Boliden Summary Report

Mineral Resources and Mineral Reserves | 2022

Aitik

Prepared by
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1 SUMMARY

Between 2021-12-31 and 2022-12-31 the mineral reserves (Table 1) have decreased by 13.5% to 1 131 Mt (million metric tonnes). Resources have increased by 25.1% to 1 147 Mt.

Table 1. Summation of total Aitik operational area mineral reserves and resources per 2022-12-31. Reserves and resources from 2021-12-31 as comparison to the right

Classification	2022 kton 31/12/2021	Au (g/t)	Ag (g/t)	Cu (%)	2021 kton 31/12/2020	Au (g/t)	Ag (g/t)	Cu (%)
Proved Mineral Reserve	126,000	0.08	1.0	0.17	154,000	0.08	1.1	0.19
Probable Mineral Reserve	1,005,000	0.17	1.3	0.24	1,153,000	0.16	1.2	0.22
Total Mineral Reserve	*1,131,000*	*0.16*	*1.2*	*0.23*	*1,307,000*	*0.15*	*1.2*	*0.22*
Measured Mineral Resource	154,000	0.06	0.6	0.14	281,000	0.06	0.7	0.15
Indicated Mineral Resource	581,000	0.12	0.9	0.18	621,000	0.09	0.8	0.17
Inferred Mineral Resource	412,000	0.08	0.8	0.17	15,000	0.14	0.7	0.19
Total Mineral Resource	*1,147,000*	*0.10*	*0.8*	*0.17*	*917,000*	*0.08*	*0.7*	*0.16*

Notes on Mineral Resource and Mineral Reserve statement.

- *Mineral Resource and Mineral Reserves is a summary of Resource estimations and studies made over time adjusted to mining situation of December 31.*
- *Mineral Resources are reported exclusive of Mineral Reserves.*
- *Mineral Reserve and Resources are reported without dilution.*
- *Reasonable Prospects for Eventual Economic Extraction is defined for the Mineral Resource by a simplified undiscounted pit optimization.*
- *The Mineral Reserve is defined by the Life of Mine Plan.*
- *The cut-off for the Mineral Reserve is based on location cost analysis and varies between 0.04% and 0.14% Cu. The cut-off for the Mineral Resource is 0.06%.*
- *The Mineral Reserve includes portions of the Life of Mine Plan where not all permits are currently in place, but there is a high confidence that they will eventually be granted. Proved Mineral Reserves are covered by all necessary permits.*
- *Tonnes and grades are rounded which may result in apparent summation differences between tonnes, grade and contained metal content.*

1.1 Competence

The compilation of this report has been completed by a team of professionals who work directly for Boliden Mineral AB and are listed as contributors in Table 2, along with responsible Competent Persons (CP).

Table 2. Contributors and responsible competent persons for this report

Description	Contributors	Responsible CP
R&R Coordinator	Anil Chatterji	Ian McGimpsey
Lead CP Ore Reserves and Mineral Resource		Ian McGimpsey
Geology	Anil Chatterji	Ian McGimpsey
Resource Estimation	Sofia Höglund	Ian McGimpsey
Mine Planning	Alexandra Voronchikhina	Hilmi Pehriz
Mineral Processing	Matti Linna	Andreas Berggren
Environmental, Social, and Governance (ESG)	Åsa Sjöblom	Nils Eriksson

The report has been verified and approved by Ian McGimpsey who is employed by Boliden as a Senior Resource Geologist and is a member of FAMMP[1] . Ian McGimpsey has over 10 years of experience in the Exploration and Mining Industry.

Hilmi Pehriz works for Boliden as Mine Planning Manager and is a member of FAMMP. Hilmi Pehriz has over 10 years' experience in the Mining Industry.

Andreas Berggren works for Boliden as a Manager of the Aitik Mill and is a member of FAMMP. Andreas has more than 20 years of experience from the Mining Industry.

Nils Eriksson works for Boliden as Head of Section for Permitting and Environmental support. Nils is a member of FAMMP and has more than 25 years of experience from the mining industry.

[1] Fennoscandian Association for Metals and Minerals Professionals

2 GENERAL INTRODUCTION

This report is issued annually to inform the public (shareholders and potential investors) of the mineral assets in Aitik held by Boliden. The report is a summary of internal reports / Competent Persons' Reports for Aitik. Boliden's method of reporting Mineral Resources and Mineral Reserves intends to comply with the Pan-European Reserves and Resources Reporting Committee (PERC) "PERC Reporting Standard 2021".

The PERC Reporting Standard is an international reporting standard that has been adopted by the mining associations in Sweden (SveMin), Finland (FinnMin) and Norway (Norsk Bergindustri), to be used for exploration and mining companies within the Nordic counties.

Boliden reports Mineral Resources exclusive of Mineral Reserves.

2.1 Pan-European Standard for Reporting of Exploration Results, Mineral Resources and Mineral Reserves – The PERC Reporting Standard

PERC is the organisation responsible for setting standards for public reporting of Exploration Results, Mineral Resources and Mineral Reserves by companies listed on markets in Europe. PERC is a member of CRIRSCO, the Committee for Mineral Reserves International Reporting Standards, and the PERC Reporting Standard is fully aligned with the CRIRSCO Reporting Template.

The PERC standard sets out minimum standards, recommendations and guidelines for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves in Europe.

2.2 Definitions

Public Reports on Exploration Results, Mineral Resources and/or Mineral Reserves must only use terms set out in the PERC standard.

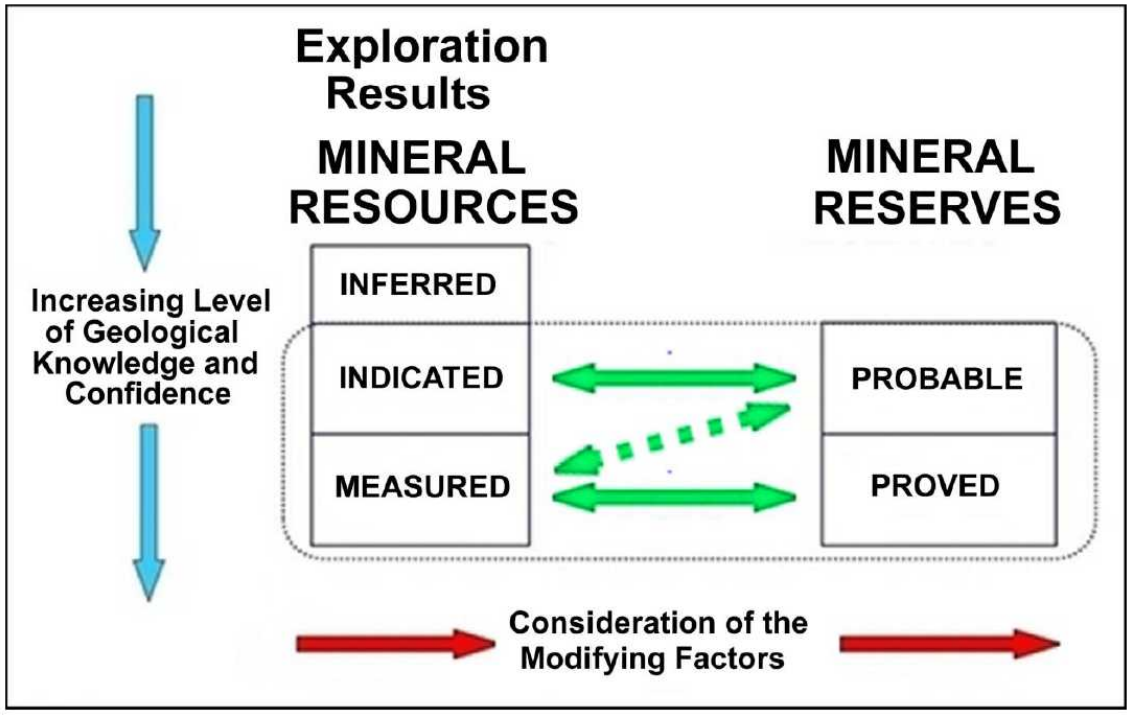


Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves (PERC 2021).

2.2.1 Mineral Resource

A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

2.2.2 Mineral Reserve

A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

3 AITIK

Aitik is a Palaeoproterozoic porphyry Cu-Au-Ag deposit, mined as open pit mine consisting of two active pits: Salmijärvi and Aitik. There are also plans to start a third open pit operation in Liikavaara, a satellite, Palaeoproterozoic Cu-(W-Au) deposit, situated 3 km east of Aitik. The mining in Aitik is commenced at three pushbacks designated S3, N6 and N7. Salmijärvi has one active pushback called SA2. The mined-out ore tonnage in 2022 totaled 43.3 mt. Copper is the most valuable commodity in Aitik, accounting for about 80 % of the revenue. The second most valuable commodity is Gold at 15%, followed by Silver at 5%.

3.1 Major changes

In 2022 the total mineral reserves in Aitik decreased by 176 Mt (million metric tonnes) to 1131 Mt. In total, 41 Mt ore has been mined, from pushbacks N6, N7, Sa2 and S3. A further 144 Mt reduction resulted from the introduction of a variable cut-off and pit redesign based on the latest optimized pit shell. An additional reduction of 8 Mt resulted from various minor adjustments. An increase of 17 Mt is the result of geological modelling work carried out during 2022 for Aitik. Measured resource in Aitik decreased by 127 Mt to 154 Mt. Indicated resource decreased by 40 Mt to 581 Mt. Inferred resource increased by 397 Mt to 412 Mt.

3.1.1 Technical studies

An application for a new permit for the entire Aitik operations is planned to be filed to the land and environmental court at the end of year 2023. As a part of ongoing studies related the new permit application, the Salmijärvi pit, once mined out, will likely be incorporated into water management plans for the mine. As a result, some 285 Mt Resource that is located under the Salmijärvi pit and between the Salmijärvi pit and Aitik pit, has been reclassified from Measured and Indicated to Inferred. This has been done to reflect the increased technical and economic thresholds to eventually mine this portion of the resource.

3.2 Location

The Aitik mine is located in Gällivare municipality, Norrbotten county, northern Sweden, about 60 km north of the Arctic Circle and 15 km east of Gällivare town center (Figure 2). The Liikavaara deposit is located 3 km east of Aitik. The mining area consists of two open pits (Aitik and Salmijärvi), waste rock and overburden dumps, an industrial area hosting maintenance and office facilities, a concentrator plant, a tailings management facility, and a rail transport terminal.

Sulphide concentrate, containing payable copper, gold, and silver, is transported by rail to Boliden Mineral AB's Rönnskär smelter located about 350 km to the south of Aitik in Skelleftehamn.

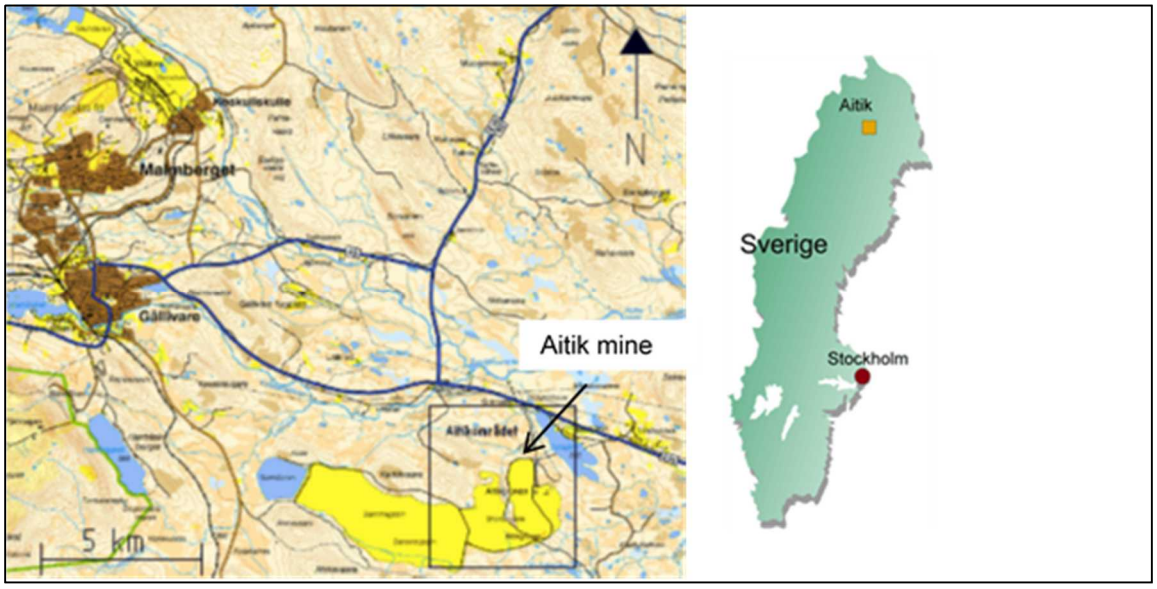


Figure 2. Location of the Aitik mine

3.3 History

The following is a short summary describing the discovery and development of the Aitik deposit:

- 1930: several boulders with significant amounts of chalcopyrite were discovered in the vicinity of Liikavaara and Aitikvaara by local prospectors.
- 1948-1964: Geochemical and geophysical surveys are carried out. Definition drilling of the Aitik and Liikavaara deposits takes place.
- 1965: Feasibility study completed.
- 1966: Construction of the Aitik mine and concentrator is begun.
- 1968: First production at Aitik. Initial production rate is 2 Mt/yr at a head grade of 0.51% Cu.
- 1972 –2000: Continuous expansions from 2Mt/yr to 18Mt/yr: Operating grade head during this period fluctuates in the vicinity of 0.40% Cu, 0.25 g/t Au, and 4 g/t Ag.
- 2010: Construction phase of Aitik 36 expansion project complete.
- 2022: Year-end ore processing achieves 43.3 Mt at a head grade of 0.20% Cu, 0.10 g/t Au, and 0.9 g/t Ag.

Table 3. Annual production numbers for 2000-2021. Between 1968 and 2000 the processed ore tonnage and grades are presented with 5-year intervals.

Year	Ore	Cu	Au	Ag	Recovery (%)		
	kton	%	g/t	g/t	Cu	Au	Ag
1968	435	0.39	-	-	90.1	-	-
1970	2285	0.50	-	-	89.4	-	-
1975	6711	0.40	0.24	3.7	90.2	46.9	68.1
1980	6436	0.39	0.24	3.6	88.5	44.0	69.7
1985	10 713	0.40	0.28	3.7	90.4	56.0	64.0
1990	12 015	0.38	0.24	3.8	89.1	56.3	69.0
1995	17 465	0.38	0.22	3.2	90.5	50.7	75.2
2000	18 219	0.42	0.17	4.1	89.3	49.5	74.9
2001	17 723	0.40	0.19	3.6	89.4	50.1	75.3
2002	18 601	0.35	0.17	3.6	88.4	48.2	70.4
2003	18 022	0.37	0.16	4.2	88.7	48.5	72.5
2004	17 663	0.41	0.23	3.8	89.0	50.6	67.6
2005	16 674	0.44	0.22	3.6	89.4	50.7	69.1
2006	18 481	0.40	0.25	2.7	89.6	50.7	70.3
2007	18 178	0.32	0.14	3.7	86.9	45.4	63.2
2008	17 813	0.30	0.14	2.8	87.9	48.5	64.9
2009	18 791	0.27	0.13	2.0	89.7	55.1	66.8
2010	27 596	0.27	0.15	2.1	90.0	53.5	64.4
2011	31 541	0.24	0.14	2.2	89.8	54.7	64.4
2012	34 321	0.22	0.11	2.5	89.9	50.7	61.0
2013	37 070	0.21	0.10	2.3	89.6	49.4	65.1
2014	39 090	0.20	0.09	2.1	88.4	49.3	66.3
2015	36 361	0.21	0.11	2.4	87.2	50.2	69.1
2016	36 051	0.22	0.11	2.1	88.3	51.2	74.3
2017	39 045	0.28	0.13	2.0	89.5	55.7	80.2
2018	38 472	0.29	0.14	1.8	90.4	57.6	78.6
2019	40 661	0.25	0.13	1.2	89.2	56.8	80.2
2020	41 661	0.24	0.13	1.1	90.1	57.1	78.2
2021	40 100	0.22	0.11	0.9	90.2	57.0	75.6
2022	43 297	0.20	0.10	0.9	90.5	58.6	75.3

3.4 Ownership and Royalties

Boliden Mineral AB owns 100 % of the Aitik mine. In Aitik there is a mineral charge for the processing concessions Aitik K nr 4 (the Salmijärvi pit) and Aitik K nr 5 (towards Aitik East). The mineral charge is 0.2% of the value of metal recovered after processing (yield losses are subtracted). The royalty payment is to be distributed at a rate of ¾ to the surface owner (Boliden) and ¼ to the Swedish state. Calculation and other details of this royalty is governed by the Swedish Mineral Law (Minerallag (1991:45)).

3.5 Environment, Social and Governance (ESG) and Permits

3.5.1 Existing permits

Current processing concessions (Aitik K nr 1-5) encompass the entire area where mining of ore in the Aitik and Salmijärvi pits is planned according to the present LOMP. Additional mining concessions over the Aitik East area will be required in the future to be able to extract the complete mineral reserves.

According to the current environmental permit for the Aitik operations (partial verdict from the land- and environmental court October 3rd 2014 in case M3092-12, in all material respects established by the supreme land- and environmental court January 22nd, 2016, in case M10031-14) Boliden Mineral AB is allowed to mine and concentrate up to 45 Mton ore/year. The permit is limited in time, in that the permitted amount of deposited waste rock has been calculated to be reached during year 2025. An application to extend the amount of waste rock that can be stored is planned to be filed to the land and environmental court during 2023. This will extend the validity of the current permit until 2026, when the permitted construction period for the dams surrounding the tailings, pond expires (the maximum time that can be granted is 10 years at a time). An application for a new permit for the entire Aitik operations is planned to be filed to the land and environmental court at the end of year 2023. This application will include widening of the Aitik pit towards the west to allow for the removal of waste rock and raising the existing tailings management facility (TMF) in order to allow tailings disposal for the permittable 10-year period. This has been considered in the reserve classification.

In relation to the recent developments regarding how to assess and evaluate the risk of static liquefaction, comprehensive studies of the tailings characteristics and the foundation characteristics, have been performed at Aitik. Based on initial results of these investigations, Boliden has come to the conclusion that additional buttressing material is necessary to guarantee dam stability if the tailings would liquefy. Boliden has submitted an application regarding additional dam safety measures within already permitted dam heights and the necessary relocation of infrastructure due to the extended footprint of the dam. Boliden is currently performing studies regarding the best dam construction method to use in order to optimize the future use of the existing TMF.

Future development of Aitik according to the LOMP will require the Municipality of Gällivare to up-date the local planning conditions. This work is ongoing.

Table 4. Current processing concessions for Boliden Aitik; please see Figure 3 for the locations.

Name	Comprises	Ref	Decision date	Valid until
Aitik K nr 1	Cu, Ag, Au	320-669-98	1999-12-16	2024-12-31
Aitik K nr 2	Cu, Ag, Au	22-1367-2000	2001-07-12	2026-07-11
Aitik K nr 3	Cu, Ag, Au	22-122-2003	2003-05-14	2028-05-13
Aitik K nr 4	Cu, Ag, Au, Mo	22-88-2005	2007-08-29	2032-08-28
Aitik K nr 5	Cu, Ag, Au, Mo	22-36-2015	2015-08-12	2040-08-11
Fridhem K nr 1	Cu, Ag, Au	22-53-2000	2000-05-04	2025-05-03
Liikavaara K nr 1	Cu, Ag, Au	320-665-98	1999-12-28	2024-12-31
Liikavaara K nr 2	Cu, Ag, Au	applied		

Figure 3. Map showing mining concessions at Aitik and Liikavaara. Aerial photo from summer 2018.

To utilize the mineralization in the planned Liikavaara open pit in the best way possible, Boliden has, as of March 16th, 2018, applied for an extension (Liikavaara K nr 2) of the existing procession concession (Liikavaara K nr 1). The handling of the Liikavaara K nr 2 processing concession has been paused until the land and environmental court has reached a verdict regarding Natura 2000 issues. This has been done through the verdict of April 29th, 2021, in case M2672-18 (change permit for the Liikavaara open pit), a verdict that was appealed but entered into legal force February 21st, 2022. Boliden is now expecting a decision regarding Liikavaara K nr 2 from the mining inspectorate.

3.5.2 Necessary permits

As described above, permitting is continuously ongoing at Aitik. New permits are needed to adjust to changes in the operations and to continue raising the dams around the tailings facility. This results in a series of ongoing and future permitting processes in terms of:

- Change-permit to increase deposited amounts of waste-rock from 860 Mton to 1000 Mton,
- Change-permit to perform dam safety measures and consequent relocation of infrastructure,
- New permit for the entire operations in Aitik from 2026 and onward,
- Extension (Liikavaara K nr 2) of the existing procession concession (Liikavaara K nr 1) at Liikavaara,
- Additional mining concessions over the Aitik East area,
- Up-date the local planning conditions

3.5.3 Environmental, Social and Governance Commitments

3.5.3.1 ESG Commitments

Boliden's business model set the company ESG priorities, and take into consideration the risks and opportunities identified by business intelligence and risk mapping, as well as applicable requirements and expectations such as:

- Stakeholder expectations
- Current and potential legislative trends
- ISO 9001, 45001, 14001 and 50001 standards and Forest Stewardship Council (FSC® COC-000122)
- OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-affected and High-risk Areas
- GRI Standards (Global Reporting Initiative)
- UN Sustainable Development Goals (SDGs)
- UN Global Compact
- ICMM Mining principles

The company regularly consults prioritized stakeholder groups on our sustainability performance from a broader perspective. These stakeholders are asked to comment on Boliden's performance to drive further improvement.

Boliden is a member of ICMM and the national mining associations in the countries where Boliden Mines operates. These commitments imply implementing relevant international and national Environmental Management System (EMS) standards and guidelines, such as, e.g., the Global Industry Standard on Tailings Management on an international level and Mining RIDAS on a national level. In addition to this, Boliden Mines is certified according to a series of standards, such as:

- ISO 14001:2015 - Environmental management systems
- ISO 45001:2018 - Occupational health and safety management systems
- ISO 50001:2018 - Energy management systems

Boliden has implemented an integrated management system (Boliden Management System, BMS) which sets a common base for all activities developed within the company.

Boliden strives to run a responsible business and expect its business partners to do the same. Good business ethics is essential for sustainable and successful business. Boliden has an ethics and compliance department to boost its compliance work. The department is responsible for the strategic development and coordination of Boliden's work regarding anti-money laundering, anti-corruption, competition law, sanctions, human rights, data protection, whistleblowing and Boliden's employees and management work together to create a compliance culture in which everyone knows what is expected of them - Boliden's codes of conduct. Regular risk assessments, trainings, audits and effective controls are important parts of Boliden's compliance efforts. The Group's whistleblower channel enables all employees and external stakeholders to report suspected and actual misconduct confidentially and anonymously. If misconduct is proven, disciplinary actions must be taken. Reprisals against anyone reporting misconduct in good faith will not be tolerated. Group management and the Board of Directors receive regular reports on risks, non-compliance and the status of initiatives in progress.

Boliden's Code of Conduct provides a framework for corporate responsibility based on the company's values and ethical principles. All employees and members of the Board are subject to the Code, which is based on international standards and relevant legislation. As a complement to the Code, there are internal policies that all employees are expected to comply with. Boliden strives for a sustainable value chain and therefore applies an overarching business ethics and risk management strategy when selecting business partners. The Business Partner Code of Conduct reflects the requirements placed on Boliden's own organization and sets the lowest standard of ethical conduct required of all parties in the value chain, whether Boliden is the buyer or seller. As with the internal Code of Conduct, this code is based on international standards such as the UN's Global Compact, the ILO's standard core conventions and guidance from the OECD. Compliance and sustainability risks are assessed when selecting business partners. If there is a risk of non-compliance by a business partner, a more detailed review is made. Depending on the outcome, an action plan may be developed and agreed upon, or the business relation may be terminated or rejected.

Boliden is a member of the United Nations Global Compact and works constantly to implement its ten principles, including preventing and limiting negative impact in our own operations and those of our external business partners. Boliden runs operations in countries where the risk of human rights violations is considered low. No operations are conducted anywhere in UNESCO's World Heritage List. Boliden supports the right of indigenous peoples to consultations under Svemin's interpretation of Free, Prior and Informed Consent (FPIC). Boliden strives for fair working conditions, and is against any form of harassment, discrimination and other behavior that may be considered as victimization by colleagues or related parties. In addition to this, aspects such as child and forced labor as well as the freedom to form and join trade unions are taken into account when evaluating business partners.

Anti-corruption forms a central part of the ethics and compliance work, and Boliden has a zero-tolerance policy regarding all types of bribery and corruption. Boliden has an anti-money laundering policy for identifying and managing risks in various parts of the business and to strengthen its anti-money laundering efforts.

3.5.3.2 Socio-economical impact

Aitik is located in the municipality of Gällivare. Typically, inland municipalities in northern Sweden are characterized by high average age, shrinking population, low education level and high unemployment. Gällivare has, since the 1960s, had a similar trend with regard to average age, shrinking population and low education level. However, Gällivare has one of the lowest unemployment rates and highest employment rates in Sweden. The average income is also amongst the highest in Sweden.

The mining industry is the likely reason for the low unemployment rate, and the high average income in the municipality. Mining industry, with Boliden Aitik and LKAB Malmberget mines within the municipality, generates not only direct employment, but also serves as an engine for the local economy.

The Aitik mine has approximately 830 employees, of which 99% are local residents within Gällivare municipality. Aitik is the biggest private employer in the municipality and employs 9.5% of the total workforce in the municipality. In addition, it is estimated that Aitik generates 1450 indirect jobs (entrepreneurs and providers of services and goods) and additional induced jobs as a direct consequence of the activities at Aitik. At Aitik, women constitute more than 30% of the employees, contributing to the strengthening women's position on the job market in Gällivare.

Aitik is assessed to have a significant positive impact on the socio-economical situation in Gällivare municipality.

In addition to jobs and taxes, Aitik contributes to the social sustainability and the socio-economical situation in many other ways. As an example, Boliden Aitik is engaged in, and contributes to, many local activities and organisations. The effect of this engagement is difficult to quantify but is assessed to positively contribute to the development of the area.

Northern Sweden has a long tradition of mining and extractive industry which has resulted in an acceptance and tolerance even for the negative impacts caused by the industry. Examples of this are the re-location of the town of Kiruna due to the expanding subsidence area around the LKAB Kiruna mine, and the re-location of large parts of the town of Malmberget due to the same reason at LKAB's Malmberget mine. This is also the case at Aitik where Boliden has re-located 22 households in the villages of Sakajärvi and Liikavaara as the living conditions in these two villages were assessed to become poor when the Liikavaara pit opens.

3.5.3.3 Communities and landowners

The area surrounding Aitik is mainly forest, often with high natural conservation values. The surface waters surrounding Aitik are to a large extent declared as Natura 2000 areas due to their high conservation values.

Apart from forestry and reindeer farming the most common land-use is hunting, fishing, berry picking and recreation. Aitik has a significant impact on land-use in the local area as the mining area is surrounded by a fence for security reasons. This limits access and cuts off original access routes and implies additional work for the active reindeer farmers. Boliden tries to compensate for this inconvenience by providing alternative access roads as well as economical compensation to the reindeer farmers.

3.5.3.4 Indigenous people

Aitik is located within the reindeer management area for Gällivare forest-Sámi community. This Sámi community conduct their activities within an area stretching from the town of Gällivare down to the coast north of the Lule-river. Within the community there are approximately 20 active reindeer herders, 270 reindeer owners and the maximum number of reindeers is 7 000 in the winter. The community is divided into 8 groups.

Gällivare forest-Sámi community keep their reindeers in a traditional way in close contact to the environment where a fundamental aspect is access to continuous and functional grazing lands with undisturbed grazing for the reindeers. Within the lands used by the community there are 8 areas declared to be of national interest for the reindeer management. One of these areas, Leipojärvi, is located north of Aitik and is affected by the Liikavaara expansion.

In general, for the reindeer management a single project, as for e.g., Liikavaara is not the main problem, but rather the accumulated pressure on their lands. Gällivare forest-Sámi community in general, and in particular the Rattuka-group within the community, which is active around Aitik, is affected by the mining activities at Aitik. Mining affects reindeer management in various ways, such as its land requirements, noise, dust and transports which results in the reindeers avoiding the areas around Aitik. The fence surrounding Aitik complicates the movements of the reindeer herds and the Liikavaara expansion affects 4% of the Leipojärvi area during the operational time of Liikavaara.

Boliden Aitik is well aware of the consequences and the problems the mining at Aitik causes for Gällivare forest-Sámi community and in particular for the Rattuka-group. In order to minimize and to compensate for the impacts a well-established dialogue is maintained between Aitik and the Sámi community. Within this dialogue the mutual understanding of the two businesses is favored and measures to minimize and compensate for impact are developed. There is also an agreement between Boliden and the Sámi community in place regulating amongst other aspects the economical compensation to be paid to Gällivare forest-Sámi community.

In addition to this, Boliden is engaged in a series of research projects and compensation measures to, e.g., improve forestry management to enhance lichen growth or facilitate the movements of the reindeer herds.

3.5.3.5 Historical legacy

There are no historical legacy objects within Aitik.

3.6 Geology

3.6.1 Regional

Northern Norrbotten forms one of the major ore districts within Sweden and is a major producer of Fe, Cu and Au. It is situated approximately 250km north of the Skelleftea district and covers an area of approximately 20,000km2. Deposits within the district consist of the massive Kiruna-type apatite-iron ore deposits (IOA) (Kiruna, Malmberget) and epigenic Cu (Aitik, Phatohavare), as well as Iron Skarn and IOCG deposits (Sahavaara, Tapuli, Gruvberget) (Wanhaninen, 2005). These deposits are hosted in Karelian and

Svecofennian units (2.2 – 1.8Ga) which overlie Archaean basement (Martinsson, O., & Wanhainen, C., 2004).

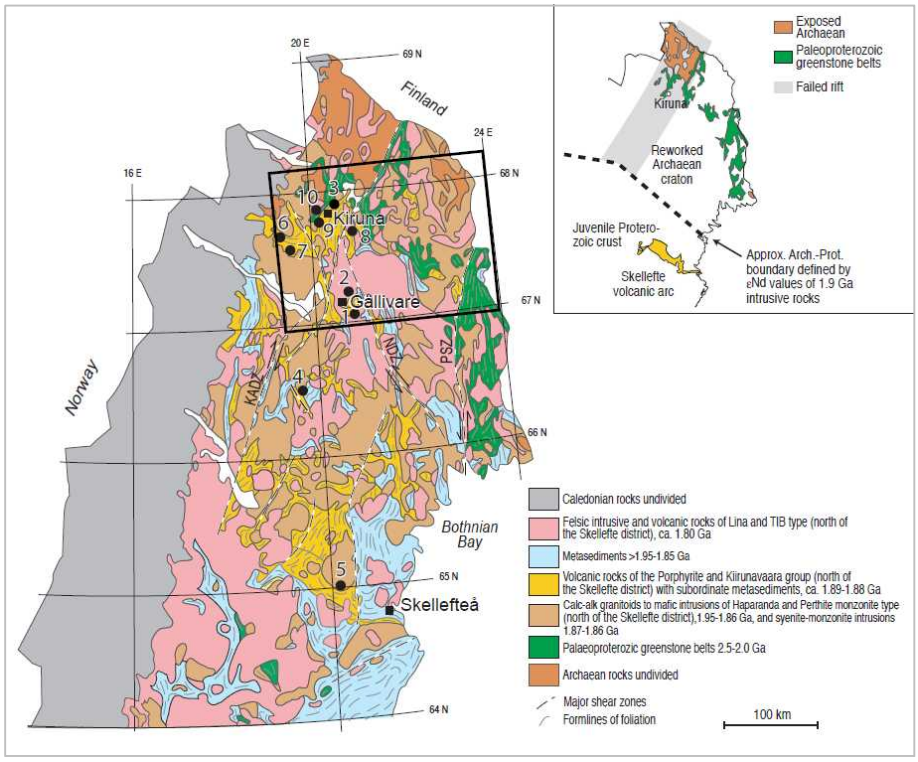


Figure 4 General geology of northern Sweden and the location of mineral deposits in northern Norrbotten (Black box). Insert highlights the location of the Archaean-Proterozoic boundary zone and aulacogen. 1. Aitik 2. Malmberget 3. Kiirunavaara 4. Vaikijaur 5. Tallberg 6. Tjårrojåkka 7. Lieteksavo 8. Gruvberget 9. Phatohavare 10. Viscaria. KADZ = Karesuando Arjeplog Deformation Zone, NDZ = Nautanen Deformation Zone, PSZ = Pajala Shear Zone (Wanhaninen, 2005)

3.6.2 Local

The Aitik deposit represents a Palaeoproterozoic porphyry-style system exhibiting characteristics of a late-stage IOCG overprinting event. Aitik is hosted within a belt of supracrustal rocks consisting of volcaniclastics, volcanics and intrusives with an intermediate affinity all of which have been metamorphosed to amphibolite facies (Bergman et al., 2001). These rocks form part of what is regionally known as the Muorjevaara Group, within the Gällivare area and the Porphyrite Group at a regional level and form the bulk of bedrock in the east of the field (Martinsson & Wanhainen, 2004).

Later stage intrusions have affected the entire area as diorite, granodioritic, quartz monzodiorite, gabbro and granite of various ages. The entire field is surrounded and locally intruded, by the Lina granite and associated pegmatites.

The Muorjevaara supracrustals group is crosscut by a major north-north-west oriented crustal scale structure, termed the Nautanen Deformation Zone (NDZ), which is known to host large numbers of sulphide showings, a few of which have been worked historically for Cu-Au. This NDZ hosts the Nautanen and Aitik deposits. The zone is typically inferred to be a steep, near-vertical structure with an undetermined amount of displacement along it, within which a strong fabric or foliation has been developed.

3.6.3 Property

The Aitik, Salmijärvi, and Aitik East deposits occur along a largely continuous elongate mineralized trend (the Aitik-Salmijärvi mineralization) stretching approximately 5 km along strike from north to south averaging about 500 m in width.

Host rocks of the mineralization at the Aitik deposit consist mainly of paleo-proterozoic (ca. 1.89 billion years) muscovite schists, biotite gneisses, and amphibole-biotite gneisses of volcanic and volcanoclastic origin, crosscut locally by diorite intrusive units. In places the diorite intrusive make up a significant proportion of the mineralized volume, but typically at lower than average grade. Foliation is well developed in the host rocks, dipping at about 50 degrees to the west. The mineralization is mainly structurally controlled and the main mineralisation; Aitik is delineated by a hangingwall thrust and a footwall shear, Figure 5 and Figure 6. Main sulfide minerals in the deposit are chalcopyrite, pyrite and pyrrhotite, with significant accessory minerals including magnetite, molybdenite and sulfates. The entire package has been metamorphosed to amphibolite grade resulting in significant re-crystallization and coarsening of both sulfide and silicate minerals. Late granite pegmatite dikes crosscut the mineralized host rocks and are generally weakly mineralized to barren.

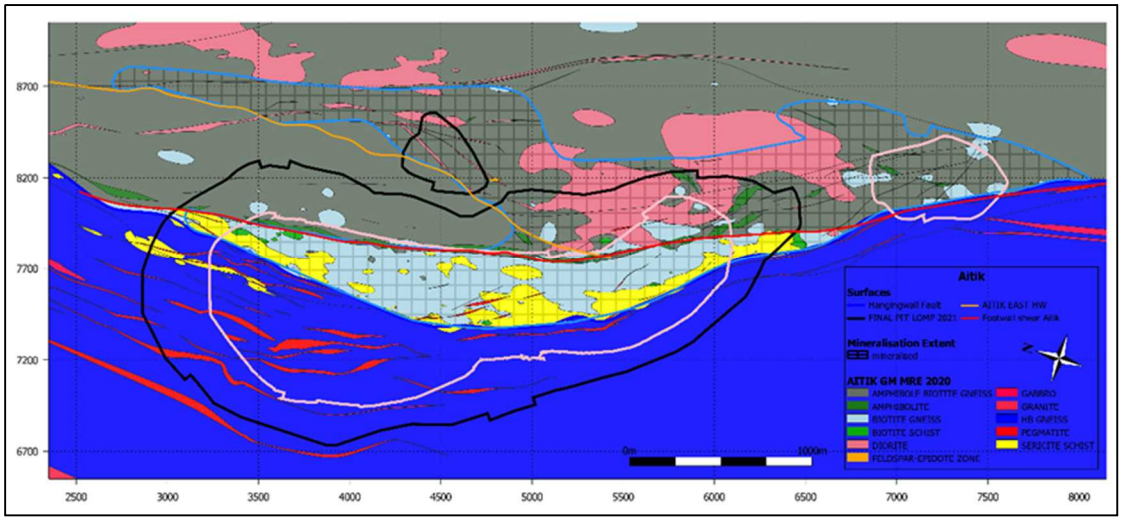


Figure 5. Plan view at -100z, showing the geology of Aitik and the planned pushbacks. The dashed Area shows the mineralization shell for > 0.06% Cu. The north arrow shows geographic north

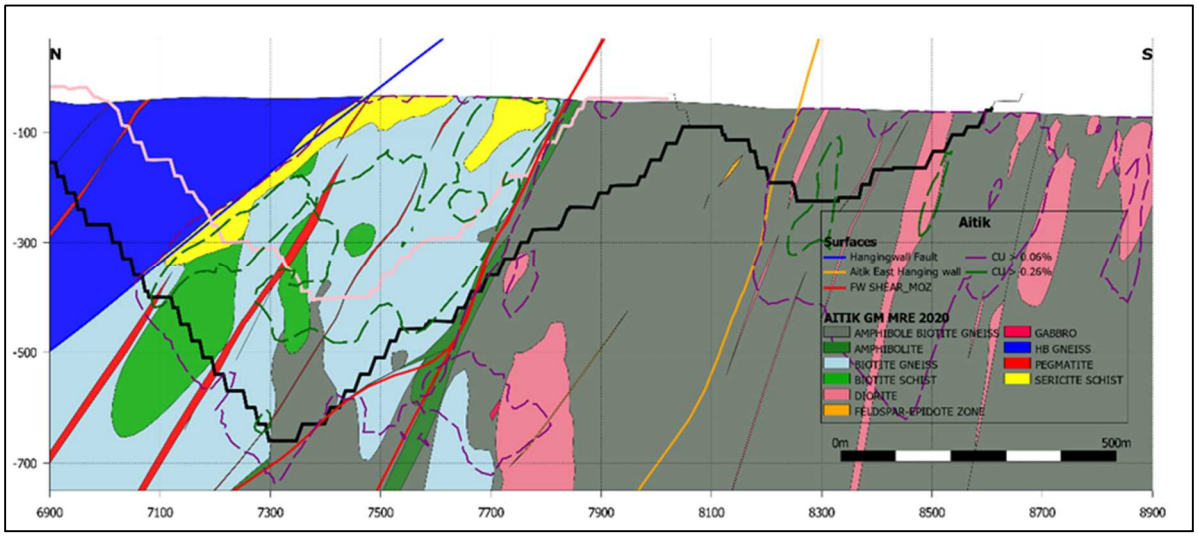


Figure 6. Crossection A-A'

Mineralization at the Salmijärvi and Aitik East deposits is very similar in nature to the Aitik deposit, with the exception that host rocks are strongly dominated by amphibole-biotite gneisses and local diorite. Sulphide mineralization in these deposits is dominated by chalcopyrite, pyrite and pyrrhotite, although at typically lower grade than in the Aitik deposit.

About 3 km to the east, on separate and volumetrically smaller mineralized trend, sits the paleoproterozoic Liikavaara Cu-(W-Au) deposit (Figure 7). At Liikavaara the mineralisation is hosted by quartz±tourmaline-calcite veins, calcite veins and aplite dykes that cross-cut biotite-amphibole schists and gneisses, steeply dipping to the west. The mineralisation is mainly chalcopyrite, pyrrhotite and pyrite, accessory minerals are sphalerite, galena, scheelite, molybdenite and magnetite. Liikavaara shows slight enrichments in Au, Ag and Bi.

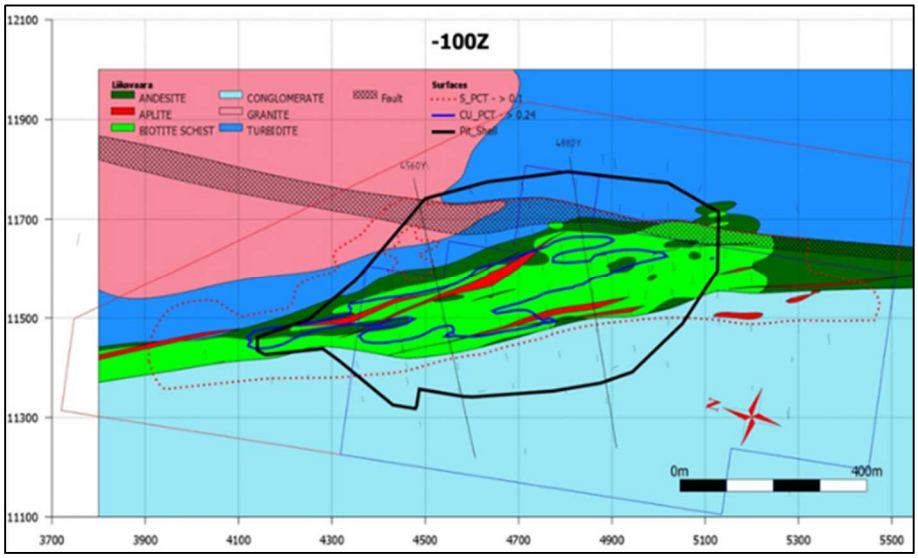


Figure 7. Plan view over Liikavaara geology at 100m depth. The current concession (Liikavaara K nr1) is highlighted by the blue line and the applied (Liikavaara K nr 2) by a red line.

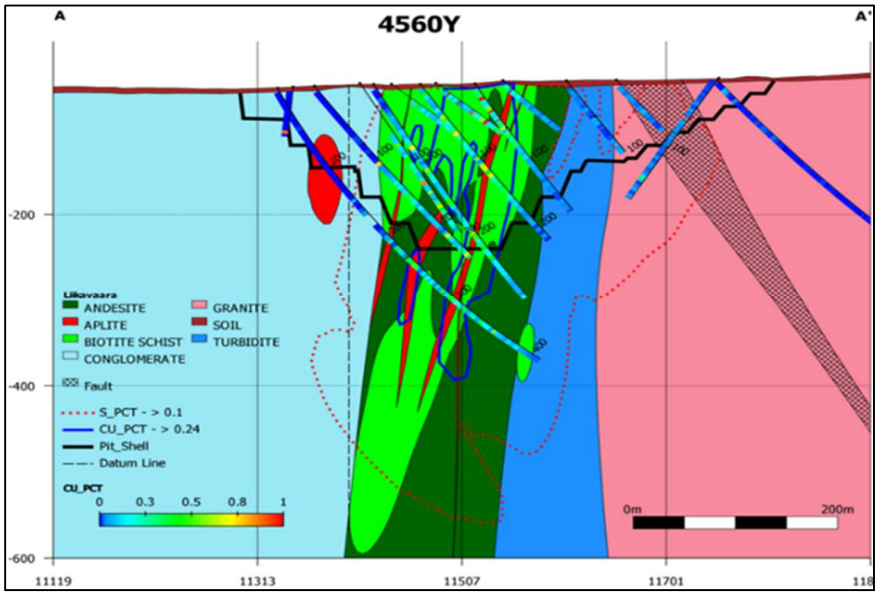


Figure 8. Liikavaara oblique cross section, along 4560Y (Figure 6), looking north. Including the planned pit shell and diamond drill holes.

3.7 Exploration procedures and data

3.7.1 Drilling techniques

Diamond drilling assay data is used for mineral resource estimation. Drilling is performed by drilling contractors and supervised by Boliden personnel. The current practice is to measure all diamond drillholes for deviation with Gyro.

3.7.2 Sampling, analyses, and QAQC

The drill core is logged and sampled by Boliden geologists. Standard samples, blanks and duplicates are inserted into every sample batch to ensure that the quality of the assay results is satisfactory. Sample assaying is carried out by ALS Minerals laboratories and duplicate check assays performed by BVM, both of which are independent actors. QAQC (Quality Assurance Quality Control) protocol is implemented all the way through from drilling to assaying.

Calculation of the reserves and resources estimated herein is based on the modeling of data from a total of over 1 100 drill holes in the operational area, totaling over 400000 m of drilling and dating from the late 1950's to present. From this a total of 75 000 composites have been taken and analyzed, the majority of which for Au, Ag, Cu, Mo, and S.

For the non-legacy assay data utilized in these reserve and resource estimates (that dating from year 2008 and later), half core samples were prepared at ALS Minerals laboratory in Öjebyn, Sweden and then shipped to analytical facilities in either Vancouver, Canada or Ireland. Samples were analyzed for Au using a 50 g fire assay with and ICP-AES finish. Ag, Cu and Mo were analyzed using aqua regia digestion and AAS finish, and S using the Total Sulphur (LECO) technique. A system of blanks, standards, (system introduced 2011) and pulp duplicates were added to the sample stream by Boliden to verify accuracy and precision of assay results, supplementing and verifying a variety of internal QAQC tests performed by ALS Minerals.

For legacy data (that dating pre-2008) verification has been carried out mainly by using drill hole twinning as well as grade and tonnage reconciliation from producing operational areas. Not all legacy data is considered fit for purpose and is excluded from mineral resource estimations when that is the case.

3.8 Exploration activities

In 2022, diamond drilling was conducted by Boliden Near Mine Exploration at the northern part of the Aitik deposit, the Salmijärvi deposit, and the Liikavaara deposit totaling 9 000m.

3.9 Mining methods, mineral processing and infrastructure

3.9.1 Mining methods

The ore is mined in two open pits along the same mineral deposit. The main pit is called Aitik and measures 4 km by 1.1 km at the surface, with the deepest point currently at 555 meters from the surface (Figure 9). In 2010, mining commenced in a second pit called Salmijärvi which has currently reached a depth of 285 meters below the surface, with a surface footprint of 0.9 by 0.6 km. The main pit will be expanded in all directions with five new pushbacks. Mining of pushback S3 in the southern part of the main pit started in 2016. Pre-stripping of pushback N7 commenced in 2019 to allow mining to start during 2020. No further expansions are planned for the Salmijärvi pit after the current pushback, which will be depleted during early 2023.

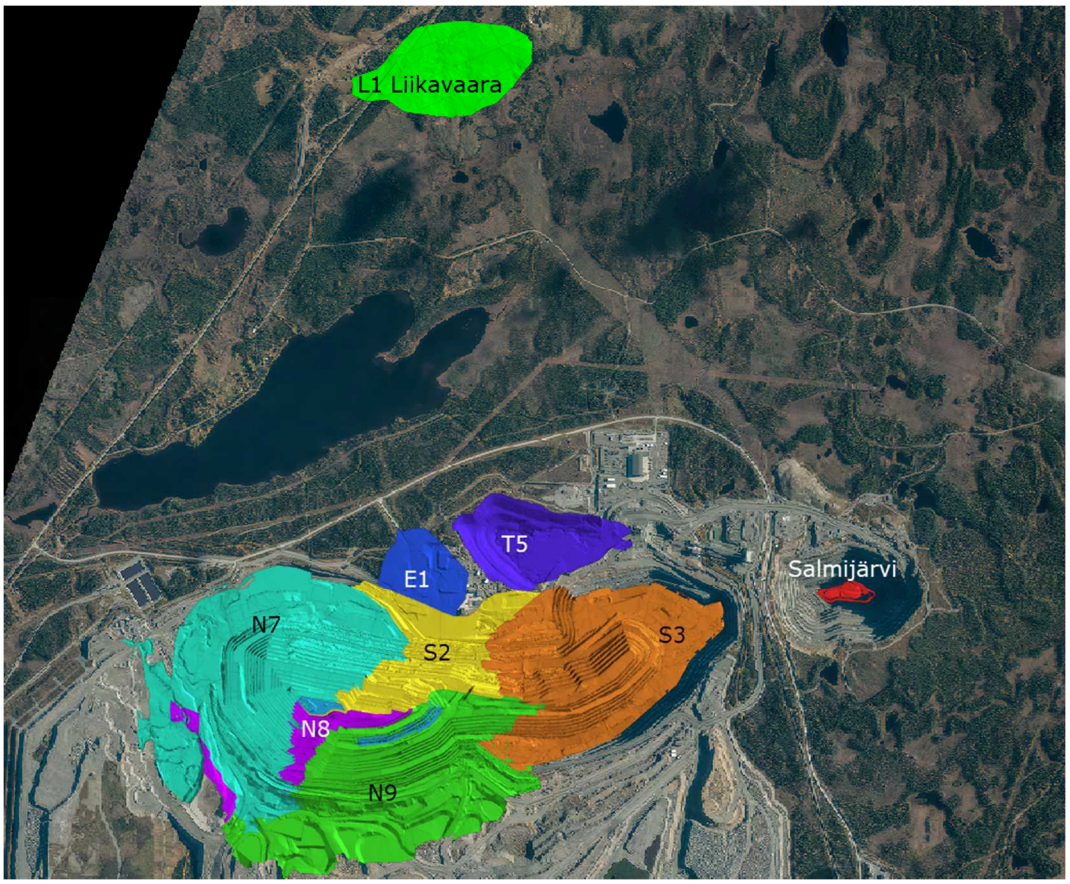


Figure 9. Overview of planned and active pushbacks at Aitik.

The ore and waste rock are blasted in 15-meter-high benches and are loaded on 300 tons capacity-size trucks by large rope shovels or hydraulic excavators. Ore from the deeper parts of the main pit is fed to one of two in-pit-crushers, while ore from pushbacks near the surface and the Salmijärvi pit is transported to a surface crusher situated between the two pits. Waste rock is separated in the loading process and hauled by trucks to dumps at the surface, where potentially acid-forming waste is dumped separately from non-acid-forming waste.

Ore handled by the crushers in the pit is transported on conveyor belts to intermediate storage on the surface, where it is mixed with ore from the surface crusher fed in by a separate conveyor line. From the intermediate storage, another conveyor belt transports the ore up to the main ore storage beside the processing plant. The main ore storage has a storage capacity corresponding to about one day's production, providing a buffer for the production.

3.9.2 Mineral processing

The Aitik mine has been mined for almost 50 years and the mineralogical variations impacting the metallurgical behavior is well known. In the process of adding new resources, the mineralogy is evaluated, and decisions taken on how to assess the metallurgical performance of the resource. There is also an ongoing project to improve the grindability prediction in the whole reserve.

In the processing plant the ore is ground in two stages, with autogenous grinding in the primary stage and pebble mill grinding in the second. The milled ore is classified using a spiral classifier. Mineral separation is done by flotation and a copper concentrate is produced. The copper concentrate is dewatered using thickeners and air pressure filters (Figure 10). The precious metals are reported in the copper concentrate. The copper concentrate is trucked to on-site railway terminal and reloaded for further transport by rail to the Boliden Rönnskär smelter in Skelleftehamn.

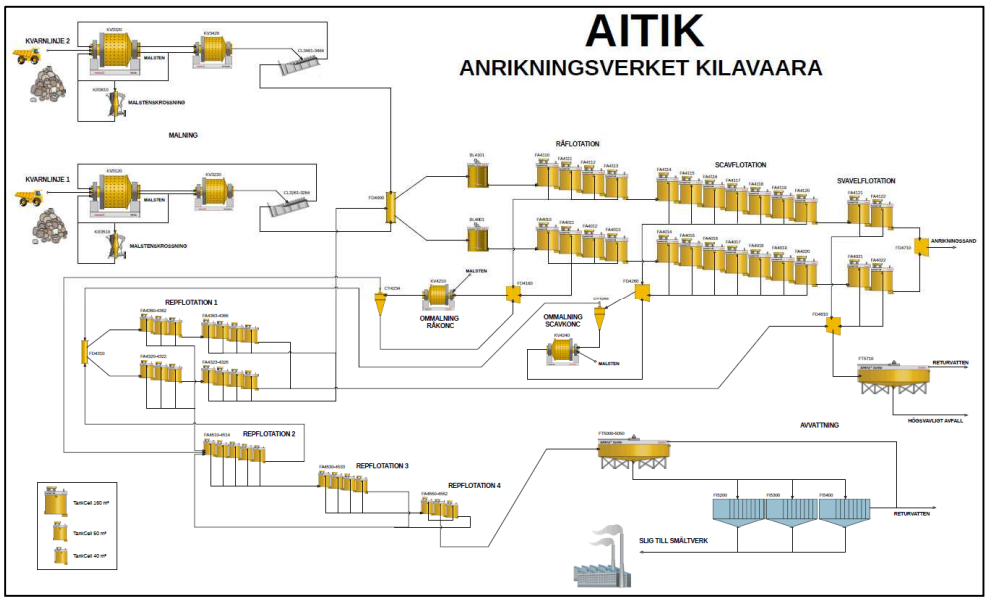


Figure 10 Aitik process flow chart

3.10 Prices, terms and costs

Copper is the most valuable commodity in Aitik, accounting for about 80% of the revenue. The second most valuable commodity is Gold at 15%, followed by Silver at 5%. Recovery at the plant for payable metals runs approximately 90% for Copper, 58% for Gold, and 75% for Silver.

Future income assumptions are based on Boliden's planning prices, which are an expression of the anticipated future average prices for approximately 10 years (Table 5).

Table 5. Boliden long term planning prices used in current Aitik Life of Mine pit optimization

	Planning prices
Copper	USD 7,200/tonne
Gold	USD 1,400/tr.oz
Silver	USD 20/tr.oz
USD/SEK	8.00

The Life of Mine Plan is used to determine the Mineral Reserve. The ultimate pit of Aitik main pit (as well as Salmijärvi and Aitik East) is based on the annual pit optimisation. Since activity costs are based on location and lithology type, the same variation in parameters is applied for the Liikavaara Pit. Unit costs used in the pit optimisations are shown in Table 6, together with reserve and resource cut-offs. To determine the Mineral Resource, simplified costs for pit optimisations, to determine reasonable prospects for eventual economic extraction (RPEEE), have been derived from the outcome of the above-mentioned studies, without discounting or mining schedule.

Table 6. Unit costs used within pit optimisations that determine Mineral Reserves and Mineral Resources.

Unit costs		**Aitik**	**Liikavaara**
Mineral Reserve			
Mining rock (fixed)	SEK/t	15,7	15,7
Mining rock (variable)	SEK/t/km	1	1
Mining free dig (fixed)	SEK/t	6	6
Mining free dig (variable)	SEK/t/km	1	1
Sustaining capex mining	SEK/t	1,8	1,8
Processing & Overhead	SEK/t	35	35
Sustaining capex processing & overhead	SEK/t	2,4	2,4
Cut-off - Variable		Lowest 0.04% Cu Highest 0,14%Cu	Lowest 0.08% Cu Highest 0,12% Cu
Mineral Resource			
Mining	SEK/t	30	20
Processing & overhead	SEK/t	30	30
Cut-off		0.06% Cu	0.08% Cu

3.11 Mineral resources

Two separate block models are used for the Aitik Mineral Resources and Reserves. One model covers the areas of the Aitik mine: Aitik, Aitik East, and Salmijärvi; and the other model covers the Liikavaara satellite deposit which is approximately 3 km from the active pit and as of yet unmined.

The Aitik mineral estimation was carried out in Datamine Studio RM, and Liikavaara in Leapfrog Edge, in both cases after first domaining in Leapfrog Geo.

All reported elements are estimated using Ordinary Kriging. Drill holes are composited to 5m sections for both models. In the Aitik model, Cu is capped at 2.0%, Au at 2 ppm, and Ag at 20 ppm. Capping effects 0.07% of Cu assays, 0.12% of Au, and 0.10% of Ag. In the Liikavaara model grade clamping is used instead of grade capping. Grade clamping is a method of limiting the distance from a high-grade sample that the sample is available to inform block estimations. In Liikavaara Au is clamped at 0.75 ppm, Ag at 17 ppm and Cu at 0.8%. This clamp is limited to half the normal search distance (Table 7).

All lithologies in the models have been assigned a density based on specific gravity measurements. Blocks in both models are 20m (x), 20m (y), 15m (z), with sub-blocking to 10m (x), 10m (y), 15m (z). Block sizes are summarized in Table 8 below.

Table 7 Top capping in Liikavaara and Aitik block models.

	Liikavaara	**Aitik**
	Clamping	Top cap
Cu	0.8%	2%
Au	0.75 ppm	2 ppm
Ag	17 ppm	20 ppm

Table 8 Block size in Liikavaara and Aitik Resource models.

	Parent block	**Sub-block**
x	20 m	10 m
y	20 m	10 m
z	15 m	15 m

Resource classification is based on quality of data, geological continuity and knowledge of the deposit. Support for determining the Resource class comes from geostatistics such as kriging efficiency and slope of regression, as well as drill hole spacing. As a general rule drill hole spacing for a Measured Resource is 90m x 90m at Aitik, 50m (E) x 40m (N) at Liikavaara, and for an Indicated Resource 180m x 180m for Aitik and 100m (E) x 80m (N) for Liikavaara. Inferred Resources generally have no more than 200m to the nearest drill hole. The general drill hole patterns per Resource category are shown in Table 9 below.

Table 9 General drill hole spacing per Resource category.

	Liikavaara	Aitik
Measured	50E m * 40N m	90 m * 90 m
Indicated	100E m * 80N m	180 m * 180 m
Inferred	< 200m * 200 m	< 200m * 200 m

An initial classification is done on all blocks of the block model and then a pit optimization using Whittle software is completed for a Resource pit. All blocks within the Resource pit are then reported as the Resource as per their classification, exclusive the Reserve.

As of December 31, 2022 a portion of the Resource pit has been downgraded to Inferred from Indicated and Measured. This area consists of approximately 285 Mt Resource and is located under the Salmijärvi pit and between the Salmijärvi pit and Aitik pit. The decision to downgrade the material came as a result of updated water management plans which incorporate the use of the Salmijärvi pit once it is mined out in 2023.

3.12 Mineral reserves

A Life of Mine Plan is created annually, and its results are used to determine the Reserves. Due to the permitting situation and technical uncertainties regarding the dam build (see chapter 3.5), material after 2026 which otherwise would have been classed as a Proved Mineral Reserve, has been classed as a Probable Mineral Reserve. All blocks initially classed as Inferred in the Reserve pit are reported as Inferred Resource.

The same process was followed for the Reserve classification in the Liikavaara pit expect that all material that would otherwise have been classed as a Proved Mineral Reserve have been classed as a Probable Mineral Reserve, reflecting the current permitting situation there.
The mineral Reserves and Resources are summarized in Table 10 below.

Table 10. Mineral Resources and Mineral Reserves Aitik 2022-12-31

Classification	2022				2021			
	kton 31/12/2021	Au (g/t)	Ag (g/t)	Cu (%)	kton 31/12/2020	Au (g/t)	Ag (g/t)	Cu (%)
Proved Mineral Reserve	126,000	0.08	1.0	0.17	154,000	0.08	1.1	0.19
Probable Mineral Reserve	1,005,000	0.17	1.3	0.24	1,153,000	0.16	1.2	0.22
Total Mineral Reserve	*1,131,000*	*0.16*	*1.2*	*0.23*	*1,307,000*	*0.15*	*1.2*	*0.22*
Measured Mineral Resource	154,000	0.06	0.6	0.14	281,000	0.06	0.7	0.15
Indicated Mineral Resource	581,000	0.12	0.9	0.18	621,000	0.09	0.8	0.17
Inferred Mineral Resource	412,000	0.08	0.8	0.17	15,000	0.14	0.7	0.19
Total Mineral Resource	*1,147,000*	*0.10*	*0.8*	*0.17*	*917,000*	*0.08*	*0.7*	*0.16*

Major studies during 2022 for the LoMP included:

- Refining cost modelling and operational inputs
- Use of Activity Based Costing (ABC) to inform the optimization process
- Assessing the practicality of variable Cut-off (CU)
- Assessing the new optimisation shells against current pushback designs
- Assessing the In-Pit Crusher Strategy
- Assessing the transportation options for environmental waste

Increased dam construction requirements have had a significant impact on the transportation of environmental waste. Haulage costs have therefore increased, and affected the optimized pit shell shape and size. The Cu cut-off is now variable, based on the hauling and drilling costs of different lithology types, and the location of the material. Such an approach resulted in changes in Mineral Reserve.

3.13 Comparison with previous year

Aitik's total ore reserve per 2022-12-31 (Table 11), has decreased by 176 000 kt from the previous year's estimate. In total, 41 000 kt ore has been mined, from pushbacks N6, N7, Sa2 and S3. Additional 144 000 kt reduction resulted from variable cut-off and pit redesign based on the latest optimized pit shell, with a further 8 000 kt reduction from various minor adjustments. 17 000 kt increase is the result of modelling work carried out during 2022 for Aitik (Table 11).

Aitik's mineral resource has increased by 230 000 kt from the previous year. The increase has come from exploration and updated modelling work, primarily occurring in the Aitik main pit. Updated cost assumptions had a negative effect and limited the potential growth of the resource. Changes to the LoMP which reduced the final pit design resulted in some tonnage moving from the reserve to the resource (Table 12).

Table 11. Explanation of changes to mineral reserve from 2021-2022

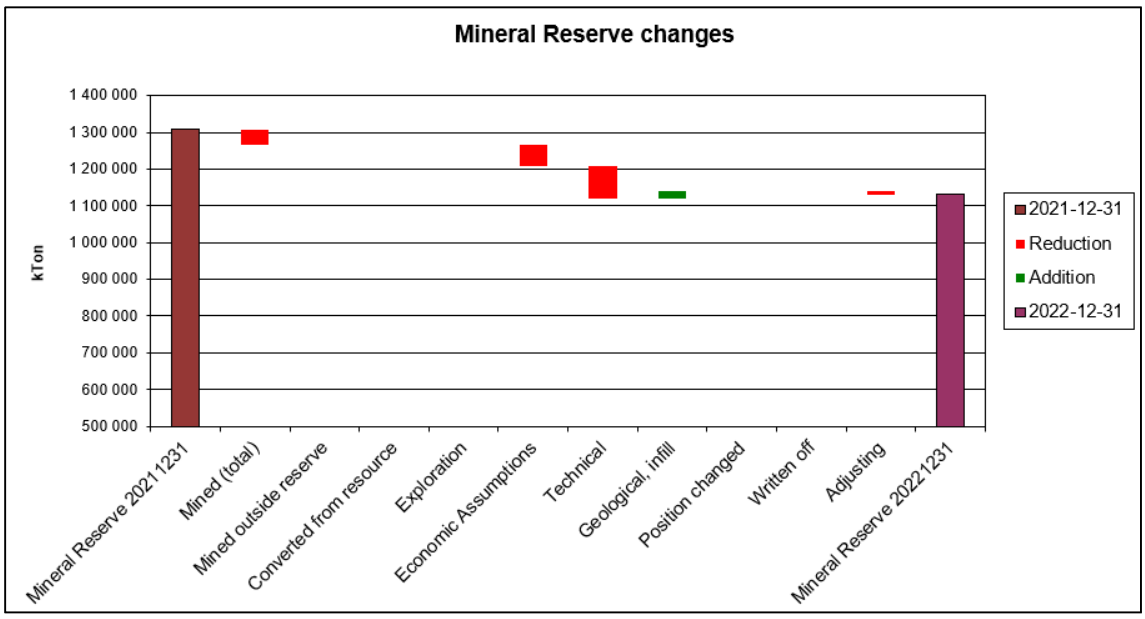
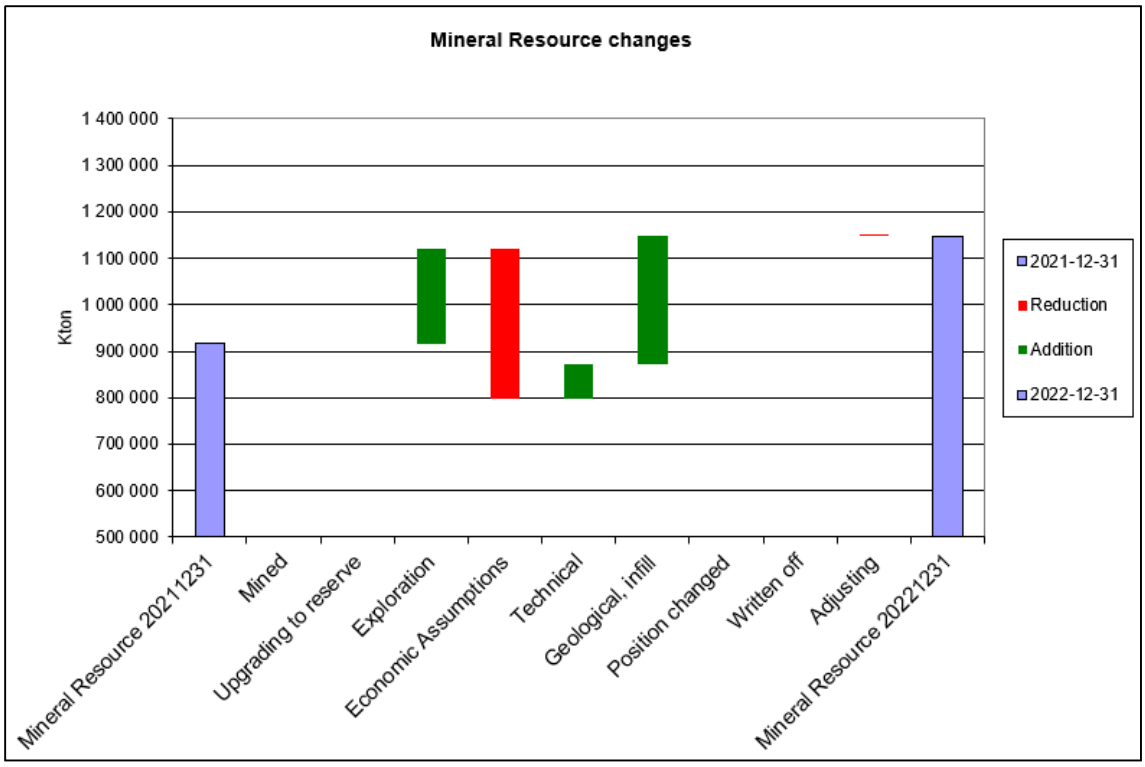


Table 12 Explanation of changes to mineral resource from 2021-2022



3.14 Reconciliation

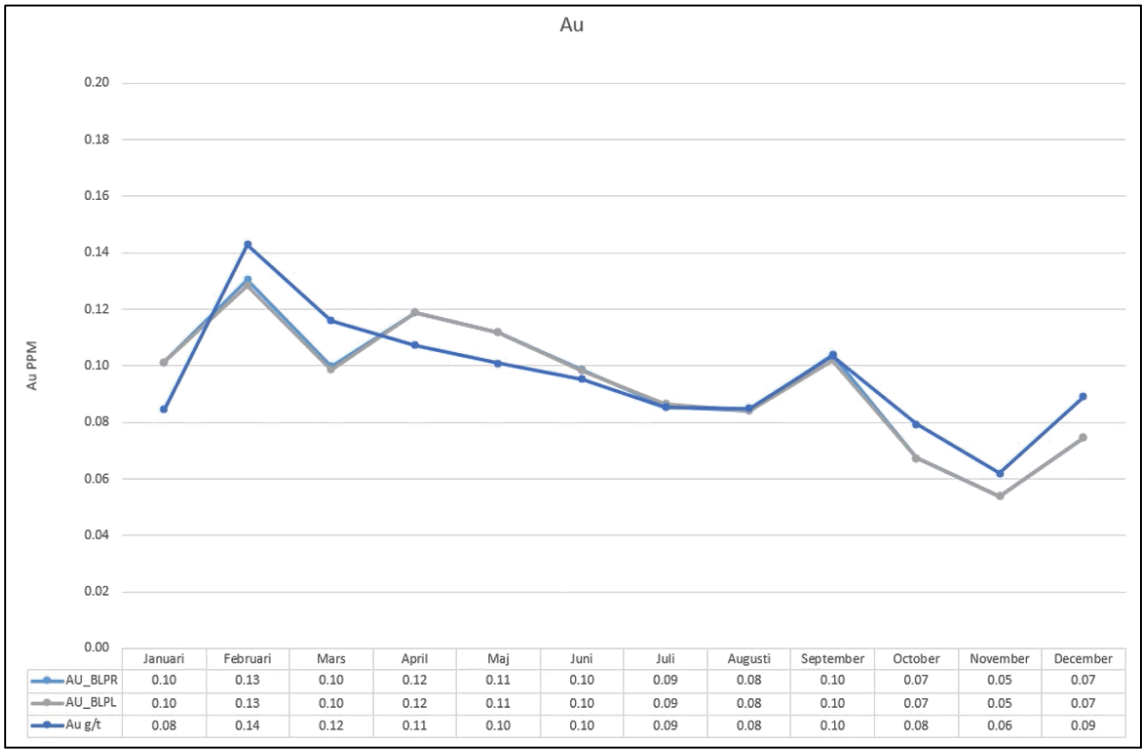
To confirm the precision of the geological interpretation, modelling, grade interpolation etc. the block model grades are checked against the actual measured results from the processing plant. Reconciliation is carried out every month. For the annual report of reserves and resources the reconciliation is compiled from an aggregation of 12 months and presented over a 10 year period in Table 13 below.

Table 13. Reconciliation figures over the last ten years for Aitik

Reconciliation	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
kton concentrated Concentrator (1)	37 070	39 090	36 361	36051	39045	38472	40661	41661	40099	43297
g/t Au Resource block model (2)	0.11	0.11	0.13	0.12	0.14	0.15	0.13	0.12	0.11	0.09
g/t Au Production block model (3)	0.11	0.11	0.13	0.12	0.14	0.14	0.13	0.12	0.11	0.09
g/t Au concentrator (4)	0.10	0.09	0.11	0.11	0.13	0.14	0.13	0.13	0.11	0.10
g/t Ag Resource block model (2)	1.9	1.8	2.1	2.0	2.1	1.8	1.2	1.0	0.9	0.9
g/t Ag Production block model (3)	1.9	1.8	2.1	2.0	2.1	1.7	1.2	1.0	0.9	0.9
g/t Ag concentrator (4)	2.3	2.1	2.5	2.1	1.9	1.8	1.2	1.1	0.9	0.9
%Cu Resource block model (2)	0.20	0.19	0.20	0.23	0.29	0.29	0.25	0.24	0.22	0.20
%Cu Production block model (3)	0.20	0.20	0.22	0.23	0.29	0.29	0.26	0.24	0.22	0.20
%Cu concentrator (4)	0.21	0.20	0.21	0.22	0.28	0.29	0.25	0.24	0.22	0.20
%S Resource block model (2)	1.2	1.0	1.5	1.5	1.4	1.2	0.9	0.8	0.6	0.7
%S Production block model (3)	1.2	1.0	1.5	1.5	1.4	1.1	0.9	0.8	0.6	0.7
%S concentrator (4)	1.3	1.1	1.5	1.4	1.2	1.1	1.0	1.0	0.8	0.7
Notes:										
1 Official processed ore tonnange from Aitik concentrator plant based on data from belt scales										
2 Summation of modelled head grade from resource block model using polygons created from shovel scoop position and blast field material type boundaries.										
3 Summation of modelled head grade from production block model using polygons created from shovel scoop position and blast field material type boundaries.										
4 Official summation of head grade based on concentrator plant analyses.										

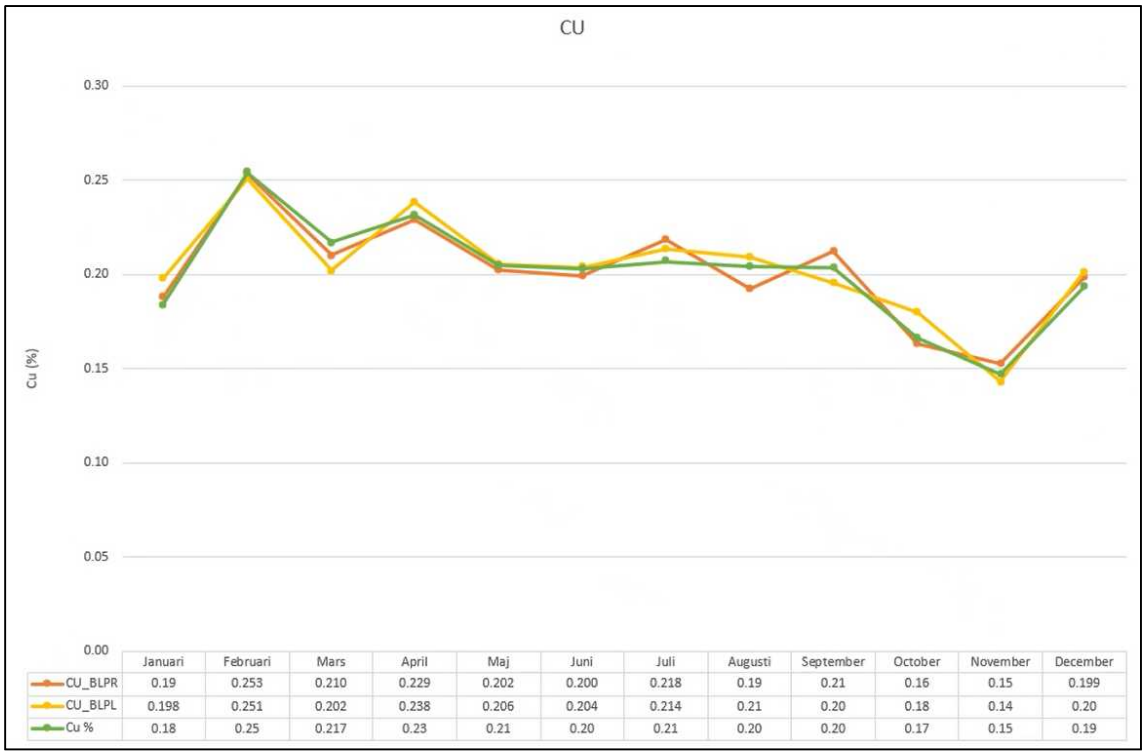
The realized/predicted values for Cu consistent with recent years of production and indicate a high-level reliability to the block model for the elements (0.1%). Cu, Au and Ag grade deviations for 2022 are within an acceptable relative precision.

For grade control, samples are taken from most blast holes within the ore zone to update the production block model (BLPR). The grades of the mined-out ore are calculated from the production block model using the tonnage reported and surveyed monthly volumes of the pit. For long term planning and resource estimation the resource block model (BLPL) is used. During reconciliation the result from the plant is compared to both the BLPL and BLPR (Figure 11 and Figure 12).



	Januari	Februari	Mars	April	Maj	Juni	Juli	Augusti	September	October	November	December
AU_BLPR	0.10	0.13	0.10	0.12	0.11	0.10	0.09	0.08	0.10	0.07	0.05	0.07
AU_BLPL	0.10	0.13	0.10	0.12	0.11	0.10	0.09	0.08	0.10	0.07	0.05	0.07
Au g/t	0.08	0.14	0.12	0.11	0.10	0.10	0.09	0.08	0.10	0.08	0.06	0.09

Figure 11 Comparing measured gold results from the processing plant with calculated results from the block models.



	Januari	Februari	Mars	April	Maj	Juni	Juli	Augusti	September	October	November	December
CU_BLPR	0.19	0.253	0.210	0.229	0.202	0.200	0.218	0.19	0.21	0.16	0.15	0.199
CU_BLPL	0.198	0.251	0.202	0.238	0.206	0.204	0.214	0.21	0.20	0.18	0.14	0.20
Cu %	0.18	0.25	0.217	0.23	0.21	0.20	0.21	0.20	0.20	0.17	0.15	0.19

Figure 12 Comparing measured copper results from the processing plant with calculated results from the block models.

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