Boliden Summary Report

Resources and Reserves | 2020

Aitik

Prepared by
Peter Karlsson

Table of contents

1 SUMMARY

Between 2019-12-31 and 2020-12-31 the mineral reserves increased by 14% to 1 353 Mt (million metric tonnes). The mineral resources decreased by 26%. The main reason to the changes in the reserve and resource was production and an updated Life of Mine Plan

Table 1. Summation of total Aitik operational area mineral reserves and resources per 2020-12-31. Reserves and resources from 2019-12-31 as comparison to the right

	2020				2019			
Classification	**kton**	**Au (g/t)**	**Ag (g/t)**	**Cu (%)**	kton	Au (g/t)	Ag (g/t)	Cu (%)
Mineral Reserve								
Proved	**702 000**	**0.14**	**1.2**	**0.22**	**726 000**	**0.15**	**1.2**	**0.22**
Probable	**651 000**	**0.16**	**1.2**	**0.22**	**461 000**	**0.14**	**1.3**	**0.23**
Total	**1 353 000**	**0.15**	**1.2**	**0.22**	**1 188 000**	**0.15**	**1.3**	**0.23**
Mineral Resource								
Measured	**272 000**	**0.06**	**0.6**	**0.15**	**310 000**	**0.07**	**0.6**	**0.15**
Indicated	**623 000**	**0.09**	**0.8**	**0.17**	**782 000**	**0.10**	**0.8**	**0.17**
Inferred	**16 000**	**0.13**	**0.7**	**0.19**	**28 000**	**0.14**	**1.0**	**0.19**
Total	**910 000**	**0.08**	**0.7**	**0.16**	**1 121 000**	**0.09**	**0.8**	**0.16**

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 below. The report has been verified and approved by Gunnar Agmalm who is Boliden's Ore Reserves and Project Evaluation manager and a member of AusIMM[1] and FAMMP[2] .

Table 2. Contributors and responsible competent persons for this report

Description	Contributors	Responsible CP
Compilation of this report	Peter Karlsson	Gunnar Agmalm
Geology	Peter Karlsson	
Resource estimations	Ian McGimpsey	
Mineral processing	Matti Linna	
Mining	Anders Melén	
Environmental and legal permits	Åsa Sjöblom	

[1] Australasian Institute of Mining and Metallurgy
[2] 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 2017".

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.

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.

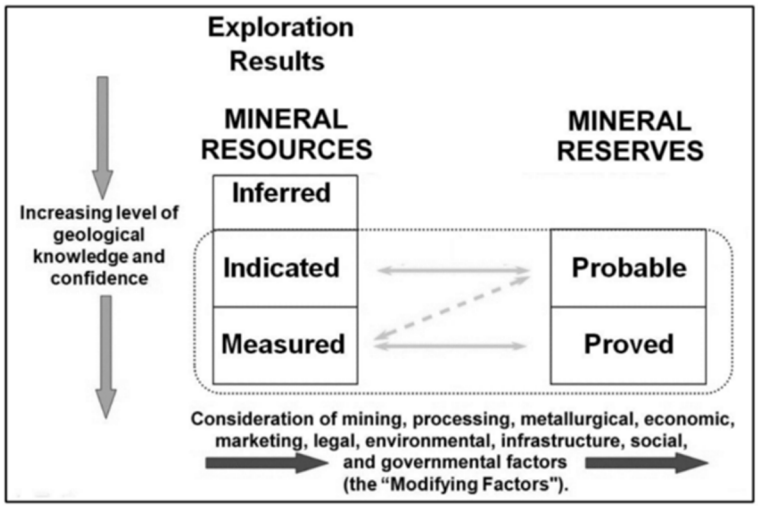

Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves (PERC 2017).

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 2020 totaled 41 661 kt. 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 2020 the total mineral reserves in Aitik increased by 165 Mt (million metric tonnes) to 1 353 Mt. Measured and indicated resource in Aitik decreased 197 Mt to 895 Mt. Inferred resource decreased by 28 Mt to 12 Mt.

3.1.1 Technical studies

During 2020 the Life of Mine Plan (LoMP) for Aitik was revised. This included adjustments of the pushbacks designs for the main pit as well as revisions on the mining sequence. The largest change was N7 and N8. With an interim stage in N7, reaching high grade earlier and improving NPV. Another major design change is the use of 10% in-pit ramp grade.

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 magazine, 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.

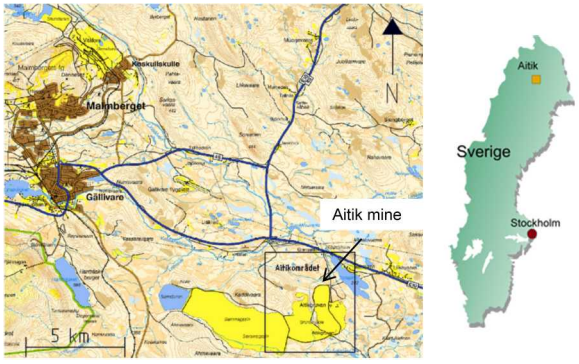

Figure 2. Location of the Aitik mine

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.

- 2020: Year-end ore processing achieves 41.6 Mt at a head grade of 0.13 g/t Au, 1.1 g/t Ag, and 0.24% Cu.

Total historic ore production at the Aitik mine site from 1968 through 2020 is calculated to 904 Mton at a grade of 0.17 g/t Au, 2.9 g/t Ag, and 0.32% Cu. Total waste stripping (overburden + waste rock) during this period is calculated to 836 Mt. This gives a total historic stripping ratio (waste/ore) of 0.93.

Table 3. Annual production numbers for 2000-2020. Between 1968 and 2000 the processed ore tonnage and grades are presented with 5-year intervals. A total of 862 Mt of ore has been processed since mining commenced.

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

3.4 Ownership

Boliden Mineral AB owns 100 % of the Aitik mine

3.5 Permits

Current processing concessions (Aitik K nr 1-5) encompass the entire area where mining 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 2023. The work with the application for the next environmental permit, which is planned to be submitted to the land and environmental court in the summer of year 2021, is ongoing. Boliden has performed studies that show that it is technically feasible to continue to raise the dams of the current tailings pond until year 2043. Due to the complexity of these investigations, they have not yet been updated to include tailings generated according to the entire present LOMP. This has been considered in the reserve classification.

.

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

Name	Comprises	Ref	Decicion 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		

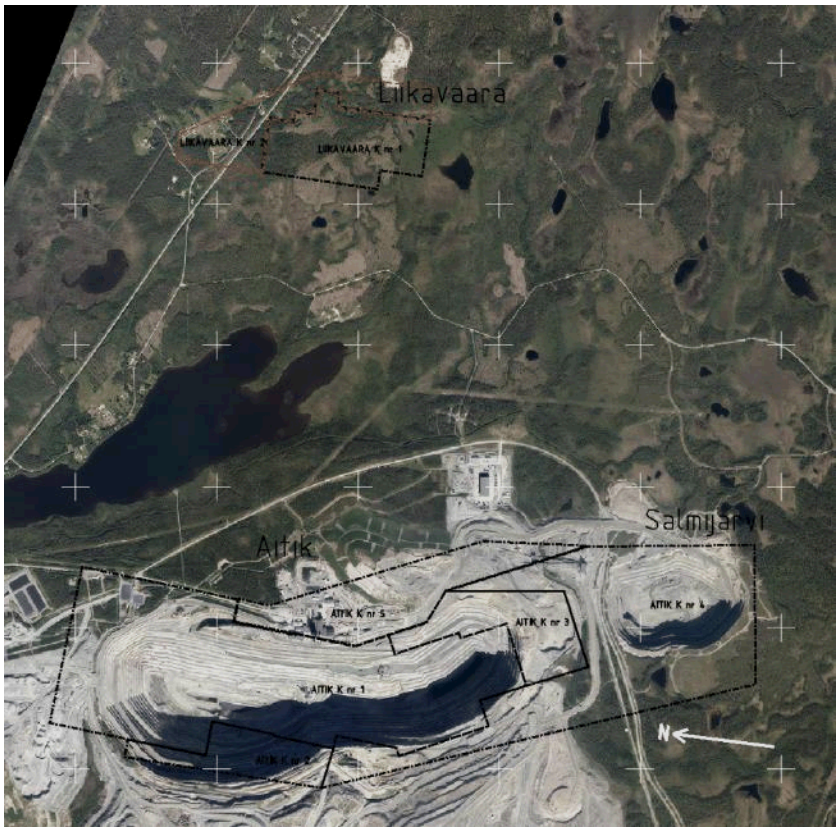

Figure 3. Map showing mining concessions at Aitik and Liikavaara. Aerial photo from summer 2018

In order 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 company has also applied for an environmental permit for the planned operations in Liikavaara (2018-09-28). Since the deposition of potentially acid forming waste rock and tailings, as well as handling of affected water, will take place in Aitik, the company judges that this issue can be handled as a minor change to the current permit. However, Boliden also judges that there is a risk of a delay in the process, due to e.g. relocation of public road E10, Natura 2000 considerations and potential appeals of permits. This has been considered in the reserve classification. Waste rock from Liikavaara is a part of the mining plan for Aitik from year 2023, ore from year 2023. Negotiations on the environmental permit for Liikavaara will take place in the Land and Environmental Court at the end of January 2021. 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.

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 2‰ of the value of mined and raised ore after concentration (yield losses are subtracted). 1.5‰ goes to the landowner (Boliden) and 0.5‰ goes to the state. In Liikavaara, all estates where mining of ore is planned today have been bought by Boliden.

3.6 Geology

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 4 and Figure 5. 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.

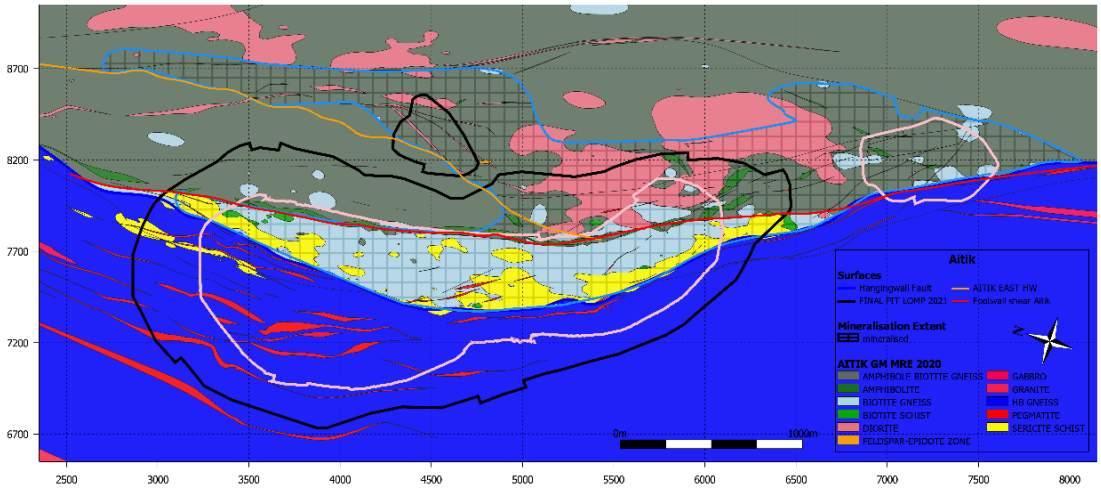

Figure 4. Plan view at -100z, showing the geology of Aitik and the planned pushbacks. The dashed Area shows the mineralization shell for > 0.06% Cu. The north arrow shows geographic north

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.

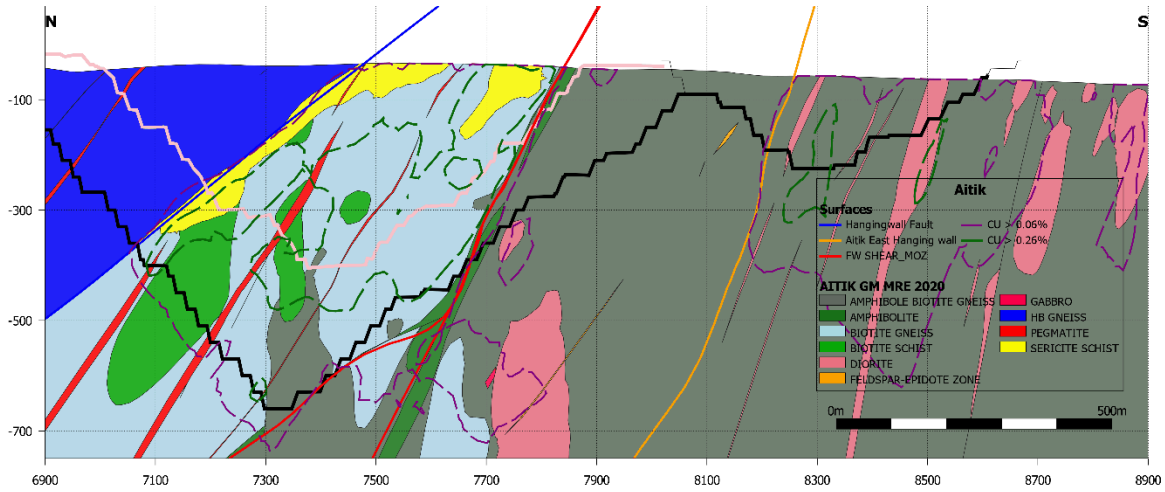

Figure 5. Crossection A-A'

About 3 km to the east, on separate and volumetrically smaller mineralized trend, sits the paleoproterozoic Liikavaara Cu-(W-Au) deposit (Figure 6). 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.

.

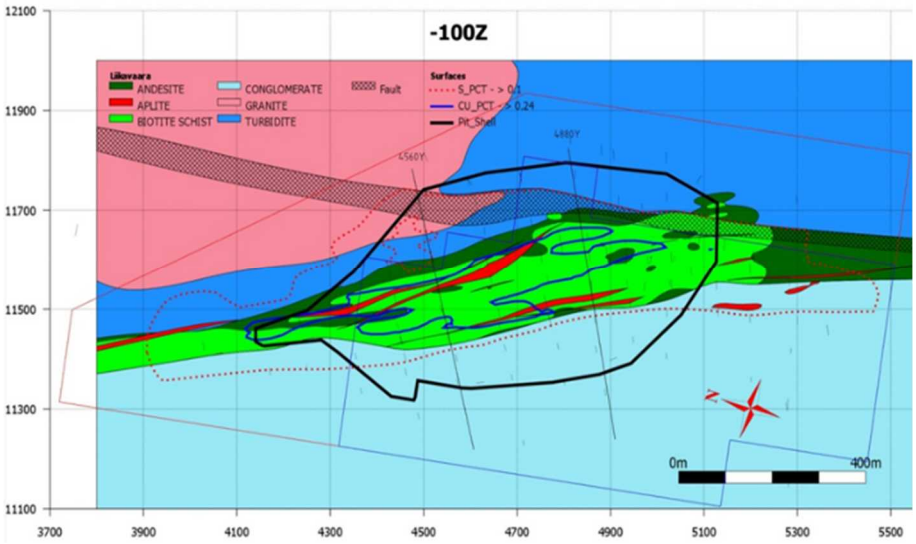

Figure 6. Plan view over Liikavaara geology at 100m depth The current concession (Liikavaara K nr1) is highlighted by the blue line and the applied (Liikavaara K nr 2) by a red line.

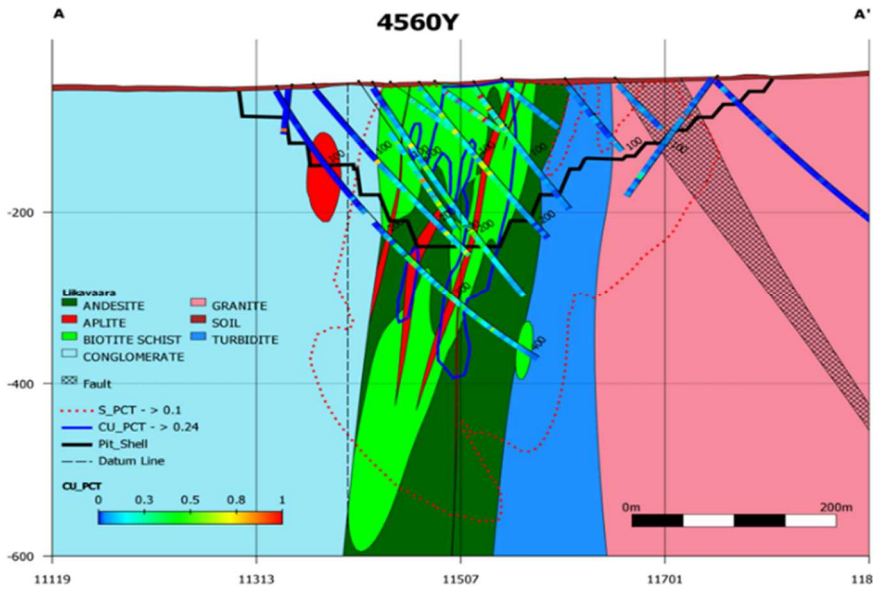

Figure 7. Oblique cross section, along 4560Y (Figure 6), looking north. Including the planned pit shell and diamond drill holes.

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 contractor OY KATI AB and supervised by Boliden personnel. The current practice is to measure all diamond drillholes for deviation with Gyro. during 2020 has SPT Gyromaster been used by the drilling contractor.

3.7.2 Sampling, analyses, QAQC, and modelling of in-data

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.

3.8 Exploration activities

In 2020, diamond drilling was conducted by Boliden Near Mine Exploration at the northern part of the Aitik deposit and the Salmijärvi deposit, totaling 8 800m.

3.9 Mining methods, mineral processing and infrastructure

The ore is mined in two open pits along the same mineral deposit. The main pit is called Aitik and measures roughly 4 km by 1.1 km at surface, with the deepest point currently at 480 meters from surface (Figure 8). In 2010, mining commenced in a second pit called Salmijärvi which has currently reached a depth of 225 meters below surface, with a surface foot print of roughly 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. Prestripping 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.

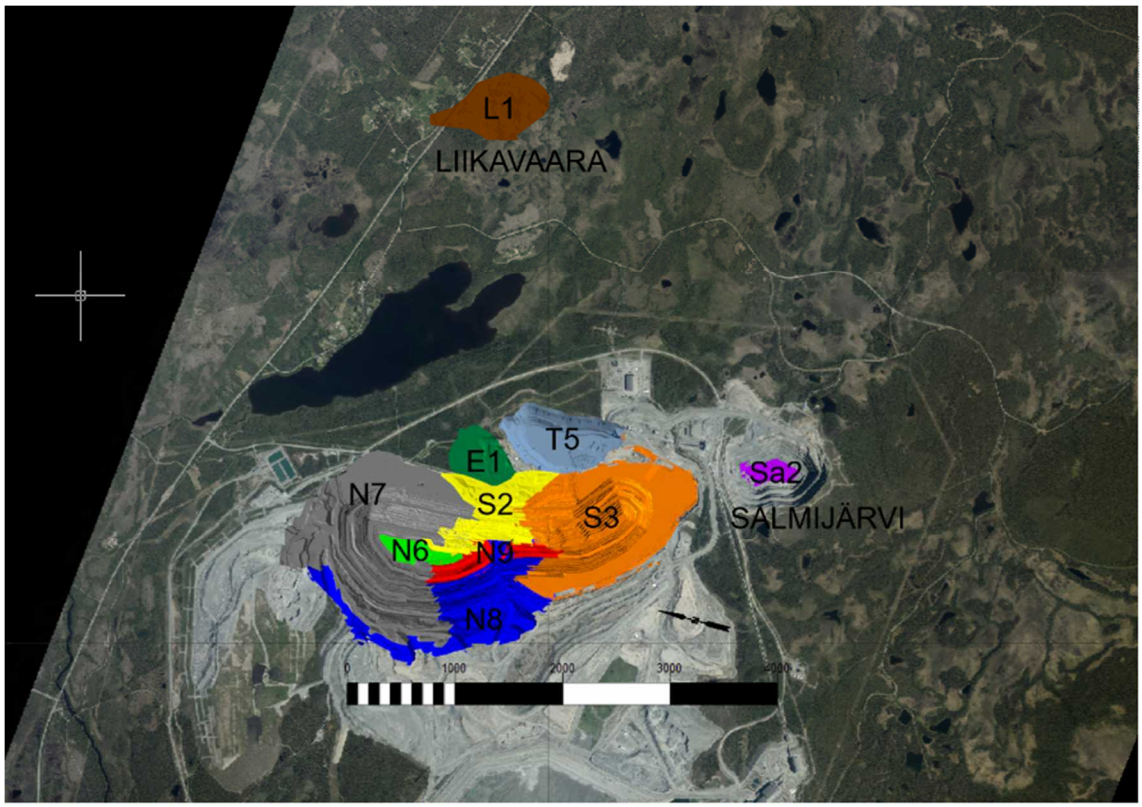

Figure 8. Overview over planned and active pushbacks at Aitik.

The ore and waste rock is blasted in 15 meter high benches and is 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 surface and from 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 pit is transported on conveyor belts to an intermediate storage on 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 buffer for the production.

3.9.1 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. 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.

3.10 Prices, terms and costs

Boliden's planning prices, which are an expression of the anticipated future average prices for approximately 10 years, are presented in Table 5.

Table 5. Long term planning prices currently used in Boliden.

	Planning prices, 2020
Copper	USD 6,600/tonne
Gold	USD 1,300/tr.oz
Silver	USD 17/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 pit optimisation from the Aitik LoMP 2020 project, while the Liikavaara pit was optimised in the Liikavaara Feasibility Study 2017. During the Liikavaara Feasibility Study 2017, the Boliden planning prices were 6200 USD/t for Cu, 1200 USD/tr.oz Au and 18 USD/tr.oz for Ag, while the exchange rate used was USD/SEK = 7.50. Unit costs used in the pit optimisations are shown in Table 6, together with reserve and resource cut-offs. Costs for resource pit optimisations, to determine reasonable prospect for eventual economic extraction (RPEEE), have been derived from the outcome of the above mentioned studies, without discounting or mining schedule. The upgrading to reserve is the main contributor to the decrease of the resource.

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	11.7	11.4
Mining rock (variable)	SEK/t/km	1.5	1.4
Mining free dig (fixed)	SEK/t	7.3	15.0
Mining free dig (variable)	SEK/t/km	1.5	-
Sustaining capex mining	SEK/t	1.8	-
Processing & Overhead	SEK/t	35.1	27.3
Sustaining capex processing & overhead	SEK/t	2.6	-
Cut-off		0.06% Cu	0.08% Cu
Mineral Resource			
Mining	SEK/t	20	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. Both mineral estimations are carried out in Datamine Studio RM 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 Cu is left uncapped, Au is capped at 0.5 ppm, and Ag at 17 ppm. Capping in the Liikavaara model effects 0.47% of Au and 0.3% Ag composites (Table 7 below). All lithologies in the models have been assigned a density based on specific gravity measurements. Blocks in the Aitik model are 20m (x), 20m (y), 15m (z), with sub-blocking to 10m (x), 10m (y), 15m (z). Blocks in the Liikavaara model are 40m (x), 40m (y), 15m (z) with sub-blocking down 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**	
	Top cap	Capped	Top cap	Capped
Cu	-	0%	2%	0.07%
Au	0.5 ppm	0.47%	2 ppm	0.12%
Ag	17p pm	0.30%	20 ppm	0.10%

Table 8 Block size in Liikavaara and Aitik Resource models.

	Liikavaara		**Aitik**	
	Parent block	Sub-block	Parent block	Sub-block
x	40 m	10 m	20 m	10 m
y	40 m	10 m	20 m	10 m
z	15 m	15 m	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 a Indicated Resource 180m x 180m for Aitik and 100m (E) x 80m (N) for Liikavaara. Inferred Resource 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. The blocks after final classification are shown as a long section though the main Aitik pit and the Salmijärvi pit in Figure 9, and as a cross section through the main pit and the planned Aitik east pit in Figure 10.

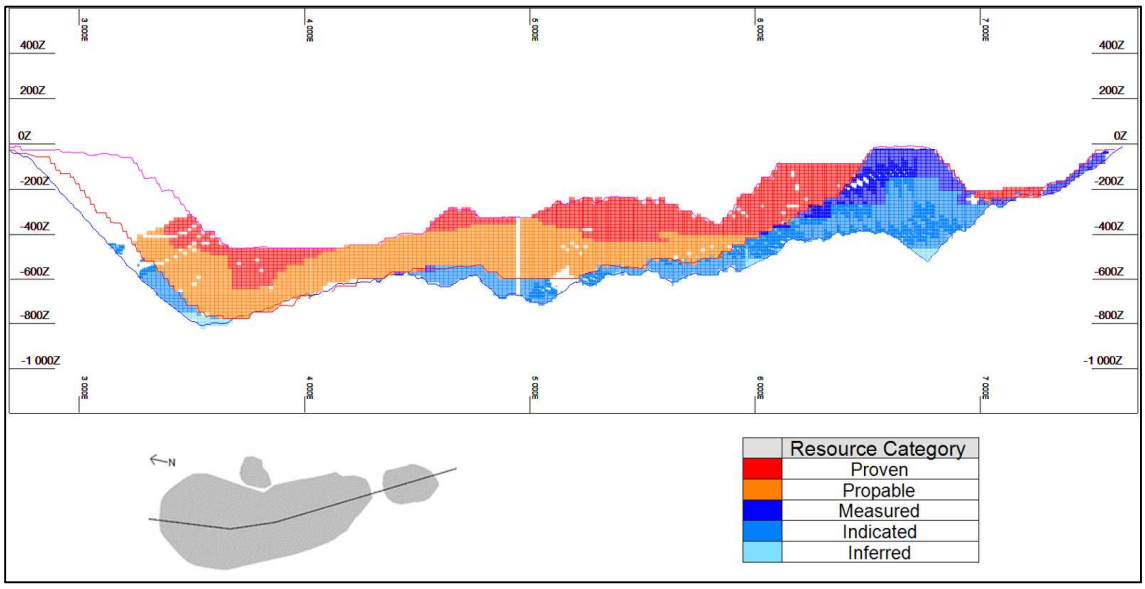

Figure 9. Long section showing the pit surface at 2020-12-31, including pit shells for the resource and the reserve.

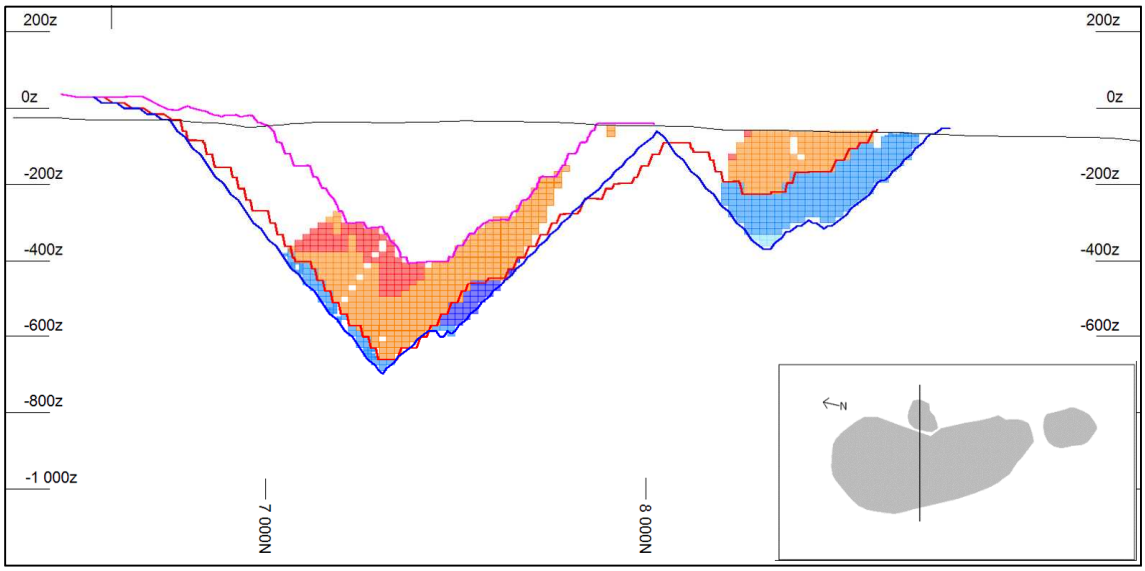

Figure 10. Cross section along 4500E

3.12 Mineral reserves

A Life of Mine Plan is created on an annual basis and the final results of this plan are used to determine the Reserves. All blocks within the Aitik Reserve pit initially classed as Measured are considered Proved, if they are initially indicated they are then considered Probable, however, Due to the permitting situation after 2044 (see chapter3.5), is material which otherwise would have been classed as a Proved Mineral Reserve been classed as a Probable Mineral Reserve. Any 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, however, as for Aitik is material that would otherwise have been classed as a Proved Mineral Reserve have been classed as a Probable Mineral Reserve due to not all permits being in place as of yet (see 3.5 Permits). Mineral Resources and Reserves for the entire mining area are shown in Table 10

Table 10. Mineral Resources and Mineral Reserves Aitik 2020-12-31

Classification	2020				2019			
	kton 2020-12-31	Au (g/t)	Ag (g/t)	Cu (%)	kton 2019-12-31	Au (g/t)	Ag (g/t)	Cu (%)
Proved Mineral Reserve	**702 000**	**0.14**	**1.2**	**0.22**	**726 000**	**0.15**	**1.2**	**0.22**
Probable Mineral Reserve	**651 000**	**0.16**	**1.2**	**0.22**	**461 000**	**0.14**	**1.3**	**0.23**
Total Mineral Reserve	*1 353 000*	*0.15*	*1.2*	*0.22*	*1 188 000*	*0.15*	*1.3*	*0.23*
Measured Mineral Resource	**272 000**	**0.06**	**0.6**	**0.15**	**310 000**	**0.07**	**0.6**	**0.15**
Indicated Mineral Resource	**623 000**	**0.09**	**0.8**	**0.17**	**782 000**	**0.10**	**0.8**	**0.17**
Inferred Mineral Resource	**16 000**	**0.13**	**0.7**	**0.19**	**28 000**	**0.14**	**1.0**	**0.19**
Total Mineral Resource	*910 000*	*0.08*	*0.7*	*0.16*	*1 121 000*	*0.09*	*0.8*	*0.16*

3.13 Comparison with previous year

Aitik's total ore reserve per 2020-12-31, Table 11, has increased with 165 000 kt from the previous year's estimate. The main reason to the increase is a new Life of Mine Plan. Explanations to the changes from the previous year can be seen in Table 7. In total, 40 661 kt ore has been mined, mainly from pushback N6, Sa2 and S3. Due to redesign of the pushbacks, 170 Mt has been upgraded from resource to reserve.

Table 11. Explanation of changes to mineral reserve from 2018-2019

	Aitik	Salmijärvi	Aitik East	Liikavaara	T5	Mine
	kton	kton	kton	kton	kton	kton
Mineral reserve 2019	**1 063 000**	**18 000**	**30 000**	**58 000**	**18 000**	**1 187 000**
Mined (total)	-28 000	-13 000	0	0	-10000	-42 000
Mined outside reserve	1000					1000
Converted from resource	170 000					170 000
Exploration						0
Economic assumptions	30 000		2000			30 000
Technical						0
Geological, infill			3000			3000
Position changed						0
Written off						0
Adjusting	-1 000	2 000			1000	-19 000
Mineral Reserve 2020	**1 231 000**	**11 000**	**35 000**	**58 000**	**18 000**	**1 353 000**

3.14 Reconciliation

In order 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.

Production reconciliation is a useful tool for checking the quality of the block model used in calculating the ore reserve and mineral resource at Aitik. Reconciliation over the period 2011-2020 is presented in Table 12.

Table 12. Reconciliation figures over ten years for Aitik

Reconciliation	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
kton concentrated Minestar [1]	30 975	35 048	38 540	37 005	35 972	35 738	39 404	38 715	39337	39832
kton concentrated Concentrator [2]	31 541	34 321	37 070	39 090	36 361	36 051	39 045	38 472	40661	41661
g/t Au Resource block model [3]	0.15	0.12	0.11	0.11	0.13	0.12	0.14	0.15	0.13	0.12
g/t Au Production block model [3]	0.15	0.12	0.11	0.11	0.13	0.12	0.14	0.14	0.13	0.12
g/t Au concentrator [4]	0.14	0.11	0.10	0.09	0.11	0.11	0.13	0.14	0.13	0.13
g/t Ag Resource block model [3]	1.9	2.1	1.9	1.8	2.1	2.0	2.1	1.8	1.2	1.0
g/t Ag Production block model [3]	2.0	2.1	1.9	1.8	2.1	2.0	2.1	1.7	1.2	1.0
g/t Ag concentrator [4]	2.2	2.5	2.3	2.1	2.5	2.1	1.9	1.8	1.2	1.1
% Cu Resource block model [3]	0.24	0.21	0.20	0.19	0.20	0.23	0.29	0.29	0.25	0.24
% Cu Production block model [3]	0.23	0.21	0.20	0.20	0.22	0.23	0.29	0.29	0.26	0.24
% Cu concentrator [4]	0.24	0.22	0.21	0.20	0.21	0.22	0.28	0.29	0.25	0.24
% S Resource block model [3]	1.2	1.2	1.2	1.0	1.5	1.5	1.4	1.2	0.9	0.8
% S Production block model [3]	1.2	1.2	1.2	1.0	1.5	1.5	1.4	1.1	0.9	0.8
% S concentrator [4]	1.1	1.3	1.3	1.1	1.5	1.4	1.2	1.1	1.0	1.0

Notes:
[1] Summation of ore tonnage from Minestar using data from shovel positions and truck scales, from May 2016 Minestar replaced the bespoken Prodadmin software
[2] Official processed ore tonnage from Aitik concentrator plant based on data from belt scales
[3] Summation of modeled head grade from block models using volymes created from shovel scoop position, Scanning and blast field 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%). Au and Ag grade deviations for 2020 are within an acceptable relative precision of ±10%, -6% and -7% respectively. The realized values for S are significantly higher than the predicted (+21%) it's, most probably, due inadequate sulpur assaying of diamond drill core in Pushback S3 and more work to address the issue is recommended

For grade control, samples are taken from virtually all 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, please see

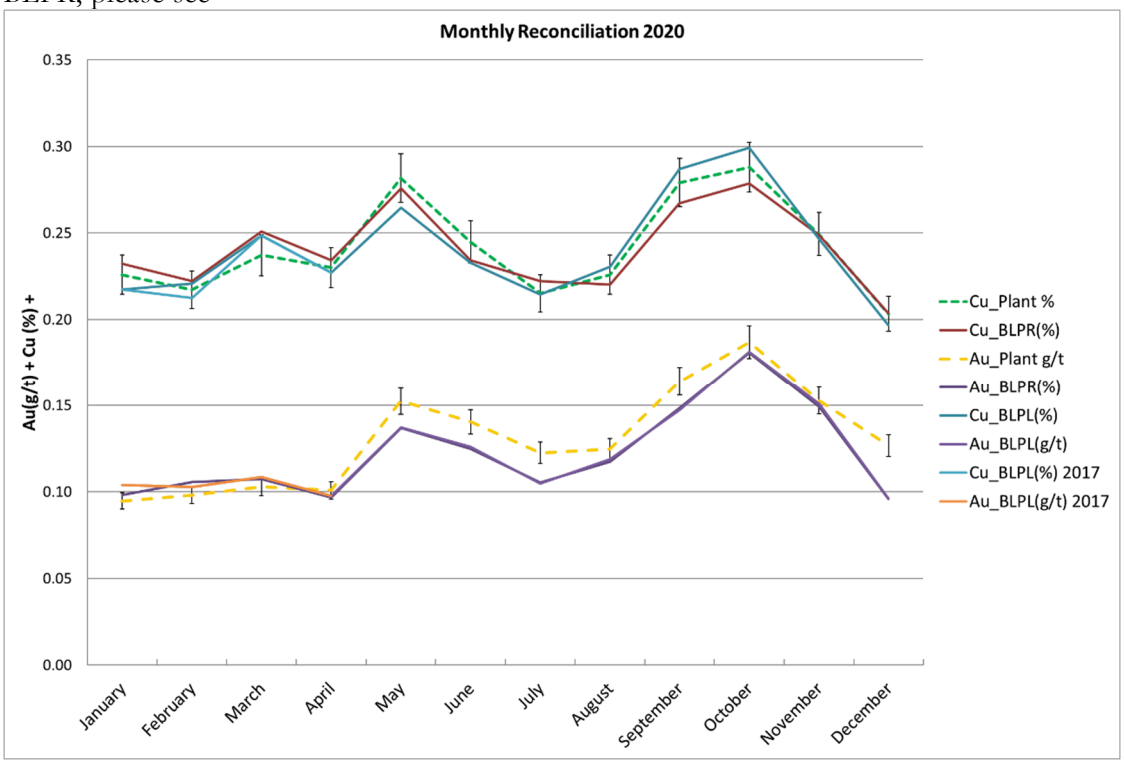

Figure 11 for last year's results.

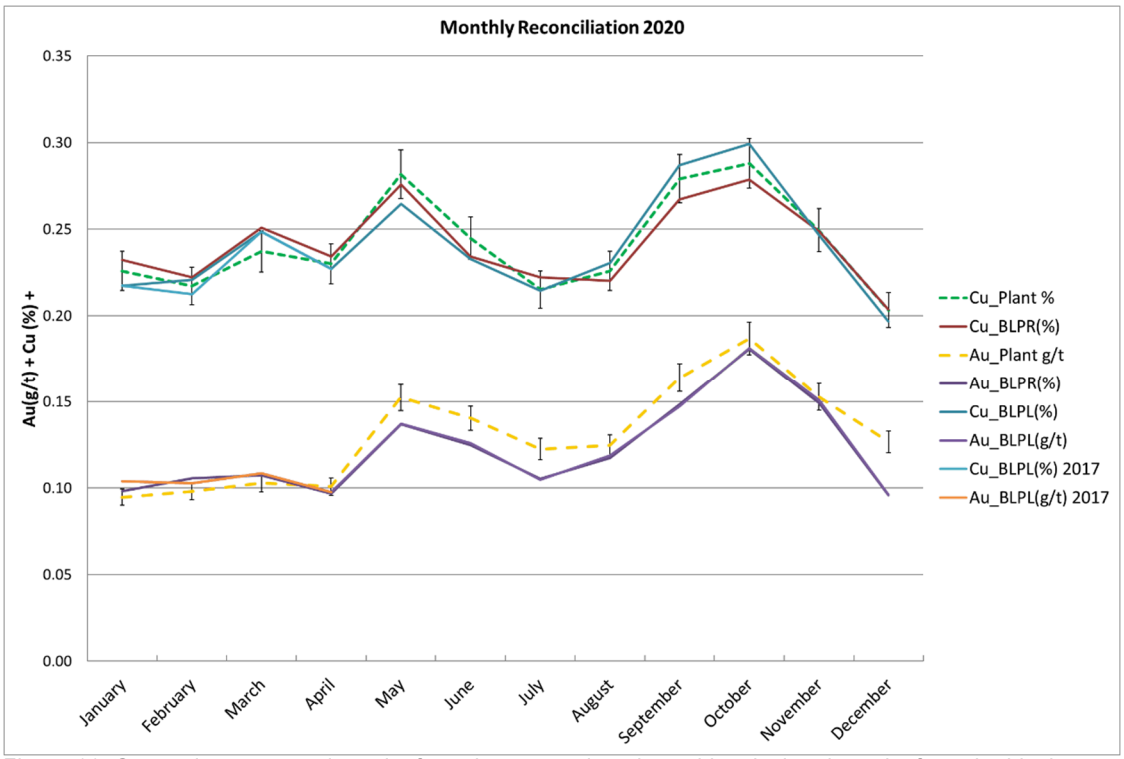

Figure 11. Comparing measured results from the processing plant with calculated results from the block models.

Table 13. Comparison of metal grades in the block model and processed ore at the end of 2020

Element	Difference in % plant/ block model BLPL	Difference in grade
Gold	-6.7	-0.009g/t
Copper	-0.2	-0.001%
Silver	-6.8	-0.072g/t

4 REFERENCES

Pan-European Standard for reporting of Exploration results, Mineral Resources and Mineral Reserves (The PERC Reporting standard 2017). www.percstandard.eu