.29

Estimates are derived from current costs and adjusted to the reserve price environment. The estimates are not adjusted for escalation or exchange rate fluctuations. Actual realized costs are reviewed periodically and estimates are refined as required.

The operating cost estimates are derived from current operating costs and practices based on extensive experience gained from many years of operating the property and do not include inflation. The operating cost estimates reflect certain pricing assumptions, primarily for energy and foreign exchange rates, that are reflective of the copper market environment ($2.50 per pound copper price) at which the reserve plan has been prepared. As the property has a long operating history, FCX believes that the accuracy of the cost estimates is better than the minimum of approximately +/- 25 percent required for a pre-feasibility study level of mineral reserves as per S-K1300, and the level of risk in the cost forecasting is low. FCX and the PT-FI mine staff review actual costs periodically and refine cost estimates as appropriate.

The LOM plan summary in this TRS is developed to support the economic viability of the mineral reserves. The latest guidance regarding updated operational forecast cost estimates are available in FCX's Annual Report on Form 10-K for the year ended December 31, 2021, filed with the SEC.

19 ECONOMIC ANALYSIS

The LOM plan includes comprehensive operational drivers (mine and corresponding processing plans, metal production schedules and corresponding equipment plans) and financial estimates (revenues, capital costs, operating costs, downstream processing, freight, taxes and royalties, etc.) to produce the reserves over the life of the property. The LOM plan is an operational and financial model that also forecasts annual cash flows of the production schedule of the reserves for the life of the property under the assumed pricing and cost assumptions. The LOM plan is used for economic analyses, sensitivity testing, and mine development evaluations.

The financial forecast incorporates revenues and operating costs for all produced metals, processing streams, and overall site management for the life of the property. The economic analysis summary in Table 19.1 includes the material drivers of the economic value for the property and includes the net present value (NPV) of the unleveraged after-tax free cash flows as the key metric for the economic value of the property's reserve plan under these pricing and cost assumptions. This analysis does not include economic measures such as internal rate of return or payback period for capital since these measures are not applicable (and are not calculable) for an on-going operation that does not have a significant upfront capital investment to be recovered.

Table 19.1 – Economic Analysis

Metal prices	
Copper ($ per pound)	$2.50
Gold ($ per ounce)	$1,200
Silver ($ per ounce)	$15.00
Life of Mine	
Copper (billion pounds)	32.2
Gold (million ozs)	26.6
Silver (million ozs)	129.5
Ore (billion metric tons)	1.67
Copper grade (%)	1.04
Gold grade (g/t)	0.77
Copper mill recovery (%)	87
Gold mill recovery (%)	67
Capital costs ($ billions)	$13.7
Site cash operating costs ($ billions)	$41.9
Unit net cash cost at $1,200 Au price ($ per pound)	$0.76
Unit net cash cost at $1,800 Au price ($ per pound)	$0.29
Economic Assumptions and Metrics	
Discount Rate (%)	8
Copper Royalty Rate (%)	4.00
Gold Royalty Rate (%)	3.75
Corporate Tax Rate (%)	25
Net Profit Tax Rate (%)	10
Exchange rate (Indonesian rupiah/$)	14,000
Net present value @ 8% ($ billions)	$13.4
Internal rate of return (%)	NA *
Payback (years)	NA *

* Not Applicable (NA) as this is an on-going operation with no significant negative initial cash flow/initial investment to be recovered.

The key drivers of the economic value of the property include the market prices, metal grades and recoveries, and costs. Depending on the changes in these key drivers, FCX can adjust operating plans (in the near-term as well as the long-term, as appropriate) to minimize negative impacts to the overall economic value of the property.

Table 19.2 summarizes the economic impact of changes to these key drivers on the property's NPV (as included in Table 19.1). The sensitivities are estimates for the changes in each key drivers' effect on the base plan summarized for the production of the mineral reserves over the life of the property.

Table 19.2 – Sensitivity Analysis

	Incremental Impact to NPV	
Sensitivity Analysis ($ billions)	**+5% Change**	**-5% Change**
Copper price	$1.32	($1.32)
Gold price	0.54	(0.54)
Copper grade/recovery	1.18	(1.18)
Gold grade/recovery	0.54	(0.54)
Capital cost	(0.35)	0.35
Operating cost	(0.72)	0.72
Discount rate	(0.43)	0.45

Sensitivity analysis does not reflect changes in mine plans or costs with changes in above items.

The after-tax NPV of the LOM plan is most sensitive to price, followed by grades and recovery, and then operating costs. The sensitivity analysis does not reflect changes in mine plans or costs with changes in the reported driver. Sustained periods in these economic scenarios would warrant a re-evaluation of the LOM plan assumptions, planned development, and reported mineral reserves.

Table 19.3 summarizes the LOM plan including the annual metal production volumes, mine plan schedule, capital and operating cost estimates, unit net cash costs, and unleveraged after-tax free cash flows over the life of the property. Free cash flow is the operating cash flow less the capital costs and is a key metric to demonstrate the cash that the property is projected to generate from its operations after capital investments for the reserve production plan at assumed pricing and cost assumptions. The property's ability to create value from the reserves is determined by its ability to generate positive free cash flow. The summary demonstrates the favorable free cash flow generated from the property's LOM plan under the assumptions. This economic analysis supports the economic viability of the mineral reserves statement.

Table 19.3 – LOM Plan Summary

	2022-2026	2027-2031	2032-2036	2037-2041
Metal prices				
Copper ($ per pound)	$2.50	$2.50	$2.50	$2.50
Gold ($ per ounce)	$1,200	$1,200	$1,200	$1,200
Silver ($ per ounce)	$15.00	$15.00	$15.00	$15.00
Annual Averages				
Copper (billion pounds/year)	1.6	1.7	1.8	1.4
Gold (million ozs/year)	1.6	1.2	1.2	1.3
Silver (million ozs/year)	6.1	7.1	6.4	6.3
Ore processed (million metric tons/year)	74	85	88	88
Copper grade (%)	1.16	1.06	1.09	0.86
Gold grade (g/t)	0.95	0.66	0.73	0.75
Copper mill recovery (%)	88	89	87	86
Gold mill recovery (%)	72	71	61	62
Capital costs ($ billions/year)	$1.34	$0.97	$0.27	$0.16
Site cash operating costs ($ billions/year)	$2.01	$2.12	$2.24	$2.00
Unit net cash cost ($ per pound)	$0.56	$0.77	$0.89	$0.80
Free cash flow ($ billions/year)	$1.04	$1.26	$1.83	$1.66

Summary of annual cash flow forecasts based on an annual production schedule for the life of property.

20 ADJACENT PROPERTIES

As of December 31, 2021, there are no adjacent properties impacting the Grasberg minerals district mineral reserve or mineral resource estimates.

21 OTHER RELEVANT DATA AND INFORMATION

In the opinion of the QPs, there is no additional information necessary for the mineral reserve and mineral resource estimates in this TRS. Further discussion regarding operational risks, health and safety programs, and other business aspects of the mine are available in FCX's Annual Report on Form 10-K for the year ended December 31, 2021.

22 INTERPRETATION AND CONCLUSIONS

Estimates of mineral reserves and mineral resources are prepared by and are the responsibility of FCX employees. All relevant geologic, engineering, economic, metallurgical, and other data is prepared according to FCX developed procedures and guidelines based on accepted industry practices. FCX maintains a process of verifying and documenting the mineral reserve and mineral resource estimates, information for which are located at the mine site and FCX corporate offices. FCX conducts ongoing studies of its ore bodies to optimize economic value and to manage risk.

FCX and the QPs believe that the geologic interpretation and modeling of exploration data, economic analysis, mine design and sequencing, process scheduling, and operating and capital cost estimation have been developed using accepted industry practices and that the stated mineral reserves and mineral resources comply with SEC regulations. Periodic reviews by third-party consultants confirm these conclusions.

The Grasberg minerals district is a large-scale producing mining property that has been operated by FCX and its predecessors for many years. Mineral reserve and mineral resource estimates consider technical, economic, environmental, and regulatory parameters containing inherent risks. Changes in grade and/or metal recovery estimation, realized metal prices, and operating and capital costs have a direct relationship to the cash flow and profitability of the mine. Other aspects such as changes to environmental or regulatory requirements could alter or restrict the operating performance of the mine. Significant differences from the parameters used in this TRS would justify a re-evaluation of the reported mineral reserve and mineral resource estimates. Mine site administration and FCX dedicate significant resources to managing these risks.

23 RECOMMENDATIONS

Although ongoing initiatives in productivity and recovery improvements are underway, the mineral reserves and mineral resources are based on the stated long-term metal prices and corresponding technical and economic performance data.

No recommendations for additional work are identified for the reported mineral reserves and mineral resources as of December 31, 2021.

24 REFERENCES

Leys, C. A., Cloos, M., New, B. T. E., and MacDonald, G. D. (2012). Copper ± Molybdenum Deposits of the Ertsberg-Grasberg District, Papua, Indonesia. *Society of Economic Geologists, Inc.*, Special Publication (16), 215–235.

25 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

FCX is experienced in managing the challenges and requirements of operating at local, regional, national, and international levels to support requirements for successfully mining metals throughout the world, using functioning divisions, departments, and teams, organized at mine sites and at the corporate level, that are tasked with meeting and supporting FCX business and operations requirements. These closely integrated departments are focused on subjects that may be peripheral to the direct production of salable metals but are essential to meeting all business requirements for FCX and to navigating the many aspects of modern mining.

As an illustrative example of the FCX organization, within the Corporate Support and Marketing division, there are departments of Finance and Accounting, Financial Reporting, Taxes, General Counsel, Communications, and Business Development groups. Other corporate teams are similarly organized to provide additional broad services. These departments support and integrate with the operating divisions providing requirements and information. A mine site, as part of the operating divisions, will be organized into its own management teams including Mine Management, Operations, Maintenance and Construction, Processing Management, Finance and Accounting, Social Responsibility and Community Development, Environmental, Regional Supply Chain, and Human Resources. These staffed teams are organized to provide responses to the many mining requirements, and they are expert in conducting their specific duties. They represent reliable sources for information and as such, they have been consulted to prepare, support, and characterize the information in this TRS.

Specific to the preparation of this TRS, FCX departments have provided the following categories of information:

- Macro-economic trends, data, interest rates, and assumptions.
- Marketing information.
- Legal matters outside of QP expertise.
- Environmental matters outside of QP expertise.
- Accommodations through community development to local groups.
- Governmental factors outside of QP expertise.

The QPs prepared Sections 3, 4, 5, 15, 16, 17, 18, 19, 20, and 21 of this TRS in reliance on the information provided by FCX above.

As explained, FCX corporate and mine site divisions that provided information for this TRS are business-directed areas that must produce reliable information in support of FCX business objectives. This organizational form contributes to producing expected results for FCX and provides appropriate information supporting mineral reserves and mineral resource estimates.

26 GLOSSARY – UNITS OF MEASURE AND ABBREVIATIONS

Unit	*Unit of Measure*
#, No.	number
$	U.S. Dollar
%	percent
dmt	dry metric ton
g	gram
gal	gallon
gpm	gallon per minute
k	thousand
kg	kilogram
km	kilometer
ktpd	thousand metric tons per day
kV	kilovolt
kWh	kilowatt-hour
lb	U.S. pound
m	meter
M	million
mm	millimeter
MW	megawatt
oz	troy ounce
t	metric ton

Abbreviation	*Description*
AAS	Atomic Absorption Spectroscopy
AMDAL	Analisis Mengenai Dampak Lingkungan
Au	Gold
BG	Big Gossan
BWI	Bond Work Index
COW	Contract of Work
CRM	Certified Reference Material
Cu	Copper
DDH	Diamond Drill Hole
DFPP	Dual-Fuel Power Plant
DMLZ	Deep Mill Level Zone
DOZ	Deep Ore Zone
EESS	Ertsberg East Skarn System
EqCu	Equivalent Copper Grade
ESIA	Environmental and Social Impact Assessment
FCX	Freeport-McMoRan Inc. and its consolidated subsidiaries
GA	PT Geoservices-GeoAssay
GB	Gunung Bijih
GBC	Grasberg Block Cave
GBT	Gunung Bijih Timur
GIC	Grasberg Intrusive Complex
GOI	Government of Indonesia
GRS_OP	Grasberg Open-Pit
GRSKL	Grasberg and Kucing Liar
HPGR	High-Pressure Grinding Roll
IOZ	Intermediate Ore Zone
IPPKH	Borrow to Use of Forest Area Permits
IUPK	Ijin Usaha Pertambangan Khusus (Special Mining Business Permit)
KL	Kucing Liar
LIMS	Laboratory Information Management System
LOM	Life-of-Mine
MGI	Main Grasberg Intrusive
ModADA	Modified Ajkwa Deposition Area

MoEF	*Ministry of Environment and Forestry (Indonesia)*
MP	*Mile post*
NA	*Not Applicable*
NPV	*Net Present Value*
OK	*Ordinary Kriging*
P.E.	*Professional Engineer*
P.Geo.	*Professional Geoscientist*
PT-FI	*PT Freeport Indonesia (subsidiary of FCX)*
QA/QC	*Quality Assurance and Quality Control*
QP	*Qualified Person*
RM-SME	*Registered Member of the Society of Mining, Metallurgy and Exploration (U.S.)*
RQD	*Rock Quality Designation*
SAG	*Semi-Autogenous Grinding*
SEC	*Securities and Exchange Commission (U.S.)*
SFKK	*PT Sucofindo Kuala Kencana*
SG	*Specific Gravity*
SGS	*SGS Mineral Services*
S-K1300	*Subpart 1300 of SEC Regulation S-K*
TCT	*FCX's Technology Center facilities in Tucson, Arizona*
TRS	*Technical Report Summary*
U.S.	*United States*
UTM	*Universal Transverse Mercator*
VPA	*Vertical Pressure Filter*
YVS	*Yellow Valley Syncline*