Technical Report Summary on the El Porvenir Mine, Department of Pasco, Peru S-K 1300 Report

Nexa Resources S.A.

SLR Project No: 233.03259.R0000

January 15, 2021

Amended October 18, 2021

SLR

Technical Report Summary on the El Porvenir Mine, Department of Pasco, Peru

SLR Project No: 233.03259.R0000

Prepared by
SLR Consulting (Canada) Ltd.
55 University Ave., Suite 501
Toronto, ON M5J 2H7
for

Nexa Resources S.A.
Rúa Guaicuí, 20 – 14° Andar
Belo Horizonte/MG
30380-380

Effective Date – December 31, 2020
Signature Date - January 15, 2021
Amended Date – October 18, 2021

FINAL

Distribution: 1 copy – Nexa Resources S.A.
1 copy – SLR Consulting (Canada) Ltd.

CONTENTS

TABLES

FIGURES

1.0 EXECUTIVE SUMMARY

1.1 Summary

SLR Consulting Ltd. (SLR) was retained by Nexa Resources S.A. (Nexa) to prepare an independent Technical Report Summary on the El Porvenir Mine (the Mine or El Porvenir), located in Pasco Province, central Peru. The purpose of this Technical Report Summary is to support the public disclosure of updated Mineral Reserve and Mineral Resource estimates. This Technical Report Summary conforms to United States Securities and Exchange Commission's (SEC) Modernized Property Disclosure Requirements for Mining Registrants as described in Subpart 229.1300 of Regulation S-K, Disclosure by Registrants Engaged in Mining Operations (S-K 1300) and Item 601 (b)(96) Technical Report Summary. SLR personnel visited the site from September 5 to 7, 2018. SLR has prepared this amended Technical Report Summary to disclose Mineral Resources and Mineral Reserves attributable to Nexa only, provide additional information about metallurgical recoveries and lead and silver markets, and to disclose the accuracy of the cost estimates. SLR notes that the effective date of the technical information contained herein remains December 31, 2021.

Nexa is a publicly traded company on the Toronto Stock Exchange (TSX) and the New York Stock Exchange (NYSE). Nexa is a reporting issuer in all provinces and territories of Canada and is under the jurisdiction of the Ontario Securities Commission.

Nexa is a large-scale, low-cost, integrated zinc producer with over 60 years of experience developing and operating mining and smelting assets in Latin America. Nexa has a diversified portfolio of polymetallic mines (zinc, lead, copper, silver, and gold) and also greenfield projects at various stages of development in Brazil and Peru. In Brazil, Nexa owns and operates two underground mines, Vazante and Morro Agudo (Zn and Pb). Nexa also operates two zinc smelters in Brazil (Três Marias and Juiz de Fora). In Peru, Nexa operates the El Porvenir (Zn, Pb, Cu, and Ag), Cerro Lindo (Zn, Cu, Pb, and Ag), and Atacocha (Zn, Cu, Pb, Au, and Ag) mines, as well as the Cajamarquilla zinc smelter near Lima. Nexa's development projects in Peru include Magistral, Shalipayco, Florida Canyon (JV with Solitario), Hilarión, and Pukaqaqa. In Brazil, Nexa is developing the Aripuanã Zinc Project (Zn, Pb, Cu, Au, and Ag), which is currently under construction and is owned by Mineração Dardanelos Ltda. (Dardanelos), a wholly-owned subsidiary of Nexa.

El Porvenir is an underground, polymetallic mine located in Peru's Central Andes mountain region at an elevation of approximately 4,200 metres above sea level (MASL). El Porvenir is situated 315 km by road northeast of Lima, the capital city, and 13 km from the city of Cerro de Pasco. The Mine began operations in 1949, and recent production has been at a rate of approximately 6,000 tonnes per day (tpd). Table 1-1 presents El Porvenir's run of mine (ROM) production for the years 2015 to 2020. The processing plant has a capacity for treating ore at a rate of approximately 2.28 million tonnes per annum (Mtpa).

Table 1-1: ROM Production – Years 2015 to 2020
Nexa Resources S.A. – El Porvenir Mine

Item	Unit	2015	2016	2017	2018	2019	2020
Tonnes	t	2,108,821	2,154,151	1,834,511	2,149,927	2,120,765	1,502,618
Zn	%	3.21	3.22	2.86	3.04	2.92	2.65
Pb	%	0.93	0.99	1.04	0.98	1.01	0.93
Cu	%	0.17	0.14	0.13	0.15	0.15	0.17
Ag	g/t	54.38	60.24	63.61	59.68	64.64	62.28

Production in 2020 was significantly lower than in 2019 due to the effects of the COVID-19 pandemic and associated production interruptions. On March 15, 2020, the Peruvian Government declared a national emergency and imposed operating business restrictions, including on the mining sector. The quarantine period was initially expected to last until the end of March 2020 but was subsequently extended up to May 10, 2020. In light of the government restrictions, Nexa suspended production at El Porvenir. During this period, mining activities were limited to critical operations with a minimum workforce to ensure appropriate maintenance, safety, and security. On May 6, 2020, the Peruvian Government announced the conditions for the resumption of operations for different sectors, including mining operations above 5,000 tpd. As a result, operations at El Porvenir, which have been suspended since March 18, 2020, restarted production on May 11, 2020, following the end of the quarantine period. Following the resumption of operations, El Porvenir ramped up production to pre-pandemic levels by June 2020.

Nexa holds a total of 80.16% that corresponds to the sum of Nexa's direct interest in Nexa Resources Peru S.A.A. (0.17%) (Nexa Peru) and indirect participation of Nexa in Nexa Peru and Pampa de Cobre S.A.C. (80.06%) through its controlled company Nexa Resources Cajamarquilla S.A. (99.91%), and the remaining 19.76% are floating shares. The Mine is comprised of 25 concessions covering approximately 4,846.8 hectares (ha) and a beneficiation plant. El Porvenir's surface properties include a 450.8 ha mine site and areas for the tailings storage facility (TSF), accommodations, and other ancillary infrastructure.

1.1.1 Conclusions

SLR has the following conclusions by area.

1.1.1.1 Geology and Mineral Resources

- As of December 31, 2020, exclusive of Mineral Reserves, Measured Mineral Resources are estimated to total 0.18 million tonnes (Mt) at 2.59% Zn, 0.99% Pb, 0.23% Cu, and 63.46 g/t Ag and Indicated Mineral Resources are estimated to total 1.07 Mt at 2.93% Zn, 0.89% Pb, 0.20% Cu, and 63.33 g/t Ag. In addition, Inferred Mineral Resources are estimated to total 6.79 Mt at 3.60% Zn, 0.95% Pb, 0.23% Cu, and 78.37 g/t Ag. Mineral Resources are reported on an 80.16% Nexa attributable ownership basis.
- El Porvenir has features of skarn, hydrothermal vein/breccia-style, and stratabound deposits.
- The control of mineralization is lithological, mineralogical, and structural.
- Protocols for drilling, sampling, analysis, verification, and security meet industry standard practices. The drill hole database was verified by SLR and is suitable for Mineral Resource estimation.

- The geological models are reasonably constructed using available geological information and are appropriate for Mineral Resource estimation.
- The assumptions, parameters, and methodology used for the El Porvenir Mineral Resource estimate are appropriate for the style of mineralization and proposed mining methods.
- Nexa's exploration strategy, practices, and procedures are in line with industry standards.
- A number of polymetallic prospects located near the deposits have been outlined and warrant additional exploration.

1.1.1.2 Mining and Mineral Reserves

- As of December 31, 2020, Proven and Probable Mineral Reserves are estimated to total 11.10 Mt at 3.75% Zn, 0.88% Pb, 0.23% Cu, and 63 g/t Ag. Mineral Reserves are reported on an 80.16% Nexa attributable ownership basis.
- The assumptions, parameters, and methodology used for the El Porvenir Mineral Reserve estimate meet industry standard practices and are appropriate for the style of mineralization and proposed mining methods.
- Most of El Porvenir's ore production comes from mechanized cut and fill (C&F), which has proven to be an effective method for mining its deposits for decades. An increasing share of the Mine's production comes from sublevel stoping (SLS) in those areas that are suitable for the method. SLS is a lower-cost method than C&F, and provides an efficient means for disposing of development waste. According to the life of mine (LOM) plan, SLS's share of El Porvenir's output will increase from approximately 16% in 2021 to 46% in 2025.

1.1.1.3 Mineral Processing

- Test work has been conducted in order to produce a geometallurgical model to predict metallurgical response during future processing at El Porvenir and relationships based on the ore source at El Porvenir having been derived to predict throughput, grinding media consumption, recovery, and concentrate quality.
- Review of historical production indicates that recoveries of copper, lead, and zinc are related to their head grades, while the majority of silver is recovered to the lead concentrate.
- Average LOM planned head grades of zinc and copper are forecast to be similar to or higher than average head grades for the past three years, while the average planned lead head grade is forecast to decrease slightly compared to recent head grades. Forecast recoveries are in line with those achieved in recent years.
- No fundamental changes to the concentrator feed are anticipated, and in the SLR Qualified Person's (QP) opinion, based on recent processing plant performance, the forecast recoveries and concentrate qualities for the near future are reasonable.

1.1.1.4 Environmental, Permitting and Social Considerations

- No environmental issues were identified from the documentation available for review that could materially impact the ability to extract the Mineral Resources and Mineral Reserves. The El Porvenir operation complies with applicable Peruvian permitting requirements. The approved permits address the authority's requirements for operation of the underground mine, TSFs, waste rock dumps (WRD), concentrator plant, water usage, and effluents discharge.

- The monitoring program at El Porvenir includes meteorology, air quality, non-ionized radiation, noise, surface water quality, groundwater quality (only one location), spring water quality, effluent discharges, fauna and flora, and TSF physical stability. El Porvenir reports the results of its monitoring program to the authorities according to the frequency stated in the approved resolutions. SLR is not aware of any non-compliance issues raised by the authorities.
- In the SLR QP's opinion, the Environmental Management Plan for El Porvenir is adequate to address potential issues related to environmental compliance. A recommendation has been provided regarding the groundwater quality monitoring program (see Section 1.1.2.4).
- Nexa utilizes an Integrated Dam Management System (referred to as SIGBar) for the El Porvenir TSF, which provides guidelines for document management, monitoring, evaluation, risk analysis, compliance with standards and legislation, training of personnel, operation of structures and other provisions.
- The safety of operating a centerline raised tailings dam depends on the ability to maintain wide tailings beaches and a low phreatic level in the dam shell for stability. No issues with regard to crest settlements were noted in recent dam safety monitoring reports. SLR notes, however, that bedrock foundation grouting of the left and right abutments carried out in 2015 observed very significant grout takes in numerous grouthole stages indicating the filling of voids. A series of seepage collection sub-drainage pipes were also installed on the downstream shell of the dam prior to raising the rockfill to crest elevation 4,056 MASL. The dam monitoring consists of instrument measurements and field inspections.
- A Mine Closure Plan has been developed for all the Mine components within the context of Peruvian legislation and is periodically updated. The most recent modification to the Mine Closure Plan and update to the closure cost estimate are from January 2020.
- SLR's social review indicates that, at present, Nexa's operations at El Porvenir are a positive contribution to sustainability and community well-being. Nexa has established and continues to implement its various corporate policies, procedures, and practices in a manner consistent with relevant International Finance Corporation (IFC) Performance Standards. Nexa has, and continues to make, a positive contribution to the communities most affected by the site operations and has done a thorough job in documenting potential effects on stakeholders and protecting the rights, health, and safety of its employees.
- In the SLR QP's opinion the grievance mechanism in place and the Community Relations Plan, in combination with Nexa's Social Management Policy and Nexa's Management Procedures on negotiation for land access, monitoring of social commitments, management of social crisis, promotion of local hiring, and communication with stakeholders, are adequate to address potential issues related to local communities.
- Nexa established commitments with the communities San Juan de Milpo and San Francisco de Asis de Yarusyacan to employ direct and indirect local workforce, dependent on employment opportunities required by the mine operations for qualified and non-qualified workforce.

1.1.1.5 Costs and Economic Analysis

- The LOM operating cost forecast reflects the existing operating status of the Mine. The SLR QP has reviewed recent operating costs and is of the opinion that the forecast is appropriate for the El Porvenir operation. Nexa also continue to assess operating efficiencies and approaches in efforts to improve operating costs in the different cost centres.

- The economics of the El Porvenir operation are positive over the LOM, confirming that the Mineral Reserves are economically viable. The economic analysis shows an after-tax net present value (NPV), at an 9% base discount rate, of $130 million, on a 100% Mine basis (Nexa owns 80.16%).

1.1.2 Recommendations

SLR has the following recommendations by area.

1.1.2.1 Geology and Mineral Resources

1. Improve the reconciliation processes by implementing a formal procedure and forming a multi-disciplinary team to organize and analyze reconciliation results so that production data can be used to calibrate future resource and reserve models.
2. Divide mineralization domains where groups of wireframes have been merged to avoid sharing of samples.
3. Review the inclusion of additional grade domains considering spatial and statistical correlations, to prevent smearing of high grades into low grade areas and vice versa.
4. Update the 2018 lithological model and build a litho-structural model with the main lithologies and faults that are controlling the mineralization to help define the geometry and boundaries of the mineralization. An updated lithological model would also be beneficial to evaluate and define density values by rock and by domain.
5. Until there is a well-established reconciliation process, monitor the silver and lead grades in the model with grade control and head grade to calibrate capping values and confirm if the higher silver and lead capping values are appropriate.
6. Investigate if capping levels should be applied based on high grade and low grade domains for zinc, lead, copper, and silver.
7. Increase the number of density samples in areas that currently have insufficient density tests available.
8. Use the production data to monitor the chosen drill spacing for the minor continuity zones to determine if sufficient confidence is provided to support detailed mine planning, as these domains show less grade and geological continuity.
9. Review and adjust resource and reserve shapes to follow the mineralization trend. Currently, there are a small number of shapes that do not follow the mineralization trend.
10. Re-evaluate some of the zones that were not included in the Mineral Resources and Mineral Reserves, on an ongoing basis, to potentially include part of these tonnes with continuous blocks that have the potential to be recoverable, to generate resource shapes and possibly reserve stopes.
11. Document all the supporting data used to define non-recoverable solids and document any changes.
12. Improve the survey accuracy of the mineralized mined-out stopes and development to guide the mineralization solid geometries and trends, and clean up the mined-out solids, particularly, overlapping areas.
13. Complete the 2021 exploration program, consisting of a 18,000 m drill program to define new Inferred Resources. The 2021 exploration program budget is approximately US$3.1 million.

1.1.2.2 Mining and Mineral Reserves

1. Consider upgrading the Mine's underground communication system by replacing the present leaky-feeder system with a high speed digital network based on Wi-Fi or LTE technology. The upgrade would permit implementing the following:
   - Centralized control and monitoring of underground operations from a control room on surface, including real-time tracking of personnel and equipment, telemetry, ventilation on demand (VOD), seismic monitoring, and closed-circuit television, among other applications.
   - Automated and tele-remote technology to operate equipment from control stations on surface for mucking development headings during shift changes, crushing, and operating rockbreakers, among other applications.
2. As the Mine has extensive existing workings, a private 4G-LTE network could be an attractive option. A private 4G-LTE network can provide substantial level coverage with a lower installation requirement than alternative systems as it sends a reliable signal over long distances without coaxial cables, amplifiers, or access points. Furthermore, it is not limited to line-of-site transmission.

1.1.2.3 Mineral Processing

1. Evaluate the potential benefits that may be derived from a geometallurgical model to determine whether additional test work and further development of a geometallurgical model will provide more valuable information than what is already available from test work results.

1.1.2.4 Environmental, Permitting and Social Considerations

1. Due to uncertainty regarding the potential for acid generation of the waste rock, geochemical evaluation (including static and kinetic geochemical testing on waste rock samples) should be carried out prior to closure to inform closure planning and water quality predictions for post-closure. Water quality monitoring should continue during operations to verify compliance with the national environmental standards and the appropriateness of the waste rock disposal and water management procedures that are in place.
2. Expand the groundwater quality monitoring program to include additional stations for collection of groundwater quality samples (and subsequent analysis). At a minimum, consideration should be given to the installation of one station upstream of the El Porvenir site.
3. Implement a water balance for ongoing operations to be updated by Mine personnel using meteorological and water monitored data on a regular basis (at least monthly). The water balance is an important tool to track trends and conduct short term predictions through simulation of variable operating and/or climatic scenarios to support decision making associated with tailings pond operation (e.g., maintaining adequate freeboard at all times).
4. Develop an integrated water balance that reflects the interaction between the El Porvenir and Atacocha operations from a water balance perspective to identify and predict possible scenarios of interruption of mine operations due to water management issues and/or dam safety concerns (e.g., not maintaining adequate dam freeboard).
5. Investigate opportunities for optimization of construction, tailings deposition, and water management between the Atacocha and El Porvenir operations in order to prevent situations

where potential problems with one of the tailings dams could impact continuity of the sister operation.

6. The following recommendations are proposed for the TSF:
   - Classification of the TSF in terms of the Global Tailings Standard or the Canadian Dam Association. The classification may require more conservative design criteria in terms of flood management and seismic loading.
   - A dam breach analysis to inform the TSF classification and emergency preparedness plan.
   - A trigger alert response plan (TARP) for the piezometers for inclusion in the monitoring plan.
   - Capacity assessments of the TSF completed on a bi-annual basis with topographic and bathymetric surveys.
   - Complete long term geochemical kinetic testing of the tailings.
   - Implement a groundwater monitoring program at the TSF to determine levels of metals and sulphates.
   - Monitor the water quality from the TSF subsurface drains.

1.1.2.5 Costs and Economic Analysis

1. Continuously monitor costs and lock in costs as soon as possible to eliminate economic uncertainty.
2. Continue efforts towards improving efficiencies and approaches to mining and development operations as opportunities arise in these areas.

1.2 Economic Analysis

The economic analysis contained in this Technical Report Summary is based on El Porvenir's Mineral Reserves reported on a 100% ownership basis (Nexa owns 80.16%), economic assumptions provided by Nexa for El Porvenir, and the capital and operating costs as presented below.

1.2.1 Economic Criteria

1.2.1.1 Physicals

- Mine life: 8 years (between 2021 and 2028):
- Underground ore tonnes mined: 13.85 Mt
  - Cu grade: 0.23%Cu
  - Zn grade: 3.75% Zn
  - Pb grade: 0.88% Pb
  - Ag grade: 62.8 g/t Ag
- Processed:
  - Total Ore Feed: 13.85 Mt
    - Cu grade: 0.23% Cu

- Zn grade: 3.75% Zn
- Pb grade: 0.88% Pb
- Ag grade: 62.8 g/t Ag

- Contained Metal:
  - Cu: 31,500 t Cu
  - Zn: 518,900 t Zn
  - Pb: 122,400 t Pb
  - Ag: 27.966 million ounces (Moz) Ag
- Metallurgical Recoveries at LOM average grades (recoveries vary as a function of head grade):
  - Cu recovery 14.3%
  - Zn recovery 89.6%
  - Pb recovery 79.2%
  - Ag in Cu recovery 3.8%
  - Ag in Zn recovery 14.6%
  - Ag in Pb recovery 59.1%
- Recovered Metals:
  - Cu: 4,500 t Cu
  - Zn: 464,700 t Zn
  - Pb: 96,800 t Pb
  - Ag: 21.676 Moz Ag
- Payable Metals:
  - Cu: 4,300 t Cu
  - Zn: 390,700 t Zn
  - Pb: 91,200 t Pb
  - Ag: 16.664 Moz Ag

1.2.1.2 Revenue

- Revenue is estimated based on the following LOM weighted average metal prices:
  - Cu price: US$6,388/t Cu
  - Zn price: US$2,511/t Zn
  - Pb price: US$1,977/t Pb
  - Ag price: US$17.20/oz Ag

- Net Revenue includes the benefit of additional US$128.7/t Zn selling price and zinc smelting at cost (rather than at commercial third-party terms), due to integration with Nexa's Cajamarquilla refinery.
- Logistics, Treatment (TC), and Refining (RC) charges:
  - LOM average Transportation/Logistics charges:
    - Cu concentrate: US$127.05/t concentrate for export
    - Zn concentrate: US$38.03/t concentrate to Cajamarquilla refinery
    - Pb concentrate: US$123.84/t concentrate for export
  - Treatment Charges:
    - TC+RC Cu concentrate: US$111.68/t concentrate
    - TC Zn concentrate for export: US$238.72/t concentrate
    - TC Pb concentrate: US$201.68/t concentrate
    - Refined Zn conversion costs at Cajamarquilla: US$509.73/t
  - Refining Charges:
    - Ag in Cu concentrate: US$0.50/oz
    - Ag in Pb concentrate: US$1.00/oz
- Net Smelter Return (NSR) Revenue after logistics, treatment, and refining charges is US$1,306 million.

1.2.1.3 Capital Costs

- LOM sustaining capital costs of US$221.1 million.
- Closure costs of US$25.2 million were included at the end of the Mineral Reserves based LOM in year 2029.

1.2.1.4 Operating Costs

- LOM unit operating cost average of:
  - Mine Development: US$6.56/t mined
  - Underground Mining: US$32.81/t mined
  - Processing: US$12.72/t milled
  - General and administrative (G&A): US$7.30/t milled
- Total unit operating costs of US$59.39/t milled.
- LOM operating costs of US$822.5 million.

1.2.1.5 Taxation and Royalties

- Corporate tax rate in Peru is 29.50%.
- Special Mining Tax (IEM/GEM) LOM average rate: 4.3%.

- Mining royalties LOM average rate: 4.3%.
- Employees participation: 8%.
- SLR has relied on a Nexa taxation model for calculation of income taxes applicable to the cash flow.

1.2.2 Cash Flow Analysis

SLR developed a LOM after-tax cash flow model for El Porvenir to confirm the economics of the LOM plan. The model is based on Nexa's TR EP 2020 v6 Final model. The model does not take into account the following components:

- Financing costs
- Insurance
- Overhead cost for a corporate office

The economic analysis confirmed that the El Porvenir Mineral Reserves are economically viable. The pre-tax NPV at a 9% discount rate is US$155 million and the after-tax NPV at a 9% discount rate is US$130 million, on a 100% Mine basis (Nexa owns 80.16%).

A cash flow summary is presented in Table 1-2. All costs are in Q4 2020 US dollars with no allowance for inflation.

Table 1-2: After-Tax Cash Flow Summary
Nexa Resources S.A. – El Porvenir Mine

	Units	Total LOM
Production		
LOM	years	8
UG Production	000 tonnes	13,850
Ag Grade	g/t	2.02
Cu Grade	%	0.23%
Pb Grade	%	0.88%
Zn Grade	%	3.75%
Concentrate Production		
Cu Concentrate	dmt	22,662
Pb Concentrate	dmt	185,932
Zn Concentrate	dmt	925,961
Recovered		
Ag	oz	21,676,261
Cu	tonnes	4,496
Pb	tonnes	96,796
Zn	tonnes	464,740
Metal Prices		
LOM average - Ag	US$/oz	17.20

	Units	Total LOM
LOM average - Cu	US$/tonne	6,388
LOM average - Pb	US$/tonne	1,977
LOM average - Zn	US$/tonne	2,511
Cash Flow		
Gross Revenue	US$ million	1,652,150
Transport / TC-RC Charges	US$ million	(345,843)
Royalties	US$ million	(19,648)
Net Revenue	US$ million	1,286,659
Operating Costs		
Mining Costs	US$ million	(545,237)
Processing Costs	US$ million	(176,174)
G&A	US$ million	(101,109)
Other Costs	US$ million	(10,624)
Operating Cash Flow	US$ million	453,516
Direct Capital Costs	US$ million	-
Sustaining Capital Costs	US$ million	(221,075)
Reclamation & Closure	US$ million	(25,196)
Change Working Capital	US$ million	-
Pre-Tax Net Cash Flow	US$ million	207,245
Taxes - Income Tax	US$ million	(28,339)
Taxes - IEM/GEM	US$ million	(2,541)
After-Tax Cashflow	US$ million	176,364
Project Economics		
Pre-Tax		
Pre-tax NPV at 7%	US$ million	164,845
Pre-tax NPV at 8%	US$ million	159,759
Pre-tax NPV at 9%	US$ million	154,883
After-Tax		
After-Tax NPV at 7%	US$ million	139,026
After-Tax NPV at 8%	US$ million	134,246
After-tax NPV at 9%	US$ million	130,143

1.2.3 Sensitivity Analysis

SLR conducted cash flow sensitivity analyses on after-tax NPV at a 9% discount rate, to identify project risks, using metal prices, head grade, metallurgical recovery, capital costs, and operating costs.

The Mine after-tax NPV is most sensitive to metal prices and head grade, followed by metallurgical recovery, operating costs, and capital costs.

1.3 Technical Summary

1.3.1 Property Description and Location

The El Porvenir mining operation is located in Peru's Central Andes region at an elevation of approximately 4,200 MASL. The Mine is situated in the districts of San Francisco de Asís de Yarusyacán and Yanacancha, in the province and department of Pasco. El Porvenir is located 13 km from the city of Cerro de Pasco, which is located approximately 315 km by road from the national capital, Lima, when travelling by the Carretera Central and the La Oroya-Huánuco highway.

1.3.2 Land Tenure

El Porvenir's mineral rights consist of 25 mining concessions covering an area of 4,846.77 ha and one beneficiation concession. None of these concessions are in urban expansion areas, protected natural areas, or archaeological sites. These concessions are subject to annual fees and penalties. Nexa reports that all fees and penalties have been paid in full up to 2020. Most of the concessions are subject to royalties according to a lease agreement signed on January 2, 2006.

1.3.3 History

El Porvenir has a long history in the Peruvian mining sector, extending over 70 years. The Mine began operating as a small-scale artisanal mine in 1949, and Compañía Minera Milpo S.A. (Milpo) was incorporated the same year to operate the Mine. A gravity separation plant was built at the site in 1953, and a flotation plant was completed in 1979. The Mine's output increased steadily over the decades, attaining its current production rate of approximately 5,600 tpd in 2014. Milpo acquired the adjacent Atacocha Mina in 2008. In 2010, Nexa, then Grupo Votorantim, gained control of Milpo and its assets, including El Porvenir. In 2014, Nexa company began integrating the El Porvenir and Atacocha operations, including administration, the TSFs, and the electrical power supply. El Porvenir's operations were interrupted from March 10, 2020 to May 15, 2020, due to the COVID-19 pandemic.

1.3.4 Geology and Mineralization

El Porvenir is situated in the Pasco region of the Western Cordillera of the Andes, within the Eocene-Miocene Polymetallic and Miocene Au-Ag Epithermal Belts.

Within the property area, the stratigraphic units of primary interest are the Pucará and the Goyllarisquizga groups. The Goyllarisquizga Group outcrops in the area of the deposit comprising quartz rich sandstone, corresponding to the Goyllarisquizga Formation. Sandstones may vary from quartz arenite to arkose. The matrix is argillaceous to siliceous. Above the 4000 Level, the lithology and stratification are well defined and easy to recognize. Below the 4000 Level, strong alteration has obliterated the original rock intensity forming siliceous breccias and massive silica where it is still possible to recognize quartz grains and in few places the stratification.

Intrusive rocks within the property are variably porphyritic dacite to quartz diorite with hornblende and biotite phenocrysts. The Milpo-Atacocha fault is a major structural feature in the region, which can be traced for nearly 15 km from Yarusyacán in the north to Carmen Chico in the south.

Mineralization is characterized as a skarn, intermediate sulphidation epithermal vein/breccia-style, or stratabound mineralization in the Goyllarisquizga Formation:

Skarn-related mineralization is commonly associated with the garnet and silica-skarn-chlorite assemblages, comprising pyrite, chalcopyrite, sphalerite, galena and minor pyrrhotite, pyrite, bornite, covellite, orpiment, and realgar within the Pucará Group sediments around the Milpo stock.

The silica breccia consists of sub-rounded to sub-angular white to milky grey opaline silica clasts, millimetres to centimetres in size, and to a lesser extent, sandstone, and limestone clasts. The silica breccia clasts are cemented by white granular silica, with occasional cross-cutting veins of white silica. Breccias include massive (siliceous) breccias, granular (siliceous) breccias, and Ag-Pb-Zn breccias sub-divided into calcareous, polymictic-monomictic, and karst (collapse). Breccia clasts include limestone, marble, silica (massive), and skarn; the composition of the clasts indicates that brecciation occurred later than skarn development.

The stratabound Pb-Ag-Zn mineralization occurs in the sandstone strata (mantos) at the base of the Goyllarizquisga Formation (near the contact with the Pucará Group). Several disseminated sulphide mantos have recently been identified at Sara and Porvenir 2W within the quartz sandstone, generally in contact with layers of silt and microconglomerates. The minerals include galena with silver content, sphalerite, and pyrite. Gold is also present.

1.3.5 Exploration Status

As of February 15, 2020, a total of 4,664 drill holes totalling 762,848.57 m, have been completed at El Porvenir. Nexa's exploration program is based on an integrated strategy of geological and structural interpretation, combined with remote sensing for alteration and magnetic patterns and anomalies. The 2020 exploration program, including an additional 36 drill holes totalling 14,246.80 m, confirmed the continuity of the mineralization at Sara, and the magnetometry program defined five geophysical anomalies (Tingo, Carmen Chico NW, Carmen Chico W, La Quinua, and Chicri), which will be studied through mapping programs, surface sampling, and diamond drilling in the next three years. Based on surface mapping, remote sensing and geophysics, six brownfield exploration projects were defined (Machcan, Curiajasha, Longreras, Manuel 05 and Pique Estrella, La Churca, and La Quinua Chicrin Corridor). The exploration work planned for 2021 involves a budget of $3.1 million, and includes 18,000 m of diamond drilling, focused on defining new Mineral Resources in the Sara corridor, comprising the eastern part of the Milpo syncline in the Goyllarisquizga Formation, and the Integration Zone at the 3,300 Level of the Mine.

1.3.6 Mineral Resources

The Mineral Resources in El Porvenir are contained in four zones: Zona Alta (Upper Zone), Zona Intermedia (Intermediate Zone), Zona Baja (Lower Zone), and Profundizacion Zona (Mine Deepening Zone).

The Mineral Resource estimate for El Porvenir, as of December 31, 2020, is summarized in Table 1-3. Mineral Resources have been classified in accordance with the definitions for Mineral Resources in S-K 1300, which are consistent with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions.

Table 1-3: Summary of Mineral Resources – December 31, 2020
Nexa Resources S.A. – El Porvenir Mine

Category	Tonnage (Mt)	Grade				Contained Metal			
		(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)
Measured	0.18	2.59	0.99	0.23	63.46	4.8	1.8	0.4	378
Indicated	1.07	2.93	0.89	0.20	63.33	31.3	9.5	2.1	2,176
M+I	1.25	2.87	0.91	0.20	63.35	36.1	11.4	2.6	2,554
Inferred	6.79	3.60	0.95	0.23	78.37	244.5	64.8	15.9	17,110

Notes:

1. The definitions for Mineral Resources in S-K 1300 were followed for Mineral Resources, which are consistent with CIM (2014) definitions.
2. Mineral Resources are reported on an 80.16% Nexa attributable ownership basis.
3. Mineral Resources are estimated at NSR cut-off values of US$60.06/t for the Upper Zone, US$61.09/t for the Intermediate Zone, US$59.75/t for the Lower Zone, and US$63.37/t for the Mine Deepening Zone for C&F resource shapes.
4. Mineral Resources are estimated using average long term metal prices of Zn: US$2,869.14/t (US$1.30/lb); Pb: US$2,249.40/t (US$1.02/lb); Cu: US$7,426.59/t (US$3.37/lb); and Ag: US$19.38/oz.
5. Metallurgical recoveries are accounted for in the NSR calculations based on historical processing data and are variable as a function of head grade. Recoveries at the LOM average head grades are 89.6% for Zn, 79.2% for Pb, 14.3% for Cu, and 77.5% for Ag.
6. A minimum mining width of 4.0 m was used for C&F resource shapes.
7. Bulk density varies depending on mineralization domain.
8. Mineral Resources are exclusive of Mineral Reserves.
9. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
10. Numbers may not add due to rounding.

The SLR QP is of the opinion that, with consideration of the recommendations summarized in this section, any issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

The Mineral Resource estimate was completed using Datamine Studio RM and Leapfrog Geo software. Wireframes for geology and mineralization were constructed in Leapfrog Geo based on geology sections, assay results, lithological information, underground mapping, and structural data. Assays were capped to various levels based on exploratory data analysis and then composited to two metre lengths. Wireframes were filled with blocks and sub-celling at wireframe boundaries. Blocks were interpolated with grade using ordinary kriging (OK) and inverse distance cubed (ID^3) interpolation algorithms. Block estimates were validated using industry standard validation techniques. Classification of blocks used distance-based and mineralization continuity criteria.

Mineral Resources at El Porvenir are reported using all the material within resource shapes generated in Deswik Stope Optimizer (DSO) software, satisfying minimum mining size, NSR cut-off values of US$60.06/t for the Upper Zone, US$61.09/t for the Intermediate Zone, US$59.75/t for the Lower Zone, and US$63.37/t for the Mine Deepening Zone for C&F resource shapes, and continuity criteria.

1.3.7 Mineral Reserves

Table 1-4 presents an updated Mineral Reserve estimate effective December 31, 2020 prepared by Nexa and reviewed by SLR. This Mineral Reserve estimate complies with CIM (2014) definitions, which are consistent with the definitions for Mineral Reserves in S-K 1300 Subpart 229.1300. Measured and Indicated Mineral Resources were converted into Proven and Probable Mineral Reserves, respectively.

Dilution and NSR cut-off values were two critical factors used in the Mineral Reserve estimate. Dilution includes waste originating from internal and planned sources. The NSR cut-off values vary with the mining zones, the mining method, and whether a block is considered marginal.

The Mineral Reserves are grouped into four mining zones, and the mining methods are mechanized C&F and SLS. The NSR calculations consider the metal grades of the mining blocks, metal prices, metallurgical recoveries, commercial terms and conditions, and mining, processing, and G&A costs. The payable metals in concentrates include concentrate treatment, transportation, refining charges, deductions, and penalties. The prices are based on 10 year averages of London Metal Exchange (LME) projections.

Table 1-4: Mineral Reserves –December 31, 2020
Nexa Resources S.A. – El Porvenir Mine

Category	Tonnage (000 t)	Grade				Contained Metal			
		(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)
Proven	3,017	3.76	0.98	0.25	62.9	113.3	29.6	7.6	6,094
Probable	8,085	3.74	0.85	0.22	62.8	302.7	68.5	18.0	16,324
Total	11,102	3.75	0.88	0.23	62.8	416.0	98.1	25.6	22,418

Notes:

1. The definitions for Mineral Reserves in S-K 1300 were followed for Mineral Reserves which are consistent with CIM (2014) definitions.
2. Mineral Reserves are reported on an 80.16% Nexa attributable ownership basis.
3. Mineral Reserves are estimated at cut-off grades depending on the zone and mining method.
4. Mineral Reserves are estimated using average long term prices of Zn: US$2,494.90/t (US$1.13/lb); Pb: US$1,956.00/t (US$0.89/lb); Cu: US$6,457.90/t (US$2.93/lb); Ag: US$16.85/oz.
5. Metallurgical recoveries are accounted for in the NSR calculations based on historical processing data and are variable as a function of head grade. Recoveries at the LOM average head grades are 89.6% for Zn, 79.2% for Pb, 14.3% for Cu, and 77.5% for Ag.
6. A minimum mining width of 5 m was used.
7. Density is 3.12 t/m^3.
8. Numbers may not add due to rounding.

The SLR QP is not aware of any risk factors associated with or changes to any aspect of the modifying factors such as mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

1.3.8 Mining Method

El Porvenir mined 2.11 Mt of zinc-lead-copper ore in 2019 and 1.52 Mt in 2020. Dilution accounted for 34% of the ore tonnage produced. Mine production is presently underway in the Upper Zone, the Intermediate Zone, the Lower North Zone, and the Lower West (El Porvenir 9) Zone.

El Porvenir uses two mining methods: mechanized overhand C&F and SLS. C&F is the predominant method, accounting for over 80% of the mine's production. El Porvenir uses a version of SLS called Avoca, also referred to as longitudinal longhole retreat mining.

C&F and SLS have similar development requirements as they both involve dividing a mining zone into horizons between sublevels and excavating the ore in an ascending fashion. Sublevels are typically spaced at 20 m vertical intervals and accessed via spiral ramps. The development on each sublevel includes an access drift, a footwall drive, and crosscuts or attack ramps, which provide access to the orebody. For SLS, the footwall drive can be as close as 15 m from the footwall contact, whereas for C&F, the footwall drives have to be offset from it by 60 m to provide sufficient distance for fanning the attack ramps.

The geotechnical conditions at El Porvenir result from the rock mass's characteristics and the Mine's depth. The host rock and the mineralized zones are generally classified as fair to good, with rock mass ratings (RMR) ranging from 40 to 60. El Porvenir is one of South America's deepest mines, extending more than 1,800 m below the main access level. Its depth contributes to the occurrence of seismic events, including rockbursts.

Table 1-5 presents the LOM production schedule broken down by metal grades on an annual basis until 2028. Mine output remains stable at present levels until 2024 but then declines progressively in subsequent years.

Table 1-5: Mine Production Schedule
Nexa Resources S.A. – El Porvenir Mine

	Units	Total	2021	2022	2023	2024	2025	2026	2027	2028
Ore Total	000 t	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802
Stopes	000 t	12,743	2,001	2,008	2,029	1,879	1,524	1,270	1,309	724
Develop	000 t	1,107	160	214	191	157	134	110	62	79
Zn	%	3.75	3.28	3.69	3.57	3.82	4.11	4.25	4.01	3.39
Pb	%	0.88	1.12	0.92	1.02	0.96	0.71	0.67	0.66	0.70
Cu	%	0.23	0.17	0.21	0.24	0.25	0.24	0.27	0.28	0.21
Ag	g/t	62.8	72.5	61.6	66.6	61.9	52.3	56.6	59.1	70.0
NSR	US$/t	98.54	95.91	97.27	98.20	100.48	99.56	103.22	99.99	92.61

1.3.9 Mineral Processing

El Porvenir processing plant is located adjacent to the Mine at an altitude of 4,100 MASL to 4,200 MASL. The concentrator has an ore processing capacity of approximately 2.2 Mtpa. El Porvenir copper and lead concentrates are sold to traders and delivered by road and rail to Callao (approximately 270 km by road) for shipping overseas, while zinc concentrate is transported by road and rail to Nexa's Cajamarquilla zinc refinery east of Lima. El Porvenir is approximately 315 km from Lima by road. The current LOM plan continues to 2028. Processing consists of conventional crushing, grinding, and flotation to produce separate copper, lead, and zinc concentrates.

Tailings are cycloned and the coarse fraction is used for mine backfill, which constitutes approximately 50% of tailings produced. Water from tailings dewatering is returned to the process. Overflow from the cyclones containing the fine tailings is deposited in the conventional TSF adjacent to the Mine and processing plant. Tailings can be discharged at various points in the TSF by means of valved discharge points on the tailings line. Clarified water discharged from the TSF joins natural water flows.

Make-up water is supplied from various streams around the TSF, as well as the Carmen Chico River, approximately 3.2 km south of the processing facility.

El Porvenir lead and zinc concentrates are generally clean and do not attract penalty charges for deleterious elements. The copper concentrate attracts penalties due to elevated lead and zinc content (approximately 15% to 20% combined). The penalty charges are approximately US$17.00/dmt.

1.3.10 Infrastructure

The El Porvenir infrastructure consists of the following facilities:

- Approximately 6,000 tpd underground mine
- A 2.2 Mtpa processing plant with associated laboratory and maintenance facilities
- Power plant
- Access roads
- Offices and warehouses
- Accommodations
- Waste rock facilities
- Temporary ore stockpiles
- Hydraulic backfill plant
- TSF

The power supply for the Mine comes from two sources, the national power grid and the La Candelaria Hydroelectric Plant.

Raw water is sourced from Tingovado Creek, as well as from other creeks around the TSF. Fresh water supply is obtained from the Carmen Chico River, approximately 3.2 km south of the processing facility.

The EL Porvenir TSF receives tailings generated by both El Porvenir and the Atacocha concentrator plants. A portion of tailings is used for hydraulic backfill at El Porvenir. The TSF was originally constructed in the 1970s, and the current elevation of the dam crest is 4,060 MASL and the dam height is 140 m.

Waste rock from the underground operations is either used as backfill underground or stockpiled on surface. If waste rock is brought to surface in the future, it will be deposited in a designated area near the secondary TSF embankment southwest of the concentrator plant area.

1.3.11 Market Studies

The principal commodities produced at El Porvenir, zinc, lead, copper, and silver, are freely traded, at prices and terms that are widely known, so that prospects for sale of any Nexa production are virtually assured. Zinc and copper represent 72% of El Porvenir's gross revenue, while lead and silver contribute 28% of the revenue. El Porvenir is an operating mine with concentrate sales contracts in place for copper and lead concentrates, while zinc concentrate is consumed by Nexa's Cajamarquilla smelter according to their internal planning.

Market information is based on the industry scenario analysis prepared by Nexa's Market Intelligence team in July 2020 using information sourced from different banks and independent financial institutions, economy and politics research groups, and metals consultants.

1.3.12 Environmental and Social Considerations

El Porvenir has a net positive water balance that results in surplus water collected on-site being discharged from the TSF to the receiving environment through a decant structure. Clean (non-contact) surface runoff water is managed through upstream diversion ditches that prevent its entrance to the TSF, and convey it downstream to the Lloclla River, a tributary of the Huallaga River. Contact water collected in the tailings pond is recycled via a decant pumping system to the concentrator plant for use in the process. A lined seepage collection monitoring pond is located at the downstream toe of the main embankment of the TSF.

The El Porvenir TSF (originally constructed in the 1970s) receives tailings generated by both Atacocha and El Porvenir concentrator plants. A portion of tailings is used for hydraulic backfill at El Porvenir. The tailings disposal is performed in subaerial conditions which allows a beach with a gentle slope towards the water or supernatant pond (settling pond). The tailings discharge locations allow for the settling pond to be centrally located within the TSF and a tailings beach to form in front of the main embankment.

Various Environmental Impact Assessments (EIA) and supporting technical reports have been submitted and approved between 2001 and 2020 to identify potential environmental effects resulting from project activities for the construction, operation, and closure stages. The most recent modification of the EIA was approved by the Peruvian authorities in 2012 to grant authorization for a maximum production rate of 7,500 tpd. The most recent update of the environment management plan was presented in the sixth supporting technical report issued in 2020. The monitoring program implemented at the Mine includes monitoring of meteorology, air quality, non-ionizing radiation, noise, surface water quality, springs water quality, effluent discharges, fauna and flora, and physical stability of the tailings dam. The results of the monitoring program for air quality, ambient noise, non-ionizing radiations, and water quality are reported to the Peruvian authorities quarterly.

El Porvenir holds a number of permits in support of the current operations. The permits are Directorial Resolutions issued by the Peruvian authorities upon approval of mining environmental management instruments filed by the mining companies. Nexa maintains an up to date record of the legal permits obtained to date.

The communities located within the area of influence of the Mine are:

- Comunidad de San Francisco de Asís de Yarusyacán (20 Anexos)
- Comunidad de Titaclayán
- Comunidad de Cajamarquilla
- Comunidad de Malauchaca
- Comunidad Santa Rosa de Pitic
- Comunidad San Miguel
- Comunidad La Candelaria
- Centro Poblado La Quinua
- Comunidad 30 de Agosto
- Comunidad San Juan de Yanacachi
- Comunidad San Juan de Jarapampa
- Cooperativa Pucayacu

Nexa adheres to international standards to provide best practices for public reporting on economic, environmental, and social impacts in order to help Nexa and its shareholders and stakeholders understand their corporate contribution to sustainable development. Corporately, Nexa has made several commitments to improve community health and safety as well as the overall well-being of community members.

A conceptual Mine Closure Plan was approved in 2007 for the Mine components within the context of the Peruvian legislation and has subsequently been amended or updated four times. The Mine Closure Plan addresses temporary, progressive, and final closure actions, and post-closure inspection and monitoring. A closure cost estimate was developed and included in the Mine Closure Plan. The total financial assurance for progressive closure, final closure, and post-closure is calculated by Nexa according to the Peruvian regulations (Supreme Decree D.S. N° 262-2012-MEM/DM).

1.3.13 Capital and Operating Costs

The capital costs for the Mine are shown in Table 1-6. El Porvenir is an operating mine, hence all capital costs are considered sustaining cost.

Table 1-6: Life of Mine Capital Budget
Nexa Resources S.A. – El Porvenir Mine

Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Tailing Dam & Waste Deposit									
Raising	53,858	10,808	18,149	24,900	-	-	-	-	-
New Dam	13,246	2,700	1,000	-	5,000	4,546	-	-	-
Tailing Treatment	3,782	3,782	-	-	-	-	-	-	-
Heavy Mobile Equipment									
Replacement	23,284	1,838	50	3,567	4,781	5,593	3,641	3,815	-
Addition	3,335	850	1,600	-	-	-	-	-	-
Asset Integrity									
Asset Integrity – Plant	11,365	6,605	2,805	475	575	705	100	100	-
Asset Integrity – Mine	150	-	-	-	-	150	-	-	-
Other Sustaining									
Others	1,340	110	550	250	290	100	0	40	-
Civil Construction	200	200	-	-	-	-	-	-	-
Mining Facilities									
Communication system	2,450	550	700	600	300	300	-	-	-
Pumping	2,500	700	300	300	300	300	300	300	-
Electrical Substation	1,650	1,000	200	450	-	-	-	-	-
Ventilation / Cooling	950	100	150	100	150	150	150	150	-

Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Operation Unit Projects									
Improvements	4,631	1,821	1,110	1,700	-	-	-	-	-
Audit & Inspection	2,380	390	890	1,100	-	-	-	-	-
Other Expenditures									
Expansion Projects	-	-	-	-	-	-	-	-	-
Information Technology	1,020	480	150	130	130	130	-	-	-
Automation Project	2,190	874	1,166	150	-	-	-	-	-
Mine Development Capital Cost									
Underground Mine Development	92,745	17,170	16,073	16,941	18,954	13,124	6,521	1,934	2,030
Total	**221,075**	**49,977**	**44,894**	**50,663**	**30,479**	**25,982**	**10,712**	**6,338**	**2,030**

The Mine Closure Plan was prepared to meet the Peruvian national requirements with the closure and reclamation cost assessed at US$25.2 million.

Table 1-7 presents El Porvenir operating costs based on a LOM period of eight years.

Table 1-7: Operating Budget
Nexa Resources S.A. – El Porvenir Mine

All-In Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Mine Underground	454,350	63,077	64,320	64,742	61,913	55,796	51,610	51,569	41,323
High Zone C&F	127,409	22,074	19,242	20,828	15,955	8,275	13,293	13,374	14,369
High Zone SLS	4,947	301	1,818	2,354	473	-	-	-	-
Intermediate C&F	49,425	19,329	11,914	12,146	4,161	1,874	-	-	-
Intermediate SLS	90,866	8,801	11,734	11,978	21,170	17,064	3,651	3,673	12,795
Low Zone C&F	30,666	11,827	11,445	4,944	13	861	1,577	-	-
Low Zone SLS	8,855	636	366	797	3,358	3,698	-	-	-
Deepening C&F	98,132	-	5	5,621	15,239	19,778	21,641	23,630	12,218
Deepening SLS	44,050	109	7,795	6,074	1,546	4,246	11,448	10,892	1,941
Processing	176,174	23,274	23,452	23,446	22,910	21,808	20,998	20,972	19,314
G&A	101,109	15,774	16,219	16,206	14,861	12,103	10,076	10,011	5,858
Development Operating Cost	90,887	17,162	15,971	14,837	13,065	10,602	8,673	6,244	4,332
Total	**822,519**	**119,288**	**119,961**	**119,231**	**112,750**	**100,309**	**91,356**	**88,797**	**70,827**

2.0 INTRODUCTION

SLR Consulting Ltd (SLR) was retained by Nexa Resources S.A. (Nexa) to prepare an independent Technical Report Summary on the El Porvenir Mine (the Mine or El Porvenir), located in Pasco Province, central Peru. The purpose of this Technical Report Summary is to support the public disclosure of updated Mineral Reserve and Mineral Resource estimates. This Technical Report Summary conforms to United States Securities and Exchange Commission's (SEC) Modernized Property Disclosure Requirements for Mining Registrants as described in Subpart 229.1300 of Regulation S-K, Disclosure by Registrants Engaged in Mining Operations (S-K 1300) and Item 601 (b)(96) Technical Report Summary. SLR has prepared this amended Technical Report Summary to disclose Mineral Resources and Mineral Reserves attributable to Nexa only, provide additional information about metallurgical recoveries and lead and silver markets, and to disclose the accuracy of the cost estimates. SLR notes that the effective date of the technical information contained herein remains December 31, 2021.

Nexa is a publicly traded company on the Toronto Stock Exchange (TSX) and the New York Stock Exchange (NYSE). Nexa is a reporting issuer in all provinces and territories of Canada and is under the jurisdiction of the Ontario Securities Commission.

Nexa is a large-scale, low-cost, integrated zinc producer with over 60 years of experience developing and operating mining and smelting assets in Latin America. Nexa has a diversified portfolio of polymetallic mines (zinc, lead, copper, silver, and gold) and also greenfield projects at various stages of development in Brazil and Peru. In Brazil, Nexa owns and operates two underground mines, Vazante and Morro Agudo (Zn and Pb). It also operates two zinc smelters in Brazil (Três Marias and Juiz de Fora). In Peru, Nexa operates the El Porvenir (Zn, Pb, Cu, and Ag), Cerro Lindo (Zn, Cu, Pb, and Ag), and Atacocha (Zn, Pb, Au, and Ag) mines, as well as the Cajamarquilla zinc smelter near Lima. Nexa's development projects in Peru include Magistral, Shalipayco, Florida Canyon (JV with Solitario), Hilarión, and Pukaqaqa. In Brazil, Nexa is developing the Aripuanã Zinc Project (Zn, Pb, Cu, Au and Ag), which is currently under construction and is owned by Mineração Dardanelos Ltda. (Dardanelos), a wholly-owned subsidiary of Nexa.

El Porvenir began operations as a small-scale artisanal mine in 1949. The operation's capacity increased almost continuously over the decades, and in 2012, its production reached its current capacity of approximately 6,000 tonnes per day (tpd) in 2013, Nexa commenced the process of integrating the El Porvenir and Atacocha mining operations. To date, integration has been achieved for the administrative function, the electric power supply, and the tailings facility. El Porvenir comprises 25 mining concessions (totalling 4,846.77 ha) and a beneficiation concession, located in the districts of San Francisco de Asís de Yarusyacán and Yanacancha, province and department of Pasco in Peru.

Nexa holds a total of 80.16% that corresponds to the sum of Nexa's direct interest in Nexa Resources Peru S.A.A. (0.17%) (Nexa Peru) and indirect participation of Nexa in Nexa Peru and Pampa de Cobre S.A.C. (80.06%) through its controlled company Nexa Resources Cajamarquilla S.A. (99.91%), and the remaining 19.76% are floating shares.

2.1 Site Visits

An SLR geologist, mining engineer, and metallurgical engineer, all of whom are Qualified Persons (QP), visited the site from September 5 to 7, 2018.

2.2 Sources of Information

During the preparation of this Technical Report Summary and the site visit, discussions were held with the following personnel from Nexa:

- Thiago Nantes Teixeira, Manager of Internal Commission of Resources and Reserves
- Priscila Artioli, Internal Commission of Resources and Reserves
- Fernando Madeira Perisse, Technical Services Manager
- Paulo Henrique Araujo Calazans, Mining Engineer
- Eliott Hidalgo, Resource Chief – Nexa Peru
- Nydia Mendizabal, Database Administrator at El Porvenir
- Daniel Arias, Modeller Geologist
- Daniel Saenz, Modeller Geologist – Anglo Peruana Terra
- Carlos Uchuquicaña, Chief Geologist at El Porvenir
- José Antonio Lopes, Corporate Resource Manager
- Cristian Mendoza, Exploration Chief Geologist
- Mervin Tapia, Brownfield Exploration Manager
- Roberto Bados, Geology Manager at El Porvenir
- Philipe Innecco Rosa, Mine Planning Engineer
- Paulo Henrique Calazans, Mine Planning Consultant
- Jorge Carbajal Diéguez, Corporative Planning Engineer – Long Term
- Julio Cesar Luna Caballero, Technical Services Manager
- Milena Alves Moreira, Environmental Manager
- Jose Madrid, Environmental Chief – El Porvenir
- Walter Heredia, Social Management Manager
- Miluska Minaya, Community Relationship Coordinator
- Camila Silva, Metallurgical Plant Chief
- Juliana Siqueira, Metallurgical Plant Manager
- Julio Cesar Luna Caballero, Technical Services Manager

The documentation reviewed and other information sources of information are listed in Section 24 (References) at the end of this Technical Report Summary.

2.3 List of Abbreviations

Units of measurement used in this report conform to the metric system. All currency in this report is US dollars (US$) unless otherwise noted.

μ	micron	kVA	kilovolt-amperes
μg	microgram	kW	kilowatt
a	annum	kWh	kilowatt-hour
A	ampere	L	litre

bbl	barrels
Btu	British thermal units
°C	degree Celsius
C$	Canadian dollars
cal	calorie
cfm	cubic feet per minute
cm	centimetre
cm^2	square centimetre
d	day
dia	diameter
dmt	dry metric tonne
dwt	dead-weight ton
°F	degree Fahrenheit
ft	foot
ft^2	square foot
ft^3	cubic foot
ft/s	foot per second
g	gram
G	giga (billion)
Gal	Imperial gallon
g/L	gram per litre
Gpm	Imperial gallons per minute
g/t	gram per tonne
gr/ft^3	grain per cubic foot
gr/m^3	grain per cubic metre
ha	hectare
hp	horsepower
hr	hour
Hz	hertz
in.	inch
in^2	square inch
J	joule
k	kilo (thousand)
kcal	kilocalorie
kg	kilogram
km	kilometre
km^2	square kilometre
km/h	kilometre per hour
kPa	kilopascal
lb	pound
L/s	litres per second
m	metre
M	mega (million); molar
m^2	square metre
m^3	cubic metre
MASL	metres above sea level
m^3/h	cubic metres per hour
mi	mile
min	minute
µm	micrometre
mm	millimetre
mph	miles per hour
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
oz	Troy ounce (31.1035 g)
oz/st, opt	ounce per short ton
ppb	part per billion
ppm	part per million
psia	pound per square inch absolute
psig	pound per square inch gauge
RL	relative elevation
s	second
st	short ton
stpa	short ton per year
stpd	short ton per day
t	metric tonne
tpa	metric tonne per year
tpd	metric tonne per day
US$	United States dollar
USg	United States gallon
USgpm	US gallon per minute
V	volt
W	watt
wmt	wet metric tonne
wt%	weight percent
yd^3	cubic yard
yr	year

3.0 PROPERTY DESCRIPTION

3.1 Location

El Porvenir's coordinates are 10°36'36" S, 76°12'37" W (Latitude/Longitude decimals -10.6100, -76.2102). The Mine is located in Peru's Central Andes region at an elevation of approximately 4,200 MASL. The Mine is situated in the districts of San Francisco de Asís de Yarusyacán and Yanacancha, in the province and department of Pasco. El Porvenir is located 13 km from the city of Cerro de Pasco, which is located approximately 315 km by road from the national capital, Lima, when travelling by the Carretera Central and the La Oroya-Huánuco highway. Figure 3-1 shows El Porvenir's location in the province of Pasco.

3.2 Land Tenure

Nexa holds a total of 80.16% that corresponds to the sum of Nexa's direct interest in Nexa Peru (0.17%) and indirect participation of Nexa in Nexa Peru and Pampa de Cobre S.A.C. (80.06%) through its controlled company Nexa Resources Cajamarquilla S.A. (99.91%), and the remaining 19.76% are floating shares. As of December 31, 2020, the concessions are held in the name of Nexa Resources El Porvenir S.A.C. (Nexa El Porvenir), Nexa Resources Atacocha S.A.A. (Nexa Atacocha), Nexa Peru, and S.M.R.L. CMA No. 54 (50% Nexa El Porvenir and Nexa Atacocha).

El Porvenir's mineral rights consist of 25 mining concessions covering an area of 4,846.77 ha and one beneficiation concession. The relevant mineral rights information, including the code number and concession name, titleholder, status, date, public registry record, and available area for each of the mineral concessions, can be found in Table 3-1 and is shown in Figure 3-2 (Nexa, 2020a). None of these concessions are in urban expansion areas, protected natural areas, or archaeological sites.

Table 3-1: El Porvenir Mining Concessions
Nexa Resources S.A. – El Porvenir Mine

No.	Code	Concession	Titleholder	Status	Date	Public Registry Record	Area (ha)
1	010000515L	Acumulación El Porvenir	Nexa Resources El Porvenir S.A.C.	Acumulación D.M. Titulada	03/04/1877	P-11248335	4,600.52
2	010000116L	Acumulación El Porvenir 1	Nexa Resources El Porvenir S.A.C.	Acumulación D.M. Titulada	25/01/2016	P-11242512	7.99
3	04013393X01	Carlitos	Nexa Resources El Porvenir S.A.C.	D. M. Titulado D.L. 109	04/05/1987	P-20002989	20.00
4	04013362X0 1	Pucayacu	Nexa Resources El Porvenir S.A.C.	D. M. Titulado D.L. 109	17/06/1986	P-20002923	36.00
5	04005441X01	Angelica Segunda	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	06/11/1915	P-0 2005830	2.00
6	04010070X01	Atacocha No. 1	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	09/11/1954	P-20000404	1.60
7	04010249X01	Atacocha No. 2	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	09/12/1955	P-0 2014333	2.77
8	040 10074X0 1	C.M.A. No. 41	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	13/11/1954	P-0 2013928	65.91
9	04010073X01	C.M.A. No. 42	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	11/11/1954	P-0 2013917	3.00
10	04010071X01	C.M.A. No. 43	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	10/11/1954	P-0 2010565	4.99
11	04010072X01	C.M.A. No. 44	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	11/11/1954	P-0 2013919	7.99
12	04010063X02	C.M.A. No. 45	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	13/11/1954	P-0 2014009	23.97
13	04010149X01	C.M.A. No. 55	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	04/06/1955	P-0 2016190	1.00
14	04005426X0 1	Ithaca	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	07/10/1915	P-0 2010173	3 .99
15	040024 71X01	Kathleen	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	03/06/1905	P-0 20105 53	5.99
16	0400273 1X01	Kitty	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	24/02/1906	P-0 2010298	5.99
17	040053 56X01	La Tunda	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	28/10/1935	P-0 2010176	5.99
18	0400 5383X0 1	Manuel Numero Dos	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	19/06/1915	P-0 2005462	7.99
19	0400 5372X0 1	Melbourne	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	27/05/1915	P-0 2010281	11.98
20	04005505X01	Tralee	Nexa Resources Atacocha S.A.A.	D. M. Titulado D.L. 109	23/02/1916	P-0 2010297	2.00

No.	Code	Concession	Titleholder	Status	Date	Public Registry Record	Area (ha)
21	04012874X0 1	C.M.A. No. 95	Nexa Resources Atacocha S.A.A. / Nexa Resources Peru S.A.A.	D. M. Titulado D.L. 109	07/12/1978	P-20000331	3.96
22	04012875X01	C.M.A. No. 96	Nexa Resources Atacocha S.A.A. / Nexa Resources Peru S.A.A.	D. M. Titulado D.L. 109	07/12/1978	P-20000332	3.99
23	010079393	Macapata	Nexa Resources Peru S.A.A.	D. M. Titulado D.L. 708	27/05/1993	P- 200048 29	14.17
24	04010148X0 1	C.M.A. No. 54	S.M.R.L. CMA No. 54	D. M. Titulado D.L. 109	04/06/1955	P- 11105479	2.00
25	04012134 X01	Demasi A AM-No. 1	S.M.R.L. CMA No. 54	D. M. Titulado D.L. 109	13/03/1973	P-20001500	1.00

Figure 3-1

Nexa Resources S.A.

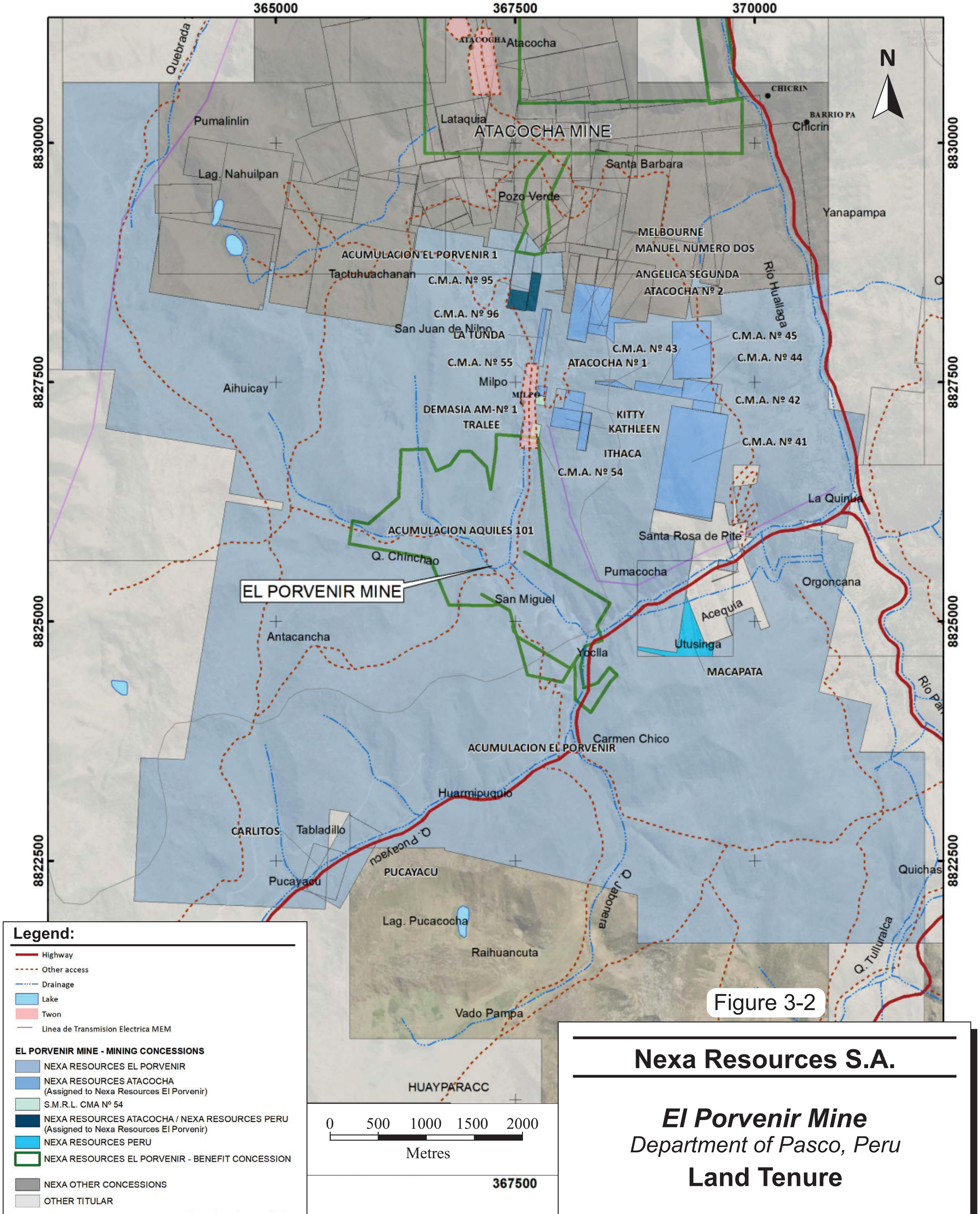
El Porvenir Mine

Department of Pasco, Peru

Mine Location

January 2021

Source: CIAmap, 2015.



Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Land Tenure

January 2021 ***Source: Nexa, 2020.***

According to the files of the titles granted by the Peruvian Institute of Geology, Mining and Metallurgy (INGEMMET), mineral rights "Acumulación El Porvenir", "C.M.A. No. 44", "C.M.A. No. 45", "Carlitos", and "Pucayacu" overlap roads, rivers, and a power transmission line. If any such infrastructure or water bodies are affected by exploration or mining activities, Nexa will need to obtain the relevant approvals prior to undertaking any activities.

3.2.1 Mineral Rights

According to Peruvian General Mining Law (the Law):

a. Mineral concessions grant their holder the right to explore, develop, and mine metallic or non-metallic minerals located within their internal boundaries.

b. A mineral claim is an application to obtain a mineral concession. Exploration, development, and exploitation rights are obtained once the title to the concession has been granted, except in those areas that overlap with priority claims or priority mining concessions. Upon completion of the title procedure, resolutions awarding title must be recorded with the Public Registry to create enforceability against third parties and the Peruvian State.

c. The beneficiation concession grants the right to use physical, chemical, and physical-chemical processes to concentrate minerals or purify, smelt, or refine metals.

d. Mineral rights are separate from surface rights. They are freely transferable.

e. A mineral concession by itself does not authorize the titleholder to carry out exploration or exploitation activities, but rather the titleholder must first:

   (i) Obtain approval from the Culture Ministry of the applicable archaeological declarations, authorizations, or certificates.

   (ii) Obtain the environmental certification issued by the competent environmental authority, subject to the rules of public participation.

   (iii) Obtain permission for the use of land (i.e., obtain surface rights) by agreement with the owner of the land or the completion of the administrative easement procedure, in accordance with the applicable regulation.

   (iv) Obtain the applicable governmental licences, permits, and authorizations, according to the nature and location of the activities to be undertaken.

   (v) Carry out consultations with Indigenous Peoples under the Culture Ministry, should there be any communities affected by potential exploitation of the mineral concession, as per International Labour Organization (ILO) Convention 169.

f. Mineral rights holders must comply with the payment of an annual fee equal to $3.00/ha, on or before June 30 of each year.

g. Holders of mineral concessions must meet a Minimum Annual Production Target or a Minimum Annual Investment before a statutory deadline. When such deadline is not met, a penalty must be paid as described below:

   (i) Mineral concessions must meet a statutory Minimum Annual Production Target of 1 Tax Unit (Unidad Impositiva Tributaria, or UIT) per hectare per year for metallic concessions, within a statutory term of ten years from the title date. The applicable penalty is 2% of the Minimum Annual Production Target per hectare per year as of the 11th year until the 15th year. Starting in the 16th year and until the 20th year, the applicable penalty is 5% of the Minimum Annual Production Target per year and starting in the 21st year until the 30th year, the applicable penalty is 10% of the Minimum Annual Production Target per year. After the 30th year, if the Minimum Annual Production Target is not met, the mining concession will lapse automatically.

h. Mineral concessions may not be revoked as long as the titleholder complies with the Good Standing Obligations according to which mineral concessions will lapse automatically if any of the following events take place:

   (i) The annual fee is not paid for two consecutive years.

   (ii) The applicable penalty is not paid for two consecutive years.

   (iii) A concession expires if it does not reach the minimum production in Year 30 and cannot justify the non-compliance up to five additional years due to reasons of force majeure described in the current legislation.

i. Agreements involving mineral rights (such as an option to acquire a mining lease or the transfer of a mineral concession) must be formalized through a deed issued by a public notary and must be recorded with the Public Registry to create enforceability against third parties and the Peruvian State.

3.2.2 Annual Fees and Penalties

Pursuant to Table 3-1, all annual fees applicable to the 25 mineral concessions and the beneficiation concession comprising the Mine have been paid in full up to 2020, as detailed in Table 3-2.

Certain mineral concessions comprising the Mine were subject to a penalty since the minimum required levels of production or exploration expenditures were not met as stated in the previous subsection (Mineral Rights). The minimum annual production is equal to a UIT per granted hectare. The minimum annual investment is the penalty to be paid multiplied by 10. All penalties applicable to the mineral concessions comprising the Mine, have been paid as indicated in Table 3-2. Penalties were incurred for concessions numbered 6 through 25 for not achieving the required production or exploration expenditures, while concessions 1 through 5 were not subject to penalties as the required annual production levels were met. The penalty amounts shown in Table 3-2 for concessions 1 through 5 represent the annual amounts that would be payable if the Minimum Annual Production Target was not met.

Table 3-2: Payments Made for Concessions in 2020
Nexa Resources S.A. – El Porvenir Mine

No.	Code	Concession	Annual Fee (US$)	Penalty (US$)	Total Payment 2020 (US$)
1	04010070X01	Atacocha No. 1	4.79	38.98	4.79
2	010000515L	Acumulacion El Porvenir	13,801.55	112,338.19	13,801.55
3	010 00011 6L	Acumulacion El Porvenir 1	23.96	194.99	23.96
4	04010149X01	C.M.A. No. 55	3.00	24.39	3.00

No.	Code	Concession	Annual Fee (US$)	Penalty (US$)	Total Payment 2020 (US$)
5	04002731X01	Kitty	17.98	146.32	17.98
6	04010148X01	C.M.A. No. 54	5.99	79.88	85.87
7	04012134X01	Demasia AM-No. 1	3.00	39.94	42.94
8	04005426X01	Ithaca	11.98	159.80	171.78
9	04002471X01	Kathleen	17.98	239.68	257.66
10	04005356X01	La Tunda	17.98	239.68	257.66
11	04005372 X01	Melbourne	35.95	479.38	515.33
12	04005505X01	Tralee	5.99	79.90	85.89
13	04005441X01	Angelica Segunda	5.99	48.77	54.76
14	04010249X01	Atacocha No. 2	8.30	67.52	75.82
15	04010074X01	C.M.A. No. 41	197.72	1,609.33	1,807.05
16	04010073X01	C.M.A. No. 42	8.99	73.15	82.14
17	04010071X01	C.M.A. No. 43	14.98	121.93	136.91
18	04010072X01	C.M.A. No. 44	23.97	195.07	219. 04
1 9	04010063X0 2	C.M.A. No. 45	71.90	585.22	6 57.12
20	04012874X01	C.M.A. No. 95	11.89	96.76	108.65
21	04012875X01	C.M. A. No. 96	11.98	97.53	109.51
22	04013393X0l	Carlitos	60.00	48.84	108.84
23	010079393	Macapata	42.23	343.77	386.00
24	04005383X01	Manuel Numero Dos	23.97	195.10	219.07
25	040 13362X01	Pucayacu	108.00	87.91	195.91
26	P000000613	Acumulacion Aquiles 101 (Beneficiation Concession)	4,587.50	N/A	4,587.50

Note. Exchange rate of 3.44 Peruvian Neuvo Sol (PEN or S/.)/ USD based on SUNAT Exchange Rate as of May 29, 2020.

3.3 Royalties

According to a lease agreement signed on January 2, 2006, the concessions listed in Table 3-3 are subject to the royalties presented in Table 3-4.

Table 3-3: Concessions Subject to Royalties Payable to Nexa Atacocha
Nexa Resources S.A. – El Porvenir Mine

Angelina Segunda	**C.M.A. No. 44**
Atacocha No. 1	C.M.A. No. 45
Atacocha No. 2	Ithaca
C.M.A. No. 41	Kathleen
C.M.A. No. 42	Manuel Numero Dos
C.M.A. No. 43	Melbourne
C.M.A. No. 55	La Tunda
Kitty	Tralee
50% of the Amount Indicated in the Royalty Schedule	
C.M.A. No. 95	C.M.A. No. 96
Demasia AM No. 1	CMA No. 54

Source: Nexa, 2020a

Table 3-4: Royalty Payments to Nexa Atacocha
Nexa Resources S.A. – El Porvenir Mine

Percentage	Mineral Value Range
7%	Up to US$40/t of mineral value
8%	Above US$40/t and up to US$50/t of mineral value
10%	Above US$50/t and up to US$60/t of mineral value
12%	Above US$60/t and up to US$70/t of mineral value
13%	Above US$70/t and up to US$80/t of mineral value
15%	Above US$80/t and up to US$100/t of mineral value
18%	Above US$100/t of mineral value

3.4 Surface Rights and Easements

El Porvenir has the following surface rights:

- On June 30, 1988, Nexa obtained the free right of use of 450.66 ha for the mine site from the Peruvian State.
- On August 5, 1991, the Ministry of Energy and Mines expropriated 18 ha from the Peasant Community of San Francisco de Asís de Yarusyacán and granted Nexa its surface-property rights for the tailings deposit and other facilities.
- On February 27, 2012, Nexa purchased six properties totalling 128 ha from the Peasant Community of San Francisco de Asís de Yarusyacán for expanding the tailings deposit, developing an access road, and installing a 138 kV power transmission line. One of the properties (1.05 ha)

has not been registered in the Public Registry pending validation of its boundaries. On January 21, 2014, the Peasant Community of San Francisco de Asís de Yarusyacán filed a civil suit against Nexa to cancel the sale of the 128 ha. On November 20, 2016, the community filed another lawsuit against Nexa regarding the same property to void the sales agreement, pay them S/. 1,000,000 for damages, and return the properties. Nexa achieved favourable interim rulings on the first claim.

- On December 19, 2012, Nexa El Porvenir obtained an easement of 105,458.50 m^2 for 30 years from the Peasant Community of San Antonio de Rancas to install, operate, and maintain ten high voltage towers and other related facilities for a 200 kV power transmission line.
- On December 20, 2012, Nexa El Porvenir obtained an easement of 94,801.7919 m^2 for 30 years from Cooperativa Agraria de Producción Pucayacu Número 004 – Yanacancha to install, operate, and maintain ten high voltage towers and other related facilities for a 200 kV power transmission line.
- On July 24, 2014, Nexa transferred the La Candelaria Power Station and related infrastructure to Nexa El Porvenir. Nexa believes that Nexa El Porvenir has the right to claim property rights over this land through the acquisitive prescription of domain, as it has been in possession of it as an owner for more than ten years.
- Other surface rights include Predio Carmen Chico and surface rights purchased from the Colqui family.

Figure 3-3 illustrates Nexa's surface rights.

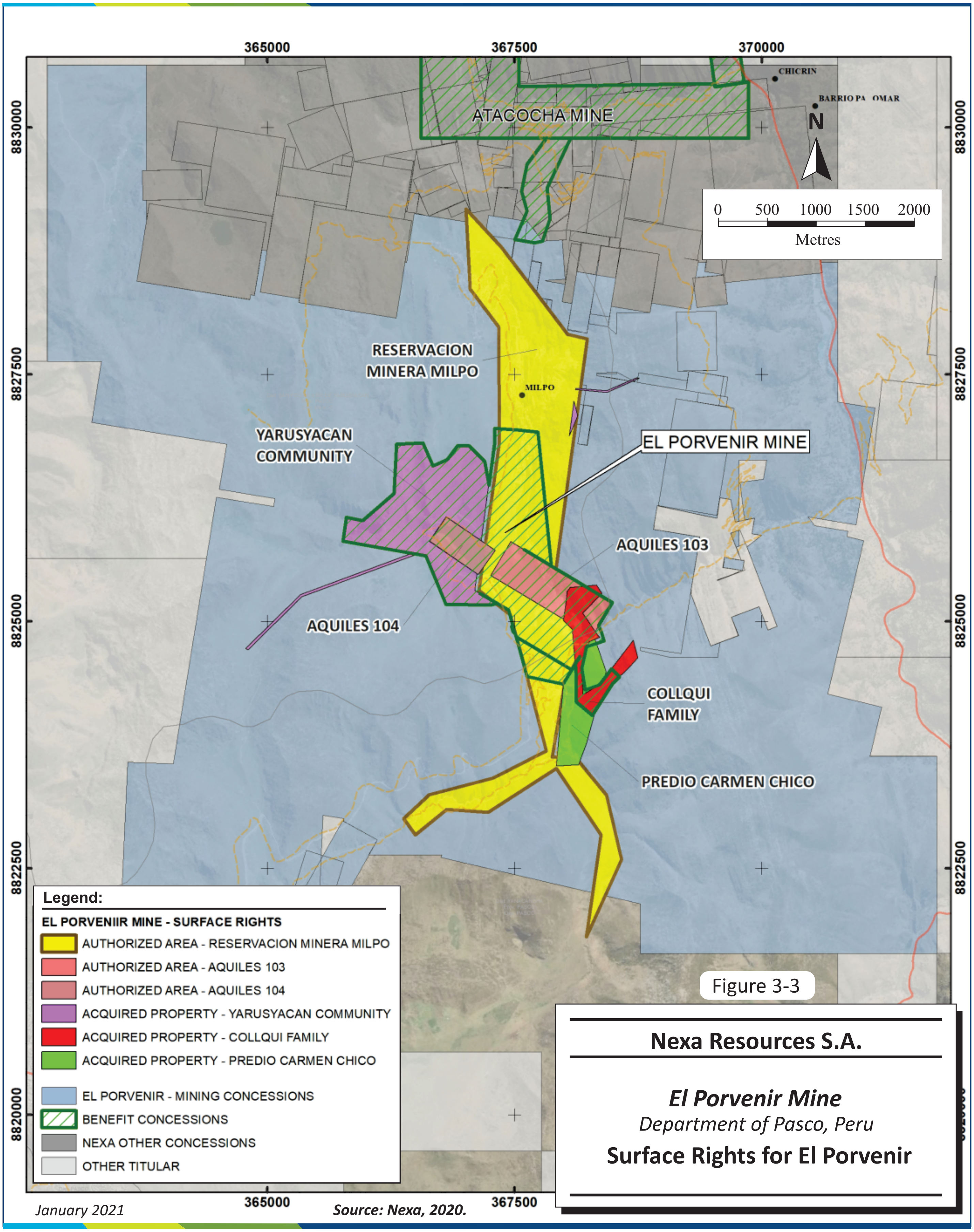


Figure 3-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Surface Rights for El Porvenir

January 2021

Source: Nexa, 2020.

3.5 Material Government Consents

This subsection details the material Governmental Consents required to carry out the operation in compliance with applicable Peruvian laws and regulations. These material Governmental Consents correspond to those permits, licences, authorizations, etc., issued by the applicable governmental authorities, which entitle Nexa Peru to build the components and/or perform the activities that are critical and typical to a mining operation. These components/activities may include: (i) mining activities and related facilities; (ii) beneficiation plant and related activities; (iii) water supply; (iv) effluent discharge and related facilities; (v) use of explosives; and (vi) power supply (Table 3-5). Of note, the third amendment to the Mine Closure Plan is currently under review and approval process by the Peruvian Authorities.

Table 3-5: Main Government Consents
Nexa Resources S.A. – El Porvenir Mine

#	Government Consent	Resolution	Approval Date
Environmental Certification			
1	Adaptation and Environmental Management Program approval.	RD 23-97-EM/DGM	17/01/1997
2	Modification of the Adaptation and Environmental Management Program – Candelaria Power Station.	RD 28-1997-EM/DGM	23/01/1997
3	El Porvenir Environmental Impact Assessment (EIA).	RD 379-2001-EM/DGAA	26/11/2001
4	First amendment to El Porvenir EIA (expansion of processing capacity to 5,500 tpd).	RD 271-2011-MEM/AAM	02/09/2011
5	Second amendment to El Porvenir EIA (expansion of processing capacity to 7,500 tpd).	RD 203-2012-MEM/AAM	25/06/2012
6	EIA for the power supply components (transmission power line).	RD 110-2013-MEM/AAM	17/04/2013
7	Supporting Technical Report to Directorial Resolution 110-2013- MEM/AAM (optimization of the design of the power transmission line).	RD 159-2014-MEM/DGAAM	02/04/2014
8	Supporting Technical Report to Directorial Resolution 203-2012- MEM/AAM (integrate the tailings disposal from the Atacocha and El Porvenir operations).	RD 526-2014-MEM-DGAAM	20/10/2014
9	Supporting Technical Report to Directorial Resolution 110-2013- MEM/AAM (optimization of the design of the power transmission line).	RD 271-2015-MEM-DGAAM	09/07/2015
10	Supporting Technical Report for expansion of processing capacity to 9,000 tpd.	RD 319-2017-SENACE-DCA	24/10/2017
11	Supporting Technical Report for modifications of ancillary components.	RD 058-2018-SENACE-PE/DEAR	13/12/2018
12	Supporting Technical Report for modification of the 9,000 tpd expansion and tailings pipe connection to Atacocha.	RD 051-2020-SENACE-PE/DEAR	10/03/2020

#	Government Consent	Resolution	Approval Date
Mine Closure Plan			
1	El Porvenir Mine Closure Plan.	RD 166-2009-MEM/AAM	17/06/2009
2	First Amendment to the Mine Closure Plan.	RD 286-2011-MEM/AAM	15/09/2011
3	Updated Mine Closure Plan.	RD 034-2013-MEM/AAM	30/01/2013
4	Second Amendment to the Mine Closure Plan.	RD 277-2016-MEM-DGAAM	15/09/2016
Beneficiation Plant and Tailings Storage Facilities (TSF)			
1	Beneficiation Concession Title.	RD 1058-1965	31/12/1965
2	Authorization to operate the beneficiation plant with 2,000 tpd Capacity.	RD 180-79-EM/DCFM	01/10/1979
3	Beneficiation Concession Titles "AQUILES 104" (tailings disposal over 18 ha).	RD 280-97-EM/DGM	12/08/1997
4	Beneficiation Concession Titles "AQUILES 103" (tailings disposal over 48 ha).	RD 281-97-EM/DGM	12/09/1997
5	Authorization to operate the beneficiation plant at 2,850 tpd.	RD S/N-99-EM-DGM/DPDM	03/03/1999
6	Authorization to operate the beneficiation plant at 4,000 tpd.	Auto Directorial AD 113-2004-MEM-DGM/DPM	08/03/2004
7	Authorization to operate the tailing deposit "El Porvenir" to a height of 4,043 MASL	RD 178-2010-MEM	07/04/2010
8	Authorization to operate the beneficiation plant at 4,700 tpd.	RD 206-2011-MEM-DGM/V	23/06/2011
9	Authorization to operate additional components for the beneficiation plant without extending the processing capacity.	RD 37-2012-MEM-DGM/V	18/01/2012
10	Authorization to operate the beneficiation plant at 5,600 tpd.	RD 235-2013-MEM-DGM/V	30/05/2013
11	Beneficiation concession "ACUMULACION AQUILES 101" (gather beneficiations concessions "AQUILES 104" and "AQUILES 103").	RD 178-2013-MEM/DGM	04/07/2013
12	Authorization to construct the tailing deposit "El Porvenir" to a height of 4,115 MASL.	RD 429-2013-MEM-DGM/V	15/11/2013
13	Authorization to operate the tailings deposit "El Porvenir" at a height of 4,047 MASL and extend the area of such beneficiation concession to a total of 323.7932.	RD 612-2015-MEM/DGM	12/06/2015
14	Authorization to operate additional components that integrate the tailings disposals from Atacocha and El Porvenir operations.	RD 251-2015-MEM-DGM/V	19/06/2015
15	Authorization to operate the beneficiation plant at 6,700 tpd.	RD 597-2015-MEM-DGM/V	03/12/2015

#	Government Consent	Resolution	Approval Date
16	Authorization to operate additional components for the beneficiation plant without extending the processing capacity.	RD 635-2015-MEM-DGM/V	12/12/2015
17	Authorization to operate the tailings deposit "El Porvenir" to a height of 4,048.5 MASL.	RD 0499-2016-MEM-DGM/V	18/08/2016
18	Authorization to operate the tailings deposit "El Porvenir" to a height of 4,056 MASL.	RD 828-2017-MEM-DGM/V	25/09/2017
19	Authorization to increase the tailings deposit "El Porvenir" to a height of 4,060 MASL.	RD 0498-2019-MINEM-DGM/V	07/10/2019
Water Abstraction, Transportation and Usage Facilities			
1	License to use surface water from Huarmipuquio, Quebrada Pucayacu for population purposes.	RD 264-2015-ANA-AAA-X-MANTARO	06/04/2015
2	License to use surface water from the rivers "Lloclla", "Yanacachi", "Chuncana", and "Tulluraica" for power supply purposes.	RD 86-2016-ANA/AAA-HUALLAGA	11/02/2016
3	Licence to use surface water from the ravines. "Pucayacu – Huarmipuquio" and "Pucayacu – Carmen Chico" for mining purposes.	RD 399-2016-ANA/AAA-HUALLAGA	13/06/2016
4	Authorization to reuse treated domestic effluents from the camp of the operation for mining purposes.	RD 600-2019-ANA/AAAHUALLAGA	06/07/2019
5	Update to the Licence to use surface water from the ravines "Pucayacu – Huarmipuquio" and "Pucayacu – Carmen Chico" for mining purposes due to titleholder name change.	RA 322-2019-ANA/AAA-HUALLAGA-ALA ALTO HUALLAGA	03/10/2019
Effluent Discharge to the Environment			
1	Authorization to discharge treated industrial effluents to rivers "Huallaga" and "Lloclla".	RD 192-2019-ANA-DGCRH	16/06/2019
Power Generation and Transmission Lines			
1	Authorization to generate electricity for 1,936 kW in the hydroelectric plant "Candelaria".	Ministerial Resolution RM 395-93-EM/DGE	31/12/1993
2	Authorization to auto-generate electricity in the thermoelectric plant "Milpo".	Ministerial Resolution RM 394-93-EM/DGE	31/12/1993
3	Authorization to generate electricity for 3,187.50 kW in the hydroelectric plant "Candelaria".	Ministerial Resolution RM 541-98-MEM/VME	03/11/1998
4	Power transmission concession for the 50 kV Power Transmission Line – Hydroelectric Plant "Candelaria" – S.E. N° 3 at El Porvenir.	Supreme Resolution RS 75-2010-EM	25/11/2010
5	Approve the transfer of the power transmission concession to Nexa El Porvenir.	Supreme Resolution RS 004-2015-EM	06/03/2015

#	Government Consent	Resolution	Approval Date
6	Power transmission concession for the 138 kV Power Transmission Line – Paragsha II – S.E. Milpo and 50 kV Power Transmission Line S.E. Milpo – V1C.	Ministerial Resolution RM 361-2016-MEM/DM	31/08/2016
Use of Explosives			
1	Authorization to operate an underground magazine – Explosives	RD 304-2020-SUCAMEC/GEPP	05/02/2020
2	Authorization to operate an underground magazine – Accessories	RD 305-2020-SUCAMEC/GEPP	05/02/2020
3	Authorization to operate an underground magazine – Accessories	RD 306-2020-SUCAMEC/GEPP	05/02/2020
4	Authorization to use and acquire explosives for UEA Milpo No. 1	RD 308-2020-SUCAMEC/GEPP	05/02/2020

Source: Nexa, 2020a

The SLR QP is not aware of any environmental liabilities on the property. Nexa has all required permits to conduct the proposed work on the property. The SLR QP is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.

4.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Accessibility

El Porvenir is located 13 km northeast of Cerro de Pasco via an unpaved road. Cerro de Pasco is situated approximately 315 km from Lima, the national capital, when travelling via the Carretera Central and La Oroya-Huanuco highways, which are paved roads. Alternatively, Highway 20A provides a shorter drive from Lima but is mostly unpaved. The nearest airport to the Mine is Alférez FAP David Figueroa Fernandini Airport (HUU which is located approximately 130 km to the north of El Porvenir, just outside of Huanuco. Two regional airlines provide daily flights between the airport and Lima.

4.2 Climate

The climate at El Porvenir is cold and humid and is generally typical of the Central Andes Mountain Region, where elevations exceed 4,000 MASL. The temperature is relatively uniform throughout the year averaging approximately 6°C and ranging from -4°C to +13°C. Precipitation in the region totals approximately 1,000 mm annually, mainly falling during the rainy season from November to March, conversely the months of June and July are mostly dry. Snowfall occurs at any time of the year, most commonly at dawn. Relative humidity is relatively uniform throughout the year averaging 78%. Mining operations are not affected by the climate and are carried out year-round.

4.3 Local Resources

The El Porvenir site is situated adjacent to the small municipality of San Juan de Milpo. The nearest city to the Mine is Cerro de Pasco, which has a population of approximately 60,000. Huanuco has a population of approximately 190,000. Most supplies used in the mining operation are delivered by truck from Lima.

4.4 Infrastructure

The El Porvenir infrastructure consists of the following facilities:

- Approximately 6,000 tpd underground mine
- A 2.2 million tonnes per annum (Mtpa) processing plant with associated laboratory and maintenance facilities
- Power plant
- Access roads
- Offices and warehouses
- Accommodations
- Waste rock facilities
- Temporary ore stockpiles
- Hydraulic backfill plant
- TSF

Additional information on infrastructure is provided in Sections 15 and 17.

4.5 Physiography

El Porvenir is situated in a glacial valley flanked by mountains on each side (Figure 4-1). The Mine's TSF, processing plant, and other buildings are located at the valley's base. A creek running through the valley drains into the Huallaga River further downstream at the village of La Quinua. The physiography of the area is typical of the Central Andes Mountain Region.

Source: SRK, 2017

Figure 4-1: Typical Landscape at El Porvenir

5.0 HISTORY

5.1 Ownership, Exploration and Development History

El Porvenir has a long history in the Peruvian mining sector, extending over 70 years. The Mine began operating as a small scale artisanal mine in 1949, and Compañía Minera Milpo S.A. (Milpo) was incorporated the same year to operate the Mine. A gravity separation plant was built at the site in 1953, and a flotation plant was completed in 1979. The Mine's output increased steadily over the decades, attaining its current production rate of 5,600 tpd in 2014.

No documentation on exploration is available prior to 2006. Exploration was conducted simultaneously with underground development and included geological mapping, diamond core drilling, and channel sampling (SRK, 2017). Milpo acquired the adjacent Atacocha Mine in 2008. In 2010, Nexa, then Grupo Votorantim (Votorantim), gained control of Milpo and its assets, including El Porvenir. In 2014, Nexa began integrating the El Porvenir and Atacocha operations, including administration, the TSFs, and the electrical power supply. El Porvenir's operations were recently interrupted from March 10, 2020 to May 15, 2020, due to the COVID-19 pandemic.

Table 5-1 lists chronologically the most significant events in the operation's history.

Table 5-1: History of the El Porvenir Mine
Nexa Resources S.A. – El Porvenir Mine

Year	Work Description
1939	The El Porvenir site is granted June 30, 1939 through Resolución Jefatural N° 076-88-EM-DGM/JRMCP.
1949	El Porvenir began operating as a small scale artisanal mine. Milpo was incorporated on April 6, 1949, by founders Mr. Aquiles Venegas, Mr. Amador Nycander, Mr. Ernesto Baertl, Mr. Manuel Montori, and Mr. Luis Cáceres P.
1953	Milpo built a gravity separation plant, which had a capacity 54,000 t/month. The plant was expanded several times until 1978.
1979	Construction of the flotation plant was completed, capacity 1,800 tpd.
1997	A new mineralized zone called Porvenir Nueve was discovered.
1999	Production increased to 3,000 tpd.
2008	Milpo acquired the Atacocha Mine.
2010	Votorantim (now Nexa) gained control of Milpo and its assets, including El Porvenir.
2012	El Porvenir's production increased to 5,600 tpd.
2013	Votorantim initiated the process of integrating the Atacocha and El Porvenir mines, forming the Cerro Pasco Mining Complex.
2014	The 1st stage integration was initiated, which consisted of integrating the administrative functions of the two operations.
2015	The 2nd stage integration was initiated, which consisted of integrating TSFs of Atacocha and El Porvenir.

Year	Work Description
2016	The 3rd stage integration was initiated, which consisted of integrating the electric power supply of the two mines.
2017	Votorantim changed its name to Nexa. The integration process continued: The two underground mines were connected by a drift allowing an exploration program to proceed in the integration area.
2018	Nexa implemented the Avoca version of the sublevel stoping (SLS) mining method at El Porvenir. Discovery of the Sara Deposit, in which the mineralization occurs in sandstone.
2019	The tailings dam level was increased to the 4,060 MASL elevation, which extended it useful life by an additional five years. The Avoca/SLS mining method contributed to 6% of El Porvenir's total production. Nexa initiated a program called the Nexa Way Experience (La Manera Nexa Experience) aiming to optimize organizational performance through autonomous work groups and employee self-management.
2020	The Nexa Way Experience program continued and, at El Porvenir, focused on lowering costs by reducing shotcrete consumption. El Porvenir's operations were halted from March 18 to May 15 due to the COVID-19 pandemic. Operations were reinitiated with the application procedures and sanitary controls to prevent the spread of the contagion.

5.2 Past Production

Table 5-2 presents El Porvenir's annual mine production since the beginning of operations. Table 5-3 provides information about the operation's yearly concentrate production from 2016 to 2020.

Table 5-2: Mine Production History
Nexa Resources S.A. – El Porvenir Mine

Year	Dry Tonnes (t)	Grade			Year	Dry Tonnes (t)	Grade		
		(oz/t Ag)	(% Pb)	(% Zn)			(oz/t Ag)	(% Pb)	(% Zn)
1950	5,144	15.90	10.30	13.60	1985	661,298	4.40	3.20	5.60
1951	13,068	12.10	8.20	11.10	1986	640,133	4.30	3.20	5.50
1952	27,478	10.90	7.10	9.20	1987	597,611	4.20	3.10	4.80
1953	33,220	7.60	6.10	7.90	1988	472,414	4.30	3.10	4.80
1954	52,747	8.10	6.50	7.50	1989	679,647	4.50	3.60	4.60
1955	72,662	7.90	6.10	7.30	1990	763,860	4.50	3.40	5.30
1956	101,172	6.90	6.10	7.50	1991	788,234	4.10	2.80	5.50
1957	118,167	6.90	6.40	6.90	1992	747,455	3.80	2.80	5.30
1958	122,740	6.40	6.20	6.40	1993	776,051	4.00	3.20	5.70
1959	135,005	5.90	6.30	6.50	1994	781,893	3.90	3.00	5.60
1960	157,174	6.60	6.10	6.70	1995	784,090	4.30	3.50	5.70

Year	Dry Tonnes (t)	Grade			Year	Dry Tonnes (t)	Grade		
		(oz/t Ag)	(% Pb)	(% Zn)			(oz/t Ag)	(% Pb)	(% Zn)
1961	178,360	5.90	5.70	7.00	1996	874,890	3.80	2.70	6.20
1962	180,577	5.30	5.60	6.20	1997	968,023	3.70	2.40	6.70
1963	176,475	5.20	5.70	6.50	1998	938,549	3.09	2.23	6.62
1964	186,642	5.00	5.10	5.70	1999	1,010,627	3.40	2.50	7.40
1965	181,240	5.30	5.10	6.00	2000	1,049,857	3.30	2.10	7.30
1966	204,800	5.50	5.20	5.60	2001	1,067,890	3.35	2.33	7.70
1967	224,656	5.30	5.40	5.80	2002	1,217,291	3.65	2.58	8.02
1968	244,647	4.80	5.20	6.20	2003	1,313,346	3.51	2.45	7.69
1969	265,264	4.70	4.80	6.20	2004	1,342,451	2.21	1.41	7.61
1970	268,048	4.70	4.70	6.70	2005	1,395,991	2.44	1.64	6.87
1971	274,516	4.90	4.90	6.90	2006	1,390,940	2.51	1.68	6.10
1972	280,265	4.40	4.50	6.60	2007	1,333,313	1.90	1.19	5.31
1973	307,683	4.30	4.30	6.50	2008	1,389,947	1.60	0.88	4.23
1974	312,529	4.40	4.20	6.70	2009	1,712,188	1.30	0.68	4.07
1975	278,680	4.10	3.80	6.40	2010	1,712,188	1.23	0.60	4.04
1976	309,518	4.20	3.70	6.50	2011	1,742,129	1.23	0.54	4.00
1977	296,578	4.00	3.20	7.00	2012	1,898,901	1.13	0.48	4.04
1978	336,790	4.40	3.00	7.40	2013	1,943,490	1.37	0.82	3.48
1979	389,830	4.30	3.20	7.20	2014	2,107,212	1.49	0.88	3.39
1980	444,230	4.20	3.00	6.50	2015	2,106,519	1.75	0.93	3.21
1981	470,735	3.90	2.60	5.70	2016	2,154,152	1.94	0.98	3.22
1982	521,859	4.30	2.90	5.60	2017	1,834,511	2.05	1.04	2.86
1983	633,861	4.50	3.10	5.60	2018	2,149,928	1.92	0.98	3.04
1984	574,354	4.40	3.10	6.00	2019	2,120,765	2.08	1.01	2.92
					2020	1,502,618	2.00	0.93	2.65

Source: Nexa, 2020

Table 5-3: Concentrate Production – 2016 to 2020
Nexa Resources S.A. – El Porvenir Mine

	2016	2017	2018	2019	2020
Treatment Ore (in tonnes)	2,154,151	1,834,511	2,149,927	2,120,765	1,502,618
Average Ore Grade					
Zinc (%)	3.22	2.86	3.04	2.92	2.65
Copper (%)	0.14	0.13	0.15	0.15	0.17
Lead (%)	0.99	1.04	0.98	1.01	0.93
Silver (ounces per tonne)	2.01	2.05	1.92	2.08	2.00
Metal Contained in Concentrate Production					
Zinc (in tonnes)	62,534	46,154	57,872	54,689	34,867
Copper (in tonnes)	653	493	567	465	334
Lead (in tonnes)	17,164	14,818	16,641	16,914	10,858
Silver (in oz)	2,715,143	2,357,442	2,533,801	3,412,656	2,315,000

Source: SEC Form 20-Fs for 2019 and 2018 and Nexa 2020

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

6.1 Regional Geology

The South American Platform is mainly composed of metamorphic and igneous complexes from the Archean/Proterozoic era and constitutes the continental interior of South America. The Platform was consolidated during late Proterozoic to early Paleozoic times in the course of the Brasilian/Pan-African orogenic cycle during which the union of different continents and micro-continents with the closure of several ocean basins led to the formation of the supercontinent Gondwana. Archaean and Proterozoic rocks are exposed in three main shield areas within the framework of the Neoproterozoic folding strips (Guiana, Central Brazil, and Atlantic Shields). The western continental margin of the South American Plate developed from approximately Neoproterozoic to early Paleozoic times and constitutes a convergent margin, along which the eastward subduction of the Pacific oceanic plates takes place under the South American plate. Through this process, the Andean Range was developed. The eastern margin of the South American Plate forms a divergent margin more than 10,000 km long, which developed as a result of the separation of the South American Plate and the African Plate from the Mesozoic through the opening of the South Atlantic and the rupture of Gondwana. The northern and southern margins of the South American Plate developed along transform faults in transient tectonic regimes due to the collision of the South American Plate with the Caribbean and Scottish plates. The South American Plate reveals a long and complex geological history (Engler, 2009).

Most of the stratigraphy, tectonics, magmatism, volcanism, and mineralization in Peru is spatially and genetically related to the evolution of the Andean Cordillera off the western coast of South America. The mountain range was formed by actions related to important events (for example subduction) that have continued to the present since approximately the Cambrian (Peterson, 1999) or the late Precambrian (Clark et al., 1990; Benavides-Cáceres, 1999). The formation of the Andean Cordillera is, however, the result of a narrower period extending from the Triassic to the present when the division of the African and South American continents formed the Atlantic Ocean. Two periods of this subsequent subduction activity have been identified (Benavides-Cáceres, 1999): Mariana-type subduction from the late Triassic to the late Cretaceous; and Andean-type subduction from the late Cretaceous to the present.

The geology of Peru, from the Peru-Chile trench in the Pacific to the Brazilian Shield, is defined as three main parallel regions, from west to east: the Andean Antearco, the high Andes, and the Andean Antepaís Basin. All three regions were formed during the Meso-Cenozoic evolution of the central Andes. The property is located within the high Andes region. A simplified geological map of Peru is shown in Figure 6-1 and a regional morphostructural map is shown in Figure 6-2.

The Andes can be divided into three sections, from west to east:

- The Western Cordillera is formed by rocks of the Mesozoic-Tertiary age, dominated by the coastal batholith, which consists of multiple intrusions with ages ranging from the Lower Jurassic to the Upper Eocene. The belt is up to 65 km long and 1,600 km long and extends in a sub-parallel direction from the Pacific coast to Ecuador and Chile. El Porvenir is located within the Western Cordillera.
- The Altiplano is a high plain with internal drainage located at an average elevation of almost 4,000 m, slightly below the average altitudes of the Western and Eastern Cordillera. It is 150 km wide and 1,500 km long, stretching from the north of Argentina to the south of Peru.

* The Eastern Cordillera forms a plateau 4,000 m high and 150 km wide. During the Cenozoic era, the arch has risen forming the Eastern Cordillera. Stratigraphically, the zone of the high Andes is composed, from west to east, of an intra-arch channel, a deep basin, a continental shelf, and the Marañón metamorphic complex (the Marañón complex). In general, the formations are progressively older from west to east, spanning from the mid-Tertiary to the Neoproterozoic-Paleozoic.

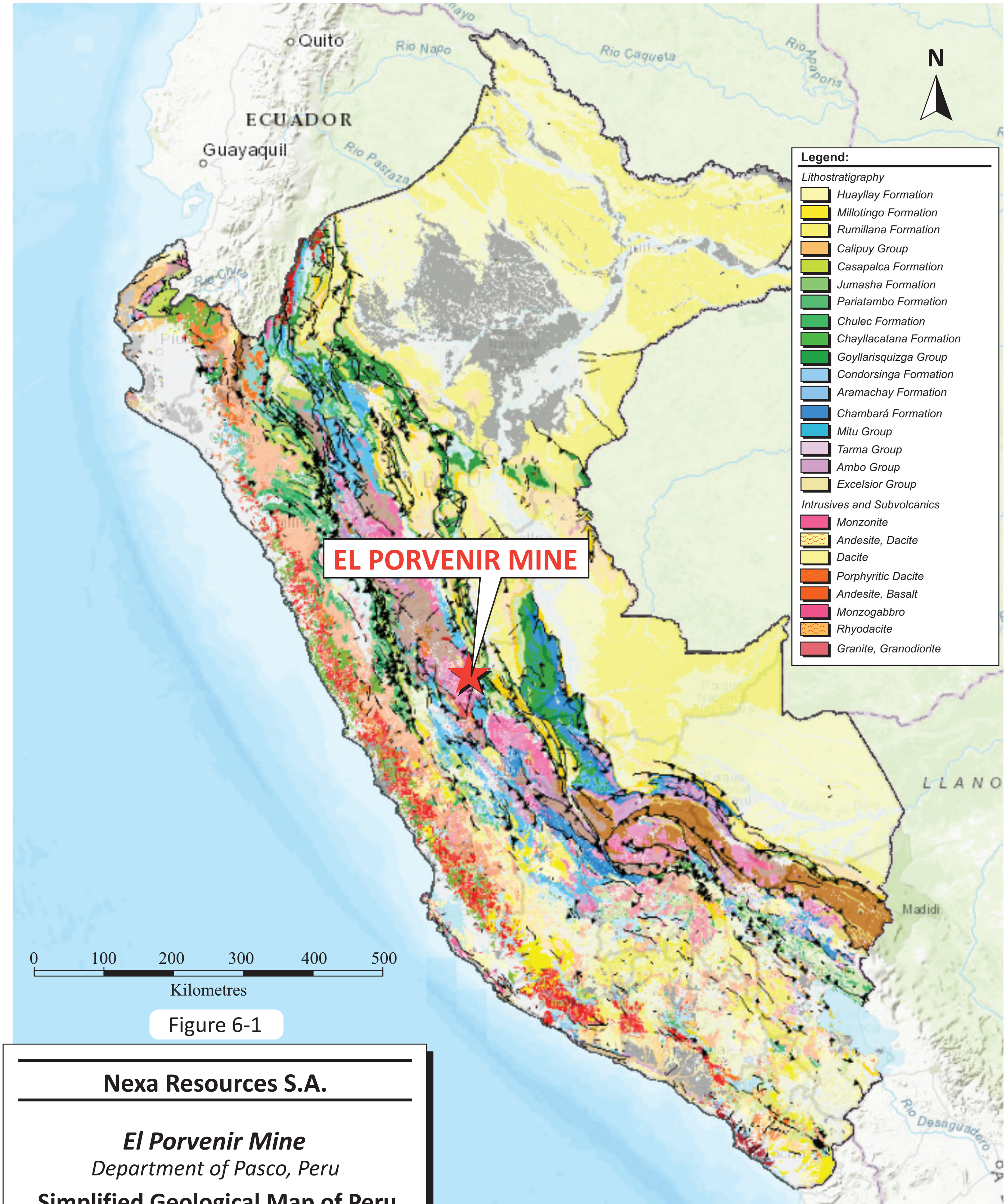


Figure 6-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Simplified Geological Map of Peru

January 2021 ***Source: INGEMMET, 2009.***

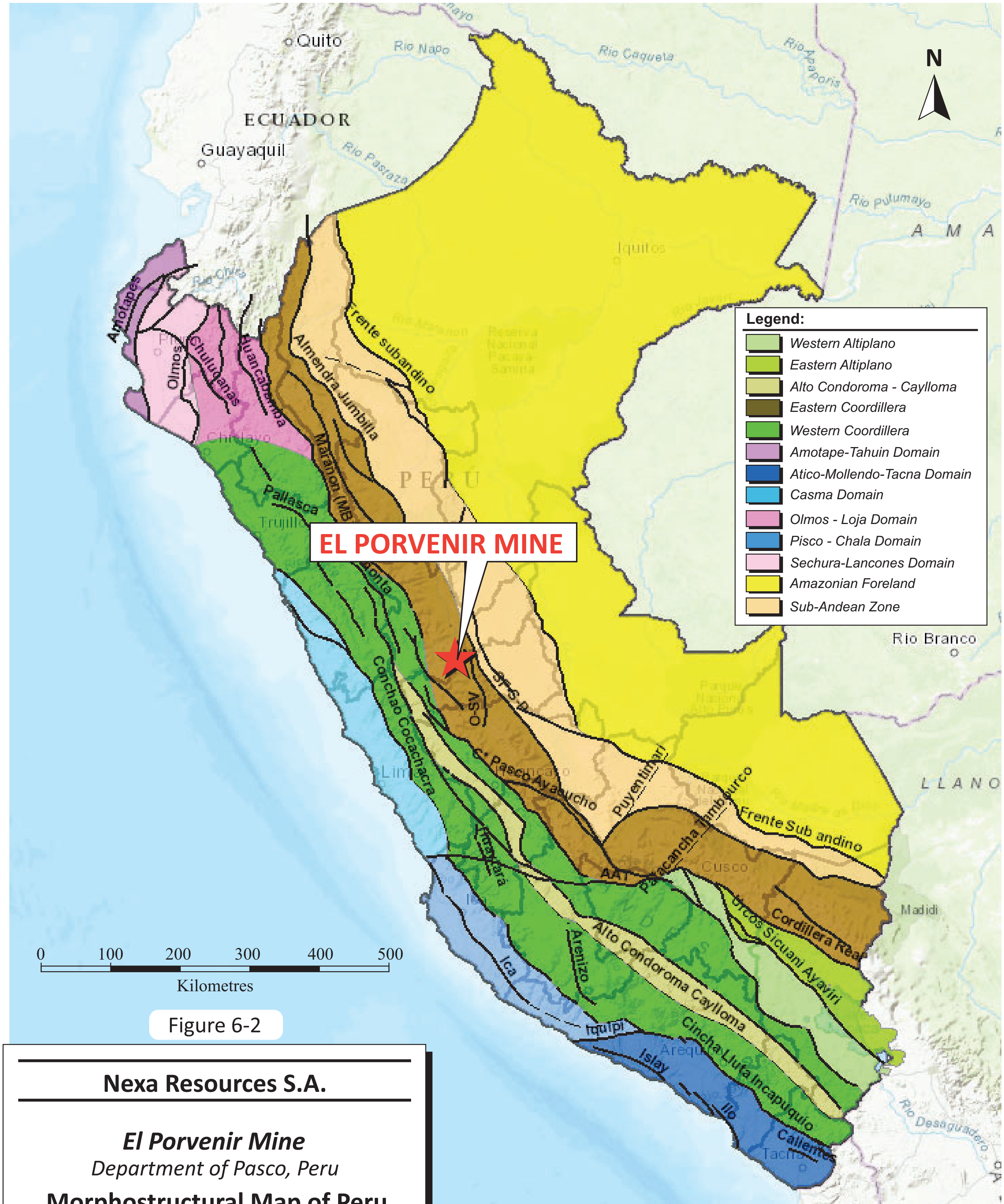


Figure 6-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Morphostructural Map of Peru

January 2021

Source: INGEMMET, 2009.

6.2 Local Geology

The following section is abridged from SRK (2017), with updates from Nexa (2020). Figure 6-3 illustrates the local geology.

El Porvenir is situated in the Pasco region of the Western Cordillera of the Andes, within the Eocene-Miocene Polymetallic and Miocene Au-Ag Epithermal Belts.

6.2.1 Stratigraphy

The oldest rocks in the region are part of the Devonian Excelsior Formation, comprising metamorphosed siliciclastic sediments or phyllite and quartzite.

The Upper Permian-Middle Triassic Mitu Group comprises clastic and volcanic sediments, including red sandstone, shale, and minor conglomerate. At the base of the Mitu Group there is a polymictic conglomerate unit which is approximately 45 m thick. Conglomerate clasts are subangular, comprising shale, phyllite, quartzite, and minor limestone. The conglomerate matrix is a well cemented, fine grained, reddish sandy material. Thin, grey to reddish siltstone layers are also present, and exhibit laminar stratification. The middle part of the Mitu Group comprises sequences of fine grained, reddish sandstone, with cross-stratification and interbedded with polymictic conglomerate layers. The Mitu Group was deposited during the Late Hercynian Tectonic Phase (based on the fossil record, and radiometric age dating). An angular unconformity exists between the underlying Excelsior Formation and overlying Mitu Group. The sediment package has accumulated with increasing thickness to the east, locally up to approximately 2,000 m, thinning to possibly as little as 100 m thickness in areas.

The Norian-Toarcian Pucará Group was deposited in the Pucará Basin, a north-northwest trending trough associated with a transtensional shear zone accommodating rifting and sinistral movement, on the Mitu Group with an erosional and angular unconformity. The Pucará Group is dominated by carbonate platform sequences which were primarily deposited in a shallow water environment during the first marine progression of the Andean Orogenic Cycle from the Upper Triassic to Lower Jurassic. The Pucará comprises interbedded grey to black limestone, dolostone, and shale with varying thicknesses of up to 60 cm, and is sub-divided into three formations: Chambará, Aramachay, and Condorsinga (Megard, 1968).

The Norian to Rhaetian Chambará Formation overall comprises massive, grey to pale limestone beds with some layers containing chert nodules, and horizons of grey to beige calcareous siltstone with variable oxides and red shale. Thicknesses vary from approximately 600 m to over 3,000 m. This formation is further sub-divided into stratigraphic units at the project scale.

The Hettangian to Sinemurian Aramachay Formation is characterized by dark grey bituminous calcareous shales and limestone beds over 15 cm thick. This formation was deposited in a deeper-water environment.

The Sinemurian to Toarcian Condorsinga Formation comprises beige to grey, thin to massive, interbedded limestone and dolostone. The thicknesses vary from approximately 500 m to over 1,500 m.

The Hauterivian to Aptian Goyllarisquizga Group, composed of siliciclastic sediments, vary from 150 m to 600 m thick and was deposited during the Lower Cretaceous with an erosional and angular unconformity over the Pucará Group during the Lower Cretaceous. Variable and discontinuous units of conglomerate, chert, and/or shale with carbonaceous fragments occur at the base of this group, which correlates with the Chimú Formation. A sequence of approximately 40 m thick comprising bitumen-bearing siltstone, with carbonaceous layers and laminar stratification is located above the Chimú Formation. Continuing up in the stratigraphic sequence is a section approximately 25 m thick comprising medium grain, reddish sandstone with thin micro-conglomerate layers, alternating with white sandstone further up in the sequence. These sequences correlate with the Santa and Carhuaz formations. The majority of the Goyllarisquizga Group comprises cross-bedded grey to white, medium to coarse grained, quartz-rich sandstone, approximately 90 m thick or more, which correlates with the Farrat Formation. Over one metre thick limestone units are present locally in the upper parts of this formation. Thin terrestrial red beds and basalt layers one to two metres thick may be interbedded near the upper contact.

A discontinuous, predominantly basaltic flow occurs in the Goyllarisquizga Group. Thin, red beds of sandstone and shale occur within the basalt unit.

The equivalent Machay and Chicrín formations comprise of approximately 250 m of massive to thinly interbedded grey calcareous sandstone, grey to brown marly limestone, grey calcareous conglomerate with clasts of fine to muddy sandstone, and fine grained red sandstone. These rocks were deposited onto the basalt flows during the Middle Cretaceous.

Another unit of predominantly basalt flows with thin beds of red sandstone and shale was disconformably deposited on top of the Machay/Chicrín formation.

The Upper Eocene Pocobamba Formation comprises breccias with sub-angular to sub-rounded limestone clasts derived from the Pucará Formation; subdivided into the Cacuán and Shuco members. The Pocobamba Formation was deposited as debris in a continental environment.

The regional stratigraphic column is shown in Figure 6-4.

Legend:

Lithology

- Overburden
- Limestone
- Basalt
- Limestone
- Basalt
- Goyllarisquizga Group
- Condorsinga Fm.
- Aramachay Fm.
- Limestone D
- Limestone C
- Limestone B
- Limestone A
- Red Limestone
- Conglomerate
- Limestone CH
- Mitu Group

Other Lithology

- Skarn
- Hydrothermal Breccia
- Sedimentary Breccia
- Marble
- Marbleized Limestone
- Dolomite
- Porphyritic Dacite Intrusive
- Bi/Hn Diorite Intrusive

Symbols

- Inferred/Measured Vein
- Inferred/Measured Fault
- Inferred/Measured Contact
- Join
- Bedding
- Strike-Slip Fault
- Displaced Fault
- Syncline
- Anticline
- Lake
- Tailings
- MnOx, FeOx

0 500 1000 1500 2000
Metres

Figure 6-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Local Geology

January 2021 **Source: Nexa, 2020.**

ERA	SYSTEM	STRATIGRAPHIC UNIT (FORMATION)			LITHOLOGY	MINERALIZATION (INTRUSIVE)
CENOZOIC	QUATERNARY	Calcareous conglomerate			Fragment of limestone with reddish clay calcareous matrix.	
CENOZOIC	EOCENE - PALEOCENE	Pocobamba			Calcareous breccia with some sandstone lenses.	
MESOZOIC	CRETACEOUS	Chulec			Limestones, dolomitized marly limestones	Basalt with alveolar texture.
MESOZOIC	CRETACEOUS	Goyllarisquizga			Quartz limestones, orthocuartites with crossbedding	Au – Ag – Pb in veins (Sheer zone) Quartz, sericite, clay.
MESOZOIC	JURASSIC	Sedimentary breccia			Calcareous breccia with reddish calcareous detritic matrix, with clasts of sandstones, limestones and chert.	Atacocha intrusive – San Gerardo Quartzodiorite (bt,hb) Skarn Zn – Pb – Ag in veins, replacement bodies.
MESOZOIC	JURASSIC	Pucará Gr.	Condorsinga	F	Light gray micritic limestones with cherts and abundant pseudomorphs fossils.	
MESOZOIC	JURASSIC	Pucará Gr.	Aramachay	E	Marls and black limestones (bt), with fossils (ammonites).	
MESOZOIC	TRIASSIC	Pucará Gr.	Chambará	D	Dolomites and gray limestones, mudstone a grainstone.	Breccia, siliceous heterolytic Zn – Pb – Ag in veins, bodies.
MESOZOIC	TRIASSIC	Pucará Gr.	Chambará	C	Limestones and dark gray dolomites chert.	
MESOZOIC	TRIASSIC	Pucará Gr.	Chambará	B	Dolomites and micritic black limestones in thin layers (bt). Fossiliferous level.	Santa Bárbara intrusive and Quartzodiorite Milpo (bt,hb) Skarn Zn – Pb – Ag.
MESOZOIC	TRIASSIC	Pucará Gr.	Chambará	A	Limestones and micritic dolomites.	

COLUMN

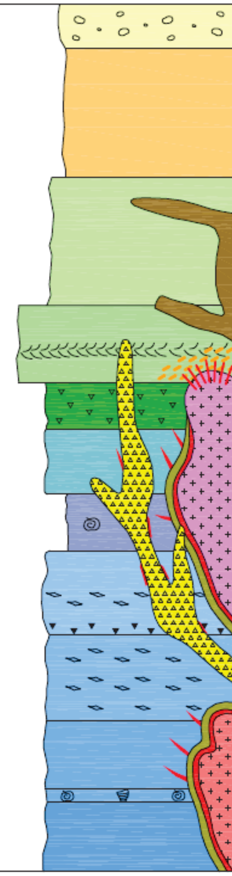


Figure 6-4

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Generalized Stratigraphic Column

NTS

January 2021

Source: Nexa, 2020.

6.2.2 Intrusive Rocks

Two generations of magmatism are recognized in the region, including the Milpo-Atacocha-Vinchos (29-26 Ma) and Cerro de Pasco-Colquijirca (16-10 Ma) belts (Cobeñas, 2008, and references therein). Both magmatic belts are oriented north-northeast to south-southwest, approximately parallel to the Andean trend.

The Milpo-Atacocha-Vinchos intrusive rocks are characterized as small hypabyssal stocks (less than one square kilometre), dikes, and sills of granodiorite (dacite) to diorite and tonalite composition and occur within high-K Calc-Alkaline Series and Shoshonitic Series. These intrusive rocks generally exhibit a porphyritic texture with plagioclase as the dominant mineral forming the matrix, and variable phenocrysts of quartz, hornblende, biotite, and pyroxenes. The matrix comprises fine-grained quartz and feldspar-plagioclase.

Magmatic emplacement occurred during the Oligocene based on two K-Ar age dates of porphyritic granodioritic samples with partially carbonate and sericite altered plagioclase (29.3±2.5 Ma and 25.9±1.5 Ma) (Soler and Bonhomme, 1988). Recently, 12 intrusive rocks samples from the El Porvenir and Atacocha areas were analyzed by U-Pb geochronology at the University of Tasmania and provided age dates of intrusive crystallization from 28.58 ± 0.38 Ma to 30.11 ± 0.23 Ma.

Intrusives in the region exhibit an elongate geometry, trending north-south to northwest-southeast, parallel to the regional fold axis, and are mostly spatially associated with the Milpo-Atacocha fault, suggesting that there is an apparent structural control on magmatic emplacement.

Metamorphic contact aureoles are variably formed around these intrusive bodies. The most intense contact aureole is recognized in the Atacocha area, where Pucará Group rocks are completely silicified with pyrite impregnations for up to 200 m.

The Cerro de Pasco-Colquijirca volcanic to sub-volcanic intrusive rocks are characterized by dacitic, trachytic, and monzonitic composition. Texture varies from porphyritic to aphanitic. Composition is dominated by quartz and plagioclase, with lesser amphiboles, biotite, and K-feldspar. Age dating from the Cerro de Pasco, Marcapunta, and Yanamate complexes reveals ages ranging from 16 Ma to 10 Ma.

6.2.3 Structure

Regional tectonics during the Mesozoic and Cenozoic are collectively referred to as the Andean Cycle which comprises multiple sedimentation and deformational events. The Andean Cycle is sub-divided into at least seven deformational phases (Ellison et al., 1989):

- Peruana (Upper Cretaceous);
- Incaica (Paleogene/Eocene);
- Quechua 1 (early Oligocene);
- Quechua 2 (late Oligocene to early Miocene);
- Quechua 3 (middle Miocene);
- Quechua 4 (late Miocene); and
- Quechua 5 (late Miocene).

Three episodes of regional folding are recognized occurring during the Paleogene and possibly earlier and are separated by periods of tension. Throughout the region, the tectonics are characterized by northeast-southwest to east-west oriented compression, which occurred during the second Andean deformation phase (Incaico), from the Eocene to Oligocene. Most Mesozoic rocks appear to have been folded conformably generally forming a series of anticlines and synclines, parallel to the principal Andean trend, with a north-northwest to south-southeast oriented fold-axis, plunging to the south. Most folds described throughout the region have gently to moderately dipping (<60°) limbs.

The Milpo-Atacocha fault is a major structural feature in the region, which can be traced for nearly 15 km from Yarusyacán in the north to Carmen Chico in the south. The Milpo-Atacocha fault strikes north-south, dipping steeply to the east, with as much as 2,000 m of reverse displacement (east-block up) and probable sinistral movement. Megard (1968) considers that the Milpo-Atacocha fault may be part of a fault system active since at least the Triassic, and during the Upper Cretaceous.

A series of fracture sets reportedly formed in response to the northeast-southwest tectonic compression, including:

1. North-northeast trending dextral faults;
2. Southwest trending sinistral faults;
3. Northeast trending tensional joints;
4. Northwest trending tensional joints.

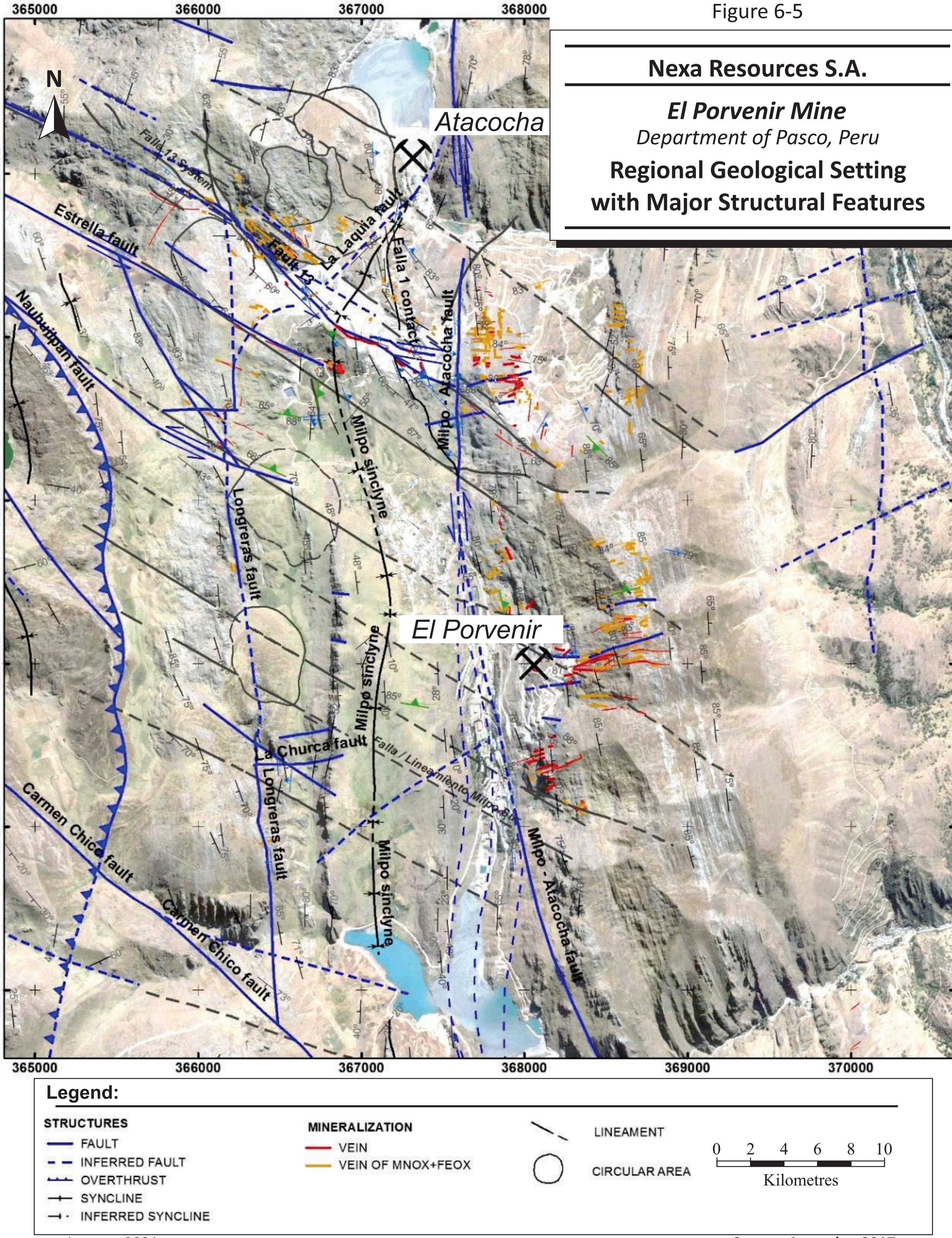
Figure 6-5

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Regional Geological Setting with Major Structural Features



January 2021

Source: Atacocha, 2017.

6.3 Property Geology

This section is based on SRK (2017) and Nexa (2020).

The geology of El Porvenir was compiled based on various internal Milpo reports. Figure 6-6 shows two representative geologic cross sections through the El Porvenir area.

Within the property area, the stratigraphic units of primary interest are the Pucará and the Goyllarisquizga groups.

The Pucará Group is subdivided into six units: A, B, C, D, which correspond to the Chambará Formation; and E and F, which correspond to the Aramachay and Condorsinga formations, respectively:

- **Unit A** is located to the east of the Atacocha fault. It consists of a grey to dark grey limestone with thin dolomite layers, calcarenites and fine, greenish volcanic siltstones at the base of the Chambará Formation. Yellowish grey limonites to compact dolomicrites are also observed.
- **Unit B** is located to the east of, and stratigraphically above, Unit A. Dark grey to black coloured limestones, dolomicrites, and micrites are observed in thin layers to tabular strata with lenticular bituminous horizons. It can be seen in many parts of the mine due to its obliteration of marble and silicification. The more competent rocks are located at the intermediate zone in the Chambará Formation.
- **Unit C** is located to the east of the mine area. Monotonous grey chertic limestones in metric strata are observed. The unit also contains dolomitic horizons. Its lithologic sequences are hard and it represents the intermediate zone of the Chambará Formation.
- **Unit D** is widely distributed within the Atacocha and Santa Bárbara sections. The limestones are beige varying from mudstone to grainstone with light beige dolomitic intercalations. Cherts and bituminous horizons are also observed. Unit D corresponds to the upper zone of the Chambará Formation.
- **Unit E** consists of black micritic limestones and black lutite. In many places, this package is obliterated by marble, silica, silica-sericite-clay, etc. In many places of the mine, the rock is altered becoming recrystallized and discoloured, adopting clearer tones without converting to marble (loss of calcium). These rocks correspond to the Aramachay Formation of the Pucará Group.
- **Unit F** is grey to light grey limestones, mudstone to packstone, with fossil horizons and dolomitic levels.

The Goyllarisquizga Group outcrops in the area of the deposit comprising quartz rich sandstone, corresponding to the Goyllarisquizga Formation. Sandstones may vary from quartz arenite to arkose. The matrix is argillaceous to siliceous. Above the 4000 Level, the lithology and stratification are well defined and easy to recognize. Below the 4000 Level, strong alteration has obliterated the original rock intensity forming siliceous breccias and massive silica where it is still possible to recognize quartz grains and in few places the stratification.

Localized basalt units are observed in some drill holes to the southwest of the mine, below the Cherchere and San Gerardo zones. The units consist of grey to greenish basalt with green vacuoles of zeolites with traces of flows with olivine phenocrystals, limonite, and magnetite.

Intrusive rocks within the property are variably porphyritic dacite to quartz diorite with hornblende and biotite phenocrysts. Dacitic dikes are subdivided into two units: porphyritic with feldspar phenocrysts and minor quartz restricted to the groundmass; and porphyritic with abundant quartz phenocrysts, with minor biotite and hornblende. The quartz diorite comprises feldspar phenocrysts up to 6 mm long, with variable quartz “eyes”, and aggregates of biotite and hornblende. The groundmass is microcrystalline quartz and plagioclase. These intrusive rocks generally form dikes trending north-south and are observed in three areas: Santa Bárbara/central, south along/parallel to the Atacocha fault, and the southern Section 3. These intrusive rocks are part of the Milpo-Atacocha-Vinchos Belt (28 Ma to 30 Ma).

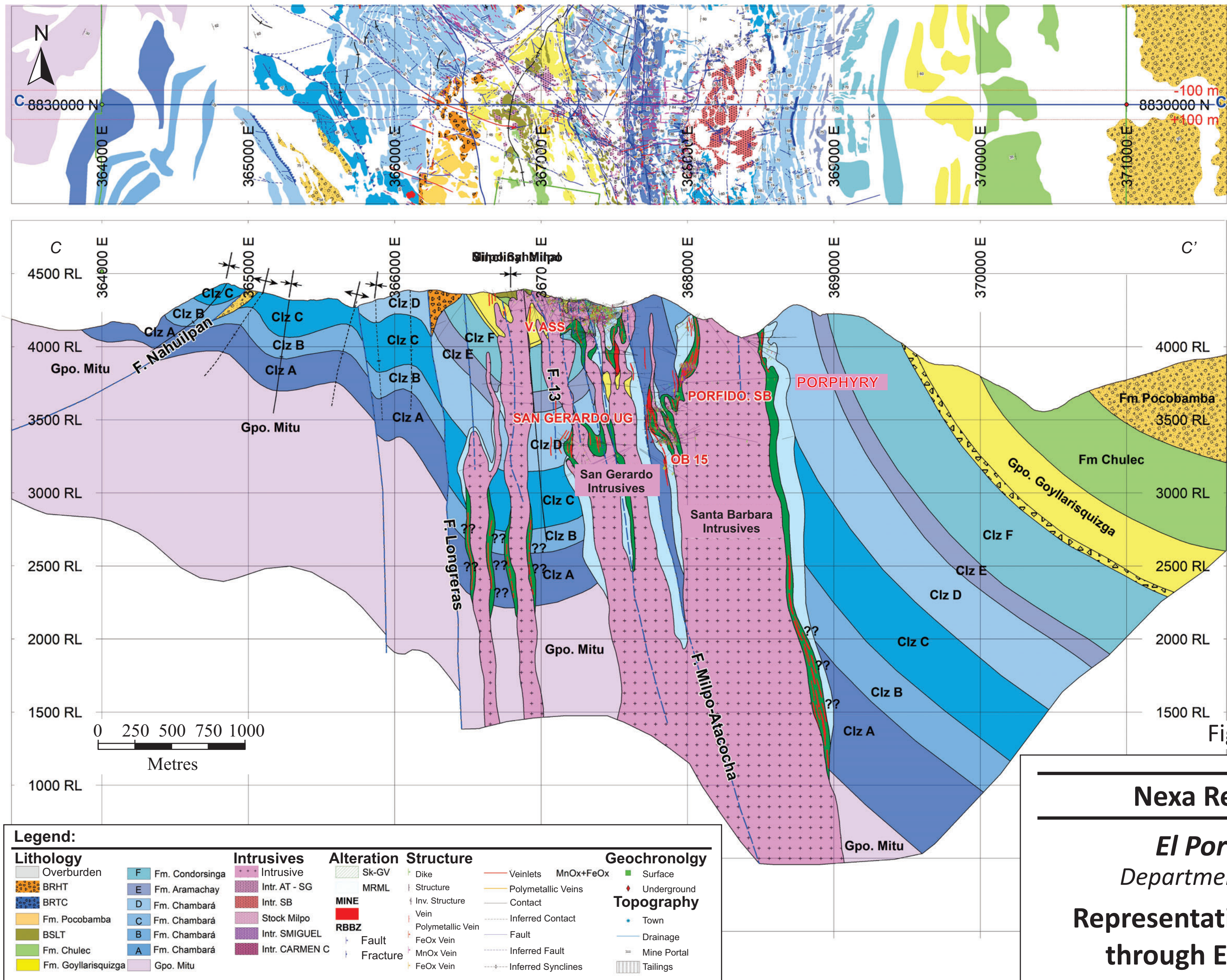


Figure 6-6

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Representative Cross Sections through El Porvenir Area

January 2021

Source: Nexa, 2020.

6.4 Alteration

Skarn-related alteration has been characterized according to dominant key mineral assemblages: silica-wollastonite, garnet, silica, and pyrite-argillic.

Garnet-skarn is dominated by >50% garnet (by volume), generally brown to greenish and medium to fine grained, or light brown to yellowish (andradite) and light green (grosularia). Pyroxene, where present, is light green, very fine grained, and associated with minor sulphides. Magnetite is spatially associated with green garnet areas, as well as lesser pyrite and pyrrhotite.

Silica-skarn is defined where silica content exceeds 50%. Silica may occur in veinlets or as disseminations. Silica-wollastonite alteration appears to form a sub-division of the silica-dominant group, and forms light grey to milky white zones with brecciated to massive/patchy textures. Wollastonite may form radiating fibrous crystals. Locally, a silica-skarn-chlorite assemblage may be present, exhibiting strong structural controls. White to grey silica developed early, followed by green skarn with variably associated chlorite and hematite.

Pyrite-argillic skarn comprises 30% to 80% massive pyrite, with 10% to 30% undistinguished whitish clays, and up to 20% greenish garnet. Locally, pyrite appears to be pseudomorphic replacing garnet.

An alteration assemblage comprising silica-sericite-argillic (halloysite, montmorillonite, and kaolinite) is associated with hydrothermal mineralization. Locally this alteration assemblage is strong, and possibly replaces original rocks completely in areas below the 4000 Level.

West of the Milpo-Atacocha fault below the 4000 Level, strong siliceous alteration has variably obliterated the original rock; within the Goyllarisquizga Group it is possible to recognize quartz grains and stratification in a few places. Locally siliceous cemented breccias with silica-sericite-clays matrix (halloysite, montmorillonite, and kaolinite) and massive silica hydrothermal breccias have formed.

Marbleization of limestone and dolomite units appears to be spatially associated with intrusive units and skarn related alteration.

6.5 Mineralization

At El Porvenir, mineralization is characterized as a skarn, intermediate sulphidation epithermal vein/breccia style, or stratabound mineralization in the Goyllarisquizga Formation.

Skarn related mineralization associated with the Milpo stock is paragenetically earlier, followed by hydrothermal mineralization. Skarn-related mineralization is commonly associated with the garnet and silica-skarn-chlorite assemblages, comprising pyrite, chalcopyrite, sphalerite, galena and minor pyrrhotite, pyrite, bornite, covellite, orpiment, and realgar within the Pucará Group sediments around the Milpo stock. Molybdenite may occur proximal to the skarn related mineralization. Elevated Bi and Au contents are reported to be associated with skarn related mineralization. Veins and veinlets with pyrite, chalcopyrite, sphalerite, galena, quartz, and carbonates occur within marble units, and are spatially associated with skarn bodies.

The silica breccia consists of sub-rounded to sub-angular white to milky grey opaline silica clasts, millimetres to centimetres in size, and to a lesser extent, sandstone, and limestone clasts. The silica breccia clasts are cemented by white granular silica, with occasional cross-cutting veins of white silica.

The massive (siliceous) breccia forms zones of pervasive alteration comprising predominantly fine grained and massive white silica.

The granular (siliceous) breccia comprises loose white to grey grains of silica within a poorly cemented (undifferentiated) clay matrix.

The Ag-Pb-Zn breccias are subdivided into calcareous, polymictic-monomictic, and karst (collapse). Breccia clasts include limestone, marble, silica (massive), and skarn; the composition of the clasts indicates that brecciation occurred later than skarn development. Massive silica alteration may cross-cut skarns.

The calcareous breccia comprises sub-angular to sub-rounded clasts of limestone and marble, cemented by a grey to dark grey calcareous matrix, with occasional bituminous material and rare pyrite. Pyrite, sphalerite, galena, and other sulphides including orpiment, realgar, tetrahedrite, alabandite, stannite, as well as quartz, calcite, rhodochrosite and rhodonite occur within the matrix. The geochemical-mineralogical zoning is evident whereby galena (Pb) and Mn bearing minerals are more abundant distally relative to sphalerite (Zn). Bi and Sn bearing minerals are most elevated in the magmatic-hydrothermal system.

The polymictic to monomictic breccias are overall grey and comprise sub-angular clasts of black limestone, shale, white silica with veins of silica-pyrite, and marble with silica, wollastonite, and calcite. Monomictic breccias comprise sub-angular limestone or intrusive clasts. Polymictic and monomictic breccia clasts vary in size and are cemented with an amorphous black material with disseminated pyrite. Pyrite, chalcopyrite, sphalerite, galena, and possibly other sulphides occur within the matrix, forming veins/veinlets, pockets, or disseminations. Karst breccias contain clasts of limestone, marble, silica, skarn, and intrusive rocks. They are sub-angular to sub-rounded, occurring within a matrix of sub-horizontal laminated limestone and silica-sericite-clay material.

The stratabound Pb-Ag-Zn mineralization occurs in the sandstone strata (mantos) at the base of the Goyllarizquisga Formation (near the contact with the Pucará Group). Several disseminated sulphide mantos have recently been identified at Sara and Porvenir 2W within the quartz sandstone, generally in contact with layers of silt and microconglomerates. The minerals include galena with silver content, sphalerite, and pyrite. Gold is also present.

6.6 Deposit Types

Three types of mineral deposits are recognized at El Porvenir:

- Skarn (exoskarn and endoskarn),
- Intermediate sulphidation epithermal veins and breccias, and
- Stratabound.

The description of the skarn deposit is largely derived from Einaudi and Burt (1982), Hammarstrom et al. (1991), and references therein. The hydrothermal vein deposit description is largely derived from Baumgartner et al. (2008) and references therein.

6.7 Skarn

Skarn deposits are generally considered as replacement style mineralization within or associated with carbonate dominant rocks. Skarns are classified as either endoskarn or exoskarn, referring to the location of skarn related mineralization either within an associated intrusive unit, or within carbonate lithology, respectively. Additionally, skarns can be divided into two broad groups: magnesian and calcic skarns, based on a dolomite dominated or limestone-dominated host lithology, respectively.

Skarn development commonly includes metamorphic and metasomatic processes associated with carbonate and intrusive rocks, and an associated hydrothermal system. Mineralization occurs via a physio-chemical reaction between circulating hydrothermal fluids and the host lithology, and results in irregular shaped bodies. The hydrothermal system is generally believed to be related to and expelled from a cooling igneous body, which then undergoes a chemical reaction and cools as the fluid interacts with the usually carbonate dominant host lithology. The lithochemistry of the host rocks (i.e., Ca or Mg rich carbonate, or calc-silicate assemblage) strongly controls or influences mineralization. Replacement mineralogy commonly comprises Ca and Mg bearing silicates, however, Fe , Al, and Mn bearing minerals may also be important. Mineral and metal zonation is common. Three generalized dynamic processes responsible for the formation of all skarns are described as:

1. Isochemical contact metamorphism during pluton emplacement;
2. Prograde metasomatic (infiltration) skarn formation as the pluton cools and an ore fluid develops; and,
3. Retrograde alteration of earlier formed mineral assemblages.

The style of mineralization at El Porvenir appears to be best represented by the base and precious metal skarn category of the calcic skarn group. In terms of a conceptual model, Zn + Pb combined may average 10% to 15%, commonly with significant Ag (from 30 g/t to 300 g/t) as well as Cu, Au, and W. Copper mineralization commonly occurs proximal to the associated intrusive unit, whereas Zn and Pb mineralization typically occurs more distally to the associated intrusive. Mineralization commonly occurs as sulphides, including sphalerite, galena, chalcopyrite, and a variety of Ag-bearing sulphosalts. Gangue mineralogy may be dominated by Mn-bearing pyroxenes and garnet. Mineral textures vary from commonly coarse grained, associated with Ca rich host lithology and in close proximity to the related intrusion, to fine-grained, more distal and associated with calc-silicate rocks.

The tectonic setting of Zn-Pb skarns are commonly reported at continental margins and formed during syn- to late orogenic processes. Plutons are commonly absent but, if present, occur as stocks and dikes and may vary in composition from granite to granodiorite to syenite to diorite. Replacement mineralogy within carbonates is usually Fe, Mn, and S rich, and low in Al; and alteration within associated intrusions may comprise locally intense epidote, pyroxene, and garnet.

6.8 Hydrothermal Vein and Breccia

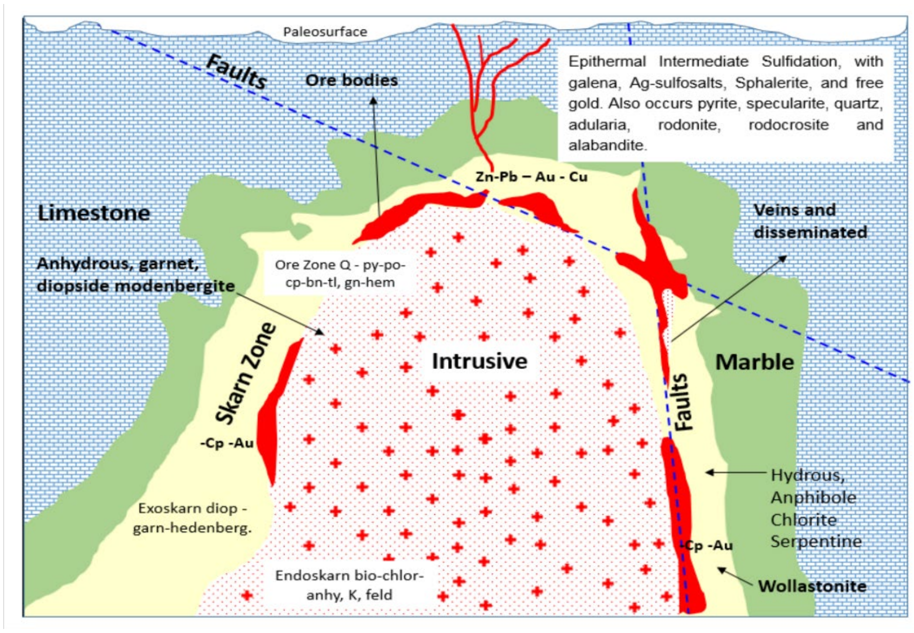
The hydrothermal veins and breccias at El Porvenir fall into a class of epithermal polymetallic base metal deposits (also referred to as Cordilleran base metal veins), which form in the upper parts of a magmatic-hydrothermal system (i.e., porphyry environment).

The Cordilleran base metal deposits have the following features:

- Close temporal and spatial association with calc-alkaline intrusions;
- Mineralization occurred under epithermal conditions (i.e., near Earth's surface);
- Sulphide-rich mineralogy, including a Cu-Zn-Pb-(Ag-Au-Bi) metal suite, and high Ag/Au ratio;
- Well-developed mineral zonation and alteration minerals, with Zn-Pb mineralization formed more distally (Pb-Ag-Au assemblage in the upper zone and Cu-Au association in the deeper zones);
- Early pyrite-quartz associated with low sulphidation mineralogy;

- Mineralization textures may be open-spacing filling in silicate host rocks, or as replacement in carbonate rocks; and
- Mineralization occurred late in the temporal evolution of the magmatic-hydrothermal system.

Figure 6-7 is a schematic diagram showing the spatial relationship of skarn, replacement, and hydrothermal vein mineralization with intrusive rocks.



Modified from Gilbert and Lowell, 1974

Figure 6-7: Schematic Diagram of Skarn, Replacement and Hydrothermal Vein Mineralization

6.9 Stratabound

Stratabound deposits have been described by Fontboté, Amstutz, Cardozo et al. (1990), Fontboté defined stratabound deposit model as deposits formed through volcanogenic, hydrothermal, metamorphic, diagenetic, and sedimentary processes both penecontemporaneously and much later than the host rock, which can be volcanic or sedimentary.

The empirical link of ore and host rock can be used to classify the stratabound ore deposit according to the age and geotectonic position of the enclosing rock. A systematic classification could be achieved with ore deposits hosted by rocks of the Andean Cycle (Mesozoic-Recent) because the regional geology and geotectonic interpretation of the rocks of this period are well known. According to Fontboté (1990), three metallogenic "stages" can be distinguished in the Central Andes. Each stage is characterized by its tectonic style, magmatic activity, and basin evolution; and in each stage, characteristic types of stratabound deposits occur.
The sandstone hosted stratiform lead-zinc occurrences in the Goyllarisquizga Formation near Milpo were included by Samaniego (1982) in the Santa Metallotect, however, the possibility that they were formed by impregnation in relation with the Tertiary skarn deposits of the Milpo-Atacocha district (Soler 1986) is supported by lead isotopic data (Gunnesch and Baumann 1990).

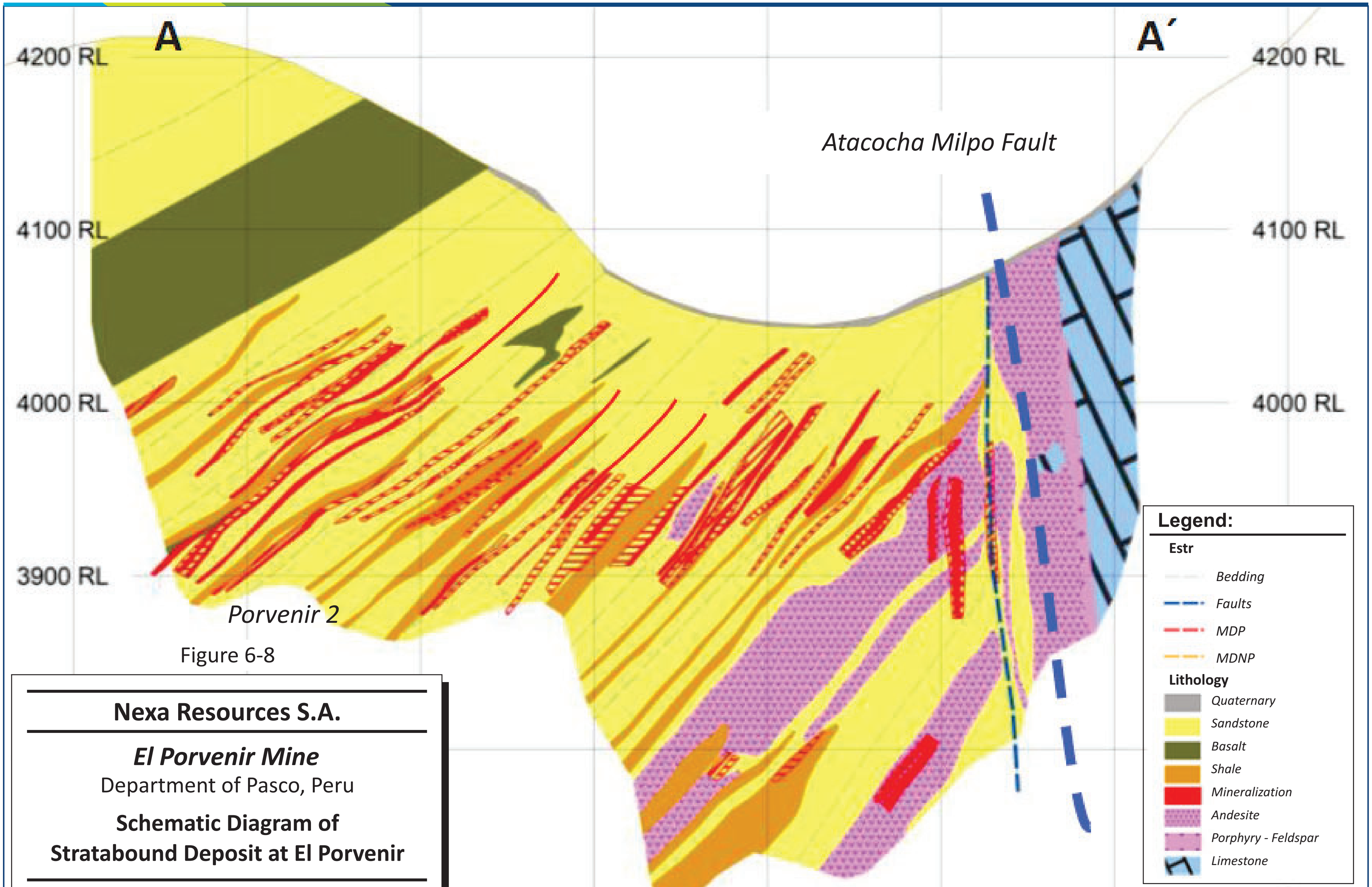


Figure 6-8

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Schematic Diagram of Stratabound Deposit at El Porvenir

January 2021

Source: Nexa, 2020.

7.0 EXPLORATION

7.1 Exploration

All exploration work at El Porvenir must be considered in the broader context of an integrated exploration program for the greater Atacocha Mine region. Nexa has been conducting exploration and development work at El Porvenir since 1949. The majority of this work is generally conducted simultaneously with underground development, which involves diamond core drilling, and channel sampling following underground drifting. Since 2019, surface diamond drilling has been carried out to identify mineralization in new areas, such as the Sara deposit which was discovered at the end of 2018. Prior to 1997, minor and sporadic exploration drilling was completed. No channel sampling is documented before 2001.

7.2 Integration of El Porvenir and Atacocha

In 2017, Nexa developed an underground connection (and integration) of the El Porvenir and Atacocha mines at the 3370 Level. At least four more of these connections were planned, and allow ample opportunities to conduct underground exploration drilling to test the volume which lies between the two mines. Figure 7-1 presents the El Porvenir and Atacocha mines with underground workings in relation to resource classifications and relevant infrastructure. In 2018, the Integration Zone was discovered at the 3300 Level, which consists of two mineralized zones, one hosted in hydrothermal breccias and one in skarn, and Nexa plans to continue exploration towards levels lower and higher than the 3300 Level.

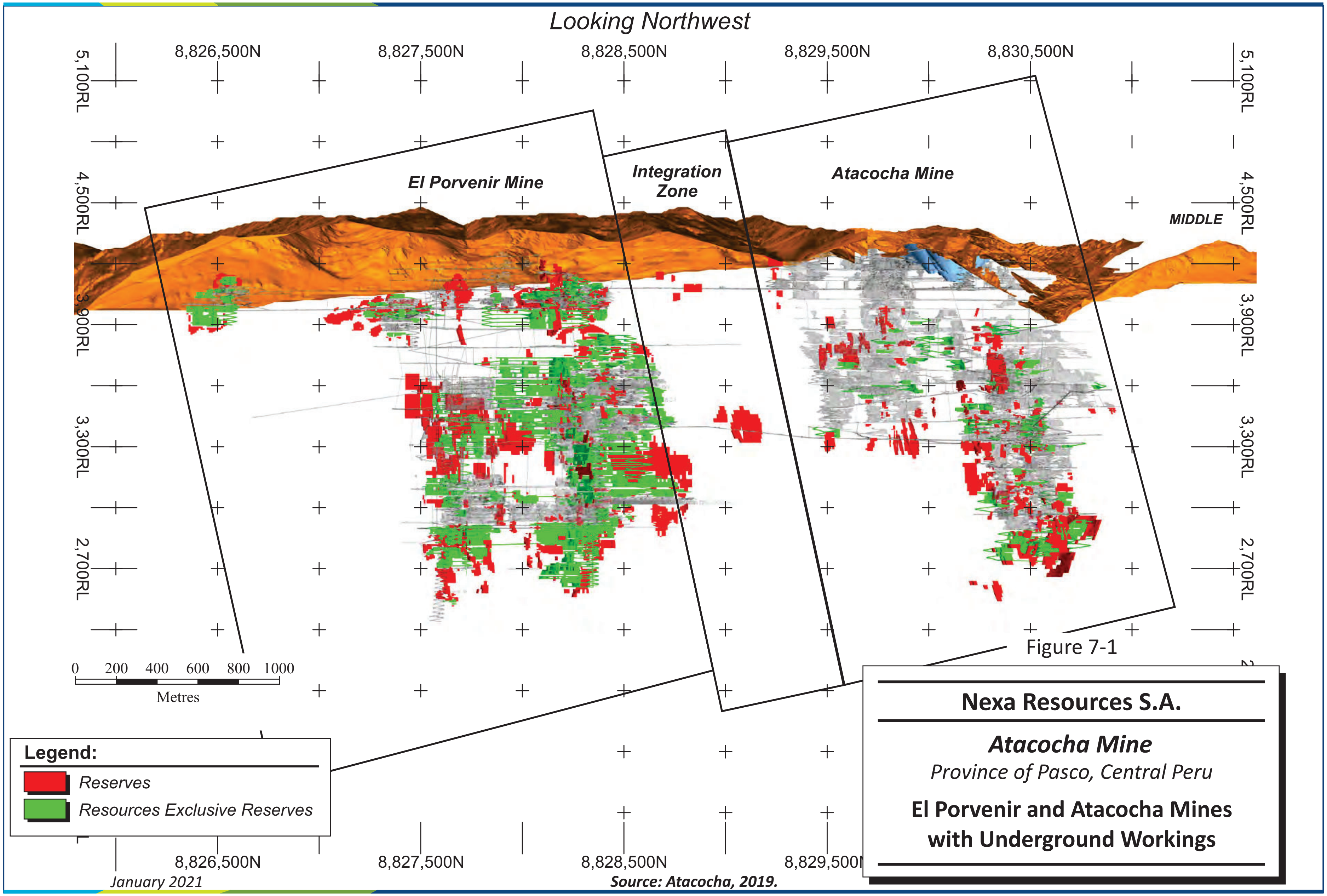


Figure 7-1

Nexa Resources S.A.

Atacocha Mine

Province of Pasco, Central Peru

El Porvenir and Atacocha Mines with Underground Workings

January 2021

Source: Atacocha, 2019.

7.3 2019 El Porvenir Exploration

Exploration in 2019 included 47,000 m of diamond core drilling, focused on defining new Inferred Mineral Resources at nine different targets such as Don Lucho, Exito, and Integration Zone underground, and Sara at surface. Nexa's diamond exploration activities from the surface and underground at El Porvenir is generally carried out simultaneously with the underground development, which involves diamond drilling, mapping, sampling, interpretations of known mineralized zones extensions and Brownfield-type satellite targets. The El Porvenir exploration team carried out the following work during 2019:

- Diamond drill core density sampling (10 cm to 15 cm, paraffin method) carried out at the Lima (ALS) laboratory.
- Incorporation of Terraspec Halo logging, to obtain better knowledge of alteration and identify correlations of grade with any preferential alteration.
- Measure orientations of existing core, in order to generate a better interpretation of the mineralized trends, faults, veins and strata.

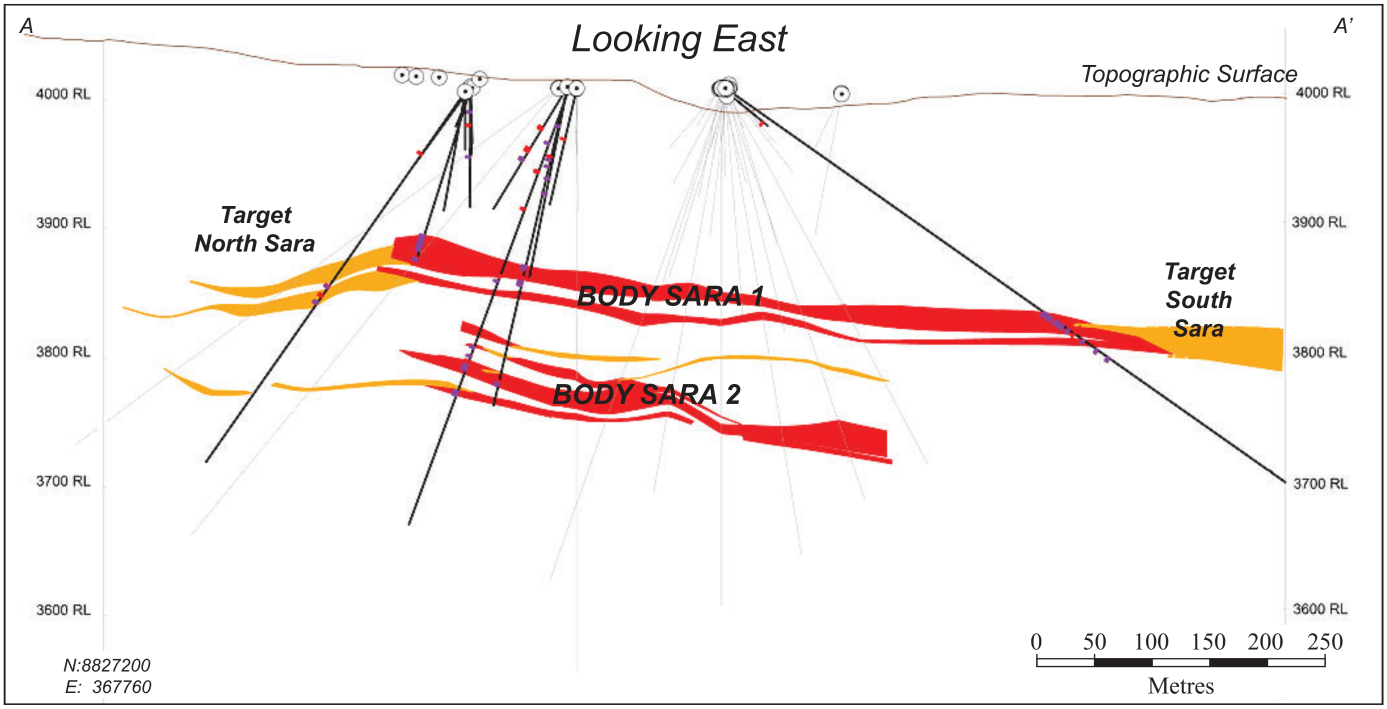
7.4 2020 Exploration Program

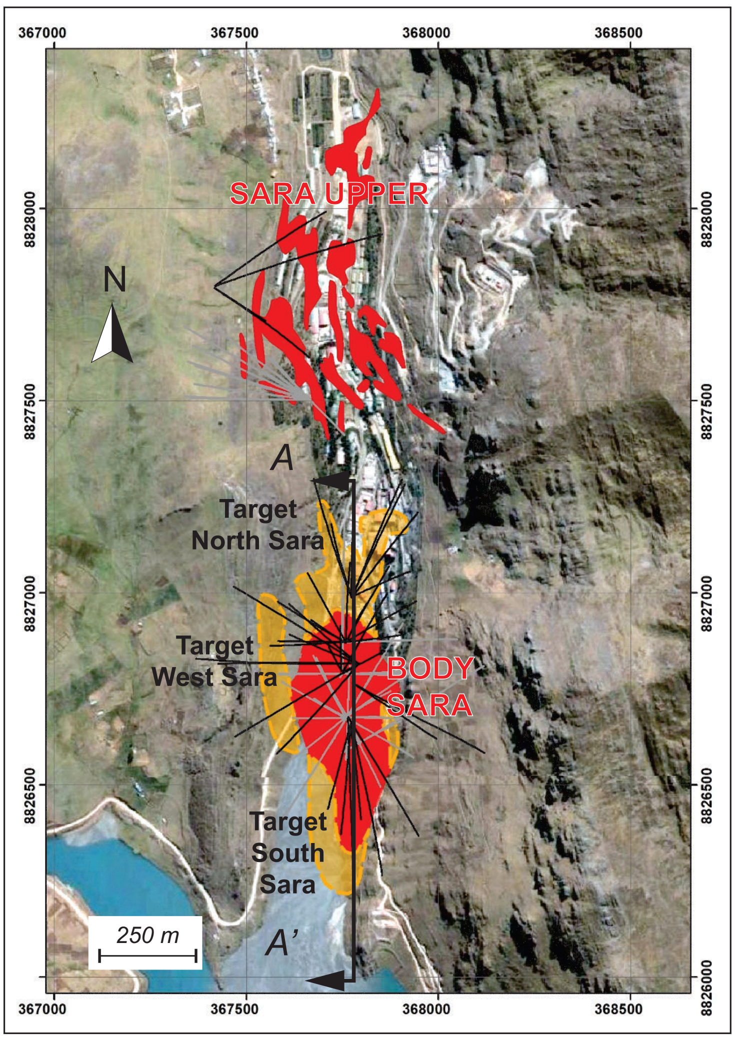
Exploration activities for 2020 at El Porvenir were projected to complete 18,000 m of diamond drilling, however, only 16,126 m in 42 holes were completed due to COVID-19 pandemic restrictions. The drilling programs focused on the extensions of the Sara mineralized zone from surface, as well as the exploration to the north of Sara mineralization, from underground at the 4050 Level. A location map of the Sara deposit is shown in Figure 7-2.

As part of the "Full Potential" Program, exploration data acquisition and interpretation activities for 2020 focused on mineralogical alteration patterns and a surface magnetometric geophysical program, aiming to identify and define Brownfield exploration targets (Figure 7-3).

7.4.1 Sara Project

The Sara deposit, located to the southwest of the El Porvenir operation area, is hosted in the sandstones of the Gollarizquisga Group and consists of mineralization with intermediate sulphidation characteristics. Nexa staff have recognized two mantles with galena and sphalerite containing significant silver and, to a lesser extent, gold.





January 2021

Source: Nexa, 2020.

Legend:

- *2020 drilling*
- *Historical drilling*
- *Sara Ore Body*
- *Lateral extensions*

Figure 7-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Sara Project Location and Example Section

7.4.2 Alteration Studies

The following techniques to obtain a better definition of mineralogical alterations were carried out:

Remote sensing and advanced spaceborne thermal emission and reflection radiometer (ASTER) data analysis, to obtain superficial alteration anomalies, using the Crosta technique based on Principal Component Analysis (Figure 7-3).

TerraSpec Halo (a full-range near-infrared spectrometer) data collection and analysis, carried out within the Sara project, to identify alteration minerals and to delineate alteration anomalies.

7.4.3 Geophysics

In 2020, Nexa commissioned a MAGDRONE magnetometry program covering 488 km of lines over a 7,200 ha area in the Cerro Pasco Complex district extending from the Machcan area to the south of El Porvenir (Figure 7-4). The geophysical survey indicated the possible presence of subcropping intrusives as new exploration targets.

Level 2700 represents an important area for the expansion of El Porvenir. A plan section of the magnetometry data for Level 2700 is shown in Figure 7-5(a), projected to surface in Figure 7-5(b). Magnetometry showed five geophysical anomalies (Tingo, Carmen Chico NW, Carmen Chico W, La Quinua and Chicri), which will be studied through geological mapping programs, surface sampling, and diamond drilling in the next three years.

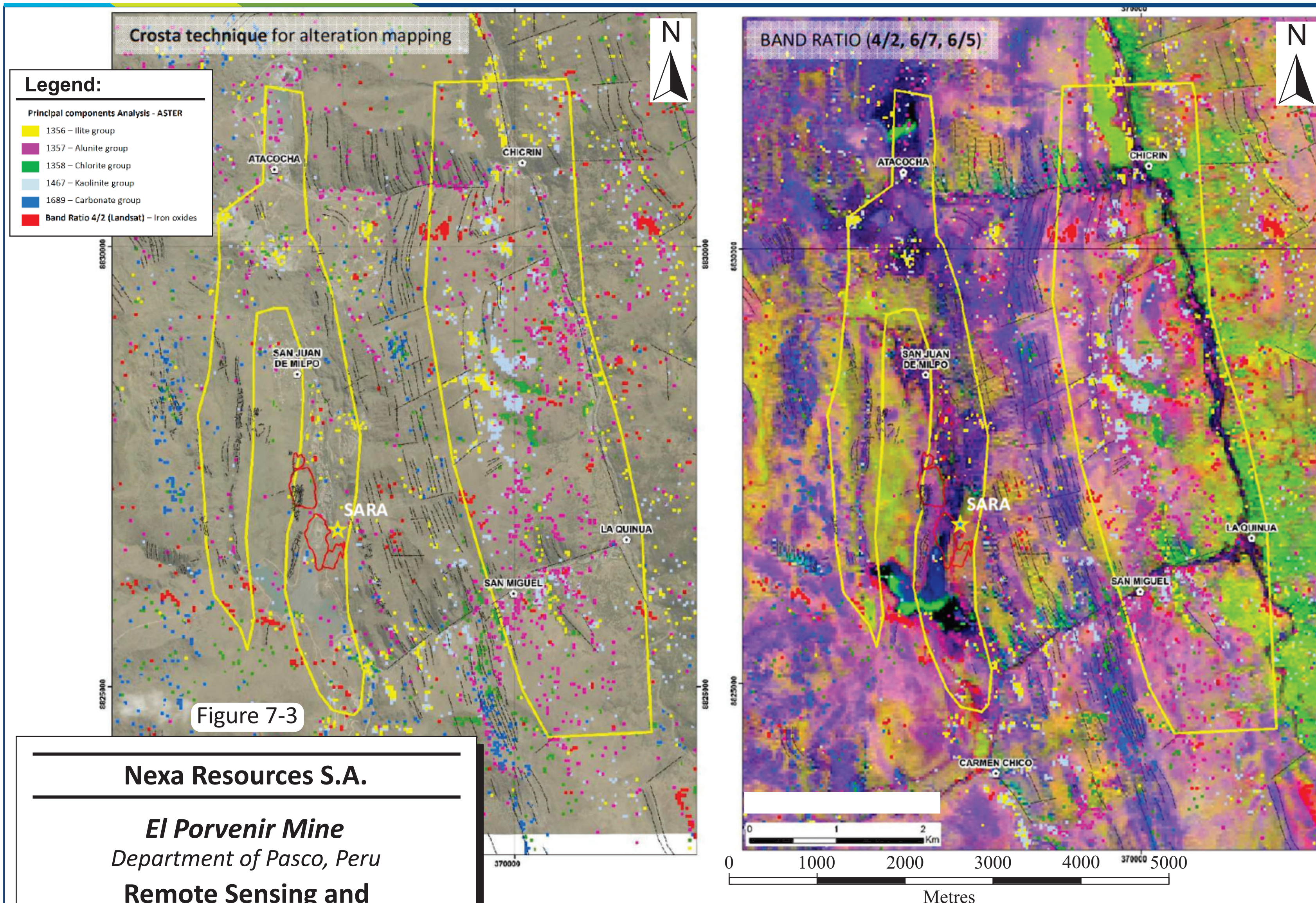


Figure 7-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Remote Sensing and Alteration Anomalies

January 2021

Source: Nexa, 2021.

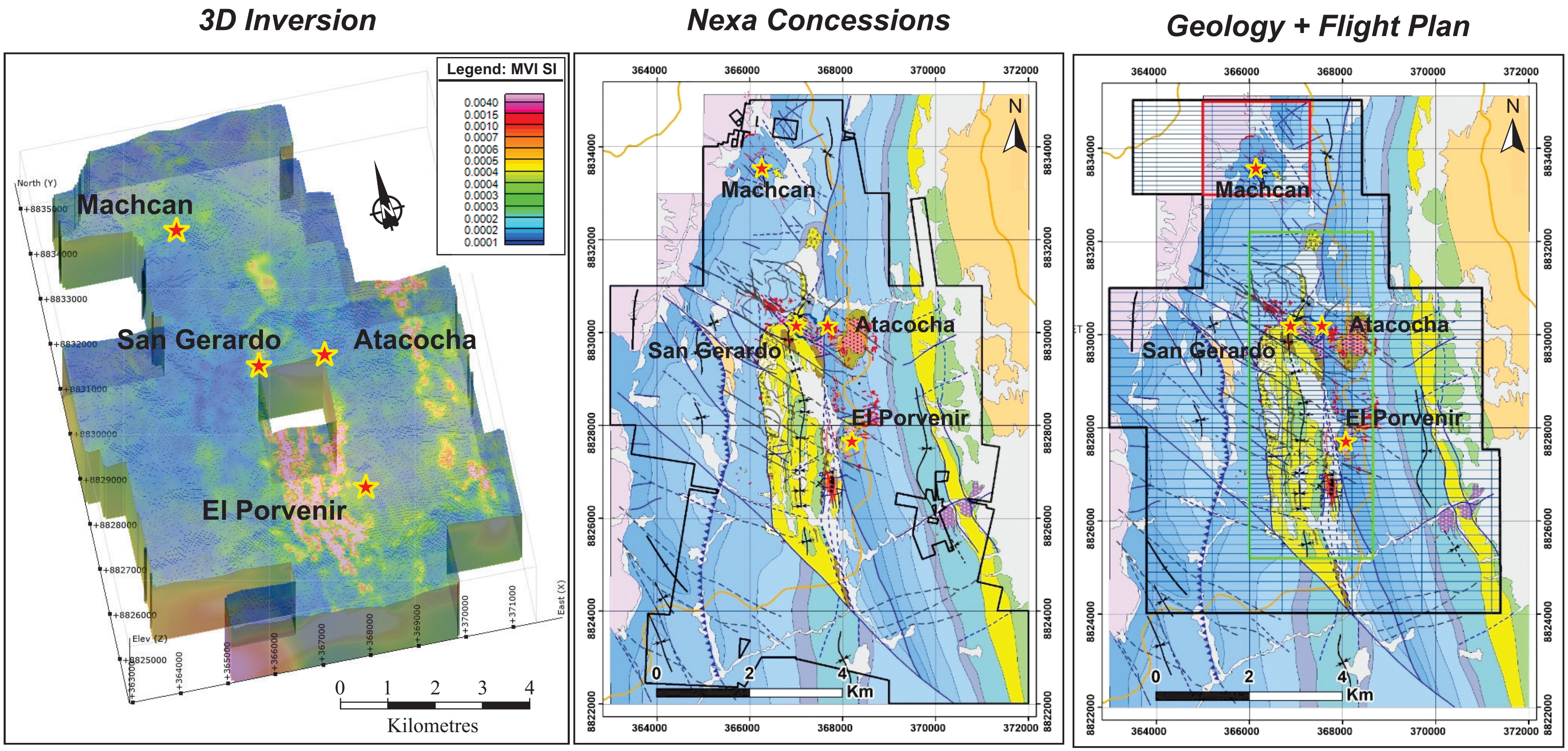
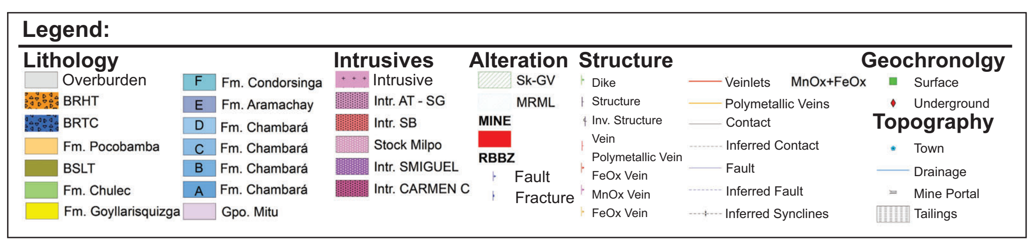


Figure 7-4



Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Geology, Flight Plan, and 3D Geophysical Model

January 2021

Source: Nexa, 2021.

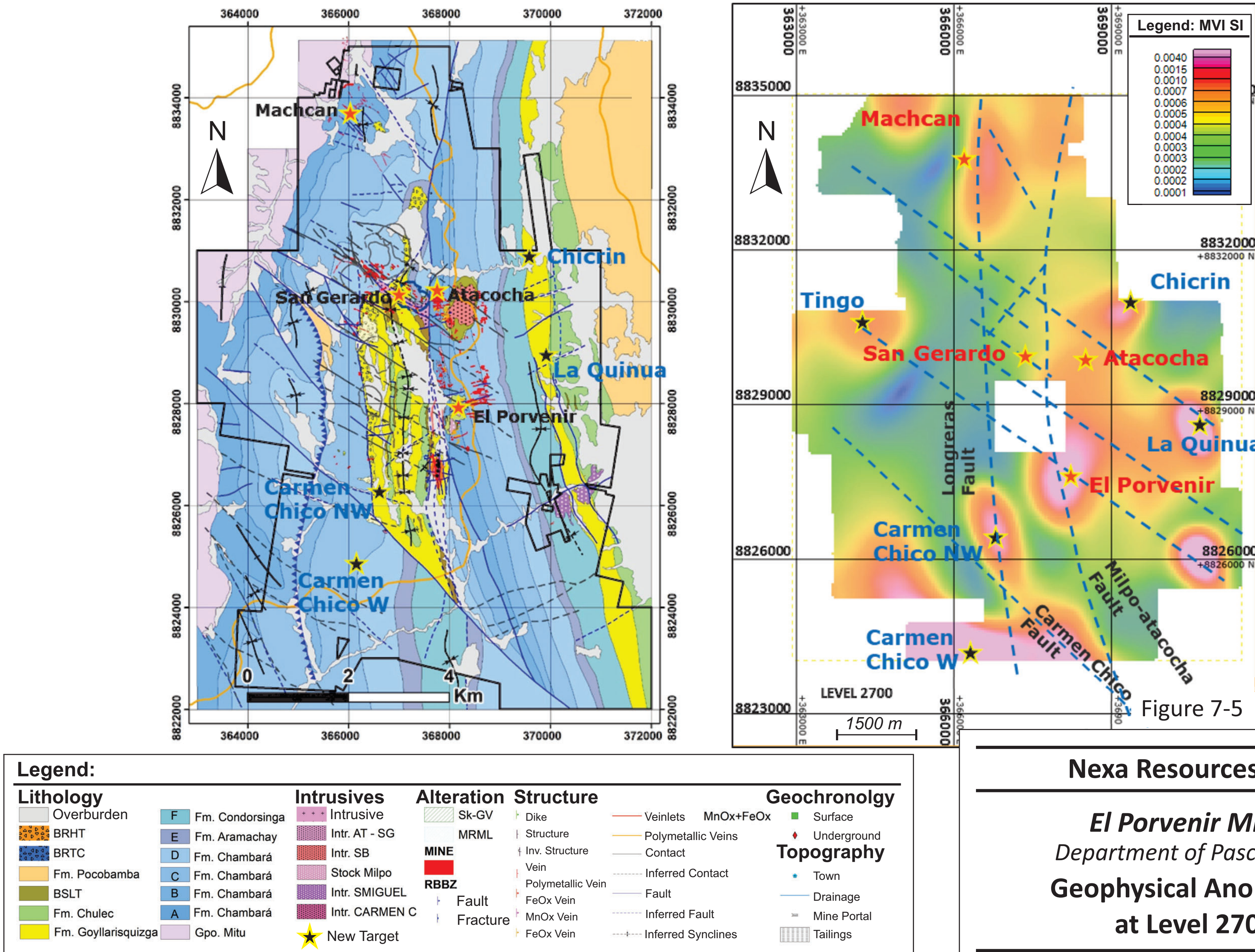


Figure 7-5

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Geophysical Anomalies at Level 2700

January 2021

Source: Nexa, 2021.

7.4.4 Brownfield Exploration

The following brownfield projects (Figure 7-6) have been recognized through surface mapping and through subsequent work, including remote sensing process and geophysics:

- Machcan: Vein outcrops and Angelica mantle with Ag, Pb, and Zn mineralization and magnetic anomalies.
- Curiajasha: Northwest faulting, concordant with the dikes and with magnetic anomalies.
- Longreras: Silicic breccia extending for more than two kilometres; the presence of Pb and Ag anomalies on surface and a magnetic anomaly to the south.
- Manuel 05 and Pique Estrella: Follow the northwest structural trend; with some historic holes cutting vein mineralization.
- La Churca: The intersection of the north-south Longreras fault and the east-west La Churca fault, and the presence of northeast oriented dikes on the surface, indicate good exploration potential.
- La Quinua Chicrin Corridor: Remote sensing anomalies, with the presence of alunite, illite, and kaolinite, and the sandstone host rock in combination with a geophysical anomaly at depth indicate a high exploration potential.

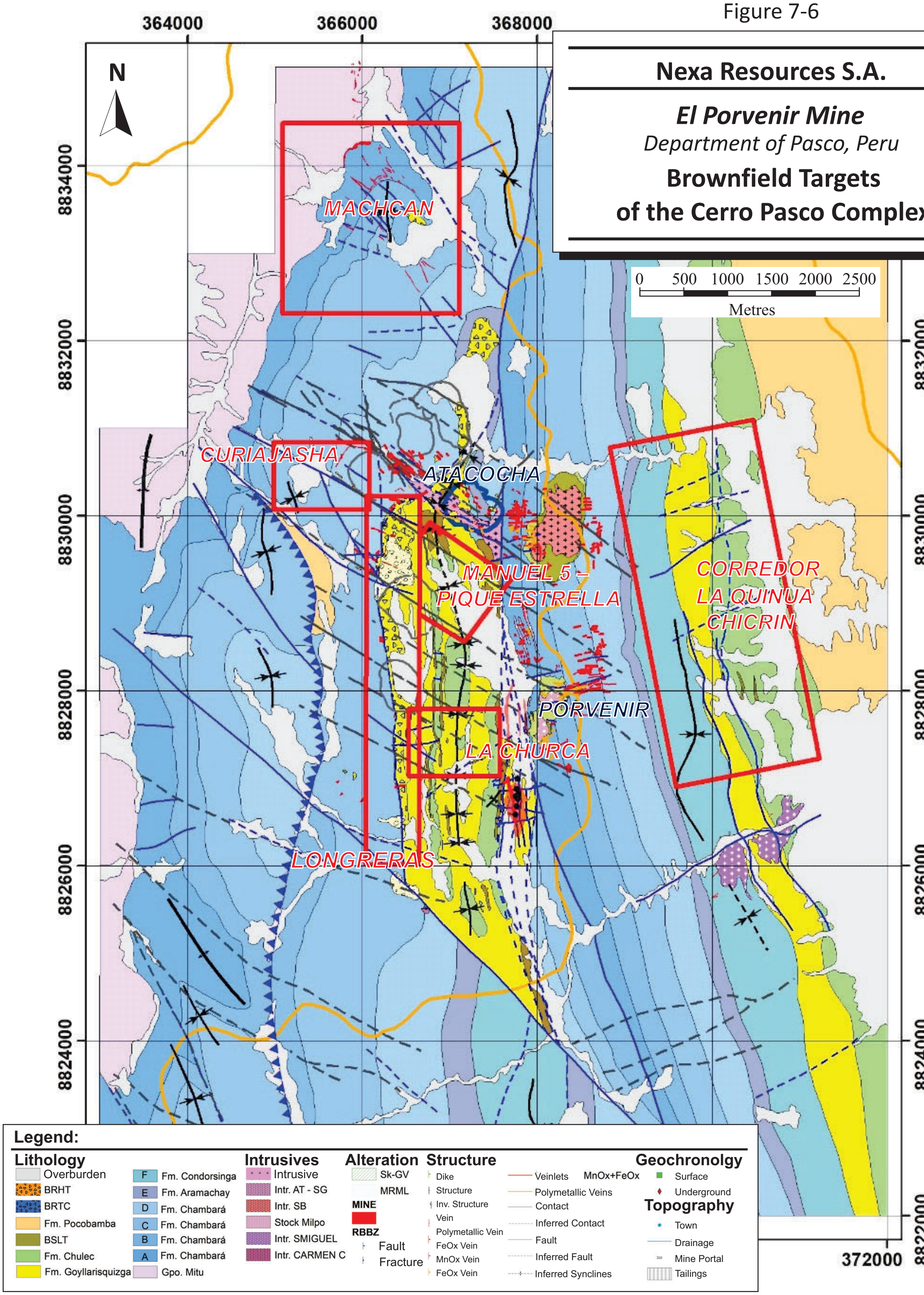
Figure 7-6

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Brownfield Targets of the Cerro Pasco Complex



January 2021

Source: Nexa, 2021.

7.5 2021 Exploration Program

The exploration work planned for 2021 has a budget of $3.1 million and includes 18,000 m of diamond drilling, focused on defining new Mineral Resources in the Sara corridor, comprising the eastern part of the Milpo syncline in the Goyllarisquizga Formation, and the Integration Zone at the 3,300 Level underground.

The exploration criteria for 2021 drilling will be based on four components:

- Stratigraphic correlation: It is evident that the Sara mineralization is hosted in a horizon of medium to coarse grained sandstones; therefore, exploration is focused on locating similar horizons.
- Structural analysis: Exploration drilling is focused on identifying extensions of known deposits based on structural geology and interpretation.
- Alteration: At Sara, Nexa identified that the alteration related to mineralization is associated with the presence of Illite and muscovite. Nexa will incorporate this new interpretation as a guide for exploration for this type of intermediate sulphidation, stratabound deposit.
- Geophysics: Exploration at Sara showed that mineralization can be located at transitions between high and low magnetic values.

The SLR QP is of the opinion that Nexa's exploration strategy, practice, and procedures are consistent with industry standards, and notes that Nexa's strategy has delineated several targets which may expand production.

7.6 Drilling

7.6.1 Drilling Summary

As of February 15, 2020, a total of 4,664 drill holes for 762,848.57 m are included in the El Porvenir drilling database (Table 7-1). All drilling was diamond drilling (DDH), with the majority of the holes (4,598) completed from underground workings, and 66 holes completed from surface. Drilling has been done by various contractors.

A total of ten historic holes, with no survey records, missing geological data, and causing grade discrepancy with overlapped new holes, were excluded from the Mineral Resource estimate. In addition to this exclusion, a total of 11 holes were relocated into the Atacocha database, as they were drilled within the Atacocha concession. SLR concurs with Nexa's list of holes excluded from the Mineral Resource estimate. Table 7-2 lists the drilling excluded from the Mineral Resource estimate, and Table 7-3 lists the drilling included in the Mineral Resource estimate.

In addition to drilling, a total of 17,127 channel samples were completed for 97,104.81 m between 1900 and 2017 (Table 7-4).

From February 16, 2020 to December 31, 2020, an additional 36 exploration diamond drill holes were completed for a total length of 14,246.80 m.

Figure 7-7 illustrates the locations of the drill holes at Porvenir. Figure 7-8 is a cross section illustrating the selected drill holes and related geological interpretation and Figure 7-9 shows channel sampling locations at the Mine (1900-2017).

Table 7-1: Drilling Summary at Porvenir
Nexa Resources S.A. – El Porvenir Mine

	Surface Holes			Underground Holes			Total		
Year	**Number**	**Metres**	**Type**	**Number**	**Metres**	**Type**	**Number**	**Metres**	**Type**
Pre-2006				789	145,120.07	DDH	789	145,120.07	DDH
2006				22	2,915.45	DDH	22	2,915.45	DDH
2008	14	638	DDH	87	17,554.74	DDH	101	18,192.74	DDH
2009	2	253.4	DDH	140	22,623.80	DDH	142	22,877.20	DDH
2010	4	376.1	DDH	143	23,651.37	DDH	147	24,027.47	DDH
2011				263	47,391.67	DDH	263	47,391.67	DDH
2012				323	56,550.90	DDH	323	56,550.90	DDH
2013				270	44,026.55	DDH	270	44,026.55	DDH
2014				258	37,782.60	DDH	258	37,782.60	DDH
2015				301	48,859.12	DDH	301	48,859.12	DDH
2016				386	64,204.70	DDH	386	64,204.70	DDH
2017				450	54,645.80	DDH	450	54,645.80	DDH
2018				459	72,236.10	DDH	459	72,236.10	DDH
2019	2	1,123.20	DDH	426	65,812.70	DDH	428	66,935.90	DDH
2020	44	16,885.90	DDH	281	40,196.40	DDH	325	57,082.30	DDH
Totals	**66**	**4.00**		**4,598**	**743,571.97**		**4,664**	**762,848.57**	

Table 7-2: Summary of Drilling Excluded from Mineral Resource Estimate
Nexa Resources S.A. – El Porvenir Mine

	Underground Holes			Total		
Year	**Number**	**Metres**	**Type**	**Number**	**Metres**	**Type**
Pre-2006	13	3,892.05	DDH	13	3,892.05	DDH
EP2008	1	244.98	DDH	1	244.98	DDH
EP2011	2	361.2	DDH	2	361.2	DDH
EP2012	3	571.6	DDH	3	571.6	DDH
EP2013	1	170.7	DDH	1	170.7	DDH
EP2016	1	17.9	DDH	1	17.9	DDH
Totals	**21**	**5,258.43**		**21**	**5,258.43**	

Note. The drilling was excluded due to discrepancy with new holes and some of them were relocated to Atacocha database.

Table 7-3: Summary of Drilling Included in Mineral Resource Estimate
Nexa Resources S.A. – El Porvenir Mine

	Surface Holes			Underground Holes			Total		
Year	Number	Metres	Type	Number	Metres	Type	Number	Metres	Type
Pre-2006				776	141,228.02	DDH	776	141,228.02	DDH
2006				22	2,915.45	DDH	22	2,915.45	DDH
2008	14	638	DDH	86	17,309.76	DDH	100	17,947.76	DDH
2009	2	253.4	DDH	140	22,623.80	DDH	142	22,877.20	DDH
2010	4	376.1	DDH	143	23,651.37	DDH	147	24,027.47	DDH
2011				261	47,030.47	DDH	261	47,030.47	DDH
2012				320	55,979.30	DDH	320	55,979.30	DDH
2013				269	43,855.85	DDH	269	43,855.85	DDH
2014				258	37,782.60	DDH	258	37,782.60	DDH
2015				301	48,859.12	DDH	301	48,859.12	DDH
2016				385	64,186.80	DDH	385	64,186.80	DDH
2017				450	54,645.80	DDH	450	54,645.80	DDH
2018				459	72,236.10	DDH	459	72,236.10	DDH
2019	2	1,123.20	DDH	426	65,812.70	DDH	428	66,935.90	DDH
2020	44	16,885.90	DDH	281	40,196.40	DDH	325	57,082.30	DDH
Totals	**66**	**19,276.60**		**4,577**	**738,313.54**		**4,643**	**757,590.14**	

Note. For the Leapfrog model all validated drill holes were used.

Table 7-4: Channel Sampling Summary at Porvenir
Nexa Resources S.A. – El Porvenir Mine

Year	Quantity	Metres	Type
Pre-2006	2,906.00	19,441.57	CHNL
2006	6,317.00	18,901.31	CHNL
2007	998.00	8,915.38	CHNL
2008	799.00	7,294.64	CHNL
2008	1,097.00	6,982.46	CHNL
2011	1,180.00	8,780.62	CHNL
2012	1,153.00	7,740.19	CHNL
2013	637.00	3,618.37	CHNL
2014	607.00	3,701.95	CHNL
2015	968.00	7,212.40	CHNL

Year	Quantity	Metres	Type
2016	437.00	4,026.30	CHNL
2017	28.00	489.62	CHNL
Totals	**17,127**	**97,104.81**	

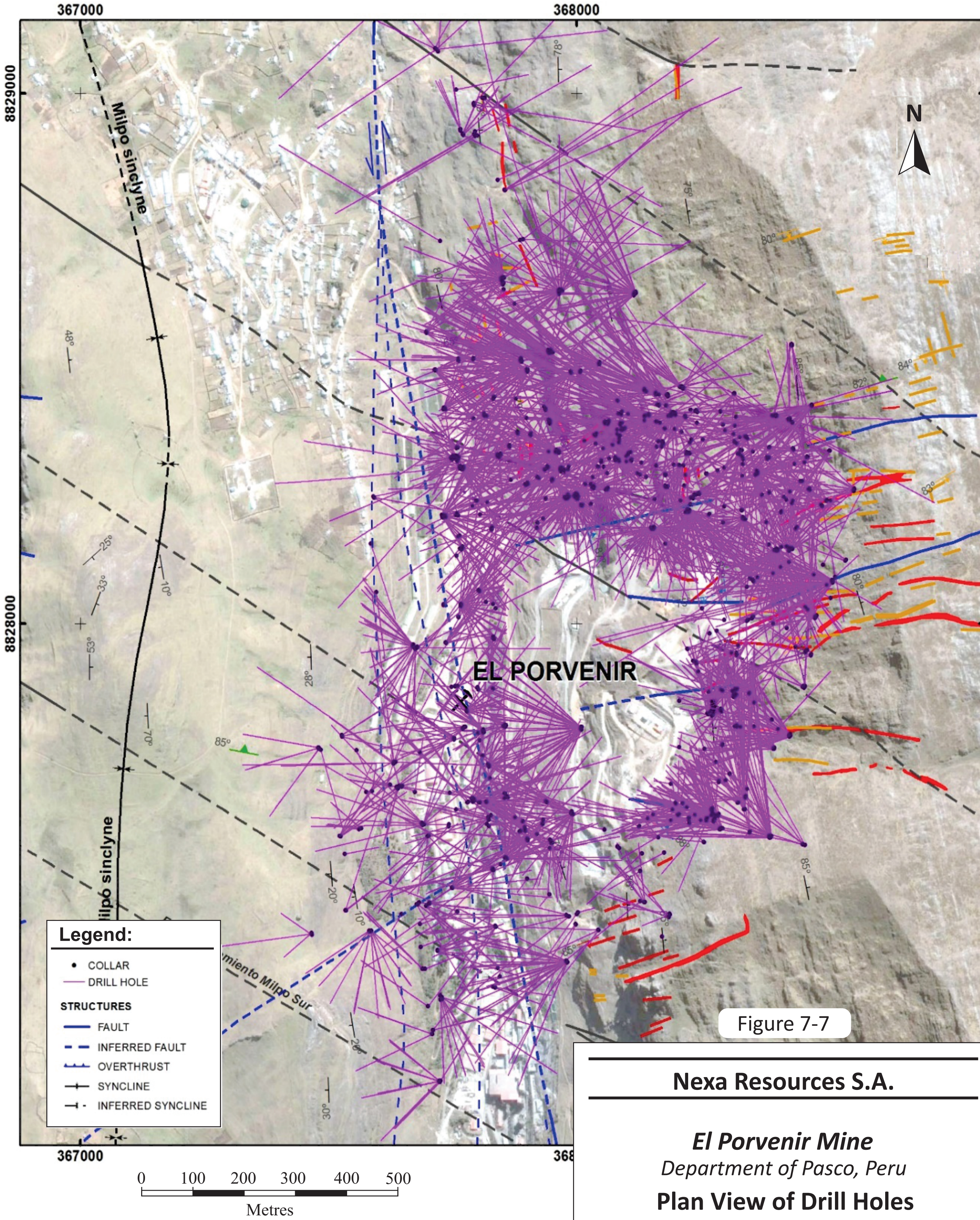


Figure 7-7

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Plan View of Drill Holes

January 2021 ***Source: Nexa, 2020.***

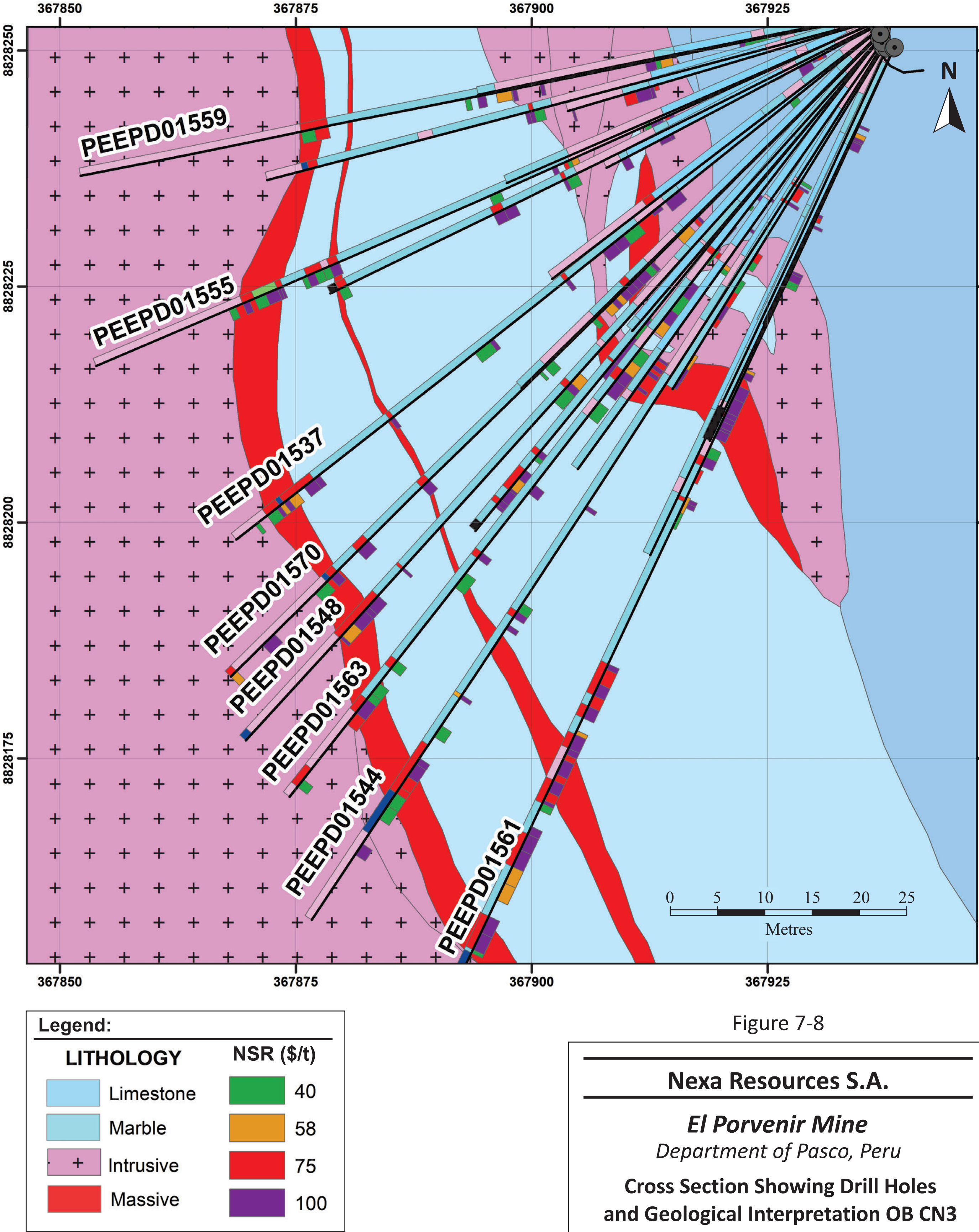


Figure 7-8

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Cross Section Showing Drill Holes and Geological Interpretation OB CN3

January 2021 ***Source: Nexa, 2020.***

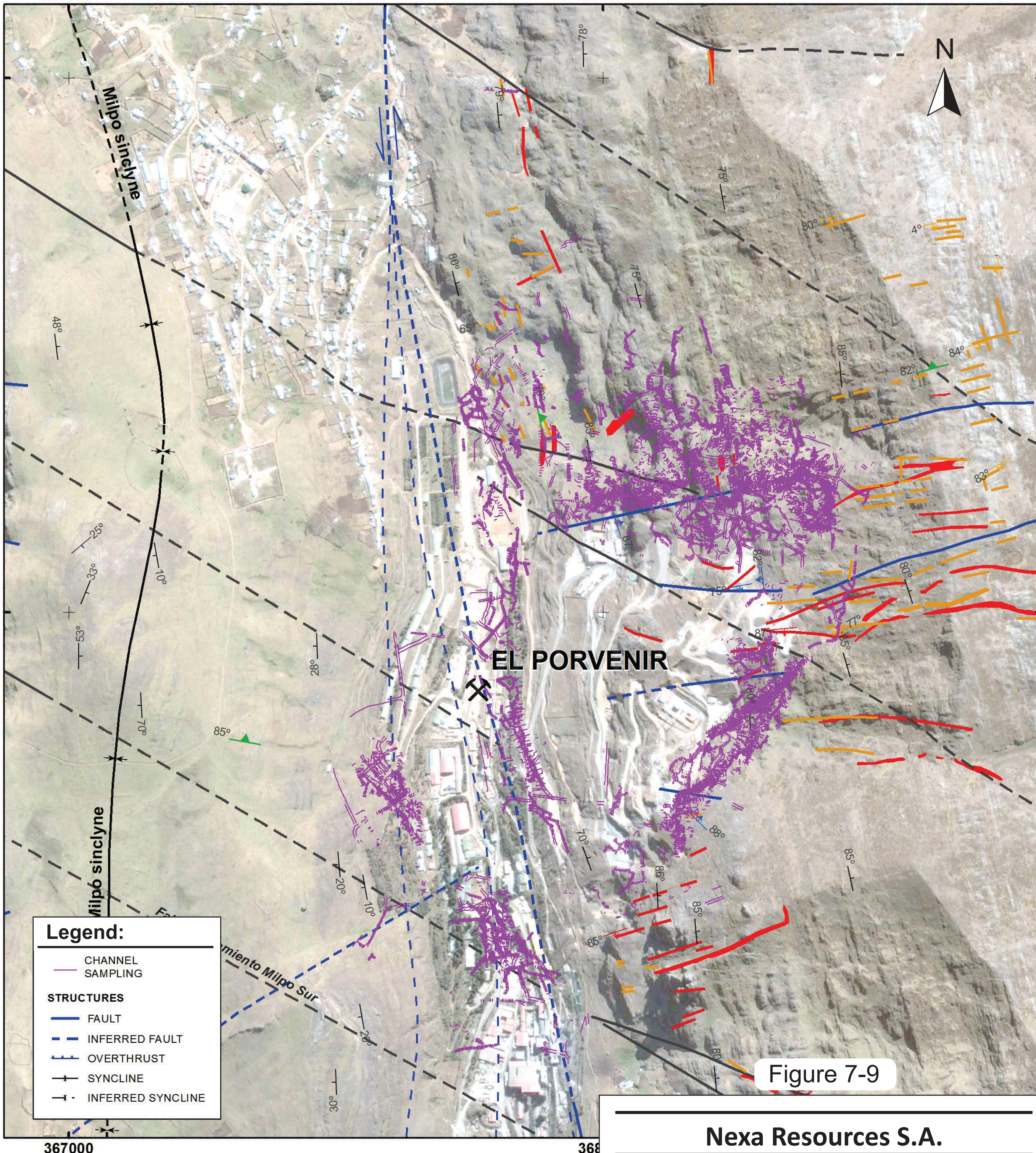


Figure 7-9

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Plan View of Channel Sampling

January 2021 ***Source: Nexa, 2020.***

7.6.2 Drilling Procedures

Drilling procedures are coordinated and supervised by company geologists (mine/production or exploration) and overseen by the Superintendent of Geology and Exploration. Drilling procedures are as follows:

Initially, drill hole collar coordinates and orientation are communicated to a mine surveyor to accurately position the drill hole and are then certified by the surveyor and validated by the responsible geologist. The coordinates and collar orientation data are entered into a master CSV file, subsequently imported into the database (Fusion) and geological/mine/modelling software program. Drill hole (and channel sample) identification is generated in a systematic and specific format, including codes to reference: country, mining unit, year, and sequential number. All related drill hole data generated is similarly referenced to the corresponding drill hole collar. Basic drill hole information (i.e., collar and survey) should be entered into the database and archived within four days of completing the drill hole.

Daily drilling logs completed and provided by the various contracted drilling companies are archived in PDF format.

Drill hole survey data is collected by various drilling contractors. The survey is generally carried out after the completion of the drill hole. Various survey equipment (i.e., Gyro, Reflex, Flexit, etc.) may be used depending on the drilling contractor and equipment availability; Gyro survey deviation information is archived in pdf format. Survey data are collected between approximately 5 m and 10 m downhole, depending on the drilling objective (infill and brownfield). Original survey data is marked on paper, and provided to the supervising geologist, signed by the driller in charge. Survey data is validated by the responsible geologist and entered into a master CSV file, subsequently imported into the database, and geological/mine/modelling software program.

Following the completion of a drill hole, the logging and core sampling procedures are carried out by a team of logging geologists. Core logging is completed using a set of geological, lithological, mineralogical, and alteration terms. Core logs are entered into logging software (Fusion). A complete series of core photos are taken for each drill hole and stored in JPEG or PDF format. Core sampling for geochemical analysis is essentially completed at the same time as core logging; see Section 8 for detailed description of drill core sampling procedures. Logging is completed within 48 hours after a drill hole is completed.

The company personnel responsible for managing the database incorporates the core logging and core sampling information, as well as the subsequent assay results once the analytical work is completed. Sample and assay data are initially combined in a master CSV file, subsequently imported into the database, and geological/mine/modelling software program.

Drilling information is stored in a structured directory and backed up on a central server (Brazil). Data available in the drill hole database includes drill hole location (Collar), downhole survey (Survey), sampling and geochemical analysis (Assay), recovery (Geotech), density (Density), and geological characteristics (Lithology, Alteration, Mineralization). Drill core diameter varies, including: BQ (36.4 mm), NQ (47.6 mm), HQ (63.5 mm), and TT-46 (35.3 mm).

7.6.3 Drilling Pattern and Density

Exploration drilling is generally completed over a 50 m by 50 m grid, whereas infill drilling is designed to cover a 15 m by 15 m grid. The overall distribution of drill holes and channel samples has been concentrated around the Carmen Norte 3, Exito, and Sara zones.

7.6.4 Drill Rigs

At El Porvenir, there are two main categories of drilling: exploration and resource definition diamond drilling. Drilling is performed by the contractor Explomin.

7.6.4.1 Exploration Diamond Drilling

Exploration drilling is planned by the exploration team and its main objective is to discover new resources. It consists of underground (mine) drilling and surface drilling using Sandvik DE140 and versadrill 1.4U drilling machines, respectively. Exploration drilling is carried out with large drill rigs with a depth range of up to 1,000 m and HQ (63.5 mm) and NQ (47.6 mm) core sizes, and as required BQ (36.6 mm), are used.

7.6.4.2 Resource Definition Diamond Drilling

Resource definition drilling is the responsibility of the geological team and has the objective to upgrade known Inferred Mineral Resources to Measured or Indicated and thus increase the Mineral Reserves at Porvenir. This drilling consists of:

Recategorization, focused on the recategorization and definition of bodies where there is little drilling information.

Infill focused on providing additional information from short to long term planning to ensure the reliability of production programs.

Small drill rigs called drillcats are used with depth ranges of up to 400 m. Infill drilling generally uses BQ core size (to a depth of 240 m) and recategorization drilling uses NQ or BQ core size (to a depth of 400 m).

7.6.5 Core Recovery

Core recovery and rock quality designation (RQD) are measured and recorded for each hole. Core runs are 3.0 m for HQ and NQ and 1.5 m for BQ core size. Measurements are reviewed by geologists and the database administrator and then exported to the Fusion database.

Table 7-5 summarizes core recovery by domain from 2017 to 2020.

Table 7-5: Core Recovery by Domain – 2017 to 2020
Nexa Resources S.A. – El Porvenir Mine

Domain	No. Samples	Minimum (%)	Maximum (%)	Mean (%)	Variance	Std. Deviation	CV
Don Ernesto	279	33.33	100	94.07	170.74	13.07	0.14
Don Lucho	469	2.23	100	93.41	319.73	17.88	0.19
Integración Ata Ep	386	48.85	100	97.43	54.64	7.39	0.08
Porvenir 3	815	32.63	100	98.23	71.25	8.44	0.09
Porvenir 2 Sur Este	1002	0.00	100	98.12	59.00	7.68	0.08
Porvenir 2 Sur Oeste	896	33.33	100	98.64	9.42	3.07	0.03
Sara	739	14.70	100	96.04	118.73	10.90	0.11
Socorro 2 and 4	265	81.82	100	99.23	2.59	1.61	0.02

Domain	No. Samples	Minimum (%)	Maximum (%)	Mean (%)	Variance	Std. Deviation	CV
Veta Am	529	20.00	100	98.04	54.01	7.35	0.07
Veta Carmen Norte 1	276	13.33	100	97.07	108.34	10.41	0.11
Veta Carmen Norte 3	1798	6.72	100	97.92	63.02	7.94	0.08
Veta Carmen Norte 4	197	86.21	100	98.43	6.46	2.54	0.03
Veta Carmen 2	104	88.33	100	98.74	9.00	3.00	0.03
Veta Carmen 3	321	54.55	100	98.73	15.46	3.93	0.04
Veta Progreso	15	98.59	100	99.71	0.26	0.51	0.01
Veta 1204	307	40.00	100	96.10	132.14	11.50	0.12
Veta 1204 Inferior	3	100.00	100	100.00	-	-	-
Veta 1204 Superior	3604	0.00	100	97.87	95.21	9.76	0.10
Veta 5	687	50.00	100	98.10	30.28	5.50	0.06
Éxito	3749	0.00	100	98.55	44.26	6.65	0.07

Notes:

Data encoded within the model.
For this analysis, 1,043 of 4,643 drill holes (22%) were used.

Based on core recovery statistics reviewed, and from the inspection of a number of drill holes, the SLR QP is of the opinion that the core recovery at Porvenir is excellent, generally greater than 95%, and provides a reliable reflection of the mineralization in the mining operation.

7.6.6 Drill Core Sampling

Drill core sampling is carried out under the supervision of the Sampling Geologist Supervisor and completed after the geotechnical and geological logging, and photographing the whole core following the Standard Operation Procedure (SOP) PO-EXP-GTO-009-PT.

The length of the samples varies between 0.30 m and 2.00 m depending on the structure and lithology. Once the sample length and cut-line have been defined by the supervising geologist, the core is cut longitudinally into two equal parts using an electric diamond drill core saw. If the core is very fractured, the sampler separates and removes 50% of the fragmented material for the sample. The fragments are deposited in a pre-coded polyethylene bag and transported to the laboratory.

Current exploration core sampling follows written protocols and consists of half-core sampling of HQ-or NQ sized core on (usually systematic) 1.5 m intervals. The remaining half-core is kept as backup. Major mineralized body contacts are respected.

Infill or resource definition drilling is typically BQ-sized core and is sampled in its entirety on 1.5 m intervals.

7.6.7 Channel Sampling

Channel samples are treated as drill holes in the database, with a location, survey (direction: azimuth and inclination), and associated sampling/assay data. Table 10-4 lists the amount of channel sampling completed by year. Figure 7-9 illustrates the distribution of the channel sampling.

Channel chip samples are generally collected from the face of newly exposed underground workings. The entire process is carried out under the inspection of the sampling supervisor geologist.

Channel samples are collected between the hanging wall and footwall contacts of mineralized zones. A channel sample area is marked, oriented perpendicular to the strike of the mineralized structure. In general, the spacing between each channel sample is 2.0 m. The width of each channel sample is approximately 0.2 m to 0.3 m wide, and 2.0 cm deep. The sample area is first washed down to provide a clear view of the vein. The channel is sampled by taking a succession of chips in sequence from the hanging wall to the footwall. If the width of the vein, or length of the channel sample, is longer than 1.5 m, sample lengths shorter than 1.5 m are collected. If the width of the vein is smaller than 0.2 m, the width of the sample is increased to 0.4 m to obtain a sufficient sample size.

Sample collection is normally performed by two samplers, one using the hammer and chisel, and the other holding the receptacle cradle to collect the rock fragments. The cradle consists of a sack, with the mouth kept open by a wire ring. The collected sample material is then placed on a mat measuring 1.0 m by 1.2 m; the larger sample fragments are then broken down to smaller fragments, less than approximately 2.0 cm, using a four- or six-pound hammer. Subsequently, the sample material is mixed, and approximately one quarter of the mixed material is separated to obtain a representative sample (cone-and-quarter method), with a target weight of between 2.5 kg and 3.0 kg. The final sample is placed in a bag with a coded ticket and shipped to the Inspectorate laboratory at the mine site. Channel sampling was discontinued in 2017. In November 2019, Nexa re-started a channel sampling pilot, however, by the time of the database closure, the program was still in a preliminary stage and the channel samples were not included in the resource database. From November 2019 to February 15, 2020, a total of 187 channel totalling 1,028.05 m were sampled. Nexa reviewed this information and noted that overall there was good agreement with the resource model. SLR agrees with Nexa and recommends validating all channel samples collected between November 2019 and February 2020 to be included in the next Mineral Resource update. The SLR QP is of the opinion that the new information is not material to significantly impact the resource estimate.

7.6.8 Drilling and Channel Sampling Results

The results of analysis and interpretation of drilling data, and prior to 2017 channel sampling data, have been continually incorporated into the El Porvenir 3D geological model.

The database is used by modelling geologists who work together with the mine/production and exploration geologists to continually construct and update the 3D geological model. The 3D geological models are built in Leapfrog, primarily using geochemical assay results, particularly for Zn, Pb, Cu, and Ag, as well as underground geological level plan maps and interpreted cross sections and transverse sections.

In the SLR QP’s opinion, the drilling, logging, and drill core and channel sampling procedures meet industry standards. The SLR QP is not aware of any drilling, sampling, or recovery factors that could materially impact the accuracy and reliability of the results.

7.7 Hydrogeology Data

The El Porvenir Mine does not produce significant quantities of water. Details related to Hydrogeology are covered in Section 13.4.

7.8 Geotechnical Data

Geotechnical studies have been conducted at the El Porvenir Mine to characterize the quality of the rock mass to predict the stope and mine workings stability. Underground geotechnical mapping, geotechnical core logging and laboratory tests are part of Nexa geotechnical procedures. Nexa has performed laboratory testing in combination with geotechnical mapping and geotechnical logging to monitor the ground stability and to define parameters for ground support design of the underground workings as it is described in Section 13.3. The geotechnical logging, mapping, testing and data analysis protocols include industry-standard practices.

8.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Density Determinations

A total of 4,876 density samples were taken from 2009 to 2020 at the El Porvenir deposit and were tested by various laboratories. Nexa used Certimin and ALS as independent laboratories for density determinations. A summary of the density measurements taken is presented in Table 8-1.

Density samples were 10 cm to 20 cm lengths of the entire core, taken from a variety of lithological and mineralogical types. Photographs and brief descriptions were taken before sending the samples to the laboratory for density determinations. Density data is recorded in the main database.

A total of 1,131 samples were collected from mineralized zones (Figure 8-1) and a total of 3,745 samples were collected from waste rocks. For the mineralized zones, an average density value was applied. In the absence of sufficient data, Nexa has assigned an average density value of surrounding mineralized zones or the global average density value of all the mineralized zones.

ALS Peru S.A. and Certimin laboratories use the water immersion method to determine the density of the provided samples. This method consists of coating the sample in paraffin wax, weighing the sample in air, then suspending the sample in water, and weighing the sample again.

From 2014 to 2016, an on-site trained technician weighted the sample in air, then suspended the sample in water and measured the volume of displaced water. Currently density measurements are performed by external laboratories.

Table 8-1: Number of Density Measurements by Sample Type and Year
Nexa Resources S.A. – El Porvenir Mine

Phase	Sample Type	All No. Samples	No. Samples within Mineralization Zones
LOM2009	Drill Holes	5	-
LOM2011	Rock	686	246
LOM2012	Rock	18	6
LOM2014	Drill Holes	267	72
	Rock	62	2
LOM2015	Drill Holes	536	120
	Rock	229	50
LOM2016	Drill Holes	375	117
	Rock	236	53
LOM2017	Drill Holes	386	99
LOM2018	Drill Holes	317	75
	Rock	86	20
LOM2019	Drill Holes	834	105
LOM2020	Drill Holes	839	166
Total		**4,876**	**1,131**

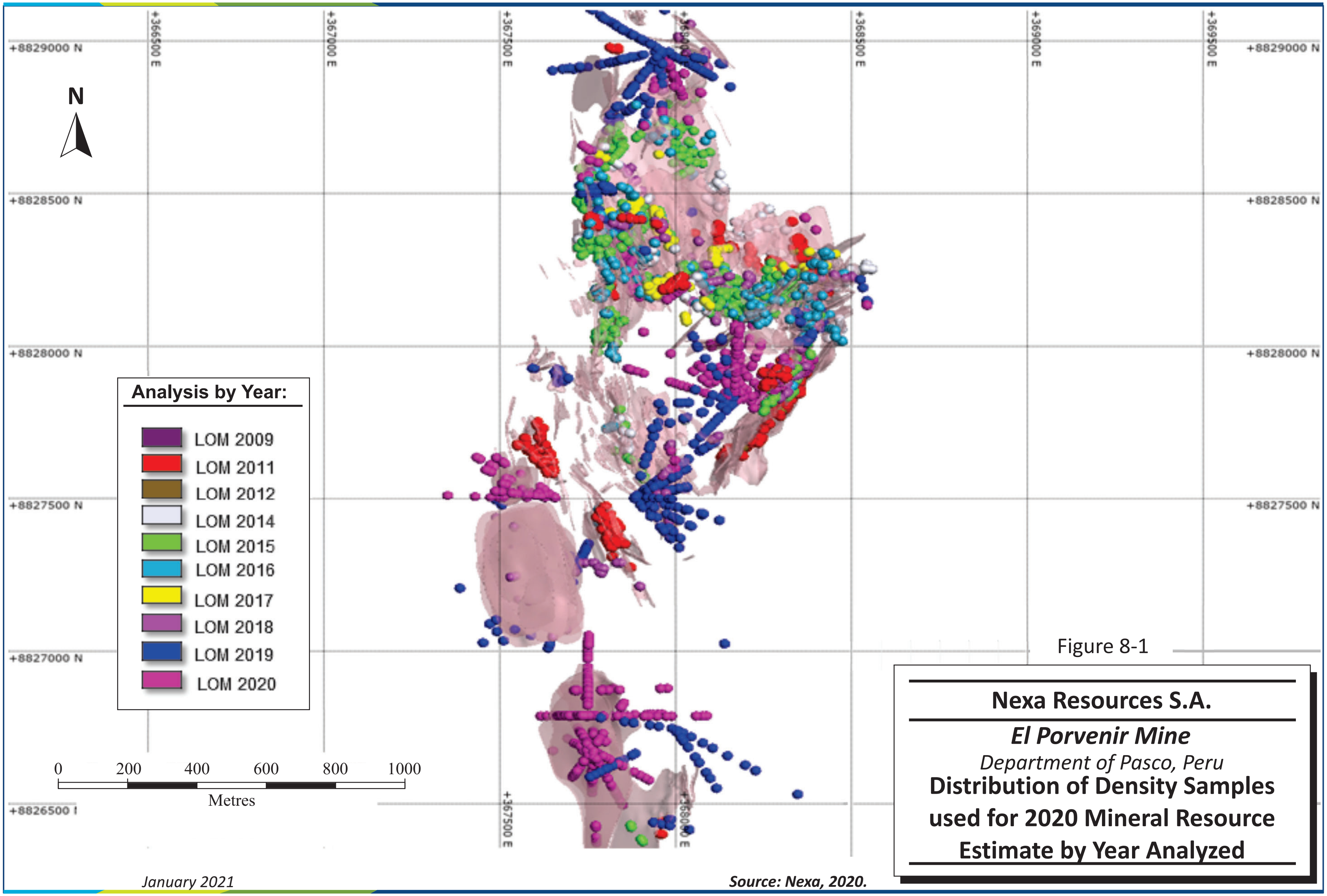


Figure 8-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Distribution of Density Samples used for 2020 Mineral Resource Estimate by Year Analyzed

January 2021

Source: Nexa, 2020.

8.2 Sample Preparation and Analysis

The core and channels samples are sent to several independent laboratories including Inspectorate (at the Mine, referred to subsequently as Inspectorate EP), SGS (at the Mine), ALS (Lima), and Certimin (Lima). Testing protocols among these laboratories differ in their detection limits and methods applied. El Porvenir has a contract with Inspectorate, which began its operations in 2011, and with ALS in 2018. SGS served as the Mine laboratory from 2006 to 2009. Exploration samples were sent to Certimin in 2017 and 2018.

Inspectorate is an independent and commercial laboratory, and is part of the Bureau Veritas, which is a global leader in testing, inspection, and certification. Certimin Lima holds ISO 9001 and NTP-ISO/IEC 17025 and 17021 certifications and is accredited by the Organismo Peruano de Acreditación (INACAL). ALS geochemical laboratories are accredited to ISO/IEC 17025:2005 for specific analytical procedures. Both Certimin and ALS laboratories are independent of Nexa.

Sampling was completed by Nexa geologists following standard operating procedures. Figure 8-2 illustrates a schematic flow chart of sample control, as well as the transfer of related data, and personnel units responsible for each respective area.

Exploration drilling samples are sent to ALS Lima, and mine drilling samples are sent to Inspectorate EP for preparation and analysis. Prepared samples are assayed principally for a suite of seven elements: Zn, Pb, Cu, Ag, Au, Bi, and Mn. Samples are initially coded and dried at 105°C to a maximum of 120°C. Following drying, the samples are crushed to a minimum of 70% passing minus two millimetres. The crushed samples are then reduced in size by passing the entire sample through a riffle splitter until 200 g to 250 g is obtained. The split samples are then pulverized to a minimum of 85% passing 75 µm. The pulverized samples are subsequently analyzed using an aqua regia digestion and atomic absorption spectroscopy (AAS).

Detection limits for Inspectorate EP, ALS Lima, and Certimin are summarized in Table 8-2.

Table 8-2: Laboratory Detection Limits
Nexa Resources S.A. – El Porvenir Mine

Laboratory	Element	Unit	Method	Detection Lower Limit	Detection Upper Limit	1st Upper Limit Default Method	2nd Upper Limit Default Method
Inspectorate EP	Ag	ppm	F-AA	4	-	GRA	-
	Cu	per	F-AA	0.01	30	VOL	-
	Fe	per	F-AA	0.01	-	-	-
	Mn	per	F-AA	0.01	-	-	-
	Pb	per	F-AA	0.01	30	VOL	-
	Zn	per	F-AA	0.01	30	VOL	-
ALS	Au	ppm	Au-AA23	0.005	10	Au-GRA21	-
	Ag	ppm	ME-ICP41	0.2	100	Ag-OG46	Ag-GRA21
	Al	per	ME-ICP41	0.01	25	-	-
	As	ppm	ME-ICP41	2	10000	-	-

Laboratory	Element	Unit	Method	Detection Lower Limit	Detection Upper Limit	1st Upper Limit Default Method	2nd Upper Limit Default Method
	B	ppm	ME-ICP41	10	10000	-	-
	Ba	ppm	ME-ICP41	10	10000	-	-
	Be	ppm	ME-ICP41	0.5	1000	-	-
	Bi	per	ME-ICP41	0.0002	1	-	-
	Ca	per	ME-ICP41	0.01	25	-	-
	Cd	ppm	ME-ICP41	0.5	1000	-	-
	Co	ppm	ME-ICP41	1	10000	-	-
	Cr	ppm	ME-ICP41	1	10000	-	-
	Cu	per	ME-ICP41	0.0001	1	Cu-OG46	-
	Fe	per	ME-ICP41	0.01	50	Fe-OG46	-
	Ga	ppm	ME-ICP41	10	10000	-	-
	Hg	ppm	ME-ICP41	1	10000	-	-
	K	per	ME-ICP41	0.01	10	-	-
	La	ppm	ME-ICP41	10	10000	-	-
	Mg	per	ME-ICP41	0.01	25	-	-
	Mn	per	ME-ICP41	0.0005	5	Mn-OG46	-
	Mo	ppm	ME-ICP41	1	10000	-	-
	Na	per	ME-ICP41	0.01	10	-	-
	Ni	ppm	ME-ICP41	1	10000	-	-
	P	ppm	ME-ICP41	10	10000	-	-
	Pb	per	ME-ICP41	0.0002	1	Pb-OG46	Pb-VOL70
	S	per	ME-ICP41	0.01	10	-	-
	Sb	ppm	ME-ICP41	2	10000	-	-
	Sc	ppm	ME-ICP41	1	10000	-	-
	Sr	ppm	ME-ICP41	1	10000	-	-
	Th	ppm	ME-ICP41	20	10000	-	-
	Ti	per	ME-ICP41	0.01	10	-	-
	Tl	ppm	ME-ICP41	10	10000	-	-
	U	ppm	ME-ICP41	10	10000	-	-
	V	ppm	ME-ICP41	1	10000	-	-
	W	ppm	ME-ICP41	10	10000	-	-
	Zn	per	ME-ICP41	0.0002	1	Zn-OG46	Zn-VOL70

Laboratory	Element	Unit	Method	Detection Lower Limit	Detection Upper Limit	1st Upper Limit Default Method	2nd Upper Limit Default Method
Certimin	Au	ppm	G0108	0.005	10	G0014	-
	Ag	ppm	G0148	0.2	100	G0001	G0008
	Al	per	G0148	0.01	15	-	-
	As	ppm	G0148	3	10000	-	-
	Ba	ppm	G0148	1	10000	-	-
	Be	ppm	G0148	0.5	10000	-	-
	Bi	per	G0148	0.0005	1	-	-
	Ca	per	G0148	0.01	15	-	-
	Cd	ppm	G0148	1	10000	-	-
	Co	ppm	G0148	1	10000	-	-
	Cr	ppm	G0148	1	10000	-	-
	Cu	per	G0148	0.00005	1	G0038	-
	Fe	per	G0148	0.01	15	G0051	-
	Ga	ppm	G0148	10	10000	-	-
	Hg	ppm	G0148	1	10000	-	-
	K	per	G0148	0.01	15	-	-
	La	ppm	G0148	0.5	10000	-	-
	Mg	per	G0148	0.01	15	-	-
	Mn	per	G0148	0.0002	1	G0060	-
	Mo	ppm	G0148	1	10000	-	-
	Na	per	G0148	0.01	15	-	-
	Ni	ppm	G0148	1	10000	-	-
	P	per	G0148	0.01	15	-	-
	Pb	per	G0148	0.0002	1	G0076	G0339
	S	per	G0148	0.01	10	-	-
	Sb	ppm	G0148	5	10000	-	-
	Sc	ppm	G0148	0.5	10000	-	-
	Sr	ppm	G0148	0.5	5000	-	-
	Th	ppm	G0148	50	10000	-	-
	Ti	per	G0148	0.01	15	-	-
	Tl	ppm	G0148	2	10000	-	-
	U	ppm	G0148	50	10000	-	-
	V	ppm	G0148	2	10000	-	-
	W	ppm	G0148	10	10000	-	-
	Zn	per	G0148	0.00005	1	G0387	G0338

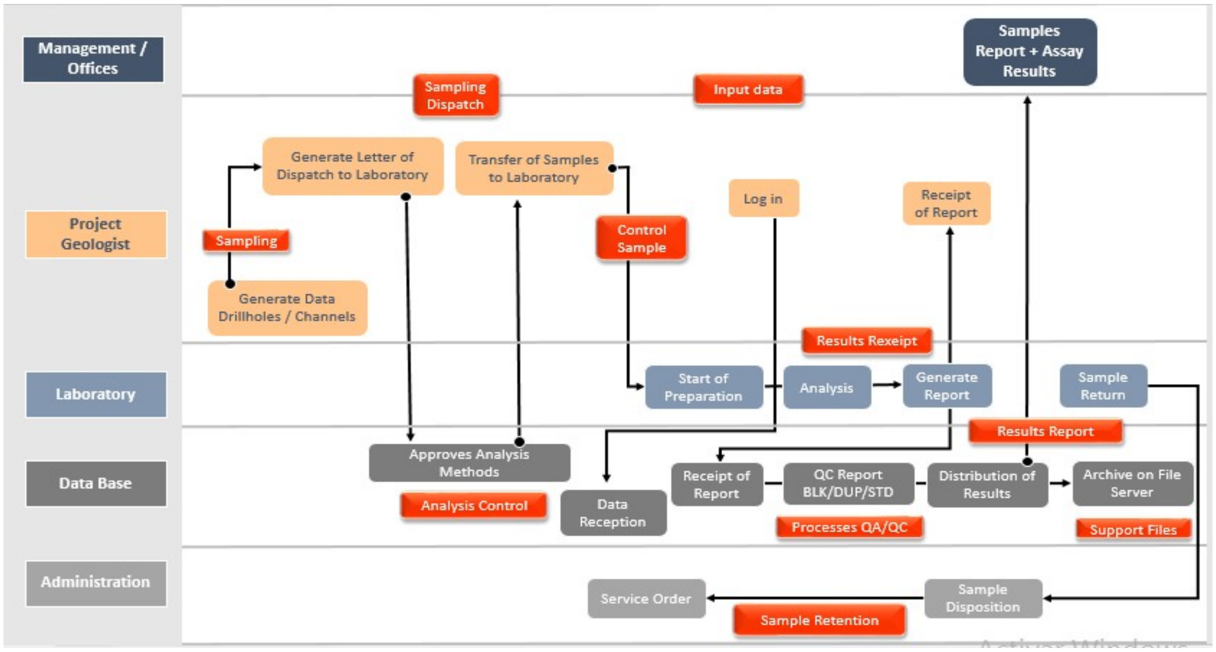


Figure 8-2: Schematic Flow Chart for Sample and Data Controls

8.3 Quality Assurance and Quality Control

El Porvenir has historical data and information up to February 15, 2020, the cut-off date for the resource database, and has implemented a quality assurance/quality control (QA/QC) program. These processes comply with current industry best practices which involve appropriate procedures and routine insertion of certified reference materials (CRM), standards, blanks, and duplicates to monitor the sampling, sample preparation, and analytical processes. Analysis of QA/QC data is performed to assess the reliability of all sample assay data and the confidence in the data used for resource estimation.

Quality control samples have been inserted into the sample stream since 2014 and channel samples since 2012. El Porvenir routinely sends in-house CRMs, blanks, field, reject (preparation), and pulp (laboratory) duplicates to the laboratory. During 2018, Nexa incorporated systematic external checks into the QA/QC program. Check assay programs were also carried out prior to 2018. Pulps were sent to external laboratories for analysis. Currently, Inspectorate EP and ALS analyze samples from infill drilling and brownfield exploration drilling, respectively.

During the 2006 to 2009 drilling campaign, samples were sent to SGS for analysis. From 2010 to present, underground infill drilling samples are sent to Inspectorate EP. If Inspectorate EP is running out of capacity, samples are delivered to Certimin and/or ALS laboratories.

8.3.1 QA/QC Protocols

Nexa has the following QA/QC protocols in place.

For infill and exploration drilling, one batch of samples is prepared for each drill hole. Control sample insertion rates are provided in Table 8-3, with field duplicates inserted directly following the original sample, coarse blank material samples inserted following a mineralized zone, and CRM samples inserted randomly.

All QA/QC sample insertions maintain consecutive numerical order. Pulp reject duplicates, an additional split of material taken after the pulverizing stage, are saved, and then resubmitted to the secondary laboratory at a later date at a rate of approximately 2% of the total samples submitted.

Each batch of check samples (pulp rejects) submitted to the secondary laboratory includes CRM and blank samples.

QA/QC samples represent approximately 16% of the total samples. A QA/QC report is prepared monthly, by the onsite Database Administrator, and reviewed by the Resource Geologist and Nexa corporate QA/QC coordinator in San Paulo. Batches of samples identified by a QA/QC review as an anomalous result are repeated by the laboratory at the request of the Geology team. Table 8-3 shows the control sample insertion rate and the acceptance criteria followed during Nexa's QA/QC program for El Porvenir.

Table 8-3: Control Sample Insertion Rate and Failure Criteria
Nexa Resources S.A. – El Porvenir Mine

Control Sample	Type	Insertion Rate	Failure Criteria	Expected/Allowed % Failures
Blanks		1 in 50 (2%)	5 x DL	<5%
CRMs		1 in 20 (5%)	Outside 3 STD	<10%
Duplicates	Twin	1 in 100 (1%)	<±30% relative error	<10%
	Coarse	1 in 100 (1%)	<±20% relative error	<10%
	Pulp	1 in 20 (5%)	<±10% relative error	<10%
External checks	Pulp	1 in 50 (2%)	<5% bias	<10%

A QA/QC relational database is maintained in Fusion. A summary of QA/QC submittals from 2014 to 2020 is presented in Table 8-4.

The actual insertion rates vary slightly by year and sample type.

Table 8-4: QC Insertion Rates
Nexa Resources S.A. – El Porvenir Mine

Year	Control	Type	Drill Holes No. Samples	Drill Holes Insertion Rate (%)	Channel No. Samples	Channel Insertion Rate (%)
2014 – Sep. 2017	Blanks	Pulp	901	2.97	393	3.85
		Coarse	899	2.96	392	3.84
	In-House CRMs	Low Grade	449	1.43	-	-
		Intermediate Grade	682	2.18	375	3.37
		High Grade	633	2.02	378	3.40
	Duplicates	Field	793	2.53	245	2.20
		Coarse	689	2.20	174	1.56
		Pulps	715	2.28	195	1.75
	All Control Samples		**5,761**	**18.36**	**2152**	**19.97**

Year	Control	Type	Drill Holes No. Samples	Drill Holes Insertion Rate (%)	Channel No. Samples	Channel Insertion Rate (%)
Nov. 2017 - Aug. 2018	Blanks	Pulp	959	2.51	-	-
		Coarse	956	2.50	-	-
	In-House CRMs	Low Grade	694	1.82	-	-
		Intermediate Grade	624	1.63	-	-
		High Grade	586	1.53	-	-
	Duplicates	Field	956	2.50	-	-
		Coarse	952	2.49	-	-
		Pulps	951	2.49	-	-
		Check Assay	747	1.96	-	-
	All Control Samples		**7,425**	**19.44**	-	-
Aug. 2018 - May. 2019	Blanks	Pulp	1,641	2.48	-	-
		Coarse	1,638	2.48	-	-
	In-House CRMs	Low Grade	1,069	1.62	-	-
		Intermediate Grade	1,464	2.22	-	-
		High Grade	639	0.97	-	-
	Duplicates	Field	1,458	2.21	-	-
		Coarse	1,652	2.50	-	-
		Pulps	1,687	2.56	-	-
		Check Assay	641	0.97	-	-
	All Control Samples		**11,890**	**18.01**	-	-
Jun. 2019 - Feb. 2020	Blanks	Coarse	1,227	2.22	-	-
	In-House CRMs	Low Grade	1,155	2.09	-	-
		Intermediate Grade	1,159	2.10	-	-
		High Grade	409	0.74	-	-
	Duplicates	Field	830	1.50	-	-
		Coarse	1,036	1.88	-	-
		Pulps	2,047	3.71	-	-
		Check Assay	388	0.70	-	-
	All Control Samples		**8,251**	**14.94**	-	-

8.3.2 Certified Reference Material

Results from the regular submission of CRMs, prepared in-house and certified by accredited laboratories, are analyzed to identify problems with specific sample batches and long term biases associated with the assay laboratories. CRMs were inserted into the sample stream by technicians trained in quality control procedures. CRMs values since 2014 are detailed in Table 8-5. Ten CRMs using in-house material were certified by Target Rocks Peru S.A.C. (MAT-05, MAT-06, MAT11, MAT12, PEPSSTD001, PEPSSTD002,

PEPSSTD003, PEPSSTD004, PEPSSTD005, PEPSSTD006), six standards (EMEI2240_2012 and "STD" pre-fixes) were certified by Actlabs Skyline Perú S.A.C., and three CRMs (PEPSSTDAGA-05, PEPSSTDPLA-06, PEPSSTDPLM-04) were certified by Smee & Associates Consulting Ltd.

Table 8-5: CRMs Used at Porvenir Since 2014
Nexa Resources S.A. – El Porvenir Mine

Laboratory	Method	Standard	Au (g/t)		Ag (oz/t)		Ag (ppm)		Pb (%)		Zn (%)		Cu (%)	
			Best Value	Std Dev	Best Value	Std Dev	Best Value	Std Dev	Best Value	Std Dev	Best Value	Std Dev	Best Value	Std Dev
Smee and Assoc. Consulting	Four acid - AAS	PEPSSTDAGA-05	0.48	0.04	16.65	1.03			1.67	0.09	2.19	0.10	0.26	0.01
		PEPSSTDPLA-06	0.36	0.01	5.63	0.26			5.37	0.25	6.08	0.24	0.48	0.01
		PEPSSTDPLM-04	0.20	0.01	2.96	0.26			1.94	0.13	2.44	0.12	0.16	0.01
Target Rocks	Four acid Digestion – AAS	MAT-05			4.12	0.25			2.37	0.06	2.50	0.12	0.58	0.02
		MAT-06			15.08	0.42			7.75	0.20	7.98	0.23	2.53	0.12
		MAT11	0.93	0.09	1.76	0.11			1.37	0.04	2.19	0.13	0.17	0.01
		MAT12	8.98	0.48					6.83	0.21	6.95	0.24	0.18	0.00
	AR Digestion - AAS	PEPSSTD001	0.07	0.01	0.44	0.02	13.80	0.60	0.41	0.01	1.02	0.06	0.07	0.00
		PEPSSTD002	0.24	0.03	1.58	0.09	49.10	2.70	1.48	0.09	3.14	0.12	0.07	0.00
		PEPSSTD003	2.36	0.16	7.81	0.23	243.00	7.10	5.79	0.14	7.34	0.18	0.18	0.01
		PEPSSTD004	0.32	0.01			23.30	0.54	0.46	0.02	0.57	0.02	0.05	0.00
		PEPSSTD005	0.53	0.02			40.80	1.44	1.15	0.03	1.52	0.03	0.06	0.00
		PEPSSTD006	0.44	0.01			185.00	3.51	4.17	0.10	6.63	0.11	0.19	0.00
ACTLABS	Four acid Digestion – AAS	EMEI2240_2012			0.78	0.06			0.08	0.00	2.66	0.10	0.49	0.03
	Mult acid Digestion – AAS	STD2_ACTLABS2014			0.93	0.06			0.46	0.02	3.07	0.08	0.36	0.01
		STD3_ACTLABS2014			3.72	0.17			3.62	0.10	7.34	0.31	0.21	0.01
		STD1_ACTLABS2015			0.46	0.10			0.39	0.02	0.78	0.02	0.15	0.01
		STD2_ACTLABS2015			1.44	0.17			1.26	0.03	4.00	0.07	0.20	0.01
		STD3_ACTLABS2015			3.13	0.31			3.04	0.07	6.72	0.27	0.27	0.01

8.3.2.1 Milpo, 2014 to 2017

This section has mostly been summarized from SRK (2017).

CRMs were used to assess the accuracy of the assay results from Inspectorate EP, they were placed into the sample stream by geologist to monitor accuracy of the analytical process. The database recorded 31,314 drill core samples with 1,764 standards (a submission rate of 1 in 18 samples) submitted in 2014 and 2017 and 11,129 channel samples with 753 standards (a submission rate of 1 in 15 samples) submitted between 2014 and 2016. Prior to 2014, El Porvenir did not have a QA/QC program implemented.

Pass rates reported for standards submitted with drill core samples were 99 % for silver, 84% for lead, 97% for zinc, and 99% for copper. The accuracy levels for silver, zinc, and copper can be considered acceptable while lead is below acceptable levels. Pass rates reported for standards submitted with channel samples were 99% for silver, 77% for lead, 96% for zinc, and 99% for copper. The accuracy levels for silver, zinc, and copper can be considered acceptable, however, lead performance should be improved. In both cases, (channel and drill core) MAT-05, STD2_ACTLABS2015 and STD3_ACTLABS2015 show values below 80%. SRK identified minor biases in some of the standards, Table 8-6 presents the CRMs performance.

Table 8-6: 2014 to 2017 CRMs Performance
Nexa Resources S.A. – El Porvenir Mine

	Metal	Standard	No. Submitted	No. Fails	Pass (%)	Best Value	Mean	Bias
Drill Hole Samples	Ag (oz)	MAT-05	200	5	98	4.12	4.04	1.98%
		MAT-06	204	7	97	15.08	15.02	0.40%
		STD1_ACTLABS2015	449	0	100	0.46	0.46	0.00%
		STD2_ACTLABS2014	97	6	94	0.93	0.97	-4.12%
		STD2_ACTLABS2015	385	0	100	1.44	1.44	0.00%
		STD3_ACTLABS2014	117	0	100	3.72	3.74	-0.53%
		STD3_ACTLABS2015	312	0	100	3.13	3.14	-0.32%
		Total	**1,764**	**18**	**99**			
	Pb (%)	MAT-05	200	44	78	2.37	2.42	-2.07%
		MAT-06	204	4	98	7.75	7.8	-0.64%
		STD1_ACTLABS2015	449	0	100	0.39	0.4	-2.50%
		STD2_ACTLABS2014	97	0	100	0.46	0.48	-4.17%
		STD2_ACTLABS2015	385	142	63	1.26	1.3	-3.08%
		STD3_ACTLABS2014	117	1	99	3.62	3.64	-0.55%
		STD3_ACTLABS2015	312	117	62	3.04	3.12	-2.56%
		Total	**1,764**	**308**	**84**			
	Zn (%)	MAT-05	200	2	99	2.5	2.49	0.40%
		MAT-06	204	1	100	7.98	7.82	2.05%
		STD1_ACTLABS2015	449	42	91	0.78	0.76	2.63%
		STD2_ACTLABS2014	97	19	80	3.07	3.01	1.99%
		STD2_ACTLABS2015	385	32	92	4.00	3.97	0.76%
		STD3_ACTLABS2014	117	0	100	7.34	7.18	2.23%
		STD3_ACTLABS2015	312	0	100	6.72	6.75	-0.44%
		Total	**1,764**	**96**	**95**			
	Cu (%)	MAT-05	200	8	96	0.58	0.56	3.57%
		MAT-06	204	2	99	2.53	2.55	-0.78%
		STD1_ACTLABS2015	449	0	100	0.15	0.15	0.00%

	Metal	Standard	No. Submitted	No. Fails	Pass (%)	Best Value	Mean	Bias
		STD2_ACTLABS2014	97	2	98	0.36	0.36	0.00%
		STD2_ACTLABS2015	385	0	100	0.2	0.2	0.00%
		STD3_ACTLABS2014	117	1	99	0.21	0.21	0.00%
		STD3_ACTLABS2015	312	3	99	0.27	0.27	0.00%
		Total	**1,764**	**16**	**99**			
Channel Sample	Ag (oz)	MAT-05	9	0	100	4.12	3.98	3.52%
		MAT-06	10	3	70	15.08	14.67	2.79%
		STD2_ACTLABS2014	178	3	98	0.93	0.96	-3.12%
		STD2_ACTLABS2015	188	0	100	1.44	1.44	0.00%
		STD3_ACTLABS2014	217	1	100	3.72	3.74	-0.53%
		STD3_ACTLABS2015	151	0	100	3.13	3.13	0.00%
		Total	**753**	**7**	**99**			
	Pb (%)	MAT-05	9	7	22	2.37	2.5	-5.20%
		MAT-06	10	0	100	7.75	7.87	-1.52%
		STD2_ACTLABS2014	178	2	99	0.46	0.48	-4.17%
		STD2_ACTLABS2015	188	104	47	1.26	1.3	-3.08%
		STD3_ACTLABS2014	217	5	98	3.62	3.66	-1.09%
		STD3_ACTLABS2015	151	54	64	3.04	3.12	-2.56%
		Total	**753**	**172**	**77**			
	Zn (%)	MAT-05	9	0	100	2.5	2.5	0.00%
		MAT-06	10	0	100	7.98	7.84	1.79%
		STD2_ACTLABS2014	178	10	94	3.07	3.02	1.66%
		STD2_ACTLABS2015	188	18	90	4	3.97	0.76%
		STD3_ACTLABS2014	217	0	100	7.34	7.19	2.09%
		STD3_ACTLABS2015	151	0	100	6.72	6.77	-0.74%
		Total	**753**	**28**	**96**			
	Cu (%)	MAT-05	9	1	89	0.58	0.55	5.45%
		MAT-06	10	0	100	2.53	2.59	-2.32%
		STD2_ACTLABS2014	178	3	98	0.36	0.36	0.00%
		STD2_ACTLABS2015	188	0	100	0.2	0.2	0.00%
		STD3_ACTLABS2014	217	1	100	0.21	0.21	0.00%
		STD3_ACTLABS2015	151	2	99	0.27	0.27	0.00%
		Total	**753**	**7**	**99**			

8.3.2.2 Nexa, November 2017 to 2020

Since November 2017, El Porvenir sent to Certimin, Inspectorate EP, and ALS a total of 139,319 drill core samples and 7,799 CRMs resulting in an insertion rate of 4.7%.

Table 8-7 lists the certified values of the CRMs for Zn, Pb, Cu, and Ag, and the summary of the assay performance for the CRMs. Figure 8-3 and Figure 8-4 illustrate examples of the zinc and lead CRM results from the Mine for the 2018 to 2019 period.

Table 8-7: 2017 to 2020 CRM Performance
Nexa Resources S.A. – El Porvenir Mine

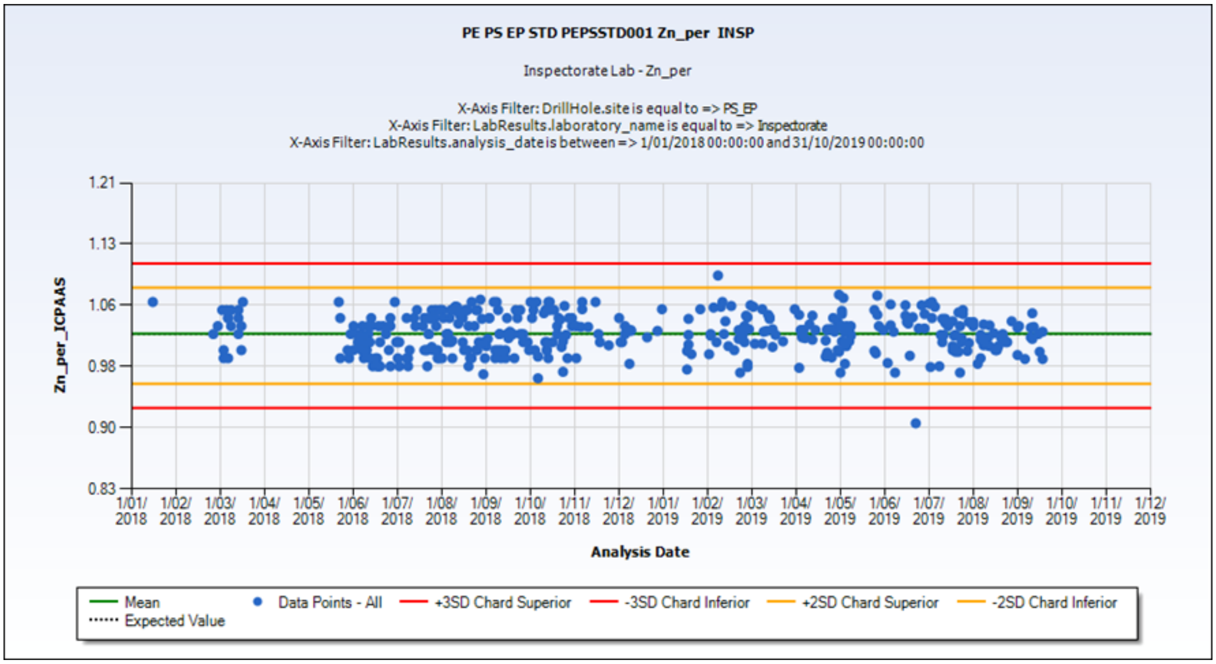
Period	Laboratory	Analytical Method	Type Standard	Element	No. Samples	Best Value	Mean	Bias	No. Samples Outside 3SD	Failure Rate
Nov. 2017 - Aug. 2018	Certimin	Mult acid Digestion - AAS	Low Grade STD1_ACTLABS2015	Ag oz/t	106	0.46	0.46	-0.20%	0	0%
				Cu %	106	0.15	0.16	2.90%	0	0%
				Pb %	106	0.39	0.4	3.10%	0	0%
				Zn %	106	0.78	0.77	-0.90%	0	0%
			Medium Grade STD2_ACTLABS2014	Ag oz/t	60	0.93	0.98	5.00%	0	0%
				Cu %	60	0.36	0.36	0.30%	2	3%
				Pb %	60	0.46	0.46	1.00%	2	3%
				Zn %	60	3.07	2.97	-3.30%	1	2%
			High Grade STD3_ACTLABS2014	Ag oz/t	101	3.72	3.9	4.90%	3	3%
				Cu %	101	0.21	0.21	-0.10%	4	4%
				Pb %	101	3.62	3.6	-0.60%	4	4%
				Zn %	101	7.34	7.3	-0.60%	3	3%
			High Grade STD3_ACTLABS2015	Ag oz/t	67	3.13	3.19	2.10%	0	0%
				Cu %	67	0.27	0.27	1.20%	0	0%
				Pb %	67	3.04	3.08	1.20%	0	0%
				Zn %	67	6.72	6.64	-1.20%	0	0%
		AR Digestion - AAS	Low Grade PEPSSTD001	Au ppm	354	0.07	0.07	7.00%	4	1%
				Ag oz/t	354	0.44	0.44	-0.20%	2	1%
				Cu %	354	0.07	0.07	1.60%	11	3%
				Pb %	354	0.41	0.41	1.40%	9	3%
				Zn %	354	1.02	1.03	0.50%	17	5%
			Medium Grade PEPSSTD002	Au ppm	360	0.24	0.25	4.10%	16	4%
				Ag oz/t	360	1.58	1.47	-7.10%	2	1%
				Cu %	360	0.07	0.07	0.50%	3	1%
				Pb %	360	1.48	1.52	2.80%	5	1%
				Zn %	360	3.14	3.1	-1.30%	4	1%
			High Grade PEPSSTD003	Au ppm	178	2.36	2.4	1.70%	2	1%
				Ag oz/t	178	7.81	7.78	-0.40%	1	1%
				Cu %	178	0.18	0.19	4.50%	2	1%
				Pb %	178	5.79	5.86	1.30%	3	2%
				Zn %	178	7.34	7.37	0.40%	2	1%
	Inspectorate EP	Mult Acid Digestion - AAS	Low Grade STD1_ACTLABS2015	Ag oz/t	100	0.46	0.45	-2.00%	2	2%
				Cu %	100	0.15	0.16	1.40%	3	3%
				Pb %	100	0.39	0.4	2.20%	0	0%
				Zn %	100	0.78	0.76	-2.10%	1	1%
			Medium Grade STD2_ACTLABS2014	Ag oz/t	34	0.93	1.03	10.80%	0	0%
				Cu %	34	0.36	0.36	-0.30%	0	0%
				Pb %	34	0.46	0.46	-0.80%	0	0%
				Zn %	34	3.07	2.97	-3.40%	0	0%
			High Grade STD3_ACTLABS2014	Ag oz/t	40	3.72	3.73	0.30%	0	0%
				Cu %	40	0.21	0.21	-0.40%	0	0%
				Pb %	40	3.62	3.64	0.50%	1	3%
				Zn %	40	7.34	7.17	-2.30%	0	0%
			High Grade STD3_ACTLABS2015	Ag oz/t	94	3.13	3.1	-0.90%	1	1%
				Cu %	94	0.27	0.27	0.10%	0	0%
				Pb %	94	3.04	3.12	2.50%	1	1%
				Zn %	94	6.72	6.72	0.10%	0	0%
		AR Digestion - AAS	Low Grade PEPSSTD001	Ag oz/t	134	0.44	0.46	4.80%	1	1%
				Cu %	134	0.07	0.07	6.40%	0	0%
				Pb %	134	0.41	0.41	2.00%	1	1%
				Zn %	134	1.02	1.02	0.00%	0	0%
			Medium Grade PEPSSTD002	Ag oz/t	170	1.58	1.54	-2.80%	1	1%
				Cu %	170	0.07	0.07	5.10%	1	1%
				Pb %	170	1.48	1.53	3.10%	1	1%
				Zn %	170	3.14	3.08	-1.90%	1	1%
			High Grade PEPSSTD003	Ag oz/t	106	7.81	7.44	-4.80%	0	0%
				Cu %	106	0.18	0.19	2.10%	0	0%
				Pb %	106	5.79	5.6	-3.20%	0	0%
				Zn %	106	7.34	7.39	0.70%	0	0%
	Certimin	AR Digestion- AAS	Low Grade PEPSSTD001	Au ppm	278	0.065	0.069	6.32%	0	0%
				Ag oz/t	52	0.444	0.448	0.88%	0	0%
				Ag ppm	226	13.8	13.88	0.57%	0	0%
				Cu %	278	0.071	0.071	0.41%	0	0%
				Pb %	278	0.406	0.412	1.43%	0	0%
				Zn %	278	1.02	1.028	0.80%	0	0%
			Medium Grade PEPSSTD002	Au ppm	268	0.239	0.247	3.53%	0	0%
				Ag oz/t	47	1.579	1.461	-7.47%	0	0%
				Ag ppm	221	49.1	45.64	-7.04%	3	1%
				Cu %	268	0.07	0.07	0.64%	0	0%
				Pb %	268	1.48	1.523	2.88%	0	0%
				Zn %	268	3.14	3.1	-1.14%	0	0%
			High Grade PEPSSTD003	Au ppm	86	2.358	2.396	1.62%	0	0%
				Ag ppm	86	243	241.79	-0.50%	0	0%
				Cu %	86	0.183	0.192	4.69%	0	0%
				Pb %	86	5.79	5.88	1.51%	0	0%
				Zn %	86	7.34	7.38	0.56%	1	1%
			Low Grade MAT10	Ag ppm	111	8.7	9.08	4.38%	0	0%
				Au ppm	110	0.249	0.253	1.52%	4	4%
				Cu %	111	0.252	0.266	5.82%	3	3%
				Pb %	111	0.113	0.114	1.45%	0	0%
				Zn %	111	0.301	0.285	-5.16%	0	0%

Period	Laboratory	Analytical Method	Type Standard	Element	No. Samples	Best Value	Mean	Bias	No. Samples Outside 3SD	Failure Rate
Aug. 2018 - May. 2019	ALS	Four Acid Digestion - AAS	Medium Grade MAT11	Ag ppm	492	54.6	56.61	3.68%	31	6%
				Au ppm	519	0.932	0.935	0.36%	3	1%
				Cu %	521	0.171	0.176	3.13%	12	2%
				Pb %	521	1.37	1.341	-2.15%	13	2%
				Zn %	521	2.19	2.106	-3.86%	9	2%
			High Grade MAT12	Ag ppm	162	268	273.4	2.01%	9	6%
				Au ppm	190	8.98	8.98	0.01%	1	1%
				Cu %	190	0.176	0.182	3.48%	4	2%
				Pb %	190	6.83	6.71	-1.81%	8	4%
				Zn %	190	6.95	6.97	0.26%	1	1%
		AR Digestion - AAS	Low Grade PEPSSTD001	Ag ppm	243	13.8	14.21	2.94%	12	5%
				Au ppm	241	0.065	0.064	-0.79%	6	2%
				Cu %	243	0.071	0.073	3.17%	18	7%
				Pb %	243	0.406	0.406	0.10%	10	4%
				Zn %	243	1.02	1.02	-0.16%	3	1%
			Medium Grade PEPSSTD002	Ag ppm	208	49.1	50.64	3.15%	9	4%
				Au ppm	207	0.239	0.238	-0.47%	1	0%
				Cu %	208	0.07	0.073	4.97%	2	1%
				Pb %	208	1.48	1.483	0.21%	0	0%
				Zn %	208	3.14	3.15	0.20%	0	0%
			High Grade PEPSSTD003	Ag ppm	99	243	239.1	-1.60%	8	8%
				Au ppm	99	2.358	2.316	-1.79%	1	1%
				Cu %	99	0.183	0.196	7.04%	5	5%
				Pb %	99	5.79	5.71	-1.43%	4	4%
				Zn %	99	7.34	7.44	1.43%	7	7%
			Low Grade PEPSSTD004	Ag ppm	225	23.3	24.72	6.11%	1	0%
				Au ppm	223	0.316	0.324	2.54%	10	4%
				Cu %	225	0.054	0.057	5.17%	5	2%
				Pb %	225	0.463	0.471	1.69%	1	0%
				Zn %	225	0.569	0.543	-4.51%	10	4%
			Medium Grade PEPSSTD005	Ag ppm	228	40.76	41.79	2.53%	1	0%
				Au ppm	227	0.525	0.519	-1.12%	7	3%
				Cu %	228	0.055	0.056	2.01%	2	1%
				Pb %	228	1.152	1.134	-1.60%	0	0%
				Zn %	228	1.515	1.536	1.41%	5	2%
			High Grade PEPSSTD006	Ag ppm	21	185.1	185.14	0.02%	0	0%
				Au ppm	21	0.438	0.433	-1.12%	0	0%
				Cu %	21	0.186	0.188	0.84%	0	0%
				Pb %	21	4.17	4.11	-1.52%	0	0%
				Zn %	21	6.63	6.86	3.43%	0	0%
	Inspectorate EP	AR Digestion - AAS	Low Grade PEPSSTD001	Ag oz/t	95	0.44	0.046	4.71%	1	1%
				Ag ppm	117	13.8	14.48	4.92%	1	1%
				Cu %	212	0.071	0.074	4.94%	0	0%
				Pb %	212	0.406	0.414	2.06%	2	1%
				Zn %	212	1.02	1.023	0.26%	0	0%
			Medium Grade PEPSSTD002	Ag oz/t	109	1.58	1.54	-2.48%	0	0%
				Ag ppm	130	49.1	48.44	-1.34%	0	0%
				Cu %	239	0.07	0.074	6.13%	1	0%
				Pb %	239	1.48	1.542	4.21%	2	1%
				Zn %	239	3.14	3.08	-1.86%	12	5%
			High Grade PEPSSTD003	Ag oz/t	55	7.81	8.37	-5.61%	0	0%
				Ag ppm	188	243	231.58	-4.70%	0	0%
				Cu %	243	0.183	0.188	2.75%	1	0%
				Pb %	243	5.79	5.64	-2.67%	4	2%
				Zn %	243	7.34	7.35	0.13%	18	7%
Jun. 2019 - Feb. 2020	Inspectorate EP	AR Digestion - AAS	Low Grade PEPSSTD001	Ag ppm	83	13.8	14.48	4.91%	0	0%
				Cu %	83	0.071	0.074	4.35%	0	0%
				Pb %	83	0.406	0.415	2.11%	0	0%
				Zn %	83	1.02	1.018	-0.24%	1	1%
			Medium Grade PEPSSTD002	Ag ppm	70	49.1	48.17	-1.89%	0	0%
				Cu %	70	0.07	0.073	4.69%	1	1%
				Pb %	70	1.48	1.542	4.17%	1	1%
				Zn %	70	3.14	3.07	-2.09%	0	0%
			High Grade PEPSSTD003	Ag ppm	77	243	229	-5.76%	0	0%
				Cu %	77	0.183	0.188	2.77%	0	0%
				Pb %	77	5.79	5.58	-3.59%	0	0%
				Zn %	77	7.34	7.33	-0.08%	0	0%
			Low Grade PEPSSTD004	Ag ppm	58	23.3	24.24	4.05%	1	2%
				Cu %	58	0.054	0.057	4.82%	2	3%
				Pb %	58	0.463	0.454	-1.90%	0	0%
				Zn %	58	0.569	0.574	0.96%	0	0%
			Medium Grade PEPSSTD005	Ag ppm	50	40.76	40.38	-0.94%	1	2%
				Cu %	50	0.055	0.057	3.31%	1	2%
				Pb %	50	1.152	1.203	4.41%	1	2%
				Zn %	50	1.515	1.558	2.83%	0	0%
			High Grade PEPSSTD006	Ag ppm	60	185.1	181.81	-1.78%	1	2%
				Cu %	60	0.186	0.185	-0.50%	0	0%
				Pb %	60	4.17	4.21	1.05%	0	0%
				Zn %	60	6.63	6.66	0.48%	1	2%
			Low Grade PEPSSTD001	Ag ppm	308	13.8	14.19	2.84%	1	0%
				Au ppm	307	0.065	0.065	-0.28%	6	2%
				Cu %	308	0.071	0.073	3.46%	0	0%
				Pb %	308	0.406	0.407	0.18%	1	0%
				Zn %	308	1.02	1.03	-0.91%	3	1%

Period	Laboratory	Analytical Method	Type Standard	Element	No. Samples	Best Value	Mean	Bias	No. Samples Outside 3SD	Failure Rate
	ALS	AR Digestion - AAS	Medium Grade PEPSSTD002	Ag ppm	305	49.1	50.65	3.16%	1	0%
				Au ppm	304	0.239	0.239	-0.16%	8	3%
				Cu %	305	0.07	0.074	5.90%	2	1%
				Pb %	305	1.48	1.481	0.06%	0	0%
				Zn %	305	3.14	3.12	-0.56%	0	0%
			High Grade PEPSSTD003	Ag ppm	77	243	239.83	-1.30%	1	1%
				Au ppm	77	2.358	2.338	-0.84%	1	1%
				Cu %	77	0.183	0.195	6.62%	1	1%
				Pb %	77	5.79	5.71	-1.45%	2	3%
				Zn %	77	7.34	7.49	2.09%	1	1%
			Low Grade PEPSSTD004	Ag ppm	706	23.3	24.72	6.10%	7	1%
				Au ppm	703	0.316	0.327	3.42%	10	1%
				Cu %	706	0.054	0.057	4.81%	0	0%
				Pb %	706	0.463	0.466	0.63%	5	1%
				Zn %	706	0.569	0.544	-4.39%	7	1%
			Medium Grade PEPSSTD005	Ag ppm	734	40.76	41.97	2.98%	9	1%
				Au ppm	733	0.525	0.531	1.23%	7	1%
				Cu %	734	0.055	0.057	2.77%	8	1%
				Pb %	734	1.152	1.134	-1.61%	7	1%
				Zn %	734	1.515	1.534	1.27%	4	1%
			High Grade PEPSSTD006	Ag ppm	195	185.1	186.17	0.58%	2	1%
				Au ppm	195	0.438	0.44	0.45%	1	1%
				Cu %	195	0.186	0.19	1.93%	0	0%
				Pb %	195	4.17	4.11	-1.32%	2	1%
				Zn %	195	6.63	6.88	3.82%	2	1%

0 - 5% bias	Excellent
5 - 10% bias	Attention
>10% bias	Reject

STD Bias % = (mean average/ certified value) - 1



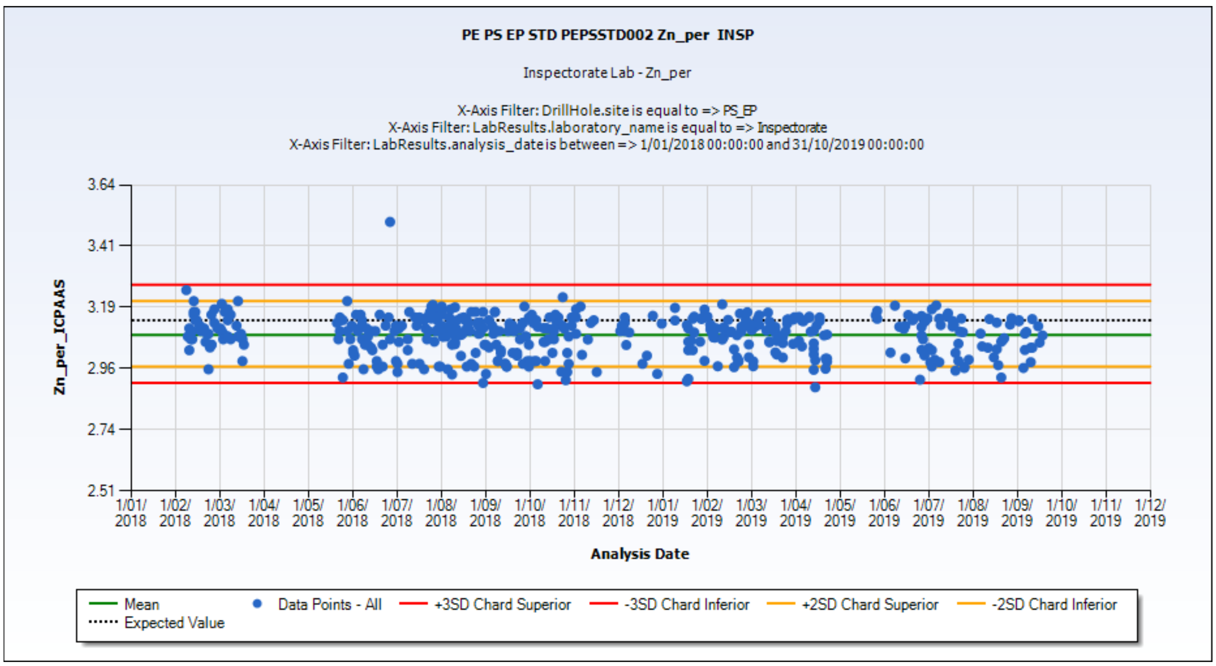
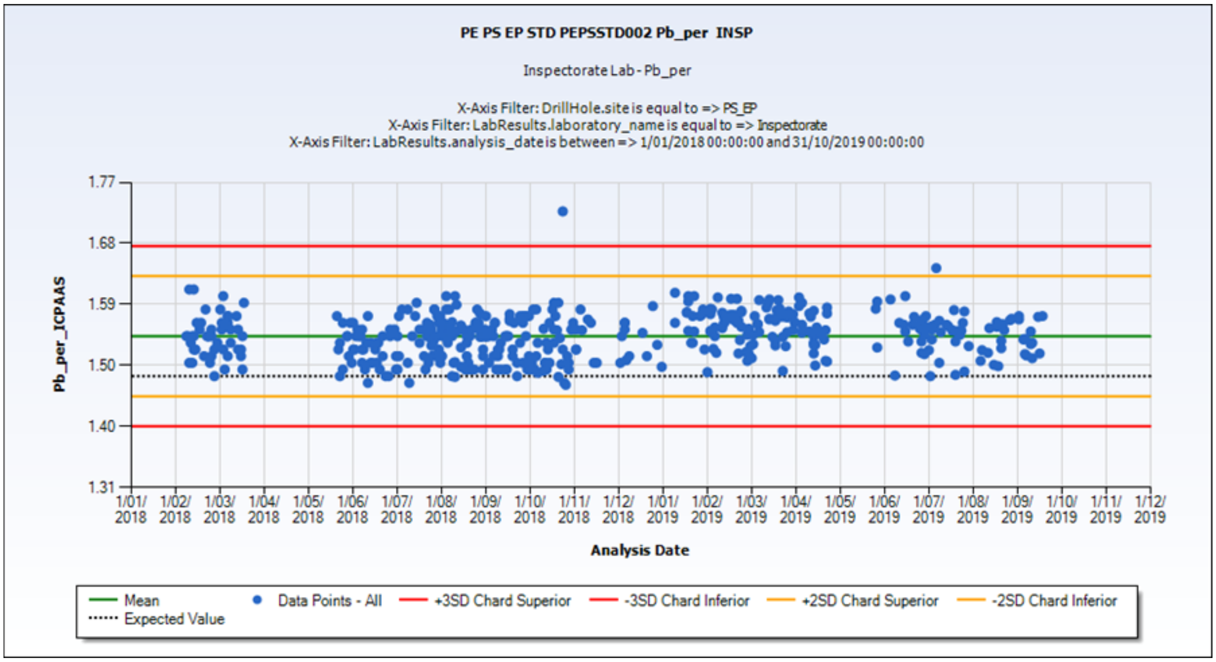


Figure 8-3: CRMs PEPSSTD001 and PEPSSTD002 Results for Zinc –Inspectorate EP (2018 to 2019)



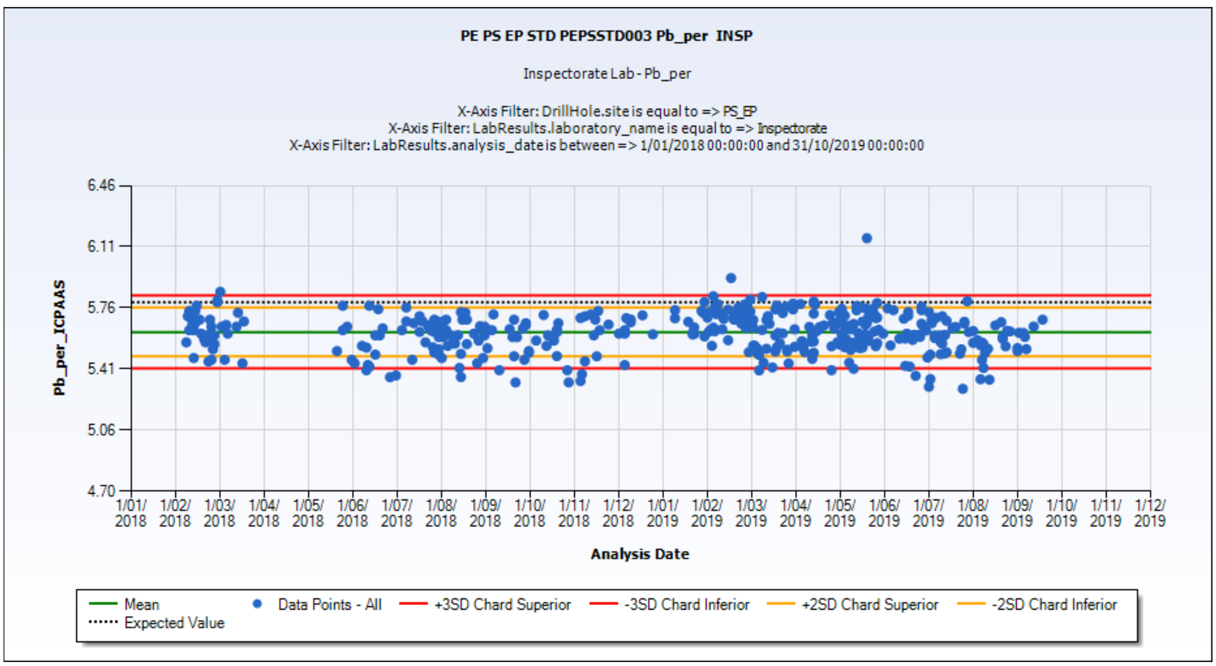


Figure 8-4: CRMs PEPSSTD002 and PEPSSTD003 Results for Lead –Inspectorate EP (2018 to 2019)

SLR reviewed the results returned from the CRMs and notes that Nexa has implemented procedures reducing the CRM failure rates significantly. Results for the CRMs are generally within acceptable limits with a small percentage of failures.

In the SLR QP's opinion, the CRMs cover a reasonable range of grades with respect to the overall resource grades and no significant bias was observed.

8.3.3 Blanks

The regular submission of blank material is used to assess contamination during sample preparation and to identify sample numbering errors. Field blank samples are composed of barren material that have grades that are less than the detection limits.

8.3.3.1 Milpo, 2014 to 2017

A total of 1,800 blanks with 30,370 drill hole samples and a total of 785 blanks with 10,213 channel samples (a submission rate of 1 in 13 samples) were sent to Inspectorate.

The results in all the laboratories show a pass rate greater than 99% indicating negligible contamination.

8.3.3.2 Nexa, November 2017 to 2020

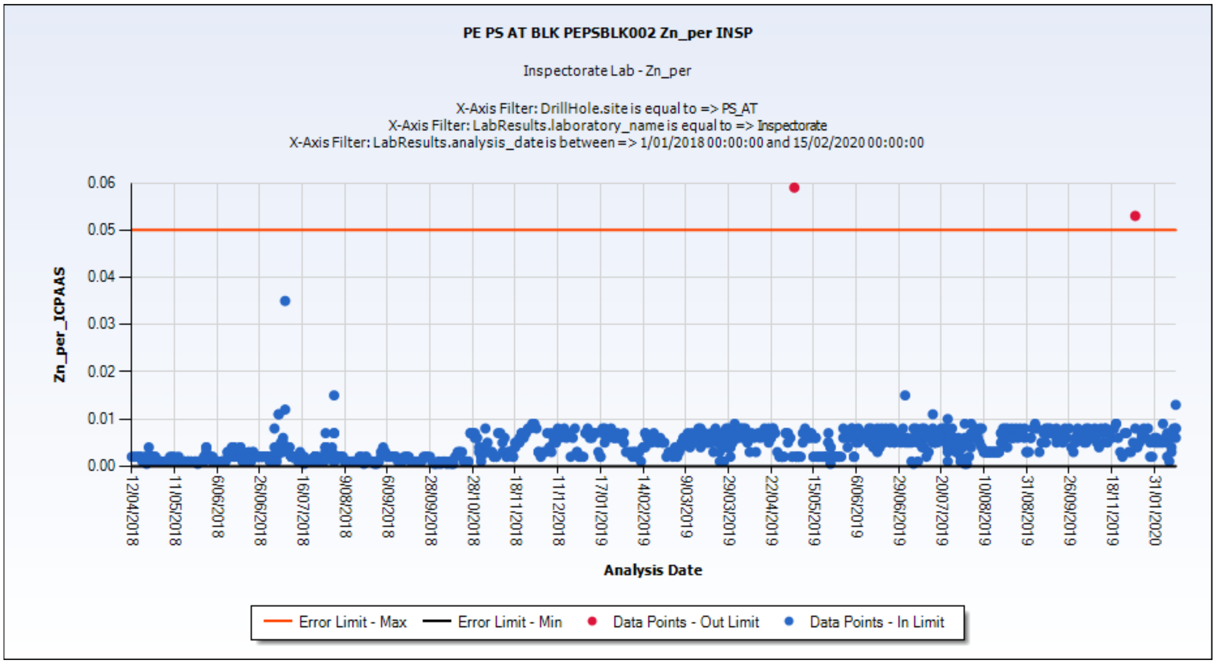
Since 2018, a total of 3,821 coarse blanks (2.3%) and 2,600 fine blanks (1.6%) were inserted with core samples. These indicated no significant contamination occurred during the preparation and analysis of the samples. Table 8-8 and Table 8-9 present the results of the coarse and fine blanks, respectively. Results of the blanks are illustrated in Figure 8-5 with Nexa's tolerance limit set at approximately five times the detection limits.

Table 8-8: 2017 to 2020 Fine Blank Results
Nexa Resources S.A. – El Porvenir Mine

Period	Laboratory	QA/QC Samples	Type	No. Samples	Failure Limit %	Failure Rate (%)					
						Au ppm	Ag oz/t	Ag ppm	Cu %	Pb %	Zn %
Nov. 2017 – Aug. 2018	Certimin	Blanks	Fine	617	<5%	0.00%	0.20%	-	0.00%	0.20%	0.20%
	Inspectorate EP	Blanks	Fine	342	<5%	0.00%	0.00%	-	0.00%	0.30%	0.00%
Aug. 2018 – May. 2019	Certimin	Blanks	Fine	321	<5%	0.00%	0.00%	0.00%	1.00%	0.00%	0.00%
	Inspectorate EP	Blanks	Fine	361	<5%	0.00%	0.00%	-	0.00%	0.00%	0.00%
	ALS	Blanks	Fine	959	<5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Table 8-9: 2017 to 2020 Coarse Blank Results
Nexa Resources S.A. – El Porvenir Mine

Period	Laboratory	QA/QC Samples	Type	No. Samples	Failure Limit %	Failure Rate (%)					
						Au ppm	Ag oz/t	Ag ppm	Cu %	Pb %	Zn %
Nov. 2017 – Aug. 2018	Certimin	Blanks	Coarse	614	<5%	0.00%	0.00%	-	0.00%	0.00%	0.00%
	Inspectorate EP	Blanks	Coarse	342	<5%	0.00%	0.30%	-	0.00%	0.00%	0.00%
Aug. 2018 – May. 2019	Certimin	Blanks	Coarse	323	<5%	0.00%	0.00%	0.00%	1.00%	0.00%	0.00%
	Inspectorate EP	Blanks	Coarse	359	<5%	-	0.00%	0.00%	0.00%	0.00%	0.00%
	ALS	Blanks	Coarse	956	<5%	0.00%	0.00%	0.00%	0.00%	0.00%	0.15%
Jun. 2019 – Feb. 2020	Inspectorate EP	Blanks	Coarse	181	<5%	-	-	0.00%	0.00%	0.00%	0.00%
	ALS	Blanks	Coarse	1046	<5%	0.00%	-	0.00%	0.00%	0.00%	0.15%



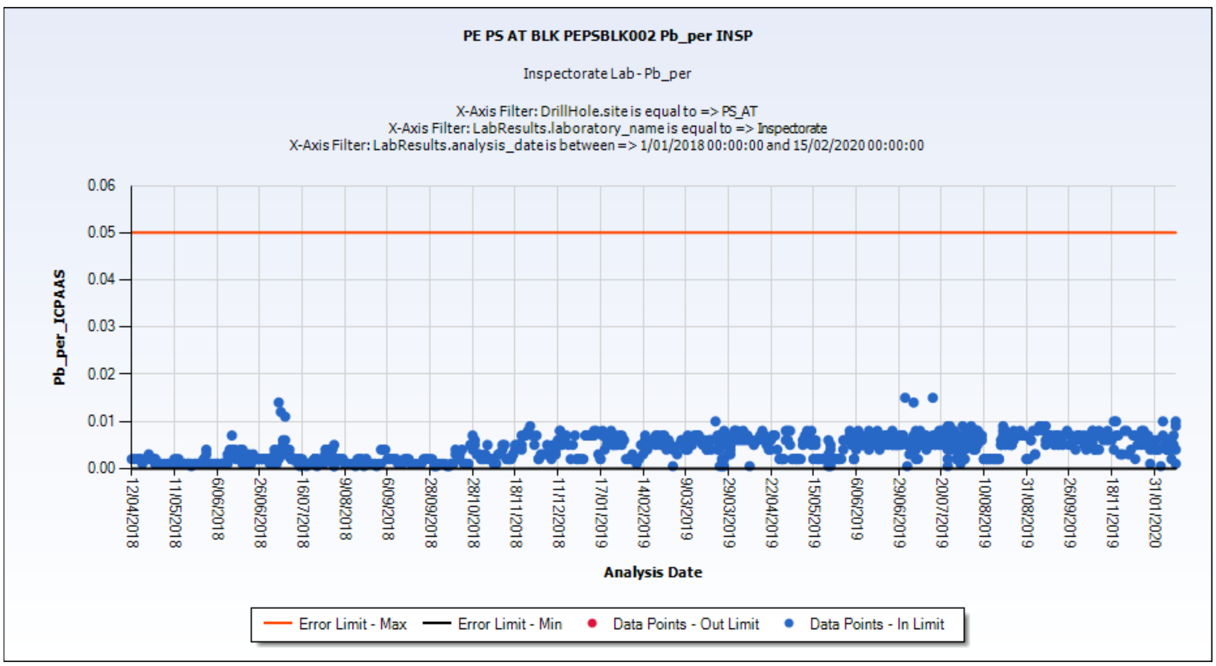


Figure 8-5: 2017 to 2020 Porvenir Blank Zn and Pb Assays – Inspectorate EP Laboratory

8.3.4 Duplicates

Duplicates help assess the natural local-scale grade variance or nugget effect and are also useful for detecting sample numbering mix-ups. The field (core) duplicates help monitor the grade variability as a function of both sample homogeneity and laboratory error.

The precision of sampling and analytical results can be quantified by re-analyzing the same sample using the same methodology. The variance between the measured results will measure their precision.

Precision is affected by mineralogical factors such as grain size, distribution, and inconsistencies in the sample preparation and analysis processes. There are several different duplicate sample types, which can be used to determine the precision of the entire sampling, sample preparation, and analytical process. Blind duplicate samples are submitted to the laboratory. A description of the different types of duplicates used by El Porvenir is provided in Table 8-10.

Table 8-10: Duplicate Types and Descriptions
Nexa Resources S.A. – El Porvenir Mine

Duplicate	Description
Field	The sample generated by another sampling operation at the same collection point includes a duplicate sample taken from a quarter of the drill core sample. Since mid-2016, a duplicate sample was taken from the second half of the drill core sample.
Reject	The second sample obtained from splitting the coarse crushed rock during sample preparation and submitted blind to the same laboratory that assayed the original sample.
Pulp	The second sample obtained from splitting the pulverized material during sample preparation and submitted blind at a later date to the same laboratory that assayed the original pulp.

Numerous plots and graphs are used monthly to monitor precision and bias levels. A brief description of the plots employed in the analysis of El Porvenir duplicate data is provided below:

- Scatter plot: assesses the scattering degree of the duplicate result plotted against the original value, which allows for bias characterization and regression calculations.
- Ranked half absolute relative difference (HARD) of samples plotted against their rank % value.

HARD:

- Acceptable HARD value for field duplicates is < 30%
- Acceptable HARD value for coarse duplicate is < 20%
- Acceptable HARD value for pulp is < 10 %

Duplicates were submitted with channel samples and drill core samples. If both the original and duplicate results returned a value less than two times the detection limit, the results were disregarded for the HARD analysis due to distortion in the precision levels at very low grades.

8.3.4.1 Milpo, 2014 to 2017

This section has mostly been taken from SRK (2017).

SRK performed the HARD analysis for the elements Ag, Pb, Zn and Cu, which have the following detection limits: 0.13 oz Ag, 0.01% Pb, 0.01% Zn and 0.01% Cu. In this analysis, SRK filtered all the samples with grades below two times the detection limit. El Porvenir inserted field duplicates with drill core samples and channel samples as part of its QA/QC program.

Precision levels of core drill sample for field duplicate were found to be outside of the acceptable limits. Additionally, reject assay results were poor for both lead and zinc and the duplicate assay results for lead were outside of acceptable limits. The poor precision levels for the field duplicates have been attributed to the sampling procedures, specifically that Milpo did not mark the cut line on the core before the cutting phase or sending a quarter of the core for analysis as a field duplicate. Precision levels for field duplicates in the channel samples were also outside the acceptable limit, and reject assay results were poor for both silver and lead. Duplicate assay results for copper were slightly out of acceptable limits.

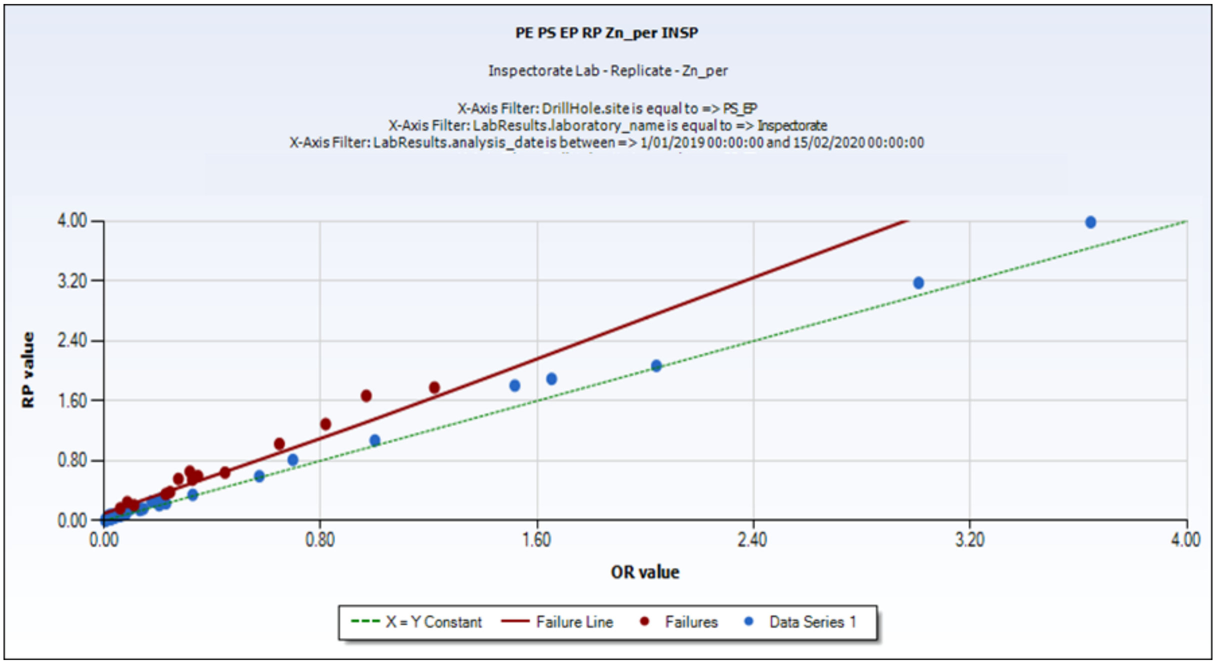
8.3.4.2 Nexa, November 2017 to 2020

Duplicate control charts were prepared for Zn, Au, Ag, Cu, and Pb in both laboratories. A total of 4,685 pulp duplicates (2.8%), 3,640 coarse duplicates (2.2%), and 3,244 field duplicates (2%) were inserted. Overall, the duplicate results indicate relatively good assay precision, with the exception of zinc field duplicates due to the variability that is inherent in the samples. Table 8-11 presents the results of the duplicate samples analyzed and Figure 8-6 to Figure 8-8 present the field, reject, and pulp duplicate scatter plots for lead and zinc, respectively.

SLR recommends continuing to select duplicates that are representative of the mineralization Zn, Pb, Cu, and Ag grade ranges, and completing ongoing studies to investigate the component of variability that is inherent in the sample, versus the component due to assay precision.

Table 8-11: 2017 to 2020 Porvenir Duplicate Performance
Nexa Resources S.A. – El Porvenir Mine

Period	Laboratory	QA/QC Samples	Type	No. Samples	Failure Limit %	Bias (%) / Failure Rate (%)					
						Au ppm	Ag oz/t	Ag ppm	Cu %	Pb %	Zn %
Nov. 2017 – Aug. 2018	Certimin	Duplicates	Twin sample	616	<30%	4.90%	9.60%	-	5.50%	10.60%	14.00%
			Coarse	612	<20%	0.80%	0.80%	-	0.70%	10.60%	0.30%
			Pulps	612	<10%	1.30%	1.50%	-	0.00%	0.20%	0.00%
	Inspectorate EP	Duplicates	Twin sample	340	<30%	-	3.80%	-	2.90%	7.60%	11.50%
			Coarse	340	<20%	-	0.30%	-	0.00%	7.60%	0.90%
			Pulps	339	<10%	-	0.60%	-	0.90%	1.20%	1.50%
Aug. 2018 – May. 2019	Certimin	Duplicates	Twin sample	322	<30%	0.31%	1.49%	0.75%	2.17%	1.55%	3.11%
			Coarse	330	<20%	0.30%	0.00%	0.00%	0.00%	0.00%	0.00%
			Pulps	335	<10%	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%
	Inspectorate EP	Duplicates	Twin sample	193	<30%	-	5.47%	4.55%	3.11%	11.92%	11.40%
			Coarse	357	<20%	-	0.00%	0.00%	0.00%	0.00%	0.00%
			Pulps	340	<10%		0.00%	0.40%	0.52%	0.52%	1.04%
	ALS	Duplicates	Twin sample	943	<30%	0.95%	2.86%	1.87%	2.33%	3.29%	6.79%
			Coarse	965	<20%	0.10%	0.00%	0.32%	0.10%	0.00%	0.21%
			Pulps	1012	<10%	0.99%	0.00%	0.31%	0.30%	0.10%	0.20%
Jun. 2019 – Feb. 2020	Inspectorate EP	Duplicates	Twin sample	23	<30%	-	-	0.00%	4.35%	21.74%	30.43%
			Coarse	182	<20%	-	-	0.00%	0.00%	0.00%	1.10%
			Pulps	282	<10%		-	0.71%	0%	0.35%	0.71%
	ALS	Duplicates	Twin sample	807	<30%	1.24%	-	2.97%	2.60%	4.83%	5.33%
			Coarse	854	<20%	0.12%	-	0.00%	0.12%	0.12%	0.00%
			Pulps	1765	<10%	0.62%	-	0.57%	0.28%	0.34%	0.45%



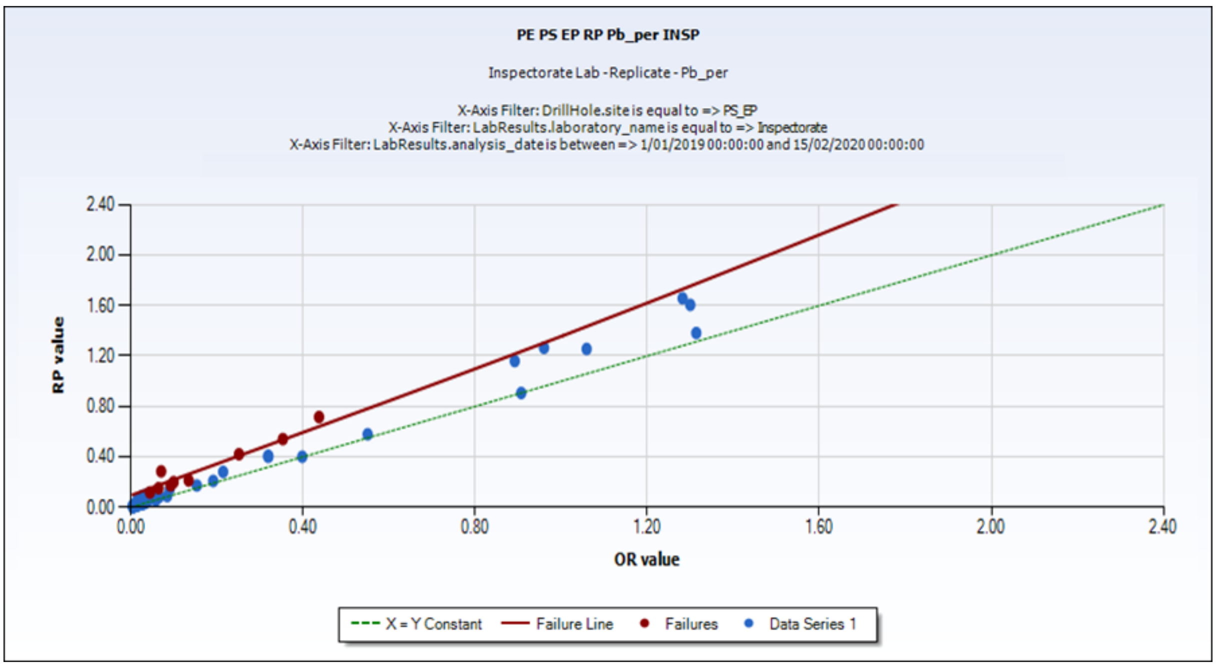
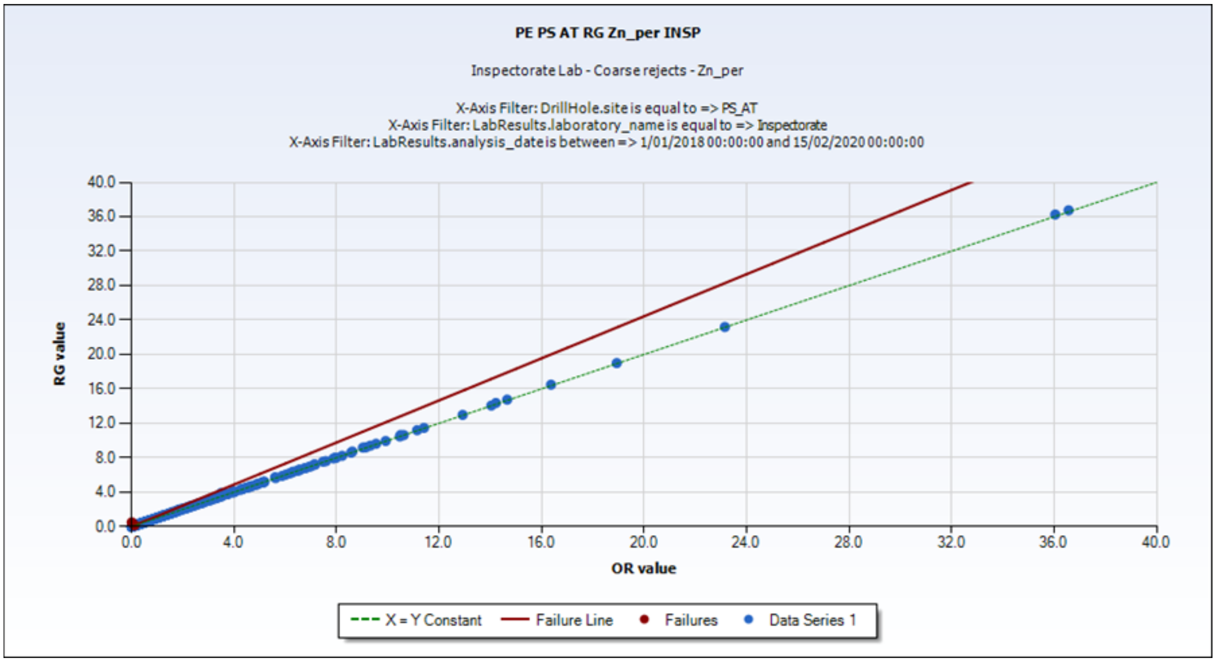


Figure 8-6: 2017 to 2020 Porvenir Field Duplicates for Zn and Pb Assays – Inspectorate EP Laboratory



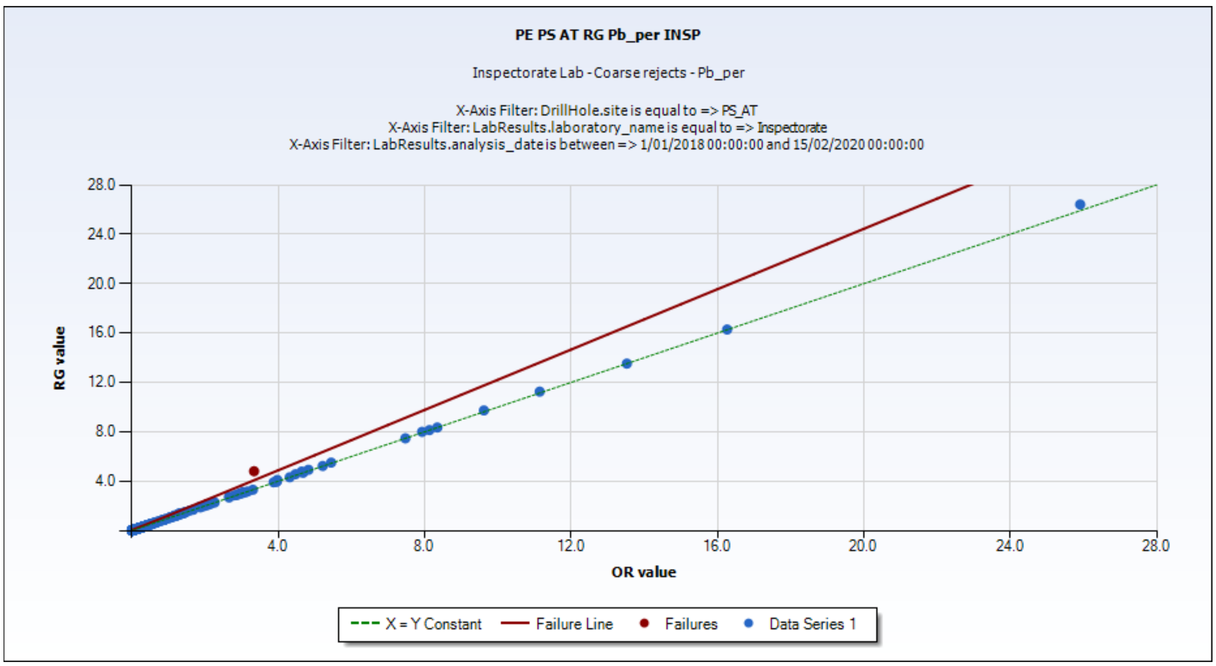
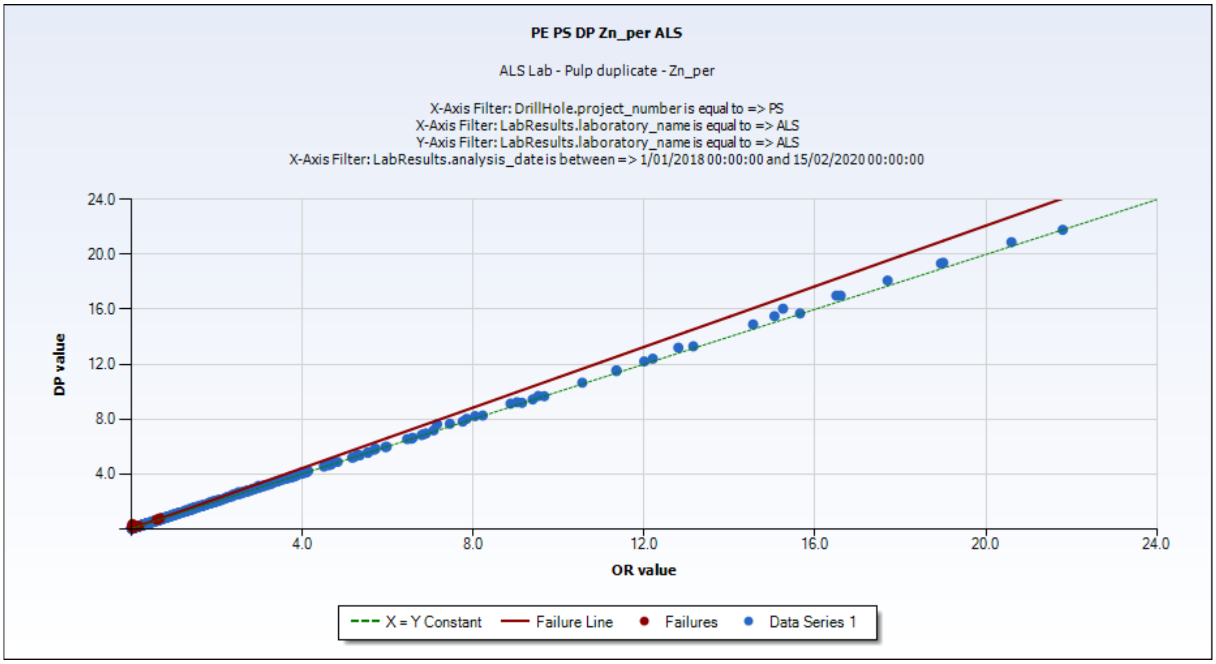


Figure 8-7: 2017 to 2020 Porvenir Coarse Reject Duplicates for Zn and Pb Assays – Inspectorate EP Laboratory



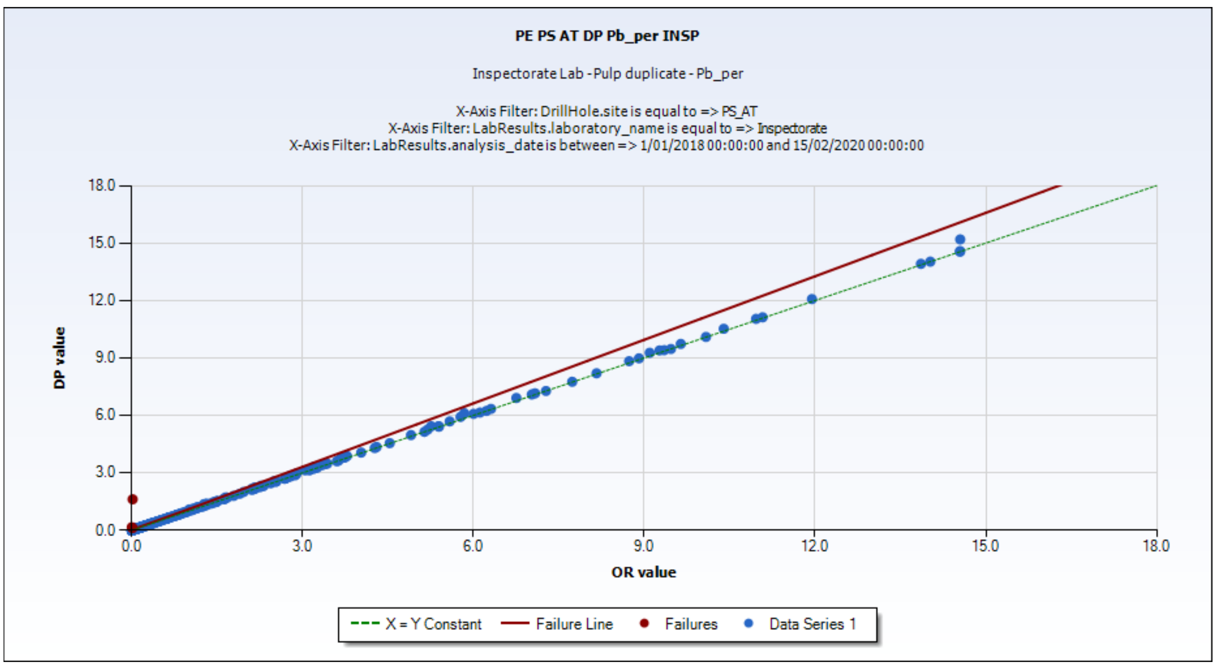


Figure 8-8: 2017 to 2020 Porvenir Pulp Duplicates for Zn and Pb Assays – Inspectorate EP Laboratory

8.3.5 External Check Samples

Submitting assays to a secondary laboratory helps to monitor bias at the principal laboratory. Reference materials and blanks were inserted in the check assay batches.

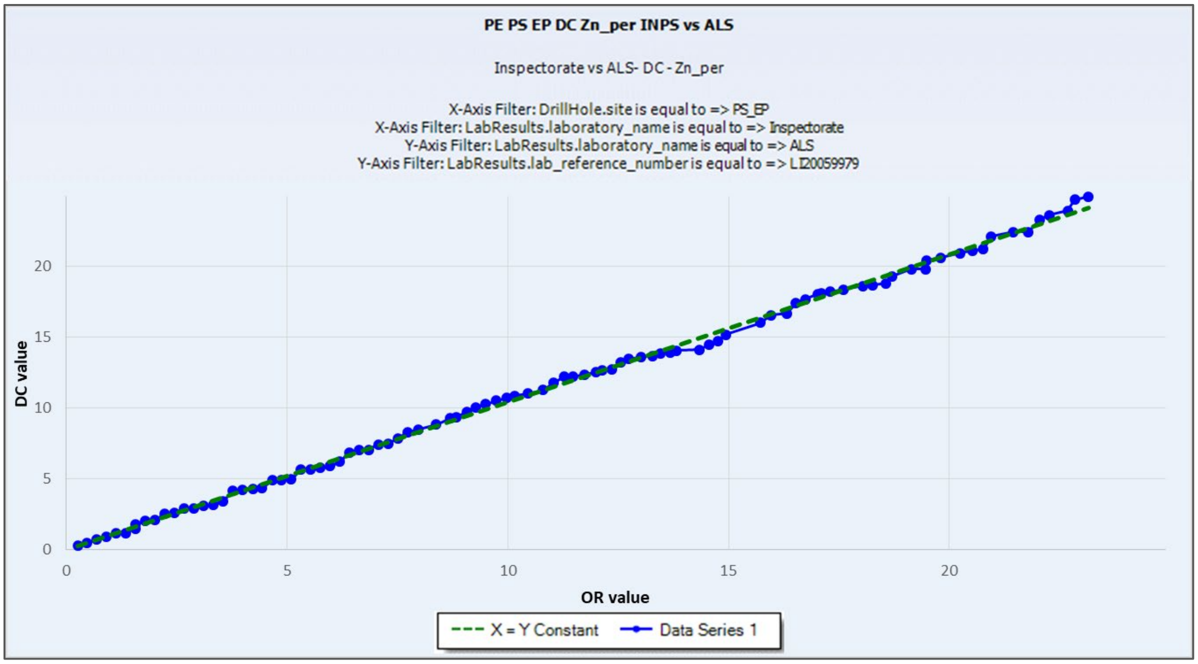
An example of zinc and lead assay performance for the check assays is provided in Figure 8-9.

Nexa sent 1,776 pulp samples analyzed at Inspectorate EP to ALS and analyzed at ALS to Certimin for referee check assays. An approximate insertion rate of 2.0 % is used for external check samples. Statistics for the check assay results are presented in Table 8-12.

Table 8-12: 2017 to 2020 Porvenir External Check Performance
Nexa Resources S.A. – El Porvenir Mine

Period	Secondary Laboratory	Primary Laboratory	Element	No. Samples	Bias (%)
Nov. 2017 - Aug. 2018	Certimin	ALS	Au ppm	432	-2.15
			Ag ppm	435	0.56
			Cu per	435	-1.66
			Pb per	435	-1.10
			Zn per	435	-0.55
	ALS	Certimin	Au ppm	202	-6.68
			Ag ppm	202	0.09
			Cu per	202	1.59
			Pb per	202	-0.35
			Zn per	202	2.37
		Inspectorate EP	Ag ppm	110	4.63
			Cu per	110	2.25
			Pb per	110	0.63
			Zn per	110	3.3
Aug. 2018 - May. 2019	Certimin	ALS	Au ppm	280	0.32
			Ag ppm	282	-1.42
			Cu per	282	-1.86
			Pb per	282	-1.03
			Zn per	282	-4.02
	ALS	Certimin	Au ppm	162	-0.26
			Ag ppm	162	-0.71
			Cu per	162	-1.75
			Pb per	162	-1.28
			Zn per	162	1.54
		Inspectorate EP	Ag ppm	197	4.04
			Cu per	197	2.63
			Pb per	197	1.53
			Zn per	197	2.45

Period	Secondary Laboratory	Primary Laboratory	Element	No. Samples	Bias (%)
Jun. 2019 - Feb. 2020	Certimin	ALS	Au ppm	294	0.26
			Ag ppm	294	2.90
			Cu per	294	-1.80
			Pb per	294	1.76
			Zn per	294	-1.47
	ALS	Inspectorate EP	Ag ppm	94	2.23
			Cu per	94	3.44
			Pb per	94	1.52
			Zn per	94	4.06



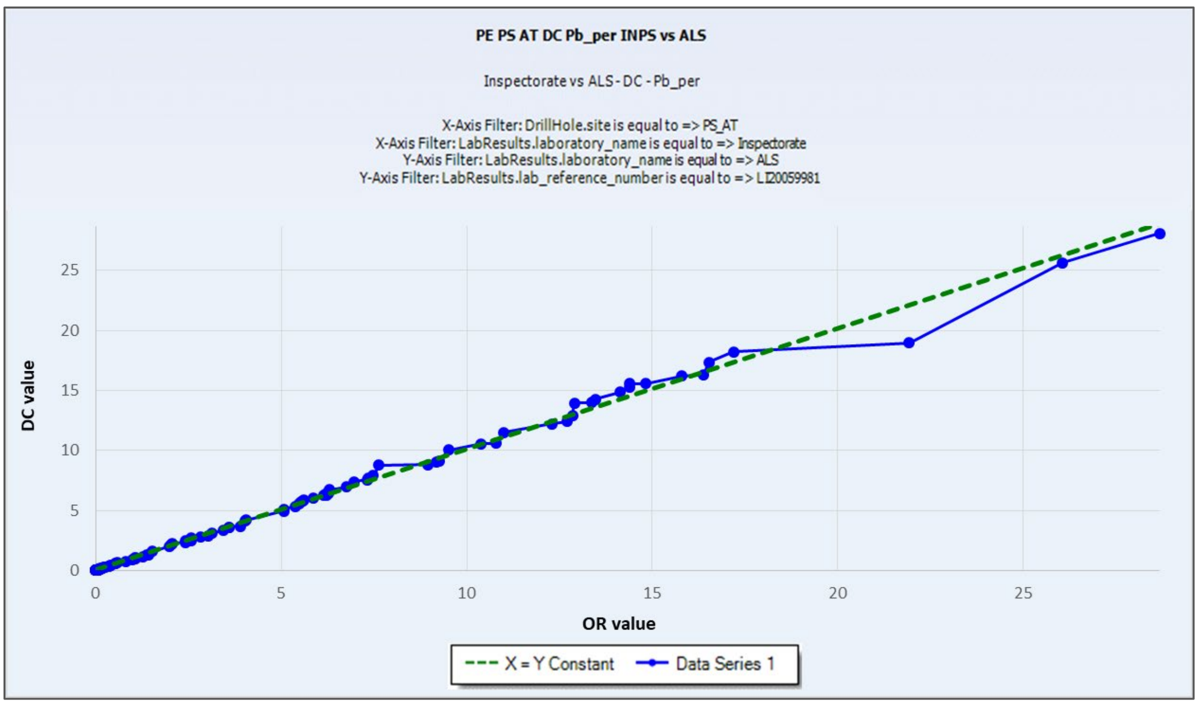


Figure 8-9: 2017 to 2020 Porvenir External Checks for Zn and Pb Assays – Inspectorate EP Laboratory

The check assay results compared well, showing very high overall correlation coefficients. For silver, a potential positive of approximately 5% at Inspectorate EP in comparison to ALS was observed and should be investigated.

The SLR QP is of the opinion that the Inspectorate EP laboratory zinc, lead, copper, and silver assays are reliable and meet industry standards.

8.4 QA/QC Recommendations

SLR's QA/QC recommendations are as follows:

Revaluate the 2014 to 2017 QA/QC failure rates after removing CRM numbering mix-ups and adjusting the failure limits for certain CRMs.

Investigate the potential 5% positive silver bias at Inspectorate EP.

In the SLR QP's opinion, the QA/QC program as designed and implemented by El Porvenir is adequate, and the assay results within the database are suitable for use in a Mineral Resource estimate.

8.5 Data Management

Database management is performed by a dedicated on-site geologist under the supervision of the Resource Geologist. Data is stored centrally on a Microsoft Cloud server in Fusion, a Datamine database product. Previous 2017, digital logging sheets prepared by the geologist were uploaded to the database management system Scoret (Balanza), which has now been superseded by Fusion. Original drill logs, structural logs, geotechnical logs, and details related to the holes are stored on-site in a folder, specific to each drill hole. Folders are clearly labelled and stored in a cabinet in the office.

Assay certificates are mailed to the Mine by ALS Peru S.A and Inspectorate and emailed to Nexa's mine and corporate Database Administrators. Certificates are reviewed by the Mine Database Administrator prior to uploading information to Fusion.

Access to the El Porvenir database is by registered Fusion users from Nexa. Nexa maintains several user profiles with different access permissions and privileges defined by the Database Administrator. The data is updated automatically daily and weekly. Monthly back-ups are run following Nexa protocols.

8.6 Sample Security

Core boxes were transported every day to the core shed by personnel from the drilling company. Samples were transported by a contractor supervised by the company personnel. Core boxes and samples were stored in safe, controlled areas.

Chain-of-custody procedures were followed whenever samples were moved between locations and to and from the laboratory, by the filling out of sample submittal forms.

In the SLR QP's opinion, the sample preparation, analysis, and security procedures at El Porvenir are adequate for use in the estimation of Mineral Resources.

In the SLR QP's opinion, the QA/QC program as designed and implemented by Nexa is adequate and the assay results within the database are suitable for use in a Mineral Resource estimate.

9.0 DATA VERIFICATION

9.1 Databases and Internal Verification

During the last quarter of 2017, Nexa transferred the database from SIOM database management system and Excel files to Fusion software and prepared an exhaustive number of checks to confirm the accuracy of the data migration. Nexa has implemented a series of routine verifications to ensure the collection of reliable data. Logging and sampling data are digitally entered into the database by downloading the information from the logging tablets.

Core logging, surveying, and sampling were monitored by exploration and mine geologists and verified routinely for consistency. The El Porvenir resource database is regularly maintained and validated by the database administrator using Fusion software validation routines and by regularly checking the drill hole data on-screen visually. Personnel from the Geology department conduct daily quality control checks on the data entry. A first check consists of identifying duplicate sample numbers or lack of information for certain intervals. Every month, all the assay data entered in the server are compared with a compilation of individual CSV files issued by the laboratory. Paper records are stored at a safe location at the Mine.

Assay data are captured from the Global LIMS server using custom routines, and this information is then entered into the Fusion database. The laboratory also issues CSV and pdf-format certificates, however, only the information that is digitally captured from the server is considered to be the true record.

Nexa prepared "The Informe de Validación de Base de Datos Atacocha" report containing additional detail regarding the data validation for El Porvenir (Nexa, 2019c). During this validation, Nexa found 76 channels and one drill hole creating inconsistencies with surrounding data. As a result, these channels and hole were removed from the Mineral Resource database.

The SLR QP is of the opinion that the data collection, import, and validation workflows are consistent with industry standards, and are of sufficient quality to support Mineral Reserve and Mineral Resource estimation.

9.2 Previous Verification

In 2017, Amec Foster Wheeler (Amec) audited the Atacocha database (which also includes El Porvenir). Amec reviewed and validated the information from 2011 to 2017 compiled by Nexa. Amec used signed assay certificates to verify the assays in the database; some inconsistencies were observed in Zn and Cu assays. Other checks included collar locations, downhole survey measurements, and lithology codes. Some inconsistencies were observed. In addition, a comparison between drill hole assay and channel assay was performed. The test compared results of nearby holes by searching for channel samples near drill holes within a four-metre distance. Amec constructed QQ plots and found that both grade distributions were very similar, with no bias observed (Amec, 2017).

As part of SRK's 2017 NI 43-101 Technical Report, SRK performed assay data verification by comparing assay certificates with values in the database. SRK found that a significant number of historical samples did not have assay certificates and downgraded some areas to Inferred as a result. Nexa has found more assay certificates since 2017 and completed a statistical and visual study that concluded that there were no significant issues with the historical data. SLR reviewed Nexa's comparison work and concurred with the inclusion of historical data in the resource estimate with no classification downgrade.

9.3 SLR Verification

SLR visited El Porvenir from September 5 to 7, 2018. During the site visit, SLR reviewed plans and sections, visited the core shack, examined some drill cores and mineralization exposures at the underground mine, and held discussions with Nexa personnel.

As part of the data verification process, SLR inspected the drill holes in section and plan view to review geological interpretation related to drill hole and channel database and found good correlation. SLR queried the database for unique headers, unique samples, duplicate holes, overlapping intervals, blank and zero grade assays, and long interval sample, and reviewed QA/QC data collected by Nexa. SLR did not identify any significant discrepancies.

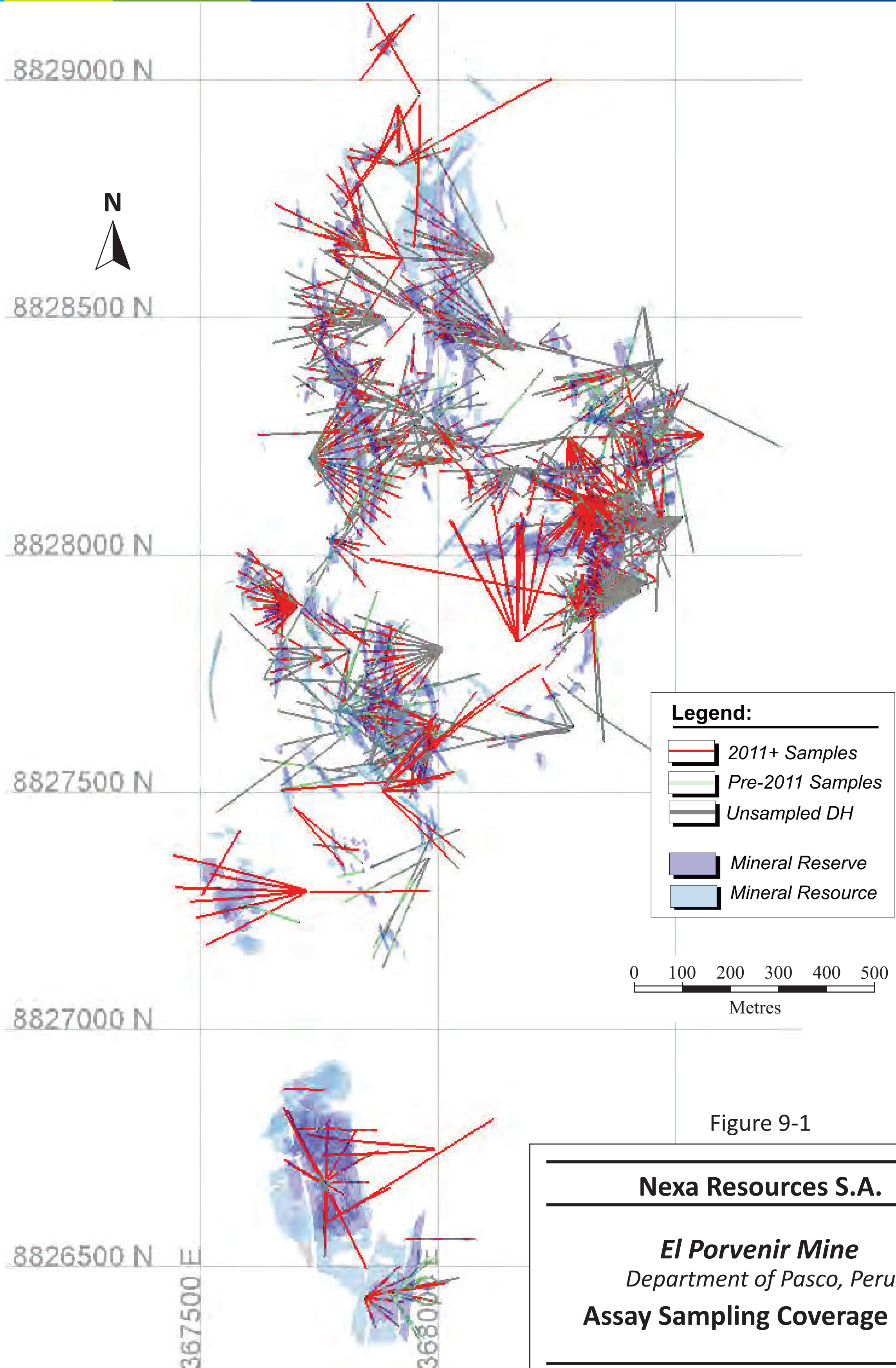
9.3.1 Assay Certificate Verification

SLR performed checks on the El Porvenir Mineral Resource database by converting approximately 166,000 assay certificate results spanning August 2011 to March 2020 from original PDF and Excel formats to reformatted comma delimited text (CSV) files, compiled and imported them to a database, and then compared the compiled certificate assays to the assay table in the Mineral Resource drill and sample database. The work matched approximately 53,000 sample IDs to the assay database for Zn, Cu, Pb, Ag, and Fe. Results of the exercise are shown in Table 9-1. No significant errors were found. There were 629 samples for Ag where the values in the database ranged from 25 g/t Ag to 285 g/t Ag lower than the certificate assays. This is likely a result of choosing the lower value of multiple re-assays and shows a conservative approach since all mis-matched values were lower in the Mineral Resource database, and SLR did not include the results of a re-assay program in its certificate conversion and compilation exercise.

Table 9-1: SLR Assay Certificate Verification Results
Nexa Resources S.A. – El Porvenir Mine

Element	Assays Count	Count Certificate IDs	Certificates Start	Certificates End	% of Assays in DB	Sample ID Matches	Abs. Diff. Threshold	Num Outside Threshold	Notes
ZN (%)	763,041	165,681	2011-07-03	2019-10-30	22%	52,860	1	0	
CU (%)	736,580	165,622	2012-04-08	2019-10-30	22%	52,860	0.001	2	Both samples 1.5 vs DHDB 1.0
PB (%)	760,687	165,668	2011-07-03	2019-10-30	22%	52,860	1	0	
AG (PPM)	764,211	165,626	2011-07-03	2019-10-30	22%	52,860	25	629	all Certimin, all DHDB samples lower grade than certificates – likely due to resample program
FE (%)	229,134	165,262	2011-07-03	2019-10-30	72%	52,860	1	0	

SLR did not review the pre-2011 certificate data as it is mostly located in mined-out areas. The bulk of the Mineral Resources and Mineral Reserves are supported with data from 2011 to 2020. Figure 9-1 shows the distribution of pre-2011 (green) and 2011-2020 (red) assays for zinc in the Mineral Resource and Mineral Reserve area. Unsampled drill traces are grey. Note the Mineral Resource and Mineral Reserve solids are well-covered by the 2011-2020 sampling. Assay certificates pre-2011 were not available, with exception of 2009, however, Nexa and SLR reviewed this data in sections and plan views. Overall, the data compared well with recent drilling. Based on SLR's review, there is no reason to believe there is any significant issue related to this data, furthermore, Nexa is currently drilling in these areas to confirm assay values.



January 2021

Source: SLR, 2020.

Figure 9-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Assay Sampling Coverage (Zn)

9.3.2 Density Verification

SLR converted 3,553 density measurement certificates, spanning November 2015 to February 2020, from original Excel formats to reformatted CSV text files, compiled and imported them to a database, and compared them to the density table in the Mineral Resource drill and sample database.

Four files from 2011, 2012 and 2014 appear to contain grab samples, and only two of these had sample ID fields which concatenated the index and year in the table. Spot checks of the available sample IDs against the density table in the Mineral Resource database resulted in zero matches.

There were 565 certificate ID matches out of 1,131 in the El Porvenir Mineral Resource database, resulting in a comparison rate of 50%. SLR notes that there was only one density discrepancy greater than 0.2 g/cm^3 between the matching certificate and the Mineral Resource sampleIDs. SLR considers this to be a very good result. Spatial coverage of the density samples relative to Mineral Resources (blue) and Mineral Reserves (orange) are shown in Figure 9-2.

The SLR QP found that the database is well maintained, and generally exceeds industry standards. The SLR QP is of the opinion that database and database verification procedures for El Porvenir comply with industry standards and are adequate for the purposes of Mineral Resource estimation.

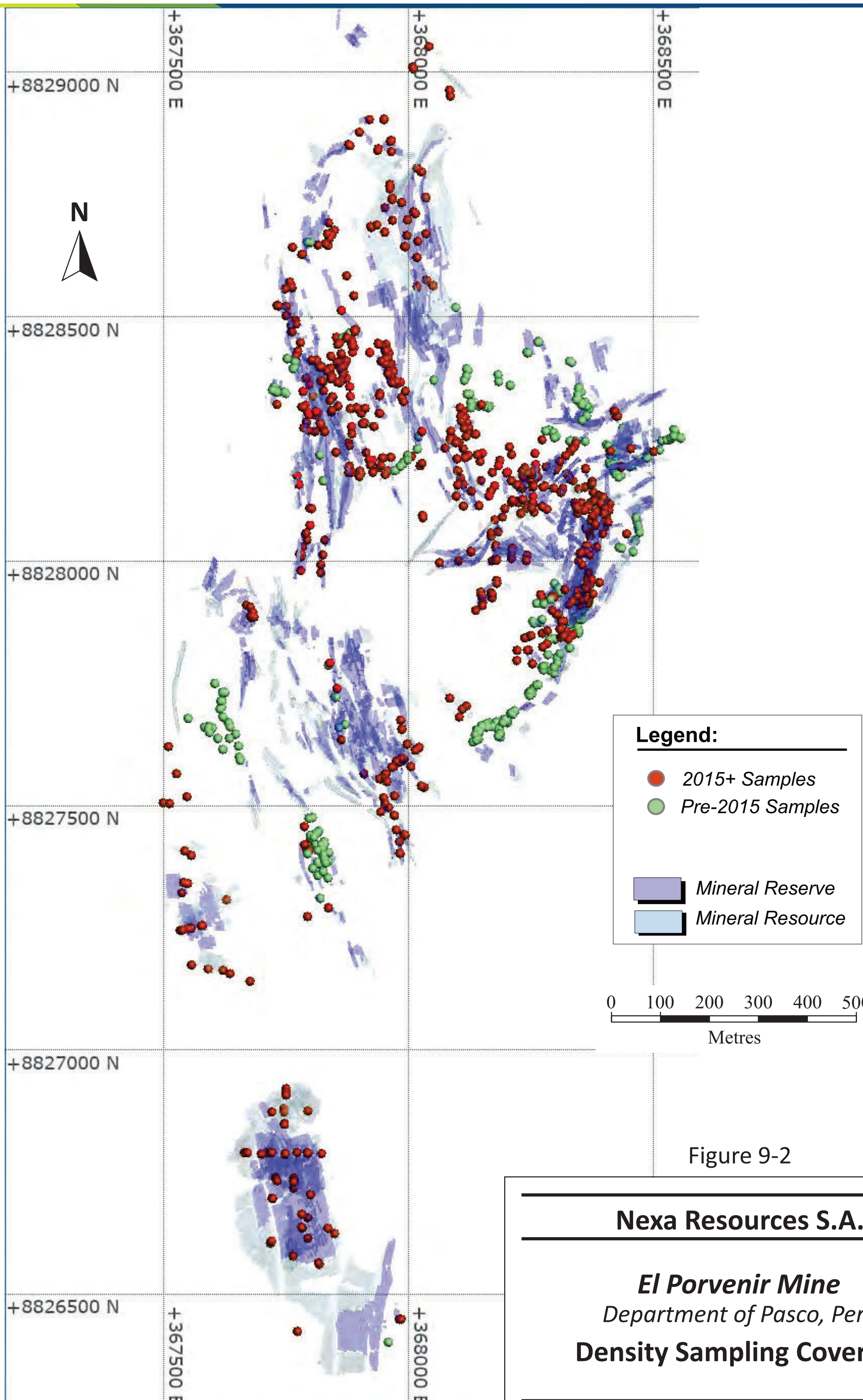


Figure 9-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Density Sampling Coverage

January 2021 ***Source: SLR, 2020.***

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING

10.1 Test Work

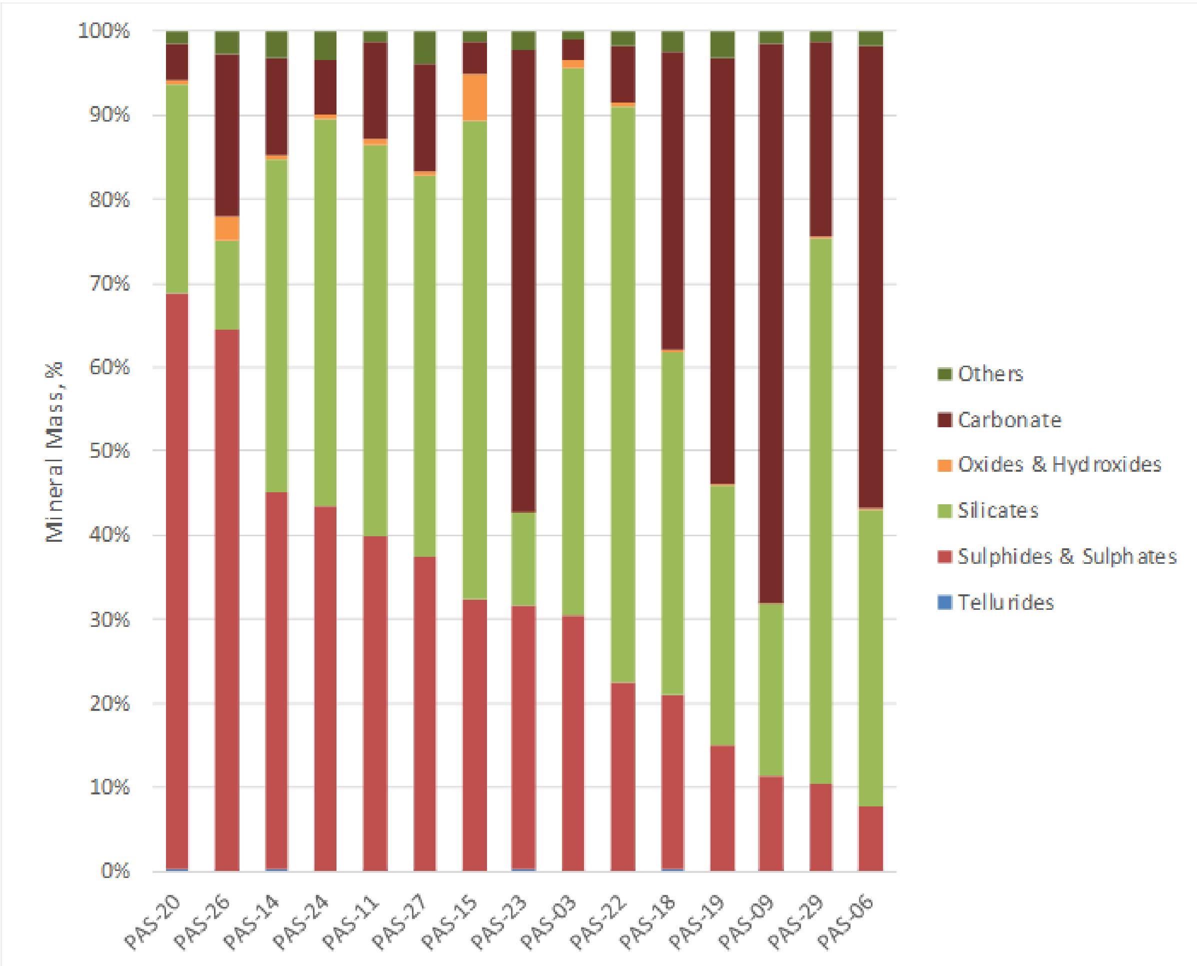
Nexa began developing a geometallurgical model for El Porvenir in 2017. The objectives of the work were to develop a geometallurgical model able to predict the recovery of lead, zinc, copper, arsenic, and manganese, concentrate grades, as well as abrasiveness (abrasion index (Ai)) and hardness (Bond ball mill work index (BWi)), and therefore throughput based on ore source within the deposit. The aim of the development work included:

- Maximization of operational value of the El Porvenir mining unit.
- Reduction of risks to production related to:
    - Plant throughput.
    - Grinding media consumption.
    - Recovery of valuable minerals.
    - Concentrate quality.
- Identification of flaws in the quality and interpretation of the available information.
- Identification of opportunities for improvement and to reduce risk.
- Definition and validation of geometallurgical domains from metallurgical test results.
- Evaluation of contaminants in the deposit.

The geometallurgical sample selection and test work were planned with the assistance of Transmin Metallurgical Consultants (Transmin). Preliminary results and interpretation were reported by Transmin in the report Estudio Geometalurgico Preliminar para Unidad Minera El Porvenir, June 15, 2018 (Transmin, 2018). The preliminary work was followed up by two additional phases of test work reported in Estudio Geometalúrgico Fase 2 para Unidad Minera El Porvenir, April 29, 2019 (Transmin, 2019) and Estudio Geometalúrgico Fase 3 para Unidad Minera El Porvenir, May 18, 2020 (Transmin, 2020).

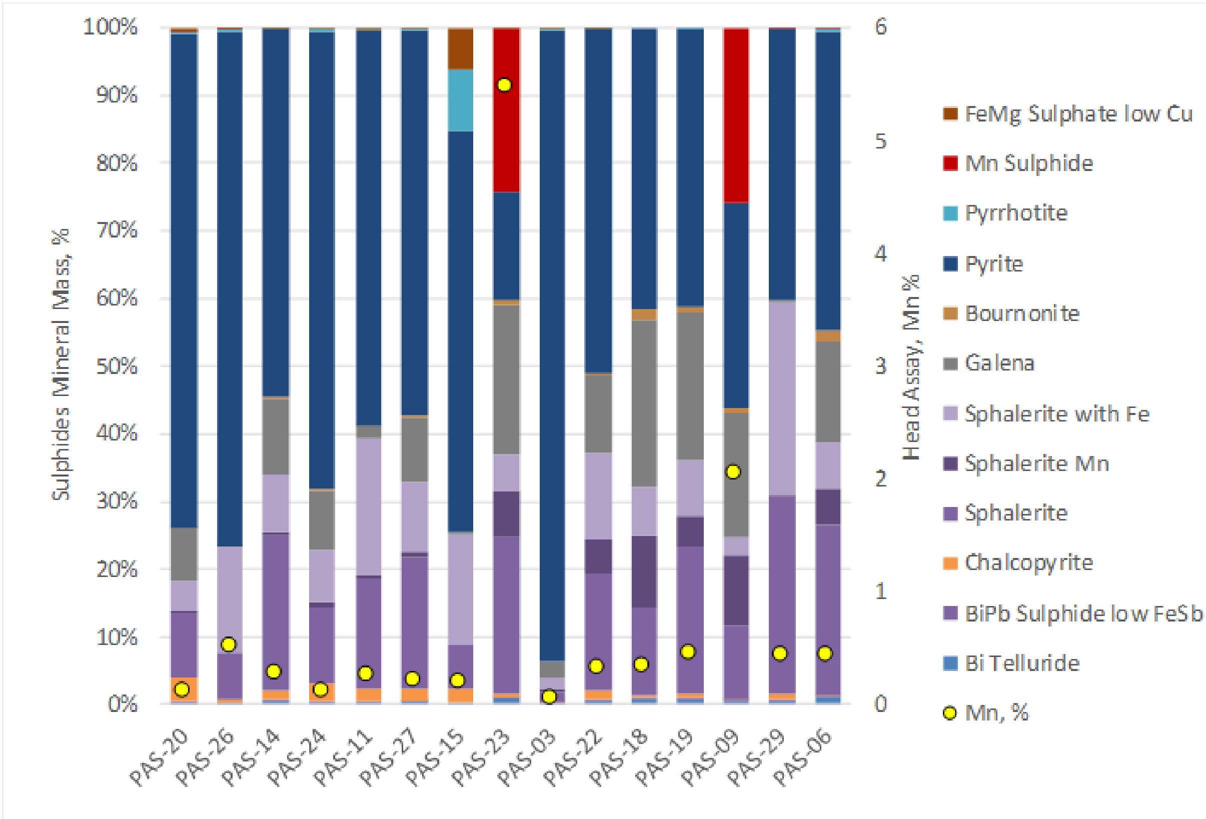
In 2017, fifteen samples from El Porvenir were submitted for metallurgical testing. The samples were intended to be representative of 2018 concentrator feed. Test work included mineralogy, comminution testing (BWi and Ai), and flotation (variability tests, locked cycle tests (LCTs), and grind size evaluation).

Priority was given to samples from holes drilled in 2016 and 2017, so as to use the freshest possible material for metallurgical test work. Samples were selected to represent areas in the block model with Net Smelter Return (NSR) values greater than or equal to $40.94/t, as well as to include majority lithologies to be processed in 2018 (predominantly skarn and limestone). Grades of zinc, lead, copper, and silver were also considered in the selection of samples. Mineralogical characterization of the samples is represented in Figure 10-1 and Figure 10-2. The mineralogy is notable for the wide range of sulphide and sulphate content, the presence of sphalerite with manganese inclusions, as well as high levels of manganese sulphide in two samples, PAS-09 and PAS-23.



Source: Transmin, 2018

Figure 10-1: Bulk Mineralogical Analysis



Source: Transmin, 2018

Figure 10-2: Sulphide Mineral Breakdown

Comminution test results ranged from 0.04 g to 0.33 g for Ai and 7.3 kWh/t to 20.6 kWh/t for Bwi.

Three composite samples were produced for use in grind size optimization flotation tests and for LCTs. Two composites of plant feed representing October 2017 and November 2017 were collected for repeatability testing and cleaner regrind testing. Bulk rougher flotation was completed at three grind sizes, 80% passing (P_{80}) 100 µm, 150 µm, and 200 µm. The tests indicated that there was a tendency towards higher recoveries of copper and zinc to the bulk rougher concentrate at the finer grind sizes. This would result, however, in the need for more effort to reject the additional zinc from the bulk concentrate. Recovery of lead to the bulk concentrate was less affected but improved at finer grind sizes. Therefore, it was noted that optimization of primary grind size could help to maximize recoveries of valuable minerals and metals, but primary grind size should be considered in conjunction with throughput and energy consumption.

An evaluation of regrind size was conducted by completing cleaner tests on bulk and zinc rougher concentrates at P_{80} 20 µm and 40 µm, as well as without regrinding. The tests indicated that recoveries were lower at finer grind sizes, but also that grades at the finer grind sizes were higher. It was noted that optimization of regrind size could help to reduce energy consumption for regrinding, while still achieving target concentrate grades.

A LCT was completed which produced a bulk concentrate of 53.8% Pb and zinc concentrate of 52.7% Zn. The limit for bismuth in the lead concentrate (1,000 ppm Bi) was exceeded at 5,597 ppm Bi, and the limit for cadmium in the zinc concentrate (3,000 ppm Cd) was exceeded at 3,275 ppm Cd. Final recoveries for lead and zinc were 88.2% and 91.5%, respectively.

Variability tests were completed on the 15 variability samples. The tests consisted of bulk and zinc rougher flotation conditions that were adjusted according to the lead and zinc content of the samples, resulting in five different sets of flotation conditions.

Lead recovery to the bulk concentrate averaged 92% (excluding the low lead content samples), while zinc recovery to the zinc rougher concentrate averaged 79%.

Test work results from the samples were used to derive recovery versus head grade relationships for lead, zinc, copper, manganese, and arsenic. Transmin noted that the number of samples tested was less than the number required to represent the variability of the deposit, and that additional test work would be required to validate and update the geometallurgical model. In addition, it was recommended that arsenopyrite and manganese sulphides be included in the logging of drill core samples, and that the behaviours of bismuth and antimony should be evaluated in future test work.

In Phase 2 of the geometallurgical model development, 96 samples were selected for metallurgical test work, including samples from both El Porvenir and Atacocha. Samples were selected to represent the distribution of ore (from different zones within the mines) planned to be mined in 2019 (except for Atacocha where sample material for certain zones to be mined in 2019 was not available), and from blocks in the block model with NSR values greater than or equal to $40.94/t.

Samples that underwent comminution testing included 36 samples from El Porvenir and 10 samples from Atacocha. Ai values of the samples ranged from 0.0056 g to 0.47 g, with the majority of samples in the low abrasiveness range of < 0.3 g. BWi for the samples ranged from 5.6 kWh/t to 20.7 kWh/t with the majority of samples in the medium to hard range of 9 kWh/t to 20 kWh/t. Abrasiveness and hardness were found to be related to the SiO_2 content of the samples.

Flotation test work was completed on 45 variability samples (rougher tests) and a composite produced from 40 individual samples from El Porvenir and 10 individual samples from a blend of 75% El Porvenir and 25% Atacocha material. Three composites (two El Porvenir and one Atacocha) were submitted for mineralogical analysis. The main gangue minerals in the composites were silicates and carbonates and the main sulphide minerals were pyrite, sphalerite, and galena. The flotation test work indicated that lead recovery was related to the lead head grade, and silver recovery was related to lead recovery; zinc, manganese, and arsenic recoveries were noted to be related to the source zone of the samples. LCTs conducted on the composites did not achieve stability and were therefore not included in the analysis of results.

In Phase 3 of the geometallurgical model development, 46 additional samples representing different zones and lithologies at El Porvenir underwent comminution testing. Ai results ranged from 0.0030 g to 0.68 g and BWi results ranged from 5.67 kWh/t to 23.1 kWh/t. Abrasiveness was found to be related to ore zone, lithology, SiO_2 content, and loss on ignition (LOI). BWi was found to be related to ore zone, lithology, and SiO_2 content.

A further 29 samples were used to produce two composites representing ore to be mined from 2020 to 2022, as well as three samples used to produce a composite representing the Don Ernesto zone for flotation test work. Mineralogical analysis of the composites indicated that the main sulphide minerals were pyrite, sphalerite, pyrrhotite, and galena. Compared to the 2020 to 2022 composites (PDFC-01 and PDFC-02), the Don Ernesto composite (PDFC-03) was higher in sulphides and also contained 2.5%

bournonite ($PbCuSbS_3$), while PDFC-02 contained 2.1% alabandite (MnS). Gangue minerals were mainly silicates and carbonates.

LCTs were completed on PDFC-01 and PDFC-02 to produce bulk copper-lead concentrates and zinc concentrates. These tests produced the following results:

- PDFC-01
  - The bulk concentrate achieved a grade of 6.1% Cu, 41.7% Pb, and 2,623 g/t Ag at recoveries of 50.3% Cu, 91.7% Pb, and 73.6% Ag.
  - The zinc concentrate achieved a grade of 49.7% Zn at a recovery of 91%.
  - The bulk concentrate was consisted mainly of galena (47%), chalcopyrite (16%), and sphalerite (15%, mostly associated with galena).
  - The zinc concentrate consisted mainly of sphalerite (85%).
- PDFC-02
  - The bulk concentrate reached a grade of 1.0% Cu, 42.4% Pb, and 2.808 g/t Ag at recoveries of 34% Cu, 87% Pb, and 70% Ag. It also contained 8% Mn and 11% Zn.
  - The Zn concentrate reached a grade of 41.8% Zn at a recovery of 73%.
  - The bulk concentrate consisted of galena (44%), alabandite (13%), and sphalerite (21%). Sphalerite was associated equally with galena and pyrite.
  - The zinc concentrate consisted mainly of sphalerite (70%) and 5% alabandite.

Transmin recommended that manganese sulphides, lead oxides, and whole rock analysis, particularly for SiO_2, be included in drill core analysis, that manganese be included in the geological model, and that consideration be given to mapping high SiO_2 zones.

Based on the results of the test work, Transmin produced relationships for comminution parameters (Ai and BWi) and flotation predictions for recoveries and grades for copper, lead, and zinc concentrates using ore zones and grades that could be used in geometallurgical modelling. These relationships were updated through the various phases of test work.

10.2 Operational Performance

Key operational performance figures for the El Porvenir concentrator since the beginning of 2016 are presented in Table 10-1. With zinc head grades of approximately 2.9% Zn and lead head grades of approximately 1.0% Pb, as well as high zinc recoveries (88%) and slightly lower lead recoveries (79%) to the respective concentrates, El Porvenir zinc concentrate production in 2019 was 110,000 t, while lead concentrate production was 33,000 t. Low copper head grades and low copper recovery to copper concentrate results in only minor copper concentrate production. Gold head grades are low at approximately 0.5 g/t Au and combined gold recovery to the lead and copper concentrates is approximately 30%, resulting in low (less than 1 oz/t Au) payable levels of gold in both concentrates. Silver recovery to the lead concentrate of 57% results in payable silver values in the lead concentrate (approximately 2,500 g/t Ag in 2020). Although silver recovery to the copper concentrate is low (5.1% in 2020), silver content in the copper concentrate is high enough (approximately 2,800 g/t Ag in 2020) that it likely contributes to the salability of the concentrate.

Production in 2020 was significantly lower than in 2019 due to the effects of the COVID-19 pandemic and associated production interruptions. On March 15, 2020, the Peruvian Government declared a national emergency and imposed operating business restrictions including on the mining sector. The quarantine period was initially expected to last until the end of March 2020 but was subsequently extended up to May 10, 2020. In light of the government restrictions, Nexa suspended production at El Porvenir. During this period, mining activities were limited to critical operations with a minimum workforce to ensure appropriate maintenance, safety, and security. On May 6, 2020, the Peruvian Government announced the conditions for the resumption of operations for different sectors, including mining operations above 5,000 tpd. As a result, El Porvenir operations, which were suspended on March 18, 2020, restarted production on May 11, 2020, following the end of the quarantine period. After the resumption of operations, El Porvenir ramped up production to pre-pandemic levels by June 2020.

Table 10-1: Concentrator Operational Performance
Nexa Resources S.A. – El Porvenir Mine

	Units	Item	2016	2017	2018	2019	2020
Ore Processed	tonnes		2,154,151	1,834,511	2,149,927	2,120,765	1,502,618
Mill Head Grade	g/t	Ag	60.2	63.6	59.7	64.6	62.3
	%	Cu	0.14	0.13	0.15	0.15	0.17
	%	Pb	0.99	1.04	0.98	1.01	0.93
	%	Zn	3.22	2.86	3.04	2.93	2.65
Cu Concentrate	tonnes		2,949	2,460	2,701	2,185	1,711
	%	Cu Grade	22.2	20.0	21.0	21.3	19.5
	%	Cu Recovery	22.0	23.1	18.0	14.7	12.7
	oz/t	Ag Grade	102.6	85.4	55.4	81.3	89.9
	%	Ag Recovery (to Cu)	7.4	6.6	3.7	4.1	5.1
	oz/t	Au Grade	1.21	0.96	0.68	0.87	
	%	Au Recovery (to Cu)	10.7	9.2	5.8	5.0	
Pb Concentrate	tonnes		31,195	28,726	31,662	33,018	21,213
	%	Pb Grade	55.0	51.6	52.6	51.2	51.2
	%	Pb recovery	80.8	77.5	79.1	79.0	77.8
	oz/t	Ag Grade	77.3	74.8	75.3	78.4	80.7
	%	Ag Recovery (to Pb)	57.7	57.4	57.8	58.8	56.9
	oz/t	Au Grade	0.18	0.21	0.25	0.24	
	%	Au Recovery (to Pb)	16.3	21.4	24.7	25.5	
Zn Concentrate	tonnes		121,294	92,446	115,256	109,976	69,891
	%	Zn Recovery	90.2	87.9	88.7	88.2	87.7
	%	Zn Grade	51.6	49.9	50.2	49.7	49.9

Historical monthly recoveries at El Porvenir for 2015 to 2020 are presented in Figure 10-3, which shows zinc, lead, and copper recoveries to their respective concentrates, and total silver and gold recoveries to the lead and copper concentrates.

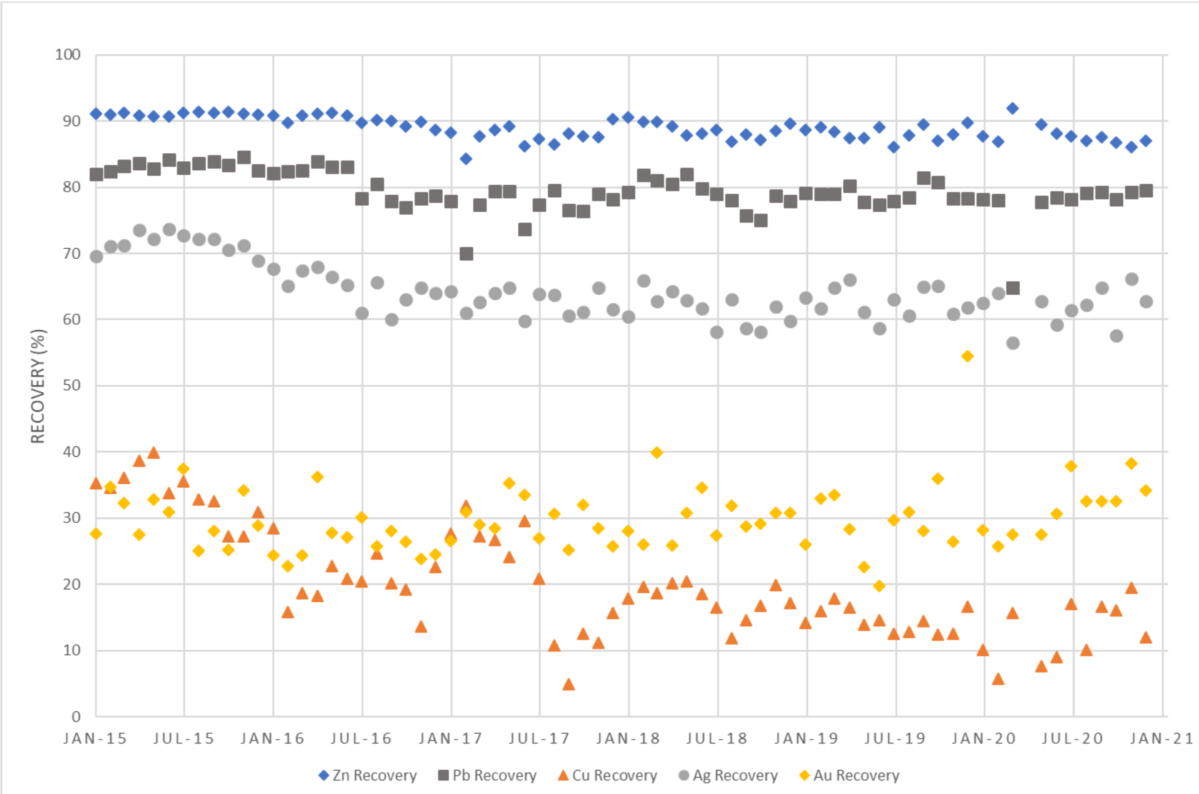


Figure 10-3: Historical Recovery to Concentrate

10.3 Deleterious Elements

Bismuth levels in the copper concentrate will likely attract penalty charges, while arsenic may exceed penalizable levels from time to time. Zinc and lead contents in the copper concentrate are high (combined approximately 15% to 20%) and attract penalties, however, the high silver and gold content (2,529 g/t Ag and 27 g/t Au in 2019) likely help the saleability of the small volumes of copper concentrate produced. Currently the copper concentrate attracts penalties of approximately US$17/dmt.

The zinc and lead concentrates are clean and do not typically attract penalty charges, although the bismuth content of the lead concentrate could reach penalizable levels if there is a high content of bismuth in the ore.

In the SLR QP's opinion, the metallurgical recovery data is adequate for the purposes of Mineral Resource and Mineral Reserve estimation in this Technical Report Summary.

11.0 MINERAL RESOURCE ESTIMATES

11.1 Summary

The Mineral Resource estimate for El Porvenir, dated December 31, 2020, using all data available as of February 15, 2020 was completed by El Porvenir staff (Nexa, 2020b) and reviewed by SLR.

The Mineral Resource estimate was completed using Datamine Studio RM and Leapfrog Geo software. Wireframes for geology and mineralization were constructed in Leapfrog Geo based on geology sections, assay results, lithological information, underground mapping, and structural data. Assays were capped to various levels based on exploratory data analysis and then composited to two metre lengths. Wireframes were filled with blocks and sub-celling at wireframe boundaries. Blocks were interpolated with grade using ordinary kriging (OK) and inverse distance cubed (ID^3) interpolation algorithms. Block estimates were validated using industry standard validation techniques. Classification of blocks used distance-based and mineralization continuity criteria.

A summary of the El Porvenir Mineral Resources, exclusive of Mineral Reserves, is shown in Table 11-1. NSR cut-off values for the Mineral Resources were established using a zinc price of US$1.30 per pound, a lead price of US$1.02 per pound, a copper price of US$3.37 per pound, and a silver price of US$19.38 per ounce.

The Mineral Resources in El Porvenir are contained in four zones: Zona Alta (Upper Zone), Zona Intermedia (Intermediate Zone), Zona Baja (Lower Zone), and Profundizacion Zona (Mine Deepening Zone).

Mineral Resources at El Porvenir are reported using all the material within underground resource shapes generated in Deswik Stope Optimizer (DSO) software, satisfying minimum mining size, NSR cut-off values of US$60.06/t for the Upper Zone, US$61.09/t for the Intermediate Zone, US$59.75/t for the Lower Zone, and US$63.37/t for the Mine Deepening Zone for cut and fill (C&F) resource shapes, and continuity criteria.

SLR's review of, and conclusions regarding, the resource model applies not just to the Mineral Resources listed in Table 11-1, but also to the Mineral Resources that were converted to Mineral Reserves.

The SLR QP reviewed the Mineral Resource assumptions, input parameters, geological interpretation, and block modelling and reporting procedures, and is of the opinion that the Mineral Resource estimate is appropriate for the style of mineralization at El Porvenir and that the block model is reasonable and acceptable to support the 2020 year end Mineral Resource estimate.

Mineral Resources have been classified in accordance with the definitions for Mineral Resources in S-K 1300, which are consistent with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves (CIM (2014) definitions).

Table 11-1: El Porvenir Mineral Resources - December 31, 2020
Nexa Resources S.A. – El Porvenir Mine

Category	Tonnage (Mt)	Grade				Contained Metal			
		(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)
Measured	0.18	2.59	0.99	0.23	63.46	4.8	1.8	0.4	378
Indicated	1.07	2.93	0.89	0.20	63.33	31.3	9.5	2.1	2,176
M+I	1.25	2.87	0.91	0.20	63.35	36.1	11.4	2.6	2,554
Inferred	6.79	3.60	0.95	0.23	78.37	244.5	64.8	15.9	17,110

Notes:

1. The definitions for Mineral Resources in S-K 1300 were followed for Mineral Resources, which are consistent with CIM (2014) definitions.
2. Mineral Resources are reported on an 80.16% Nexa attributable ownership basis.
3. Mineral Resources are estimated at NSR cut-off values of US$60.06/t for the Upper Zone, US$61.09/t for the Intermediate Zone, US$59.75/t for the Lower Zone, and US$63.37/t for the Mine Deepening Zone for C&F resource shapes.
4. Mineral Resources are estimated using average long term metal prices of Zn: US$2,869.14/t (US$1.30/lb); Pb: US$2,249.40/t (US$1.02/lb); Cu: US$7,426.59/t (US$3.37/lb); and Ag: US$19.38/oz.
5. Metallurgical recoveries are accounted for in the NSR calculations based on historical processing data and are variable as a function of head grade. Recoveries at the LOM average head grades are 89.6% for Zn, 79.2% for Pb, 14.3% for Cu, and 77.5% for Ag.
6. A minimum mining width of 4.0 m was used for C&F resource shapes.
7. Bulk density varies depending on mineralization domain.
8. Mineral Resources are exclusive of Mineral Reserves.
9. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
10. Numbers may not add due to rounding.

The SLR QP reviewed the Mineral Resource assumptions, input parameters, geological interpretation, and block modelling and reporting procedures, and is of the opinion that the Mineral Resource estimate is appropriate for the style of mineralization and that the block model is reasonable and acceptable to support the December 31, 2020 Mineral Resource estimate.

The SLR QP is of the opinion that, with consideration of the recommendations summarized in Section 1 and Section 23, any issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

11.2 Resource Database

Nexa maintains the entire database in Studio RM-Fusion. The resource database contains drilling information and analytical results up to February 15, 2020. Information received after this date was not used in the Mineral Resource estimate. The database comprises 4,643 drill holes for a total of 757,590.140 m and 17,127 underground channels for a total of 97,104.81 m.

The Mineral Resource estimate is based on the WGS-84 coordinate system, and two B-Level National Grid points are used as a reference for all topographical measurements.

SLR received data from Nexa in Microsoft Excel format. A Datamine database was also provided and extracted in CSV format. Data were amalgamated, parsed as required, and imported by SLR into Maptek's Vulcan Version 10.1.5 (Vulcan) software and Sequent Limited's Leapfrog software version 5.0 (Leapfrog) for review.

The drill hole and channel database comprise coordinate, length, azimuth, dip, lithology, density, and assay data. For grade estimation, unsampled intervals within mineralization wireframes were replaced with half of the detection limit values. Detection limit text values (e.g., “<0.05”) were replaced with numerical values that were half of the analytical detection limit. The channel sample data was converted into drill hole data for use in interpretation and Mineral Resource estimation.

For the purpose of the Mineral Resource estimate, the drill hole data were limited to those assays located inside the mineralization wireframes. This includes 4,290 drill holes containing 38,158 samples totalling 54,463 m, and 10,069 underground channels containing 28,356 samples totalling 46,785 m. A total of 21 drill holes were excluded from the Mineral Resource database (Table 7-2) as they either overlapped with new holes and have discrepancies with these holes, or were relocated to the Atacocha (mine adjacent and connected by an underground drift with El Porvenir) database. These 21 holes were also excluded from the geological modelling and estimation processes. Figure 11-1 illustrates the drill hole location in relation with the mineralization solids.

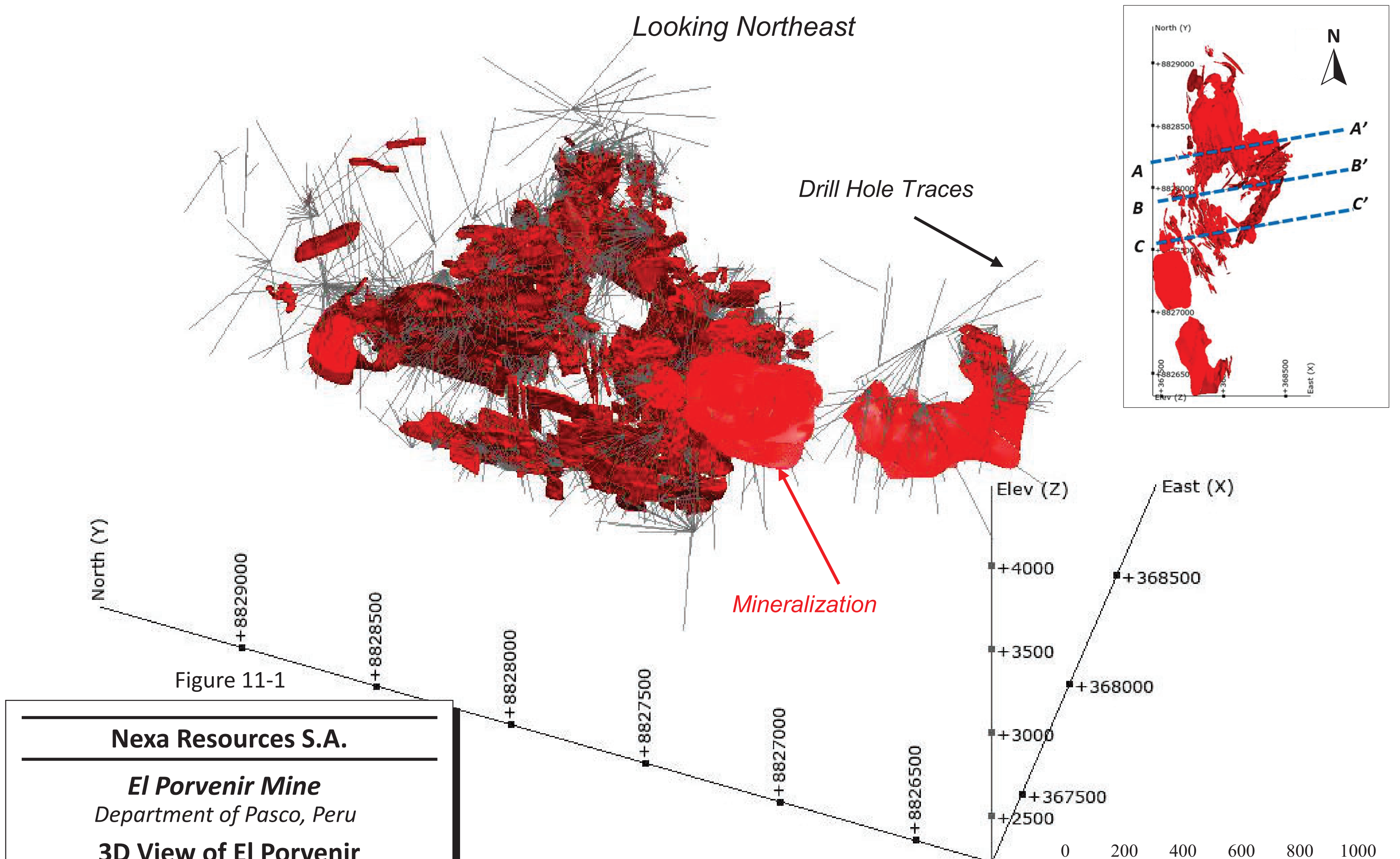


Figure 11-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

3D View of El Porvenir Mineralized Solid and Drill Holes

January 2021

Source: Nexa, 2020.

The SLR QP conducted a number of checks on the Mineral Resource database as discussed in Section 9, Data Verification. The SLR QP is of the opinion that the database is of high quality and generally exceeds industry standards and is appropriate to support Mineral Resource estimation.

11.3 Geological Interpretation

The El Porvenir underground Mineral Resource estimate is based on assay and geological interpretation for each individual mineralized domain. Geological models were built by El Porvenir geologists using the drilling and channel sampling assay results, as well as geological domains such as: rock type (sandstone, calcareous breccia, marble and skarn), mineralization structure type (vein, orebody, and mantos), structural and lithological controls observed in underground workings and drill core logging data. Figure 11-2 and Figure 11-3 present the El Porvenir geological domains.

During the interpretation process, three main styles of mineralization were identified at the Porvenir deposit:

- **Skarn:** mineralized zones of irregular to structurally controlled geometry, primarily contained within the Pucará Group, comprising garnet with associated metallic mineralization of galena, sphalerite, chalcopyrite, and silver-bearing sulphosalts (i.e., tetrahedrite).
- **Structurally controlled zones (i.e., veins):** mineralization comprising galena, sphalerite, and silver-bearing sulphosalts (i.e., tetrahedrite) with quartz, rhodochrosite, and pyrite that forms structurally controlled shoots with lengths of up to 150 m and vertical extents of up to 350 m.
- **Replacement:** lenses to irregular geometry contacts within the Pucará Group, comprising metallic mineralization of galena, sphalerite, chalcopyrite, and silver-bearing sulphosalts (i.e., tetrahedrite), and lenses or "mantos" in stratabound galena, sphalerite, and pyrite mineralization hosted in the Goyllarisquizga sandstone.

Skarn bodies are highly irregular in geometry and structurally controlled by variable trends (north-south to northwest-southeast) around the Milpo stock. For the vein mineralization, at least three groups were identified: (1) east-west striking; (2) replacement-style structures striking northwest-southeast dipping to the north; (3) and veins associated with intrusive dikes striking northeast-southwest; dipping to the south, and for the "mantos", a northwest trending with shallow dipping to the south was recognized.

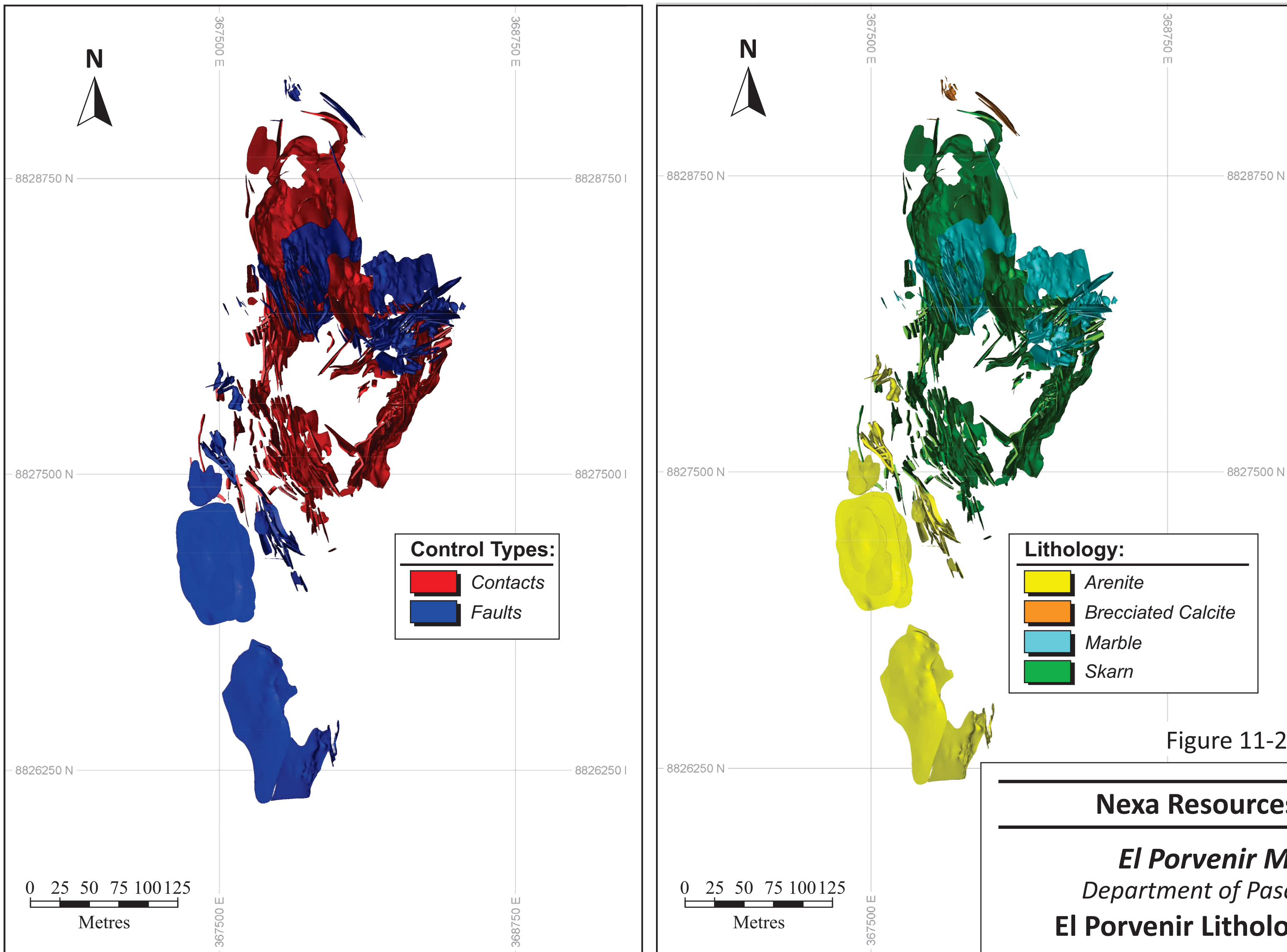


Figure 11-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

El Porvenir Lithological and Control Type Domains

January 2021

Source: Nexa, 2020.

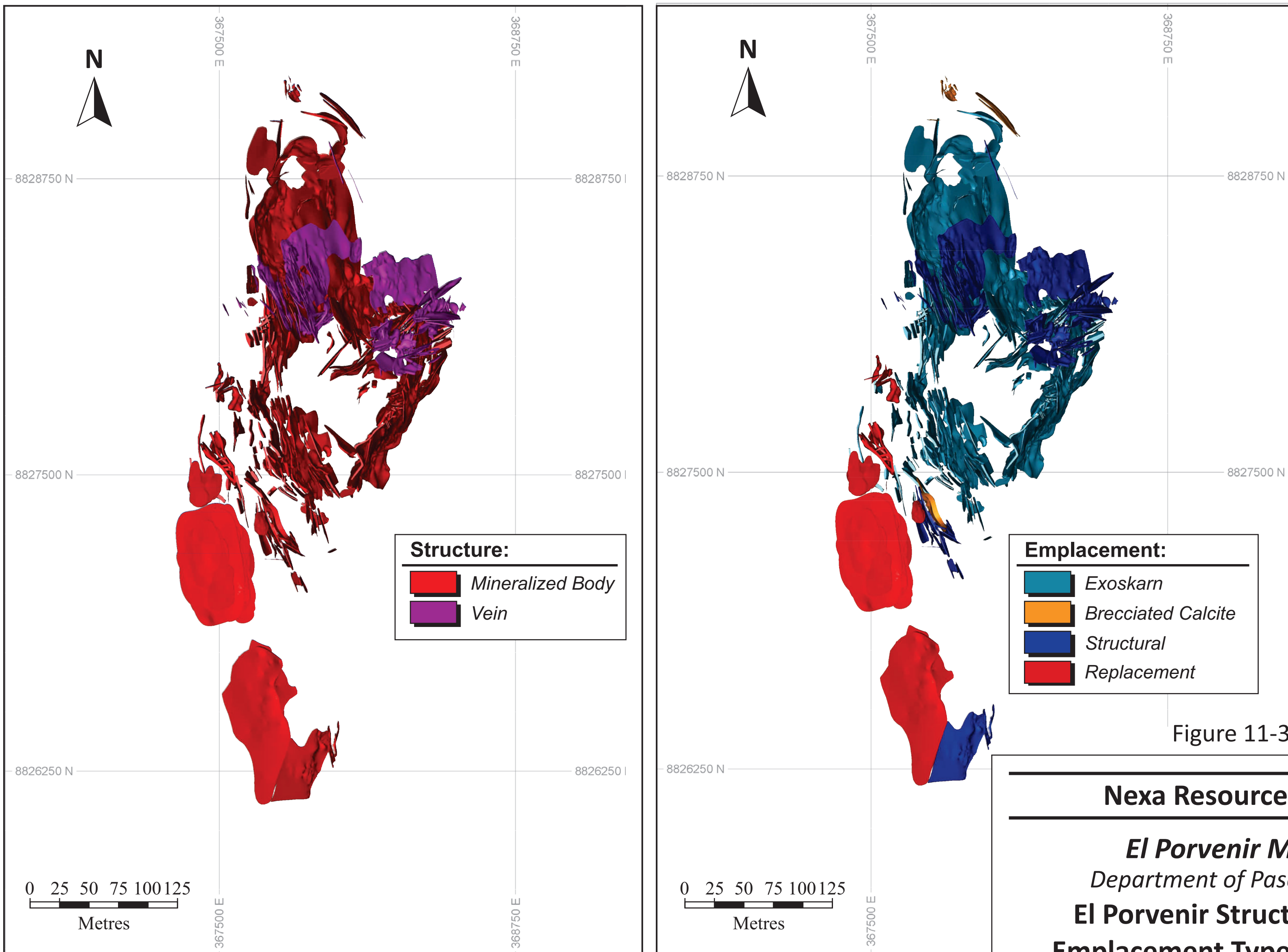


Figure 11-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

El Porvenir Structure and Emplacement Type Domains

January 2021

Source: Nexa, 2020.

11.4 Geological Modelling

Nexa performed geological modelling of the Porvenir deposit using Leapfrog. All contact surfaces were modelled based on the drilling and channel sampling assay results, as well as the structural and lithological controls observed in underground workings and drill core logging data. A total of 41 interpreted cross sections and 40 levels with underground mapping were used to guide the modelling (Figure 11-4), and polylines were used to better control contacts where data was sparse and to mimic underground mapping to adjust for mineralization displacement. No minimum mining thickness was used for the mineralization wireframes because DSO shapes were used for resource reporting.

The vein and "mantos" were modelled as vein objects and grouped using the vein system tool, with no consideration for external lithologies. Orebody type mineralization style was modelled using the intrusion tool. Extra boundary control was imposed using polylines if necessary. The modelled mineralized zones were then exported to Datamine software to encode the block model. A total of 430 individual mineralization domains (Table 11-2) and a total of 24 mineralization group zones were interpreted and modelled (Table 11-3). Most of the mineralization group zones are in the operation area, with exception of Sara and Porvenir 2 Sur Oeste. Figure 11-5 and Figure 11-6 illustrate the mineralization group zone domain solids in plan view and cross sections, respectively.

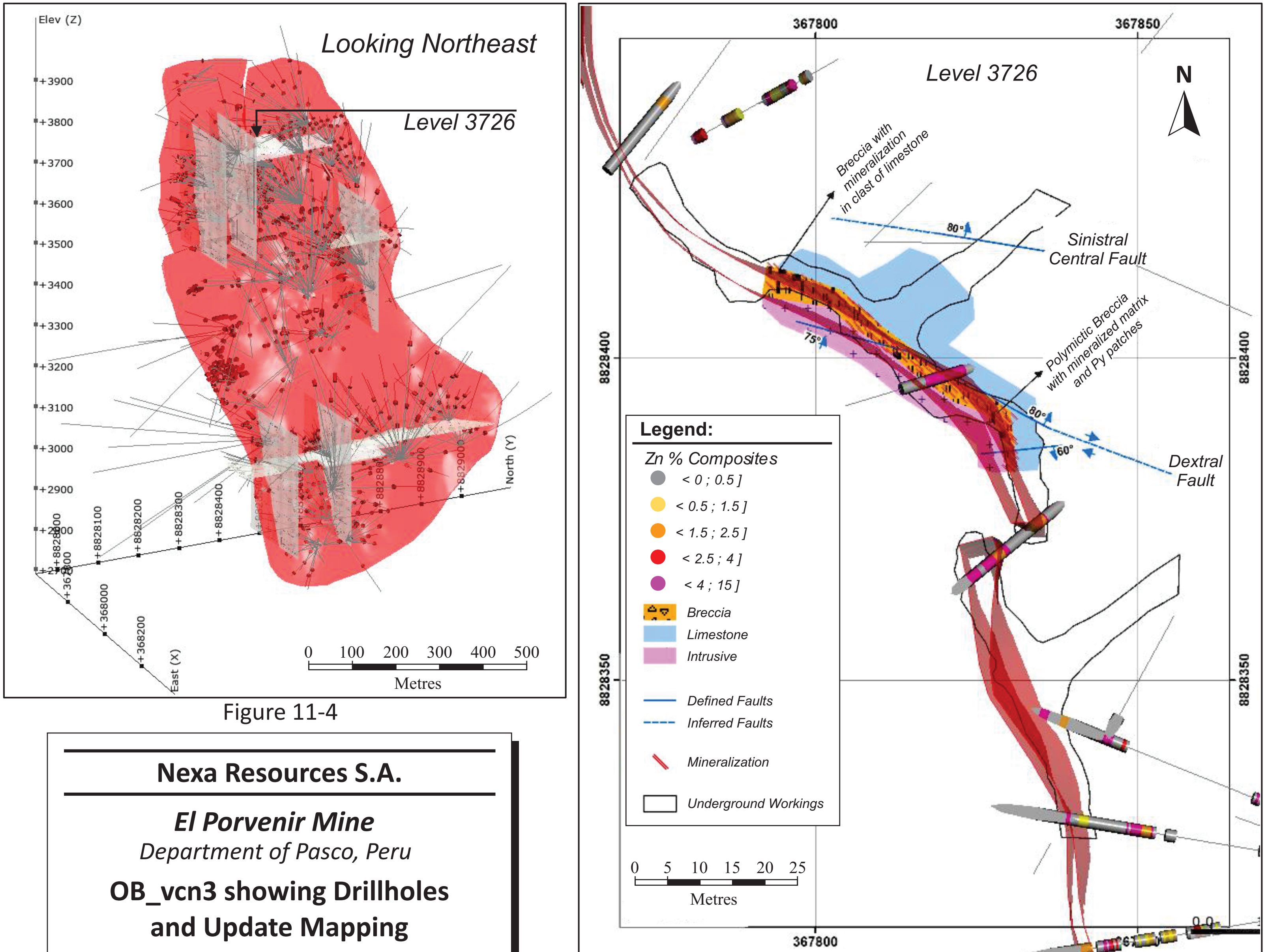


Figure 11-4

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

OB_vcn3 showing Drillholes and Update Mapping

January 2021

Source: Nexa, 2020.

Table 11-2: Individual Mineralization Domains
Nexa Resources S.A. – El Porvenir Mine

Mineralization Group Zone	Individual Mineralization Domain
Don Ernesto	de1,de2,de3,de4,de5
Don Lucho	dl01,dl02,dl03,dl04,dl05,dl06,dl07,dl08,dl09,dl10,dl11
Éxito	cpoex1,cpoex2,exit10,exit11,exit12,exit13,exit16,exit17,exit18,exiti1,exiti2,exiti3,exiti4,exiti5,exiti6,exiti7,exito,exito1,exito2,exito3,exito4,exito5,exito6,exito7 ,exito8,exito9,exitoa,exitob,exitoc,exitod,exits,exits1,exits2,exits3,exits4,exits5,exits6,exits7,exits8
Integracion AT-EP	int1,int10,int2,int3,int4,int5,int6,int7,int8,int9,ints1,ints10,ints11,ints12,ints13,ints14,ints15,ints16,ints17,ints21,ints22,ints23,ints24,ints25,ints26,ints28,ints29 ,ints3,ints31,ints32,ints4,ints5,ints6,ints7
Porvenir 3	vpor31,vpor32,vpor33,vpor34,vpor35,vpor36,vpor37,vpor38
Porvenir 9	por9,por91,por92,por93,por94,por95,por96,por97,por98,por9a,por9b,por9c,por9cf1,por9cf2,por9cf3,por9cf4,por9cf5,por9cf6,por9cf7,por9cf8,por9e,por9f,por9g,por9h,por9i,por9j,por9l,por9m,por9n,por9o,por9p,por9q,por9r,por9s,por9t,por9u,por9v,por9w,por9x,por9y,por9z,porv9a,porv9e,porv9f,porv9w,porv9x
Porvenir 2 Sur Este	p2se1,p2se10,p2se11,p2se12,p2se13,p2se14,p2se15,p2se16,p2se17,p2se18,p2se2,p2se3,p2se4,p2se5,p2se6,p2se7,p2se8,p2sr,por2sd
Porvenir 2 Sur Oeste	p2sw1,p2sw10,p2sw11,p2sw12,p2sw13,p2sw14,p2sw15,p2sw16,p2sw17,p2sw18,p2sw19,p2sw2,p2sw20,p2sw21,p2sw22,p2sw23,p2sw24,p2sw25,p2sw26,p2sw27,p2sw28,p2sw29,p2sw3,p2sw4,p2sw5,p2sw6,p2sw7,p2sw8,p2sw9
Sara	sara1,sara2,sara3,sara4,sara5,sara6,saras1,saras2,saras3,saras4,saras5,saras6
Socorro 2 y 4	soc21,soc210,soc211,soc212,soc213,soc214,soc22,soc23,soc24,soc25,soc27,soc28,soc29,soc41,soc410,soc411,soc412,soc413,soc414,soc42,soc43,soc434,soc435,soc436,soc437,soc44,soc45,soc46,soc47,soc48,soc49
Veta 1204	v12,v122,v123,v125,v1252,v126,v127,v12ne
Veta 1204 Inferior	v12i1,v12i10,v12i11,v12i12,v12i13,v12i14,v12i15,v12i16,v12i17,v12i18,v12i1a,v12i1b,v12i1c,v12i1d,v12i2,v12i3,v12i4,v12i5,v12i6,v12i7,v12i8,v12i9
Veta 1204 Superior	v12s1,v12s10,v12s11,v12s12,v12s13,v12s14,v12s15,v12s16,v12s17,v12s18,v12s19,v12s2,v12s21,v12s22,v12s23,v12s24,v12s25,v12s26,v12s27,v12s28 ,v12s29,v12s3,v12s30,v12s31,v12s32,v12s33,v12s34,v12s35,v12s36,v12s37,v12s4,v12s5,v12s6,v12s7,v12s8,v12s9
Veta 5	v5i,v5ne1,v5ne2,v5ne3,v5ne4,v5ne5,v5ne6,v5nw1,v5nw10,v5nw11,v5nw12,v5nw13,v5nw14,v5nw15,v5nw16,v5nw17,v5nw18,v5nw19,v5nw2,v5nw20,v5nw21,v5nw3,v5nw4,v5nw5,v5nw6,v5nw7,v5nw8,v5nw9
Veta AM	am1,am12,am14,am16,am17,am20,am21,am23,am3,am4,am8,am9,amsk1,amsk10,amsk11,amsk13,amsk14,amsk15,amsk16,amsk17,amsk18,amsk2,amsk3,amsk4,amsk5,amsk6,amsk7,amsk8,amsk9
Veta BX	bx
Veta Carmen Norte 1	vcn12,vcn13,vcn14,vcn15,vcn16,vcn17,vcn18,vcarmn
Veta Carmen Norte 3	cn3ei1,cn3ei2,vcn3,vcn32,vcn324,vcn327,vcn3e1,vcn3e3,vcn3e6,vcn3e8,vcn3w1,vcn3w2,vcn3w4,vcn3w5,vcn3w6,vcn3w8,vcn3w9
Veta Carmen Norte 4	vcn41,vcn42,vcn43,vcn44,vcn45,vcn46,vcn4i
Veta Carmen 1	vc1,vc1a,vc1b,vc1c
Veta Carmen 2	vc21,vc214,vc215,vc216,vc217,vc222,vc224,vc24,vc26,vc2922
Veta Carmen 3	vc31,vc32,vc33,vc34,vc35
Veta Progreso	vprg,vprg1,vprg2,vprg3,vprg4,vprg5,vprg6,vprgb,vprgb1,vprgb2,vprgb3,vprgb4,vprgb5,vprgb6,vprgb7,vprgb8,vprgb9,vprgba,vprgbb
Veta Vr	vr,vr1

Table 11-3: Mineralization Group Zone Domains
Nexa Resources S.A. – El Porvenir Mine

Mineralization Group Zone	Volume (m^3)	Lithological Control	Rock Type	Structure Type	Emplacement Type
Don Ernesto	394,265.02	Fault	Sandstone	Mineralized body	Structural
Don Lucho	766,128.63	Contact	Skarn	Mineralized body	Exoskarn
Éxito	2,763,581.47	Contact	Skarn	Mineralized body	Exoskarn
Integracion AT-EP	954,292.48	Fault/ Contact	Breccia-Skarn	Mineralized body	Breccia-Exoskarn
Porvenir 3	340,210.92	Fault	Sandstone	Mineralized body	Replacement Contact
Porvenir 9	7,067,926.99	Fault/ Contact	Sandstone-Skarn	Mineralized body	Exoskarn-Replacement
Porvenir 2 Sur Este	1,023,911.97	Fault	Sandstone	Mineralized body	Breccia-Structural-Replacement
Porvenir 2 Sur Oeste	1,893,829.62	Fault	Sandstone	Mineralized body	Replacement Contact
Sara	1,881,233.84	Fault	Sandstone	Mineralized body	Replacement Contact
Socorro 2 y 4	576,392.07	Fault	Marmol	Vein	Structural
Veta 1204	484,165.83	Fault	Marmol	Vein	Structural
Veta 1204 Inferior	1,189,380.33	Fault	Marmol	Vein	Structural
Veta 1204 Superior	1,228,289.40	Fault	Marmol	Vein	Structural
Veta 5	1,503,477.81	Fault/ Contact	Skarn	Mineralized body	Exoskarn
Veta AM	490,337.52	Contact	Skarn	Mineralized body	Exoskarn
Veta BX	4,679.90	Fault	Breccia	Mineralized body	Breccia
Veta Carmen Norte 1	604,381.53	Contact	Skarn	Mineralized body	Exoskarn
Veta Carmen Norte 3	3,710,274.16	Contact	Skarn	Mineralized body	Exoskarn
Veta Carmen Norte 4	461,265.07	Fault/ Contact	Marmol-Skarn	Vein	Structural-Exoskarn
Veta Carmen 1	850,357.73	Fault	Marmol	Vein	Structural
Veta Carmen 2	296,457.86	Fault	Marmol	Vein	Structural
Veta Carmen 3	404,796.21	Fault	Marmol	Vein	Structural
Veta Progreso	4,857,800.73	Contact	Skarn	Mineralized body	Exoskarn
Veta Vr	29,941.27	Fault	Marmol	Vein	Structural

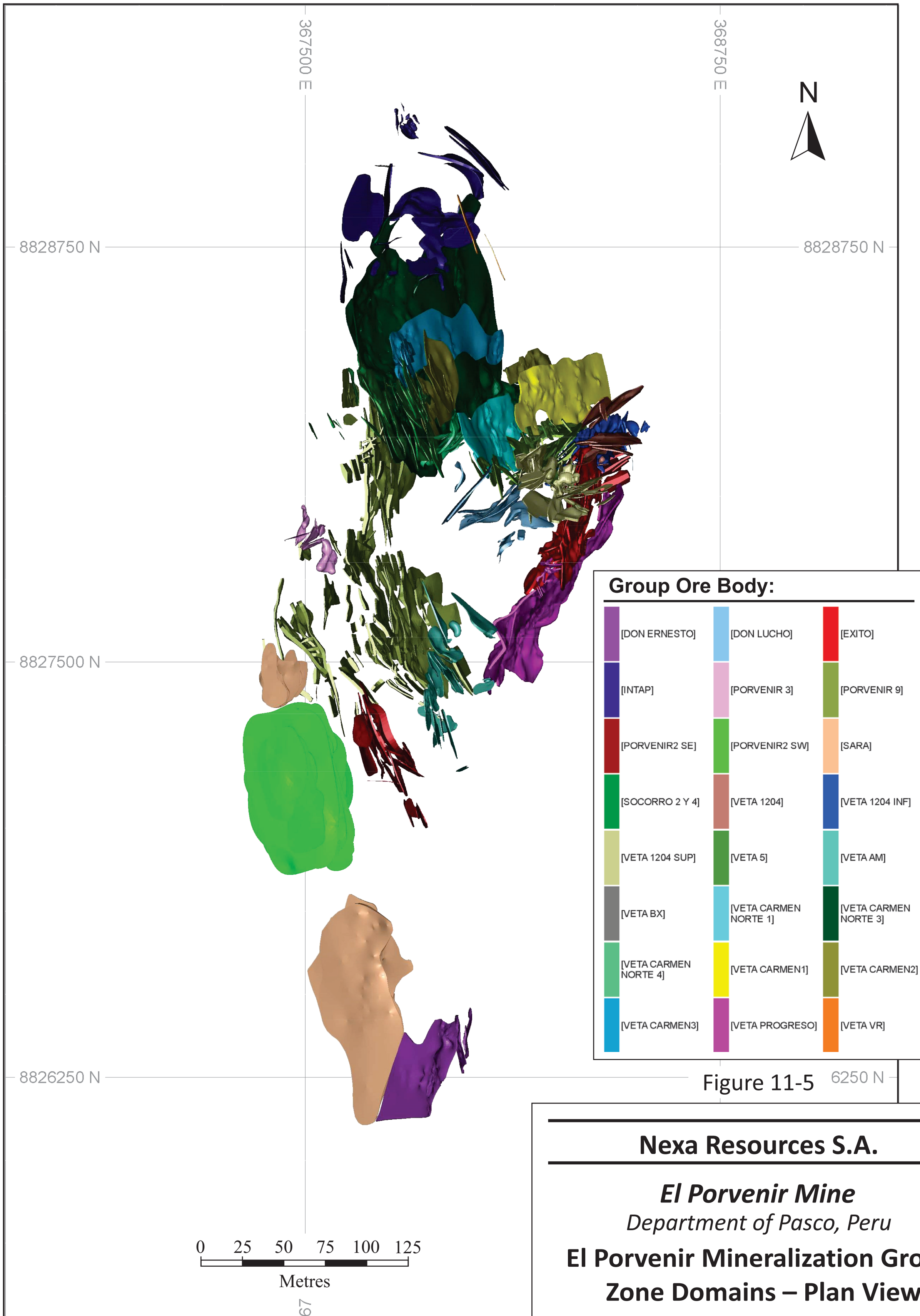


Figure 11-5

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

El Porvenir Mineralization Group Zone Domains – Plan View

January 2021 ***Source: Nexa, 2020.***

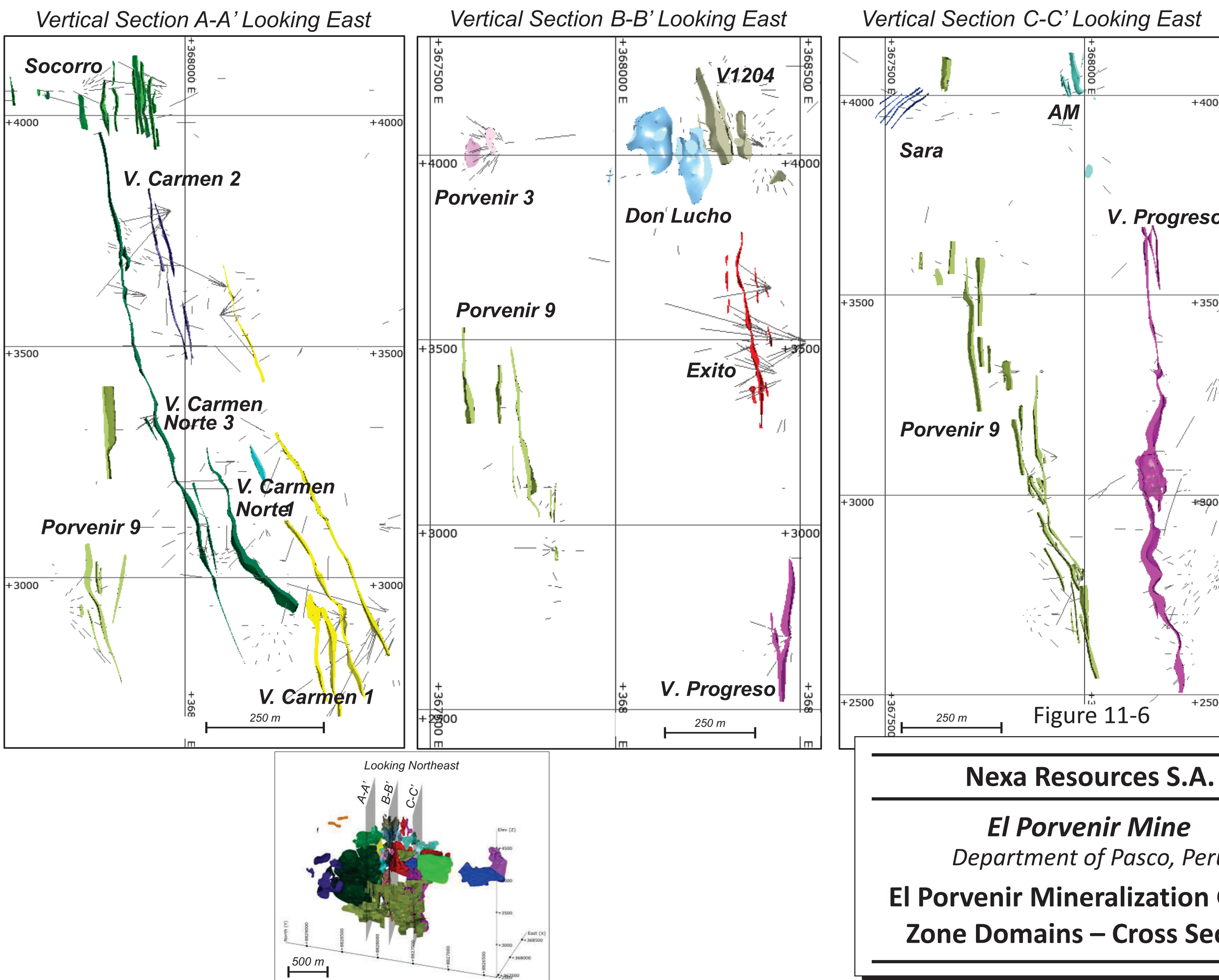


Figure 11-6

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

El Porvenir Mineralization Group Zone Domains – Cross Section

January 2021

Source: Nexa, 2020.

11.5 Domain Modelling

11.5.1 Grade Domains

Nexa prepared grade domain models for some of the individual mineralization domains by creating grade envelope wireframes based on assay grades. Grade threshold limits used to outline grade envelopes, and to define high and low grade domains, were determined by assessing probability plots, histograms, and contact plots to identify different populations, and by also considering spatial grade continuity.

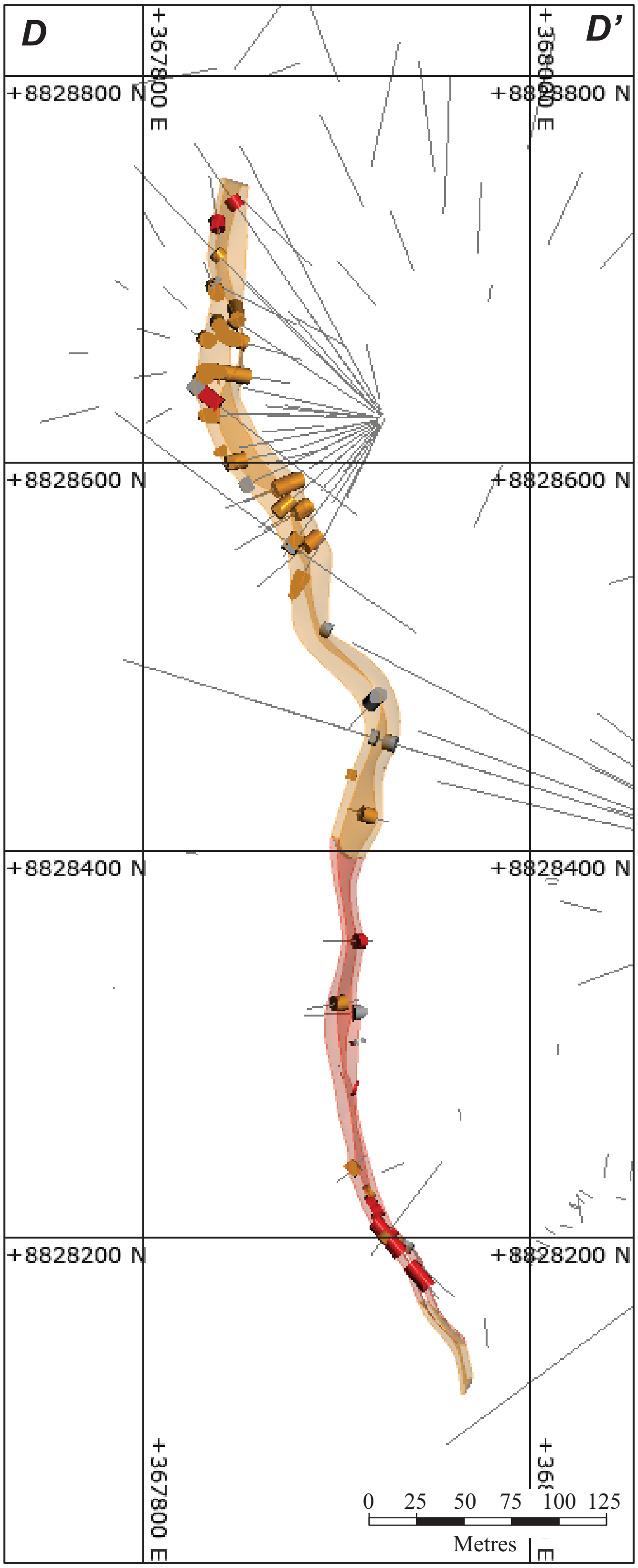
A total of eight grade envelopes were built within the individual mineralization domains for Zn, Cu, Pb, and Ag. Silver and lead used the same grade domains as they were found statistically and spatially correlated.

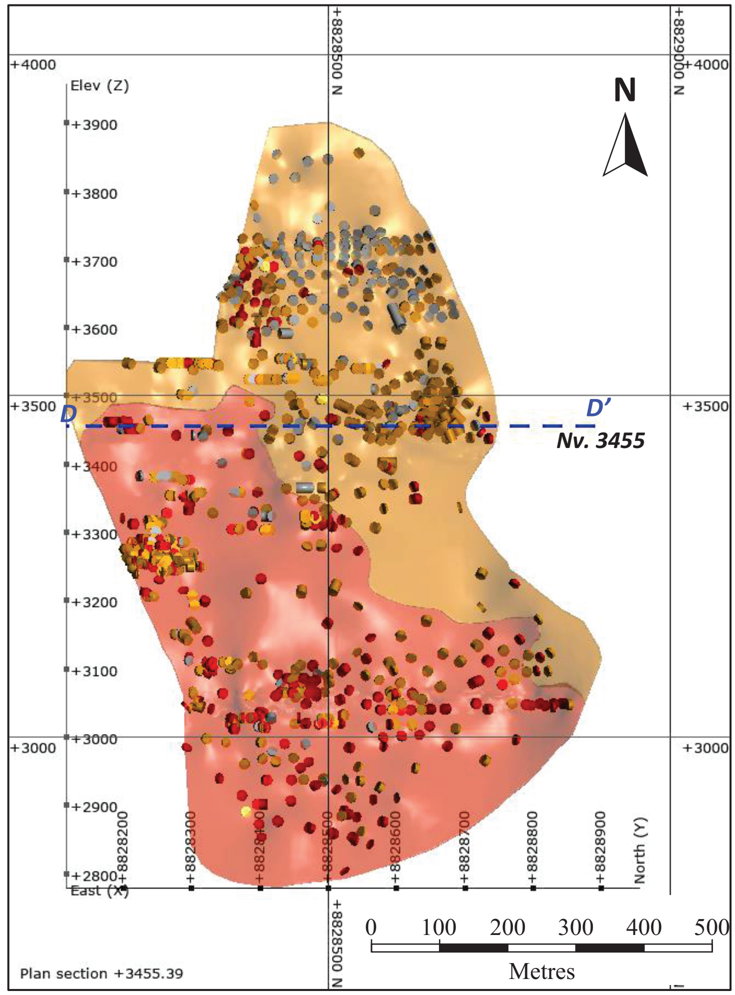
The purpose of building high grade and low grade domains was to control the internal dilution and limit the smearing of high grade areas into low grade areas and vice versa, during the grade estimation. Table 11-4 lists the zinc, copper, silver, and lead grade domains and Figure 11-7 illustrates a 3D view of the grade domains in the VCN3 mineralization domain.

For the remaining individual mineralization domains, grade domains were not built.

Table 11-4: Zn, Cu, Ag, and Pb Grade Domains
Nexa Resources S.A. – El Porvenir Mine

Individual Mineralization Domains	COD_OB	Domain by Element	Grade Domain	C_Estim	Domain Type	Mean Grade of Domain	Grade Envelope
Por9	450	Zn	1	4501	Low Grade	3.30%	Outside 2%Zn envelope
Por9	450	Zn	2	4502	High grade	6.20%	Inside 2% Zn envelope
v5ne1	1750	Zn	1	17502	Low Grade	3.40%	Outside 10% Zn envelope
v5ne1	1750	Zn	2	17501	High grade	8.10%	Inside 10% Zn envelope
v12i1	259	Ag	1	2592	Low Grade	22.2 g/t	Outside 60 g/t Ag envelope
v12i1	259	Ag	2	2591	High grade	71.5 g/t	Inside 60 g/t Ag envelope
v12i1	259	Pb	1	2592	Low Grade	0.10%	Outside 0.1% Pb envelope
v12i1	259	Pb	2	2591	High grade	0.60%	Inside 0.1% Pb envelope
vcn3	1151	Cu	1	11511	Low Grade	0.10%	Outside 0.1% Cu envelope
vcn3	1151	Cu	2	11512	High grade	0.30%	Inside 0.1% Cu envelope





Legend:

Cu % Composites

- *< 0 ; 0.1]*
- *< 0.1 ; 0.3]*
- *< 0.3 ; 10]*

Domains Color

- *Low grade Cu*
- *High grade Cu*

Figure 11-7

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Plan and Cross Section Copper Grade Domains for VCN3

January 2021 ***Source: Nexa, 2020.***

11.5.2 Estimation Domains

Based on observations of the drill core and underground mineralization exposures, discussions with the geologists on-site, a review of the data in 3D, and statistical analysis, the mineralization at Porvenir is considered to be lithologically and structurally controlled. The bulk of the mineralization is located in the Porvenir 9, Don Ernesto, Exito, Veta Carmen Norte 3, Veta Progreso, and Sara, with some mineralization in the Veta 5, Veta 1204, Veta 1204 Inferior, Veta 1204 Superior, Veta Carmen 1 and Don Lucho, and lesser mineralization in the Veta VR, and Integracion AT-EP domains.

Nexa created zinc, lead-silver, and copper estimation domains using a number of geological parameters, which include geological domains (lithological control and mineralization type), grade domains (high grade and low grade domains), and the anisotropy and orientation of the estimation domains. A total of 91 zinc, 69 lead-silver, and 70 copper estimation domains were defined. Table 11-5, Table 11-6, and Table 11-7 summarize the estimation domains and Figure 11-8, Figure 11-9, and Figure 11-10 show the estimation domains in plan view.

Table 11-5: Zinc Estimation Domains
Nexa Resources S.A. – El Porvenir Mine

C_ESTZN	Domains_Zn
1	vc1,vc1a,vcn12,vcn14,vcn17,vcn18,vprg2
100	soc23,soc25,soc28,vc1c,vc21,vc24,vc26,vc31,vc35,vcn3w5
154	ints7,soc214,vc1b,vc214,vcarmn,vcn13,vcn32,vcn327,vcn3e6
157	vc216,vc217
250	v12i10,v12i8,vc215
256	v12i13,v12i16,v12s17,v5nw17
259	v12i1
302	vprg3,vprg5
307	vprg,vprg1,vprg4,vprg6,350,por9a,por9b,por9m,porv9e,porv9f
450	por9
453	ints29,por9c,por9e,por9j,por9l
458	ints4,por9f,por9g,por9h,por9i,por9n,466,por91,por96,por98,por9p,por9q,porv9a
453	ints29,por9c,por9e,por9j,por9l
458	ints4,por9f,por9g,por9h,por9i,por9n
466	por91,por96,por98,por9p,por9q,porv9a
550	por9v,por9w,porv9w
600	por92,por93,por94,por95,por97,por9o,por9r,por9s,por9t,por9u,por9x,por9y,por9z,porv9x
652	p2sw11,p2sw12,p2sw19,p2sw20,p2sw21,p2sw23,p2sw25,p2sw28,p2sw29,p2sw9
671	p2sw1,p2sw16,p2sw2
674	p2sw17,p2sw18,p2sw22,p2sw4,p2sw5
677	p2sw10,p2sw13,p2sw14,p2sw15,p2sw26,p2sw27,p2sw8
700	de1,de3,de4,de5
701	de2,sara2
750	vpor31,vpor33,vpor35
751	vpor32,vpor34
756	vpor36,vpor37,vpor38
800	amsk10,amsk2,bx,ints22,ints5
850	am1,am16,am8,am9,amsk3,amsk8,p2se14
860	am12,am20,am3,amsk18,amsk5,amsk9,p2se15,p2se16,p2se17
865	am14,am17,am4,amsk14
872	am23,amsk1,amsk11,amsk15,amsk16,amsk7
883	amsk13,amsk17,amsk4,amsk6
901	v12,v122,v123
908	v125,v1252,v126
950	v12ne,v12s13
1016	exito7,v12s14,v12s16,v12s23,v12s26,v12s28,v12s36
1019	v12s29,v12s5,v12s8,v5nw6,1026,v12s15,v12s19,v12s32,v12s35
1028	exito6,v12s10,v12s11,v12s3,v12s33,v12s37
1029	exito2,exits4,v12s4,v12s6,v5nw18,v5nw19,v5nw20
1034	v12s21,v12s25,v12s27,v12s9
1054	vcn15,vcn16
1151	vcn3
1208	ints21,ints32,vcn3e8
1300	cn3ei1,cn3ei2
1350	cpoex1,cpoex2,exit11,exitoa,exitob
1402	exito,exito1,exito8,exito9,exitoc
1408	dl03,dl06,exit17,exito3,exito4
1410	exit10,exit12,exit13,exito5,exitod
1450	exits1,v12s1,vprgb6
1452	am21,exit16,exits2,exits3,exits5,exits7,exits8,v12s2,vprgb2,vprgb4,vprgb5,vprgb8,vprgb9
1458	exits,vprgb3,vprgba,vprgbb
1504	exiti1,exiti2,exiti3,exiti4,exiti5,exiti7,v12i1a
1555	ints17,soc21,soc211,soc22,soc27,v12i2,v12i5,v5nw1,v5nw14,v5nw15,vc222,vc224,vcn324,vcn3e1,vcn3e3,vcn3w1,vcn3w2,vcn3w4,vcn3w6,vcn3w8
1558	ints14,soc210,soc212,soc213,soc24,soc29,soc413,vc2922,vc32,vc33,vc34,vcn3w9
1607	soc41,soc411,soc414,soc42,soc43,soc44,soc49
1609	soc410,soc412,soc45,soc46,soc47,soc48
1614	soc434,soc435,soc436,soc437,1650,v5i,vcn4i
1702	v12i14,v5nw12,v5nw5,1712,v127,v12i18,v12i9,v5nw10,v5nw11,v5nw16,v5nw21,v5nw9,1714,v12i11,v12i12,v12i15,v12i17,v5nw3,v5nw4,1718,v5nw2,v5nw7
1750	v5ne1
1755	v5ne6
1855	v12s12,vcn46
1950	p2se10,p2se11,p2se12,p2se13,p2se5,p2se8,saras2
1959	p2se1,p2se4
2000	p2sr,p2sw24,p2sw3,p2sw6,p2sw7
2051	int1,int10,int2,int3,int4,int5,int6,int7,int8,int9
2060	ints1,ints11,ints12,ints13,ints28
2065	ints31,ints6
2067	ints10,ints23,ints3
2072	ints15,ints26
2073	ints16
2079	ints24,ints25
2100	dl01,dl02,dl04,dl08,dl10,dl11,exit18,v12s22,vprgb1
2104	dl05,dl07,dl09
2150	sara1,sara3,sara4,sara5,sara6
2156	saras1,saras3,saras4,saras5,saras6
270	exiti6,v12i1b,v12i1c,v12i1d
1850	vcn41,vcn42,vcn43,vcn44,vcn45
1754	v12s24,v12s30,v12s31,v12s34,v12s7,v5ne2,v5ne3,v5ne4,v5ne5
264	v12i3,v12i4,v12i6,v12i7
201	vr,vr1
306	exits6,vprgb,vprgb7
1008	v12s18,v5nw13
1900	p2se2,por2sd
1965	p2se18,p2se3,p2se6,p2se7
21	por9cf1,por9cf2,por9cf3,por9cf4,por9cf5,por9cf6,por9cf7,por9cf8
1151	vcn3
259	v12i1
17501	v5ne1
17502	v5ne1
4501	por9
4502	por9

Table 11-6: Lead-Silver Estimation Domains
Nexa Resources S.A. – El Porvenir Mine

CESTIM_AG-PB	Domains_Ag
1	ints7,vc1,vc224,vc26,vc32,vcarmn,vcn13,vcn16,vprg2
100	soc24,soc27,vc21,vc24,vc2922,vc31,vc33,vc35,vcn14,vcn15
154	ints17,soc210,soc213,soc23,soc25,soc29,v12i2,v12i5,v5nw1,vc1a,vc1b,vc1c,vc214,vc34,vcn17,vcn18, vcn327,vcn3w1,vcn3w2,vcn3w4,vcn3w5,vcn3w6,vcn3w8
157	vc216,vc217
185	exito2,exits4,v12s18,v12s4,v12s6,v5nw13,v5nw18,v5nw19,v5nw20
201	vr,vr1
256	v12i13,v12i16,v12s17,v5nw17
264	v12i3,v12i4,v12i6,v12i7
307	vprg,vprg1,vprg3,vprg4,vprg5,vprg6
308	dl04,dl06,dl08,exit18,vprgb1
309	am21,exit16,exits2,exits5,exits7,exits8,v12s2,vprgb2,vprgb4,vprgb5,vprgb8,vprgb9
310	vprgb3,vprgba,vprgbb
350	porv9e
451	por9a,por9b,por9m,porv9f
456	ints4,por9e,por9f,por9j,por9l
458	ints29,por9c,por9g,por9h,por9i,por9n
466	por91,por92,por93,por94,por95,por9o,por9p,por9q,por9t,por9y,por9z
600	por96,por97,por98,por9r,por9s,por9u,por9v,por9w,por9x,porv9a,porv9w,porv9x
671	p2sw1,p2sw13,p2sw15,p2sw2,p2sw20,p2sw3,p2sw5,p2sw6,p2sw8
700	de1,de3,de4,de5
701	de2,sara1,sara2,sara3,sara4,sara5,sara6
750	vpor31,vpor33,vpor35
751	amsk10,amsk2,bx,ints22,ints5,vpor32,vpor34
756	vpor36,vpor37,vpor38
850	am1,am12,am16,am20,am3,am8,am9,amsk18,amsk3,amsk5,amsk8,amsk9,p2se14,p2se15,p2se16,p2 se17
865	am17,am4,amsk1,amsk14,amsk16
878	am14,am23,amsk11,amsk15,amsk7
883	amsk13,amsk17,amsk4,amsk6
901	v12,v122,v123
908	v125,v1252,v126
1028	exito6,exito7,v12s10,v12s11,v12s14,v12s15,v12s16,v12s19,v12s23,v12s26,v12s28,v12s3,v12s32,v12 s33,v12s35,v12s36,v12s37
1034	v12s21,v12s24,v12s27,v12s7,v12s9,v5ne2,v5ne4,v5ne6
1300	cn3ei1,cn3ei2
1351	cpoex2,exit10,exit12,exit13,exito5
1402	cpoex1,exito,exito1,exitoc,exitod

CESTIM_AG-PB	Domains_Ag
1404	exit11,exito8,exito9,exitoa,exitob
1408	dl01,dl02,dl03,dl10,dl11,exit17,exito3,exito4,v12s22
1450	exits1,exits3,v12s1,vprgb6
1458	exits,exits6,vprgb,vprgb7
1504	exiti1,exiti2,exiti3,exiti4,exiti5,exiti6,exiti7,v12i1a,v12i1b,v12i1c,v12i1d
1555	ints14,soc21,soc211,soc212,soc214,soc22,soc28,soc413,v5nw14,v5nw15,vc222,vcn12,vcn32,vcn324, vcn3e1,vcn3e3,vcn3e6
1607	soc41,soc410,soc412,soc414,soc42,soc43,soc45,soc48
1611	soc411,soc44,soc46,soc47,soc49
1614	soc434,soc435,soc436,soc437
1650	v5i,vcn4i
1712	v127,v12i11,v12i12,v12i15,v12i17,v12i18,v12i9,v5nw10,v5nw11,v5nw16,v5nw21,v5nw3,v5nw4,v5nw9
1716	v12i10,v12i14,v12i8,v12s29,v12s5,v12s8,v5nw12,v5nw5,v5nw6,vc215
1718	v5nw2,v5nw7,v5nw8
1850	vcn41,vcn42,vcn43,vcn44,vcn45
1855	v12ne,v12s12,v12s13,v12s25,v12s30,v12s31,v12s34,v5ne3,v5ne5,vcn46
1900	p2se1,p2se12,p2se4,por2sd
1960	p2se10,p2se11,p2se13,p2se2,p2se5,p2se8,saras2
1965	p2se18,p2se3,p2se6,p2se7
2000	p2sr,p2sw10,p2sw11,p2sw12,p2sw14,p2sw16,p2sw17,p2sw18,p2sw19,p2sw21,p2sw22,p2sw23,p2sw2 4,p2sw25,p2sw26,p2sw27,p2sw28,p2sw29,p2sw4,p2sw7,p2sw9
2051	int1,int10,int2,int3,int4,int5,int6,int7,int8,int9
2060	ints1,ints11,ints12,ints13,ints21,ints28,ints32,vcn3e8
2067	ints10,ints23,ints3
2073	ints16
2079	ints24,ints25
2080	ints15,ints26
2083	ints31,ints6
2104	dl05,dl07,dl09
2156	saras1,saras3,saras4,saras5,saras6
21	por9cf1,por9cf2,por9cf3,por9cf4,por9cf5,por9cf6,por9cf7,por9cf8
1151	vcn3
2591	v12i1
2592	v12i1
1750	v5ne1
450	por9

Table 11-7: Copper Estimation Domains
Nexa Resources S.A. – El Porvenir Mine

CESTIM_CU	Domains_Cu
1	ints14,ints17,v12i2,v12i5,vc1,vc1a,vc1b,vcn12,vcn16,vcn32,vcn3w9,vprg2
100	soc21,soc210,soc211,soc212,soc213,soc214,soc22,soc23,soc24,soc25,soc28,soc29,soc413, v5nw1,v5nw14,v5nw15,vc1c,vc21,vc214,vc222,vc224,vc24,vc26,vc2922,vc31,vc32,vc33,vc3 4,vc35,vcn3e3,vcn3e6,vcn3w1,vcn3w4,vcn3w5,vcn3w6
157	vc216,vc217
164	por92,por95,por9t,por9y
201	vr,vr1
252	v12i12,v12i15,v12i17,v12i9
264	v12i3,v12i4,v12i6,v12i7
307	vprg,vprg1,vprg3,vprg4,vprg5,vprg6
350	por9a,por9b,por9m,porv9e,porv9f
456	por9c,por9f,por9n
458	ints29,ints4,por9e,por9g,por9h,por9i,por9j,por9l
466	por91,por93,por94,por96,por97,por98,por9o,por9p,por9q,por9r,por9s,por9u,por9v,por9w,por9x ,por9z ,porv9a,porv9w,porv9x
671	p2sr,p2sw1,p2sw10,p2sw11,p2sw12,p2sw13,p2sw14,p2sw15,p2sw16,p2sw17,p2sw18,p2sw1 9,p2sw2,p2sw20,p2sw21,p2sw22,p2sw23,p2sw24,p2sw25,p2sw26,p2sw27,p2sw28,p2sw29,p 2sw3,p2sw4,p2sw5,p2sw6,p2sw7,p2sw8,p2sw9
700	de1,de3,de4,de5
701	de2,sara1,sara2,sara3,sara4,sara5,sara6
750	vpor31,vpor33,vpor35
751	amsk10,amsk2,bx,ints22,ints5,vpor32,vpor34
756	vpor36,vpor37,vpor38
852	am14,am4,amsk14,amsk15,amsk16
860	am1,am12,am3,am8,am9,amsk18,amsk9,p2se14,p2se15,p2se16,p2se17
864	am16,am20,amsk3,amsk5,amsk8
865	am17,am23,amsk1,amsk11,amsk7
883	amsk13,amsk17,amsk4,amsk6
901	v12,v122,v1252
902	v123,v125,v126
1004	v12s14,v12s28
1008	exits4,v12s18,v5nw13,v5nw18,v5nw19,v5nw20
1010	am21,exits2,exits3,v12s1,v12s2,vprgb2,vprgb4,vprgb5,vprgb6
1023	v12s10,v12s11,v12s15,v12s16,v12s19,v12s23,v12s26,v12s32
1028	exito6,exito7,v12s3,v12s33,v12s35,v12s36,v12s37
1029	exito2,v12s4,v12s6
1034	v12s12,v12s21,v12s24,v12s25,v12s27,v12s30,v12s31,v12s34,v12s7,v12s9,v5ne2,v5ne3,v5n e5
1051	ints7,soc27,vcarmn,vcn13,vcn14,vcn15,vcn17,vcn18,vcn324,vcn327,vcn3e1,vcn3w2,vcn3w8
1300	cn3ei1,cn3ei2
1402	cpoex1,cpoex2,exit10,exit11,exit12,exit13,exito,exito1,exito8,exito9,exitoa

CESTIM_CU	Domains_Cu
1404	exito5,exitob,exitoc,exitod
1408	dl01,dl02,dl03,dl04,dl06,dl08,dl10,dl11,exit17,exit18,exito3,exito4,v12s22,vprgb1
1450	exit16,exits1,exits5,exits7,exits8,vprgb8,vprgb9
1455	exits6,vprgb3,vprgb7,vprgba,vprgbb
1458	exits,vprgb
1502	exiti1,exiti2,exiti3,exiti4,exiti7
1504	exiti5,exiti6,v12i1a,v12i1b,v12i1c,v12i1d
1607	soc41,soc410,soc411,soc412,soc414,soc42,soc43,soc44,soc45,soc46,soc47,soc48,soc49
1614	soc434,soc435,soc436,soc437
1650	v5i,vcn4i
1702	v12i10,v12i13,v12i14,v12i16,v5nw12,v5nw6,vc215
1712	v127,v12i11,v12i18,v5nw10,v5nw11,v5nw16,v5nw21,v5nw3,v5nw4,v5nw9
1716	v12i8,v12s17,v12s29,v12s5,v12s8,v5nw17,v5nw5
1718	v5nw2,v5nw7,v5nw8
1850	vcn41,vcn42,vcn43,vcn44,vcn45
1855	v12ne,v12s13,v5ne4,v5ne6,vcn46
1900	p2se1,p2se10,p2se11,p2se12,p2se13,p2se4,p2se5,p2se8,por2sd
1960	p2se2,saras2
1965	p2se18,p2se3,p2se6,p2se7
2051	int1,int10,int2,int3,int4,int5,int6,int7,int8,int9
2060	ints1,ints11,ints13,ints21,ints28,vcn3e8
2065	ints31,ints6
2067	ints10,ints23,ints3
2069	ints12,ints32
2072	ints15,ints26
2073	ints16
2079	ints24,ints25
2104	dl05,dl07,dl09
2156	saras1,saras3,saras4,saras5,saras6
21	por9cf1,por9cf2,por9cf3,por9cf4,por9cf5,por9cf6,por9cf7,por9cf8
11511	vcn3
11512	vcn3
259	v12i1
1750	v5ne1
450	por9

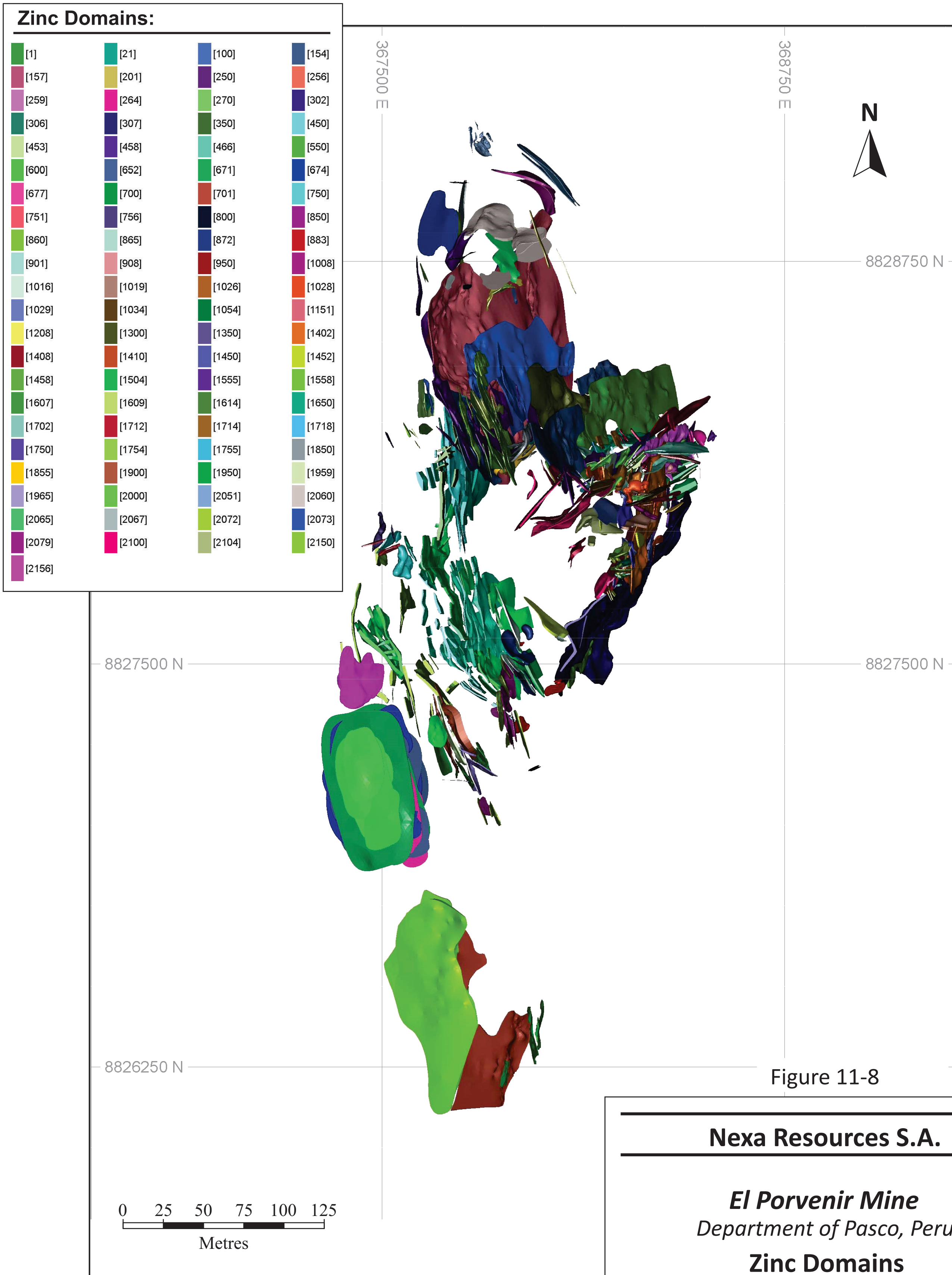


Figure 11-8

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Zinc Domains

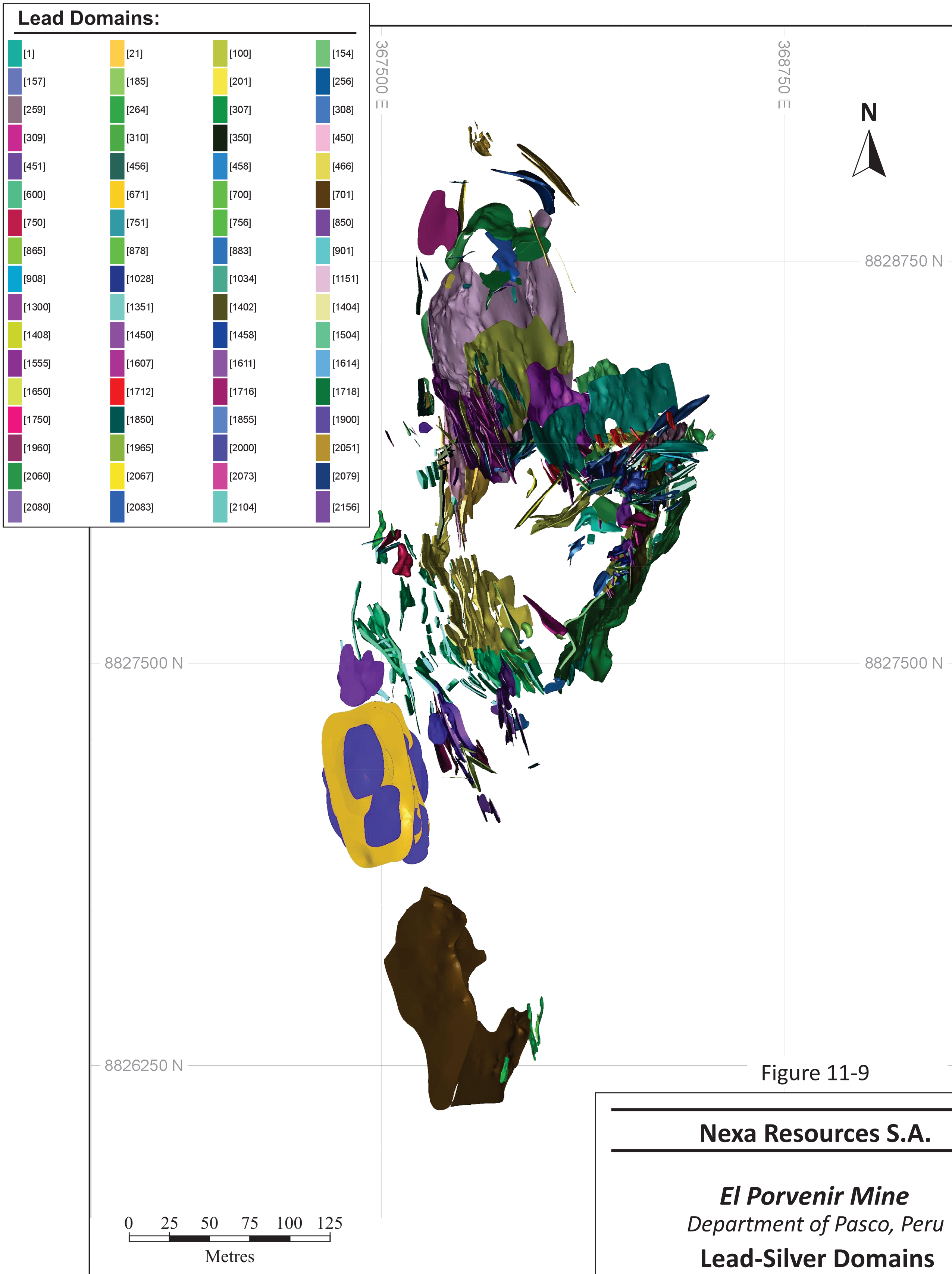


Figure 11-9

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Lead-Silver Domains

January 2021 ***Source: Nexa, 2020.***

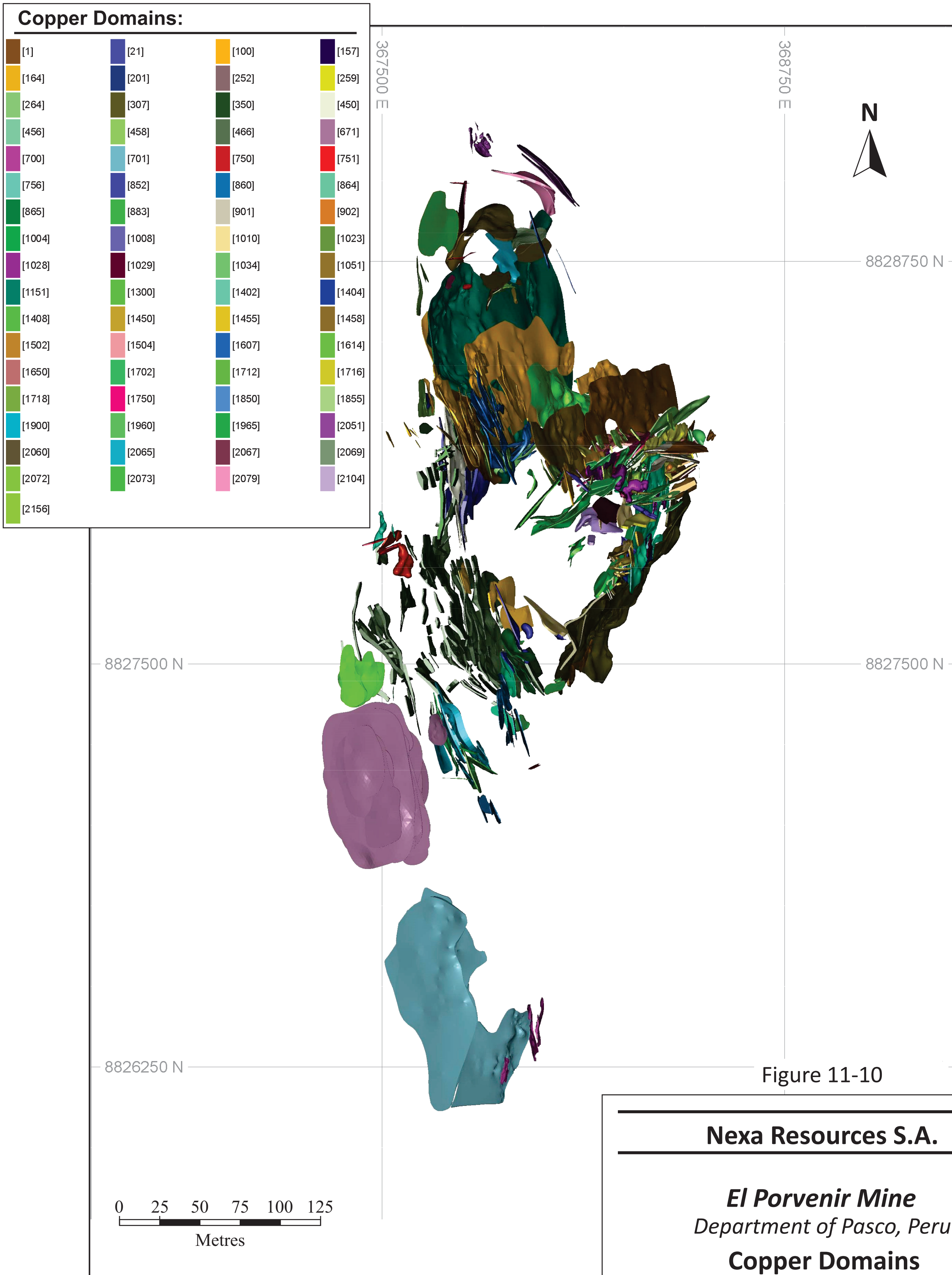


Figure 11-10

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Copper Domains

January 2021 ***Source: Nexa, 2020.***

With respect to the geological and domain modelling used to support the Mineral Resource estimate, SLR offers the following conclusions and recommendations:

- Overall, the mineralization wireframes are adequate for the style of mineralization.
- The wireframes and estimation domains are suitable to support Mineral Resource and Mineral Reserve estimation.
- There is an opportunity to increase the volume of the mineralization solids. SLR observed some areas where mineralization intervals with high grades were close but excluded from the domain solids.
- Update the lithological model (it has not been updated since 2018) and build a litho-structural model with the main lithologies and faults that are controlling the mineralization, with all the data available, to help define the geometry and boundaries of the mineralization. An updated lithological model would also be beneficial to evaluate and define density values by rock and by domain.
    - Some interpreted sections, plan views, and underground mapping were used to build the mineralization solids, however, there is no new 3D lithological model.
    - Three faults (F1_Exito, F2_Exito, and F1_VCN3) based on underground mapping were used in the model to define Exito and Carmen Norte 3 limits and movements. These faults were built projecting a unique dip, however, they should be interpreted in 3D to improve the understanding and controlling of the mineralization solids.
- Nexa incorporated grade domains for zinc, lead-silver, and copper for some individual mineralization domains. SLR recommends reviewing the inclusion of more grade domains considering spatial and statistical correlations, to prevent smearing of high grades into low grade areas and vice versa.
- Review inclusion of very low grade in the contacts of the modelled solid and exclude if they are not used to achieve minimum thickness.
- Divide mineralization domains where groups of wireframes have been merged to avoid sharing of samples.
- The interaction between Don Ernesto and Sara should be considered and possibly modelled as a continuous mineralization solid, especially if both mineralization structures (Don Ernesto lower levels and Sara) have the same host rock and mineralization features.
- Include a logging code for each mineralization domain, structure type, and emplacement type to correlate with modelled domains.
- Improve the survey accuracy of the mineralized mined-out stopes and development to guide the mineralization solid geometries and trends.

11.6 Resource Assays

Nexa performed exploratory data analysis (EDA) for each estimation domain, including univariate statistics, histograms, cumulative probability plots; box plots to compare geology domain statistics, and contact plots to investigate grade profiles between estimation domains and determine the extent of sample sharing across the geology contacts within the mineralization domains. Hard boundaries were determined for each of the estimation variables (zinc, copper, lead, and silver). The majority of the zinc is contained in eight estimation domains: vcn3, por9, porv9a, vprg, exito, por9p, por9q, and porv9w.

11.7 Treatment of High Grade Assays

11.7.1 Capping Levels

Where the assay distribution is skewed positively or approaches log-normal, erratic high grade values can have a disproportionate effect on the average grade of a deposit. One method of treating these outliers in order to reduce their influence on the average grade is to cut or cap them at a specific grade level.

Nexa evaluated the raw assay grades using log-probability plots and histograms to assess the influence of higher grades for each element within the mineralization domains. Figure 11-11 is an example of a log-probability plot for the OB 1300 (vcn3ei1) domain. The criteria, applied by Nexa, for restricting outliers was to identify a pronounced break in the probability curve that occurs above the 95th to 99th percentile. Nexa applied a second capping level for the third interpolation pass in channel composites to restrict the high grade influence.

Table 11-8 lists the capping levels for drill hole ("CAPD") and channel ("CAPC") raw assays determined for each mineralization domain, and the second capping levels applied to the channel samples used for the third interpolation pass ("CAPC3"). A summary of raw assays and capped raw assays statistics is provided in Table 11-9, Table 11-10, Table 11-11, and Table 11-12.

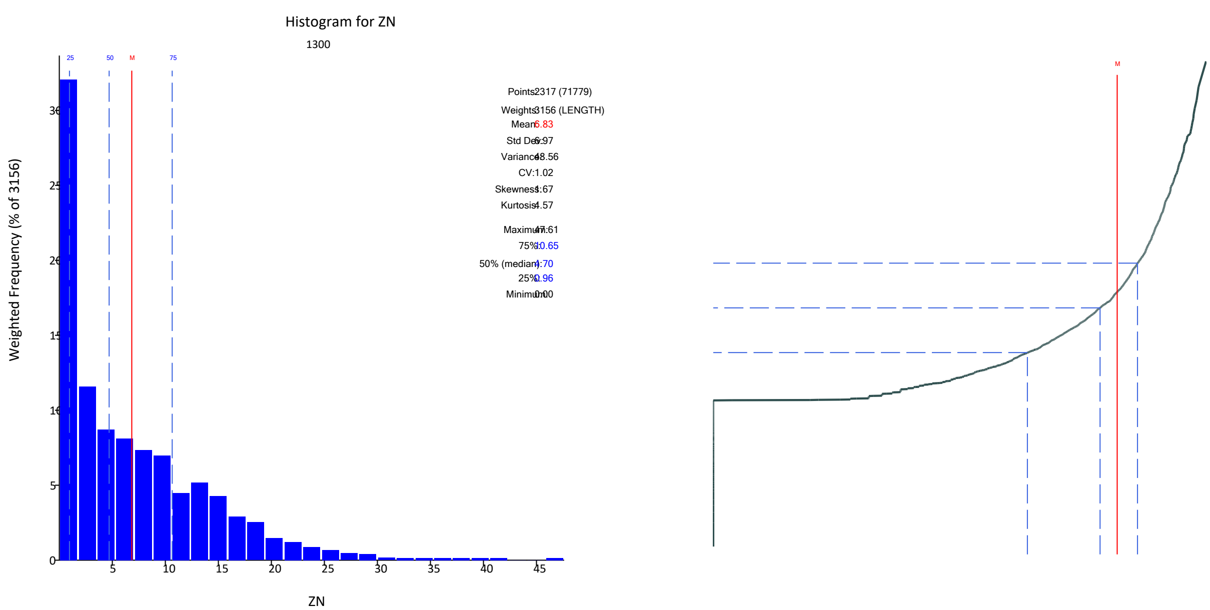


Figure 11-11: Zn Capping Analysis for 1300 (VCN3EI1) Domain

Table 11-8: Capping Levels by Mineralized Domains
Nexa Resources S.A. – El Porvenir Mine

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
de1	31	42.5	35.4	-	20	18.7	0.12	0.1	0.07	1790	1200	546.67	1
de2	29	39	16.92	22	28	15.7	0.45	-	0.31	2000	3000	1234.81	1
de3	31	42.5	42.5	-	20	20	0.12	0.1	0.1	1790	1200	1200	1
de4	31	42.5	42.5	-	20	20	0.12	0.1	0.1	1790	1200	1200	1
de5	31	42.5	42.5	-	20	20	0.12	0.1	0.1	1790	1200	1200	1
exit10	17	-	-	2	-	-	8.2	-	-	600	-	-	1
exit11	27.5	24.5	24.5	12	-	-	8.2	-	-	900	-	-	1
exito	31	13	10.56	12	8	6.45	8.2	-	0.79	712	400	208.69	1
exitoa	27.5	24.5	24.5	12	-	-	8.2	-	-	900	-	-	1
exitob	27.5	24.5	24.5	12	-	-	3.4	-	-	900	-	-	1
exito1	31	13	13	12	8	8	8.2	-	-	712	400	400	1
exit12	17	-	-	2	-	-	8.2	-	-	600	-	-	1
exit13	17	-	-	2	-	-	8.2	-	-	600	-	-	1
exito2	25	10.8	10.8	18	15.8	3	2.9	-	-	1000	250	250	1
exito3	19	-	-	15	-	-	1.6	-	-	1050	-	-	1
exito4	19	-	-	15	-	-	1.6	-	-	1050	-	-	1
exito5	17	-	-	2	-	-	3.4	-	-	600	-	-	1
exitoc	31	13	13	12	8	8	3.4	-	-	712	400	400	1
exitod	17	-	-	12	8	8	3.4	-	-	712	400	400	1
exito6	23.5	15.5	15.5	25	11.5	11.5	0.82	-	-	2000	1000	1000	1
exito7	25	5	5	25	11.5	11.5	0.82	-	-	2000	1000	1000	1
exito8	31	13	13	12	-	-	8.2	-	-	900	-	-	1
exito9	31	13	13	12	-	-	8.2	-	-	900	-	-	1
exit16	26	13	12	20	13	6	-	-	-	800	400	400	1
exit17	19	-	-	15	-	-	1.6	-	-	1050	-	-	1
exit18	30	16.5	16.5	0.9	10	6	1.6	-	-	435	179	100	1
cpoex1	27.5	24.5	22.75	12	8	6.87	8.2	-	0.54	712	400	379.62	1
cpoex2	27.5	24.5	24.5	2	-	-	8.2	-	-	600	-	-	1
exiti1	23	15.5	15.5	0.1	0.2	0.2	7.5	-	-	210	70	50	1
exiti2	23	15.5	15.5	0.1	0.2	0.2	7.5	-	-	210	70	50	1
exiti3	23	15.5	6.64	0.1	0.2	0.02	7.5	-	0.38	210	70	11.73	1
exiti4	23	15.5	15.5	0.1	0.2	0.2	7.5	-	-	210	70	50	1
exiti5	23	15.5	6.99	0.1	0.2	0.02	4.9	-	2.66	210	70	35.99	1
exiti6	31	-	-	0.1	0.2	0.2	4.9	-	-	210	70	50	1
exiti7	23	15.5	15.5	0.1	0.2	0.2	7.5	-	-	210	70	50	1
exits	26.5	30	9.92	14.4	12	6.97	-	1.5	0.64	1400	850	320.55	1
exits1	21	8	6.4	12	9.5	8.52	-	-	0.12	890	500	225.08	1
exits2	26	13	5.27	20	13	4.04	2	-	0.06	800	400	89.84	1
exits3	26	13	10.85	12	9.5	6.11	2	-	0.45	890	500	461.08	1
exits4	25	10.8	9.84	18	15.8	2.73	-	-	0.08	1000	250	191.75	1
exits5	26	13	7.02	20	13	5.4	-	-	0.08	800	400	400	1
exits6	24	15	9.88	14.4	12	9.64	-	0.3	0.12	1400	850	457.07	1
exits7	26	13	2.74	20	13	2.66	-	-	0.09	800	400	129.13	1
exits8	26	13	12	20	13	6	-	-	-	800	400	400	1
int1	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int2	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int3	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int4	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int5	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int6	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int7	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int8	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int9	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
int10	16.5	-	-	8.4	-	-	1.7	-	-	2000	-	-	1
ints1	28	-	-	1.5	-	-	-	-	-	400	-	-	1
ints3	14	-	-	-	-	-	-	-		50	-	-	1
ints4	24	9.5	9.5	5.5	-	-	5	-	-	450	47.4	47.4	1
ints5	8	-	-	20	37	12	0.25	0.26	0.26	420	1922	1922	1
ints6	20	-	-	0.05	-	-	-	-	-	29	-	-	1
ints7	38	31	31	30	30	30	1.7	1.1	1.1	2000	1000	1000	1
ints10	14	-	-	-	-	-	-	-		50	-	-	1
ints11	28	-	-	1.5	-	-	-	-	-	400	-	-	1
ints12	28	-	-	1.5	-	-	-	-	-	400	-	-	1
ints13	28	-	-	1.5	-	-	-	-	-	400	-	-	1
ints14	34.5	16.5	16.5	15	15	12	6.2	2.7	2.7	1600	1800	1800	1
ints15	9	-	-	-	-								1
ints16	4.5	-	-	-	-								1
ints17	38.5	37	37	6.5	-	-	6.2	2.7	2.7	420	490	480	1
ints21	41.5	-	-	1.5	-	-	-		-	400	-	-	1
ints22	8	-	-	20	37	12	0.25	0.26	0.26	420	1922	1922	1

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
soc412	17	2	2	15	15	8	-	-	-	1250	750	750	1
soc413	34.5	16.5	16.5	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
soc414	32	10.8	0.42	15	15	0.44	-	-	0.04	1250	750	165.28	1
soc434	23	-	4	20	-	-				1155	-	-	1
soc435	23	-	4	20	-	-				1155	-	-	1
soc436	23	-	0.2	20	-	0.12	-	-	-	1155	-	6.28	1
soc437	23	-	6.63	20	-	5.96	-	-	0.1	1155	-	268.05	1
v5i	29	36	18.9	0.3	4	1.86	5	2.5	0.98	300	400	142.5	1
v5ne2	29	10.4	10.4	14	10	10	0.63	-	-	700	244	200	1
v5ne3	29	10.4	8.64	22	22	19.5	0.63	-	0.25	1570	688	293.62	1
v5ne4	29	10.4	6.23	14	10	9	2.3	1.5	0.3	700	244	244	1
v5ne5	29	10.4	10.4	22	22	22	0.63	-	-	1570	688	688	1
v5ne6	25	28	28	14	10	10	2.3	1.5	1.5	700	244	200	1
v5nw1	38.5	37	37	6.5	-	-	1.6	1.3	1.3	420	490	480	1
v5nw2	13	14.5	6.77	3	-	1	0.13	-	0.05	200	214	92.19	1
v5nw3	33	13.5	13.5	24	-	-	0.4	-	-	900	600	600	1
v5nw4	33	13.5	13.5	24	-	-	0.4	-	-	900	600	600	1
v5nw5	36	17	11.95	25	18	11.59	-	-	0.31	844	570	330.68	1
v5nw6	24	-	-	25	18	18	1.4	-	-	844	570	570	1
v5nw7	13	14.5	8.36	3	-	7.25	0.13	-	0.31	200	214	160.57	1
v5nw8	13	14.5	14	3	-	1.2	0.13	-	0.12	200	214	210.04	1
v5nw9	23.5	15.5	15.5	24	-	-	0.4	-	-	900	600	600	1
v5nw10	23.5	15.5	15.5	24	-	-	0.4	-	-	900	600	600	1
v5nw11	23.5	15.5	10.71	24	-	7.63	0.4	-	0.38	900	600	570.81	1
v5nw12	36	17	8.74	25	18	3.2	1.4	-	0.79	844	570	145.84	1
v5nw13	23	-	16.26	18	15.8	14	-	-	0.12	1000	250	250	1
v5nw14	38.5	37	3.23	15	15	3.46	1.6	1.3	0.05	1600	1800	109.9	1
v5nw15	38.5	37	37	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
v5nw16	23.5	15.5	15.5	24	-	-	0.4	-	-	900	600	600	1
v5nw17	21	-	-	13.5	-	-	-			500	-	-	1
v5nw18	25	10.8	10.8	18	15.8	3	-	-	-	1000	250	250	1
v5nw19	25	10.8	10.8	18	15.8	3	-	-	-	1000	250	250	1
v5nw20	25	10.8	10.8	18	15.8	3	-	-	-	1000	250	250	1
v5nw21	23.5	15.5	15.5	24	-	-	0.4	-	-	900	600	600	1
v12i1a	23	15.5	7.02	0.1	0.2	0.2	4.9	-	1.32	210	70	55.8	1
v12i1b	31	-	14.99	0.1	0.2	0.1	4.9	-	0.7	210	70	26.13	1
v12i1c	31	-	-	0.1	0.2	0.2	4.9	-	-	210	70	50	1
v12i1d	31	-	-	0.1	0.2	0.2	4.9	-	-	210	70	50	1
v12i2	38.5	37	37	6.5	-	-	6.2	2.7	2.7	420	490	480	1
v12i3	33	-	-	-	-	-	7.9	-	-	60	-	-	1
v12i4	33	-	-	-	-	-	7.9	-	-	60	-	-	1
v12i5	38.5	37	37	6.5	-	-	6.2	2.7	2.7	420	490	480	1
v12i6	33	-	-	-	-	-	7.9	-	-	60	-	-	1
v12i7	33	-	-	-	-	-	7.9	-	-	60	-	-	1
v12i8	21	32	18.1	25	18	7.13	-	-	0.4	844	570	247.27	1
v12i9	23.5	15.5	15	24	-	0.43	-	-	0.47	900	600	190.66	1
v12i10	21	32	15.74	25	18	1.71	1.4	-	0.75	844	570	224.64	1
v12i11	33	13.5	13.5	24	-	-	0.4	-	-	900	600	600	1
v12i12	33	13.5	9.13	24	-	0.99	-	-	1.54	900	600	260.8	1
v12i13	21	-	12.61	13.5	-	0.67	1.4	-	0.42	500	-	203.04	1
v12i14	36	17	3.33	25	18	0.07	1.4	-	0.36	844	570	23.89	1
v12i15	33	13.5	11.92	24	-	0.38	-	-	0.3	900	600	124.07	1
v12i16	21	-	-	13.5	-	-	1.4	-	-	500	-	-	1
v12i17	33	13.5	13.5	24	-	-	-	-	-	900	600	600	1
v12i18	23.5	15.5	15.5	24	-	-	0.4	-	-	900	600	600	1
v122	26.5	12.5	5.33	16	8	3.38	2.5	1.9	0.45	1000	250	184.37	1
v123	26.5	12.5	10.74	16	8	7	-	-	0.17	1000	250	250	1
v125	21	-	-	20	-	-	-	-	-	1400	-	-	1
v126	21	-	-	20	-	-	-	-	-	1400	-	-	1
v127	23.5	15.5	3.08	24	-	5.51	0.4	-	0.22	900	600	253.96	1
v12	26.5	12.5	5.2	16	8	3.93	2.5	1.9	1.65	1000	250	225.47	1
v1252	21	-	-	20	-	-	2.5	1.9	1.3	1400	-	-	1
v12ne	33	17	16	22	22	13.76	2.3	1.5	0.59	1570	688	435.14	1
v12s1	21	8	8	12	9.5	9.5	2	-	-	890	500	500	1
v12s2	26	13	12	20	13	6	2	-	-	800	400	400	1
v12s3	23.5	15.5	13.03	25	11.5	8.89	0.82	-	0.44	2000	1000	782.73	1
v12s4	25	10.8	5	18	15.8	3	2.9	-	-	1000	250	250	1
v12s5	24	-	-	25	18	18	-	-	-	844	570	570	1
v12s6	25	10.8	10.8	18	15.8	3	2.9	-	-	1000	250	250	1
v12s7	29	10.4	10.4	14	10	10	0.63	-	-	700	244	200	1

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
ints23	14	-	-	-						50	-	-	1
ints24	7.5	-	-										1
ints25	7.5	-	-										1
ints26	9	-	-										1
ints28	28	-	-	1.5	-	-	-		-	400	-	-	1
ints29	41	-	-	0.3	0.1	0.1	5	-	-	57	61.5	58	1
ints31	20	-	-	0.05	-	-	-		-	29	-	-	1
ints32	41.5	-	-	1.5	-	-	-		-	400	-	-	1
por2sd	17.5	-	15.04	12	14	7.14	0.86	0.9	0.38	1500	1000	391.59	1
p2se1	20	9.5	5.11	12	14	5.66	0.86	0.9	0.13	1500	1000	308.24	1
p2se2	17.5	-	13.45	4	5.3	0.75	-	-	0.4	586	375	78.93	1
p2se3	12.5	12	6.1	5	7	6.58	0.15	-	0.15	400	438	316.24	1
p2se4	20	9.5	3.85	12	14	4.35	0.86	0.9	0.12	1500	1000	304.29	1
p2se5	10.5	12	11	4	5.3	0.89	0.86	0.9	0.25	586	375	73.81	1
p2se6	12.5	12	3.67	5	7	2.04	0.15	-	0.08	400	438	192.34	1
p2se7	12.5	12	5.97	5	7	2.88	0.15	-	0.17	400	438	301.7	1
p2se8	10.5	12	2.8	4	5.3	3.46	0.86	0.9	0.13	586	375	86.17	1
p2se10	10.5	12	6.47	4	5.3	5	0.86	0.9	0.18	586	375	167.71	1
p2se11	10.5	12	3.34	4	5.3	3.98	0.86	0.9	0.04	586	375	276.82	1
p2se12	10.5	12	4.06	12	14	0.27	0.86	0.9	0.27	1500	1000	310.88	1
p2se13	10.5	12	1.38	4	5.3	0.18	0.86	0.9	0.16	586	375	24.85	1
p2se14	30	-	-	19	-	-	1	-	-	1400	-	-	1
p2se15	18	-	-	19	-	-	1	-	-	1400	-	-	1
p2se16	18	-	9.78	19	-	3.65	1	-	0.04	1400	-	133.14	1
p2se17	18	-	-	19	-	-	1	-	-	1400	-	-	1
p2se18	12.5	12	7.69	5	7	6.5	0.15	-	0.38	400	438	375.39	1
p2sr	11	-	5.1	4.5	-	1.22	0.18	0.25	0.25	320	-	352.85	1
p2sw1	13	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw2	13	-	4.51	9.5	-	3.55	0.18	0.25	0.09	1300	-	244.92	1
p2sw3	11	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw4	7.8	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw5	7.8	-	2.31	9.5	-	6.48	0.18	0.25	0.04	1300	-	395.17	1
p2sw6	11	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw7	11	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw8	5	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw9	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw10	5	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw11	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw12	2	-	0.88	4.5	-	0.92	0.18	0.25	0.23	320	-	242.23	1
p2sw13	5	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw14	5	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw15	5	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw16	13	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw17	7.8	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw18	7.8	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw19	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw20	2	-	-	9.5	-	5	0.18	0.25	0.25	1300	-	-	1
p2sw21	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw22	7.8	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw23	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw24	11	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw25	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw26	5	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw27	5	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw28	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
p2sw29	2	-	-	4.5	-	-	0.18	0.25	0.25	320	-	-	1
por9a	30	37	37	0.25	3	3	3.5	1.8	1.8	400	150	150	1
por9b	30	37	37	0.25	3	3	3.5	1.8	1.8	400	150	150	1
por9c	41	-	-	0.3	0.1	0.1	-	-	-	57	61.5	58	1
por9e	41	-	-	5.5	-	-	5	-	-	450	47.4	47.4	1
por9f	24	9.5	9.06	5.5	-	0.67	-	-	1.21	450	47.4	28.02	1
por9g	24	9.5	5.98	0.3	0.1	0.01	5	-	0.41	57	61.5	2.02	1
por9h	24	9.5	6.79	0.3	0.1	0.07	5	-	0.56	57	61.5	39.5	1
por9i	24	9.5	8.25	0.3	0.1	0.08	5	-	0.78	57	61.5	37.64	1
por9j	41	-	1.81	5.5	-	0.96	5	-	0.16	450	47.4	47	1
por9l	41	-	17.69	5.5	-	0.05	5	-	0.4	450	47.4	13.44	1
por9m	30	37	7.82	0.25	3	0.1	3.5	1.8	0.56	400	150	39.03	1
por9n	24	9.5	9.5	0.3	0.1	0.1	-	-	-	57	61.5	58	1
por9o	34	24	8.49	1.3	2	0.15	4.4	2.7	0.88	580	160	31.34	1
por9p	37	36	16.43	1.3	2	0.89	4.4	2.7	0.78	580	160	84.1	1
por9q	37	36	1.71	1.3	2	0.17	4.4	2.7	0.05	580	160	20.31	1
por9r	34	24	7.04	6	12	0.11	4.4	2.7	0.74	900	1100	84.94	1
por9s	34	24	24	6	12	11	4.4	2.7	2.7	900	1100	1100	1

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
v12s8	24	-	-	25	18	18	-	-	-	844	570	570	1
v12s9	25.5	-	-	14	10	10	0.63	-	-	700	244	200	1
v12s10	23.5	15.5	15.5	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s11	23.5	15.5	15.5	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s12	-	30	30	22	22	22	0.63	-	-	1570	688	688	1
v12s13	33	17	17	22	22	22	2.3	1.5	1.5	1570	688	688	1
v12s14	25	5	4	25	11.5	7.83	-	-	0.74	2000	1000	460.14	1
v12s15	19	10	10	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s16	25	5	5	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s17	21	-	-	13.5	-	-	-	-	-	500	-	-	1
v12s18	23	-	-	18	15.8	3	-	-	-	1000	250	250	1
v12s19	19	10	10	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s21	25.5	-	1.57	14	10	1.51	0.63	-	0.03	700	244	106.61	1
v12s22	30	16.5	16.5	15	-	-	1.6	-	-	1050	-	-	1
v12s23	25	5	5	25	11.5	11.5	1.8	-	-	2000	1000	1000	1
v12s24	29	10.4	10.2	14	10	7.47	0.63	-	0.16	700	244	244	1
v12s25	25.5	-	-	22	22	22	0.63	-	-	1570	688	688	1
v12s26	25	5	3.48	25	11.5	3.22	1.8	-	0.06	2000	1000	250.45	1
v12s27	25.5	-	-	14	10	10	0.63	-	-	700	244	200	1
v12s28	25	5	5	25	11.5	11.5	-	-	-	2000	1000	1000	1
v12s29	24	-	-	25	18	18	-	-	-	844	570	570	1
v12s30	29	10.4	10.4	22	22	22	0.63	-	-	1570	688	688	1
v12s31	29	10.4	8.97	22	22	14.26	0.63	-	0.23	1570	688	688	1
v12s32	19	10	4.65	25	11.5	4.44	1.8	-	0.12	2000	1000	340.65	1
v12s33	23.5	15.5	6.79	25	11.5	8.11	0.82	-	0.18	2000	1000	383.4	1
v12s34	29	10.4	10.4	22	22	22	0.63	-	-	1570	688	688	1
v12s35	19	10	4.48	25	11.5	3.88	0.82	-	0.11	2000	1000	445.6	1
v12s36	25	5	1.94	25	11.5	2.29	0.82	-	0.04	2000	1000	111.68	1
v12s37	23.5	15.5	10.84	25	11.5	10	0.82	-	0.22	2000	1000	625.68	1
vc1	39	-	25.5	30	30	19.23	6.2	2.7	0.7	2000	1000	648.23	1
vc1a	39	-	37.54	6.5	-	6.55	6.2	2.7	1	420	490	243.21	1
vc1b	38	31	24.57	6.5	-	13.79	6.2	2.7	1.93	420	490	343.51	1
vc1c	49.5	39.5	10.04	6.5	-	0.05	1.6	1.3	0.14	420	490	25.55	1
vc21	49.5	39.5	22.02	30	20	16.67	1.6	1.3	0.16	2000	1200	655.79	1
vc24	49.5	39.5	39.5	30	20	20	1.6	1.3	1.3	2000	1200	1200	1
vc26	49.5	39.5	12.96	30	30	14.5	1.6	1.3	0.15	2000	1000	602.01	1
vc214	38	31	20.51	6.5	-	10.08	1.6	1.3	1.3	420	490	288.8	1
vc215	21	32	31.62	25	18	17	1.4	-	2.23	844	570	508.95	1
vc216	-	23	17.56	-	15.5	2.66	-	-	1.33	-	220	101.68	1
vc217	-	23	22	-	15.5	10.31	-	-	1.4	-	220	220	1
vc222	38.5	37	37	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
vc224	38.5	37	37	30	30	30	1.6	1.3	1.3	2000	1000	1000	1
vc2922	34.5	16.5	16.5	30	20	20	1.6	1.3	1.3	2000	1200	1200	1
vc31	49.5	39.5	17.14	30	20	7.49	1.6	1.3	0.26	2000	1200	507.55	1
vc32	34.5	16.5	16.5	30	30	30	1.6	1.3	1.3	2000	1000	1000	1
vc33	34.5	16.5	16.5	30	20	20	1.6	1.3	1.3	2000	1200	1200	1
vc34	34.5	16.5	16.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
vc35	49.5	39.5	39.5	30	20	20	1.6	1.3	1.3	2000	1200	1200	1
vcn32	38	31	31	15	15	12	6.2	2.7	2.7	1600	1800	1800	1
vcn324	38.5	37	37	15	15	12	1.7	1.1	1.1	1600	1800	1800	1
vcn327	38	31	31	6.5	-	-	1.7	1.1	1.1	420	490	480	1
vcn3e1	38.5	37	9.48	15	15	2.64	1.7	1.1	0.51	1600	1800	112.15	1
vcn3e3	38.5	37	6.84	15	15	0.84	1.6	1.3	0.41	1600	1800	32.81	1
vcn3e6	38	31	31	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
vcn3e8	41.5	-	-	1.5	-	-	-	-	-	400	-	-	1
vcn3w1	38.5	37	37	6.5	-	-	1.6	1.3	1.3	420	490	480	1
vcn3w2	38.5	37	37	6.5	-	-	1.7	1.1	1.1	420	490	480	1
vcn3w4	38.5	37	37	6.5	-	-	1.6	1.3	1.3	420	490	480	1
vcn3w5	49.5	39.5	39.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
vcn3w6	38.5	37	37	6.5	-	-	1.6	1.3	1.3	420	490	480	1
vcn3w8	38.5	37	37	6.5	-	-	1.7	1.1	1.1	420	490	480	1
vcn3w9	34.5	16.5	16.5	6.5	-	-	6.2	2.7	2.7	420	490	480	1
cn3ei1	38.6	36.5	20.98	7	10	8	1.9	-	0.89	400	900	297.74	1
cn3ei2	38.6	36.5	0.39	7	10	-	1.9	-	3.62	400	900	35.46	1
vcarmn	38	31	25.68	30	30	13.98	1.7	1.1	0.31	2000	1000	683.22	1
vcn12	39	-	21.13	15	15	8.6	6.2	2.7	0.8	1600	1800	315.62	1
vcn13	38	31	20.6	30	30	10	1.7	1.1	0.23	2000	1000	317.57	1
vcn14	39	-	22.24	30	20	11.01	1.7	1.1	0.39	2000	1200	363.6	1
vcn15	-	-	-	30	20	20	1.7	1.1	1.1	2000	1200	1200	1
vcn16	-	-	-	30	30	30	6.2	2.7	2.7	2000	1000	1000	1
vcn17	39	-	-	6.5	-	-	1.7	1.1	1.1	420	490	480	1
vcn18	39	-	-	6.5	-	-	1.7	1.1	1.1	420	490	480	1
vcn4i	29	36	16.31	0.3	4	1.31	5	2.5	0.51	300	400	87.4	1

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
por9t	34	24	24	1.3	2	1	5	-	-	580	160	150	1
por9u	34	24	24	6	12	11	4.4	2.7	2.7	900	1100	1100	1
por9v	37	-	-	6	12	11	4.4	2.7	2.7	900	1100	1100	1
por9w	37	-	-	6	12	11	4.4	2.7	2.7	900	1100	1100	1
por9x	34	24	24	6	12	11	4.4	2.7	2.7	900	1100	1100	1
por9y	34	24	24	1.3	2	1	5	-	-	580	160	150	1
por9z	34	24	24	1.3	2	1	4.4	2.7	2.7	580	160	150	1
por91	37	36	36	1.3	2	1	4.4	2.7	2.7	580	160	150	1
por92	34	24	5.92	1.3	2	0.05	5	-	1.65	580	160	33.16	1
por93	34	24	24	1.3	2	1	4.4	2.7	2.7	580	160	150	1
por94	34	24	24	1.3	2	1	4.4	2.7	2.7	580	160	150	1
por95	34	24	3.51	1.3	2	0.09	5	-	0.75	580	160	30.23	1
por96	37	36	17.05	6	12	1.04	4.4	2.7	0.4	900	1100	72.25	1
por97	34	24	16.1	6	12	0.31	4.4	2.7	0.49	900	1100	73.4	1
por98	37	36	1.5	6	12	0.22	4.4	2.7	0.16	900	1100	11.63	1
porv9a	37	36	20.28	6	12	4.04	4.4	2.7	0.58	900	1100	158.19	1
porv9e	30	37	16.85	2	10	8.06	3.5	1.8	0.9	120	300	280.4	1
porv9f	30	37	37	0.25	3	3	3.5	1.8	1.8	400	150	150	1
porv9w	37	-	-	6	12	11	4.4	2.7	2.7	900	1100	1100	1
porv9x	34	24	6.6	6	12	4.45	4.4	2.7	0.22	900	1100	279.85	1
sara1	12	-	-	22	28	28	0.45	-	-	2000	3000	3000	1
sara2	29	39	39	22	28	28	0.45	-	-	2000	3000	3000	1
sara3	12	-	-	22	28	28	0.45	-	-	2000	3000	3000	1
sara4	12	-	-	22	28	28	0.45	-	-	2000	3000	3000	1
sara5	12	-	-	22	28	28	0.45	-	-	2000	3000	3000	1
sara6	12	-	-	22	28	28	0.45	-	-	2000	3000	3000	1
saras1	4.5	-	-	3.8	-	-	-		-	200	-	-	1
saras2	10.5	12	12	4	5.3	5.3	-	-	-	586	375	375	1
saras3	4.5	-	-	3.8	-	-	-		-	200	-	-	1
saras4	4.5	-	-	3.8	-	-	-		-	200	-	-	1
saras5	4.5	-	-	3.8	-	-	-		-	200	-	-	1
saras6	4.5	-	-	3.8	-	-	-		-	200	-	-	1
soc21	38.5	37	17.02	15	15	14	1.6	1.3	0.27	1600	1800	860.57	1
soc22	38.5	37	9.13	15	15	7.7	1.6	1.3	0.21	1600	1800	727.67	1
soc23	49.5	39.5	20.32	6.5	-	4.52	1.6	1.3	0.2	420	490	225.25	1
soc24	34.5	16.5	8.22	30	20	8.99	1.6	1.3	0.12	2000	1200	752.39	1
soc25	49.5	39.5	39.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
soc27	38.5	37	37	30	20	20	1.7	1.1	1.1	2000	1200	1200	1
soc28	49.5	39.5	39.5	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
soc29	34.5	16.5	16.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
soc41	32	10.8	4.99	15	15	3.62	-	-	0.08	1250	750	180.17	1
soc42	32	10.8	1.71	15	15	4.23	-	-	0.09	1250	750	156.33	1
soc43	32	10.8	6.11	15	15	5.29	-	-	0.12	1250	750	410.69	1
soc44	32	10.8	10.8	11.5	-	-	-	-	-	1130	-	-	1
soc45	17	2	1.88	15	15	2.99	-	-	0.09	1250	750	127.45	1
soc46	17	2	2	11.5	-	-	-	-	-	1130	-	-	1
soc47	17	2	2	11.5	-	-	-	-	-	1130	-	-	1
soc48	17	2	0.38	15	15	0.24	-	-	0.03	1250	750	147.21	1
soc49	32	10.8	10.8	11.5	-	-	-	-	-	1130	-	-	1
soc210	34.5	16.5	16.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
soc211	38.5	37	37	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
soc212	34.5	16.5	16.5	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
soc213	34.5	16.5	16.5	6.5	-	-	1.6	1.3	1.3	420	490	480	1
soc214	38	31	31	15	15	12	1.6	1.3	1.3	1600	1800	1800	1
soc410	17	2	2	15	15	8	-	-	-	1250	750	750	1
soc411	32	10.8	10.8	11.5	-	-	-	-	-	1130	-	-	1

Domain Ore Body	ZN_D (%)	ZN_C (%)	ZN_C3 (%)	PB_D (%)	PB_C (%)	PB_C3 (%)	CU_D (%)	CU_C (%)	CU_C3 (%)	AG_D (g/t)	AG_C (g/t)	AG_C3 (g/t)	Grade Domain
vcn41	17.5	17	11.37	8	10	7.78	-	-	0.14	2580	1500	776.78	1
vcn42	17.5	17	17	8	10	9	-	-	-	2580	1500	1500	1
vcn43	17.5	17	17	8	10	9	-	-	-	2580	1500	1500	1
vcn44	17.5	17	17	8	10	9	-	-	-	2580	1500	1500	1
vcn45	17.5	17	17	8	10	9	-	-	-	2580	1500	1500	1
vcn46	-	30	22	22	22	15	2.3	1.5	0.8	1570	688	418.34	1
vpor31	21	-	-	9	0.08	0.08	1	-	-	825	-	-	1
vpor32	7	-	1.11	20	37	1.09	0.25	0.26	-	420	1922	45.82	1
vpor33	21	-	-	9	0.08	0.08	1	-	-	825	-	-	1
vpor34	7	-	-	20	37	12	0.25	0.26	0.26	420	1922	1922	1
vpor35	21	-	0.14	9	0.08	0.08	1	-	0.74	825	-	188.33	1
vpor36	15.5	-	-	15.5	-	-	1.8	-	-	400	-	-	1
vpor37	15.5	-	-	15.5	-	-	1.8	-	-	400	-	-	1
vpor38	15.5	-	-	15.5	-	-	1.8	-	-	400	-	-	1
vprg	27	37	19	2	9	5.8	4	4.3	1.12	400	1200	236.39	1
vprg1	27	37	24.07	2	9	4.27	4	4.3	0.5	400	1200	180.77	1
vprg2	39	-	24.14	30	30	12	6.2	2.7	0.72	2000	1000	741.34	1
vprg3	1.5	-	2.87	2	9	0.02	4	4.3	2.04	400	1200	24.71	1
vprg4	27	37	37	**2**	9			4.3	4.3	400	1200	1200	1
vprg5	1.5	-	-	**2**	9			4.3	4.3	400	1200	1200	1
vprg6	27	37	15.85	**2**	9			4.3	0.3	400	1200	306.37	1
vprgb	24	15	8.02	14.4	12	2.84	-	1.5	0.42	1400	850	134.44	1
vprgb1	30	16.5	12.04	0.9	10	3.5	1.6	-	0.54	435	179	156.25	1
vprgb2	26	13	12	20	13	12	2	-	0.92	800	400	331.19	1
vprgb3	26.5	30	15.93	27.5	22	16.5	-	0.3	0.25	1070	-	1363.78	1
vprgb4	26	13	12	20	13	6	2	-	-	800	400	400	1
vprgb5	26	13	12	20	13	6	2	-	-	800	400	400	1
vprgb6	21	8	8	12	9.5	9.5	2	-	-	890	500	500	1
vprgb7	24	15	15	14.4	12	12	-	0.3	0.2	1400	850	850	1
vprgb8	26	13	12	20	13	6	-	-	-	800	400	400	1
vprgb9	26	13	12	20	13	6	-	-	-	800	400	400	1
vprgba	26.5	30	12.55	27.5	22	15.88	-	0.3	0.21	1070	-	688.2	1
vprgbb	26.5	30	26.5	27.5	22	20	-	0.3	0.23	1070	-	958.75	1
vr	-	-		30	-	-	-		-	1600	-	-	1
vr1	-	-		30	-	-	-		-	1600	-	-	1
por9cf1	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf2	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf3	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf4	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf5	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf6	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf7	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9cf8	40	20	15	5	0.2	0.15	2	0.7	0.5	300	60	40	1
por9	17	9	8	-	-	-		-				-	1
por9	22	27	20	-	-	-		-				-	2
por9	-	-	-	2.5	1.5	1	2.5	1.5	1	140	88	70	1
vcn3	-	-	-				0.9	0.4	0.3	-	-	-	1
vcn3	-	-	-				2	1.2	1	-	-	-	2
vcn3	35	22	20	19	11	9				1000	510	490	1
v5ne1	15	20	17	-	-	-		-				-	1
v5ne1	19	15	11	-	-	-		-				-	2
v5ne1	-	-	-	15	12	-	2	1.2	-	700	600	500	1
v12i1	30	-	35	-	-		6	1.6	1.2	-	-	-	1
v12i1	-	-		2	8	1	-	-	-		600	500	1
v12i1	-	-	-	0.5	2.8	1	-	-	-	100	200	190	2

Note:
1. C:Capping levels fo Channels, D: Capping levels for drill holes, C3: Capping levels for Channels for third pass interpolation.

Table 11-9: Estimation Domain Capped and Raw Assay Statistics for Zinc (Zn %)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Raw Assay					Capped Raw Assay				
			Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.	Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.
1	1	3196	0.00	50.86	10.48	8.99	0.86	0.00	50.86	10.48	8.99	0.86
1	2	2009	0.00	40.84	3.54	6.60	1.86	0.00	39.00	3.54	6.59	1.86
21	1	179	0.02	36.55	4.80	6.93	1.44	0.02	20.00	4.47	5.85	1.31
21	2	799	0.00	49.05	4.61	7.02	1.52	0.00	40.00	4.58	6.86	1.50
100	1	469	0.00	54.63	4.00	6.78	1.69	0.00	39.50	3.97	6.57	1.66
100	2	2227	0.00	49.81	4.65	7.63	1.64	0.00	49.50	4.65	7.63	1.64
154	1	1139	0.00	37.33	6.06	7.54	1.25	0.00	31.00	6.04	7.48	1.24
154	2	1776	0.00	46.56	6.15	7.76	1.26	0.00	38.00	6.13	7.70	1.26
157	1	77	0.04	31.30	10.78	8.06	0.75	0.04	23.00	10.60	7.72	0.73
201	2	24	0.00	14.98	2.00	3.77	1.89	0.00	14.98	2.00	3.77	1.89
250	1	205	0.06	42.96	8.12	8.02	0.99	0.06	32.00	8.01	7.62	0.95
250	2	39	0.00	30.65	8.70	7.59	0.87	0.00	21.00	8.35	6.76	0.81
256	1	9	0.11	13.91	7.28	4.94	0.68	0.11	13.91	7.28	4.94	0.68
256	2	273	0.00	25.64	2.51	4.17	1.66	0.00	21.00	2.48	4.03	1.63
259	1	2236	0.00	50.00	8.07	6.86	0.85	0.00	50.00	8.07	6.86	0.85
259	2	673	0.00	40.06	4.26	6.55	1.54	0.00	30.00	4.22	6.33	1.50
264	2	184	0.00	37.83	5.67	6.19	1.09	0.00	33.00	5.66	6.16	1.09
270	1	26	0.07	23.20	4.39	5.50	1.25	0.07	23.20	4.39	5.50	1.25
270	2	168	0.00	31.92	5.19	6.82	1.31	0.00	31.00	5.19	6.80	1.31
302	1	23	0.02	7.71	0.56	1.63	2.90	0.02	7.71	0.56	1.63	2.90
302	2	170	0.00	10.41	0.53	1.19	2.24	0.00	1.50	0.38	0.51	1.35
306	1	65	0.12	20.86	2.07	3.08	1.49	0.12	15.00	2.02	2.79	1.38
306	2	509	0.00	28.06	2.02	4.14	2.04	0.00	24.00	2.02	4.09	2.03
307	1	5574	0.00	53.65	6.95	6.79	0.98	0.00	37.00	6.95	6.77	0.97
307	2	4169	0.00	40.46	2.20	4.09	1.86	0.00	27.00	2.19	4.03	1.84
350	1	69	0.00	20.60	6.30	5.55	0.88	0.00	20.60	6.30	5.55	0.88
350	2	346	0.00	32.86	4.47	5.64	1.26	0.00	30.00	4.46	5.61	1.26
453	1	31	0.02	24.87	5.44	6.43	1.18	0.02	24.87	5.44	6.43	1.18
453	2	161	0.00	43.79	3.33	7.30	2.19	0.00	41.00	3.31	7.22	2.18
458	1	91	0.01	10.76	2.50	2.72	1.09	0.01	9.50	2.49	2.70	1.09
458	2	415	0.00	27.40	3.47	3.57	1.03	0.00	24.00	3.47	3.55	1.02
466	1	1086	0.00	38.18	4.77	6.10	1.28	0.00	36.00	4.77	6.09	1.28
466	2	2615	0.00	42.38	4.23	6.28	1.49	0.00	37.00	4.23	6.27	1.48
550	1	1	14.73	14.73	14.73	-	-	14.73	14.73	14.73	-	-
550	2	1063	0.00	41.45	3.05	5.98	1.96	0.00	37.00	3.05	5.94	1.95
600	1	2274	0.00	35.28	1.94	2.79	1.44	0.00	24.00	1.94	2.73	1.41
600	2	1859	0.00	45.40	2.45	4.40	1.80	0.00	34.00	2.44	4.33	1.77
652	1	9	0.02	0.93	0.43	0.30	0.69	0.02	0.93	0.43	0.30	0.69
652	2	494	0.00	14.77	0.27	0.70	2.64	0.00	2.00	0.23	0.43	1.89

C_ESTIM	C_Hole	# Samples	Raw Assay					Capped Raw Assay				
			Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.	Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.
671	1	19	0.04	5.02	1.25	1.39	1.12	0.04	5.02	1.25	1.39	1.12
671	2	378	0.00	14.44	0.66	1.30	1.97	0.00	13.00	0.66	1.26	1.93
674	1	10	0.02	3.45	0.51	1.07	2.12	0.02	3.45	0.51	1.07	2.12
674	2	182	0.00	7.88	0.59	1.20	2.02	0.00	7.80	0.59	1.19	2.01
677	2	354	0.00	6.39	0.45	0.76	1.67	0.00	5.00	0.45	0.74	1.65
700	1	272	0.04	43.07	6.77	10.46	1.55	0.04	42.50	6.76	10.45	1.54
700	2	241	0.00	45.78	3.53	6.24	1.77	0.00	31.00	3.44	5.73	1.67
701	1	590	0.00	44.23	4.07	5.96	1.46	0.00	39.00	4.06	5.91	1.45
701	2	828	0.00	35.00	2.08	4.00	1.92	0.00	29.00	2.07	3.93	1.89
750	1	11	0.04	3.69	0.57	1.24	2.17	0.04	3.69	0.57	1.24	2.17
750	2	1266	0.00	24.10	1.57	2.47	1.57	0.00	21.00	1.57	2.42	1.55
751	1	8	0.01	1.33	0.50	0.39	0.77	0.01	1.33	0.50	0.39	0.77
751	2	135	0.00	7.26	1.40	1.34	0.96	0.00	7.00	1.39	1.33	0.95
756	2	225	0.00	20.02	1.15	2.03	1.76	0.00	15.50	1.14	1.97	1.72
800	1	46	0.02	3.88	0.50	0.76	1.51	0.02	3.88	0.50	0.76	1.51
800	2	60	0.00	18.37	1.62	3.44	2.12	0.00	8.00	1.34	2.29	1.71
850	2	97	0.00	32.36	4.98	7.09	1.42	0.00	30.00	4.96	6.98	1.41
860	1	12	0.26	13.83	3.15	3.82	1.21	0.26	13.83	3.15	3.82	1.21
860	2	146	0.00	32.73	2.25	3.60	1.60	0.00	18.00	2.20	3.28	1.49
865	2	103	0.00	33.02	5.55	6.90	1.24	0.00	27.00	5.51	6.77	1.23
872	2	111	0.00	16.54	2.03	3.01	1.49	0.00	14.50	2.02	2.98	1.48
883	1	11	1.92	21.91	5.53	3.55	0.64	1.92	21.91	5.53	3.55	0.64
883	2	38	0.12	19.97	5.70	5.23	0.92	0.12	18.50	5.68	5.18	0.91
901	1	134	0.01	13.66	2.51	2.63	1.05	0.01	12.50	2.50	2.59	1.04
901	2	550	0.00	34.36	3.78	4.75	1.26	0.00	26.50	3.77	4.70	1.25
908	2	245	0.00	30.81	2.31	3.69	1.60	0.00	21.00	2.28	3.47	1.52
950	1	22	0.30	17.70	5.86	5.33	0.91	0.30	17.00	5.81	5.24	0.90
950	2	283	0.00	34.92	3.88	6.28	1.62	0.00	33.00	3.87	6.23	1.61
1008	1	9	0.04	26.07	4.36	8.66	1.99	0.04	26.07	4.36	8.66	1.99
1008	2	237	0.00	23.92	1.55	3.55	2.29	0.00	23.00	1.54	3.51	2.28
1016	1	72	0.08	14.20	1.10	1.72	1.57	0.08	5.00	1.00	1.15	1.15
1016	2	199	0.00	29.96	3.55	5.61	1.58	0.00	25.00	3.50	5.41	1.55
1019	2	182	0.00	27.07	2.38	3.78	1.59	0.00	24.00	2.37	3.72	1.57
1026	1	195	0.03	12.24	1.32	1.73	1.31	0.03	10.00	1.31	1.66	1.27
1026	2	634	0.00	22.94	1.62	2.79	1.72	0.00	19.00	1.61	2.74	1.70
1028	1	188	0.02	19.46	2.24	2.89	1.29	0.02	15.50	2.23	2.84	1.27
1028	2	1876	0.00	25.51	2.04	2.60	1.27	0.00	23.50	2.04	2.60	1.27
1029	1	25	0.51	44.59	3.12	5.44	1.74	0.51	10.80	2.64	2.41	0.91
1029	2	300	0.00	33.23	2.96	3.86	1.31	0.00	25.00	2.93	3.66	1.25
1034	1	15	0.03	1.61	0.42	0.51	1.23	0.03	1.61	0.42	0.51	1.23
1034	2	302	0.00	34.83	1.83	3.72	2.03	0.00	25.50	1.82	3.65	2.00
1054	1	1	4.12	4.12	4.12	-	-	4.12	4.12	4.12	-	-

C_ESTIM	C_Hole	# Samples	Raw Assay					Capped Raw Assay				
			Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.	Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.
1054	2	16	0.05	27.87	13.78	11.09	0.80	0.05	27.87	13.78	11.09	0.80
1151	1	1042	0.01	40.07	5.30	5.65	1.06	0.01	22.00	5.20	5.25	1.01
1151	2	3355	0.00	47.10	5.04	6.06	1.20	0.00	35.00	5.03	6.00	1.19
1208	2	118	0.00	47.80	6.63	9.09	1.37	0.00	41.50	6.56	8.78	1.34
1300	1	1333	0.00	41.28	7.79	6.84	0.88	0.00	36.50	7.78	6.81	0.88
1300	2	984	0.00	47.61	3.98	6.57	1.65	0.00	38.60	3.97	6.53	1.64
1350	1	49	1.55	30.30	13.34	6.01	0.45	1.55	24.50	13.22	5.71	0.43
1350	2	1508	0.00	28.24	4.82	4.79	0.99	0.00	27.50	4.82	4.79	0.99
1402	1	89	0.21	15.45	4.55	2.71	0.60	0.21	13.00	4.54	2.67	0.59
1402	2	2471	0.00	38.40	3.57	3.94	1.10	0.00	31.00	3.57	3.93	1.10
1408	2	460	0.00	22.55	3.32	3.69	1.11	0.00	19.00	3.31	3.61	1.09
1410	2	427	0.00	19.02	2.08	2.91	1.40	0.00	17.00	2.08	2.88	1.38
1450	1	129	0.02	11.72	1.57	2.28	1.45	0.02	8.00	1.50	2.01	1.34
1450	2	214	0.00	23.38	2.35	3.34	1.42	0.00	21.00	2.33	3.26	1.40
1452	1	81	0.00	20.72	1.94	4.07	2.10	0.00	13.00	1.73	3.27	1.89
1452	2	193	0.00	32.56	3.74	5.38	1.44	0.00	26.00	3.71	5.22	1.41
1458	1	334	0.00	34.48	3.98	6.20	1.56	0.00	30.00	3.95	6.08	1.54
1458	2	291	0.00	32.95	2.70	4.51	1.67	0.00	26.50	2.67	4.34	1.63
1504	1	113	0.01	21.48	1.71	3.14	1.84	0.01	15.50	1.65	2.83	1.71
1504	2	400	0.01	38.64	2.72	5.74	2.11	0.01	23.00	2.63	5.36	2.03
1555	1	907	0.01	38.44	2.94	4.84	1.64	0.01	37.00	2.94	4.83	1.64
1555	2	2121	0.00	55.23	3.12	5.26	1.69	0.00	38.50	3.11	5.21	1.67
1558	1	158	0.01	30.50	1.54	3.37	2.19	0.01	16.50	1.46	2.77	1.90
1558	2	905	0.00	37.41	1.71	3.81	2.23	0.00	34.50	1.71	3.79	2.22
1607	1	280	0.00	14.64	0.85	1.78	2.09	0.00	10.80	0.85	1.75	2.06
1607	2	785	0.00	34.25	1.56	3.46	2.21	0.00	32.00	1.56	3.43	2.20
1609	1	27	0.03	2.47	0.60	0.69	1.16	0.03	2.00	0.58	0.65	1.12
1609	2	306	0.00	21.61	0.94	2.27	2.41	0.00	17.00	0.93	2.17	2.33
1614	1	13	0.04	9.67	1.90	1.90	1.00	0.04	9.67	1.90	1.90	1.00
1614	2	118	0.00	34.11	3.31	5.80	1.75	0.00	23.00	3.18	5.22	1.64
1650	1	2089	0.00	41.38	7.36	6.45	0.88	0.00	36.00	7.35	6.43	0.87
1650	2	1281	0.00	37.30	3.28	5.15	1.57	0.00	29.00	3.27	5.07	1.55
1702	1	169	0.03	23.81	2.86	3.93	1.38	0.03	17.00	2.82	3.76	1.33
1702	2	264	0.00	48.23	3.14	5.23	1.67	0.00	36.00	3.12	5.11	1.64
1712	1	37	0.02	23.80	2.75	5.16	1.87	0.02	15.50	2.48	4.14	1.67
1712	2	186	0.00	26.97	2.53	4.90	1.94	0.00	23.50	2.52	4.83	1.92
1714	1	44	0.20	16.71	3.46	3.45	1.00	0.20	13.50	3.39	3.21	0.95
1714	2	222	0.00	35.84	5.49	7.40	1.35	0.00	33.00	5.49	7.37	1.34
1718	1	85	0.02	18.49	3.40	3.93	1.16	0.02	14.50	3.32	3.68	1.11
1718	2	73	0.00	18.25	1.46	3.38	2.32	0.00	13.00	1.41	3.18	2.26
1754	1	41	0.29	15.10	3.27	3.37	1.03	0.29	10.40	3.20	3.17	0.99
1754	2	860	0.00	43.26	2.57	3.90	1.52	0.00	29.00	2.56	3.85	1.50

C_ESTIM	C_Hole	# Samples	Raw Assay					Capped Raw Assay				
			Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.	Min.(%)	Max.(%)	Mean(%)	Std. Dv	C.V.
1755	2	5	0.44	15.79	5.92	6.47	1.09	0.44	15.79	5.92	6.47	1.09
1850	1	312	0.01	22.49	2.29	3.80	1.66	0.01	17.00	2.27	3.70	1.63
1850	2	800	0.00	44.47	1.22	2.96	2.42	0.00	17.50	1.18	2.63	2.22
1855	1	329	0.00	31.40	10.32	7.77	0.75	0.00	30.00	10.31	7.75	0.75
1855	2	141	0.00	22.20	4.26	7.01	1.65	0.00	22.20	4.26	7.01	1.65
1900	1	1225	0.00	24.87	4.49	4.87	1.09	0.00	24.87	4.49	4.87	1.09
1900	2	705	0.00	19.67	2.49	3.14	1.26	0.00	17.50	2.48	3.12	1.26
1950	1	220	0.01	18.68	2.02	2.59	1.29	0.01	12.00	1.97	2.34	1.19
1950	2	227	0.00	13.97	1.35	2.11	1.56	0.00	10.50	1.34	2.01	1.51
1959	1	512	0.00	13.77	1.61	1.81	1.12	0.00	9.50	1.60	1.73	1.09
1959	2	317	0.00	24.28	1.49	2.47	1.65	0.00	20.00	1.48	2.38	1.61
1965	1	216	0.02	14.12	1.81	2.34	1.29	0.02	12.00	1.80	2.28	1.27
1965	2	288	0.00	23.85	1.06	2.21	2.09	0.00	12.50	1.02	1.91	1.87
2000	1	17	0.09	5.78	1.76	1.77	1.00	0.09	5.78	1.76	1.77	1.00
2000	2	290	0.00	14.74	1.42	1.64	1.15	0.00	11.00	1.41	1.53	1.08
2051	2	388	0.00	19.93	1.52	2.23	1.46	0.00	16.50	1.52	2.20	1.45
2060	2	488	0.00	31.67	1.84	3.38	1.83	0.00	28.00	1.84	3.31	1.80
2065	2	71	0.00	34.19	4.40	5.04	1.14	0.00	20.00	4.32	4.69	1.08
2067	2	22	0.01	25.31	2.98	5.53	1.85	0.01	14.00	2.44	3.50	1.43
2072	2	22	0.00	14.12	1.82	3.14	1.72	0.00	9.00	1.66	2.57	1.55
2073	2	12	0.16	4.59	2.06	1.42	0.69	0.16	4.50	2.06	1.42	0.69
2079	2	19	0.01	11.15	3.98	2.50	0.63	0.01	7.50	3.89	2.30	0.59
2100	1	75	0.04	21.24	2.04	3.45	1.69	0.04	16.50	2.00	3.25	1.63
2100	2	281	0.00	32.32	2.08	2.81	1.35	0.00	30.00	2.07	2.77	1.34
2104	2	226	0.02	28.60	2.60	4.13	1.59	0.02	26.00	2.60	4.10	1.58
2150	2	829	0.00	15.05	0.82	1.53	1.86	0.00	12.00	0.82	1.51	1.84
2156	1	1	0.72	0.72	0.72	-	-	0.72	0.72	0.72	-	-
2156	2	103	0.01	5.23	0.78	0.97	1.25	0.01	4.50	0.77	0.95	1.23
4501	1	180	0.01	21.75	2.92	3.72	1.27	0.01	9.00	2.62	2.79	1.06
4501	2	325	0.00	24.42	3.65	3.99	1.09	0.00	17.00	3.62	3.84	1.06
4502	1	693	0.01	52.17	6.49	6.15	0.95	0.01	27.00	6.38	5.62	0.88
4502	2	540	0.00	30.13	5.81	5.26	0.91	0.00	22.00	5.76	5.11	0.89
17501	1	191	0.01	30.30	8.51	7.87	0.93	0.01	20.00	8.18	7.25	0.89
17501	2	71	0.00	25.61	6.62	6.96	1.05	0.00	15.00	5.93	5.64	0.95
17502	1	288	0.02	23.75	3.08	4.45	1.45	0.02	15.00	2.97	4.05	1.36
17502	2	336	0.00	27.16	3.77	5.46	1.45	0.00	19.00	3.71	5.25	1.41

Note:

C_Hole: 1: Channels, 2: Drill holes

Table 11-10: Estimation Domain Capped and Raw Assay Statistics for Lead (Pb %)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
1	1	2363	0.00	39.80	6.57	7.12	1.08	0.00	30.00	6.54	7.01	1.07
1	2	2312	0.00	36.65	2.60	5.29	2.04	0.00	30.00	2.59	5.25	2.03
21	1	179	0.01	6.29	0.09	0.56	6.11	0.01	0.20	0.04	0.04	1.17
21	2	799	0.00	26.48	0.14	1.08	7.95	0.00	5.00	0.10	0.41	4.20
100	1	486	0.00	34.43	2.05	4.30	2.10	0.00	20.00	1.97	3.84	1.95
100	2	2181	0.00	39.31	2.71	5.04	1.86	0.00	30.00	2.70	5.00	1.85
154	1	1449	0.00	45.78	1.61	3.99	2.47	0.00	45.78	1.61	3.99	2.47
154	2	2547	0.00	25.93	0.45	2.03	4.50	0.00	6.50	0.33	1.12	3.42
157	1	77	0.01	23.26	1.91	3.82	1.99	0.01	15.50	1.78	3.14	1.76
185	1	34	0.04	37.26	2.74	7.21	2.63	0.04	15.80	1.89	3.28	1.73
185	2	537	0.00	36.24	2.02	3.26	1.62	0.00	18.00	1.98	3.03	1.53
201	2	24	0.00	34.99	4.09	8.26	2.02	0.00	30.00	3.99	7.90	1.98
256	1	9	0.01	1.02	0.20	0.27	1.34	0.01	1.02	0.20	0.27	1.34
256	2	273	0.00	22.71	0.90	2.44	2.72	0.00	13.50	0.86	2.17	2.54
264	2	184	0.00	0.10	0.01	0.01	0.82	0.00	0.10	0.01	0.01	0.82
307	1	5597	0.00	37.60	0.91	2.84	3.11	0.00	9.00	0.75	1.89	2.50
307	2	4339	0.00	20.31	0.17	1.02	6.12	0.00	2.00	0.09	0.31	3.41
308	1	71	0.02	18.16	0.43	1.42	3.32	0.02	10.00	0.41	1.23	3.03
308	2	177	0.00	18.10	0.30	1.54	5.04	0.00	0.90	0.09	0.21	2.33
309	1	57	0.07	19.68	1.51	3.18	2.10	0.07	13.00	1.39	2.56	1.84
309	2	155	0.00	33.77	2.54	4.82	1.90	0.00	20.00	2.44	4.34	1.78
310	1	118	0.00	32.60	5.94	7.80	1.31	0.00	22.00	5.74	7.30	1.27
310	2	105	0.00	32.52	3.07	5.88	1.92	0.00	27.50	3.04	5.74	1.89
350	1	59	0.00	25.50	2.13	4.44	2.09	0.00	10.00	1.76	2.81	1.60
350	2	197	0.00	7.80	0.36	1.15	3.24	0.00	2.00	0.21	0.51	2.47
450	1	873	0.01	17.17	0.15	0.99	6.46	0.01	1.50	0.07	0.25	3.36
450	2	865	0.00	17.91	0.15	1.07	6.98	0.00	2.50	0.08	0.33	4.04
451	1	10	0.01	0.17	0.03	0.05	1.51	0.01	0.17	0.03	0.05	1.51
451	2	149	0.00	2.36	0.06	0.22	3.82	0.00	0.25	0.03	0.06	1.91
456	1	45	0.00	1.30	0.11	0.26	2.32	0.00	1.30	0.11	0.26	2.32
456	2	195	0.00	27.65	1.11	3.83	3.44	0.00	5.50	0.60	1.47	2.46
458	1	77	0.01	1.07	0.03	0.12	3.89	0.01	0.10	0.02	0.02	1.06
458	2	381	0.00	12.46	0.05	0.43	9.36	0.00	0.30	0.02	0.04	1.63
466	1	1220	0.00	22.59	0.20	1.07	5.33	0.00	2.00	0.12	0.35	2.85
466	2	2793	0.00	32.33	0.17	1.14	6.84	0.00	1.30	0.08	0.22	2.84
600	1	2141	0.00	22.41	1.30	1.96	1.51	0.00	12.00	1.27	1.76	1.38
600	2	2744	0.00	29.00	0.65	2.30	3.51	0.00	6.00	0.48	1.18	2.45
671	1	30	0.02	8.56	1.37	1.96	1.43	0.02	8.56	1.37	1.96	1.43

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
671	2	767	0.00	30.33	1.17	2.08	1.78	0.00	9.50	1.12	1.71	1.53
700	1	272	0.02	38.66	3.53	5.68	1.61	0.02	20.00	3.47	5.48	1.58
700	2	241	0.00	25.91	2.75	5.22	1.90	0.00	25.91	2.75	5.22	1.90
701	1	590	0.02	35.88	5.15	5.72	1.11	0.02	28.00	5.11	5.54	1.08
701	2	1657	0.00	58.28	2.15	4.36	2.03	0.00	22.00	2.05	3.70	1.81
750	1	11	0.02	7.92	1.12	2.71	2.42	0.02	0.08	0.05	0.02	0.50
750	2	1266	0.00	29.59	0.92	1.90	2.07	0.00	9.00	0.87	1.53	1.76
751	1	54	0.01	43.41	3.64	8.00	2.20	0.01	37.00	3.51	7.38	2.10
751	2	195	0.00	31.43	1.31	1.92	1.47	0.00	20.00	1.29	1.77	1.37
756	2	225	0.00	17.76	0.90	1.72	1.90	0.00	15.50	0.90	1.68	1.86
850	1	12	0.14	5.12	1.57	1.27	0.81	0.14	5.12	1.57	1.27	0.81
850	2	243	0.00	23.32	1.82	3.65	2.01	0.00	19.00	1.79	3.50	1.96
865	2	141	0.00	16.03	1.14	2.53	2.23	0.00	9.00	1.04	2.10	2.02
878	2	73	0.00	5.37	0.38	0.87	2.32	0.00	3.50	0.35	0.74	2.11
883	1	11	1.77	17.22	4.20	2.86	0.68	1.77	17.22	4.20	2.86	0.68
883	2	38	0.00	19.58	3.42	4.66	1.36	0.00	19.58	3.42	4.66	1.36
901	1	134	0.08	16.73	1.66	2.33	1.40	0.08	8.00	1.55	1.80	1.16
901	2	550	0.00	29.01	2.34	3.47	1.48	0.00	16.00	2.27	3.12	1.37
908	2	245	0.00	25.28	2.19	3.31	1.51	0.00	20.00	2.17	3.14	1.45
1028	1	455	0.04	31.87	1.86	3.02	1.63	0.04	11.50	1.73	2.26	1.30
1028	2	2709	0.00	38.29	1.92	2.86	1.49	0.00	25.00	1.91	2.76	1.45
1034	1	30	0.05	20.00	1.47	2.81	1.91	0.05	10.00	1.37	2.25	1.64
1034	2	559	0.00	29.72	1.81	2.89	1.60	0.00	14.00	1.76	2.62	1.49
1151	1	1042	0.00	36.20	0.87	2.67	3.07	0.00	11.00	0.77	1.99	2.58
1151	2	3355	0.00	40.00	0.78	2.99	3.85	0.00	19.00	0.75	2.74	3.68
1300	1	1333	0.00	34.30	1.31	3.46	2.64	0.00	10.00	1.10	2.43	2.21
1300	2	984	0.00	22.54	0.51	1.99	3.87	0.00	7.00	0.41	1.29	3.15
1351	2	555	0.00	26.20	0.45	1.50	3.35	0.00	2.00	0.29	0.54	1.86
1402	1	138	0.03	12.80	1.76	2.19	1.24	0.03	8.00	1.71	1.98	1.16
1402	2	3483	0.00	31.16	0.91	2.08	2.30	0.00	12.00	0.88	1.87	2.13
1404	2	368	0.00	27.48	3.00	3.32	1.11	0.00	12.00	2.94	3.09	1.05
1408	1	4	0.06	15.40	5.19	6.22	1.20	0.06	15.40	5.19	6.22	1.20
1408	2	564	0.00	19.10	1.48	2.35	1.58	0.00	15.00	1.47	2.29	1.55
1450	1	153	0.00	24.97	1.98	2.65	1.34	0.00	9.50	1.91	2.34	1.23
1450	2	252	0.00	16.40	2.21	2.95	1.33	0.00	12.00	2.17	2.80	1.29
1458	1	281	0.00	23.37	1.75	2.80	1.60	0.00	12.00	1.69	2.43	1.44
1458	2	695	0.00	29.55	1.22	2.73	2.24	0.00	14.40	1.20	2.62	2.19
1504	1	139	0.00	8.60	0.15	0.87	5.96	0.00	0.20	0.03	0.04	1.49
1504	2	568	0.00	11.15	0.02	0.24	9.84	0.00	0.10	0.02	0.01	0.88
1555	1	1572	0.00	33.64	1.83	3.98	2.18	0.00	15.00	1.69	3.33	1.97
1555	2	2014	0.00	38.56	1.25	3.50	2.80	0.00	15.00	1.14	2.84	2.50

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
1607	1	306	0.00	22.89	0.96	1.83	1.91	0.00	15.00	0.95	1.74	1.83
1607	2	1002	0.00	31.86	1.57	3.16	2.01	0.00	15.00	1.50	2.73	1.83
1611	1	1	0.61	0.61	0.61	-	-	0.61	0.61	0.61	-	-
1611	2	89	0.00	20.44	1.06	2.17	2.06	0.00	11.50	1.03	1.99	1.93
1614	1	13	0.03	9.28	1.66	2.55	1.54	0.03	9.28	1.66	2.55	1.54
1614	2	118	0.00	29.73	2.56	4.38	1.71	0.00	20.00	2.50	4.07	1.63
1650	1	2089	0.00	62.83	0.47	2.20	4.68	0.00	4.00	0.32	0.83	2.61
1650	2	1281	0.00	15.99	0.05	0.37	6.74	0.00	0.30	0.03	0.05	1.90
1712	1	81	0.02	8.67	0.68	1.31	1.93	0.02	8.67	0.68	1.31	1.93
1712	2	408	0.00	35.34	2.59	5.24	2.02	0.00	24.00	2.49	4.71	1.89
1716	1	374	0.01	29.12	1.95	3.90	2.00	0.01	18.00	1.89	3.56	1.89
1716	2	485	0.00	27.31	1.74	3.49	2.01	0.00	25.00	1.74	3.47	2.00
1718	1	85	0.02	7.27	1.40	1.98	1.42	0.02	7.27	1.40	1.98	1.42
1718	2	73	0.00	16.77	0.79	2.22	2.81	0.00	3.00	0.47	0.75	1.61
1750	1	479	0.00	22.91	1.84	2.92	1.59	0.00	12.00	1.78	2.66	1.49
1750	2	407	0.00	40.61	2.46	4.51	1.83	0.00	15.00	2.32	3.87	1.66
1850	1	312	0.01	27.23	1.76	3.32	1.89	0.01	10.00	1.58	2.51	1.59
1850	2	800	0.00	31.49	1.06	2.93	2.77	0.00	8.00	0.84	1.61	1.92
1855	1	377	0.00	45.00	3.91	6.37	1.63	0.00	22.00	3.78	5.92	1.57
1855	2	1032	0.00	30.47	2.46	4.02	1.64	0.00	22.00	2.43	3.88	1.60
1900	1	1437	0.00	21.76	1.87	2.41	1.29	0.00	14.00	1.86	2.33	1.26
1900	2	886	0.00	16.09	1.35	2.43	1.81	0.00	12.00	1.33	2.33	1.76
1960	1	520	0.00	17.52	0.62	1.26	2.03	0.00	5.30	0.58	0.92	1.59
1960	2	363	0.00	7.27	0.51	0.79	1.57	0.00	4.00	0.50	0.74	1.50
1965	1	216	0.01	12.81	1.62	2.10	1.29	0.01	7.00	1.56	1.85	1.19
1965	2	288	0.00	25.36	0.78	1.79	2.29	0.00	5.00	0.67	1.13	1.67
2000	1	25	0.01	1.56	0.42	0.37	0.90	0.01	1.56	0.42	0.37	0.90
2000	2	931	0.00	33.52	0.62	1.56	2.51	0.00	4.50	0.53	0.83	1.56
2051	2	388	0.00	16.27	0.90	1.70	1.89	0.00	8.40	0.86	1.43	1.66
2060	2	606	0.00	15.94	0.24	0.85	3.48	0.00	1.50	0.18	0.35	1.98
2067	2	22	0.00	0.15	0.02	0.04	1.66	0.00	0.15	0.02	0.04	1.66
2073	2	12	0.01	0.16	0.03	0.03	1.26	0.01	0.16	0.03	0.03	1.26
2079	2	19	0.00	0.78	0.14	0.20	1.43	0.00	0.78	0.14	0.20	1.43
2080	2	22	0.00	2.60	0.28	0.56	2.00	0.00	2.60	0.28	0.56	2.00
2083	2	71	0.00	0.41	0.01	0.04	3.02	0.00	0.05	0.01	0.01	1.17
2104	2	226	0.00	24.20	1.10	2.94	2.67	0.00	3.50	0.66	0.94	1.43
2156	1	1	0.48	0.48	0.48	-	-	0.48	0.48	0.48	-	-
2156	2	103	0.01	5.31	0.95	1.01	1.07	0.01	3.80	0.92	0.93	1.01
2591	1	1134	0.00	36.40	0.62	1.93	3.13	0.00	8.00	0.55	1.24	2.26
2591	2	43	0.00	2.35	0.12	0.38	3.14	0.00	2.00	0.11	0.34	3.00
2592	1	1102	0.00	10.80	0.16	0.81	5.14	0.00	2.8	0.11	0.38	3.40

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.	Capped Raw Assay Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
2592	2	630	0.00	4.92	0.04	0.22	5.21	0.00	0.5	0.03	0.06	1.85

Note:
C_Hole: 1: Channels, 2: Drill holes

Table 11-11: Estimation Domain Capped and Raw Assay Statistics for Silver (Ag g/t)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.	Capped Raw Assay Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.
1	1	2363	0.00	1427.65	232.24	237.63	1.02	0.00	1000.00	230.22	229.67	1.00
1	2	2312	0.00	3864.61	152.62	301.30	1.97	0.00	2000.00	150.91	287.90	1.91
21	1	179	2.02	232.34	13.22	24.97	1.89	2.02	60.00	11.17	13.08	1.17
21	2	799	0.00	1009.93	19.80	53.12	2.68	0.00	300.00	18.40	35.35	1.92
100	1	486	0.00	1467.77	128.77	225.57	1.75	0.00	1200.00	127.59	219.41	1.72
100	2	2181	0.00	9873.80	167.16	449.62	2.69	0.00	2000.00	153.97	242.53	1.58
154	1	1449	0.00	1445.07	73.87	119.45	1.62	0.00	490.00	70.64	100.59	1.42
154	2	2547	0.00	1287.99	36.48	89.38	2.45	0.00	420.00	33.70	68.46	2.03
157	1	77	1.24	377.91	98.93	73.16	0.74	1.24	220.00	94.90	61.70	0.65
185	1	34	2.02	880.85	105.99	179.96	1.70	2.02	250.00	75.82	66.56	0.88
185	2	537	0.00	2506.50	113.78	199.09	1.75	0.00	1000.00	108.14	153.43	1.42
201	2	24	0.00	2117.84	214.82	458.18	2.13	0.00	1600.00	205.02	421.44	2.06
256	1	9	5.29	208.08	78.89	76.75	0.97	5.29	208.08	78.89	76.75	0.97
256	2	273	0.00	775.10	55.56	99.34	1.79	0.00	500.00	53.23	84.66	1.59
264	2	184	0.00	143.39	18.38	15.87	0.86	0.00	60.00	17.61	11.45	0.65
307	1	5597	0.00	2901.95	58.28	97.66	1.68	0.00	1200.00	57.88	89.03	1.54
307	2	4339	0.00	926.88	19.36	37.22	1.92	0.00	400.00	19.20	34.69	1.81
308	1	71	2.02	479.93	40.52	65.14	1.61	2.02	179.00	36.46	43.32	1.19
308	2	177	1.40	805.00	30.41	72.62	2.39	1.40	435.00	28.93	59.50	2.06
309	1	57	2.02	692.36	62.07	107.90	1.74	2.02	400.00	58.74	91.65	1.56
309	2	155	0.00	1256.89	146.68	229.63	1.57	0.00	800.00	141.30	209.76	1.48
310	1	118	0.00	1679.59	291.47	399.35	1.37	0.00	1679.59	291.47	399.35	1.37
310	2	105	0.00	1819.86	159.61	275.33	1.72	0.00	1070.00	155.17	254.45	1.64
350	1	59	0.00	360.80	95.64	100.77	1.05	0.00	300.00	94.39	97.86	1.04
350	2	197	0.00	200.00	29.28	41.11	1.40	0.00	120.00	26.71	32.63	1.22
450	1	873	1.24	362.36	14.94	33.58	2.25	1.24	88.00	12.60	17.65	1.40
450	2	865	0.00	658.46	15.51	42.93	2.77	0.00	140.00	13.11	21.48	1.64
451	1	10	2.02	65.32	12.72	17.92	1.41	2.02	65.32	12.72	17.92	1.41
451	2	149	0.00	135.92	8.95	12.97	1.45	0.00	135.92	8.95	12.97	1.45
456	1	45	2.02	52.88	9.15	11.23	1.23	2.02	47.40	9.08	10.96	1.21
456	2	195	0.00	1182.24	55.69	143.69	2.58	0.00	450.00	47.84	100.42	2.10
458	1	77	2.02	142.76	7.78	18.60	2.39	2.02	61.50	6.68	11.76	1.76

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (g/t)	Raw Assay Max. (g/t)	Raw Assay Mean (g/t)	Raw Assay Std. Dv (g/t)	Raw Assay C.V.	Capped Raw Assay Min. (g/t)	Capped Raw Assay Max. (g/t)	Capped Raw Assay Mean (g/t)	Capped Raw Assay Std. Dv (g/t)	Capped Raw Assay C.V.
458	2	381	0.00	530.31	7.32	18.97	2.59	0.00	57.00	6.78	8.51	1.25
466	1	1220	0.00	855.03	21.07	44.04	2.09	0.00	160.00	19.00	27.35	1.44
466	2	2793	0.00	1035.75	19.92	40.41	2.03	0.00	580.00	19.83	38.81	1.96
600	1	2141	0.00	1801.51	77.78	119.84	1.54	0.00	1100.00	77.26	114.32	1.48
600	2	2744	0.00	3278.62	48.99	116.26	2.37	0.00	900.00	47.87	100.53	2.10
671	1	30	4.04	534.98	84.69	118.63	1.40	4.04	534.98	84.69	118.63	1.40
671	2	767	0.00	9117.05	75.14	207.70	2.76	0.00	1300.00	71.45	126.80	1.77
700	1	272	2.02	2229.19	108.40	213.60	1.97	2.02	1200.00	105.17	190.78	1.81
700	2	241	0.00	4321.30	138.10	329.57	2.39	0.00	1790.00	129.47	249.74	1.93
701	1	590	0.93	3801.78	333.27	470.02	1.41	0.93	3000.00	331.54	458.86	1.38
701	2	1657	0.00	6760.00	153.15	307.22	2.01	0.00	2000.00	149.70	265.54	1.77
750	1	11	31.41	265.93	110.78	86.24	0.78	31.41	265.93	110.78	86.24	0.78
750	2	1266	0.00	1153.15	55.18	85.24	1.54	0.00	825.00	54.78	80.93	1.48
751	1	54	4.04	2071.18	192.89	395.80	2.05	4.04	1922.00	189.91	381.99	2.01
751	2	195	0.00	931.86	63.07	68.10	1.08	0.00	420.00	62.55	63.26	1.01
756	2	225	0.00	1630.76	92.76	125.16	1.35	0.00	400.00	87.85	90.52	1.03
850	1	12	6.53	186.00	62.59	45.76	0.73	6.53	186.00	62.59	45.76	0.73
850	2	243	0.00	1792.49	124.18	211.75	1.71	0.00	1400.00	123.84	209.39	1.69
865	2	141	0.00	1035.71	113.78	126.95	1.12	0.00	581.00	112.48	120.13	1.07
878	2	73	0.00	388.08	37.60	45.21	1.20	0.00	170.00	35.75	35.13	0.98
883	1	11	46.66	738.09	158.63	130.99	0.83	46.66	738.09	158.63	130.99	0.83
883	2	38	4.48	2002.75	167.37	272.51	1.63	4.48	700.00	148.27	171.18	1.15
901	1	134	2.02	584.12	90.95	81.17	0.89	2.02	250.00	86.78	64.74	0.75
901	2	550	0.00	1418.63	126.21	142.67	1.13	0.00	1000.00	125.70	139.22	1.11
908	2	245	0.00	2022.97	105.29	174.54	1.66	0.00	1400.00	104.31	165.71	1.59
1028	1	455	2.02	2055.94	105.74	168.75	1.60	2.02	1000.00	102.63	140.32	1.37
1028	2	2709	0.00	2933.68	95.03	153.25	1.61	0.00	2000.00	94.80	149.92	1.58
1034	1	30	2.02	746.48	63.52	100.39	1.58	2.02	244.00	56.77	69.92	1.23
1034	2	559	0.00	1187.53	81.03	121.80	1.50	0.00	700.00	80.03	115.33	1.44
1151	1	1042	0.31	836.68	49.60	100.75	2.03	0.31	510.00	47.90	90.63	1.89
1151	2	3355	0.00	2504.00	48.11	134.07	2.79	0.00	1000.00	46.88	121.99	2.60
1300	1	1333	0.00	1100.75	68.05	118.28	1.74	0.00	900.00	67.75	115.93	1.71
1300	2	984	0.00	728.75	31.49	66.63	2.12	0.00	400.00	30.79	61.82	2.01
1351	2	555	0.00	833.88	48.52	60.50	1.25	0.00	600.00	48.38	58.95	1.22
1402	1	138	3.11	503.88	123.54	91.26	0.74	3.11	400.00	122.05	85.86	0.70
1402	2	3483	0.00	1026.13	75.67	80.06	1.06	0.00	712.00	75.53	78.72	1.04
1404	2	368	0.00	1293.59	146.85	122.59	0.83	0.00	900.00	146.48	119.93	0.82
1408	1	4	4.35	1279.29	369.92	546.51	1.48	4.35	1279.29	369.92	546.51	1.48
1408	2	564	0.00	1469.02	89.84	120.88	1.35	0.00	1050.00	88.75	109.96	1.24
1450	1	153	0.00	714.76	63.21	86.76	1.37	0.00	500.00	62.69	83.76	1.34
1450	2	252	0.00	1206.21	99.77	133.49	1.34	0.00	890.00	98.90	127.14	1.29

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (g/t)	Raw Assay Max. (g/t)	Raw Assay Mean (g/t)	Raw Assay Std. Dv (g/t)	Raw Assay C.V.	Capped Raw Assay Min. (g/t)	Capped Raw Assay Max. (g/t)	Capped Raw Assay Mean (g/t)	Capped Raw Assay Std. Dv (g/t)	Capped Raw Assay C.V.
1458	1	281	0.00	1100.13	96.68	151.63	1.57	0.00	850.00	95.21	143.09	1.50
1458	2	695	0.00	1567.49	98.75	215.11	2.18	0.00	1400.00	98.51	213.60	2.17
1504	1	139	0.93	320.68	15.55	35.40	2.28	0.93	70.00	12.21	12.77	1.05
1504	2	568	0.00	1148.03	16.70	33.50	2.01	0.00	210.00	15.97	16.04	1.00
1555	1	1572	0.00	2282.68	108.29	221.15	2.04	0.00	1800.00	107.69	216.02	2.01
1555	2	2014	0.00	5366.44	88.19	196.88	2.23	0.00	1600.00	87.49	185.20	2.12
1607	1	306	0.00	895.16	71.57	129.13	1.80	0.00	750.00	71.01	125.86	1.77
1607	2	1002	0.00	1669.01	139.00	239.04	1.72	0.00	1250.00	138.11	234.27	1.70
1611	1	1	284.29	284.29	284.29	-	-	284.29	284.29	284.29	-	-
1611	2	89	0.00	1482.39	248.75	293.32	1.18	0.00	1130.00	244.49	278.73	1.14
1614	1	13	4.04	470.60	87.16	124.75	1.43	4.04	470.60	87.16	124.75	1.43
1614	2	118	0.00	4381.24	219.35	345.19	1.57	0.00	1155.00	209.61	263.80	1.26
1650	1	2089	0.00	776.65	40.94	60.25	1.47	0.00	400.00	40.41	55.81	1.38
1650	2	1281	0.00	439.80	13.35	25.54	1.91	0.00	300.00	13.19	23.27	1.76
1712	1	81	2.02	654.42	78.38	120.30	1.53	2.02	600.00	78.04	118.73	1.52
1712	2	408	0.00	1363.92	113.58	172.20	1.52	0.00	900.00	110.35	152.73	1.38
1716	1	374	2.02	667.79	92.63	110.06	1.19	2.02	570.00	92.21	108.05	1.17
1716	2	485	0.00	1001.80	79.52	110.66	1.39	0.00	844.00	79.38	109.57	1.38
1718	1	85	0.31	265.62	65.68	55.96	0.85	0.31	214.00	64.71	52.93	0.82
1718	2	73	0.00	771.37	45.13	123.33	2.73	0.00	200.00	30.19	53.22	1.76
1750	1	479	2.02	1420.50	118.10	145.92	1.24	2.02	600.00	115.36	129.23	1.12
1750	2	407	0.00	2312.23	129.81	181.47	1.40	0.00	700.00	125.73	157.36	1.25
1850	1	312	2.02	1597.79	224.96	290.26	1.29	2.02	1500.00	224.38	287.59	1.28
1850	2	800	0.00	14727.19	184.32	488.68	2.65	0.00	2580.00	175.68	304.26	1.73
1855	1	377	0.00	1323.76	129.14	151.11	1.17	0.00	688.00	128.31	146.24	1.14
1855	2	1032	0.00	1806.99	120.63	181.64	1.51	0.00	1570.00	120.35	179.17	1.49
1900	1	1437	0.00	2237.58	119.12	141.16	1.19	0.00	1000.00	117.79	127.85	1.09
1900	2	886	0.00	6672.63	96.87	226.39	2.34	0.00	1500.00	92.62	131.54	1.42
1960	1	520	0.00	519.43	42.84	47.03	1.10	0.00	375.00	42.50	44.21	1.04
1960	2	363	0.00	1060.47	52.12	92.64	1.78	0.00	586.00	50.89	81.76	1.61
1965	1	216	1.24	777.90	103.59	114.68	1.11	1.24	438.00	100.43	100.60	1.00
1965	2	288	0.00	1098.57	50.49	104.30	2.07	0.00	400.00	46.19	72.26	1.56
2000	1	25	4.04	417.10	149.49	119.84	0.80	4.04	417.10	149.49	119.84	0.80
2000	2	931	0.00	1030.15	39.77	84.11	2.11	0.00	320.00	36.00	55.62	1.55
2051	2	388	0.00	3634.28	95.09	228.50	2.40	0.00	2000.00	91.57	182.56	1.99
2060	2	606	0.00	565.15	22.78	48.28	2.12	0.00	400.00	22.49	45.52	2.02
2067	2	22	0.90	123.26	13.60	27.58	2.03	0.90	50.00	10.23	16.07	1.57
2073	2	12	1.00	67.20	8.11	15.59	1.92	1.00	67.20	8.11	15.59	1.92
2079	2	19	2.36	81.96	16.89	18.91	1.12	2.36	81.96	16.89	18.91	1.12
2080	2	22	0.00	284.60	28.82	39.09	1.36	0.00	284.60	28.82	39.09	1.36
2083	2	71	0.00	55.60	4.74	6.57	1.39	0.00	29.00	4.51	5.12	1.14

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (g/t)	Raw Assay Max. (g/t)	Raw Assay Mean (g/t)	Raw Assay Std. Dv (g/t)	Raw Assay C.V.	Capped Raw Assay Min. (g/t)	Capped Raw Assay Max. (g/t)	Capped Raw Assay Mean (g/t)	Capped Raw Assay Std. Dv (g/t)	Capped Raw Assay C.V.
2104	2	226	2.00	1100.44	84.00	119.63	1.42	2.00	920.00	83.43	115.11	1.38
2156	1	1	18.04	18.04	18.04	-	-	18.04	18.04	18.04	-	-
2156	2	103	1.30	368.00	71.06	71.97	1.01	1.30	200.00	66.35	58.53	0.88
2591	1	1134	0.00	1100.13	72.30	82.17	1.14	0.00	600.00	71.51	74.69	1.04
2591	2	43	0.00	139.34	34.69	37.58	1.08	0.00	139.34	34.69	37.58	1.08
2592	1	1102	0.00	560.17	24.84	42.62	1.72	0.00	200.00	23.35	31.08	1.33
2592	2	630	0.00	235.14	15.38	21.15	1.38	0.00	100.00	14.82	17.40	1.17

Note:

C_Hole: 1: Channels, 2: Drill holes

Table 11-12: Estimation Domain Capped and Raw Assay Statistics for Copper (Cu %)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
1	1	3365	0.00	11.58	0.28	0.48	1.69	0.00	2.70	0.27	0.33	1.23
1	2	3183	0.00	14.06	0.23	0.56	2.39	0.00	6.20	0.23	0.47	2.06
21	1	179	0.01	1.04	0.20	0.19	0.96	0.01	0.70	0.19	0.17	0.90
21	2	799	0.00	5.91	0.31	0.47	1.54	0.00	2.00	0.29	0.37	1.26
100	1	2262	0.00	30.69	0.23	1.13	4.96	0.00	1.30	0.12	0.28	2.23
100	2	4481	0.00	10.21	0.10	0.30	3.08	0.00	1.60	0.09	0.19	2.10
157	1	77	0.01	1.88	0.35	0.43	1.23	0.01	1.88	0.35	0.43	1.23
164	1	28	0.10	2.96	0.74	0.61	0.83	0.10	2.96	0.74	0.61	0.83
164	2	263	0.00	14.08	0.89	0.91	1.03	0.00	5.00	0.87	0.76	0.87
201	2	24	0.00	0.60	0.03	0.09	2.75	0.00	0.60	0.03	0.09	2.75
252	1	51	0.02	2.41	0.42	0.49	1.18	0.02	2.41	0.42	0.49	1.18
252	2	19	0.00	0.76	0.19	0.15	0.80	0.00	0.76	0.19	0.15	0.80
259	1	2236	0.00	10.07	0.23	0.41	1.79	0.00	1.60	0.21	0.23	1.06
259	2	673	0.00	12.29	0.46	0.83	1.79	0.00	6.00	0.45	0.71	1.57
264	2	184	0.00	14.41	0.90	1.07	1.19	0.00	7.90	0.87	0.85	0.97
307	1	5597	0.00	12.10	0.41	0.43	1.05	0.00	4.30	0.41	0.41	1.02
307	2	4339	0.00	17.23	0.43	0.64	1.50	0.00	4.00	0.42	0.54	1.29
350	1	69	0.00	1.10	0.33	0.23	0.69	0.00	1.10	0.33	0.23	0.69
350	2	346	0.00	5.90	0.42	0.69	1.64	0.00	3.50	0.41	0.60	1.47
450	1	873	0.01	3.32	0.36	0.39	1.08	0.01	3.32	0.36	0.39	1.08
450	2	865	0.00	6.14	0.37	0.47	1.25	0.00	6.14	0.37	0.47	1.25
456	1	14	0.07	1.33	0.51	0.41	0.80	0.07	1.33	0.51	0.41	0.80
456	2	158	0.00	8.14	0.68	1.11	1.63	0.00	8.14	0.68	1.11	1.63
458	1	108	0.01	2.93	0.22	0.32	1.47	0.01	2.93	0.22	0.32	1.47
458	2	418	0.00	35.00	0.39	2.02	5.22	0.00	5.00	0.29	0.43	1.50

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
466	1	3333	0.00	6.30	0.15	0.29	1.92	0.00	2.70	0.15	0.26	1.74
466	2	5274	0.00	16.55	0.26	0.47	1.79	0.00	4.40	0.26	0.42	1.64
671	1	55	0.01	0.41	0.07	0.09	1.31	0.01	0.25	0.06	0.08	1.20
671	2	1698	0.00	4.09	0.02	0.06	3.52	0.00	0.18	0.02	0.03	1.74
700	1	272	0.01	0.12	0.02	0.02	1.07	0.01	0.10	0.02	0.02	1.06
700	2	241	0.00	4.17	0.03	0.20	6.19	0.00	0.12	0.02	0.03	1.30
701	1	590	0.00	1.61	0.08	0.15	1.91	0.00	1.61	0.08	0.15	1.91
701	2	1657	0.00	3.44	0.04	0.11	2.76	0.00	0.45	0.04	0.07	1.83
750	1	11	0.02	1.03	0.32	0.26	0.80	0.02	1.03	0.32	0.26	0.80
750	2	1266	0.00	3.38	0.14	0.35	2.42	0.00	1.00	0.12	0.23	1.93
751	1	54	0.01	0.32	0.04	0.06	1.56	0.01	0.26	0.04	0.06	1.49
751	2	195	0.00	1.15	0.05	0.14	2.58	0.00	0.25	0.04	0.06	1.68
756	2	225	0.00	3.58	0.22	0.41	1.83	0.00	1.80	0.21	0.35	1.66
852	2	86	0.00	4.94	0.55	0.64	1.17	0.00	4.94	0.55	0.64	1.17
860	1	12	0.00	0.11	0.02	0.03	1.14	0.00	0.11	0.02	0.03	1.14
860	2	199	0.00	5.04	0.11	0.26	2.32	0.00	1.00	0.10	0.16	1.53
864	2	44	0.00	2.78	0.38	0.47	1.24	0.00	2.78	0.38	0.47	1.24
865	2	128	0.00	0.92	0.12	0.15	1.21	0.00	0.92	0.12	0.15	1.21
883	1	11	0.03	0.41	0.07	0.05	0.82	0.03	0.41	0.07	0.05	0.82
883	2	38	0.01	0.65	0.18	0.17	0.93	0.01	0.65	0.18	0.17	0.93
901	1	111	0.01	2.11	0.23	0.35	1.51	0.01	1.90	0.23	0.34	1.48
901	2	530	0.00	6.38	0.22	0.39	1.81	0.00	2.50	0.21	0.27	1.31
902	1	23	0.01	0.46	0.08	0.10	1.30	0.01	0.46	0.08	0.10	1.30
902	2	265	0.00	0.84	0.08	0.11	1.35	0.00	0.84	0.08	0.11	1.35
1004	1	6	0.02	0.99	0.18	0.28	1.54	0.02	0.99	0.18	0.28	1.54
1004	2	54	0.01	1.03	0.33	0.25	0.76	0.01	1.03	0.33	0.25	0.76
1008	1	34	0.00	0.13	0.02	0.03	1.39	0.00	0.13	0.02	0.03	1.39
1008	2	272	0.00	0.77	0.04	0.07	1.87	0.00	0.77	0.04	0.07	1.87
1010	1	48	0.00	0.94	0.10	0.19	1.97	0.00	0.94	0.10	0.19	1.97
1010	2	280	0.00	3.45	0.17	0.30	1.72	0.00	2.00	0.17	0.28	1.62
1023	1	177	0.01	0.30	0.03	0.04	1.32	0.01	0.30	0.03	0.04	1.32
1023	2	465	0.00	5.33	0.09	0.27	3.20	0.00	1.80	0.08	0.17	2.20
1028	1	272	0.01	0.79	0.05	0.08	1.53	0.01	0.79	0.05	0.08	1.53
1028	2	2190	0.00	4.64	0.09	0.14	1.51	0.00	0.82	0.09	0.11	1.25
1029	2	265	0.00	5.84	0.26	0.42	1.61	0.00	2.90	0.25	0.36	1.42
1034	1	45	0.00	0.50	0.05	0.07	1.55	0.00	0.50	0.05	0.07	1.55
1034	2	1103	0.00	1.38	0.07	0.11	1.51	0.00	0.63	0.07	0.10	1.39
1051	1	243	0.00	1.35	0.13	0.17	1.28	0.00	1.10	0.13	0.16	1.23
1051	2	1390	0.00	7.89	0.11	0.23	2.10	0.00	1.70	0.11	0.17	1.64
1300	1	1333	0.00	3.70	0.31	0.33	1.06	0.00	3.70	0.31	0.33	1.06

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Raw Assay Max. (%)	Raw Assay Mean (%)	Raw Assay Std. Dv (%)	Raw Assay C.V.	Capped Raw Assay Min. (%)	Capped Raw Assay Max. (%)	Capped Raw Assay Mean (%)	Capped Raw Assay Std. Dv (%)	Capped Raw Assay C.V.
1300	2	984	0.00	3.52	0.20	0.34	1.65	0.00	1.90	0.20	0.31	1.54
1402	1	138	0.00	2.20	0.29	0.28	0.95	0.00	2.20	0.29	0.28	0.95
1402	2	3827	0.00	20.65	0.33	0.57	1.73	0.00	8.20	0.33	0.46	1.41
1404	2	579	0.00	5.67	0.75	0.63	0.85	0.00	3.40	0.74	0.58	0.79
1408	1	75	0.01	0.88	0.14	0.18	1.26	0.01	0.88	0.14	0.18	1.26
1408	2	741	0.00	2.67	0.22	0.29	1.32	0.00	1.60	0.21	0.25	1.17
1450	1	162	0.01	0.47	0.04	0.06	1.57	0.01	0.47	0.04	0.06	1.57
1450	2	127	0.00	0.38	0.04	0.07	1.69	0.00	0.38	0.04	0.07	1.69
1455	1	168	0.00	10.88	0.14	0.93	6.75	0.00	0.30	0.06	0.08	1.32
1455	2	329	0.00	0.34	0.03	0.06	1.92	0.00	0.34	0.03	0.06	1.92
1458	1	231	0.00	2.80	0.18	0.33	1.87	0.00	1.50	0.16	0.25	1.54
1458	2	471	0.00	3.14	0.21	0.38	1.79	0.00	3.14	0.21	0.38	1.79
1502	1	26	0.01	0.86	0.21	0.15	0.73	0.01	0.86	0.21	0.15	0.73
1502	2	280	0.01	10.50	1.07	1.08	1.00	0.01	7.50	1.06	0.99	0.93
1504	1	113	0.00	5.41	0.63	0.77	1.21	0.00	5.41	0.63	0.77	1.21
1504	2	288	0.00	13.46	0.72	0.87	1.21	0.00	4.90	0.70	0.77	1.09
1607	1	307	0.00	0.41	0.03	0.04	1.44	0.00	0.41	0.03	0.04	1.44
1607	2	1091	0.00	1.25	0.04	0.08	1.94	0.00	1.25	0.04	0.08	1.94
1614	1	13	0.01	0.13	0.04	0.04	1.03	0.01	0.13	0.04	0.04	1.03
1614	2	118	0.00	0.39	0.07	0.08	1.16	0.00	0.39	0.07	0.08	1.16
1650	1	2089	0.00	11.60	0.40	0.46	1.14	0.00	2.50	0.39	0.35	0.91
1650	2	1281	0.00	13.38	0.37	0.68	1.87	0.00	5.00	0.35	0.45	1.27
1702	1	189	0.01	4.91	0.34	0.51	1.50	0.01	4.91	0.34	0.51	1.50
1702	2	386	0.00	1.63	0.20	0.24	1.19	0.00	1.40	0.20	0.23	1.15
1712	1	30	0.01	0.75	0.08	0.16	2.02	0.01	0.75	0.08	0.16	2.02
1712	2	389	0.00	1.60	0.07	0.14	2.13	0.00	0.40	0.06	0.09	1.47
1716	1	194	0.00	0.84	0.11	0.15	1.27	0.00	0.84	0.11	0.15	1.27
1716	2	372	0.00	1.30	0.09	0.16	1.74	0.00	1.30	0.09	0.16	1.74
1718	1	85	0.00	0.40	0.08	0.09	1.21	0.00	0.40	0.08	0.09	1.21
1718	2	73	0.00	0.70	0.04	0.11	2.92	0.00	0.13	0.02	0.04	1.70
1750	1	479	0.00	1.75	0.17	0.20	1.22	0.00	1.20	0.16	0.19	1.18
1750	2	407	0.00	1.98	0.20	0.35	1.77	0.00	1.98	0.20	0.35	1.77
1850	1	312	0.00	1.02	0.05	0.10	1.98	0.00	1.02	0.05	0.10	1.98
1850	2	800	0.00	1.28	0.03	0.07	2.17	0.00	1.28	0.03	0.07	2.17
1855	1	362	0.00	2.60	0.29	0.32	1.11	0.00	1.50	0.28	0.28	1.00
1855	2	488	0.00	5.93	0.16	0.29	1.78	0.00	2.30	0.16	0.24	1.48
1900	1	1652	0.00	5.70	0.08	0.19	2.42	0.00	0.90	0.07	0.12	1.55
1900	2	1081	0.00	1.26	0.05	0.11	2.03	0.00	0.86	0.05	0.10	1.87
1960	1	305	0.00	1.02	0.15	0.14	0.93	0.00	1.02	0.15	0.14	0.93
1960	2	168	0.00	0.69	0.08	0.09	1.22	0.00	0.69	0.08	0.09	1.22

C_ESTIM	C_Hole	# Samples	Raw Assay Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.	Capped Raw Assay Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1965	1	216	0.00	0.68	0.05	0.08	1.57	0.00	0.68	0.05	0.08	1.57
1965	2	288	0.00	2.41	0.03	0.11	3.31	0.00	0.15	0.03	0.03	1.39
2051	2	388	0.00	3.52	0.06	0.20	3.06	0.00	1.70	0.06	0.13	2.22
2060	2	580	0.00	3.56	0.13	0.23	1.75	0.00	3.56	0.13	0.23	1.75
2065	2	71	0.00	1.22	0.28	0.27	0.96	0.00	1.22	0.28	0.27	0.96
2067	2	22	0.02	2.97	0.29	0.40	1.38	0.02	2.97	0.29	0.40	1.38
2069	2	26	0.00	1.02	0.33	0.25	0.76	0.00	1.02	0.33	0.25	0.76
2072	2	22	0.00	0.18	0.04	0.05	1.29	0.00	0.18	0.04	0.05	1.29
2073	2	12	0.02	0.29	0.11	0.08	0.72	0.02	0.29	0.11	0.08	0.72
2079	2	19	0.10	1.06	0.42	0.25	0.58	0.10	1.06	0.42	0.25	0.58
2104	2	226	0.01	2.99	0.29	0.42	1.47	0.01	1.90	0.28	0.36	1.32
2156	1	1	0.01	0.01	0.01	-	-	0.01	0.01	0.01	-	-
2156	2	103	0.00	0.15	0.02	0.03	1.24	0.00	0.15	0.02	0.03	1.24
11511	1	323	0.01	1.16	0.14	0.11	0.79	0.01	0.40	0.14	0.09	0.67
11511	2	2137	0.00	3.06	0.14	0.16	1.14	0.00	0.90	0.14	0.14	1.02
11512	1	719	0.00	6.41	0.27	0.43	1.57	0.00	1.20	0.25	0.20	0.82
11512	2	1218	0.00	14.81	0.31	0.54	1.73	0.00	2.00	0.30	0.25	0.85

Note:

C_Hole: 1: Channels, 2: Drill holes

SLR performed an independent capping analysis on some elements for some domains, as well as a visual validation of the block model in section and plan view. Log probability plots were inspected for some of these domains and SLR applied a capping grade using a combination of histograms, probability plots, and decile analyses. SLR found that most of the coefficients of variation (CV) after applying capping are low, with exception of a few domains with CV values more than 1.5. SLR considers that the capping levels selected are appropriate.

SLR offers the following conclusions and recommendations:

- In general, the capping levels are reasonable, and suitable for the estimation of Mineral Resources.
- Silver and lead grades increased in comparison with previous estimates. SLR prepared independent silver capping analysis for some domains and these values were 3% to 5% less than Nexa silver capping values. Currently, there is not a well established reconciliation process to evaluate if the higher silver capping levels are reasonable. SLR recommends monitoring the silver and lead grades with grade control and head grade from the plant to compare with the model and to calibrate the silver capping values.
- Investigate if capping levels should be applied based on high grade and low grade domains for lead, copper, and silver.
- Report the metal loss as a result of capping high grades, and assess the amount of metal in the upper decile and percentiles of the distribution to gain a better understanding of the amount of risk associated with extreme values in each capping domain. For the major domain contributor

to the Mineral Reserve and Mineral Resources (C_ESTAG 1151 Mineralization domain), there is still 58% of the total metal within the upper decile of the silver distribution.

- Adjust capping values with production data when an accurate reconciliation process is established.

11.8 Compositing

Nexa composited the capped assays to 2.0 m with a 1.0 m tolerance, beginning at the collars. Small intervals were merged with the previous interval. Sample lengths range from 0.1 m to 3.0 m. Composites were generated inside the mineralization domain wireframes, flagged by mineralization domain. The majority of samples (89%) had a length from 0.9 m to 2.0 m. Unsampled core intervals were assigned half of the detection limit value for each of the elements. The composite length corresponds to half of the parent block size height for the deposit. Figure 11-12 illustrates a comparison of the mean relative error between length-weighted composites at different composite lengths versus assay means by mineralization domain. Based on this analysis, the two metre composites result in the best correlation between assay data and composites. Nexa generated statistics of the composites is presented in Table 11-13, Table 11-14, Table 11-15, and Table 11-16.

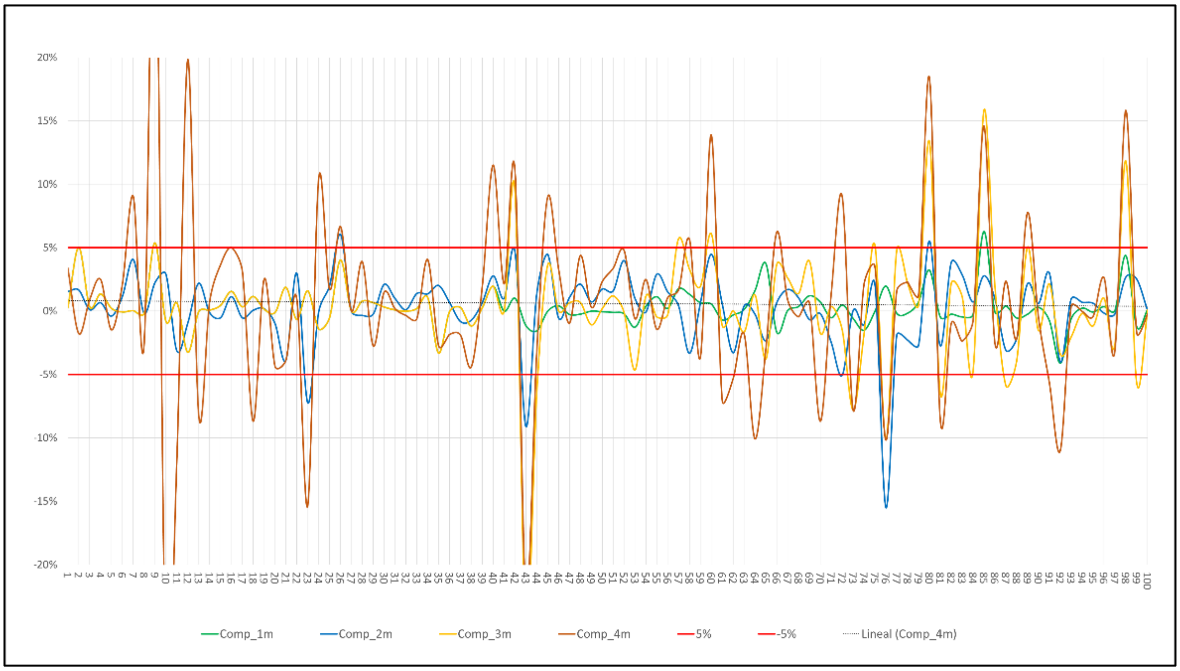


Figure 11-12: Composite Length Comparison

Table 11-13: Estimation Domain Composite Statistics for Zinc (Zn %)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1	1	2865	0.00	49.48	10.48	8.58	0.82
1	2	822	0.00	37.17	3.54	5.66	1.60
21	1	127	0.03	20.00	4.47	5.00	1.12

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
21	2	410	0.00	32.29	4.58	5.63	1.23
100	1	346	0.02	31.26	3.97	5.28	1.33
100	2	980	0.00	33.99	4.65	5.98	1.29
154	1	769	0.00	31.00	6.04	6.61	1.09
154	2	870	0.00	35.13	6.13	6.17	1.01
157	1	59	0.04	23.00	10.60	7.13	0.67
201	2	8	0.00	5.97	2.00	2.10	1.05
250	1	155	0.08	32.00	8.01	7.25	0.90
250	2	25	0.00	19.78	8.35	6.40	0.77
256	1	6	1.53	13.83	7.28	4.33	0.59
256	2	118	0.00	16.42	2.48	3.11	1.26
259	1	2064	0.00	41.20	8.07	6.71	0.83
259	2	405	0.00	29.80	4.22	5.22	1.24
264	2	102	0.03	24.25	5.66	4.78	0.84
270	1	26	0.07	23.20	4.39	5.50	1.25
270	2	95	0.00	26.58	5.19	5.56	1.07
302	1	16	0.03	5.01	0.56	1.23	2.19
302	2	105	0.00	1.50	0.38	0.48	1.25
306	1	44	0.12	5.92	2.02	1.81	0.90
306	2	219	0.00	12.29	2.02	2.81	1.39
307	1	5019	0.00	37.00	6.95	6.62	0.95
307	2	2117	0.00	27.00	2.19	3.50	1.60
350	1	54	0.00	19.64	6.30	5.45	0.86
350	2	196	0.00	29.04	4.46	4.89	1.10
453	1	24	0.02	24.87	5.44	6.43	1.18
453	2	77	0.00	32.42	3.31	6.03	1.82
458	1	88	0.01	9.50	2.49	2.66	1.07
458	2	219	0.00	11.97	3.47	2.64	0.76
466	1	864	0.00	36.00	4.77	5.62	1.18
466	2	1341	0.00	31.17	4.23	5.16	1.22
550	1	1	14.73	14.73	14.73	-	-
550	2	431	0.00	34.77	3.05	5.00	1.64
600	1	1940	0.00	24.00	1.94	2.62	1.35
600	2	931	0.00	27.95	2.44	3.63	1.49
652	1	6	0.07	0.72	0.43	0.25	0.57
652	2	330	0.00	2.00	0.23	0.39	1.70
671	1	17	0.04	5.02	1.25	1.35	1.09
671	2	250	0.00	7.61	0.66	0.93	1.42
674	1	10	0.02	3.45	0.51	1.06	2.10
674	2	107	0.00	5.61	0.59	0.92	1.56
677	2	251	0.00	4.54	0.45	0.66	1.47
700	1	202	0.04	42.44	6.76	9.07	1.34

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
700	2	119	0.00	28.12	3.44	5.09	1.48
701	1	460	0.01	38.24	4.06	5.52	1.36
701	2	405	0.00	24.65	2.07	3.31	1.59
750	1	7	0.04	3.69	0.57	1.24	2.17
750	2	755	0.00	16.13	1.57	2.03	1.30
751	1	8	0.01	1.33	0.50	0.39	0.77
751	2	76	0.00	4.27	1.39	1.09	0.78
756	2	115	0.00	7.70	1.14	1.66	1.46
800	1	37	0.02	3.33	0.50	0.67	1.33
800	2	30	0.00	8.00	1.34	2.26	1.68
850	2	61	0.00	27.64	4.96	5.29	1.07
860	1	12	0.26	13.83	3.15	3.82	1.21
860	2	86	0.00	12.74	2.20	2.34	1.06
865	2	62	0.00	24.55	5.51	5.80	1.05
872	2	67	0.00	14.50	2.02	2.34	1.16
883	1	8	3.09	7.89	5.53	1.72	0.31
883	2	21	0.33	15.70	5.68	3.82	0.67
901	1	109	0.01	12.50	2.50	2.38	0.95
901	2	312	0.00	26.50	3.77	3.69	0.98
908	2	110	0.00	17.42	2.28	2.40	1.06
950	1	20	0.30	17.00	5.81	4.97	0.85
950	2	153	0.00	23.04	3.87	4.93	1.27
1008	1	9	0.04	26.07	4.36	7.91	1.81
1008	2	104	0.00	17.97	1.54	2.60	1.69
1016	1	50	0.11	4.34	1.00	0.95	0.95
1016	2	98	0.00	24.50	3.50	4.44	1.27
1019	2	121	0.00	15.93	2.37	2.83	1.19
1026	1	161	0.03	10.00	1.31	1.47	1.12
1026	2	296	0.00	16.30	1.61	2.33	1.45
1028	1	137	0.03	12.72	2.23	2.46	1.10
1028	2	1160	0.00	17.82	2.04	1.99	0.97
1029	1	18	0.70	10.80	2.64	2.12	0.80
1029	2	189	0.00	17.09	2.93	2.64	0.90
1034	1	11	0.03	1.24	0.42	0.46	1.10
1034	2	156	0.00	24.78	1.82	2.83	1.56
1054	1	1	4.12	4.12	4.12	-	-
1054	2	8	0.34	26.52	13.78	8.21	0.60
1151	1	883	0.01	22.00	5.20	4.91	0.94
1151	2	1796	0.00	32.39	5.03	5.00	0.99
1208	2	63	0.00	37.46	6.56	6.73	1.03
1300	1	1211	0.00	36.50	7.78	6.51	0.84
1300	2	409	0.00	31.83	3.97	5.40	1.36

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1350	1	47	1.55	24.50	13.22	5.53	0.42
1350	2	980	0.00	24.27	4.82	4.18	0.87
1402	1	72	0.29	13.00	4.54	2.35	0.52
1402	2	1501	0.00	18.49	3.57	3.26	0.91
1408	2	267	0.00	16.00	3.31	2.90	0.88
1410	2	262	0.00	14.09	2.08	2.52	1.21
1450	1	79	0.10	7.74	1.50	1.73	1.16
1450	2	136	0.00	12.64	2.33	2.23	0.96
1452	1	68	0.02	11.26	1.73	2.81	1.62
1452	2	92	0.00	15.65	3.71	3.81	1.03
1458	1	257	0.00	30.00	3.95	5.44	1.38
1458	2	129	0.00	15.75	2.67	3.50	1.31
1504	1	81	0.02	15.50	1.65	2.44	1.47
1504	2	266	0.01	23.00	2.63	4.74	1.80
1555	1	707	0.01	24.80	2.94	4.04	1.37
1555	2	951	0.00	28.73	3.11	4.02	1.29
1558	1	112	0.01	15.02	1.46	2.33	1.60
1558	2	433	0.00	26.44	1.71	2.90	1.70
1607	1	225	0.00	10.36	0.85	1.45	1.71
1607	2	364	0.00	19.94	1.56	2.46	1.58
1609	1	23	0.03	1.73	0.58	0.55	0.96
1609	2	134	0.00	7.60	0.93	1.45	1.56
1614	1	11	0.04	5.25	1.90	1.69	0.89
1614	2	68	0.00	23.00	3.18	4.49	1.41
1650	1	1861	0.00	36.00	7.35	6.31	0.86
1650	2	762	0.00	28.14	3.27	4.31	1.32
1702	1	112	0.04	16.39	2.82	3.22	1.14
1702	2	128	0.00	29.32	3.12	4.20	1.35
1712	1	31	0.02	15.50	2.48	3.74	1.51
1712	2	101	0.00	18.32	2.52	3.74	1.49
1714	1	33	0.34	12.04	3.39	2.78	0.82
1714	2	120	0.00	24.60	5.49	5.49	1.00
1718	1	60	0.03	13.19	3.32	3.11	0.94
1718	2	28	0.00	13.00	1.41	3.09	2.20
1754	1	36	0.33	10.40	3.20	2.55	0.80
1754	2	486	0.00	25.88	2.56	2.87	1.12
1755	2	4	0.48	15.79	5.92	6.23	1.05
1850	1	266	0.01	17.00	2.27	3.47	1.53
1850	2	349	0.00	17.50	1.18	1.92	1.62
1855	1	322	0.00	30.00	10.31	7.65	0.74
1855	2	53	0.00	22.00	4.26	6.28	1.47
1900	1	1029	0.00	24.74	4.49	4.72	1.05

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1900	2	478	0.00	17.26	2.48	2.89	1.16
1950	1	192	0.01	12.00	1.97	2.25	1.14
1950	2	141	0.00	9.23	1.34	1.79	1.34
1959	1	399	0.00	9.50	1.60	1.65	1.03
1959	2	212	0.00	16.20	1.48	2.12	1.43
1965	1	185	0.02	12.00	1.80	2.21	1.23
1965	2	187	0.00	11.25	1.02	1.66	1.63
2000	1	17	0.09	5.78	1.76	1.77	1.00
2000	2	193	0.02	10.90	1.41	1.31	0.93
2051	2	254	0.04	16.50	1.52	1.80	1.19
2060	2	284	0.00	15.41	1.84	2.43	1.33
2065	2	41	0.00	20.00	4.32	4.02	0.93
2067	2	18	0.05	14.00	2.44	3.48	1.42
2072	2	13	0.00	6.36	1.66	1.97	1.19
2073	2	6	0.16	3.49	2.06	1.19	0.58
2079	2	12	0.05	7.08	3.89	1.84	0.47
2100	1	61	0.06	8.54	2.00	2.04	1.02
2100	2	171	0.00	12.62	2.07	2.13	1.03
2104	2	135	0.03	21.22	2.60	3.26	1.25
2150	2	448	0.00	7.79	0.82	1.18	1.43
2156	1	1	0.72	0.72	0.72	-	-
2156	2	68	0.01	3.15	0.77	0.85	1.10
4501	1	148	0.01	9.00	2.62	2.63	1.00
4501	2	188	0.00	15.22	3.62	3.17	0.88
4502	1	527	0.01	27.00	6.38	5.19	0.81
4502	2	300	0.02	21.80	5.76	4.01	0.70
17501	1	148	0.01	20.00	8.18	6.81	0.83
17501	2	34	0.00	15.00	5.93	4.60	0.78
17502	1	220	0.02	15.00	2.97	3.56	1.20
17502	2	146	0.00	17.33	3.71	4.07	1.10

Note:

C_Hole: 1: Channels, 2: Drill holes

Table 11-14: Estimation Domain Composite Statistics for Lead (Pb%)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	Field	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1	1	2104	0.00	30.00	6.54	6.84	1.05
1	2	948	0.00	25.67	2.59	4.34	1.68
21	1	127	0.01	0.20	0.04	0.04	1.06
21	2	410	0.00	3.32	0.10	0.31	3.16

C_ESTIM	Field	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
100	1	360	0.02	20.00	1.97	3.27	1.66
100	2	959	0.00	29.77	2.70	3.71	1.37
154	1	1022	0.00	45.78	1.61	3.61	2.24
154	2	1183	0.00	6.50	0.33	0.97	2.97
157	1	59	0.03	15.50	1.78	3.11	1.75
185	1	27	0.04	15.80	1.89	2.77	1.46
185	2	293	0.00	14.30	1.98	2.34	1.18
201	2	8	0.00	11.20	3.99	3.85	0.96
256	1	6	0.01	0.64	0.20	0.21	1.05
256	2	118	0.00	9.66	0.86	1.60	1.87
264	2	102	0.00	0.05	0.01	0.01	0.60
307	1	5035	0.00	9.00	0.75	1.86	2.47
307	2	2222	0.00	2.00	0.09	0.27	2.93
308	1	58	0.02	5.03	0.41	0.76	1.88
308	2	119	0.00	0.90	0.09	0.19	2.12
309	1	47	0.07	11.17	1.39	2.21	1.58
309	2	72	0.00	13.16	2.44	3.17	1.30
310	1	91	0.05	22.00	5.74	6.21	1.08
310	2	46	0.00	20.54	3.04	4.60	1.51
350	1	44	0.00	10.00	1.76	2.71	1.54
350	2	117	0.00	2.00	0.21	0.46	2.21
450	1	675	0.01	1.50	0.07	0.23	3.11
450	2	488	0.00	2.50	0.08	0.28	3.39
451	1	10	0.01	0.17	0.03	0.05	1.51
451	2	79	0.00	0.24	0.03	0.05	1.63
456	1	38	0.01	1.12	0.11	0.26	2.29
456	2	97	0.00	5.50	0.60	1.30	2.17
458	1	74	0.01	0.10	0.02	0.02	1.06
458	2	199	0.00	0.28	0.02	0.03	1.33
466	1	949	0.00	2.00	0.12	0.33	2.69
466	2	1415	0.00	1.30	0.08	0.19	2.45
600	1	1856	0.00	12.00	1.27	1.70	1.34
600	2	1288	0.00	6.00	0.48	1.00	2.07
671	1	28	0.02	8.56	1.37	1.94	1.41
671	2	501	0.00	9.50	1.12	1.35	1.20
700	1	202	0.02	20.00	3.47	4.78	1.37
700	2	119	0.00	23.87	2.75	4.72	1.72

C_ESTIM	Field	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
701	1	460	0.02	28.00	5.11	5.02	0.98
701	2	853	0.00	22.00	2.05	3.19	1.56
750	1	7	0.02	0.08	0.05	0.02	0.43
750	2	755	0.00	8.90	0.87	1.34	1.53
751	1	45	0.01	29.86	3.51	6.11	1.74
751	2	106	0.00	9.24	1.29	1.40	1.08
756	2	115	0.00	7.34	0.90	1.40	1.55
850	1	12	0.14	5.12	1.57	1.27	0.81
850	2	147	0.00	19.00	1.79	2.71	1.52
865	2	85	0.00	8.60	1.04	1.81	1.74
878	2	44	0.00	3.22	0.35	0.64	1.84
883	1	8	1.89	5.57	4.20	1.12	0.27
883	2	21	0.01	11.98	3.42	3.62	1.06
901	1	109	0.08	8.00	1.55	1.71	1.10
901	2	312	0.00	15.92	2.27	2.61	1.15
908	2	110	0.00	11.95	2.17	2.20	1.01
1028	1	348	0.04	11.50	1.73	1.95	1.13
1028	2	1554	0.00	23.03	1.91	2.18	1.14
1034	1	24	0.05	10.00	1.37	1.96	1.43
1034	2	335	0.00	14.00	1.76	2.10	1.19
1151	1	883	0.00	11.00	0.77	1.85	2.40
1151	2	1796	0.00	19.00	0.75	2.29	3.07
1300	1	1211	0.00	10.00	1.10	2.39	2.17
1300	2	409	0.00	7.00	0.41	1.10	2.68
1351	2	368	0.00	2.00	0.29	0.51	1.74
1402	1	119	0.03	8.00	1.71	1.95	1.14
1402	2	2123	0.00	11.94	0.88	1.59	1.81
1404	2	252	0.00	12.00	2.94	2.63	0.89
1408	1	3	0.70	9.92	5.19	4.06	0.78
1408	2	319	0.00	10.17	1.47	1.91	1.30
1450	1	100	0.01	9.50	1.91	1.95	1.02
1450	2	156	0.00	12.00	2.17	2.26	1.04
1458	1	210	0.00	12.00	1.69	2.19	1.29
1458	2	302	0.00	9.94	1.20	1.96	1.63
1504	1	107	0.00	0.20	0.03	0.04	1.41
1504	2	361	0.00	0.08	0.02	0.01	0.72
1555	1	1314	0.00	15.00	1.69	2.96	1.75

C_ESTIM	Field	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1555	2	974	0.00	15.00	1.14	2.29	2.02
1607	1	247	0.00	10.86	0.95	1.40	1.47
1607	2	454	0.00	15.00	1.50	2.16	1.44
1611	1	1	0.61	0.61	0.61	-	-
1611	2	44	0.00	5.80	1.03	1.42	1.38
1614	1	11	0.03	9.28	1.66	2.46	1.48
1614	2	68	0.00	20.00	2.50	3.48	1.39
1650	1	1861	0.00	4.00	0.32	0.81	2.57
1650	2	762	0.00	0.30	0.03	0.05	1.66
1712	1	64	0.02	6.33	0.68	1.14	1.68
1712	2	221	0.00	24.00	2.49	3.87	1.55
1716	1	267	0.02	18.00	1.89	3.16	1.67
1716	2	274	0.00	21.41	1.74	2.81	1.62
1718	1	60	0.02	7.27	1.40	1.85	1.33
1718	2	28	0.00	3.00	0.47	0.70	1.48
1750	1	368	0.00	12.00	1.78	2.38	1.33
1750	2	180	0.00	13.96	2.32	3.13	1.35
1850	1	266	0.01	10.00	1.58	2.33	1.48
1850	2	349	0.00	8.00	0.84	1.25	1.49
1855	1	365	0.00	22.00	3.78	5.84	1.55
1855	2	517	0.00	22.00	2.43	2.93	1.21
1900	1	1167	0.00	14.00	1.86	2.21	1.19
1900	2	608	0.00	12.00	1.33	2.10	1.58
1960	1	453	0.00	5.30	0.58	0.87	1.50
1960	2	223	0.00	3.67	0.50	0.65	1.31
1965	1	185	0.01	7.00	1.56	1.78	1.14
1965	2	187	0.00	5.00	0.67	1.02	1.51
2000	1	22	0.03	1.56	0.42	0.36	0.87
2000	2	630	0.00	4.50	0.53	0.71	1.33
2051	2	254	0.03	8.40	0.86	1.15	1.34
2060	2	347	0.00	1.50	0.18	0.31	1.72
2067	2	18	0.00	0.13	0.02	0.04	1.48
2073	2	6	0.01	0.10	0.03	0.03	1.04
2079	2	12	0.01	0.55	0.14	0.17	1.18
2080	2	13	0.00	1.55	0.28	0.43	1.56
2083	2	41	0.00	0.05	0.01	0.01	1.08
2104	2	135	0.00	3.50	0.66	0.78	1.18

C_ESTIM	Field	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
2156	1	1	0.48	0.48	0.48	-	-
2156	2	68	0.01	3.80	0.92	0.81	0.88
2591	1	1039	0.00	8.00	0.55	1.21	2.22
2591	2	21	0.00	1.88	0.11	0.33	2.93
2592	1	1025	0.00	2.80	0.11	0.38	3.38
2592	2	384	0.00	0.48	0.03	0.05	1.66

Note. C_Hole: 1: Channels, 2: Drill holes

Table 11-15: Estimation Domain Composite Statistics for Silver (Ag g/t)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.
1	1	2104	0.00	1000.00	230.22	223.70	0.97
1	2	948	0.00	2000.00	150.89	240.77	1.60
21	1	127	2.02	60.00	11.17	11.94	1.07
21	2	410	0.00	258.95	18.40	28.85	1.57
100	1	360	2.02	1200.00	127.59	190.70	1.49
100	2	959	0.00	2000.00	153.96	179.51	1.17
154	1	1022	0.00	490.00	70.64	89.57	1.27
154	2	1183	0.00	420.00	33.70	59.82	1.78
157	1	59	5.91	220.00	94.90	58.14	0.61
185	1	27	2.02	250.00	75.82	54.24	0.72
185	2	293	0.00	714.38	108.13	113.72	1.05
201	2	8	0.00	634.72	205.02	220.17	1.07
256	1	6	5.44	202.48	78.89	66.25	0.84
256	2	118	0.00	355.96	53.23	62.68	1.18
264	2	102	0.25	58.54	17.61	9.09	0.52
307	1	5035	0.00	1200.00	57.88	87.61	1.51
307	2	2222	0.00	400.00	19.20	29.14	1.52
308	1	58	2.02	150.23	36.46	32.24	0.88
308	2	119	1.64	411.28	28.93	50.58	1.75
309	1	47	2.02	300.82	58.74	74.20	1.26
309	2	72	0.00	800.00	141.22	156.26	1.11
310	1	91	1.87	1601.67	291.47	348.88	1.20
310	2	46	0.00	854.15	155.07	196.78	1.27
350	1	44	0.00	289.26	94.39	96.31	1.02
350	2	117	0.00	120.00	26.71	29.62	1.11
450	1	675	1.37	88.00	12.60	16.39	1.30
450	2	488	0.00	137.47	13.11	18.52	1.41
451	1	10	2.02	65.32	12.72	17.92	1.41
451	2	79	0.00	43.08	8.95	8.76	0.98

C_ESTIM	C_Hole	# Samples	Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.
456	1	38	2.02	47.40	9.08	10.67	1.18
456	2	97	0.00	415.63	47.82	85.98	1.80
458	1	74	2.02	61.50	6.68	11.76	1.76
458	2	199	0.00	34.24	6.78	6.81	1.00
466	1	949	0.00	160.00	19.00	25.88	1.36
466	2	1415	0.00	300.45	19.83	29.01	1.46
600	1	1856	0.00	1100.00	77.26	110.94	1.44
600	2	1288	0.00	900.00	47.88	83.86	1.75
671	1	28	4.04	534.98	84.69	118.40	1.40
671	2	501	0.00	969.50	71.45	94.62	1.32
700	1	202	2.02	1200.00	105.17	163.95	1.56
700	2	119	0.00	1120.04	129.47	208.17	1.61
701	1	460	2.02	3000.00	331.54	414.20	1.25
701	2	853	0.00	1925.58	149.70	221.07	1.48
750	1	7	32.75	265.93	110.78	75.09	0.68
750	2	755	0.00	755.46	54.78	71.13	1.30
751	1	45	4.04	1559.25	189.91	321.41	1.69
751	2	106	0.00	323.01	62.54	53.41	0.85
756	2	115	0.00	329.67	87.81	78.05	0.89
850	1	12	6.53	186.00	62.59	45.76	0.73
850	2	147	0.00	1400.00	123.84	171.88	1.39
865	2	85	0.00	500.78	112.48	105.11	0.93
878	2	44	0.00	126.06	35.75	26.48	0.74
883	1	8	96.73	230.48	158.63	49.25	0.31
883	2	21	5.18	383.18	148.27	126.56	0.85
901	1	109	2.02	250.00	86.78	61.53	0.71
901	2	312	0.00	859.83	125.71	113.23	0.90
908	2	110	0.00	662.63	104.31	108.88	1.04
1028	1	348	2.02	850.68	102.63	117.26	1.14
1028	2	1554	0.00	1404.94	94.79	116.40	1.23
1034	1	24	2.02	244.00	56.77	60.41	1.06
1034	2	335	0.00	700.00	80.03	91.30	1.14
1151	1	883	0.31	510.00	47.90	84.26	1.76
1151	2	1796	0.00	1000.00	46.88	103.40	2.21
1300	1	1211	0.00	900.00	67.75	113.27	1.67
1300	2	409	0.00	400.00	30.78	53.34	1.73
1351	2	368	0.00	534.52	48.38	50.85	1.05
1402	1	119	3.11	400.00	122.05	83.23	0.68
1402	2	2123	0.00	668.72	75.53	67.65	0.90
1404	2	252	0.00	900.00	146.48	98.50	0.67
1408	1	3	17.42	823.95	369.92	380.80	1.03
1408	2	319	0.00	498.27	88.75	82.38	0.93

C_ESTIM	C_Hole	# Samples	Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.
1450	1	100	1.98	500.00	62.69	71.44	1.14
1450	2	156	0.00	569.89	98.90	91.62	0.93
1458	1	210	0.00	817.98	95.21	128.33	1.35
1458	2	302	0.00	1229.95	98.50	152.15	1.54
1504	1	107	0.93	70.00	12.21	11.99	0.98
1504	2	361	0.00	114.31	15.97	12.43	0.78
1555	1	1314	0.00	1800.00	107.69	185.06	1.72
1555	2	974	0.00	1528.42	87.48	152.08	1.74
1607	1	247	0.00	750.00	71.01	111.94	1.58
1607	2	454	0.00	1192.70	138.10	191.96	1.39
1611	1	1	284.29	284.29	284.29	-	-
1611	2	44	0.00	1130.00	244.49	236.74	0.97
1614	1	11	4.04	470.60	87.16	121.19	1.39
1614	2	68	0.00	1155.00	209.61	232.32	1.11
1650	1	1861	0.00	400.00	40.41	54.94	1.36
1650	2	762	0.00	300.00	13.19	19.28	1.46
1712	1	64	2.02	599.68	78.04	108.51	1.39
1712	2	221	0.00	900.00	110.35	125.61	1.14
1716	1	267	2.07	492.91	92.21	94.40	1.02
1716	2	274	0.00	579.06	79.38	82.96	1.05
1718	1	60	0.31	209.95	64.71	46.65	0.72
1718	2	28	0.00	200.00	30.19	50.67	1.68
1750	1	368	2.02	600.00	115.36	117.93	1.02
1750	2	180	0.00	698.47	125.70	129.61	1.03
1850	1	266	2.02	1500.00	224.38	267.55	1.19
1850	2	349	0.00	1529.36	175.69	237.47	1.35
1855	1	365	0.00	681.17	128.31	143.14	1.12
1855	2	517	0.00	1285.36	120.33	133.11	1.11
1900	1	1167	0.00	1000.00	117.79	119.30	1.01
1900	2	608	0.00	788.24	92.62	108.72	1.17
1960	1	453	0.00	375.00	42.50	40.42	0.95
1960	2	223	0.00	586.00	50.89	74.28	1.46
1965	1	185	1.24	438.00	100.43	95.57	0.95
1965	2	187	0.00	307.61	46.19	59.22	1.28
2000	1	22	7.46	417.10	149.49	116.78	0.78
2000	2	630	0.00	320.00	36.00	48.47	1.35
2051	2	254	1.00	1344.90	91.57	144.04	1.57
2060	2	347	0.00	368.74	22.49	40.35	1.79
2067	2	18	0.90	50.00	10.23	14.94	1.46
2073	2	6	1.00	44.05	8.11	13.61	1.68
2079	2	12	2.86	49.16	16.89	14.55	0.86
2080	2	13	0.00	90.46	28.82	24.76	0.86

C_ESTIM	C_Hole	# Samples	Min. (g/t)	Max. (g/t)	Mean (g/t)	Std. Dv (g/t)	C.V.
2083	2	41	0.00	29.00	4.51	4.53	1.01
2104	2	135	2.90	557.75	83.43	85.51	1.02
2156	1	1	18.04	18.04	18.04	-	-
2156	2	68	4.98	200.00	66.35	55.20	0.83
2591	1	1039	0.00	600.00	71.51	73.63	1.03
2591	2	21	0.00	88.09	34.67	30.41	0.88
2592	1	1025	0.00	200.00	23.35	30.69	1.31
2592	2	384	0.00	99.63	14.82	14.81	1.00

Note. C_Hole: 1: Channels, 2: Drill holes

Table 11-16: Estimation Domain Composite Statistics for Copper (Cu %)
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1	1	3024	0.00	2.70	0.27	0.32	1.18
1	2	1426	0.00	6.20	0.23	0.39	1.69
21	1	127	0.01	0.60	0.19	0.16	0.81
21	2	410	0.00	2.00	0.29	0.33	1.14
100	1	1574	0.00	1.30	0.12	0.24	1.93
100	2	2010	0.00	1.41	0.09	0.15	1.71
157	1	59	0.01	1.84	0.35	0.41	1.19
164	1	21	0.16	2.52	0.74	0.55	0.75
164	2	156	0.00	4.36	0.87	0.64	0.73
201	2	8	0.00	0.11	0.03	0.04	1.15
252	1	38	0.05	1.61	0.42	0.42	1.00
252	2	11	0.00	0.40	0.19	0.10	0.51
259	1	2064	0.00	1.60	0.21	0.22	1.04
259	2	405	0.00	4.80	0.45	0.58	1.29
264	2	102	0.01	6.77	0.87	0.75	0.86
307	1	5035	0.00	4.30	0.41	0.40	0.98
307	2	2222	0.00	3.30	0.42	0.48	1.14
350	1	54	0.00	1.10	0.33	0.22	0.68
350	2	196	0.00	2.75	0.41	0.49	1.22
450	1	675	0.01	3.19	0.36	0.35	0.97
450	2	488	0.00	6.14	0.37	0.40	1.06
456	1	14	0.07	1.33	0.51	0.41	0.80
456	2	76	0.00	5.82	0.68	0.89	1.30
458	1	98	0.01	2.93	0.22	0.32	1.46
458	2	220	0.00	3.13	0.29	0.33	1.14
466	1	2784	0.00	2.70	0.15	0.24	1.64
466	2	2547	0.00	4.39	0.26	0.36	1.38

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
671	1	50	0.01	0.25	0.06	0.07	1.15
671	2	1131	0.00	0.18	0.02	0.02	1.48
700	1	202	0.01	0.09	0.02	0.02	0.91
700	2	119	0.00	0.11	0.02	0.02	1.09
701	1	460	0.00	1.61	0.08	0.14	1.73
701	2	853	0.00	0.39	0.04	0.05	1.45
750	1	7	0.02	0.63	0.32	0.19	0.59
750	2	755	0.00	1.00	0.12	0.22	1.83
751	1	45	0.01	0.22	0.04	0.05	1.26
751	2	106	0.00	0.25	0.04	0.06	1.57
756	2	115	0.00	1.60	0.21	0.30	1.40
852	2	51	0.00	2.18	0.55	0.53	0.96
860	1	12	0.00	0.11	0.02	0.03	1.14
860	2	117	0.00	0.85	0.10	0.12	1.20
864	2	30	0.00	2.78	0.38	0.44	1.17
865	2	78	0.00	0.92	0.12	0.13	1.09
883	1	8	0.04	0.12	0.07	0.02	0.37
883	2	21	0.01	0.49	0.18	0.13	0.69
901	1	88	0.01	1.90	0.23	0.33	1.46
901	2	283	0.00	1.71	0.21	0.22	1.07
902	1	21	0.01	0.46	0.08	0.10	1.28
902	2	139	0.00	0.63	0.08	0.08	0.98
1004	1	5	0.02	0.51	0.18	0.17	0.95
1004	2	30	0.05	0.73	0.33	0.20	0.61
1008	1	27	0.01	0.13	0.02	0.03	1.17
1008	2	121	0.00	0.32	0.04	0.06	1.44
1010	1	41	0.00	0.87	0.10	0.17	1.78
1010	2	158	0.00	2.00	0.17	0.24	1.41
1023	1	142	0.01	0.24	0.03	0.04	1.20
1023	2	221	0.00	1.11	0.08	0.13	1.69
1028	1	201	0.01	0.79	0.05	0.07	1.38
1028	2	1303	0.00	0.82	0.09	0.10	1.08
1029	2	172	0.00	2.35	0.25	0.31	1.24
1034	1	36	0.00	0.50	0.05	0.07	1.41
1034	2	593	0.00	0.63	0.07	0.08	1.10
1051	1	202	0.00	1.07	0.13	0.15	1.17
1051	2	628	0.00	1.70	0.11	0.14	1.36
1300	1	1211	0.00	3.70	0.31	0.32	1.02
1300	2	409	0.00	1.88	0.20	0.25	1.25
1402	1	119	0.00	2.20	0.29	0.27	0.92
1402	2	2331	0.00	7.05	0.33	0.40	1.22

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
1404	2	412	0.00	3.24	0.74	0.53	0.72
1408	1	61	0.01	0.65	0.14	0.16	1.17
1408	2	438	0.00	1.60	0.21	0.22	1.02
1450	1	106	0.01	0.35	0.04	0.05	1.30
1450	2	70	0.00	0.23	0.04	0.05	1.29
1455	1	127	0.00	0.30	0.06	0.07	1.15
1455	2	136	0.00	0.21	0.03	0.04	1.34
1458	1	174	0.00	1.47	0.16	0.23	1.41
1458	2	212	0.00	2.35	0.21	0.33	1.53
1502	1	16	0.03	0.59	0.21	0.12	0.61
1502	2	173	0.01	6.96	1.06	0.77	0.72
1504	1	91	0.01	5.12	0.63	0.70	1.11
1504	2	188	0.00	4.36	0.70	0.66	0.94
1607	1	248	0.00	0.37	0.03	0.04	1.33
1607	2	498	0.00	0.67	0.04	0.07	1.51
1614	1	11	0.01	0.13	0.04	0.04	1.02
1614	2	68	0.00	0.39	0.07	0.07	0.97
1650	1	1861	0.00	2.50	0.39	0.35	0.89
1650	2	762	0.00	3.11	0.35	0.36	1.03
1702	1	137	0.01	4.91	0.34	0.48	1.40
1702	2	190	0.00	1.29	0.20	0.20	1.00
1712	1	26	0.01	0.75	0.08	0.15	1.97
1712	2	210	0.00	0.40	0.06	0.07	1.17
1716	1	136	0.00	0.84	0.11	0.14	1.18
1716	2	202	0.00	1.09	0.09	0.14	1.54
1718	1	60	0.00	0.39	0.08	0.08	1.11
1718	2	28	0.00	0.13	0.02	0.04	1.67
1750	1	368	0.00	1.04	0.16	0.18	1.07
1750	2	180	0.00	1.79	0.20	0.33	1.67
1850	1	266	0.00	0.59	0.05	0.08	1.68
1850	2	349	0.00	0.29	0.03	0.04	1.39
1855	1	353	0.00	1.50	0.28	0.27	0.99
1855	2	259	0.00	1.49	0.16	0.18	1.14
1900	1	1354	0.00	0.90	0.07	0.11	1.46
1900	2	724	0.00	0.86	0.05	0.09	1.64
1960	1	266	0.00	0.81	0.15	0.13	0.87
1960	2	107	0.00	0.69	0.08	0.09	1.12
1965	1	185	0.00	0.68	0.05	0.07	1.50
1965	2	187	0.00	0.14	0.03	0.03	1.19
2051	2	254	0.00	0.94	0.06	0.10	1.61
2060	2	330	0.00	1.32	0.13	0.17	1.29

C_ESTIM	C_Hole	# Samples	Min. (%)	Max. (%)	Mean (%)	Std. Dv (%)	C.V.
2065	2	41	0.00	0.93	0.28	0.25	0.89
2067	2	18	0.02	1.28	0.29	0.32	1.10
2069	2	17	0.00	1.02	0.33	0.23	0.70
2072	2	13	0.00	0.17	0.04	0.05	1.20
2073	2	6	0.02	0.21	0.11	0.06	0.55
2079	2	12	0.17	0.93	0.42	0.19	0.45
2104	2	135	0.02	1.90	0.28	0.34	1.25
2156	1	1	0.01	0.01	0.01	-	-
2156	2	68	0.00	0.10	0.02	0.02	1.06
11511	1	267	0.01	0.40	0.14	0.09	0.63
11511	2	1100	0.00	0.86	0.14	0.12	0.88
11512	1	616	0.00	1.20	0.25	0.19	0.77
11512	2	696	0.00	1.86	0.30	0.22	0.75

Note. C_Hole: 1: Channels, 2: Drill holes

11.9 Trend Analysis

11.9.1 Variography

Nexa generated downhole and directional variograms using the two metre composite values generated for each domain and each element. The variograms were used to support the characterization and quantification of the variance of mineralization within the spatial continuity of the mineralization domains being analyzed. Variograms were standardized and modelled using two spherical structures in three directions. The variograms were used for OK interpolation and as a guide for selecting search ellipse ranges.

Figure 11-13 illustrates an example of the zinc variograms for the 307 Progreso Domain. The results for all modelled variograms for zinc are listed in Table 11-17.

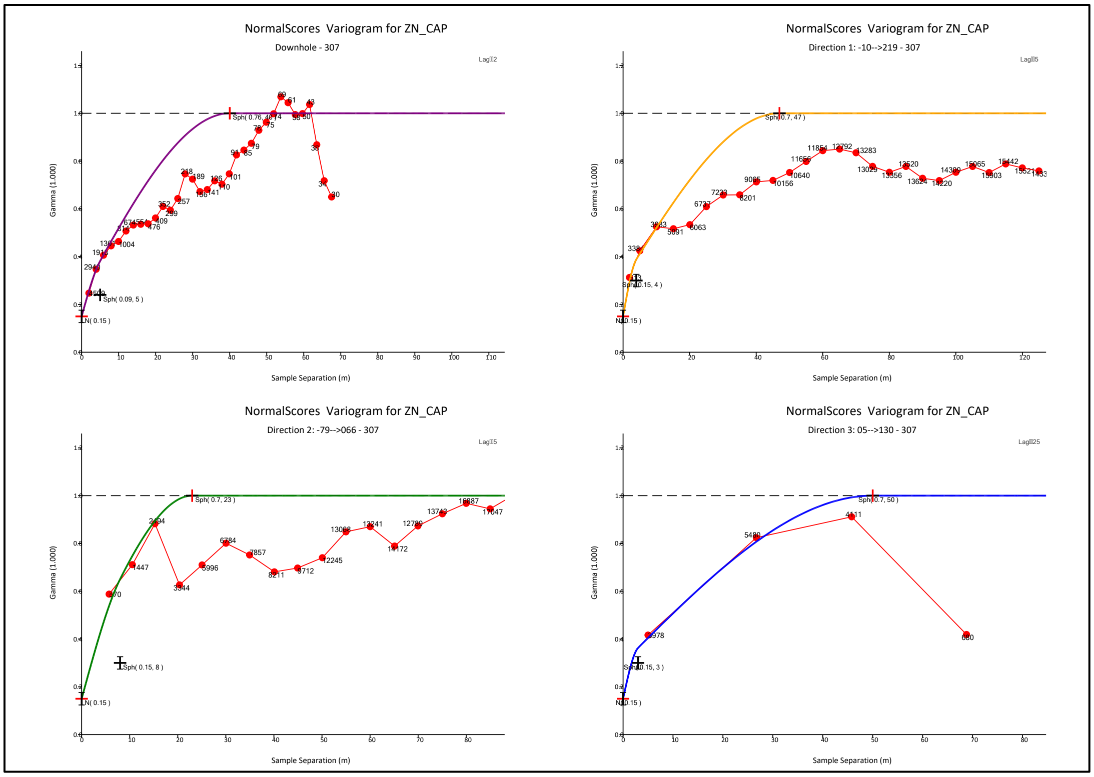


Figure 11-13: Zinc Normal Score Experimental and Modelled Variograms for Domain Progreso 307

Table 11-17: Zinc Variogram Parameters
Nexa Resources S.A. – El Porvenir Mine

C_ESTIM	Nugget	Datamine Rotation V-ANGLE			Rotation System V-AXIS			Search Ellipse Structure 1					Search Ellipse Structure 2				
		1	2	3	1	2	3	Var. Model Type	Sill	Major	Minor	Vertical	Var. Model Type	Sill	Major	Minor	Vertical
1	0.3	69.00	0.00	65.00	3	2	1	1	0.38	9	6	16	1	0.32	23	31	27
100	0.22	92.13	40.24	57.80	3	2	1	1	0.4	50	10	10	1	0.38	98	27	12
154	0.34	-139.74	66.80	-58.14	3	2	1	1	0.28	10	5	2	1	0.38	32	16	8
157	0.25	-66.51	-4.33	59.91	3	2	1	1	0.51	17	19	1	1	0.24	25	20	15
256	0.2	6.55	-9.39	69.72	3	2	1	1	0.09	17	19	1	1	0.71	65	20	15
264	0.15	80.00	44.92	85.76	3	2	1	1	0.31	38	16	3	1	0.54	56	36	14
270	0.13	146.34	14.94	84.83	3	2	1	1	0.31	23	35	5	1	0.56	99	36	30
302	0.16	105.94	9.95	-83.91	3	2	1	1	0.16	46	19	5	1	0.68	63	52	14
350	0.07	92.57	38.94	-86.14	3	2	1	1	0.32	19	13	6	1	0.61	45	29	18
453	0.2	-74.26	58.53	70.58	3	2	1	1	0.01	23	21	1	1	0.79	60	58	15
466	0.15	138.39	73.26	16.91	3	2	1	1	0.41	28	4	11	1	0.44	43	14	13
550	0.06	-114.69	48.97	-74.66	3	2	1	1	0.1	91	3	1	1	0.84	94	38	15
600	0.23	97.95	72.04	55.73	3	2	1	1	0.01	22	7	8	1	0.76	59	30	17
652	0.08	-69.00	18.75	23.86	3	2	1	1	0.08	63	19	1	1	0.84	335	20	15
671	0.447	-58.80	18.89	16.69	3	2	1	1	0.05	52	19	1	1	0.503	66	20	15
674	0.447	8.80	28.02	-11.17	3	2	1	1	0.01	3	19	1	1	0.543	91	39	15
677	0.13	26.69	20.25	-14.97	3	2	1	1	0.33	38	19	1	1	0.54	74	20	15
700	0.21	64.36	54.47	126.05	3	2	1	1	0.08	58	19	1	1	0.71	59	20	15
750	0.39	-97.53	35.63	-58.67	3	2	1	1	0.19	6	5	1	1	0.42	34	17	20
751	0.39	-175.98	74.21	-108.68	3	2	1	1	0.01	47	47	1	1	0.6	106	50	20
860	0.39	68.49	39.93	-86.09	3	2	1	1	0.19	6	5	1	1	0.42	20	20	20
865	0.39	-124.18	39.82	-83.49	3	2	1	1	0.01	20	5	1	1	0.6	20	20	20

C_ESTIM	Nugget	Datamine Rotation V-ANGLE			Rotation System V-AXIS			Search Ellipse Structure 1					Search Ellipse Structure 2				
		1	2	3	1	2	3	Var. Model Type	Sill	Major	Minor	Vertical	Var. Model Type	Sill	Major	Minor	Vertical
872	0.17	-119.13	-4.92	-79.96	3	2	1	1	0.07	19	5	1	1	0.76	20	20	20
901	0.19	-179.12	-9.96	95.08	3	2	1	1	0.11	22	8	2	1	0.7	167	88	28
908	0.13	78.26	78.83	26.30	3	2	1	1	0.06	10	7	5	1	0.81	40	22	13
950	0.08	-54.42	49.34	-77.67	3	2	1	1	0.57	86	61	1	1	0.35	92	66	20
1008	0.39	-144.18	39.82	-83.49	3	2	1	1	0.19	6	5	1	1	0.42	20	20	20
1016	0.39	-77.34	-14.77	-79.66	3	2	1	1	0.19	6	5	1	1	0.42	20	20	20
1019	0.26	-171.00	50.00	90.00	3	2	1	1	0.32	6	5	1	1	0.42	20	20	20
1026	0.39	91.26	19.74	80.43	3	2	1	1	0.19	15	12	1	1	0.42	43	24	9
1028	0.39	104.93	34.39	77.85	3	2	1	1	0.01	64	16	1	1	0.6	93	30	20
1029	0.21	-129.68	19.47	-76.20	3	2	1	1	0.37	6	5	1	1	0.42	20	20	20
1034	0.11	-5.41	54.01	-105.44	3	2	1	1	0.11	7	22	4	1	0.78	46	125	12
1208	0.39	125.19	14.67	77.59	3	2	1	1	0.07	79	28	1	1	0.54	134	33	20
1300	0.26	115.03	59.88	38.86	3	2	1	1	0.55	13	12	1	1	0.19	34	17	20
1350	0.14	-78.46	59.94	94.00	3	2	1	1	0.18	36	5	6	1	0.68	40	24	22
1402	0.39	-84.87	14.89	97.24	3	2	1	1	0.11	34	5	4	1	0.5	60	41	14
1408	0.22	130.47	69.41	75.65	3	2	1	1	0.25	42	37	1	1	0.53	71	41	20
1410	0.21	-105.41	42.82	-67.93	3	2	1	1	0.02	33	5	1	1	0.77	48	28	20
1450	0.39	-109.25	34.51	-79.06	3	2	1	1	0.01	6	44	1	1	0.6	55	53	20
1452	0.39	-108.63	24.60	-78.99	3	2	1	1	0.12	45	5	1	1	0.49	76	75	20
1458	0.09	-20.00	60.00	90.00	3	2	1	1	0.25	28	20	3	1	0.66	34	21	13
1504	0.06	152.23	9.93	-97.11	3	2	1	1	0.37	9	7	3	1	0.57	40	26	12
1555	0.39	-79.05	-72.04	-55.73	3	2	1	1	0.1	25	12	2	1	0.51	34	31	7
1558	0.11	81.90	38.96	74.49	3	2	1	1	0.01	9	5	14	1	0.88	34	24	21
1607	0.24	-115.26	19.74	-80.43	3	2	1	1	0.01	23	24	1	1	0.75	72	28	20
1614	0.39	65.00	70.00	-90.00	3	2	1	1	0.01	20	5	1	1	0.6	20	20	20

C_ESTIM	Nugget	Datamine Rotation V-ANGLE			Rotation System V-AXIS			Search Ellipse Structure 1					Search Ellipse Structure 2				
		1	2	3	1	2	3	Var. Model Type	Sill	Major	Minor	Vertical	Var. Model Type	Sill	Major	Minor	Vertical
1650	0.16	91.00	83.00	0.00	3	2	1	1	0.35	10	4	4	1	0.49	26	29	18
1702	0.28	52.42	65.19	51.92	3	2	1	1	0.02	19	16	1	1	0.7	89	17	20
1712	0.39	-124.00	10.00	-90.00	3	2	1	1	0.01	25	5	1	1	0.6	33	20	20
1714	0.39	114.03	59.88	38.86	3	2	1	1	0.19	6	5	1	1	0.42	20	20	20
1718	0.09	-99.00	70.00	90.00	3	2	1	1	0.01	47	5	1	1	0.9	56	20	20
1754	0.39	-46.00	40.00	-90.00	3	2	1	1	0.11	21	38	1	1	0.5	92	45	20
1850	0.19	-71.00	70.00	-90.00	3	2	1	1	0.62	10	5	1	1	0.19	34	17	20
1855	0.25	-45.40	64.83	97.07	3	2	1	1	0.28	54	5	6	1	0.47	55	17	20
1900	0.05	-77.05	72.04	-124.27	3	2	1	1	0.14	5	6	2	1	0.81	48	11	11
1950	0.39	66.09	-19.97	-86.81	3	2	1	1	0.27	19	13	1	1	0.34	34	23	8
1959	0.16	-110.00	-15.00	-90.00	3	2	1	1	0.01	4	12	15	1	0.83	38	29	26
1965	0.11	-114.38	49.96	93.11	3	2	1	1	0.09	27	17	4	1	0.8	46	30	14
2000	0.35	29.81	18.30	162.67	3	2	1	1	0.21	21	5	1	1	0.44	41	23	11
2051	0.36	-136.12	9.96	-95.08	3	2	1	1	0.01	29	5	1	1	0.63	51	39	20
2060	0.39	95.93	59.62	171.42	3	2	1	1	0.32	33	17	1	1	0.29	46	29	20
2100	0.15	146.00	40.00	-90.00	3	2	1	1	0.23	7	5	4	1	0.62	37	20	20
2150	0.39	16.33	35.63	160.48	3	2	1	1	0.01	53	5	1	1	0.6	63	17	20
2156	0.39	-49.32	-27.03	142.55	3	2	1	1	0.19	6	5	1	1	0.42	20	11	5
201	0.5	70.00	75.00	90.00	3	2	1	1	0.02	3	19	1	1	0.48	20	20	20
250	0.3	-141.19	14.67	-77.59	3	2	1	1	0.22	10	13	6	1	0.48	74	29	9
306	0.25	-90.00	90.00	175.00	3	2	1	1	0.36	5	3	1	1	0.39	49	18	15
307	0.17	129.12	-9.96	84.92	3	2	1	1	0.17	4	8	3	1	0.65	47	23	11
458	0.31	85.00	30.00	-90.00	3	2	1	1	0.48	75	31	8	1	0.21	82	55	24
701	0.16	-70.34	15.76	37.25	3	2	1	1	0.38	8	7	8	1	0.46	44	10	12
756	0.23	85.98	74.21	-71.32	3	2	1	1	0.59	30	5	1	1	0.17	34	17	20

C_ESTIM	Nugget	Datamine Rotation V-ANGLE			Rotation System V-AXIS			Search Ellipse Structure 1					Search Ellipse Structure 2				
		1	2	3	1	2	3	Var. Model Type	Sill	Major	Minor	Vertical	Var. Model Type	Sill	Major	Minor	Vertical
800	0.08	-177.27	19.99	87.87	3	2	1	1	0.44	37	19	1	1	0.47	40	26	14
850	0.44	-125.25	38.38	-70.72	3	2	1	1	0.2	6	5	1	1	0.36	20	20	20
883	0.41	111.48	35.63	-58.67	3	2	1	1	0.19	6	5	1	1	0.4	20	20	20
1054	0.43	-112.28	37.43	-65.80	3	2	1	1	0.19	6	5	1	1	0.39	20	20	20
1609	0.34	-125.85	69.62	-78.45	3	2	1	1	0.13	46	26	1	1	0.52	80	51	20
1755	0.5	-31.85	34.94	-56.37	3	2	1	1	0.18	6	5	1	1	0.32	20	20	20
2065	0.42	108.02	74.21	71.32	3	2	1	1	0.19	6	5	1	1	0.38	30	20	20
2067	0.48	-86.18	39.82	-83.49	3	2	1	1	0.19	6	5	1	1	0.32	20	20	20
2072	0.46	-9.18	39.82	-83.49	3	2	1	1	0.19	6	5	1	1	0.35	20	20	20
2073	0.44	-95.82	39.82	-96.52	3	2	1	1	0.19	6	5	1	1	0.38	20	20	20
2079	0.44	-134.89	-3.21	3.83	3	2	1	1	0.18	6	5	1	1	0.38	20	20	20
2104	0.22	92.00	70.00	0.00	3	2	1	1	0.27	82	5	1	1	0.51	94	66	20
4501	0.06	-105.79	24.85	-83.39	3	2	1	1	0.6	6	4	5	1	0.35	18	21	16
4502	0.06	-105.79	24.85	-83.39	3	2	1	1	0.6	6	4	5	1	0.35	18	27	16
259	0.08	99.06	31.03	59.23	3	2	1	1	0.51	6	6	6	1	0.41	57	34	30
17501	0.06	-25.81	-34.78	-82.69	3	2	1	1	0.69	14	17	5	1	0.25	40	51	8
17502	0.06	-25.81	-34.78	-82.69	3	2	1	1	0.45	16	59	5	1	0.49	31	131	8
1151	0.06	116.26	58.39	49.26	3	2	1	1	0.38	8	31	4	1	0.56	42	114	58
21	0.22	92.133	40.239	57.803	3	2	1	1	0.4	50	10	10	1	0.38	98	27	12

11.10 Search Strategy and Grade Interpolation Parameters

Grades were interpolated into blocks on a parent cell basis using OK for a small number of domains with sufficient data and reasonable modelled variograms. For the other domains, ID^3 interpolation method was used. All the variables, Zn, Cu, Pb, and Ag, were interpolated, and estimates were not density weighted. All directions were based on Datamine's dynamic anisotropy, which varies search ellipsoid orientations according to the trend of the mineralization domain.

The grade estimation was completed in three passes. Pass 1 uses a search radius equal to the variogram range; Pass 2 uses a search radius equal to 1.5 to 2.5 times the range of Pass 1; and Pass 3 uses a search radius of 10 times the range of Pass 1.

The search criteria for the largest contributor domains for the Mineral Resource and the Mineral Reserve are listed in Table 11-18 for zinc estimates and in Table 11-19 for silver estimates.

Table 11-18: Zinc Estimation Parameters
Nexa Resources S.A. – El Porvenir Mine

Individual Mineralization Domain (COD_OB)	COD_OB Code	Grade Domain	Method	Rotation S-AXIS			Ellipse S-DIST			Pass 1 SVOLFAC	# Comp		Pass 2 SVOLFAC	# Comp		Pass 3 SVOLFAC	# Comp		Max Comp. Per Hole
				1	2	3	1	2	3		Min	Max		Min	Max		Min	Max	
701	de2		IDW3	3	2	1	40.00	9.00	11.00	1	8	10	2.5	8	10	10	1	3	2
2100	dl01		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	4	6	10	2	6	2
2104	dl05		IDW3	3	2	1	20.00	15.00	8.00	1	8	10	2	4	6	10	2	4	2
2110	dl11		IDW3	3	2	1	33.00	18.00	18.00	1	8	10	2	4	6	10	2	6	2
1500	exiti1		IDW3	3	2	1	36.00	18.00	10.00	1	10	14	2	7	10	10	1	7	2
1403	exitoa		IDW3	3	2	1	36.00	22.00	20.00	1	8	10	2	4	6	10	2	6	2
1404	exitob		IDW3	3	2	1	36.00	18.00	8.00	1	8	10	2	4	6	10	2	4	2
1402	exito		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	4	6	10	2	6	2
21	por9cf1		IDW3	3	2	1	25.00	20.00	10.00	1	4	12	2	4	6	10	2	4	2
465	por9o		IDW3	3	2	1	53.00	27.00	15.00	1	8	10	2	4	6	10	2	6	2
466	por9p		IDW3	3	2	1	39.00	13.00	12.00	1	8	10	2	4	6	10	2	6	2
467	por9q		IDW3	3	2	1	39.00	13.00	12.00	1	8	10	2	4	6	10	2	6	2
468	por9r		IDW3	3	2	1	53.00	27.00	15.00	1	6	12	3	6	12	10	4	8	3
469	por9s		IDW3	3	2	1	53.00	27.00	15.00	1	8	10	2	4	6	10	2	6	2
471	por9u		IDW3	3	2	1	53.00	27.00	15.00	1	8	10	2	4	6	10	2	6	2
450	por9	**Low Grade**	IDW3	3	2	1	16.00	19.00	14.00	1	8	10	1.5	4	6	10	2	6	2
450	por9	**High Grade**	IDW3	3	2	1	16.00	24.00	14.00	1	8	10	1.5	4	6	10	2	6	2
500	porv9a		OK	3	2	1	39.00	13.00	12.00	1	8	10	2	4	6	10	2	6	2
350	porv9e		IDW3	3	2	1	41.00	26.00	16.00	1	8	10	2	4	6	10	2	6	2
550	porv9w		IDW3	3	2	1	85.00	34.00	14.00	1	8	10	2	4	6	10	2	6	2
2150	sara1		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	7	10	10	2	6	2
2151	sara2		IDW3	3	2	1	34.00	16.00	10.00	1	7	10	2	4	7	15	2	5	2
2152	sara3		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	6	7	25	2	5	2
259	v12i1		IDW3	3	2	1	51.00	31.00	27.00	1	8	10	1.5	4	6	10	2	6	2
950	v12ne		IDW3	3	2	1	83.00	59.00	18.00	1	8	10	2	4	6	10	2	6	2
1024	v12s33		IDW3	3	2	1	84.00	27.00	18.00	1	8	10	2	4	6	10	2	6	2
1650	v5i		OK	3	2	1	32.00	16.00	10.00	1	10	14	2	5	9	10	2	4	2
1754	v5ne5		IDW3	3	2	1	24.00	12.00	8.00	1	7	9	1.5	4	6	10	2	3	2
51	vc1b		IDW3	3	2	1	29.00	14.00	7.00	1	8	10	2	4	6	10	1	3	2
100	vc31		IDW3	3	2	1	88.00	24.00	11.00	1	8	10	2	4	6	10	2	6	2
1051	vcarmn		IDW3	3	2	1	29.00	14.00	7.00	1	8	10	2	4	6	10	2	6	2
1154	vcn32		IDW3	3	2	1	29.00	14.00	7.00	1	8	10	2	4	6	10	2	6	2
1255	vcn3w6		IDW3	3	2	1	31.00	28.00	6.00	1	8	10	2	4	6	10	2	6	2
1257	vcn3w8		IDW3	3	2	1	31.00	28.00	6.00	1	8	10	2	4	6	10	2	6	2
1151	vcn3		IDW3	3	2	1	38.00	103.00	52.00	1	8	10	1.5	4	6	10	2	6	2
307	vprg		IDW3	3	2	1	42.00	21.00	10.00	1	8	10	2	4	6	10	2	6	2

Table 11-19: Silver Estimation Domains
Nexa Resources S.A. – El Porvenir Mine

Individual Mineralization Domain (COD_OB)	COD_OB Code	Grade Domain	Method	Rotation S-AXIS			Search Ellipse S-DIST			Pass 1 SVOLFAC	# Comp		Pass 2 SVOLFAC	# Comp		Pass 3 SVOLFAC	# Comp		Max Comp. Per Hole
				1	2	3	1		3		Min	Max		Min	Max		Min	Max	
701	de2		IDW3	3	2	1	34.00	18.00	9.00	1	8	12	2.5	8	12	10	1	3	2
2100	dl01		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	4	6	10	2	6	2
2104	dl05		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	4	6	10	2	6	2
2110	dl11		IDW3	3	2	1	59.00	28.00	14.00	1	8	10	2	4	6	10	2	6	2
1500	exiti1		IDW3	3	2	1	36.00	18.00	10.00	1	10	14	2	7	10	10	1	7	2
1403	exitoa		IDW3	3	2	1	31.00	17.00	7.00	1	8	10	2	4	6	10	2	6	2
1404	exitob		IDW3	3	2	1	36.00	18.00	8.00	1	8	10	2	4	6	10	2	4	2
1402	exito		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	4	6	10	2	6	2
21	por9cf1		IDW3	3	2	1	36.00	18.00	10.00	1	4	12	2	4	6	10	2	4	2
465	por9o		IDW3	3	2	1	13.00	8.00	24.00	1	8	10	2	4	6	10	2	6	2
466	por9p		IDW3	3	2	1	13.00	8.00	24.00	1	8	10	2	4	6	10	2	6	2
467	por9q		IDW3	3	2	1	13.00	8.00	24.00	1	8	10	2	4	6	10	2	6	2
468	por9r		IDW3	3	2	1	71.00	44.00	23.00	1	6	12	3	6	12	10	4	8	3
469	por9s		IDW3	3	2	1	71.00	44.00	23.00	1	8	10	2	5	6	10	2	6	2
471	por9u		IDW3	3	2	1	71.00	44.00	23.00	1	8	10	2	4	6	10	2	6	2
450	por9		IDW3	3	2	1	22.00	17.00	17.00	1	8	10	1.5	4	6	10	2	6	2
500	porv9a		IDW3	3	2	1	71.00	44.00	23.00	1	8	10	2	4	6	10	2	6	2
350	porv9e		IDW3	3	2	1	25.00	15.00	9.00	1	8	10	2	4	6	10	2	6	2
550	porv9w		IDW3	3	2	1	71.00	44.00	23.00	1	8	10	2	8	10	10	1	3	2
2150	sara1		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	7	10	10	2	6	2
2151	sara2		IDW3	3	2	1	34.00	16.00	10.00	1	7	10	2	4	7	15	2	5	2
2152	sara3		IDW3	3	2	1	36.00	18.00	10.00	1	8	10	2	6	7	25	2	5	2
259	v12i1	c estim 2591 (High Grade)	IDW3	3	2	1	35.00	20.00	10.00	1	8	10	1.3	4	6	10	2	6	2
259	v12i1	c estim 2592 (Low Grade)	IDW3	3	2	1	35.00	20.00	10.00	1	8	10	1.3	4	6	10	2	6	2
950	v12ne		IDW3	3	2	1	25.00	29.00	13.00	1	8	10	2	4	6	10	2	6	2
1024	v12s33		IDW3	3	2	1	68.00	36.00	21.00	1	8	10	2	4	6	10	2	6	2
1650	v5i		OK	3	2	1	32.00	16.00	10.00	1	10	14	2	5	9	10	2	4	2
1754	v5ne5		IDW3	3	2	1	24.00	12.00	8.00	1	7	9	1.5	4	6	10	2	3	2
51	vc1b		IDW3	3	2	1	57.00	28.00	10.00	1	8	10	2	4	6	10	1	3	2
100	vc31		IDW3	3	2	1	32.00	18.00	11.00	1	8	10	2	4	6	10	2	6	2
1051	vcarmn		IDW3	3	2	1	70.00	39.00	22.00	1	8	10	2	4	6	10	2	6	2
1154	vcn32		IDW3	3	2	1	59.00	23.00	10.00	1	8	10	2	4	6	10	2	6	2
1255	vcn3w6		IDW3	3	2	1	57.00	28.00	10.00	1	8	10	2	4	6	10	2	6	2
1257	vcn3w8		IDW3	3	2	1	57.00	28.00	10.00	1	8	10	2	4	6	10	2	6	2
1151	vcn3		IDW3	3	2	1	98.00	75.00	14.00	1	8	10	1.5	4	6	10	2	6	2
307	vprg		IDW3	3	2	1	115.00	32.00	37.00	1	8	10	2	4	6	10	2	6	2

11.11 Bulk Density

A total of 1,131 density measurements were taken within 191 mineralization domains. Nexa grouped individual mineralization domains by rock and mineralization style and defined density domains (Figure 11-14). Table 11-20 shows the statistics of all of the density data for each density domain and the density sample location is shown in Figure 11-15. Nexa assigned the mean density values to their respective density domains. In areas without or little density data, Nexa assigned either the average density for the deposit (3.42 g/cm^3) or a density value from a nearby density domain with similar mineralization and rock type.

Table 11-20: Density Data Statistics
Nexa Resources S.A. – El Porvenir Mine

C_DENS	COB_OB	No. Samples	(g/cm^3)	(g/cm^3)	(g/cm^3)
100	am1,am12,am14,am16,am17,am20,am21,am23,am3,am4,am8,am9, amsk1,amsk10,amsk11,amsk13,amsk14,amsk15,amsk16,amsk17,amsk18, amsk2,amsk3,amsk4,amsk5,amsk6,amsk7,amsk8,amsk9	47	3.16	3.88	3.51
102	v5nw13,v5nw14,v5nw15,v5nw16,v5nw18,v5nw19,v5nw20,v5nw21	9	2.66	3.34	2.96
103	dl01,dl02,dl03,dl04,dl05,dl06,dl07,dl08,dl09,dl10,dl11	37	2.89	3.94	3.34
104	cpoex1,cpoex2,exit10,exit11,exit12,exit13,exit16,exit17,exit18,exiti1, exiti2,exiti3,exiti4,exiti5,exiti6,exiti7,exito,exito1,exito2,exito3,exito4,exito5,exito6,exito7,exito8,exito9,exitoa,exitob,exitoc,exitod,exits,exits1,exits2,exits3 ,exits4,exits5,exits6,exits7,exits8	134	2.82	3.9	3.39
105	int10,int,int9,ints1,ints10,ints11,ints12,ints13,ints14,ints15,ints16, ints17,ints21,ints22,ints23,ints24,ints25,ints26,ints28,ints29,ints3,ints31,ints32,ints4,ints5,ints6,ints7	29	2.75	3.5	3.13
106	p2se1,p2se10,p2se11,p2se12,p2se13,p2se14,p2se15,p2se16,p2se17, p2se18,p2se2,p2se3,p2se4,p2se5,p2se6,p2se7,p2se,p2sr,por2sd	43	2.62	2.94	2.78
107	p2sw1 ,p2sw10,p2sw11,p2sw12,p2sw13,p2sw14,p2sw15,p2sw16, p2sw17,p2sw18,p2sw19,p2sw2,p2sw20,p2sw21,p2sw22,p2sw23,p2sw24,p2sw25,p2sw26,p2sw27,p2sw28,p2sw29,p2sw3,p2sw4,p2sw5,p2sw6,p2sw7 ,p2sw8 ,p2sw9	22	2.57	2.82	2.68
108	por9_1,por9_2 ,por91,por92,por93,por94,por95,por96,por97,por98, por9a,por9b,por9c,por9cf1,por9cf2,por9cf3,por9cf4,por9cf5,por9cf6,por9cf7 ,por9cf8,por9e,por9f,por9g,por9h,por9i,por9j,por9l,por9m,por9n,por9o,por9p,por9q,por9r,por9s,por9t,por9u,por9v,por9w,por9x,por9y,por9z,porv9a,porv9e,porv9f,porv9w,porv9x	85	2.87	3.65	3.21
109	de1,de2,de3,de4,de5,sara1,sara2,sara3,sara4,sara5,sara6,saras1 ,saras2,saras3,saras4,saras5,saras6	63	2.41	2.81	2.6
110	soc21,soc210,soc211,soc212,soc213,soc214,soc22,soc23,soc24,soc25, soc27,soc28,soc29,soc41,soc410,soc411,soc412,soc413,soc414,soc42,soc43,soc434,soc435,soc436,soc437,soc44,soc45,soc46,soc47,soc48,soc49	44	2.7	3.62	3.15
111	v5i,v5ne1,v5ne2,v5ne3,v5ne4,v5ne5,v5ne6,v5nw1,v5nw10,v5nw11, v5nw12,v5nw17,v5nw2,v5nw3,v5nw4,v5nw5,v5nw6,v5nw7,v5nw8,v5nw9,	41	2.85	3.94	3.46
112	v12i1 ,v12i10,v12i11,v12i12,v12i13,v12i14,v12i15,v12i16,v12i17,v12i18, v12i1a,v12i1b,v12i1c,v12i1d,v12i2,v12i3,v12i4,v12i5,v12i6,v12i7,v12i8,v12i	54	3.41	4.16	3.75
113	v12 ,v122,v123,v125,v1252,v126,v127,v12ne	13	2.72	3.45	3.09
114	v12s1 ,v12s10,v12s11,v12s12,v12s13,v12s14,v12s15,v12s16,v12s17, v12s18,v12s19,v12s2,v12s21,v12s22,v12s23,v12s24,v12s25,v12s26,v12s27,v12s28,v12s29,v12s3,v12s30,v12s31,v12s32,v12s33,v12s34,v12s35,v12s36,v12s37,v12s4,v12s5,v12s6,v12s7,v12s8,v12s9,	69	2.72	3.73	3.12
115	vc1 ,vc1a,vc1b,vc1c	17	3.27	4.23	3.77
116	vc21 ,vc214,vc215,vc216,vc217,vc222,vc224,vc24,vc26,vc2922	58	2.77	4.15	3.39
117	vc31,vc32,vc33,vc34,vc35,	41	3	4.38	3.5
118	cn3ei1,cn3ei2,vcn3_1,vcn3_2,vcn32,vcn324,vcn327,vcn3e1,vcn3e3,vcn3e6 , vcarmn,vcn12,vcn13,vcn14,vcn15,vcn16,vcn17,vcn18,	133	2.94	4.22	3.59
119	vcn41,vcn42,vcn43,vcn44,vcn45,vcn46,vcn4i,	42	2.79	4.34	3.58
120	vpor31,vpor32,vpor33,vpor34,vpor35,vpor36,vpor37,vpor38,	22	2.72	3.67	3.15
121	vprg ,vprg1,vprg2,vprg3,vprg4,vprg5,vprg6,vprgb,vprgb1,vprgb2,vprgb3,	8	2.79	3.12	2.93
122	vprgb4,vprgb5,vprgb6,vprgb7,vprgb8,vprgb9,vprgba,vprgbb,	120	2.9	4.34	3.58
Grand Total		**1,131**	**2.41**	**4.38**	**3.33**

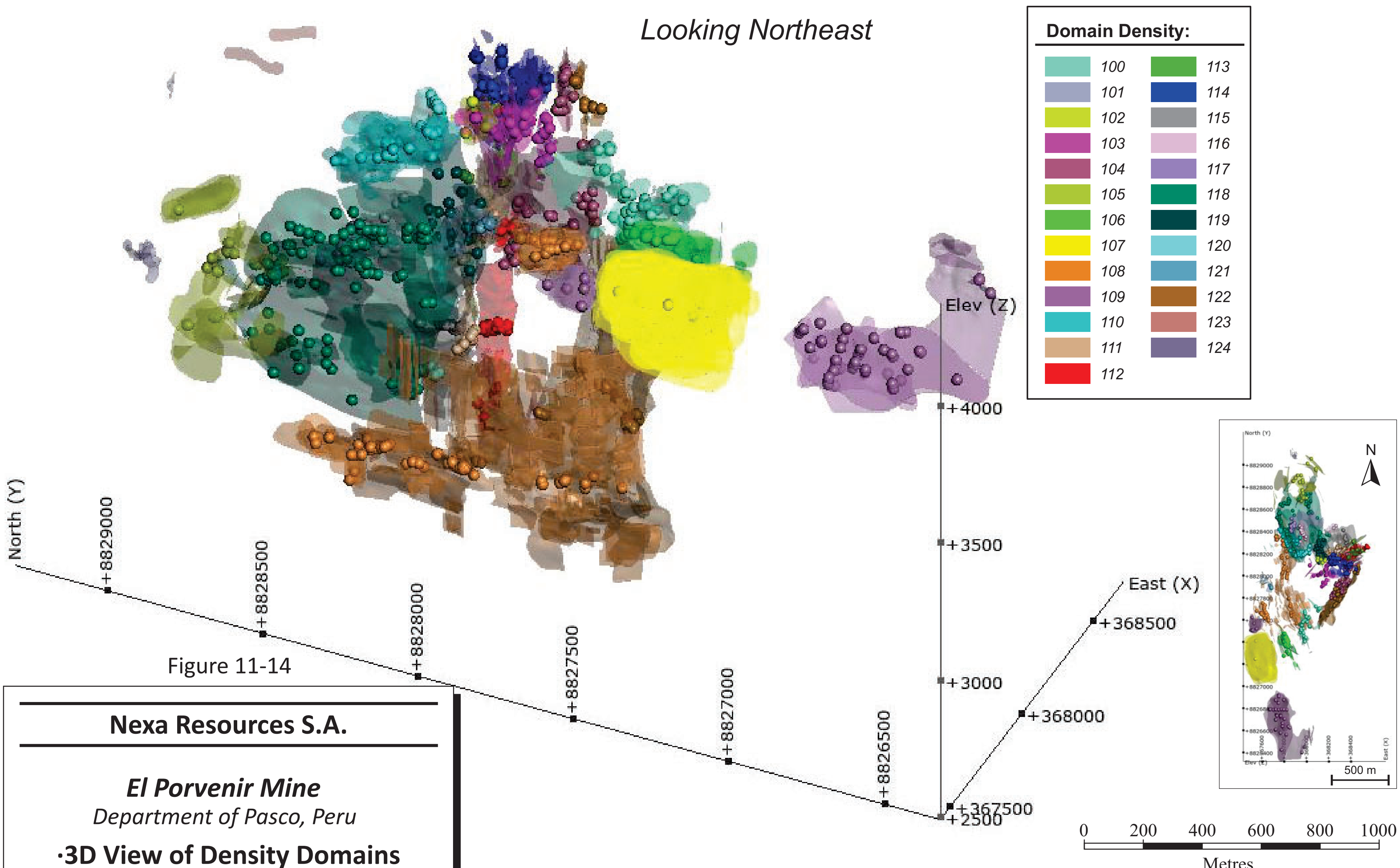


Figure 11-14

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

3D View of Density Domains

January 2021

Source: Nexa, 2020.

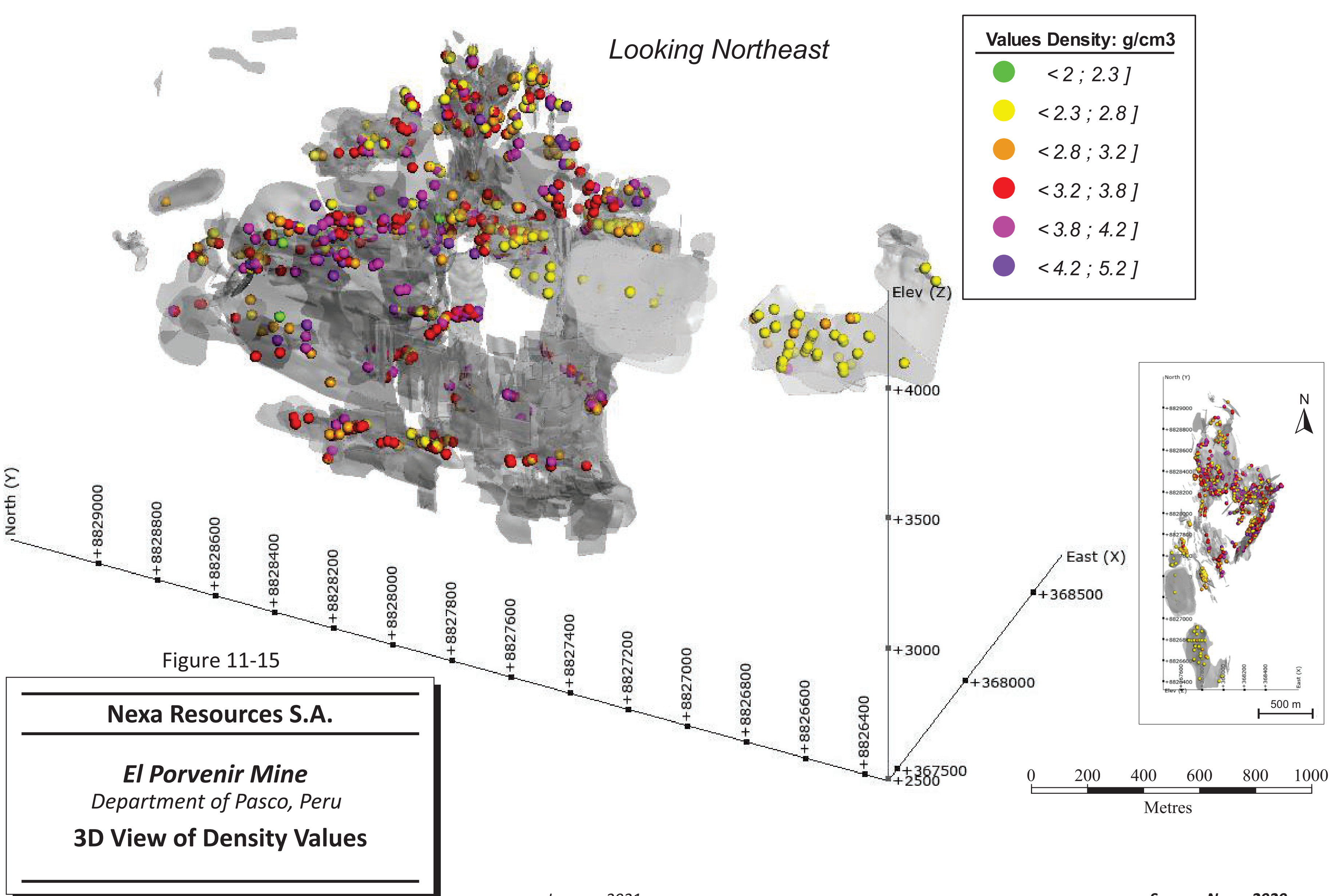


Figure 11-15

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

3D View of Density Values

January 2021

Source: Nexa, 2020.

The SLR QP generated statistics based on mineralized zones and density domains to review the assigned density values and is of the opinion that the density values are reasonable and acceptable. The SLR QP recommends taking more density measurements in areas that currently have insufficient density tests available, particularly in areas within the Mineral Resource and Mineral Reserve shapes.

11.12 Block Models

Mineralization wireframes were filled with blocks in Datamine Studio RM. The block model was sub-celled at wireframes boundaries with parent cells measuring 4 m by 4 m by 4 m and minimum sub-cell sizes of 0.5 m by 0.5 m by 0.5 m. The block model setup is shown in Table 11-21.

Table 11-21: Block Model Setup
Nexa Resources S.A. – El Porvenir Mine

Parameter	East (m)	North (m)	Elevation (m)
Minimum Coordinate	366,300	8,826,200	2,398
Maximum Coordinate	368,700	8,831,156	4,702
Block size	4	4	4
Min. Sub Block size	0.5	0.5	0.5

The SLR QP is of the opinion that the block size is appropriate, based on the drill spacing and proposed mining method, and is suitable to support the estimation of Mineral Resources and Mineral Reserves.

11.13 Net Smelter Return and Cut-Off Value

An NSR value was determined using the Mineral Resource metal prices, metallurgical recoveries, transport, treatment, and refining costs. Metal prices used for Mineral Resources are based on consensus, long term forecasts from banks, financial institutions, and other sources. The NSR value is expressed as US$/t and is calculated for Mineral Resources to make an adequate comparison with production costs in order to determine whether the mineralized material can be economically mined.

The Mine currently produces zinc concentrate with contained silver, lead concentrate with contained silver and gold, and copper concentrate with contained silver and gold as sellable products. The payable metals in concentrates include the applicable concentrate treatment, transportation, refining charges, deductions and penalty elements, according to sales agreements signed between mines and smelters or traders.

The smelter terms and metal prices used to determine NSR factors are provided in Table 11-22. The prices are based on 10 year average of the London Metal Exchange (LME) projected prices. The smelter terms are effective as of October 2020.

Table 11-22: NSR Data
Nexa Resources S.A. – El Porvenir Mine

Item	Units	Value
	Net Metallurgical Recovery *	
Zn	%	89.60
Pb	%	79.21

Item	Units	Value
Cu	%	14.29
Ag	%	77.50
Cu Concentrate Payable %		
Cu	%	96.7
Ag	%	90
Pb Concentrate Payable %		
Pb	%	95
Ag	%	95
Zn Concentrate Payable %		
Zn	%	94.6
Ag	%	70
Metal Prices		
Zn	US$/lb	1.30
Pb	US$/lb	1.02
Cu	US$/lb	3.37
Ag	US$/oz	19.38
Logistics and TC		
Zn Concentrate	US$/t conc	$295
Pb Concentrate	US$/t conc	$266
Cu Concentrate **	US$/t conc	$279
Integrated Zn		
Conversion Cost	US$/t Zn prod	$452
Premium	US$/t Zn Prod	$173
Refining Cost		
Au in Pb conc	US$/oz	$10.00
Ag in Pb conc	US$/oz	$1.00
Ag in Cu conc	US$/oz	$0.50

* Based on LOM average metal grades

** Included a 16.68 USD/t penalty

Nexa reviewed supply and demand projections for zinc, lead, and copper, as well as consensus long term (ten year) metal price forecasts. SLR verified that Nexa's selected metal prices for estimating Mineral Reserves are in line with independent forecasts from banks and other lenders. Prices selected for Mineral Resource estimation are 15% higher, which is in line with typical industry practice.

The average NSR factors are calculated using the LOM revenue contribution from each metal net of off-site costs and factors, divided by the reserve grade for that metal, and are indicative of the relative contribution of each metal unit to the economics of the mine. For most metals, a variable recovery (as a function of head grade) was used, and therefore the average NSR factors should not be applied to head grades without considering the head grade versus recovery relationship.

Metallurgical recoveries used for Mineral Resources are based on historical data which have been consolidated by Nexa as head grade vs. recovery curves shown in Figure 11-16, Figure 11-17, and Figure 11-18. These curves are developed by regression on data set of historical performance.

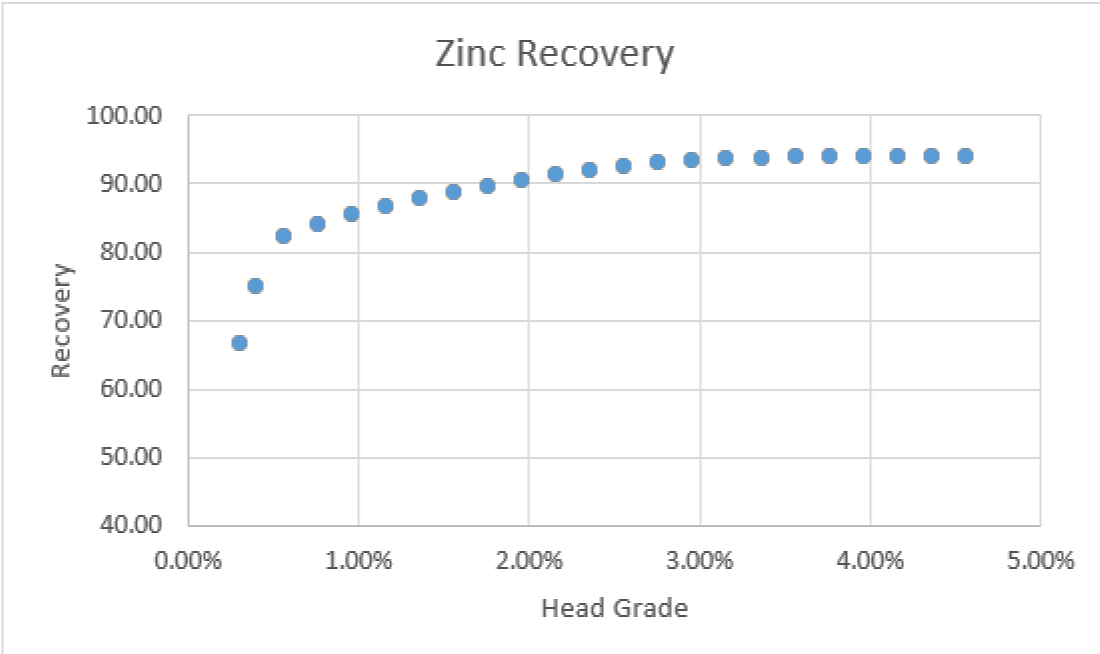


Figure 11-16: Zinc Recovery Curve

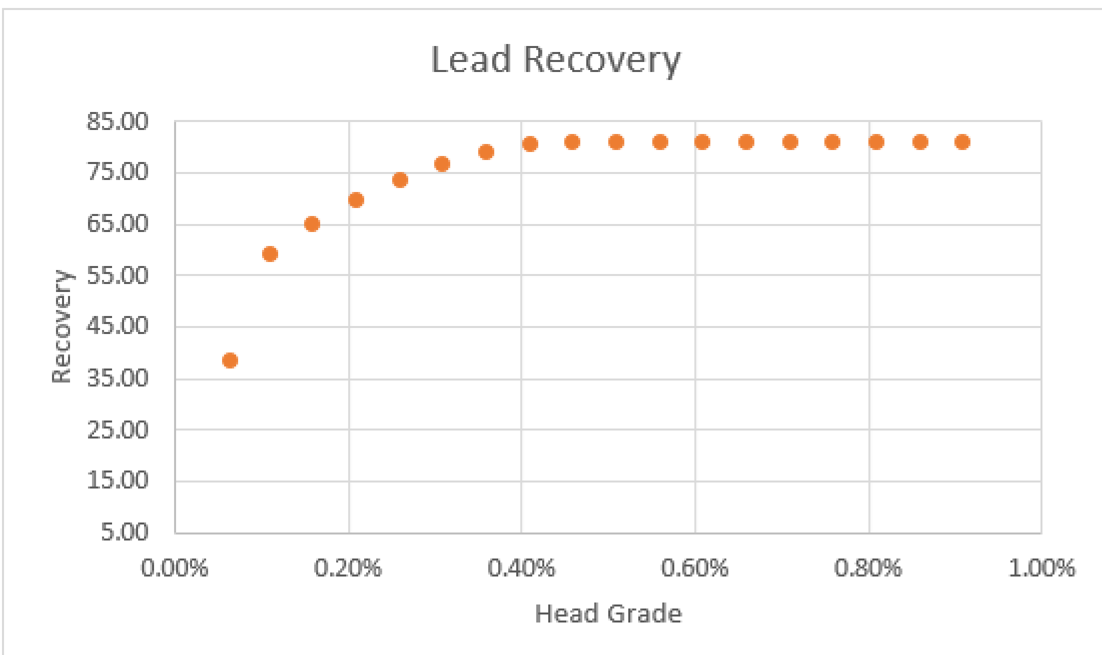


Figure 11-17: Lead Recovery Curve

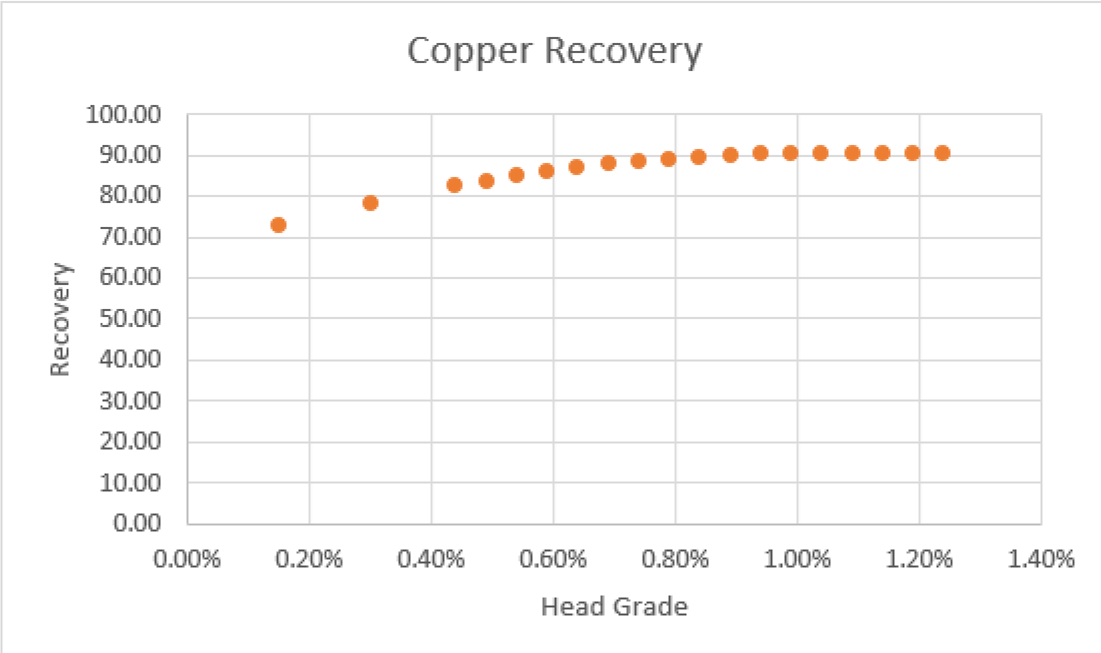


Figure 11-18: Copper Recovery Curve

Several cut-off NSR values (or cut-off grades) have been calculated for El Porvenir dependent on the mining zone and mining method. Each zone has a different material movement cost depending on whether truck haulage, shaft, or a combination of the two is used. Break-even cut-off grade includes direct and indirect mining costs, processing costs, and general and administrative (G&A) as shown in Table 11-23.

Table 11-23: Cut-Off Grade Calculation by Mining Zone and Method
Nexa Resources S.A. – El Porvenir Mine

Item	Units	C&F
Upper Zone		
Mine Cost	US$/t	42.26
Development	US$/t	13.82
Plant Costs	US$/t	10.50
G&A	US$/t	7.30
Cut-Off Grade	US$/t	60.06
Intermediate Zone		
Mine Cost	US$/t	43.29
Development	US$/t	13.82
Plant Costs	US$/t	10.50
G&A	US$/t	7.30

Item	Units	C&F
Cut-Off Grade	US$/t	61.09
Lower Zone		
Mine Cost	US$/t	41.95
Development	US$/t	13.82
Plant Costs	US$/t	10.50
G&A	US$/t	7.30
Cut-Off Grade	US$/t	59.75
Mine Deepening Zone		
Mine Cost	US$/t	45.57
Development	US$/t	13.82
Plant Costs	US$/t	10.50
G&A	US$/t	7.30
Cut-Off Grade	US$/t	63.37

Mining costs have been reviewed, and SLR considers that the operating costs are reasonable for this type of operation and mining methods.

11.14 Classification

Definitions for resource categories used in this report are those defined by SEC in S-K 1300. Mineral Resources are classified into Measured, Indicated, and Inferred categories.

Blocks were classified as Measured, Indicated, and Inferred based on drill hole spacing requirements determined from global variograms for the mineralization domains with a combination of the number of holes. Three classification groups were defined based on geology, grade continuity, and volume. Separate classification interpolation passes were run to flag the resource categories for each group. Flagging of the blocks by drill hole spacing was done by using a search pass with dimensions as described in Table 11-25.

The first pass involved a numerical block classification based on the number of drill holes and search radii in Table 11-25 followed by a post processing of the classification to remove isolated blocks to avoid the "spotted dog" effect and to demonstrate continuity between samples.

The classification of the Mineral Resource estimate was applied as follows:

- **Measured Mineral Resources:** Measured blocks were defined, using criteria as defined in Table 11-25, and supported with data of a low level of uncertainty as follows:
    - **Drilling, sampling, and sample preparation and assay procedures**: follow industry standards and best practices.
    - **Reliability of sampling data:** Good database integrity and representativity based on SLR's independent data verification and validation, as well as no significant bias observed in QA/QC analysis results.

   - **Confidence in interpretation and modelling of geological and estimation domains:** The drill hole spacing is sufficient to confirm the location and continuity of the geological and estimation domain wireframes and has been confirmed by underground mapping in places at Veta Carmen Norte 3, Exito, Socorro 2 and 4, and Carmen Norte 1, and Veta Carmen Norte 1.
   - **Geology and grade continuity:** Based on drilling and underground mapping, trend analysis and variography show reasonable geology and grade continuity.
   - **Confidence in estimation of block grades for the main metals:** Block grades correlate well with composite data, statistically and spatially, locally and globally.
   - **Acceptable bulk density representativity:** Sufficient density measurements have been taken for the main domains.
   - **Well supported drilling spacing criteria:** Block grade interpolations are based on a minimum of three drill holes using search radii that are based on reasonable variograms ranges.
- **Indicated Mineral Resources:** Indicated blocks were defined, using criteria as defined in Table 11-25, and supported with data of a low and/or medium level of uncertainty as follows:
   - **Drilling, sampling, and sample preparation and assay procedures:** follow industry standards and best practices.
   - **Reliability of sampling data:** Acceptable database integrity and representativity based on SLR's independent data verification and validation, as well as no significant bias observed in QA/QC analysis results.
   - **Confidence in interpretation and modelling of geological and estimation domains:** The drill spacing is sufficient to assume the locations and continuity of grade. Most of the main domains (Veta Carmen Norte 3, Porvenir 9, Progreso, and Sara) show good agreement with the drill holes or/and underground mapping and some minor domains show relatively acceptable agreement with the drill holes and underground mapping where the density of drill holes is less, particularly at the mineralization edges.
   - **Geology and Grade Continuity:** Based on drilling and underground mapping, trend analysis and variography, main domains show reasonable geology and grade continuity.
   - **Confidence in estimation of block grades for the main metals:** Block grades correlate well with composite data, statistically and spatially, locally and globally.
   - **Acceptable bulk density representativity:** Sufficient density measurements were taken for most of the main domains, and reasonable density measurements for some of the domains with limited density measurements available at some of the mineralization edges.
   - **Well supported drilling spacing criteria:** Block grade interpolations are based on a minimum of three drill holes using search radii that are based on reasonable variograms ranges.
- **Inferred Mineral Resources:** Inferred blocks were defined, using criteria as defined in Table 11-24 and supported with data of a low and/or medium and/or high level of uncertainty as follows:
   - **Drilling, sampling, and sample preparation and assay procedures:** follow industry standards and best practices.
   - **Reliability of sampling data:** Acceptable database integrity and representativity based on SLR's independent data verification and validation, as well as no significant bias observed in

QA/QC analysis results. There are some areas with drill holes pre-2006 with limited data support, however, most of these zones are surrounding with drill holes with good data support.

- **Confidence in interpretation and modelling of geological and estimation domains:** Mineralization domain solids show relatively acceptable agreement with the drill holes and underground mapping where the density of drill holes is less, particularly at the mineralization edges and areas supported by wider drill hole spacing is implied.
- **Geology and grade continuity:** Based on drilling and underground mapping, trend analysis and variography, some domains show good geology and grade continuity, some other domains geometries are less well defined, and geological and grade continuity for these domains is less continuous and more variable.
- **Confidence in estimation of block grades for the main metals:** Block grades correlate reasonably well with composite data, statistically and spatially, locally and globally.
- **Bulk density representativity:** Reasonable for most of the domains. Density measurements for some domains are required.

Infill drilling: More drilling is required to determine continuity of mineralization in areas of wide drill spacing in order to upgrade Inferred Resources to Indicated.

Table 11-24: Nexa Search Ellipse Ranges for Classification Criteria
Nexa Resources S.A. – El Porvenir Mine

Classification Groups	Measured	Indicated	Inferred
Major Continuity Zones	25 m x 25 m x 12.5 m	50 m x 50 m x 25 m	100 m x 100 m x 50 m
Medium Continuity Zones	20 m x 20 m x 10 m	50 m x 50 m x 25 m	100 m x 100 m x 50 m
Minor Continuity Zones	15 m x 15 m x 10 m	40 m x 40 m x 20 m	60 m x 60 m x 30 m
Minimum DDH in ellipse[1]	3	3	2

Note:

1. Minimum DDH in ellipse refers to the isotropic search ellipsoid used to flag the distances in the blocks

Figure 11-19 show histogram validations of the classification based on the distance of each block to its closest sample for the major, medium, and minimum continuity domains, respectively. Figure 11-20 and Figure 11-21 show a plan view and a longitudinal section of the final model classification.

The SLR QP reviewed the classification results and is of the opinion that the resource classification criteria developed by El Porvenir are reasonable and acceptable, however, SLR noticed that there are a small number of areas where the largest continuity was assigned to small mineralization solids due to merging small wireframes for estimation purposes. This observation is not significant as there were few areas observed, however, SLR recommends re-evaluating the Measured and Indicated classification in these smaller solids. SLR also recommends monitoring the production data to confirm the drill spacing is appropriate for detailed planning.

The SLR QP is of the opinion that the definitions for Mineral Resources used in this report have been classified in accordance with the definitions for Mineral Resources in S-K 1300, which are consistent with CIM (2014) definitions.

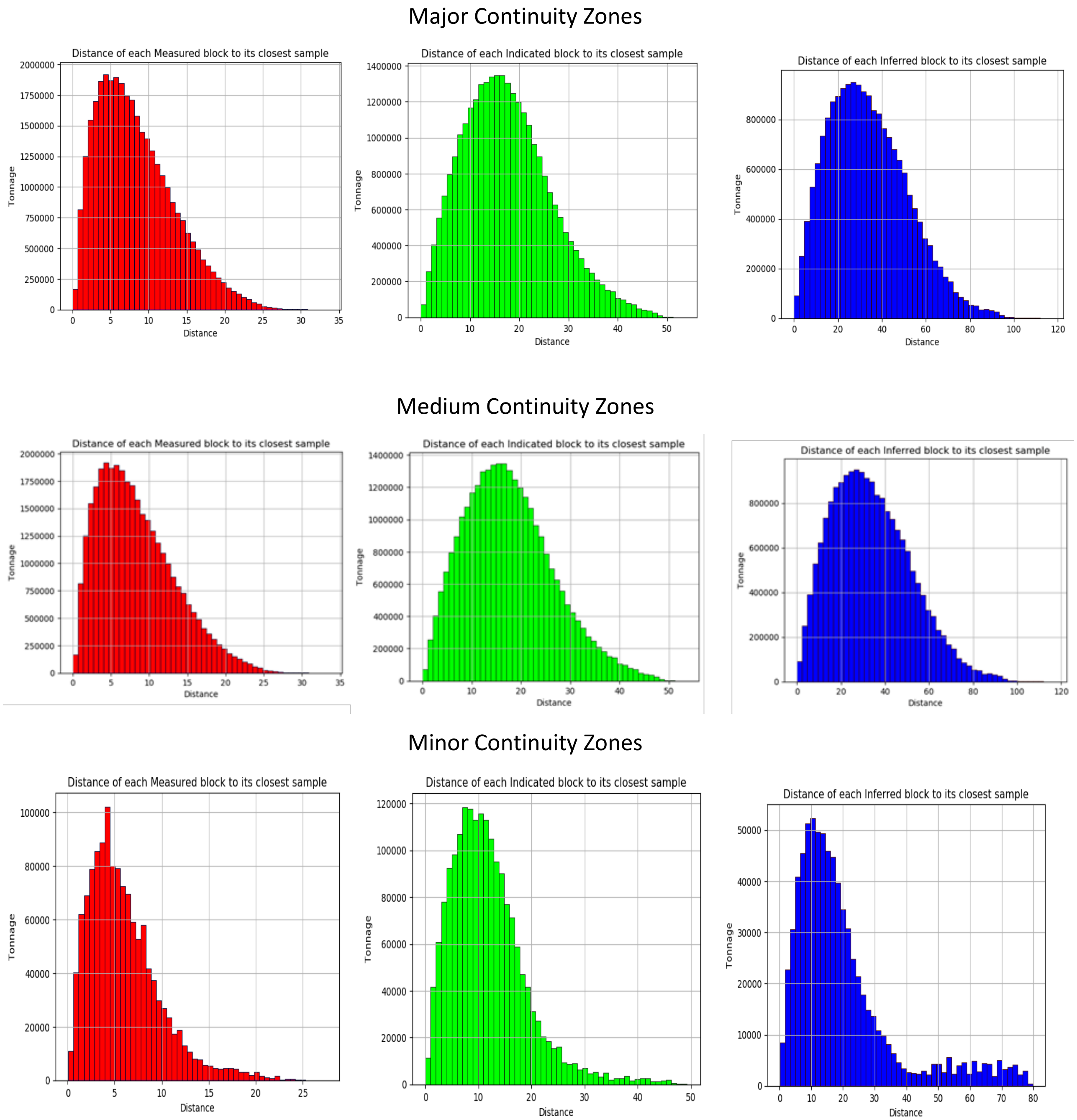


Figure 11-19: Histogram of Distance (M) by Category and Continuity Zone

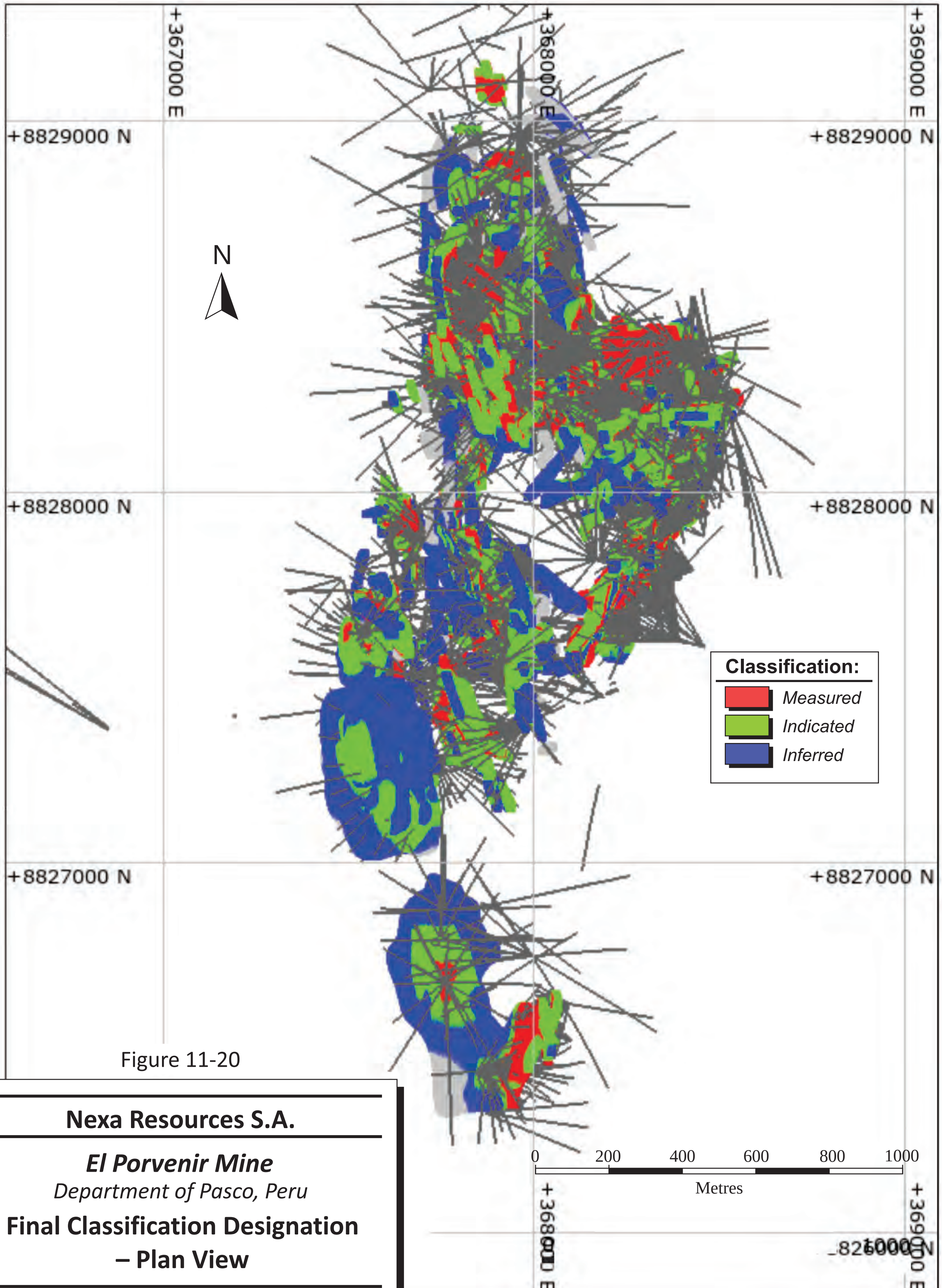


Figure 11-20

Nexa Resources S.A.

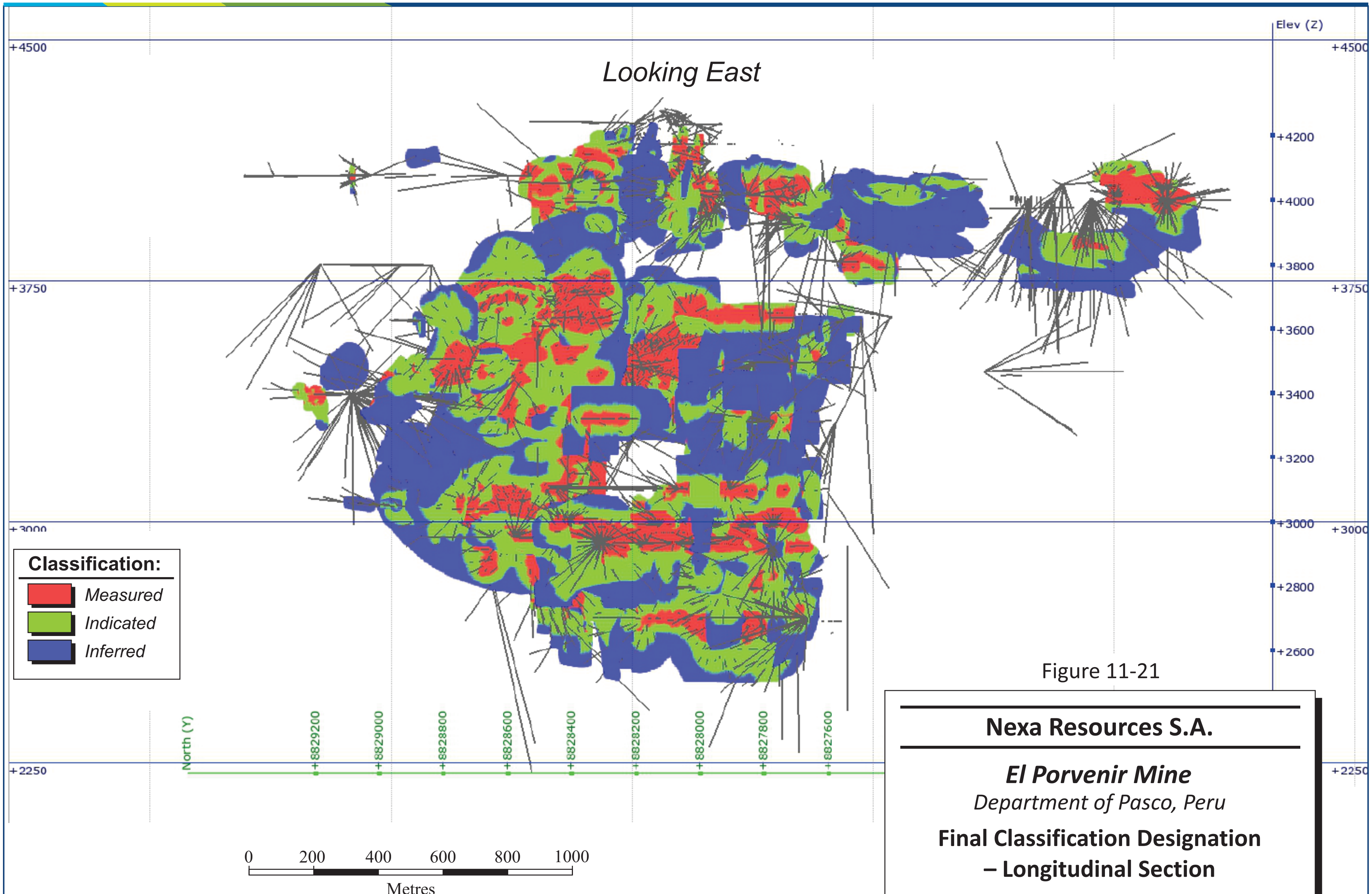
El Porvenir Mine

Department of Pasco, Peru

Final Classification Designation – Plan View

January 2021

Source: Nexa, 2020.



January 2021

Source: Nexa, 2020.

Figure 11-21

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Final Classification Designation – Longitudinal Section

11.15 Block Model Validation

Nexa and SLR carried out a number of block model validation procedures including:

- Visual inspection of composite versus block grades (Figure 11-22, Figure 11-23, Figure 11-24, and Figure 11-25).
- Comparison between OK, ID^3, NN, and composite mean grades (Table 11-25).
- Swath plots (Figure 11-26).
- Histogram comparison of grade block distribution versus composite grade distribution (Figure 11-27).

11.15.1 Visual Validation

A visual comparison on vertical sections and plan views found good overall correlations between the block and composite grades. Figure 11-22, Figure 11-23, Figure 11-24, and Figure 11-25 illustrate the visual correlation between the block and composite grades in the vcn3 and vcn32 mineralization domains on cross sections looking north for Zn, Pb, Cu, and Ag, respectively. There is a better correlation in the blocks closest to the composites as opposed to the blocks located further away, which show a reasonable degree of smoothing.

Nexa and SLR visually compared the composite and block grades on plans and sections and found that they correlated well spatially.

11.15.2 Global Statistical Comparison

The OK or ID^3 block means for each mineralization domain were compared with the NN estimations. These comparisons produced percentage differences between the estimates which were within ±10% in most of the domains, with the exception of domains dl11, por9o, and por9q that appear to be underestimated and exiti1, porv9e, and por9cf1 that appear to be overestimated. Overall, the comparisons show that the methods used to estimate grades were appropriate. Table 11-25 shows an example of this comparison for the largest contributor domains for the Mineral Resource and the Mineral Reserve. SLR recommends reviewing the grade interpolation of these domains to control high grade smearing in low grade areas and vice versa. A grade domain will also help to prevent smearing.

Table 11-25: Comparison of ID^3, OK, and NN Zinc Grades – Measured and Indicated Blocks
Nexa Resources S.A. – El Porvenir Mine

Domain	Class	Inter. Method	# Blocks	ZN_NN		ZN_OK		Rel. diff in Means	ZN_IDW3		Rel. diff in Means
				Mean (%)	CV	Mean (%)	CV		Mean (%)	CV	
de2	1	IDW3	35,886	2.53	1.53	2.69	1.02	-6%	2.77	1.05	***-9%***
de2	2	IDW3	42,173	2.41	1.11	2.32	0.64	4%	2.44	0.77	***-1%***
dl01	2	IDW3	30,088	2.43	0.85	2.30	0.41	6%	2.29	0.53	***6%***
dl05	2	IDW3	22,252	2.73	1.40	2.75	0.87	-1%	2.66	0.97	***3%***
dl11	2	IDW3	5,885	2.63	0.70	2.17	0.25	19%	2.18	0.40	***19%***
exiti1	2	IDW3	3,908	2.27	1.45	4.45	0.57	-65%	3.24	0.81	***-35%***

Domain	Class	Inter. Method	# Blocks	ZN_NN Mean (%)	ZN_NN CV	ZN_OK Mean (%)	ZN_OK CV	Rel. diff in Means	ZN_IDW3 Mean (%)	ZN_IDW3 CV	Rel. diff in Means
exito	1	IDW3	55,586	3.55	0.86	3.68	0.46	-3%	3.66	0.56	***-3%***
exito	2	IDW3	101,243	3.35	0.95	3.50	0.53	-4%	3.40	0.66	***-1%***
exitoa	1	IDW3	3,341	5.58	0.75	5.41	0.36	3%	5.43	0.43	***3%***
exitoa	2	IDW3	7,912	4.90	0.84	4.61	0.40	6%	5.39	0.43	***-10%***
exitob	1	IDW3	2,579	5.73	0.63	5.80	0.33	-1%	5.88	0.39	***-3%***
exitob	2	IDW3	13,377	5.06	0.75	5.34	0.37	-5%	5.38	0.43	***-6%***
porv9a	1	OK	13,820	6.61	0.92	6.56	0.54	**1%**	6.83	0.57	*-3%*
porv9a	2	OK	79,718	3.98	1.15	4.63	0.59	**-15%**	4.43	0.71	*-11%*
porv9e	1	IDW3	10,301	5.57	0.93	5.83	0.45	-5%	5.79	0.45	***-4%***
porv9e	2	IDW3	28,628	3.09	1.27	3.60	0.70	-15%	3.69	0.74	***-18%***
porv9w	1	IDW3	16,978	3.10	1.21	3.31	0.60	-7%	3.36	0.68	***-8%***
porv9w	2	IDW3	128,987	2.76	1.82	2.89	1.02	-5%	2.80	1.26	***-2%***
por9cf1	1	IDW3	1,790	5.70	1.16	5.70	0.61	0%	5.87	0.80	***-3%***
por9cf1	2	IDW3	10,145	4.35	1.23	5.11	0.60	-16%	5.08	0.77	***-16%***
por9o	1	IDW3	33,522	2.37	2.03	2.20	1.23	8%	2.10	1.32	***12%***
por9o	2	IDW3	94,951	2.82	1.35	3.08	0.94	-9%	3.11	1.03	***-10%***
por9p	1	IDW3	56,296	4.11	1.23	4.14	0.73	-1%	4.15	0.77	***-1%***
por9p	2	IDW3	88,538	4.25	1.16	4.30	0.67	-1%	4.32	0.81	***-2%***
por9q	1	IDW3	4,003	2.77	1.72	2.54	0.93	9%	2.34	1.12	***17%***
por9q	2	IDW3	113,741	4.97	1.13	5.00	0.58	-1%	5.05	0.78	***-2%***
por9r	1	IDW3	42,930	2.81	1.18	2.58	0.58	9%	2.51	0.62	***11%***
por9r	2	IDW3	34,198	3.87	0.89	2.54	0.51	42%	2.65	0.57	***37%***
por9s	2	IDW3	52,578	3.38	1.08	3.02	0.95	11%	3.26	1.00	***4%***
por9u	2	IDW3	15,549	2.08	1.09	2.10	0.49	-1%	2.23	0.59	***-7%***
sara1	2	IDW3	35,771	1.11	1.26	1.16	0.60	-5%	1.12	0.80	***-1%***
sara2	2	IDW3	39,877	1.51	1.27	1.37	0.86	9%	1.41	0.99	***7%***
sara3	2	IDW3	33,713	0.63	0.99	0.60	0.54	4%	0.60	0.69	***6%***
vcarmn	1	IDW3	6,721	6.99	1.06	6.97	0.75	0%	7.12	0.76	***-2%***
vcarmn	2	IDW3	68,807	8.05	1.06	7.75	0.71	4%	7.62	0.82	***5%***
vcn3w6	2	IDW3	14,019	3.74	0.72	3.16	0.40	17%	3.38	0.53	***10%***
vcn3w8	2	IDW3	21,119	4.24	1.38	4.38	0.63	-3%	4.39	0.85	***-4%***
vcn32	1	IDW3	2,479	4.77	0.90	4.71	0.57	1%	4.89	0.64	***-2%***

Domain	Class	Inter. Method	# Blocks	ZN_NN		ZN_OK		Rel. diff in Means	ZN_IDW3		Rel. diff in Means
				Mean (%)	CV	Mean (%)	CV		Mean (%)	CV	
vcn32	2	IDW3	77,285	6.74	0.79	6.75	0.40	0%	6.86	0.53	***-2%***
vc1b	1	IDW3	5,583	6.46	0.96	7.11	0.39	-10%	7.03	0.47	***-9%***
vc1b	2	IDW3	14,406	4.47	1.22	4.99	0.54	-11%	4.59	0.70	***-3%***
vc31	1	IDW3	103,152	4.63	1.12	4.56	0.71	1%	4.52	0.78	***2%***
vc31	2	IDW3	73,470	5.37	1.20	5.15	0.74	4%	5.41	0.89	***-1%***
vprg	1	IDW3	392,908	5.93	1.05	6.04	0.70	-2%	6.06	0.74	***-2%***
vprg	2	IDW3	476,484	3.25	1.44	3.44	1.01	-6%	3.39	1.09	***-4%***
v12ne	1	IDW3	44,661	4.20	1.20	4.09	0.56	3%	4.12	0.77	***2%***
v12ne	2	IDW3	31,050	4.78	1.23	4.28	0.59	11%	4.41	0.77	***8%***
v12s33	1	IDW3	20,983	2.62	1.10	2.62	0.66	0%	2.53	0.72	***4%***
v12s33	2	IDW3	11,721	5.18	0.84	4.99	0.60	4%	5.39	0.69	***-4%***
v5i	1	OK	75,980	7.48	0.85	7.45	0.42	**0%**	7.46	0.47	*0%*
v5i	2	OK	71,267	3.28	1.36	3.61	0.76	**-10%**	3.46	0.88	*-5%*
v5ne5	2	IDW3	11,036	2.74	0.81	2.88	0.49	-5%	2.86	0.58	***-4%***

In the SLR QP's opinion, the statistical tables that compare the declustered composite mean (NN) and block zinc grades show that the two populations have similar distributions with not much grade smoothing evident.

11.15.3 Local Validation

Swath plots were generated to assess for local bias and to compare the differences between the OK and ID^3 block grade estimates and the NN estimated grades for each domain and element. The plots in Figure 11-26 show the combined Measured, Indicated, and Inferred blocks in the east, north, and vertical directions. SLR considers that the results show acceptable agreement of composite (NN) and block grades.

Histograms comparing the composite grades versus the block grades suggest that the grade distribution of these two data are similar. An example is shown in Figure 11-27.

On the basis of its review and validation procedures, the SLR QP is of the opinion that the grade estimates for zinc, copper, lead, and silver are reasonable, and that the block model is suitable to support Mineral Resource and Mineral Reserve estimation.

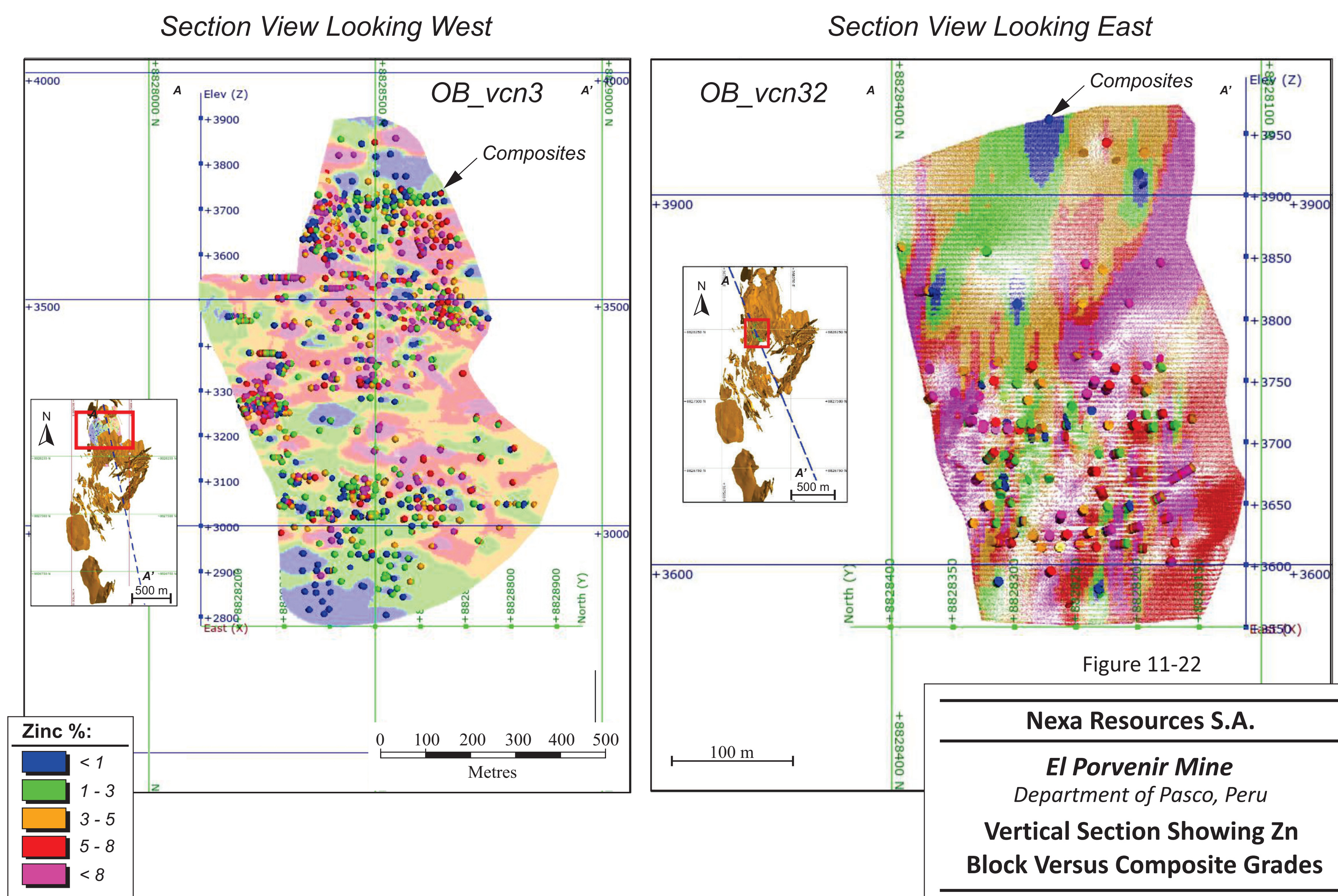


Figure 11-22

Nexa Resources S.A.

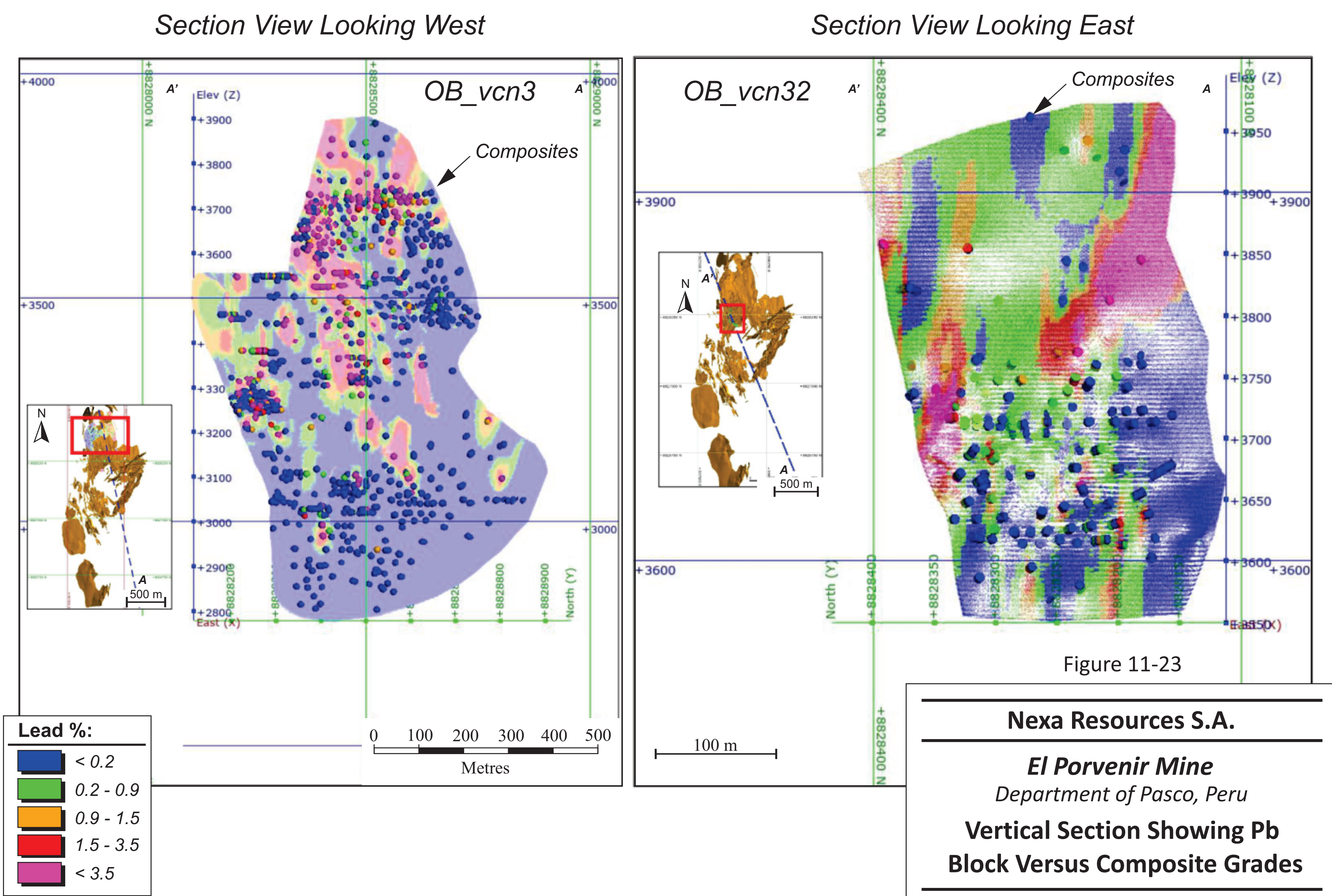
El Porvenir Mine

Department of Pasco, Peru

Vertical Section Showing Zn Block Versus Composite Grades

January 2021

Source: Nexa, 2020.



January 2021

Source: Nexa, 2020.

Figure 11-23

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Vertical Section Showing Pb Block Versus Composite Grades

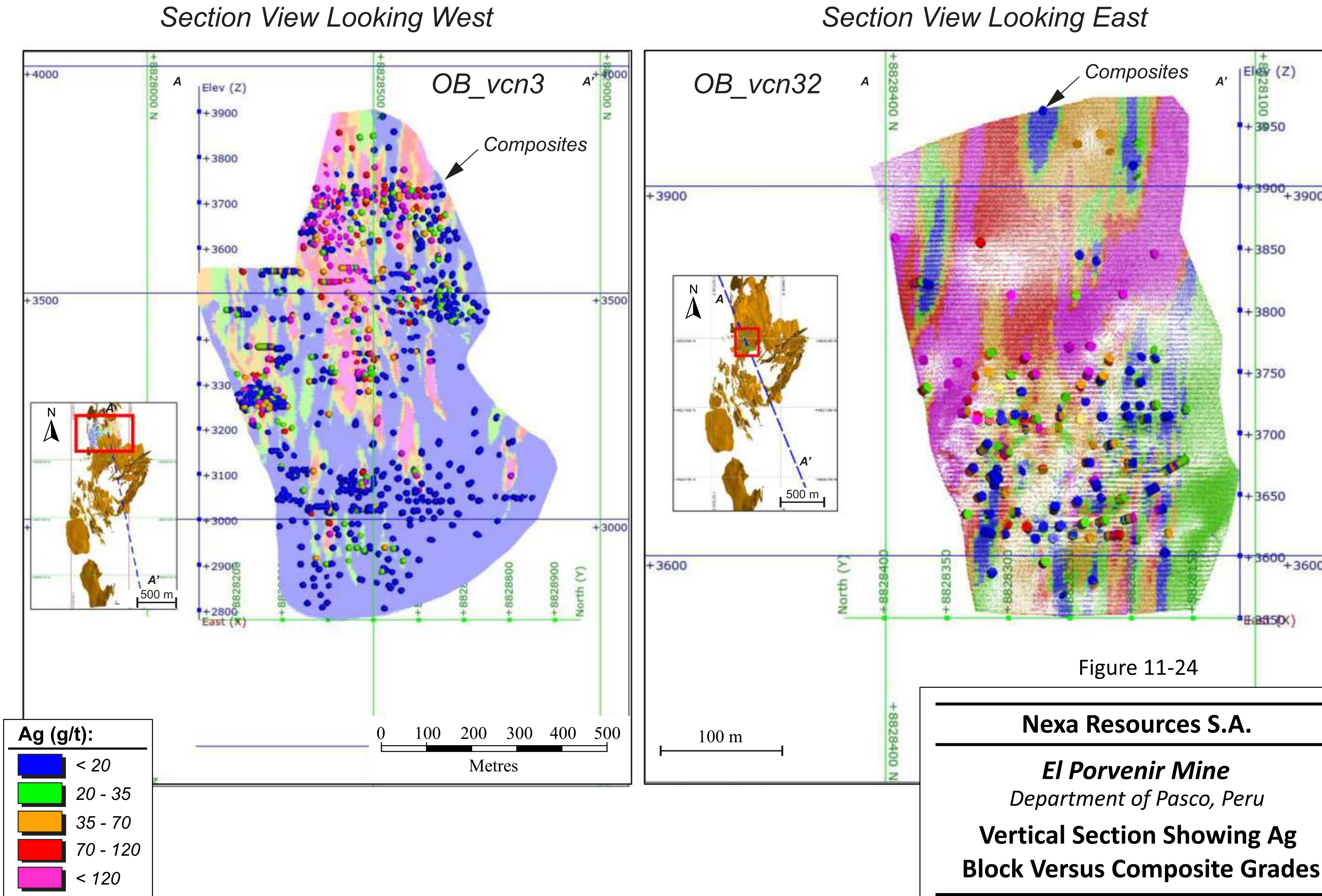


Figure 11-24

Nexa Resources S.A.

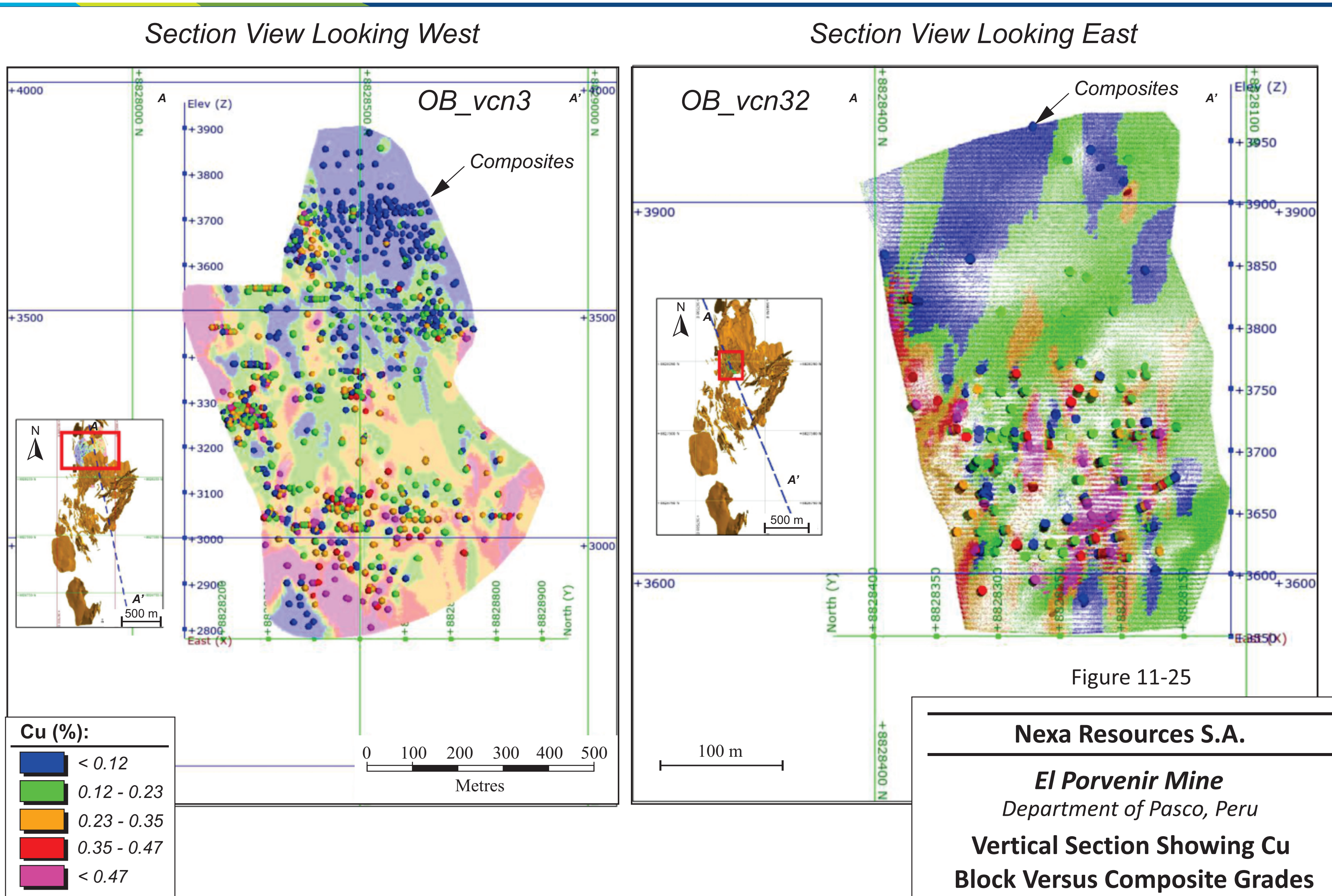
El Porvenir Mine

Department of Pasco, Peru

Vertical Section Showing Ag Block Versus Composite Grades

January 2021

Source: Nexa, 2020.



January 2021

Source: Nexa, 2020.

Figure 11-25

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Vertical Section Showing Cu Block Versus Composite Grades

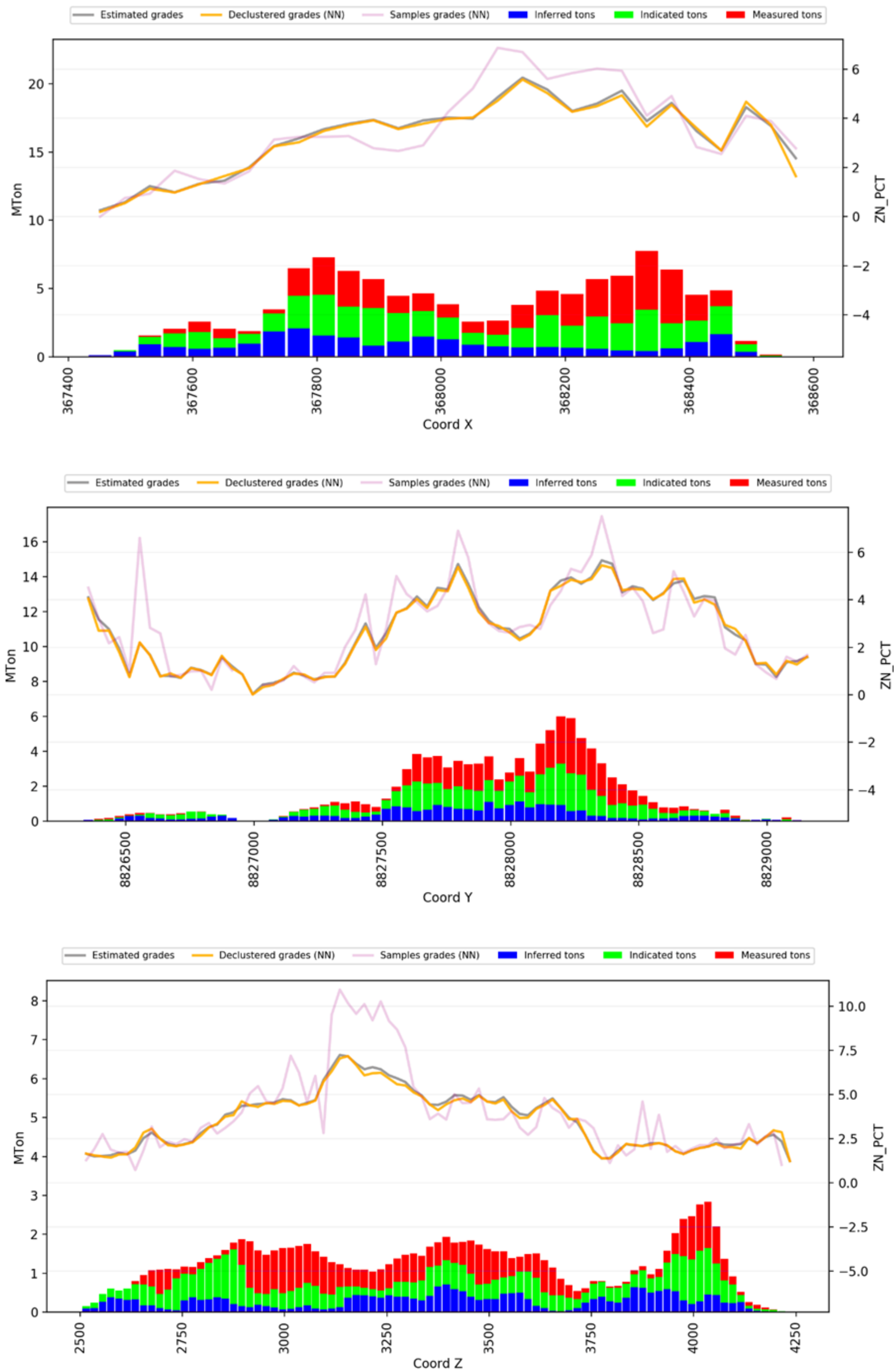


Figure 11-26: Swath Plot: Zn Grade Variation Along X, Y, and Z

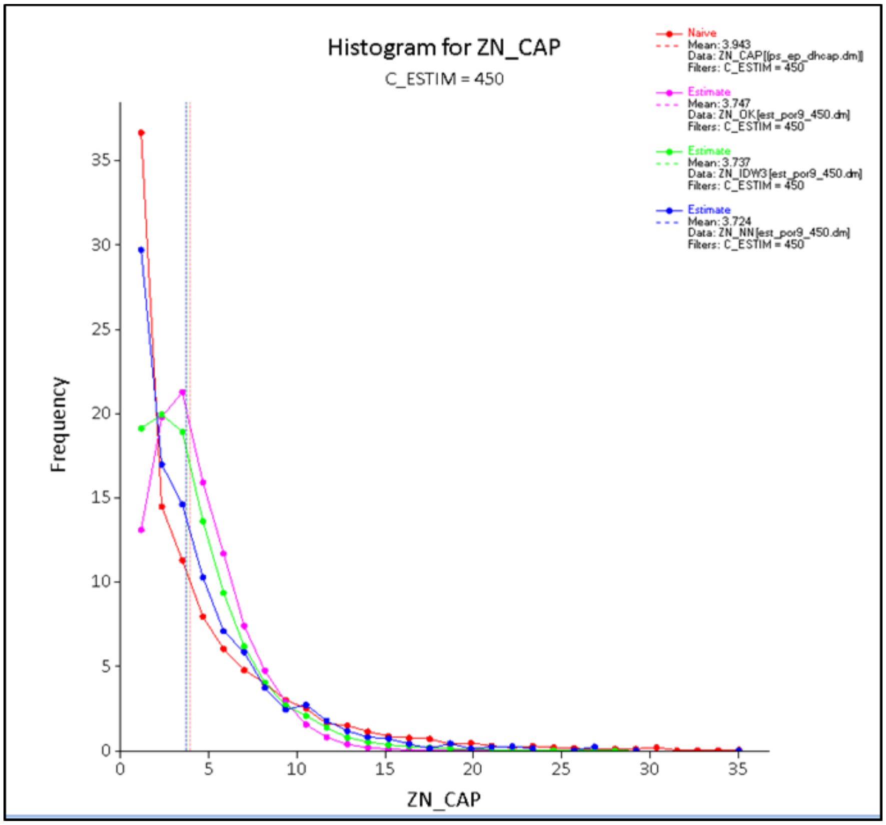


Figure 11-27: Zn OK, ID^3, Nn Blocks Versus Zn Composite Histograms

11.16 Mineral Resource Reporting

The Mineral Resources for the El Porvenir underground operation as of December 31, 2020, are summarized in Table 11-1. The Mineral Resource estimate was reported using all the material within resource shapes generated in Deswik software, satisfying minimum mining size, continuity criteria, and using NSR cut-off values of US$60.06/t for the Upper Zone, US$61.09/t for the Intermediate Zone, US$59.75/t for the Lower Zone, and US$63.37/t for the Mine Deepening Zone for C&F resource shapes (Figure 11-28 and Figure 11-29). NSR cut-off values for the Mineral Resources were established using a zinc price of US$2,869.14/t Zn, a lead price of US$2,249.40/t Pb, a copper price of US$7,427.59/t Cu, and a silver price of US$19.38/oz Ag. El Porvenir Mineral Resources are in compliance with the S-K 1300 resource definition requirement of “reasonable prospects for economic extraction”.

Wireframe models for the underground excavations as of September 30, 2020 were prepared to remove the portions of the mineralized zones that had been mined-out before the resource and reserve stopes were generated. Mineral Resource and Mineral Reserves estimates were depleted for forecast production from October 1, 2020 to December 31, 2020. After year end, SLR verified the estimate by reviewing actual mining results for this short period of projected mining. Deviations from plan were approximately 1% less of total Mineral Reserves tonnage. The SLR QP is of the opinion that this has had an insignificant impact on the year end resource and reserve estimates. The sub-blocking functions of the Deswik software package were employed to maximize the accuracy of the mined-out contacts. For the underground excavations, solid models of the stopes, mine development, and drifts were constructed digitally from data collected using a total station surveying unit.

Nexa also generated solids for non-recoverable areas (“constraint” solids) due to poor ground conditions and inaccessibility, to remove these zones from the Mineral Resources and Mineral Reserves. SLR considers generating operational and safety constraints to identify, quantify, and remove the tonnes and grades from Mineral Resources and Mineral Reserves to be a good practice. SLR recommends documenting all the data support to define non-recoverable solids and document any changes to these solids.

The SLR QP reviewed the resource shapes and is of the opinion that overall they are reasonable, however, there are few areas where shapes do not follow the mineralization trend wireframe and, as a result, unnecessary internal dilution was incorporated and some resources were excluded locally. SLR recommends adjusting these resource shapes to follow mineralization trend.

SLR also noticed that there is a significant amount of tonnes within blocks above the NSR cut-off value that were not included in the Mineral Resources or Mineral Reserves, and are not part of the “constraint” solids. Nexa and SLR reviewed these areas and note that they are mostly skin remnants, however, SLR recommends re-evaluating these zones on an ongoing basis to potentially include part of these tonnes with continuous blocks that have the potential to be recoverable, to generate resource shapes and possibly reserve stopes.

SLR also observed a minor overlapping of the resource shapes with areas that were within the “constraint solids”, and few reserve stopes that were overlapping with mined-out solids. The overlapping volume is not material as it is less than 1%. Nevertheless, the SLR QP recommends improving and cleaning up the mined-out solids to deplete appropriately the block model and resource and reserve shapes, and incorporating a validation step of reviewing for overlapping of solids.

In the SLR QP’s opinion, the assumptions, parameters, and methodology used for the El Porvenir underground Mineral Resource estimates are appropriate for the style of mineralization and mining methods.

The SLR QP is of the opinion that with consideration of the recommendations summarized in Section 1 and Section 23, any issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

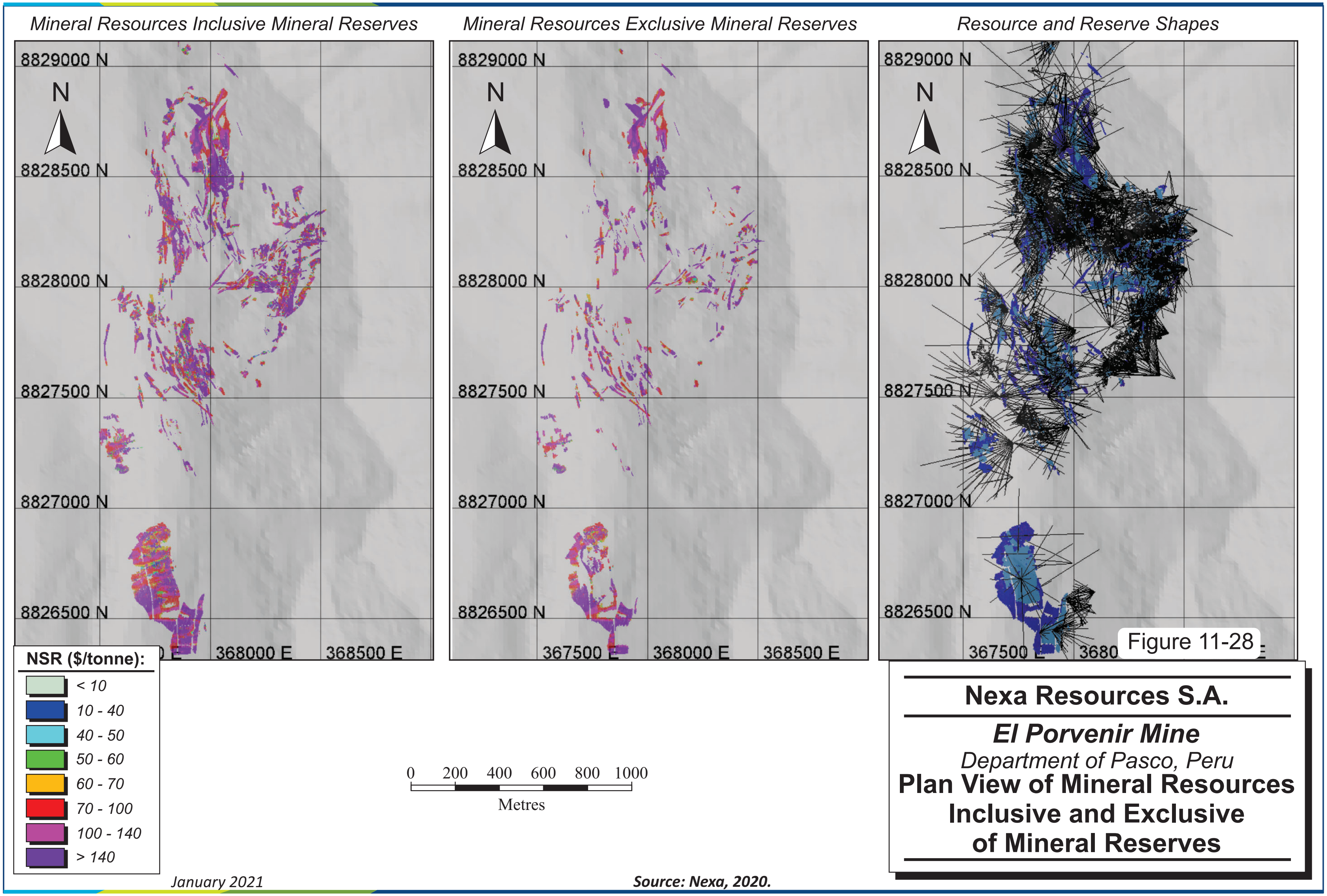


Figure 11-28

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Plan View of Mineral Resources Inclusive and Exclusive of Mineral Reserves

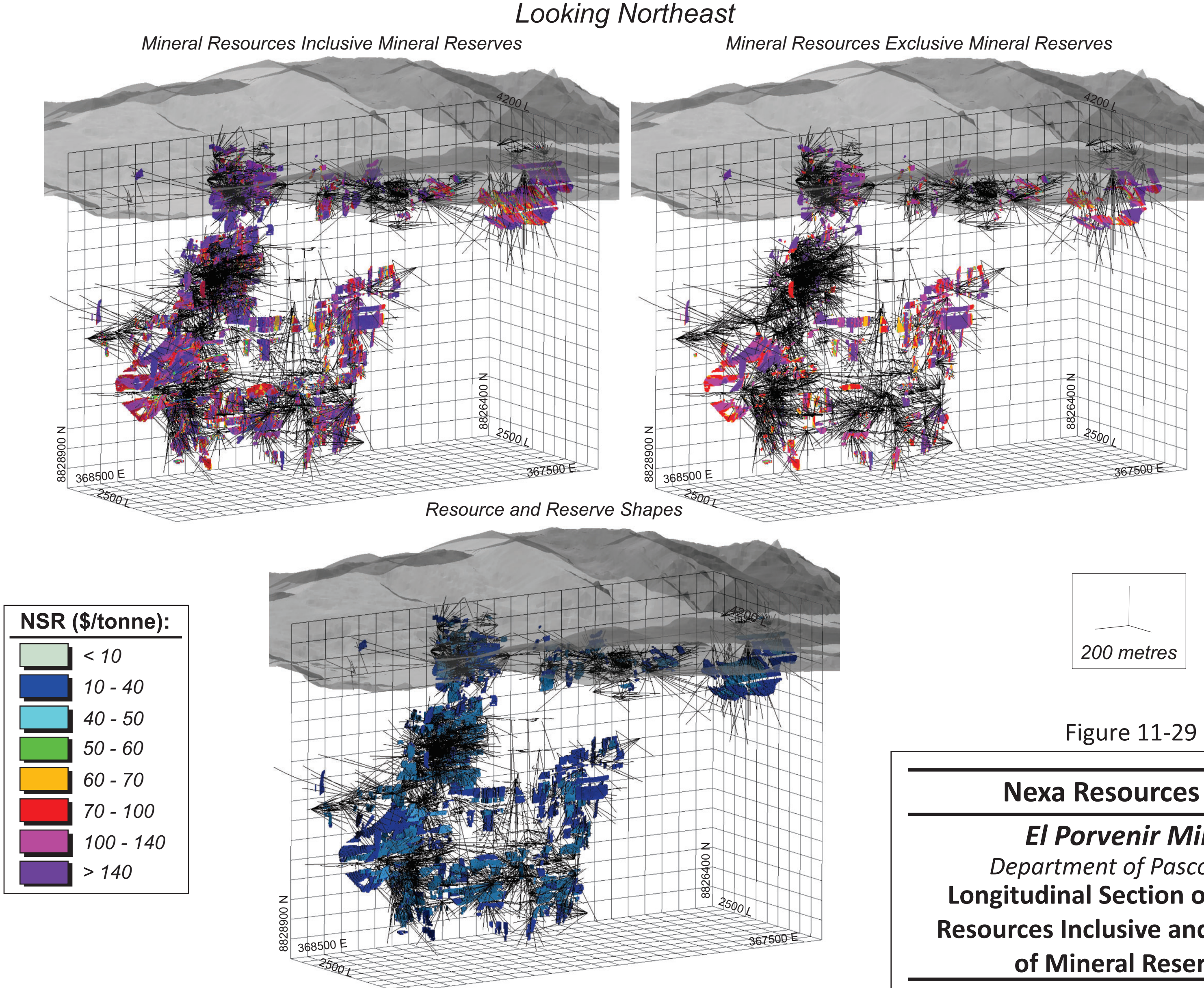


Figure 11-29

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Longitudinal Section of Mineral Resources Inclusive and Exclusive of Mineral Reserves

January 2021

Source: Nexa, 2020.

11.17 Comparison to Previous Mineral Resource Estimates

A comparison of the current Nexa Mineral Resource estimate, exclusive of Mineral Reserves, to the previous 2019 Mineral Resource estimate is presented in Table 11-26. Mineral Resources are reported on an 80.16% Nexa attributable ownership basis. Overall, the resources have slightly decreased. The differences are primarily due to the following changes:

- Higher NSR cut-off values.
- Decrease in tonnes in Porvenir 9, Progreso, Veta 1204 due to changes in interpretation, and in Carmen Norte 3, Carmen Norte 4, Veta 1204 inferior, and Socorro due to new drilling and reinterpretation. Some of the decrease in tonnes was offset by delineating new resources in Sara, and incorporating more resources in Don Lucho, AM, Integration ATA EP, Carmen 1, and Exito.
- Depletion of material through mining.
- Incorporation of "constraint " solids or non-recoverable areas that are excluded from the Mineral Reserves and Mineral Resources, due to poor ground conditions and inaccessibility.
- Increase in silver values due to higher capping values.
- Slightly lower density values due to the addition of 219 density determinations from the 2019-2020 drilling campaign located mostly at Sara, Don Lucho, Integration ATA EP, Veta Carmen Norte 3, and Veta AM.

Table 11-26: EL Porvenir Underground Comparison of 2020 versus 2019 Mineral Resources
Nexa Resources S.A. – El Porvenir Mine

Category	El Porvenir Mineral Resources - December 31, 2020									El Porvenir Mineral Resources - December 31, 2019								
	Tonnage	Grade				Contained Metal				Tonnage	Grade				Contained Metal			
	(Mt)	(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)	(Mt)	(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)
Measured	0.18	2.59	0.99	0.23	63.46	4.8	1.8	0.4	378	0.83	3.1	1.08	0.21	70.2	25.8	9.0	1.8	1,881
Indicated	1.07	2.93	0.89	0.2	63.33	31.3	9.5	2.1	2,176	1.00	3.2	1.01	0.21	57.8	32.5	10.1	2.1	1,861
M+I	1.25	2.87	0.91	0.2	63.35	36.1	11.4	2.6	2,554	1.84	3.2	1.04	0.21	63.4	58.3	19.1	3.8	3,741
Inferred	6.79	3.6	0.95	0.23	78.37	244.5	64.8	15.9	17,110	7.46	3.6	0.85	0.22	58	270.1	63.4	16.4	13,917

12.0 MINERAL RESERVE ESTIMATES

12.1 Summary

El Porvenir is an underground mine that, at full output, produces approximately 5,600 tpd of ore. The Mine has been in operation since 1949. The current Mineral Resource and Mineral Reserve model consists of 430 deposits of various sizes and dips.

The Mineral Reserves are grouped into four mining zones, which are differentiated by elevation (Table 12-1).

Table 12-1: El Porvenir Mining Zones
Nexa Resources S.A. – El Porvenir Mine

Original Name	Term Used in Report	Definition
Zona Alta	Upper Zone	Above 3,700 m
Zona Intermedia	Intermediate Zone	Between 3,100 m and 3,700 m
Zona Baja	Lower Zone	Between 2,900 m and 3,100 m
Profundizacion	Mine Deepening Zone	Below 2,900 m

The Upper Zone is the oldest mining area, where most of the mineralized areas have been mined, with currently available stopes mainly corresponding to the recovery of remnant material and new mineralized zones. The vertical spacing of levels in the Upper Zone ranges between 60 m and 100 m.

The Intermediate and Lower zones are the major current mining areas with levels spacing of approximately 200 m.

The Mine Deepening Zone is the future mining area at depth and has a level spacing of 100 m.

El Porvenir uses two mining methods, C&F and SLS. C&F uses the overhand method to extract the ore using attack ramps and is employed in areas of poor ground conditions that do not allow for the SLS method to be used. The SLS method is used in areas that have favourable ground conditions and are steeply dipping.

Measured and Indicated Mineral Resources were used as inputs for conversion into Proven and Probable Mineral Reserves, respectively, and for the mine design process.

Mineral Reserves were estimated by flagging mined-out stope surveys through September 2020 and planned mining to December 31, 2020, as zero-values in the block model. After year end, SLR verified the estimate by reviewing actual mining results for the short period of projected mining. Deviations from the plan, amounting to approximately 1% of total Mineral Reserves tonnage, were caused by 2020 infill drilling and mining of some areas classified as Inferred at the time of the estimate. SLR considers these deviations to be typical of ongoing mining operations, and not significant or material to the estimate of Mineral Reserves.

The Mineral Reserves for El Porvenir as of December 31, 2020 are summarized in Table 12-2.

Table 12-2: Mineral Reserves – December 31, 2020
Nexa Resources S.A. – El Porvenir Mine

Category	Tonnage (000 t)	Grade				Contained Metal			
		(% Zn)	(% Pb)	(% Cu)	(g/t Ag)	(000 t Zn)	(000 t Pb)	(000 t Cu)	(000 oz Ag)
Proven	3,017	3.76	0.98	0.25	62.9	113.3	29.6	7.6	6,094
Probable	8,085	3.74	0.85	0.22	62.8	302.7	68.5	18.0	16,324
Total	11,102	3.75	0.88	0.23	62.8	416.0	98.1	25.6	22,418

Notes:

1. The definitions for Mineral Reserves in S-K 1300 were followed for Mineral Reserves which are consistent with CIM (2014) definitions.
2. Mineral Reserves are reported on an 80.16% Nexa attributable ownership basis.
3. Mineral Reserves are estimated at cut-off grades depending on the zone and mining method.
4. Mineral Reserves are estimated using average long term prices of Zn: US$2,494.90/t (US$1.13/lb); Pb: US$1,956.00/t (US$0.89/lb); Cu: US$6,457.90/t (US$2.93/lb); Ag: US$16.85/oz.
5. Metallurgical recoveries are accounted for in the NSR calculations based on historical processing data and are variable as a function of head grade. Recoveries at the LOM average head grades are 89.6% for Zn, 79.2% for Pb, 14.3% for Cu, and 77.5% for Ag.
6. A minimum mining width of 5 m was used.
7. Density is 3.12 t/m^3.
8. Numbers may not add due to rounding.

The SLR QP is not aware of any risk factors associated with, or changes to, any aspect of the modifying factors such as mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

12.2 Dilution

The following formula is used to determine the amount of dilution in a stope:

$$Dilution\ (\%) = \frac{\text{mass of waste}}{\text{mass of ore} + \text{mass of waste}}$$

The dilution used in the Mineral Reserve estimation is implemented through two means:

- Dilution by design (internal dilution)
- Dilution by overbreak (planned/operational dilution)

Dilution by design refers to the waste incorporated during the stope design process, in which portions of waste wall rock (non categorized) and Inferred blocks are incorporated inside the shape of the stopes. This is commonly referred to as internal dilution and is shown inside the blue stope design in Figure 12-1.

Dilution by overbreak is determined from several factors such as:

- Geometry of the mineralized zone
- Mining method
- Operational conditions
- Geomechanics
- Rock mechanics implemented

- Presence of water

These factors determine the amount of planned overbreak in a stope.

The dilution factor for C&F is 0.5 m of dilution applied to the hanging wall and footwall of the design. The dilution was applied using DSO.

The dilution factor for SLS stopes is 10% and is applied post design as a factor. Nexa is in the process of determining the dilution factor for each mining method and is using the above factors as an acceptable base point. The SLS stopes are in good ground and have an average dip of 80°. In the SLR QP's opinion, the factor used is reasonable.

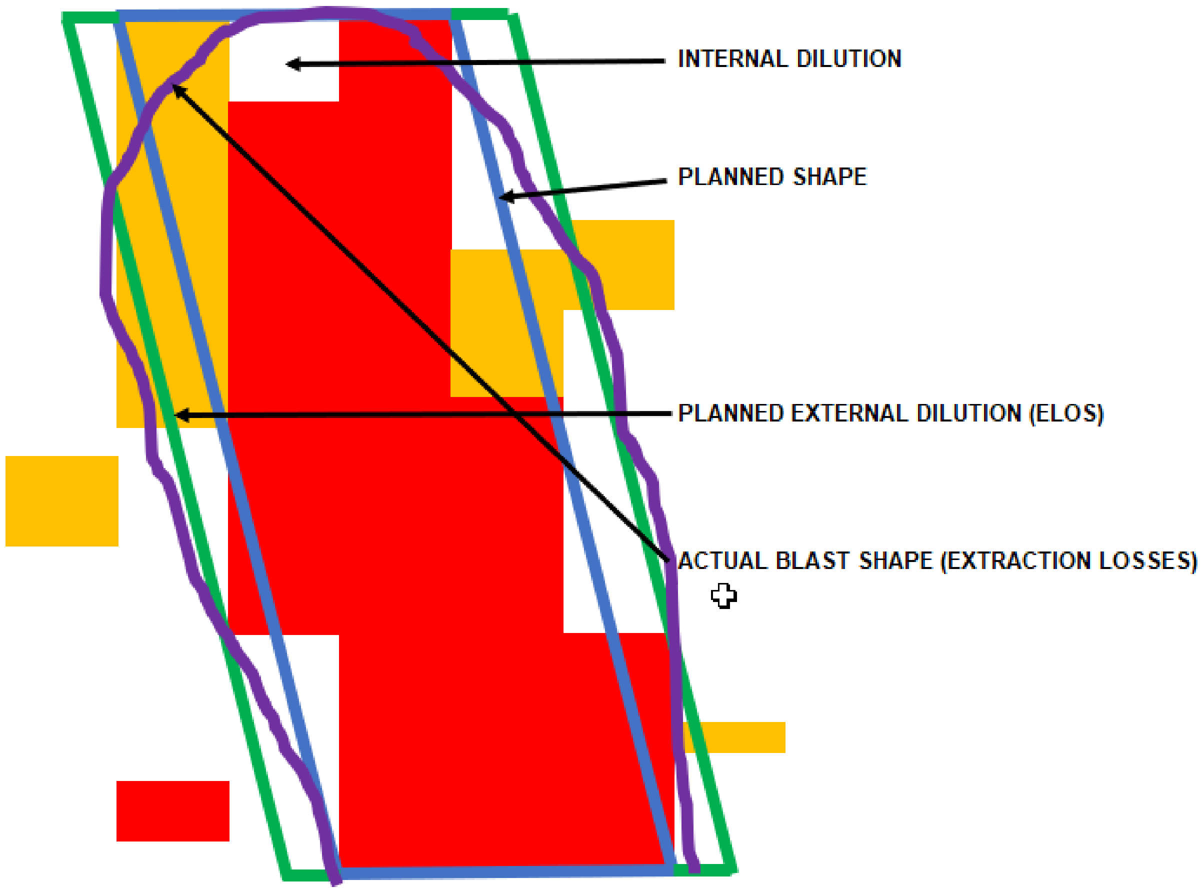


Figure 12-1: Schematic Section View of Stope Illustrating Dilution and Extraction Values in a Stope

12.3 Net Smelter Return

A NSR value calculation was performed on potential mining blocks, considering the following attributes:

- Grades: Zn, Pb, Cu, Ag
- Metal prices
- Metallurgical recovery
- Commercial terms and conditions

The NSR value is expressed as US$/t and is calculated for Mineral Reserves to make an adequate comparison with production costs in order to determine whether mined material is ore (economically minable) or waste.

The sellable products from the Mine are:

- Zinc concentrate
- Lead concentrate with silver content
- Copper concentrate with silver content

The payable metals in concentrates include the applicable concentrate treatment, transportation, refining charges, deductions, and penalty elements, according to sales agreements signed between mines and smelters or traders.

Costs and other parameters used to calculate the NSR cut-off value are shown in Table 12-3. The metal prices are based on 10 year average of the LME projected prices.

The average NSR factors are calculated using the LOM revenue contribution from each metal net of off-site costs and factors, divided by the reserve grade for that metal, and are indicative of the relative contribution of each metal unit to the economics of the mine. For most metals, a variable recovery (as a function of head grade) was used, and therefore the average NSR factors should not be applied to head grades without considering the head grade versus recovery relationship. Therefore, the NSR factors are variable by head grade. The grade-recovery relationship for each metal based on recent operating performance are presented in Figure 12-2, Figure 12-3, and Figure 12-4.

Table 12-3: NSR Data
Nexa Resources S.A. – El Porvenir Mine

Item	Units	
Net Metallurgical Recovery *		
Zn	%	89.60
Pb	%	79.21
Cu	%	14.29
Ag	%	77.50
Cu Concentrate Payable %		
Cu	%	96.7
Ag	%	90
Pb Concentrate Payable %		
Pb	%	95
Ag	%	95

Item	Units	
Zn Concentrate Payable %		
Zn	%	94.6
Ag	%	70
Metal Prices		
Zn	US$/lb	1.13
Pb	US$/lb	0.89
Cu	US$/lb	2.93
Ag	US$/oz	16.85
Logistics and TC		
Zn Concentrate	US$/t conc	$295
Pb Concentrate	US$/t conc	$266
Cu Concentrate **	US$/t conc	$279
Integrated Zn		
Conversion Cost	US$/t Zn prod	$452
Premium	US$/t Zn prod	$173
Refining Cost		
Ag in Pb conc	US$/oz	$1.00
Ag in Cu conc	US$/oz	$0.50

* Based on LOM average metal grades

** Included a US$16.68/t penalty

Nexa reviewed supply and demand projections for zinc, lead, and copper, as well as consensus long term (ten year) metal price forecasts. SLR verified that Nexa's selected metal prices for estimating Mineral Reserves are in line with independent forecasts from banks and other lenders.

Metallurgical recoveries used for Mineral Reserves are based on historical data which has been consolidated by Nexa in Ore Head Grade vs. Recovery Curves presented in Figure 12-2, Figure 12-3, and Figure 12-4. These curves are developed by regression of historical performance data sets.

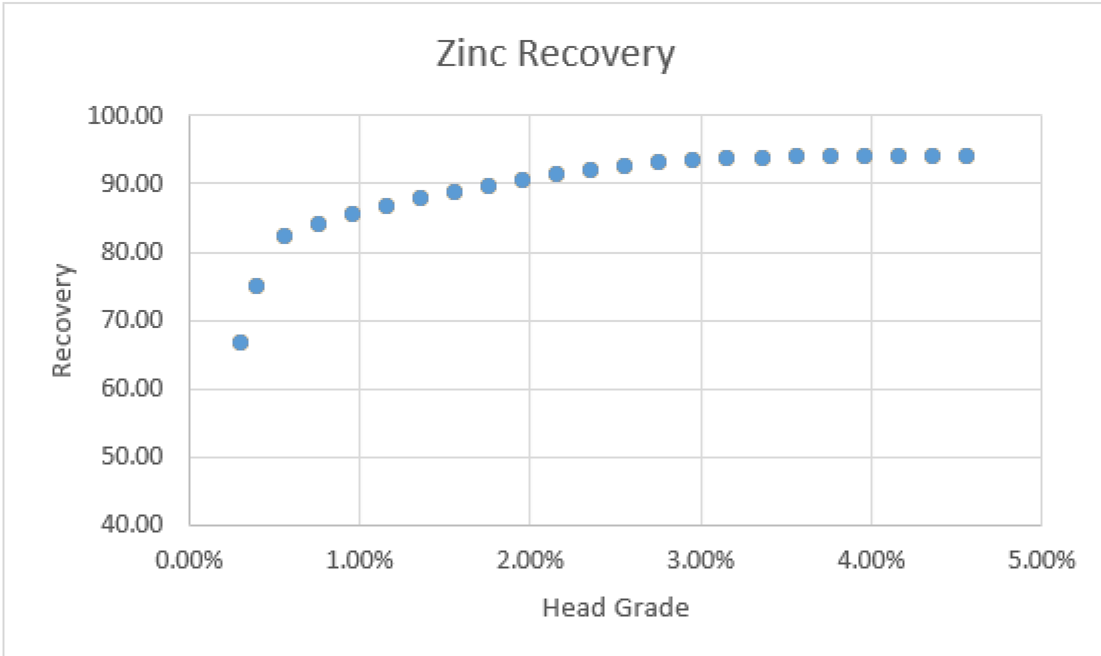


Figure 12-2: Zinc Recovery Curve

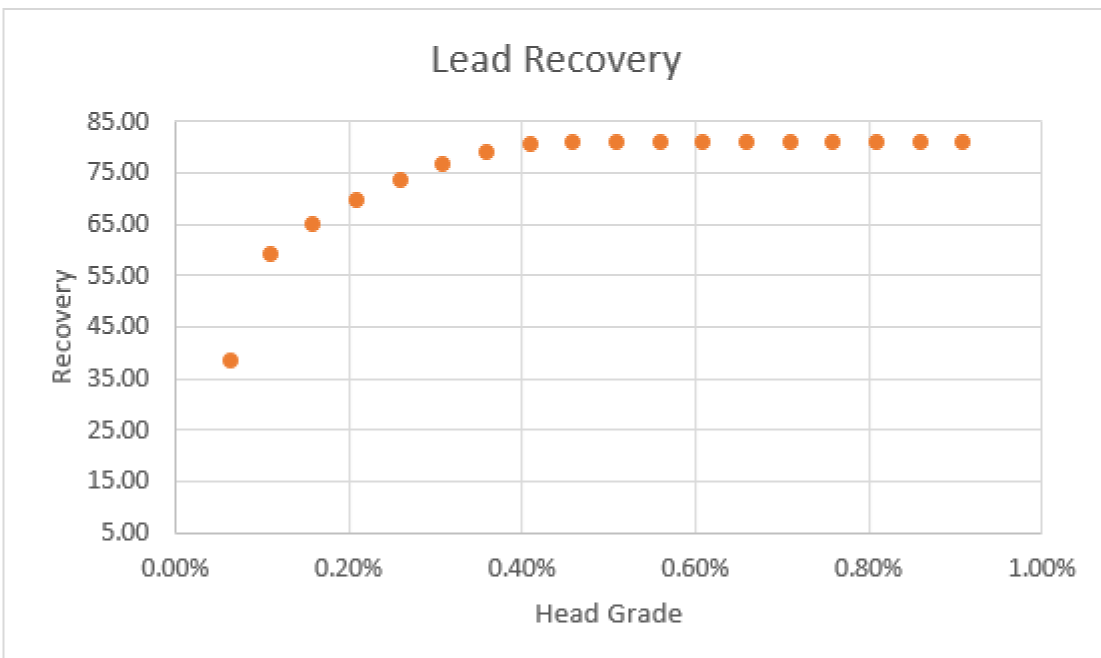


Figure 12-3: Lead Recovery Curve

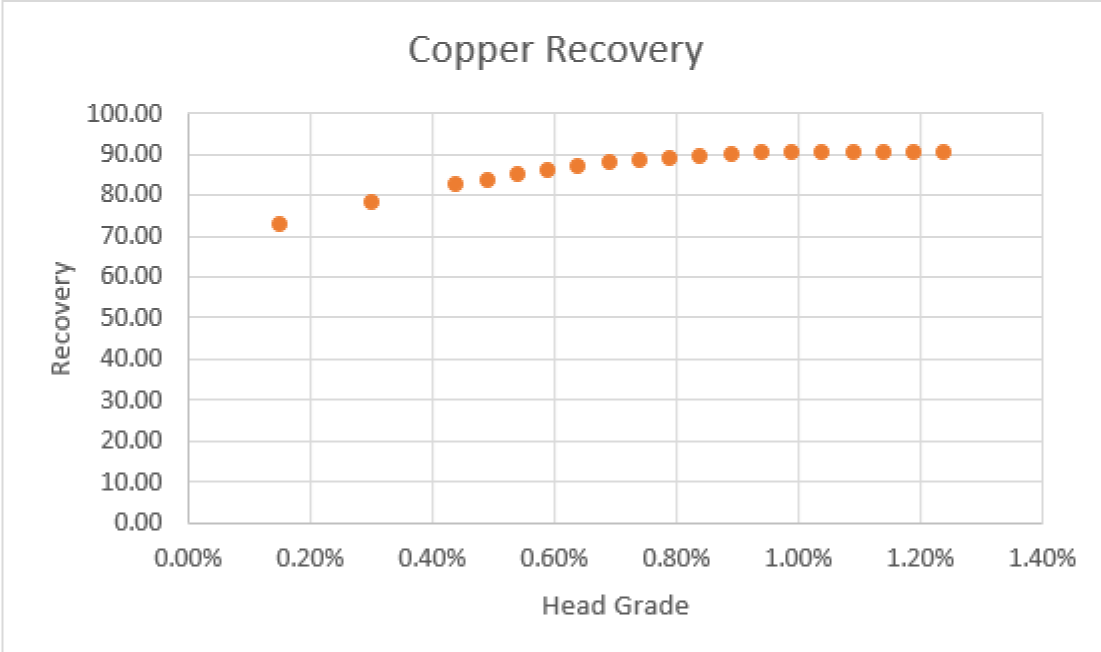


Figure 12-4: Copper Recovery Curve

12.4 Cut-Off Grade

Metal prices used for Mineral Reserves are based on consensus, long term forecasts from banks, financial institutions, and other sources. For Mineral Resources, metal prices used are slightly higher than those for Mineral Reserves.

Several cut-off NSR values (or cut-off grades) have been calculated for El Porvenir dependent on the mining zone and mining method. Each zone is based on an elevation range as listed in Table 12-1. Each zone has a different material movement cost depending on whether truck haulage, shaft, or a combination of the two is used. The Lower Zone, for instance, has a lower cut-off grade than the other zones due to heavy skipping influence as shown in Table 12-4, below. Economic cut-off grade included direct and indirect costs as follows:

- Mining costs (including cost of mine development costs)
- Processing costs
- G&A costs

Measured or Indicated blocks that have an average NSR value above the economic cut-off grade, are scheduled to be mined, and are not isolated (i.e., a single stope far from other stopes) are classified as economically mineable and included in the Mineral Reserve estimate.

Marginal mining blocks are defined as blocks below the economic cut-off grade, which, however, benefit from certain conditions such as location and thus can be evaluated using a marginal cut-off grade. The stopes generally have development complete due to development accessing adjacent stopes and therefore, the development costs are removed for such marginal blocks resulting in the marginal cut-off grade.

Capital costs have been averaged in cut-off grade calculation.

Mining blocks with an NSR value below the marginal cut-off grade are classified as waste.

Table 12-4: Cut-Off Grade Calculation by Mining Zone and Method
Nexa Resources S.A. – El Porvenir Mine

Item	Units	SLS Costs	C&F Cost
Upper Zone			
Mine Cost	US$/t	38.95	42.26
Development	US$/t	13.82	13.82
Plant Costs	US$/t	10.50	10.50
G&A	US$/t	7.30	7.30
Cut-Off Grade	US$/t	56.75	60.06
Marginal Cut-Off Grade	US$/t	42.93	46.24
Development Cost	US$/m	1,395.73	1,395.73
Intermediate Zone			
Mine Cost	US$/t	39.98	43.29
Development	US$/t	13.82	13.82
Plant Costs	US$/t	10.50	10.50
G&A	US$/t	7.30	7.30
Cut-Off Grade	US$/t	57.78	61.09
Marginal Cut-Off Grade	US$/t	43.96	47.27
Development Cost	US$/m	1,395.73	1,395.73
Lower Zone			
Mine Cost	US$/t	38.64	41.95
Development	US$/t	13.82	13.82
Plant Costs	US$/t	10.50	10.50
G&A	US$/t	7.30	7.30
Cut-Off Grade	US$/t	56.44	59.75
Marginal Cut-Off Grade	US$/t	42.62	45.93
Development Cost	US$/m	1,395.73	1,395.73
Mine Deepening Zone			
Mine Cost	US$/t	42.26	45.57
Development	US$/t	13.82	13.82
Plant Costs	US$/t	10.50	10.50
G&A	US$/t	7.30	7.30

Item	Units	SLS Costs	C&F Cost
Cut-Off Grade	US$/t	60.06	63.37
Marginal Cut-Off Grade	US$/t	46.24	49.55
Development Cost	US$/m	1,395.73	1,395.73

SLR considers that the operating costs are reasonable for this type of operation and mining methods.

13.0 MINING METHODS

13.1 Introduction

El Porvenir is one of the deepest underground mines in South America, extending more than 1,800 m below the main access level. El Porvenir produces approximately 2.1 Mtpa of zinc-lead-copper ore using two mining methods, with the predominant method being mechanized overhand C&F. C&F has been used at El Porvenir for many decades and accounts for over 80% of its production. The remainder of the output comes from SLS, which was introduced at the operation in 2018. El Porvenir uses a version of this method called Avoca, also referred to as longitudinal longhole retreat mining.

Mine production is presently underway in the Upper Zone, the Intermediate Zone, the Lower North Zone, and the Lower West (El Porvenir 9) Zone (Figure 13-1). Table 13-1 indicates the mining methods used in the active mineral deposits within these zones.

Table 13-1: Mining Methods in Active Mining Zones
Nexa Resources S.A. - El Porvenir Mine

	C&F	SLS
Upper Mine Zone		
DE2	✓	
V1204	✓	
CN4	✓	
AM	✓	
Don Lucho	✓	
Intermediate Mine Zone		
CN3	✓	
Exito		✓
Carmen	✓	✓
Lower North Mine Zone		
CN3	✓	
Lower West Mine Zone		
Porvenir-9	✓	

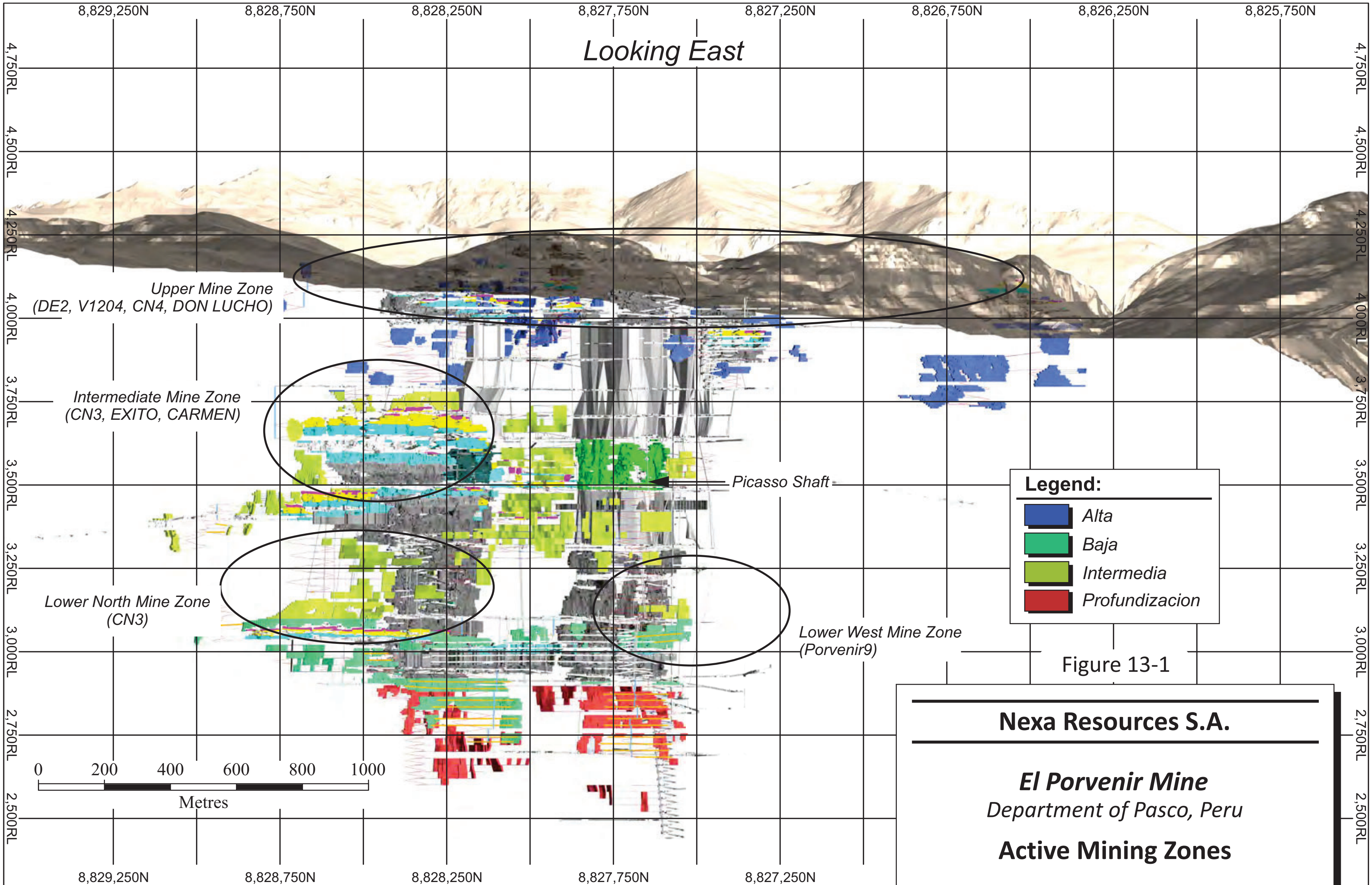


Figure 13-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Active Mining Zones

January 2021

Source: SLR, 2020.

13.2 Mine Design and Mining Methods

Table 13-2 through Table 13-5 present the design parameters used for modelling Mineral Reserves. Respectively, these tables provide the parameters for stope design, development excavations, production rates, dilution, and recovery.

Table 13-2: Long Term Stope Design Parameters
Nexa Resources S.A. - El Porvenir Mine

Item	Method	Parameters (m)
Height	C&F	5.00
	SLS	20.00
Minimum Width	C&F	5.00
	SLS	5.00
Maximum Width	C&F	10.00
	SLS	8.00
Length	C&F	5.00
	SLS	10.00
Minimum Pillar - Veins	C&F	5.00
	SLS	5.00
Rib Pillar	C&F	-
	SLS	10.00
Sill Pillar - Panels	Above Level -440	10.00
	Below Level -440	15.00
Pillar - Surface	Upper Zone	30.00

Table 13-3: Development Design Parameters
Nexa Resources S.A. - El Porvenir Mine

Item	Width (m)	Height (m)	Grade (%)	Radius (m)
Ramps for Truck Haulage	4.50	4.00	13%	18.00
Ramps for Load-Haul- Dump Units (LHDs)	4.50	4.00	13%	18.00
Main Crosscut	4.50	4.00	+ 1%	8.00
Crosscut between Veins	4.50	4.00	+ 1%	8.00
Bypass	4.50	4.00	Per design	8.00
Access to Orebody	4.50	4.00	15%	8.00

Item	Width (m)	Height (m)	Grade (%)	Radius (m)
Attack Ramps	Per design	Per design	Per design	8.00
Drift	4.50	4.00	+ 1%	8.00
Ventilation Drift	4.00	4.00	+ 1%	8.00
Electrical Substation	4.00	4.00	+ 1%	6.00
Sump	4.50	4.00	-15%	6.00
Diamond Drill Station	6.00	6.00	+ 1%	6.00
Raise Bore (diameter)	2.1/3.1	2.1/3.1	-	-
Raise (diameter)	2.1/3.1	2.1/3.1	-	-

Table 13-4: Long Term Production Rate Parameters
Nexa Resources S.A. - El Porvenir Mine

Item	Units	Parameters
C&F Crew Contribution - ZA	t/month	35,000
C&F Crew Contribution - ZI/ZB	t/month	38,000
SLS Contribution	t/month	17,500
Hydraulic Backfill	t/month	10,500
Advance per Crew	blasts/month	55
Output through Hoisting	t/month	133,000
Output through Truck Haulage	t/month	46,000
Ore Density	t/month	3.54
Waste Density	t/month	2.98

Table 13-5: Long Term Parameters For Dilution And Recovery
Nexa Resources S.A. - El Porvenir Mine

Item	Method	Units	Parameters
Operational Dilution	C&F	(m)	1.00
	SLS	(%)	10.00
Planned Dilution	C&F	(m)	Varies
	SLS	(%)	Varies
Recovery	C&F	(%)	98.00
	SLS	(%)	85.00

Table 13-6 and Table 13-7 provide monthly results for mine production and development advance during recent years. El Porvenir mined 2.11 Mt of ore in 2019 and 1.52 Mt in 2020, and advanced development headings by 12.2 km in 2019 and by 10.8 km in 2020. Dilution accounted for 37.5% of the ore tonnage produced in 2020.

Table 13-6: Mine Production -- Years 2018 to 2020
Nexa Resources S.A. - El Porvenir Mine

	Units	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2018														
Ore Mined	000 t	172.8	175.7	171.4	174.6	184.8	179.2	181.3	179.2	176.1	186.1	177.7	186.0	2,145.0
Stockpile	000 t	7.4	22.4	9.9	9.2	14.0	11.5	9.5	12.8	3.1	18.1	11.3	10.8	11.7
Dilution	%	23.1	16.3	16.2	22.8	20.9	21.5	22.1	24.6	22.0	22.0	22.0	36.8	22.6
2019														
Ore Mined	000 t	179.8	170.2	187.9	172.9	191.4	165.4	193.5	169.8	179.3	148.8	186.4	165.4	2,110.7
Stockpile	000 t	16.6	20.0	17.7	14.9	13.1	6.8	9.1	5.7	2.3	2.7	2.0	0.4	9.3
Dilution	%	34.0	25.3	33.4	41.9	35.9	39.6	35.5	38.8	31.8	34.1	29.0	27.4	33.9
2020														
Ore Mined	000 t	163.7	150.5	102.6	-	80.2	151.7	116.6	145.6	165.0	139.1	139.6	170.2	1,524.7
Stockpile	000 t	11.7	0.62	-	-	8.76	6.3	1.2	0.41	0.54	0.90	1.6	0.13	3.2
Dilution	%	36.5	36.5	31.6	-	29.1	38.4	35.4	44.2	45.0	35.3	37.0	36.0	37.5

Table 13-7: Development Advance - Years 2017 to 2020
Nexa Resources S.A. - El Porvenir Mine

Year	Units	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2017	m	1,427	1,111	847	1,039	1,085	1,128	1,095	963	974	1,065	1,156	873	12,762
2018	m	1,545	986	1,153	1,363	1,180	1,215	1,175	1,213	1,245	1,249	1,214	916	14,453
2019	m	1,135	1,235	1,138	955	763	977	1,120	1,021	983	976	999	939	12,242
2020	m	1,139	967	690	-	264	1,020	612	892	1,254	1,333	1,403	1,239	10.811

C&F and SLS have similar development requirements as they both involve dividing a mining zone into horizons between sublevels and excavating the ore in an ascending fashion. Sublevels are typically spaced at 20 m vertical intervals and accessed via spiral ramps. The development on each sublevel includes an access drift, a footwall drive, and crosscuts or attack ramps, which provide access to the orebody. For SLS, the footwall drive can be as close as 15 m from the footwall contact, whereas for C&F, they have to be offset from it by 60 m to provide sufficient distance for fanning the attack ramps. Figure 13-2 illustrates a zone mined with C&F, while Figure 13-3 shows a zone with SLS.

Figure 13-4 illustrates C&F's mining cycle, consisting of drilling, blasting, mucking, and ground support. Backfilling is carried out after completing a cut and before initiating the next higher-up one. Table 13-8 provides information about the method as applied at the Mine. With C&F, ore in an ore block is mined from bottom to top in five metre thick horizontal slices or cuts. The first cut of the stope is mined as a drift through the orebody, which is slashed out between the footwall and hanging wall contacts. The subsequent cuts are mined by breasting, which involves slashing the ore by drilling horizontal holes with the jumbo and blasting the ore downwards to the previous cut's free face. Following each breast, the broken ore is mucked and transported out of the stope with an LHD.

Table 13-8: Cut and Fill Mining Method at El Porvenir
Nexa Resources S.A. - El Porvenir Mine

Parameter	Description
Version	Mechanized overhand C&F
Sublevel interval	Typically, 20 m
Cut height	5 m
Cuts accessed per attack ramp	4 cuts
Attack-ramp grade	15%
Excavation method	Breasting - horizontal drilling with jumbo
Explosive	Ammonium nitrate/fuel oil (ANFO)
Backfill	• Up to 70% uncemented rockfill and • remainder hydraulic tailings backfill

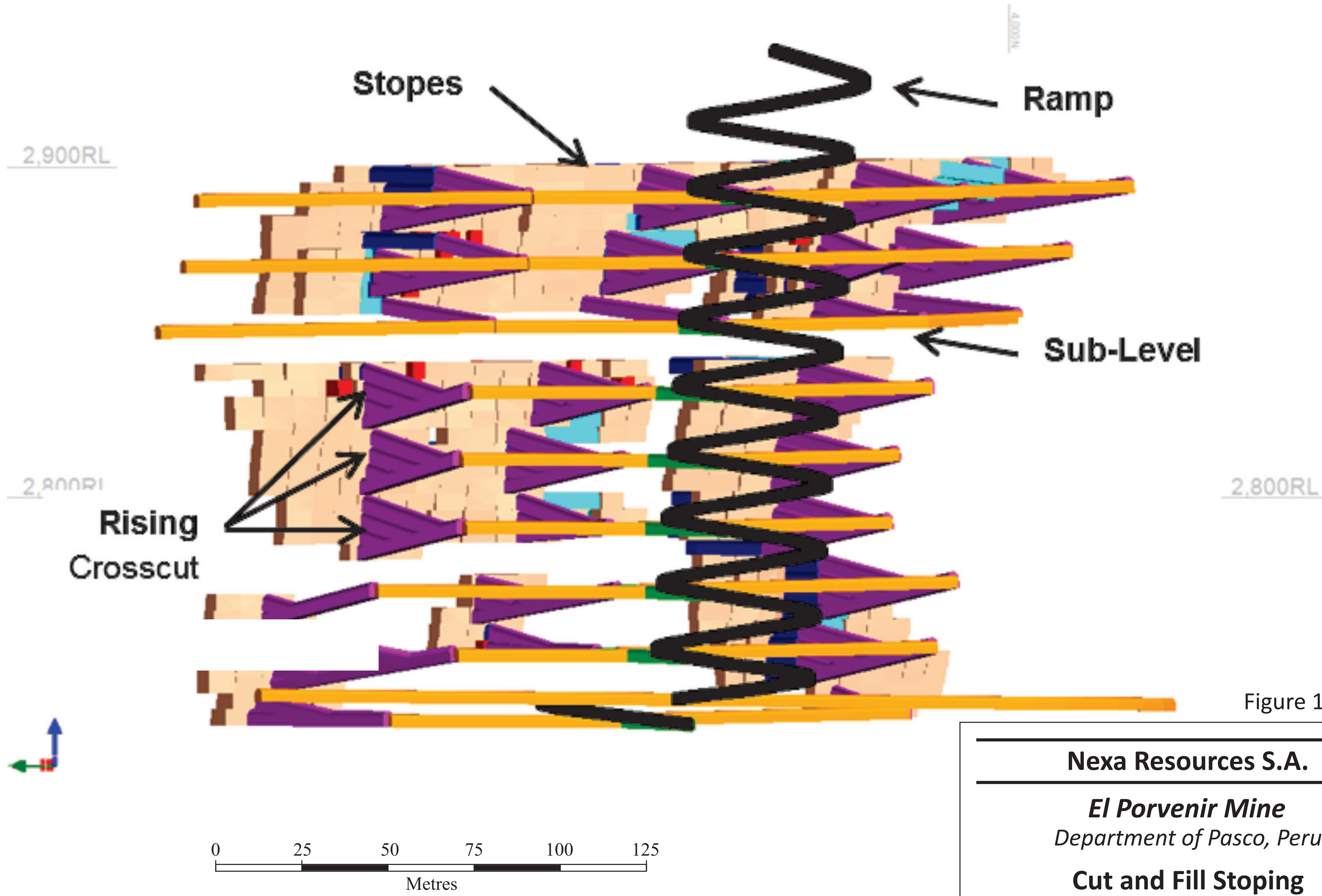


Figure 13-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Cut and Fill Stoping – Longitudinal View

January 2021

Source: Nexa, 2017.

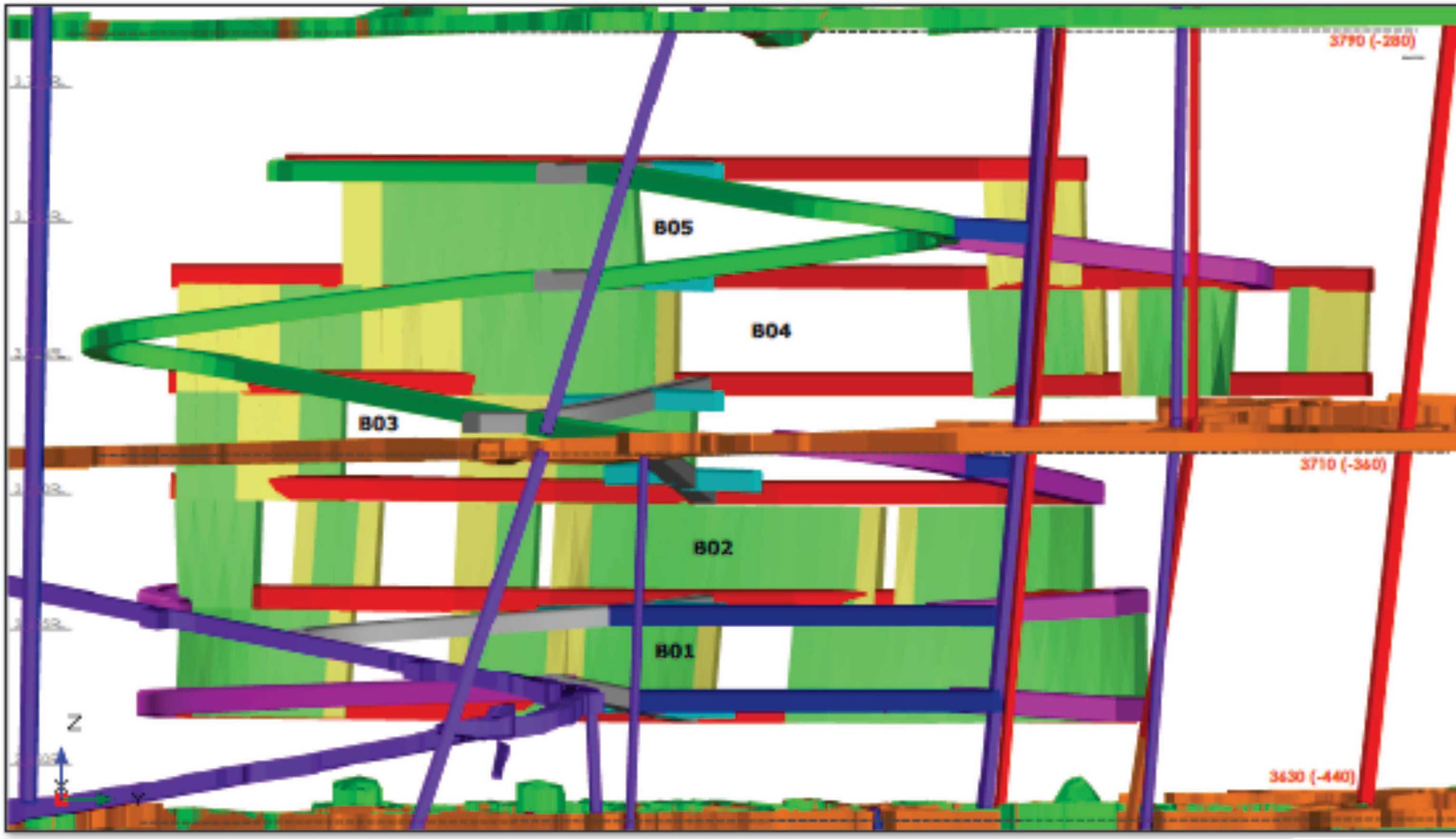


Figure 13-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Sublevel Stoping – Longitudinal View

Not to Scale

January 2021

Source: Nexa, 2020.

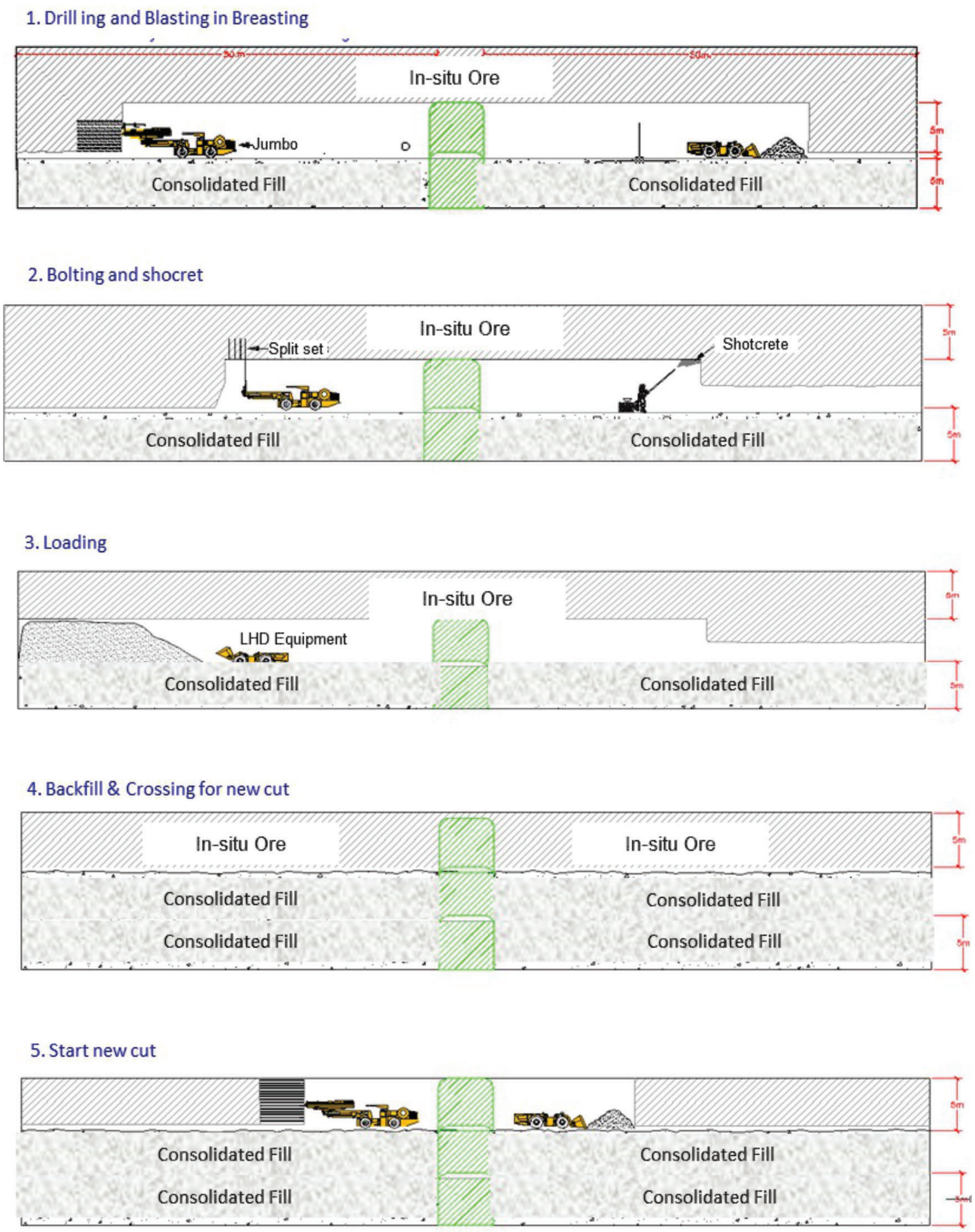


Figure 13-4

Nexa Resources S.A.

El Porvenir Mine

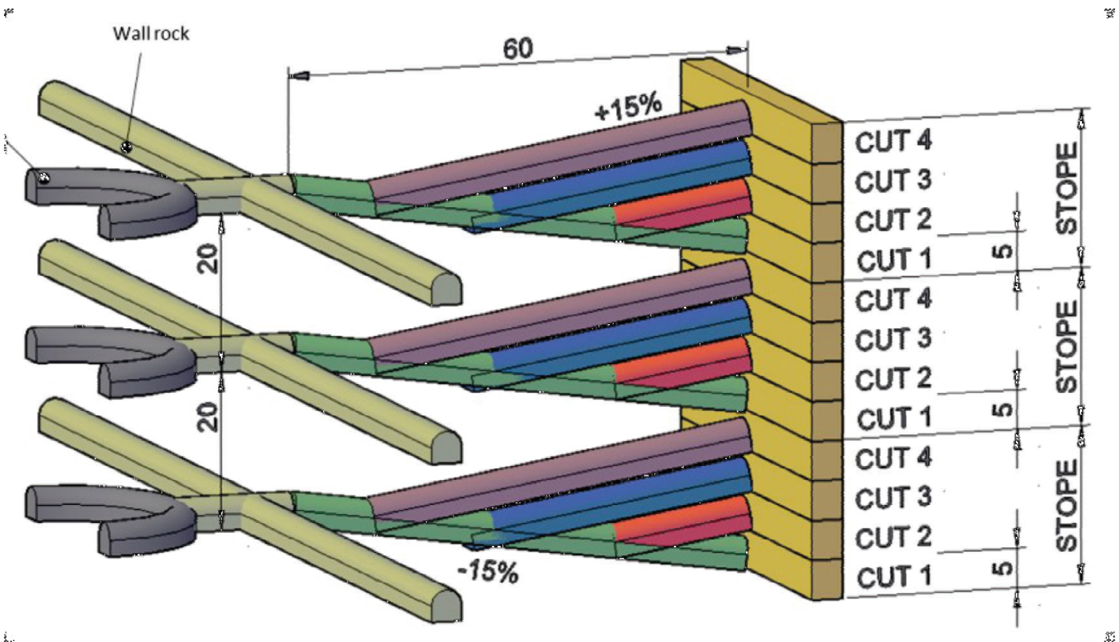
Department of Pasco, Peru

Cut and Fill Mining Cycle

January 2021 ***Source: Nexa, 2020.***

Attack ramps driven from the sublevels provide access to a C&F stope. Figure 13-5 illustrates the procedure for accessing the progressively higher cuts. An attack ramp is initially driven with a -15% inclination to access a cut below the sublevel's elevation. The attack ramp is then back-slashed in a fan-like fashion with some muck left on the floor to access each subsequent cut. The ramp to the highest cut will have a continuous positive grade over its entire 60 m length. The next cut must be accessed with a new attack ramp, driven at -15% from the next higher-up sublevel. An attack ramp at El Porvenir permits accessing four cuts from a sublevel.

After mining the complete cut or horizontal slice of a C&F stope, the open space must be backfilled from floor to back. Besides supporting the stope walls, the backfill provides the floor for mining the next higher-up cut. Hydraulic backfill is the principal backfill used for C&F at the Mine and consists of classified mill tailings sent underground via a pipeline as slurry. Up to 70% of the stope is filled with rockfill, which is waste from development headings. This material is dumped on the stope floor, after which hydraulic backfill is placed to tight-fill the remaining opening. The stope then sits inactive for several days until the water drains out of the hydraulic backfill, leaving it with a consistency similar to fine sand.



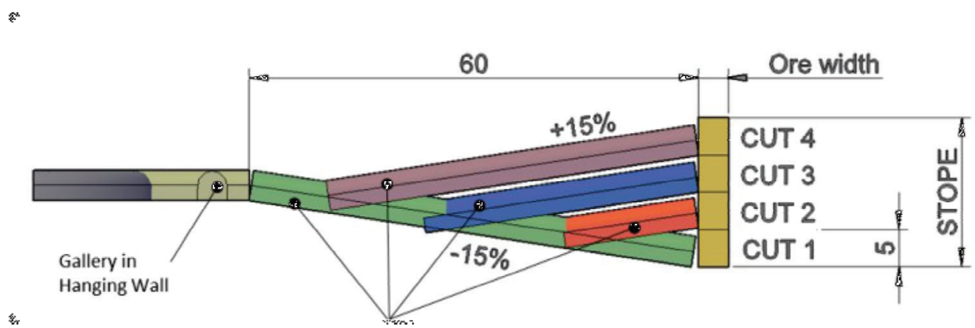


Figure 13-5

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Access to Cut and Fill Stopes

January 2021

Source: Nexa, 2020.

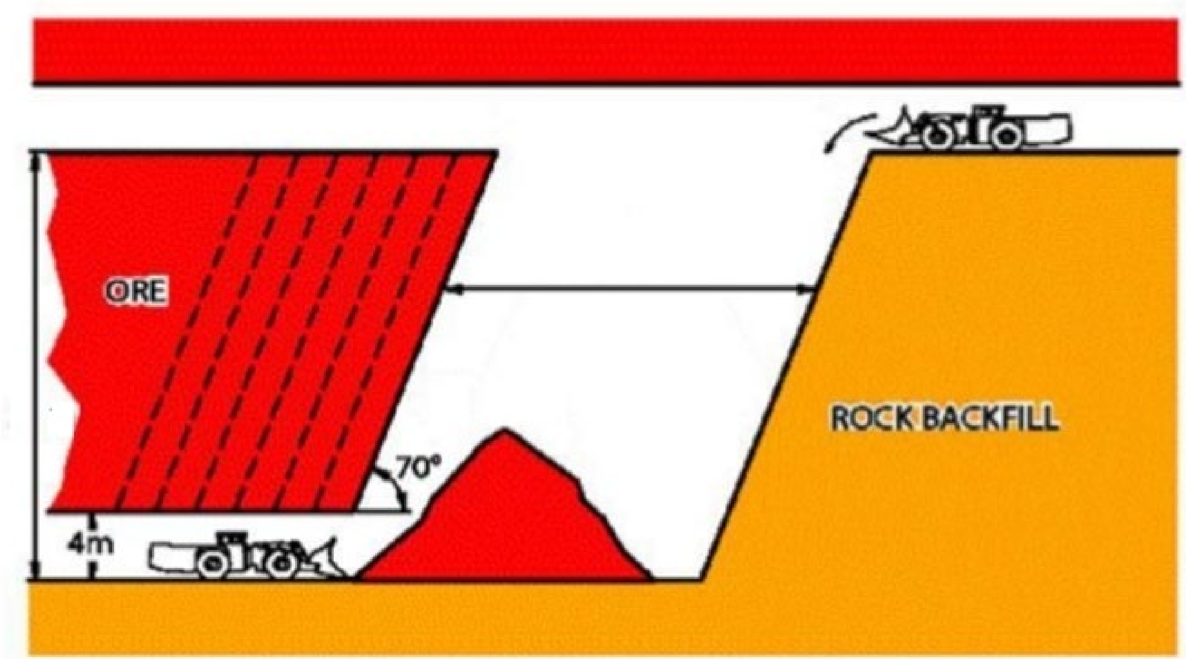
While C&F is the predominant mining method at El Porvenir, SLS accounts for a small but growing proportion of the production. The Mine uses a version of SLS called Avoca, which is used instead of C&F when the configuration of the orebody and the ground conditions are suitable for the method and when development waste is available for backfilling. Table 13-9 analyzes the advantages and disadvantages of the SLS Avoca method as compared with C&F.

Table 13-9: Advantages and Disadvantages of Avoca Compared with Cut and Fill
Nexa Resources S.A. - El Porvenir Mine

Advantages	Disadvantages
• Is an excellent method for disposing of development waste, which is not the case with C&F. • Has a higher productivity and lower mining costs than C&F. • Backfilling can be carried out in parallel with longhole drilling. • Sublevel development may be less. The footwall drive can be located closer to the contact which reduces the length of crosscuts and there is no back-slashing of attack ramps. • Less ground support is required as the stoping procedure does not involve breasting cuts or back-slashing attack ramps.	• Is not a selective method like C&F, so wall dilution will be higher and recovery lower. • Additional dilution will occur when backfill from the waste pile is mucked with the ore. • The method only works with rockfill. It is not compatible with hydraulic backfill. • Is only suitable if the footwall dips at a sufficiently steep angle such that the broken ore can be drawn down by gravity without it hanging up on the footwall. • Is less suitable for mining zones with poor ground conditions than C&F. For instance, cable bolts may be required to stabilize a weak hanging wall.

As previously stated, the SLS Avoca method is similar to C&F in terms of its bottom-up mining sequence and development requirements. The main difference between the methods is how they excavate the ore horizons between sublevels. C&F mines the ore in horizontal slices by breasting, while Avoca mines vertical slices by benching.

Avoca benches the ore in a retreating fashion. The benches retreat towards the middle of the vein, starting from the opposite ends of the vein. The ore between two sublevels is completely mined-out once the final bench is blasted at the middle of the vein. Backfilling is an integral part of the mining cycle. The stope is progressively backfilled as the ore is extracted. The rockfill pile advances behind the bench. Figure 13-6 illustrates the Avoca version of SLS, and Figure 13-7 shows the method's mining cycle. Table 13-10 provides information about how Avoca is applied at El Porvenir.



Source: Nexa

Figure 13-6: Avoca Mining Method

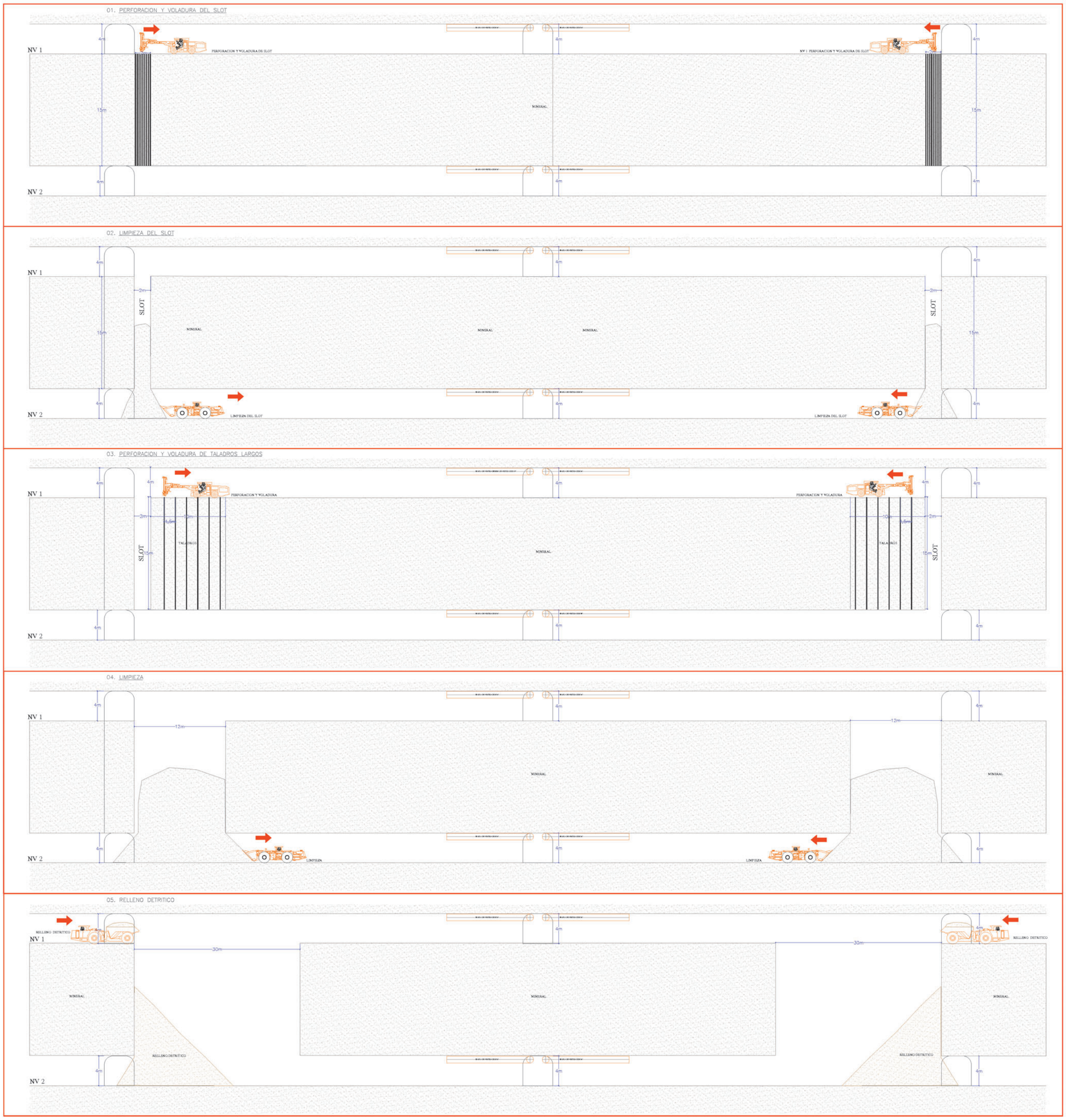


Figure 13-7

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Sublevel Stoping Mining Cycle

January 2021

Source: Nexa, 2020.

Table 13-10: Sublevel Stoping Method at El Porvenir
Nexa Resources S.A. - El Porvenir Mine

Parameter	Description
SLS at El Porvenir	
• Contribution	15% to 20% of mine production
• Version of SLS	Avoca (longitudinal longhole retreat mining)
Orebody Characteristics Required for SLS	
• Vein Configuration	Continuity, tabular form, regular profile
• Dip	Dip > 65°
• Width	Width > 3 m
• Ground Conditions	RMR > 40 (favourable ground)
Longhole Drilling	
• Drilling Direction	Downholes
• Hole Diameter	63 mm
• Burden	1.5 m
• Spacing	1.5 m
• Drilling Layout	Parallel or fanned depending on vein geometry
• Bench-Face Inclination	90° - holes in each row are drilled in vertical plane
• Bench Height	15 m to 18 m, depending on sublevel interval
Production Blasting	
• Typical Blast	Three rows of longholes per blast
• Explosive	ANFO
• Primer	One stick of emulsion per hole
• Controlled Blasting	Sometimes emulsion in footwall and hanging wall
• Slot to Initiate Bench	Vertical crater retreat (VCR) drop raise between upper and lower ore drives
Backfilling	
• Backfill	Loose rockfill from development waste
• Backfilling Procedure	LHD enters from extreme ends of stope
• Minimum Span	20 m to 25 m rockfill pile to ore bench before blast
• Maximum Span	30 m to 40 m rockfill pile to ore bench after blast
• Backfill Pile Slope	Angle of repose = 30° to 40°
Ground Support	
• Cable Bolting	In hanging wall with shallow dip or poor ground.
• Cable Bolts	Up to 15 m long, depends on stope design.

Parameter	Description
• Shotcrete	50 mm, on sublevels per geotechnical recommendation
Crosscut Spacing	80 m to 120 m

Benching at each end of the vein is initiated by drilling and blasting longholes into a slot raise consisting of a drop raise between the upper and lower ore drives. The benches are drilled with rows of longholes, which are drilled as downholes from the upper ore drive. Typically, three rows of longholes are blasted at a time. Figure 13-8 is an example of a drilling layout for a row of longholes in an Avoca stope.

Following each bench blast, an LHD mucks the broken ore from the lower sublevel ore drive. As the LHD operates beyond the bench's brow, some of the ore must be mucked using radio remote control. The LHD transports each bucket of ore out of the stope, and either dumps it into an orepass on the sublevel or loads it onto a truck.

With Avoca, backfilling is an integral part of the mining cycle, generally proceeding in parallel with production drilling. Once the blasted ore is mucked out, the stope is backfilled by advancing the pile of rockfill toward the bench, filling the void created by mining it.

An LHD delivers each bucket of rockfill to the stope entering via one of the upper sublevel crosscuts. It travels over the rockfill already deposited and dumps its load over the edge of the advancing pile. The filling operation stops when the gap between the top edge of the waste pile and the bench edge measures 20 m to 30 m. This gap provides a free face for the next production blast. When blasted, the broken ore impacts against the sloping waste pile, rather than scattering about an open stope. When mucking the ore, the LHD operator must avoid mixing it with the waste backfill.

In veins with strike lengths of less than approximately 100 m, El Porvenir may use a version of the mining method called Modified Avoca. With this version, the LHD delivers rockfill to the stope via the central crosscut rather than the ones at the ends of the vein. The LHD travels through the upper sublevel ore drive and dumps the rockfill starting from the bench edge.

The advantage of Modified Avoca is that a footwall drive is not required. Its disadvantages are:

- Production drilling cannot be carried out in parallel with backfilling on the same side of the stope.
- Ventilation uses vent ducting.
- Extra rockfill handling is required.

This additional handling occurs as some of the rockfill must be mucked out from the lower ore drive to open up a free face for blasting the next bench. The time and cost saved by eliminating the footwall drive often outweigh the disadvantages. Modified Avoca is not a suitable method when the vein's strike length exceeds 100 m as the LHD's in-stope travel time becomes excessive.

El Porvenir has successfully applied C&F mining for decades, and C&F will continue to be the predominant mining method in future years. The Avoca version of SLS is an advantageous method for zones that have suitable conditions for its application. Compared with C&F, it is a higher productivity and lower cost mining method. Furthermore, it is an excellent method for disposing of development waste. Using development waste as backfill saves on the cost of hauling it out of the Mine, reduces ramp congestion, and saves on ventilation for truck haulage.

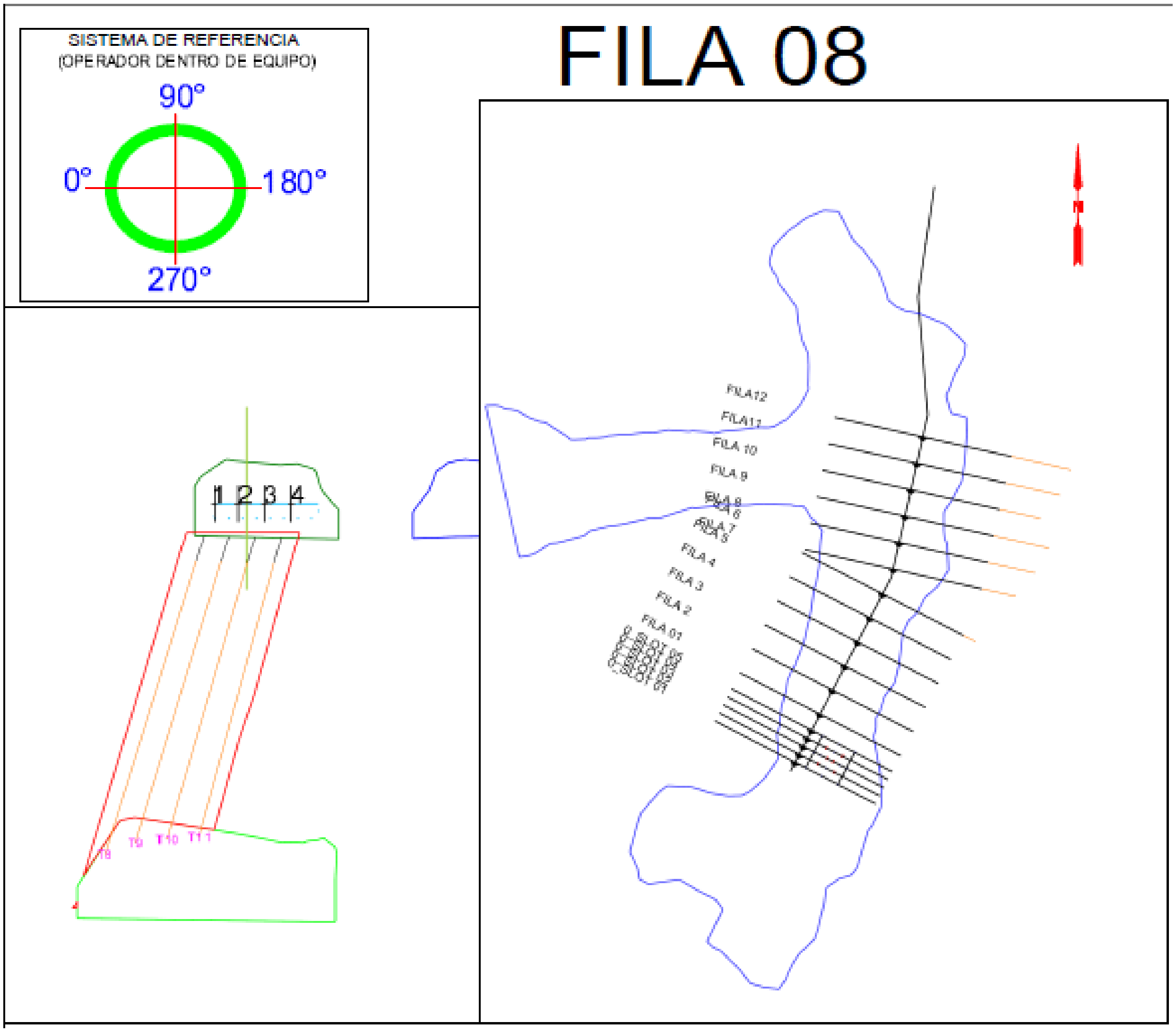


Figure 13-8: Typical Layout for Longhole Drilling

13.3 Geomechanics and Ground Support

The geotechnical conditions at El Porvenir result from the rock mass's characteristics and the Mine's depth. The host rock and the mineralized zones are generally classified as fair to good, with rock mass ratings (RMR) ranging from 40 to 60. El Porvenir is one of South America's deepest mines, extending more than 1,800 m below the main access level. Its depth contributes to the occurrence of seismic events, including rockbursts.

Table 13-11 summarizes information regarding the rock mass characteristics at El Porvenir. The host rock consists mainly of slightly altered limestones and marble. The mineralized zone is moderately altered and consists primarily of skarn, breccia, calcareous breccias, heterolithic breccias, and siliceous breccias. The rock mass has three joint sets of discontinuities and a system of random joints spaced from 50 mm to 600 mm. The discontinuities are generally calcite filled or clean and wet. The rock strengths range from medium to high (60 MPa to 120 MPa). The in-situ stresses are approximately 45 MPa in the middle zone of the Mine and high in the lower zones, exceeding 60 MPa. Table 13-12 presents representative values for major stresses both in magnitude and azimuth that were measured in 2001.

Table 13-11: Rock Mass Characteristics
Nexa Resources S.A. - El Porvenir Mine

Deposit Geology	Description	
Host Rock	Slightly altered limestones and marble.	
Mineralized Zones	Moderately altered, includes skarn, breccia, calcareous breccias, heterolithic breccias, and siliceous breccias	
Deposit Type	Contact metasomatic replacement type polymetallic ore deposit	
Alteration Zone	Alteration zone of metamorphism, skarn, and marble in the intrusive-limestone rock contacts.	
Strike	Southern bodies and veins strike north-south, northeast, and northwest, and northern structures strike northwest.	
Discontinuities	Three joint sets of discontinuities plus random joints system with spacings ranging from 50 mm to 600 mm. Discontinuities are generally calcite filled or clean and wet.	
Intact Rock Properties	**Density (t/m^3)**	**UCS (MPa)**
Intrusive Rock	2.65 to 2.96	50 to 80
Pyritic Intrusive	3 to 4.2	
Marble	2.7 to 3.1	50 to 250
Limestone	2.7	50 to 100
Mineralization	3.2 to 4.1	50 to 100
Geomechanics Classification		
Permanent Workings	Type II rock (RMR: 60–80) to type III rock (RMR: 40–60)	
Producing ore zones	Type III rock (RMR: 40–60) and type IV rock (RMR: 20–40)	
In-Situ Stresses		
Middle Zone	~ 45 MPa	
Lower Zones	> 60 MPa	
Water Conditions	Minimal water infiltrations, the rock mass is generally dry.	

Sources: SRK, 2017 & Nexa, 2020

Table 13-12: Magnitude and Azimuth of the In-Situ Stresses
Nexa Resources S.A. - El Porvenir Mine

Sigma 1	Azimuth	Dip	Sigma 2	Azimuth	Dip	Sigma 2	Azimuth	Dip
42.4 MPa	90°	16.5°	36 MPa	356°	13°	30 MPa	231°	70°

Source: SRK, 2017

Seismic events, including rockbursts, occur due to the high ground pressures associated with the Mine's depth. Table 13-13 presents information about seismicity and seismic events at El Porvenir. Sudden, violent rock failure (rockbursts) is one of the most critical risks for the operation. Most seismic events originate sufficiently far away from the mine workings that they are not severe enough to impact underground operations.

Table 13-13: Seismic Events
Nexa Resources S.A. - El Porvenir Mine

Seismic Events at El Porvenir		
Largest recorded		M_w 1.6 in September 2018. Historically, since 2006, events up to 2.2 have occurred.
Typical events		M_w -0.5 to 1.5
Distances in the rock mass		Typically, 300 m to 500 m from the excavations
Seismic Risk	1.13	The classic formulation of the Gutenberg-Richter model (Model GR, Gutenberg and Richter 1958) is the one most used in the seismic characterization of a source for hazard studies combined with area-type sources. The recurrence model involves considering a logarithmic relationship between the rate of large and small earthquakes that can occur in a source zone or a fault (or a linear relationship between the logarithm of the rate of large and small earthquakes).
Procedures According to Intensity of Seismic Event		
Small	ML < 0	
Medium	ML 0 to 0.8	Temporarily stop work and inspect the area.
Large	ML 0.8 to 1.5	Leave the stopes and shut down operations for one shift.
Very Large	ML > 1.5	Withdraw to a safe zone and shut down operations in the stope and nearby ones for at least two shifts.
Seismic Magnitude Measurements Used		
ML = Linear Magnitude Scale		
Mw = Moment Magnitude Scale, measures the size of events in terms of the amount of energy released. Specifically, moment magnitude refers to the amount of rock movement (i.e., the distance of movement along a fault or fracture) and the area of the fault or fracture surface, defined by Hanks & Kanamori (1979).		

Source: Nexa, 2020

El Porvenir has implemented measures to minimize the risks associated with seismic events. The Mine's geomechanical team has a microseismic monitoring system installed in the Mine to monitor seismicity. Figure 13-9 presents the procedures to be followed when a seismic event occurs. The Mine planning team incorporates the following measures in its mine designs:

- The timing and sequencing of excavations are planned such that yielded ground does not store excessive strain energy.
- Stope-blast designs minimize the number of mining steps. Blasts are controlled to maintain stability around excavations.

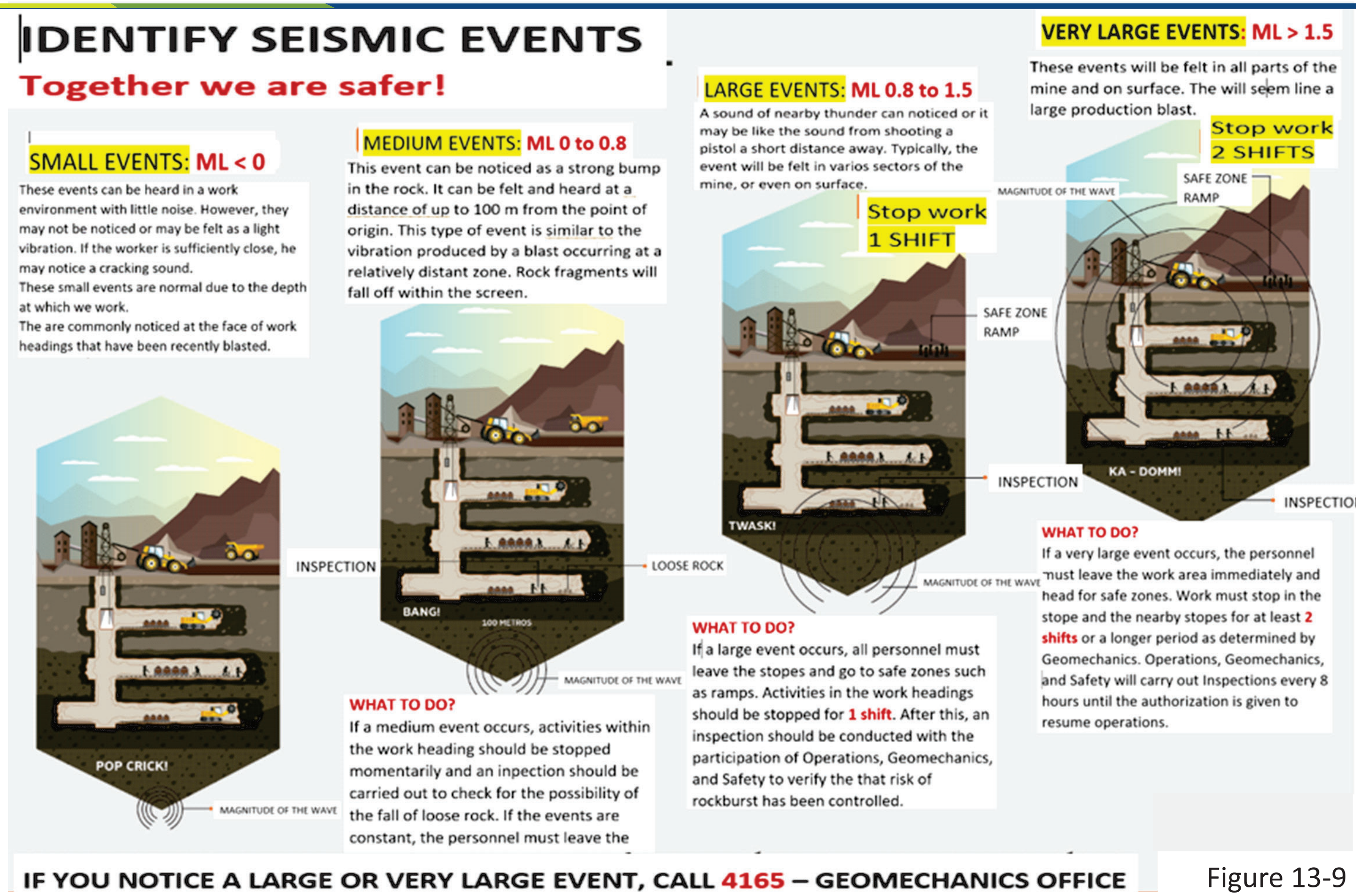


Figure 13-9

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Procedures for Seismic Events

January 2021

Source: Nexa, 2020.

Table 13-14 presents El Porvenir's ground support standards. An excavation's ground support requirement depends on whether it is permanent or temporary and the quality of its rock in terms of RMR. Split sets are used in temporary mine workings, and resin-rebar bolts are required in permanent ones. Shotcrete containing synthetic fibre is applied when ground conditions are less than favourable.

Table 13-14: Ground Support Procedures
Nexa Resources S.A. - El Porvenir Mine

Excavation Type	RMR Range	Bolt Type	Bolt Length	Bolt Spacing (m)	Mesh Type	Shotcrete[1] Thickness (mm)	Steel Sets
Temporary (< 1 year) Maximum Span 8 m	< 30	Split Set	2.1 m	1.00 x 1.00m	Welded	75	-
	30 - 40	Split Set	2.1 m	1.20 x 1.20m	-	50	-
	40 - 50	Split Set	2.1 m	1.10 x 1.10m	Welded	-	-
	50 - 60	Split Set	2.1 m	1.30 x 1.30m	Welded	-	-
	> 60	Split Set	2.1 m	1.50 x 1.50m	-	-	-
Permanent (> 1 year) Maximum Span 6 m	< 20	Avoid Excavating					
	20 - 30	Split Set		-	-	50	1.0 m
	30 - 40	Split Set	2.1 m	1.10 x 1.10m	Welded	75	-
	40 - 50	Resin Rebar	2.1 m	1.20 x 1.20m	-	50	-
	50 - 60	Resin Rebar	2.1 m	1.30 x 1.30m	Welded	-	-
	> 60	Resin Rebar	2.1 m	1.50 x 1.50m	Welded	-	-

Note:

1. Contains synthetic fibre

13.3.1 Recent Geotechnical Studies

A number of geotechnical studies have recently been carried out by Nexa (Nexa, 2019c; Nexa 2020h; Nexa, 2021):

- Geomechanical study for implementing ground support standards;
- Stability analysis for applying the sublevel stoping method in the CN-03 Vein, Level -890/-910;
- Stability analysis for applying the sublevel stoping method in the Carmen Cola Vein, Level 3470/3450;
- Determining the rib pillar for the Éxito Vein, 3550 Level;
- Determining the maximum longitudinal span for mining the Éxito Vein (3370 Level) with sublevel open stoping;
- Determining the crown pillar for mining the Porvenir 3 Stope – Upper Zone;
- Geomechanical study of the Don Ernesto Orebody at El Porvenir Mine; and
- Evaluation of the seismic hazard at the El Porvenir Mine (Calixto, 2020)

13.4 Hydrogeology

El Porvenir experiences moderate groundwater inflows and consequently has not developed hydrological models. The average flow of water discharged is 125 L/s. This rate is from all sources, including drilling. Amphos 21 Consulting Perú S.A.C. (Amphos 21) has carried out the following hydrogeological studies related to an environmental impact, shaft deepening, and the tailings dam:

- Modification of the Environmental Impact Study of the Atacocha Mine - Hydrological and Hydrogeological Study (July 2018)
- Preliminary Hydrogeological Study for deepening the Picasso shaft (December 2016)
- Hydrogeological Analysis for Flow Estimation during the Construction of the Winze (October 2014)
- Hydrogeological Study and Water Balance Support for Raising the El Porvenir Tailings Dam to 4,100 MASL (August 2019)

Amphos 21 identified the following hydrogeological systems at El Porvenir:

- Sub-surface system: It occurs in quaternary sediments and weathered and highly fractured rock. It is associated with shallow and surface water and the principal water bodies and catchments where the mine's infrastructure, including the tailings dam facilities, is located.
- Depth system: It is hydraulically disconnected from the sub-surface system and occurs adjacent to the underground workings. Water infiltrations towards the mine are minimal. However, some water infiltration occurs in the fractures and drill holes in the mine's western area, close to Milpo-Atacocha fault.

13.5 Infrastructure and Mine Services

13.5.1 Introduction

Table 13-15 summarizes the Mine's infrastructure and fixed equipment.

Table 13-15: Mine Infrastructure
Nexa Resources S.A. - El Porvenir Mine

Infrastructure	Location	Description
Compressor House	0 Level San Carlos mine entrance	1 x Ingersoll Rand, 298 kW, 85 psig, 1050 cfm 1 x Ingersoll Rand, 223 kW, 85 psig, 1000 cfm 2 x Gardener Denver, 130 kW, 85 psig, 700 cfm
La Quinua Tunnel	Level 3620 (-450)	Drainage tunnel
Pump station	Level 3470 (-600)	3 x Stationary pumps Vogel, 450 hp, one of which on standby.
Pump station	Level 3240 (-830)	3 x Stationary pumps Vogel, 600 hp, one of which on standby.
Pump station	Level 3100 (-970)	3 x Stationary pumps Vogel, 250 hp, one of which on standby.
Pump station	Level 2840 (-1230)	3 x Stationary pumps Vogel, 450 hp, one of which on standby.
Auxiliary pump	Level -1370	Submersible pump, 15 hp
Auxiliary pump	Level 1570	Submersible pump, 15 hp

Infrastructure	Location	Description
Dewatering Pipe		Steel, 10" Ø
Refuge Station	Level 3650 (-420), Cx 969	20-person capacity, 72 hours
Refuge Station	Level 2460, Spiral 55	20-person capacity, 72 hours
Powder Magazine	Level -440	
Powder Magazine	Level -970	
Maintenance Shop	Level 3470	For rubber-tired mobile equipment
Picasso Shaft	Collar Level (0) 4101.78 MASL	1 Cage + 2 skips, 1,732 m depth
Hoist Room:		
Production Hoist	Level 4070 MASL	2 x 3,000 hp / 2 drum 192" x 72"
Service Hoist	Level 4070 MASL	1,200 hp / 1 drum 120"x72"

The following subsections describe El Porvenir's infrastructure and mine services.

13.5.2 Ventilation

El Porvenir's ventilation system provides airflow of approximately 32,000 m^3/min to the underground workings. Figure 13-10 illustrates the Mine's ventilation system.

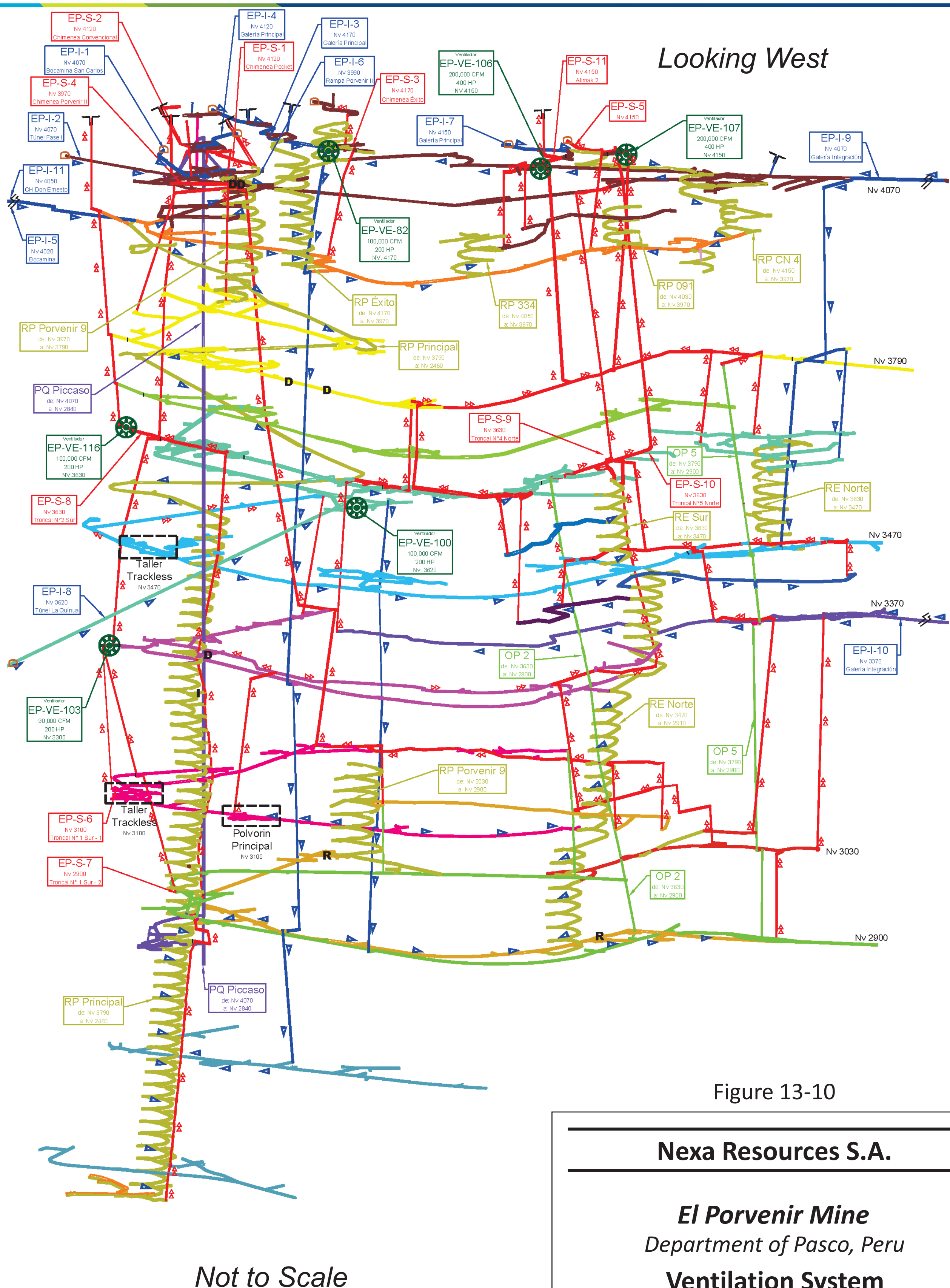


Figure 13-10

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Ventilation System

January 2021 **Source: Nexa, 2020.**

Table 13-16 and Table 13-17 present the balance between intake and return airflows measured at each of the monitoring stations listed. The fresh air enters the Mine via 11 intake points, and the return air is expelled to surface via 11 routes.

Table 13-16: Ventilation Balance - Intake Airflow
Nexa Resources S.A. - El Porvenir Mine

Code	Intake Airflow	Flow (m^3/min)
EP-I-1	Mine Entrance San Carlos 4070 level	2,593.4
EP-I-2	Phase 1 Adit 4070 level	269.7
EP-I-3	Main Drift 4170 level	4,383.0
EP-I-4	Main drift 4120 level	1,299.6
EP-I-5	Mine Entrance 4020 level	356.2
EP-I-6	Porvenir II Ramp 3990 level	1,008.8
EP-I-7	Main Drift 4150 level	6,960.1
EP-I-8	La Quiñua Tunnel 3620 level	4,849.4
EP-I-9	Connecting Drift to Atacocha 4070m level	2,420.5
EP-I-10	Connecting Drift to Atacocha 3370m level	5,535.3
EP-I-11	Don Ernesto Raise 4050 level	2,428.1
	Total	**32,104.1**

Table 13-17: Ventilation Balance - Return Airflow
Nexa Resources S.A. - El Porvenir Mine

Code	Return Airflow	Flow (m^3/min)
EP-S-1	Pocket Raise 4120 level	1,205.4
EP-S-2	Conventional raise 4120 level	2,277.4
EP-S-3	Exito raise 4170 level	1,571.0
EP-S-1	Porvenir II raise 3970 level	4,383.0
EP-S-1	CN 4 raise 4150 level	7,616.0
EP-S-1	Drift #1 South - 1 3100 level	999.3
EP-S-1	Drift #1 South - 2 2900 level	1,508.7
EP-S-1	Drift #2 South 3630 level	2,901.3
EP-S-1	Drift #4 South 3630 level	1,862.9
EP-S-1	Drift #5 South 3630 level	1,579.8
EP-S-1	Alimak 2 4150 level	8,084.1
	Total	**33,988.9**

The Mine's total estimated ventilation demand is based on the factors indicated in Table 13-18. As El Porvenir is a mechanized operation, approximately 80% of the requirement is attributable to diesel equipment. Six main ventilation fans with capacities ranging from 90,000 cfm to 210,000 cfm extract the return air from the Mine (Table 13-19). Figure 13-11 presents a 200,000 cfm main ventilation fan both before installation and while in operation.

Table 13-18: Ventilation Requirement
Nexa Resources S.A. - El Porvenir Mine

Item	Flow (m^3/min)
Personnel	2,011.0
Wood	0.0
Temperature	0.0
Diesel Equipment	24,828.9
Leaks	4,026.0
Total	30,865.9
Actual Fresh Air Intake	32,104.1
Coverage (%)	104%

Table 13-19: Main Ventilation Fans
Nexa Resources S.A. - El Porvenir Mine

Code	Make	Power (hp)	Capacity (cfm)	Level
EP-VE-103	Howden	200	90,000	Level 3300 (-770)
EP-VE-107	Zitron	400	200,000	Level 4150 (+80)
EP-VE-110	Zitron	400	200,000	Level 4150 (+80)
EP-VE-116	Airtec	200	100,000	Level 3630 (-440)
EP-VE-43	Joy	400	210,000	Level 4170 (+100)
EP-VE-44	Joy	400	180,000	Level 3620 (-450)

Source: Nexa, 2020d

Figure 13-11: Main Ventilation Fan

Secondary fans direct the airflow through the Mine's secondary ventilation circuits. Table 13-20 presents the system's main branches. Smaller auxiliary fans and vent ducting ventilate the development headings. Auxiliary fans range from 20,000 cfm to 50,000 cfm in capacity and have electric motors ranging from 40 hp to 100 hp. The fabric type ventilation ducting ranges from 24 in. to 36 in. in diameter. Figure 13-12 presents examples of work headings ventilated with ducting.

Table 13-20: Main Ventilation Branches
Nexa Resources S.A. - El Porvenir Mine

Ventilation Branch	Nominal Capacity (cfm)	Intake/Return
Raise CH-3	200,000	Intake
Raise CH-Central	180,000	Intake
Raise Socorro Norte	100,000	Intake
Raise CH-2A	200,000	Return
Raise CH-1	100,000	Return
Raise CH-2	100,000	Return
Raise CN-4	200,000	Return
Raise CH-4&5	200,000	Return

Source: Nexa, 2020d

Figure 13-12: Ventilation Ducting Used to Ventilate Work Headings

13.5.3 Mine Dewatering

El Porvenir's dewatering system discharges water via the La Quinua tunnel. Mine water occurring above the tunnel's elevation drains to it by gravity via drain holes. Water occurring in the levels below the tunnel is pumped to it by the Mine's pumping system. Figure 13-13 illustrates El Porvenir's dewatering system.

Figure 13-13

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Mine Dewatering System

January 2021

Source: Nexa, 2020.

The water occurring in the stopes, sublevels, and work headings flows by gravity or is pumped to the auxiliary sumps present on each sublevel. The water is then conducted via drain holes and ditches to one of the main sumps and pumping stations. As shown in Figure 13-14, water is pumped sequentially from station to station until it is finally discharged to the La Quinua tunnel. Pump stations are located on levels 2840 (-1230), 3100 (-970), 3240 (-830), and 3470 (-600).

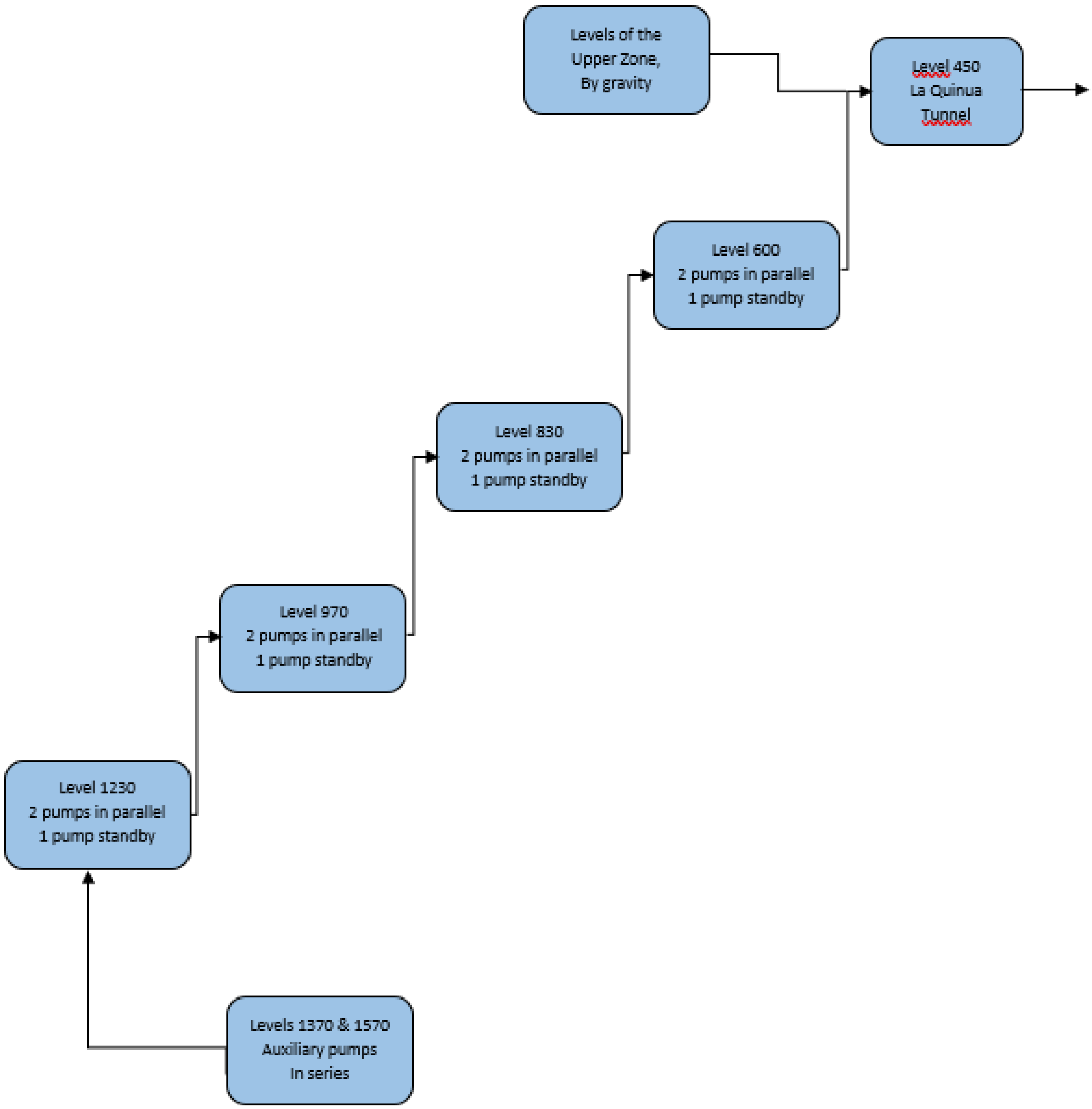


Figure 13-14: Dewatering Sequence

Each station has two sumps with capacities ranging from 400 m^3 to 700 m^3. The first sump receives the dirty water and allows the sediments to settle out of it. The clean overflow is transferred to the second sump. The water is then pumped to the station on the next higher level or from the 3240 level station to the La Quinua tunnel. The sumps are periodically cleaned by pumping the mud and sediment to old stopes.

Each pump station is equipped with three stationary, multi-stage pumps, each with a capacity of 70 m^3/h to 90 m^3/h. Two of these pumps operate in parallel, while the third one is a standby unit, available to replace either of the others. An automatic system controls the starting and stopping of these pumps. Two independent lines consisting of 10 in. diameter steel pipe extend between the pumping stations and from the uppermost station to the La Quinua tunnel. One of the dewatering lines is in use while the other is on standby.

The La Quinua tunnel is the drainage outlet for the Mine's dewatering system. The water flows via a ditch in the tunnel, exiting through the portal at the town of La Quinua. The water passes through the water treatment plant and then discharges into the Huallaga River. The discharge from the Mine averages 136 m/s. Table 13-21 presents details about the Mine's dewatering system.

Table 13-21: Dewatering System
Nexa Resources S.A. - El Porvenir Mine

Pump Station	Pump Type	Power (hp)	Capacity (L/s)		Elevation (MASL)	Pumping Height (m)
La Quinua Water-Treatment Plant						
Level 3620 (-450) Quinua Drainage Tunnel					3,620	
Level 3470 (-600) Pump Station	Vogel	450	83	} In parallel	3,513.72	158
	Vogel	450	83			
	Vogel	450	83	Standby		
Level 3240 (-830) Pump Station	Vogel	600	90	} In parallel	3,281.81	247.4
	Vogel	600	90			
	Vogel	600	90	Standby		
Level 3100 (-970) Pump Station	Vogel	250	73	} In parallel	3,120.89	158
	Vogel	250	73			
	Vogel	250	73	Standby		
Level 2840 (-1230) Pump Station	Vogel	450	83	} In parallel	2,874.98	200
	Vogel	450	83			
	Vogel	450	83	Standby		
Level -1370 Auxiliary Pump	Auxiliary pump	15			2,879.82	60
Level -1570 Auxiliary Pump	Auxiliary pump	15				

While part of the mine water originates from groundwater inflows, drilling, and other mine operations, most of it comes from backfilling. When hydraulic backfill is placed in a C&F stope, it requires a sufficient water content to flow as a slurry through the backfill pipeline. Once the backfill is placed in the stope, the water drains out of it over several days. The water percolates through the backfill material and drains out through the barricades that seal the attack ramps. The barricades are lined with textile, and the water filters through it. The tailings component of the backfill remaining in the stope has a consistency similar to fine sand. The water drained from the barricades flows or is pumped to the auxiliary sumps on the sublevel. Figure 13-15 illustrates the process of draining backfill from a stope.

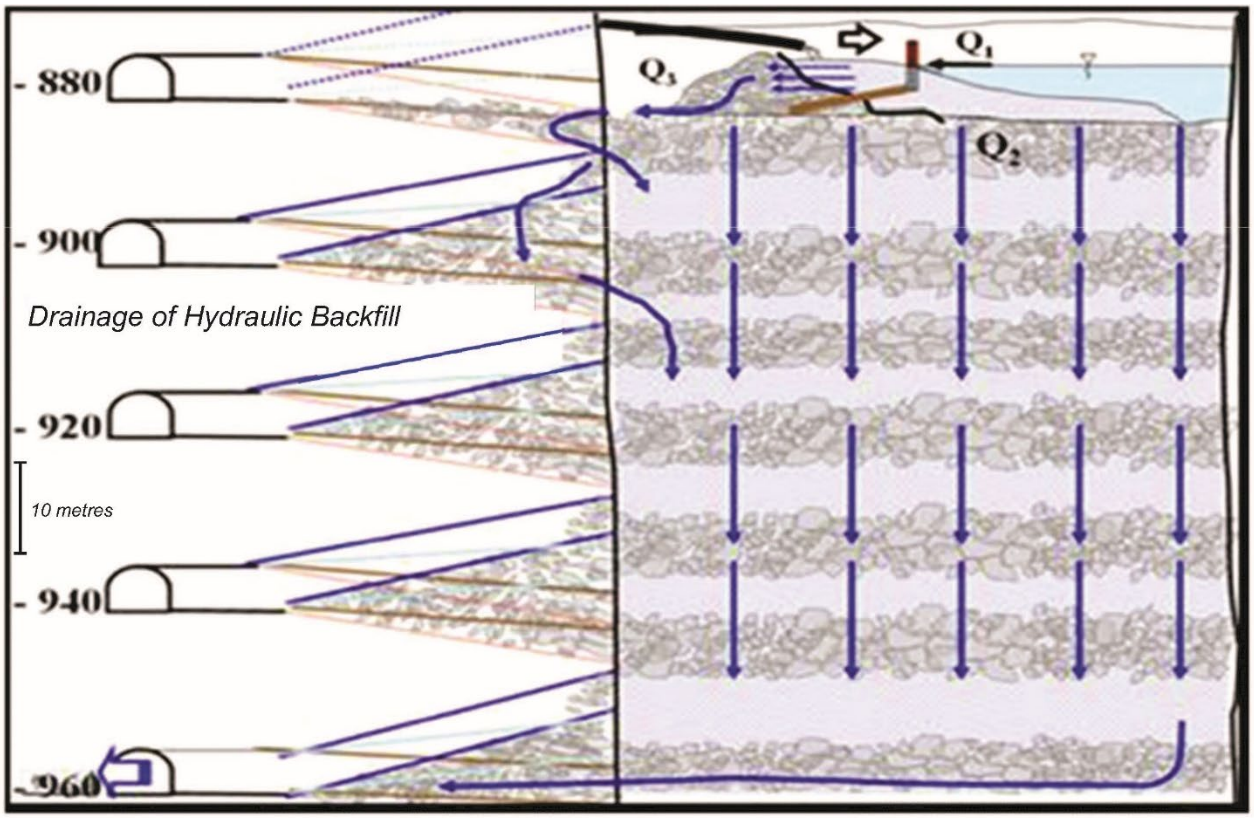


Figure 13-15: Drainage from Backfilling Stopes

13.5.4 Compressed Air

The Mine's compressed air is supplied by four compressors (Table 13-15, Mine Infrastructure) installed in a compressor house situated at the San Carlos entrance (0 level). These units have a combined nominal capacity of 3,450 cfm. Compressed air is supplied to the underground working areas via a system of pipes.

13.5.5 Water Supply

Seven tanks and pipes with 2 in., 3 in., and 4 in. diameters supply the Mine's industrial water. Table 13-22 lists the locations and capacities of the water tanks.

Table 13-22: Water Tanks
Nexa Resources S.A. - Mina El Porvenir

Location	Capacity (m^3)
Level +170	180
Level +80	165
Level -280	400
Level -360	300
Level -600	180
Level -700	188
Level -970	200

13.5.6 Backfill

Backfill plays a critical role in a stope's ground support by filling the opening left from excavating the ore. Backfill also serves as a floor for mining the next higher up cut in the case of C&F and the next higher up intersublevel horizon in SLS. El Porvenir's mining operations use two types of backfill:

- Unconsolidated hydraulic backfill
- Loose rockfill

Rockfill consists of waste blasted in development headings. C&F stopes can be backfilled with up to 70% rockfill, while hydraulic backfill must fill the remaining opening. SLS (Avoca) stopes are backfilled with rockfill only. Any waste that cannot be used as backfill must be hauled via truck to surface where it may be used for civil work on the tailings dam.

Figure 13-16 illustrates the hydraulic-backfill system, and Table 13-23 provides information about the backfill's preparation and distribution. Table 13-24 presents the design criteria for hydraulic backfill, which is a slurry consisting of mill tailings from the processing plant that have been classified to remove the fine particles. A bank of hydrocyclones achieves this classification process. The coarser component, which is suitable for backfill, is separated as the underflow. The fine tailings in the overflow are disposed of in the TSF.

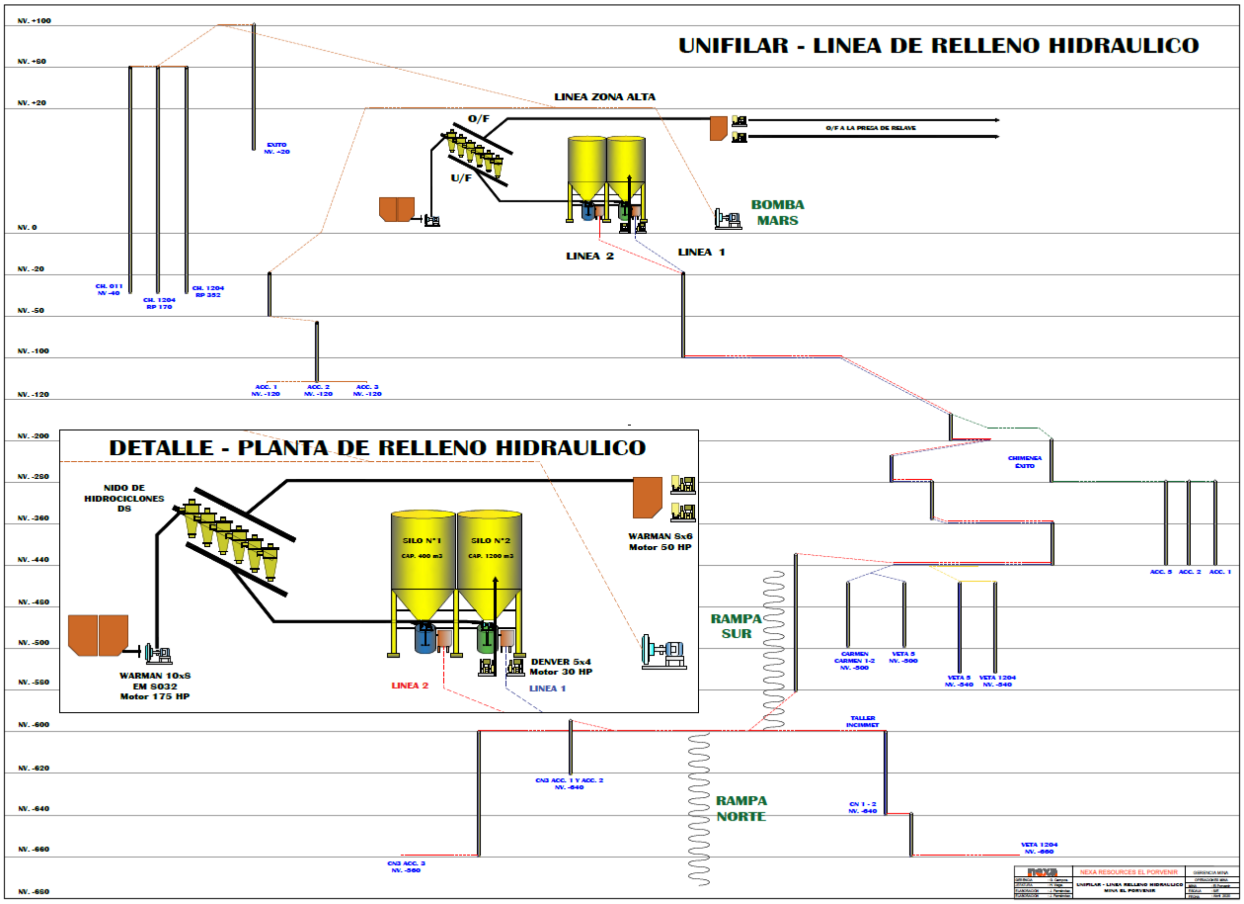


Figure 13-16: Hydraulic Backfill System

Table 13-23: Hydraulic Backfill Preparation and Distribution
Nexa Resources S.A. - El Porvenir Mine

Item	Description
Warman Pump, 10x8, EM 8032, 175 hp	Pumps tailings from processing plant thickener to backfill plant
Nest of 8 hydrocyclones, CAVEX D10	Overflow (fines) goes to the tailings pond
	Underflow used for backfill
Warman 8x6, 50 hp Pumps	Pump overflow to either of two tailings ponds
Denver 5x4, 30 hp	Two pumps pump backfill mixture to storage tanks
Storage Tank #1, 400 m^3,	Stores backfill mixture (1,200 t capacity)
Storage Tank #2, 400 m^3	Holds water used to flush backfill lines
Agitators	Two 11 m^3 agitators keep pulp at 1,750 g/L to 1,950 g/L for Low Area and 1,650 g/L to 1,800 g/L for the High Area
Mars H180 S Pump, 250 hp	Pumps hydraulic backfill via 4 in. dia. pipeline to the higher-elevation zones

Item	Description
Lines #1 and #2	Hydraulic backfill flows to lower levels by gravity via boreholes
Distribution Piping Network	
• From plant to -100 (3070) level	Polyethylene pipe with 5 in. external diameter, 500 m in length
• From -100 (3970) level to the raise	Polyethylene pipe with 4 in. external diameter
• From the raise to the stopes	Polyethylene pipe with 3i n. external diameter

Table 13-24: Design Criteria of Hydraulic Backfill
Nexa Resources S.A. - Mina El Porvenir Mine

Parameter	Units	Value
Pulp density low area	g/L	1,750 to 1,950
Pulp density high area	g/L	1,650 to 1,800
% solids low area	%	63.77
Quantity pulp low area	m^3/hr	54
Percolation time	cm/hr	2.44
D_{60}/D_{10}		5.23
Aggressiveness		Low

Until the Mine is ready to receive it, the backfill is stored at the hydraulic backfill plant in two tanks, which keep the tailings suspended as a slurry (Figure 13-17). The backfill supplied to El Porvenir's Upper Zone is pumped with a Mars Pump. This part of the system has a capacity of 30,000 t/month. The backfill supplied to the Intermediate Zone flows by gravity through the Mine's reticulation system. This part of the system has a capacity of 60,000 t/month.

Figure 13-17: Hydraulic Backfill Plant

13.5.7 Emergency Egress and Mine Rescue

Figure 13-18 illustrates the Mine's emergency egress routes and shows the locations of two refuge stations. The refuge stations are set up for Mine rescue purposes and can accommodate 20 individuals for up to 72 hours (Table 13-15, Mine Infrastructure). Table 13-25 lists the routes available for exiting the Mine.

Table 13-25: Exits to Surface
Nexa Resources S.A. - El Porvenir Mine

Exit	Description
1	Level 0, where the Picasso Shaft is located
2	Via the Principal Spiral Ramp, which communicates to surface at level -50
3	Level +80 by Ramp
4	Level -450, connecting to surface via the La Quinua tunnel.

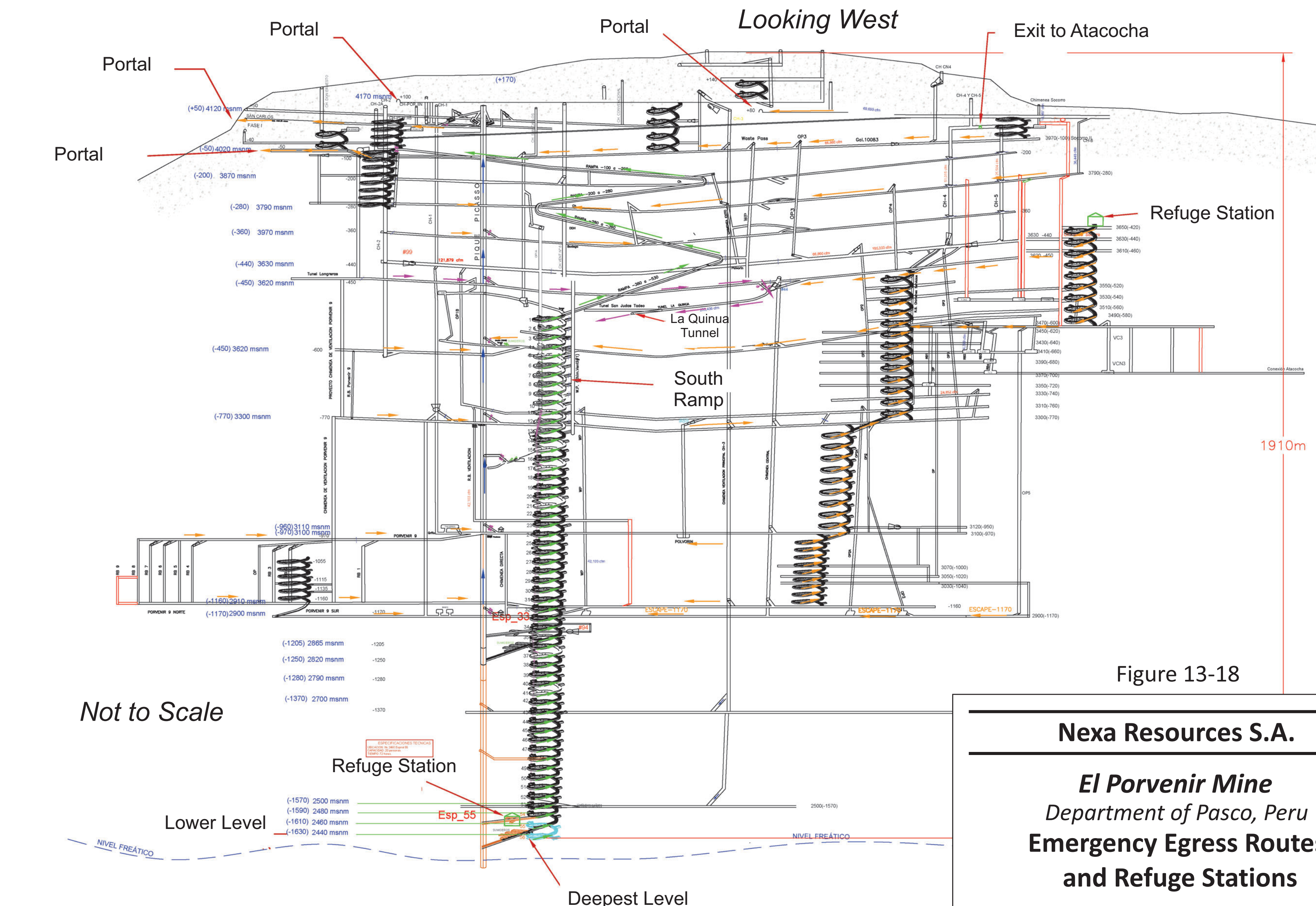


Figure 13-18

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Emergency Egress Routes and Refuge Stations

January 2021

Source: Nexa, 2021.

13.5.8 Electric Power

El Porvenir has the following three sources of electric power:

- Paragsha II Substation
- La Candelaria Hydroelectric Plant
- Standby power from generators

Table 13-26 describes electrical power supply for the El Porvenir operation. Figure 13-19 illustrates the electrical system for the Mine in a one-line diagram.

Table 13-26: Supply of Electric Power
Nexa Resources S.A. - El Porvenir Mine

Electric Power Source #1: Paragsha II Substation

- The Paragsha II Substation is located in the nearby city of Cerro de Pasco and is part of the national electric power grid (Sistema Interconectado Nacional).
- The Paragsha II Substation supplies electric power at 138 kV to the Milpo Substation via a 12.57 km long transmission line.
- The Milpo Substation has two 25 MVA transformers operating in parallel that step down the voltage from 138 kV to 50 kV.
- The Milpo Substation supplies electric power at 50 kV to #3 Substation via a 0.88 km long transmission line.
- Substation #3 has two transformers operating in parallel that step down the voltage from 50 kV to 13.2 kV.
- The Milpo Substation also supplies electricity at 50 kV to the Nueva Chicrin Substation, which provides power for the Atacocha Mine.

Electric Power Source #2: La Candelaria Hydroelectric Plant

- The La Candelaria Hydroelectric Plant is located in La Quinua and has a capacity of 5.5 MVA.
- The hydroelectric plant supplies electric power at 50 kV to the secondary side of the Milpo Substation via a 2.94 km-long transmission line.
- The Milpo Substation supplies electric power to #3 Substation, which steps down the voltage from 50 kV to 13.2 kV.

Electric Power Source #3: Standby Generators at Substation #2

- Substation #2 has four Sulzer generator sets that provide standby power.
- These generators produce electricity at 460 V, have a combined capacity of 2.3 MVA, and are rated at 100 kW, 250 kW, 450 kW, and 750 kW, respectively.
- In case of an interruption of supply from the national electric power grid, the generators and hydroelectric plant can provide electricity for operating critical services such as ventilation fans and pumps.
- The voltage of the electricity produced by the generators is stepped up from 460 V to 13.2 KV.
- Substation #2 can provide power at 13.2 kV to the secondary side of Substation #3 and to the main Substations #10 and #11, which supply the Picasso Shaft.
- These substations subsequently reduce the voltage to 2.4 kV.
- Substation #2 also has transformers that step down the voltage from 13.2 kV to 2.4 kV and can connect to secondary substations located underground, including Substations #121 and #123.
- These secondary substations step down the voltage from 2.4 kV to 440 V and supply power for pumps and other equipment.

Distribution of Electric Power to the Underground Mine: Substation #3

- Substation #3 distributes electric power to the main underground substations, which reduce to the voltage from 13.2 kV to 2.4 kV

- These main substations supply power to secondary substations throughout the mine.
- The secondary substations reduce the voltage from 2.4 kV to 440 V for operating ventilation fans, pumps, and other equipment.

  Source: Nexa, 2020d

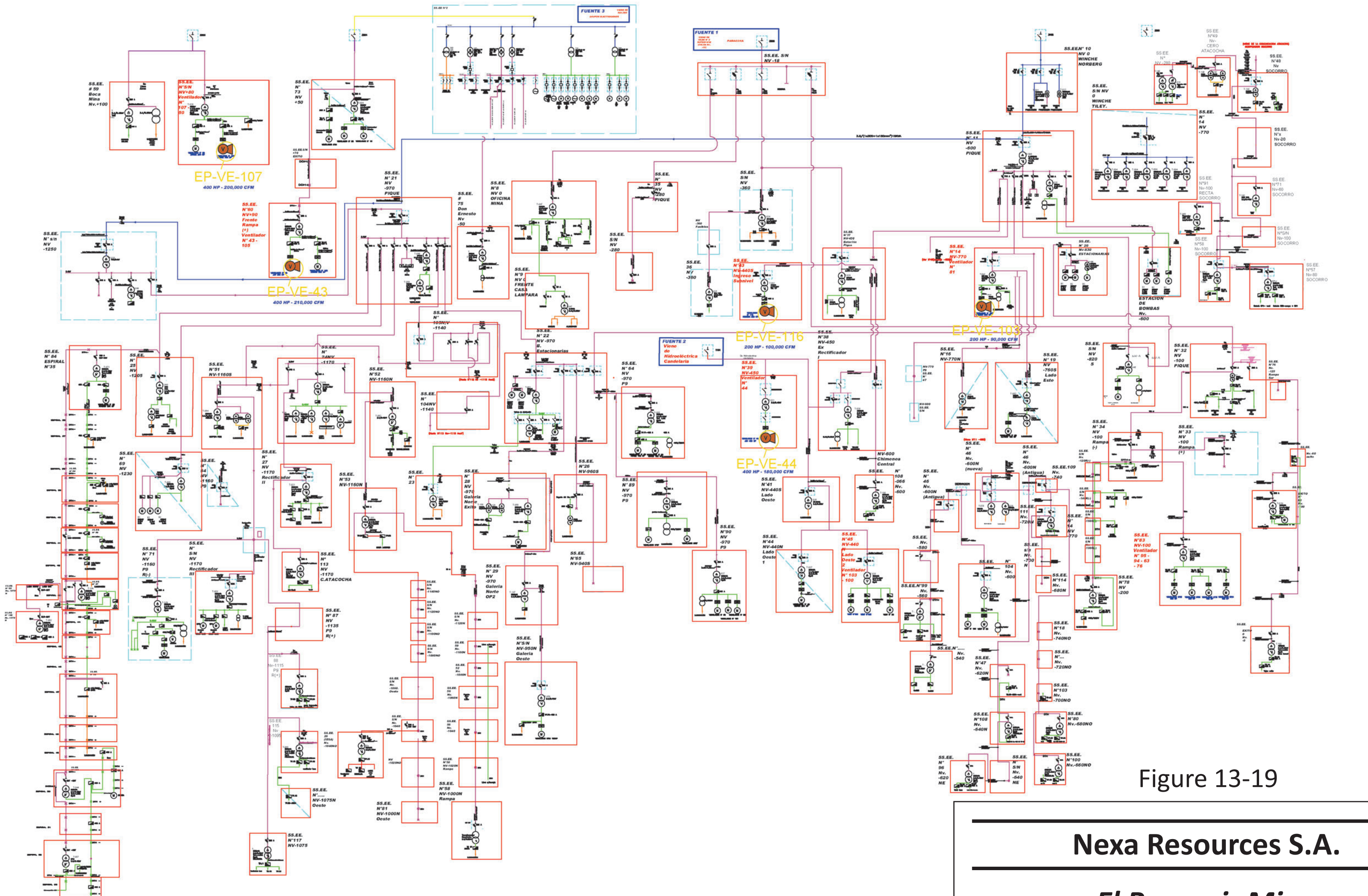


Figure 13-19

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

One-Line Diagram of El Porvenir Mine Electrical System

January 2021

Source: Nexa, 2021.

The Paragsha II Substation is located in the nearby city of Cerro de Pasco and is part of the national electric power grid (Sistema Interconectado Nacional), and supplies electric power at 138 kV to the Milpo Substation via a 12.57 km long transmission line. The Milpo Substation has two 25 MVA transformers operating in parallel that step down the voltage from 138 kV to 50 kV. The Milpo Substation supplies electric power at 50 kV to #3 Substation via a 0.88 km long transmission line and also supplies electricity at 50 kV to the Nueva Chicrin Substation, which provides power for the Atacocha Mine.

The La Candelaria Hydroelectric Plant is located in the town of La Quinua and has a capacity of 5.5 MVA. It supplies electric power at 50 kV to the secondary side of the Milpo Substation via a 2.94 km long transmission line. The Milpo Substation provides electric power to #3 Substation, which steps down the voltage from 50 kV to 13.2 kV.

El Porvenir has four Sulzer generators at Substation #2. These are standby units and are available to provide power in case of an interruption of supply from the national electric power grid. The generators working together with the La Candelaria Hydroelectric Plant can provide power for operating critical services such as ventilation fans and pumps. The four units are rated at 100 kW, 250 kW, 450 kW, and 750 kW, respectively, and have a combined capacity of 2.3 MVA. They produce electricity at 460 V, which is stepped up to 13.2 kV.

Substation #2 can provide power at 13.2 kV to the secondary side of Substation #3 and to the main Substations #10 and #11, which supply the Picasso Shaft. These latter substations reduce the voltage to 2.4 kV. Substation #2 also has transformers that step down the voltage from 13.2 kV to 2.4 kV and connect to secondary substations located underground, including Substations #121 and #123. These secondary substations step down the voltage from 2.4 kV to 440 V and supply power for pumps and other equipment.

Substation #3 serves as a central hub for distributing El Porvenir's power and consists of two transformers operating in parallel that step down the voltage from 50 kV to 13.2 kV. It distributes electric power to the main underground substations, which reduce the voltage to 2.4 kV. The main substations supply electricity to the secondary substations throughout the mine. These, in turn, reduce the voltage from 2.4 kV to 440 V for operating ventilation fans, pumps, and other equipment. Figure 13-20 and Figure 13-21 illustrate the standard layout of a substation and electrical equipment, respectively.

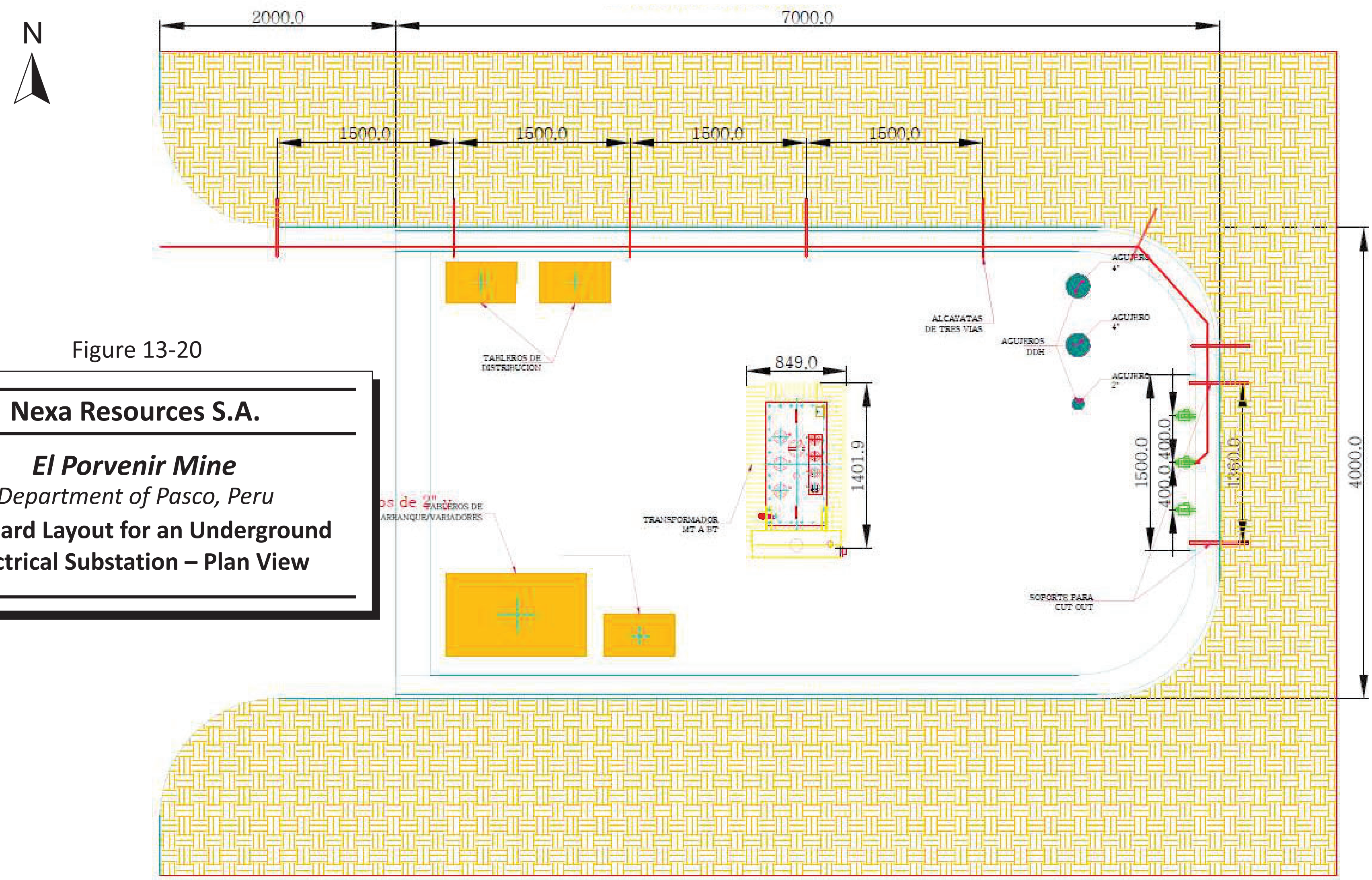
Figure 13-20

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Standard Layout for an Underground Electrical Substation – Plan View



January 2021

Source: Nexa, 2018.

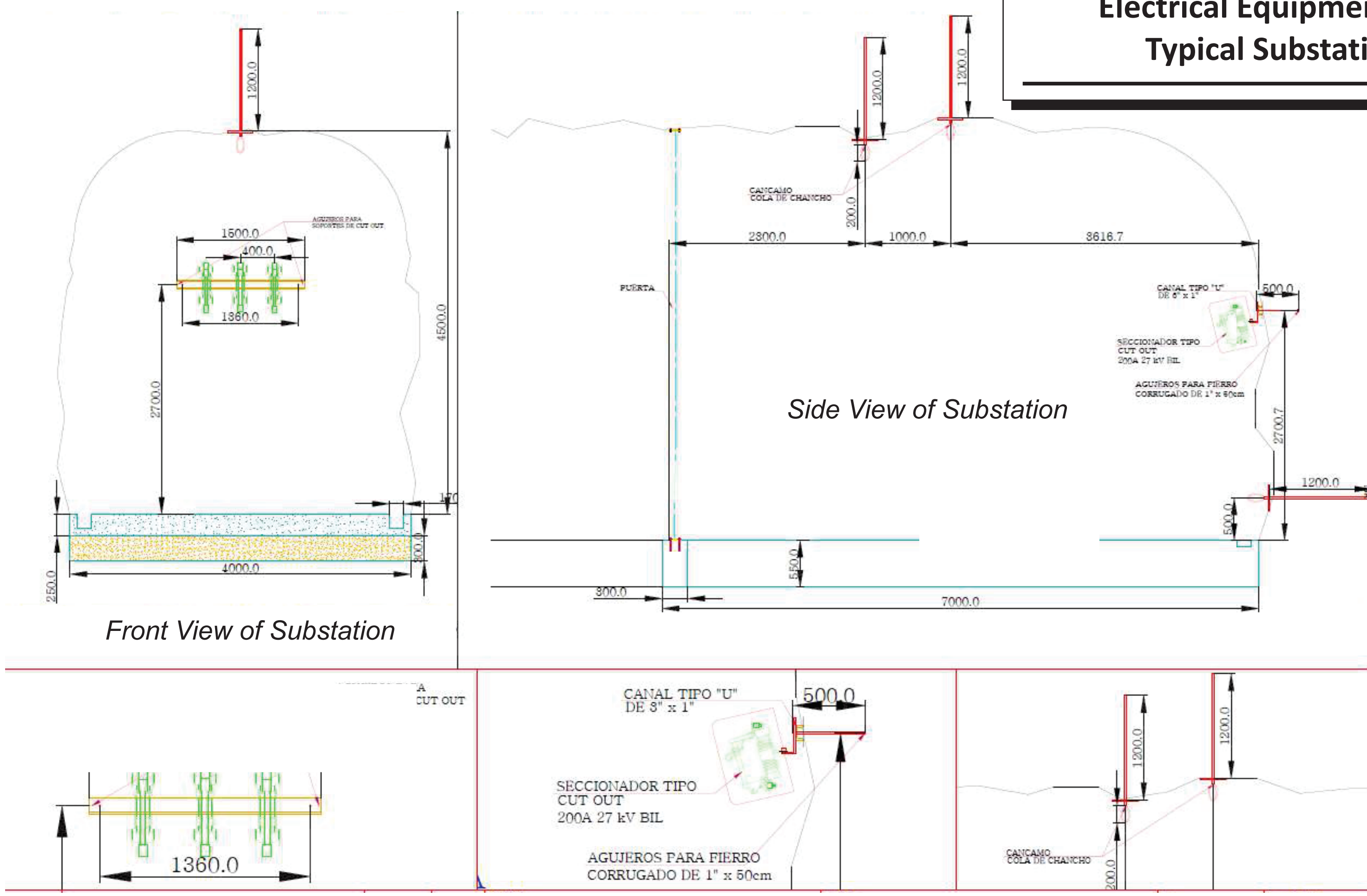
Figure 13-21

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Electrical Equipment in a Typical Substation



January 2021

Source: Nexa, 2018.

13.5.9 Communications

El Porvenir has a leaky-feeder system for communications and data transmission underground. The system consists of the installation of a special coaxial cable that acts as an antenna along its length for two-way radio communication. It is called “leaky” because the cable has slots cut into its outer shield enabling it to emit and receive radio signals as a radiating cable. The system requires line-of-site positioning between the cable and the handset or other device. Consequently, the coaxial cable must be extended along a drift or other heading advances to maintain full communications capability.

Should El Porvenir plan on upgrading its underground data communications capabilities, it should consider replacing the leaky-feeder system with a high speed digital network based on Wi-Fi or LTE technology. Leaky feeder’s low frequency limits its data transferring capacity and hence its compatibility with mining’s increasingly data driven technologies.

As the Mine has extensive existing workings, a private 4G-LTE network could be an attractive option. A private 4G-LTE network can provide substantial level coverage with a lower installation requirement than alternative systems as it sends a reliable signal over long distances without coaxial cables, amplifiers, or access points. Furthermore, it is not limited to line-of-site transmission.

A high speed digital network will permit El Porvenir to implement centralized control and monitoring of underground operations from a control room on surface. These centralized functions can include real time tracking of personnel and equipment, telemetry, ventilation on demand (VOD), seismic monitoring, and closed circuit television, among other applications.

With a high speed digital network, El Porvenir could implement automated and/or tele-remote technology to operate equipment from control stations on surface. The technology can be used for mucking development headings, crushing, and operating rockbreakers, etc. A significant benefit is that it allows many mining operations to continue during otherwise non-productive periods, including lunch breaks, shift changes, blasting times, and ventilating smoke. SLR does not, however, consider automated/tele-remote technology a practical option for mucking stopes or production drilling, as automation technology is not compatible with El Porvenir’s mining methods and orebody configuration.

With an upgraded communications system, El Porvenir could implement tele-remote mucking of development headings. After blasting the round and during shift change, the operator could run the LHD from a control station on surface. With this procedure, the heading could be mucked out and ready for ground support as soon as the oncoming crew arrives at the workplace underground.

13.5.10 Transport and Material Handling

The underground transportation and materials handling system at El Porvenir has the following components:

- Ramps
- Orepasses
- Track haulage level
- Picasso Shaft
- Conveyor

El Porvenir has several ramp systems that provide access to the levels and sublevels. Most of the ramps have a spiral configuration and coil from sublevel to sublevel over a vertical interval of typically 20 m.

While the Mine uses most of the development waste as rockfill to backfill the stopes, approximately 10% to 30% of it must be hauled to surface via the ramps.

The ore produced in the C&F and SLS stopes is transported to and dumped in orepasses by LHDs. These orepasses extend to the 2,900 track haulage level (-1170), where the ore is pulled from chutes and loaded onto mine cars. The mine cars dump at an orepass grizzly, and the ore is transferred to the Picasso Shaft's loading pocket on the 2,500 level. From there, the ore is loaded onto skips and hoisted via the shaft to the ore dump. After being discharged at the dump, the ore is transferred to the underground crushing plant. Crushed ore is transported to the surface and the processing plant via a conveyor in an inclined drift.

With a shaft depth of 1,732 m, the El Porvenir shaft is the deepest in South America (southamericatotheworld.com). Information about the Picasso Shaft is presented Table 13-27. The Picasso Shaft consists of a cage for transporting personnel and two counterbalanced skips for hoisting ore. It is not set up for hoisting waste. Nexa plans to upgrade the Picasso Shaft by replacing the wood sets in its upper portion with steel ones. This upgrade will permit higher hoisting speeds increasing its ore hoisting capacity.

Table 13-27: Picasso Shaft
Nexa Resources S.A. - El Porvenir Mine

Item	Description
Production hoist	2 x 3,000 hp, two drum 192" x 72"
Service hoist	1,200 hp, single drum 120" x 72"
Hoisting rope - production hoist	2 1/4" diameter
Hoisting rope - service hoist	1 1/4" diameter
Hoistroom - production hoist	Level 4070 MASL
Hoistroom - service hoist	Level 4070 MASL
Shaft collar level	San Carlos level, Level (0) 4101.78 MASL
Shaft bottom	2370 MASL
Shaft depth	1,732 m
Skips	2 skips counterbalanced
Skips, hoisting speed	3,000 feet per metre (fpm) nominal, 2,000 fpm in operation
Skip payload	16 t/skip nominal capacity, 13 t/skip in operation depending on ore grade.
Cage	9 Persons per deck, 2 decks
Cage, maximum hoisting speed	1,254 fpm
Loading pocket	Level (-1570) 2500 MASL
Ore dump	Level 4070 MASL
Tramming level	Level 2900 (-1170)
Underground crushing plant	Level 4060 MASL, Hewitt Robins 30" x 42", 150 hp, 300 t/h, 4.5" opening

13.6 Mine Equipment

El Porvenir is a highly mechanized mining operation and consequently has a considerable quantity of equipment. Table 13-28 and Table 13-29 present information about the Mine's trackless mobile equipment and track equipment, respectively. Table 13-15 (Mine Infrastructure) and Table 13-27 (Picasso Shaft) provide information about fixed pieces of equipment, including the Picasso Shaft's hoisting plant. To achieve its production and development targets, El Porvenir strives to achieve the mechanical availabilities indicated in Table 13-30 for strategic equipment.

Table 13-28: Trackless Mobile Equipment
Nexa Resources S.A. - El Porvenir Mine

Type	Make	Model	Nexa	Contractors			
				Seprocal[1]	Iesa[2]	Incimmet[3]	Unicon[4]
Underground Loader 3.5 yd^3	Caterpillar	R1300G	1	-	-	-	-
Underground Loader 6.0 yd^3	Caterpillar	R1600G	6	-	-	-	-
Underground Loader 6.0 yd^3	Caterpillar	R1600H	2	3	6	-	-
Underground Loader 6.0 yd^3	Atlas Copco	ST 1030	-	1	-	-	-
Jumbo	Tamrock	DD410	1	-	-	-	-
Jumbo	Sandvik	DD411-60	1	-	-	-	-
Jumbo	Sandvik	DT821	2	-	-	-	-
Jumbo	EPIROC	Boomer S1D	-	3	6	-	-
Scaler	BTI	H519BX10	2	-	-	-	-
Scaler	BTI	HS18	1	-	-	-	-
Scaler	BTI	VPS25	1	-	-	-	-
Scaler	Paus	853-S8	-	3	3	-	-
Bolter	MacLean	MEM-928 & 946	6	-	-	-	-
Bolter	Resemin	Bolter 88	-	3	-	-	-
Bolter	EPIROC	BOLTEC S	-	-	4	-	-
Scissor Lift	BTI	SL6-812	1	-	-	-	-
ANFO Loader	Normet	Charmec 6605B	1	-	-	-	-
ANFO Loader	MacLean	AC3	3	-	-	-	-
ANFO Loader	Mercedes Benz	ATEGO 1726 / 42	-	-	3	-	-
Forklift	Caterpillar	DP70NM	1	-	-	-	-
Production Drill Rig	Resemin	Raptor 552 R	-	-	-	1	-
Cable Bolter	Tamrock	Cabolt 7-5	-	-	-	1	-
Dump Trucks	VOLVO	FM500 6X4R	-	-	10	-	-
Dump Trucks	SANDVIK	EJC-417	-	-	1	-	-
Dump Trucks	EPIROC	MT2010	-	-	1	-	-
Dump Trucks	EPIROC	MT2200	-	-	1	-	-
Dump Trucks	Sandvik	TH-320	-	1	-	-	-

Type	Make	Model	Nexa	Contractors			
				Seprocal[1]	Iesa[2]	Incimmet[3]	Unicon[4]
Dump Trucks	Atlas Copco	MT-2010	-	4	-	-	-
Shotcrete Sprayer	Putzmeister	Wetcret SPM 4210	-	-	-	-	5
Shotcrete Sprayer	Putzmeister	Mixkret4	-	-	-	-	11

Notes:

1. Operaciones Seprocal S.A.C. (Seprocal)
2. Iesa S.A. (Iesa)
3. Ingenieros Civiles Mineros y Metallurgistas S.A. (Incimmet)
4. Unión de Concreteras S.A. (Unicon)

Table 13-29: Track Equipment
Nexa Resources S.A. - El Porvenir Mine

Type	Make	Model	Quantity
Trolley Locomotive	Goodman	15 ton 36 in. gauge	2
Trolley Locomotive	IMIM	LT-15	1
Mine Cars	Kiruna	04 m3	22

Table 13-30: Required Mechanical Availability for Strategic Equipment
Nexa Resources S.A. - El Porvenir Mine

Equipment	Mechanical Availability	Quantity
6 yd^3 LHD	93%	9
Jumbo	85%	5
Scissor Lift	85%	5
ANFO Loader	80%	2
Scaler	85%	4
Locomotive	90%	3
Hoisting System	90%	1

13.7 Personnel

The workforce of El Porvenir's mining operations consists of Nexa personnel and employees of the following contractors:

- Seprocal
- Iesa
- Incimmet
- Unicon

Production at El Porvenir is carried out by Nexa mine personnel, while contractors carry out development. Table 13-31 lists the Nexa personnel involved with underground operations at El Porvenir. The Mine operates on two 12 hour shifts providing 24/7 coverage. Mine personnel work a 14 x 7 shift cycle consisting of seven days of dayshift, seven days of nightshift, and seven days off.

Table 13-31: Nexa Personnel - Underground Mine
Nexa Resources S.A. - El Porvenir Mine

Area	Qty	Comments
Personnel on Shift Work	89	< 12 hour shift
Personnel on Time Off	44	< Shift cycle 14 days working on-site x 7 days off
Personnel with Restrictions	48	< Personnel with risk (>65, medical restriction) + Permanent union leave
Mine Supervision	18	< Including personnel on time off
Technical Services Staff	6	< Including personnel on time off
Total Nexa	**205**	

Source: Nexa

13.8 Life of Mine Plan

At El Porvenir, mine design and planning are conducted using Deswik software. The life of mine (LOM) plan is based on operations continuing until 2028. Table 13-32 presents the mine production schedule broken down by metal grades on a annual basis until 2028. Mine output remains stable at present levels until 2024 but then progressively declines over the remaining years of operations. Table 13-33 breaks down the production by mining method. The share of the output originating from SLS increases steadily from 19% in 2021 to 84% in 2025 and then drops over the final three years of operations. Table 13-34 breaks down the production by mining zone. The share of output originating from the Mine Deepening Zone increases progressively from almost nil in 2021 to 66% in 2027. Table 13-35 presents El Porvenir's LOM development schedule, broken down by heading and expenditure type.

Table 13-32: Mine Production Schedule
Nexa Resources S.A. - El Porvenir Mine

	Units	Total	2021	2022	2023	2024	2025	2026	2027	2028
Ore Total	000 t	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802
Stopes	000 t	12,743	2,001	2,008	2,029	1,879	1,524	1,270	1,309	724
Develop	000 t	1,107	160	214	191	157	134	110	62	79
Zn	%	3.75	3.28	3.69	3.57	3.82	4.11	4.25	4.01	3.39
Pb	%	0.88	1.12	0.92	1.02	0.96	0.71	0.67	0.66	0.70
Cu	%	0.23	0.17	0.21	0.24	0.25	0.24	0.27	0.28	0.21
Ag	g/t	62.8	72.5	61.6	66.6	61.9	52.3	56.6	59.1	70.0
NSR	US$/t	98.54	95.91	97.27	98.20	100.48	99.56	103.22	99.99	92.61

Table 13-33: Mine Production by Mining Method
Nexa Resources S.A.- El Porvenir Mine

	Units	Total	2021	2022	2023	2024	2025	2026	2027	2028
Cut and Fill										
Ore Mined	000 t	9,319	1,823	1,480	1,493	1,148	902	976	983	514
ZnEq Grade	%	4.93	4.83	4.75	4.88	4.83	5.15	5.15	5.22	4.73
Grade Zn	%	3.48	3.20	3.41	3.29	3.56	4.20	3.81	3.76	2.59
Grade Pb	%	0.97	1.17	0.94	1.11	0.91	0.69	0.79	0.86	1.07
Grade Cu	%	0.18	0.15	0.16	0.18	0.20	0.22	0.21	0.23	0.15
Grade Ag	g/t	69.0	73.4	64.4	69.0	61.0	54.7	68.1	74.0	99.8
Development	m	70,117	20,519	12,216	11,573	10,061	7,926	4,560	2,209	1,052
Sublevel Stoping										
Ore Mined	000 t	4,531	338	742	727	888	756	404	388	289
ZnEq Grade	%	5.17	5.02	5.33	5.30	5.44	4.88	5.55	4.71	4.68
Grade Zn	%	4.30	3.72	4.24	4.14	4.16	4.01	5.31	4.64	4.81
Grade Pb	%	0.71	0.83	0.87	0.82	1.03	0.74	0.37	0.17	0.06
Grade Cu	%	0.33	0.31	0.30	0.38	0.31	0.25	0.40	0.42	0.32
Grade Ag	g/t	50.4	67.5	56.3	61.6	63.5	49.8	28.6	21.5	16.8
Development	m	58,868	3,593	10,284	10,842	12,414	8,741	6,032	3,584	3,377
From All Sources										
Ore Mined	000 t	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802
ZnEq Grade	%	5.01	4.86	4.94	5.01	5.10	5.03	5.26	5.08	4.71
Grade Zn	%	3.75	3.28	3.69	3.57	3.82	4.11	4.25	4.01	3.39
Grade Pb	%	0.88	1.12	0.92	1.02	0.96	0.71	0.67	0.66	0.70
Grade Cu	%	0.23	0.17	0.21	0.24	0.25	0.24	0.27	0.28	0.21
Grade Ag	g/t	62.8	72.5	61.6	66.6	61.9	52.3	56.6	59.1	70.0
Total ZnEq	000 t	693	105	110	111	104	83	73	70	38
Development	m	128,985	24,113	22,500	22,416	22,475	16,667	10,592	5,793	4,429

Table 13-34: Production by Mining Zone
Nexa Resources S.A. - El Porvenir Mine

Mining Zones	Units	Total	2021	2022	2023	2024	2025	2026	2027	2028
Upper Mine Zone	000 t	4,069	758	722	795	542	248	361	362	281

Mining Zones	Units	Total	2021	2022	2023	2024	2025	2026	2027	2028
Intermediate Zone	000 t	4,470	957	815	831	843	572	100	100	251
Lower Mine Zone	000 t	1,380	443	425	207	118	143	45	0	0
Mine Deepening Zone	000 t	3,932	4	259	387	533	695	874	909	270
Total	**000 t**	**13,850**	**2,161**	**2,222**	**2,220**	**2,036**	**1,658**	**1,380**	**1,371**	**802**

Table 13-35: Development Schedule
Nexa Resources S.A. - El Porvenir Mine

	Unit	Total	2021	2022	2023	2024	2025	2026	2027	2028
Horizontal Development										
Capital Development	m	63,867	11,817	11,058	11,785	13,114	9,071	4,378	1,319	1,325
Operating Development	m	65,118	12,296	11,442	10,630	9,361	7,596	6,214	4,474	3,104
Total	m	128,985	24,113	22,500	22,416	22,475	16,667	10,592	5,793	4,429
Vertical Development	m	2,582	485	458	352	465	333	294	67	129
Heading Type										
Access	m	14,495	5,332	2,942	2,081	1,639	1,632	686	45	138
Haulage	m	19,732	3,342	4,586	3,808	3,184	2,848	1,775	190	0
Ore Access	m	18,856	2,491	2,939	3,432	3,540	2,632	1,642	1,513	668
Ore Drive	m	31,757	4,423	5,603	5,118	4,182	3,332	3,886	2,916	2,298
Orepass Drive	m	545	90	153	71	154	78	0	0	0
Electrical Substation	m	529	95	93	116	117	109	0	0	0
Ramp	m	27,407	6,908	3,847	4,775	5,281	2,985	1,833	830	947
Sump	m	583	46	34	25	330	147	0	0	0
Vent Drive	m	5,842	552	727	769	1,584	1,812	239	70	90
Crosscut	m	9,237	835	1,576	2,222	2,466	1,091	531	229	288
Total	m	128,985	24,113	22,500	22,416	22,475	16,667	10,592	5,793	4,429

14.0 PROCESSING AND RECOVERY METHODS

El Porvenir concentrator has an ore processing capacity of approximately 2.2 Mtpa and consists of conventional crushing, grinding, and flotation to produce copper, lead, and zinc concentrates. El Porvenir copper and lead concentrates are sold to traders and delivered by road and rail to Callao which is approximately 270 km by road for shipping overseas, while zinc concentrate is transported by road and rail to Nexa's Cajamarquilla zinc refinery near Lima. El Porvenir is approximately 315 km from Lima by road.

14.1 Process Description

A simplified flow sheet for El Porvenir concentrator is provided in Figure 14-1. The concentrator processes on average approximately 5,800 tpd to 5,900 tpd.

Primary crushing takes place underground at El Porvenir using a 30 in. x 42 in. jaw crusher. The product of the primary crusher with a top size of approximately 4.0 in. to 4.5 in. (100 mm to 125 mm) is transported by conveyor to the 30,000 t coarse ore stockpile at surface. Ore is reclaimed from the coarse ore stockpile by two feeders and transferred to a conveyor feeding a primary screen. Oversize from the screen reports to the secondary cone crusher while the screen undersize (top size of 10 mm) reports to the grinding circuit feed bins. Secondary crusher product with a top size of 30 mm reports to a three-way splitter that splits the material between three secondary screens. Oversize from these screens is fed to two tertiary crushers while screen undersize (top size of 10 mm) reports to the grinding circuit feed bins. Tertiary crusher product is returned to the secondary screens.

The grinding circuit consists of two primary ball mills and five secondary ball mills. Crushed ore is fed from the two grinding circuit feed bins to the two primary ball mills. Discharge from the primary ball mills reports to two flash flotation cells which produce lead concentrate that reports to the final lead concentrate storage tank and tails that undergo high frequency vibrational screening. Coarse material from the classifiers reports to the secondary ball mills while fine material or overflow from the classifiers is combined in a mixing box, a portion of which is directed to an additional flash flotation step also producing lead concentrate while the remainder (as well as the tails from this flotation step) report to bulk flotation conditioning.

The bulk flotation circuit consisting of bulk rougher, scavenger, and cleaner cells produces a copper and lead concentrate. Bulk scavenger concentrate is reground before being returned to the roughers. Bulk flotation is followed by copper-lead separation consisting of copper roughers, scavengers, and cleaners, during which copper minerals are floated while lead minerals are depressed to produce separate copper and lead concentrates. Tails from the bulk flotation circuit go on to feed the zinc flotation circuit.

Tails from the bulk flotation circuit undergo three stages of conditioning prior to zinc flotation. The zinc flotation circuit consists of zinc roughers, scavengers, and three stages of cleaning to produce zinc concentrate and final tails.

Concentrates are dewatered in thickeners (lead and zinc) and a dewatering cone (copper) followed by a filter press for zinc concentrate and disc filters for lead and copper concentrates. The filtered concentrates are stored in covered stockpiles prior to being loaded into trucks using a front-end loader. Water from concentrate dewatering is recycled for use in the process. Lead and zinc concentrate moisture content is approximately 8% to 9%, and copper concentrate moisture content is approximately 11%.

Tailings at approximately 22% solids are classified in cyclones, with coarse material in the underflow at approximately 62% solids sent to the hydraulic backfill plant for use in the Mine as backfill. Mine backfill constitutes approximately 50% of tailings produced. Water from tailings dewatering is returned to the process. Overflow from the cyclones containing the fine tailings is deposited in the conventional TSF adjacent to the Mine and processing plant. Tailings can be discharged at various points in the TSF by means of valved discharge points on the tailings line. Clarified water discharged from the TSF joins natural water flows used to generate electricity in Nexa's La Candelaria Hydroelectric Plant.

14.2 Energy, Water, and Process Materials Requirements

Power requirements for the processing facilities are not anticipated to change significantly in the foreseeable future from the current power requirements.

Make-up water is supplied from various creeks around the TSF, as well as the Carmen Chico River, approximately 3.2 km south of the processing facility. Water consumption is not expected to change significantly from the recent historical water usage and no supply concerns have been noted.

Key reagents used in the process include lime, sodium cyanide, sodium isopropyl xanthate (SIPX), methyl isobutyl carbinol (MIBC), copper sulphate, zinc sulphate, and collectors for copper, lead, and zinc.

14.3 Manpower

The processing plant personnel number 63. Maintenance (124), technical services (28), and projects personnel (nine) service the Mine and other departments in addition to the processing plant. These numbers are not anticipated to change significantly in the foreseeable future.

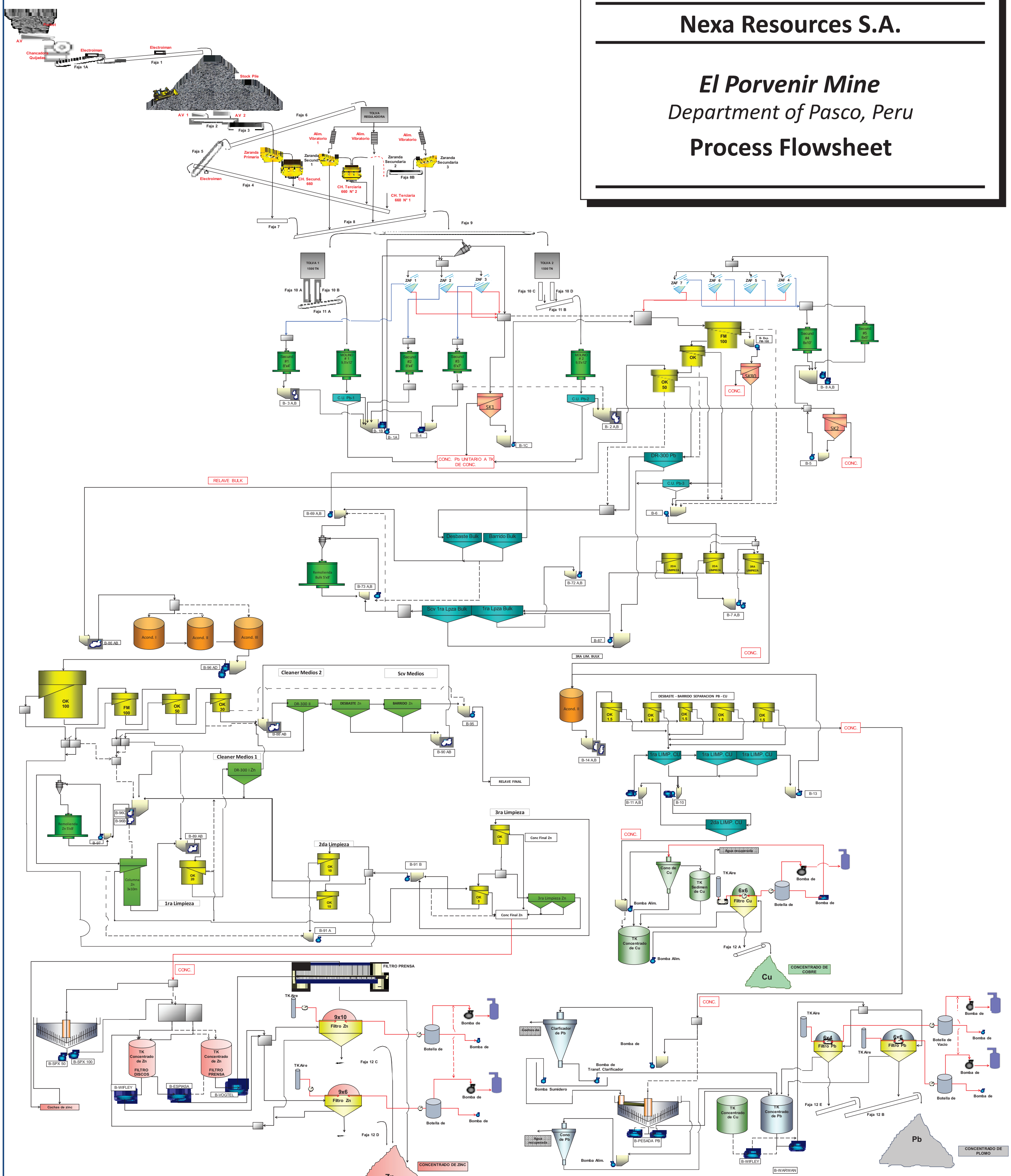
Figure 14-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Process Flowsheet



January 2021

Source: Nexa, 2020.

15.0 INFRASTRUCTURE

A combination of transportation methods, including road access, aircraft via Huánuco, and rail to Cerro de Pasco are used to supply the Mine. Off-site infrastructure includes facilities for the transfer of concentrate from truck to rail at Cerro de Pasco to transport concentrate for export by train to the port of Callao. Mine access is via a 13 km dirt road northeast from Cerro de Pasco, and paved road from Lima to Cerro de Pasco (approximately 315 km).

The main road from Lima to Cerro de Pasco is used for personnel transportation, supply of food, reagents, spare parts, mining supplies, and diesel fuel. Huánuco airport can be used for personnel transportation and emergency situations.

The site comprises an underground mine, TSF, waste rock stockpiles, an ore processing facility with associated laboratory and maintenance facilities, and maintenance buildings for underground and surface equipment. Additional facilities and structures include an office building, change house facilities, main shaft, ventilation shaft, backfill plant, explosives storage area, hydroelectric power generating plant, power lines and substation, fuel storage tanks, a warehouse and laydown area, and an accommodation camp.

15.1 Power Plant and Distribution

The power supply for the Mine comes from two sources:

- The national power grid via a 50/13.8 kV main substation located near the Mine,
- The La Candelaria Hydroelectric Plant, which consists of three turbines (0.5 MVA, 1.2 MVA and 3.5 MVA), is connected to the Mine through the main substation by a 4.6 km long 50 kV transmission line.

Power is generated at 4,660 kV at the La Candelaria Hydroelectric Plant. All other project loads are fed at 13.8 kV from the main substation through overhead power lines. These power lines are used to deliver power to various locations to support activities during operation of the Mine.

15.2 On-Site Roads

Mine site roads include main roads suitable for mining trucks that transport concentrates to Cerro de Pasco and Lima and service roads for smaller vehicles. The site roads are used by authorized mine personnel and equipment, with access controlled by Nexa.

A network of approximately 15 km to 20 km of service roads has been built providing access to the underground mine, processing plant, TSF, waste rock stockpiles, mine offices, workshops, mine camps, and other surface infrastructure. The roads are approximately six metres wide designed for two-way 15 m^3 truck traffic and road maintenance equipment.

15.3 Utilities and Services

Raw water is sourced from a small creek, Tingovado, as well as from other creeks around the TSF.

Fresh water supply is obtained from the Carmen Chico River, approximately 3.2 km south of the processing facility. This water is primarily for use in the mine camps and make-up requirements for the processing facility and industrial area.

15.4 Sewage Collection and Disposal

A sewage treatment facility has been constructed south of the industrial and mine camp sites at a lower elevation. Buried sewer pipes collect sewage from the site and transfer it to the treatment facility. The treatment facility consists of two independent containerized treatment lagoon systems providing redundancy if one unit must be shut down for maintenance. The system is capable of treating all of the wastewater generated in the camp, industrial, and office areas. Treated effluent is released to the TSF via a small stream.

15.5 Site Security

The principal site entry point on the access road from Cerro de Pasco consists of a lighted security gate and vehicle access barrier. A gatehouse provides sanitary facilities, communications equipment, and search facilities including metal detection. A weighbridge is located close to the gatehouse to enable load monitoring of incoming and outgoing vehicles.

15.6 Communication and IT Systems

Point-to-point satellite communication is the main communication system between the Mine and the outside world. The system includes voice/data/video/fax, internet, and VPN services, including bidirectional links between the Mine site and Lima.

Satellite television for entertainment, cellular communication, and FM radio is provided by local service providers.

15.7 Vehicle Fueling Facility and Mine Equipment Ready Line

The vehicle fueling facility and ready line is located adjacent to the processing plant. The fueling facility stores diesel and gasoline. Smaller tanks hold a variety of oils and lubricants.

15.8 Site Buildings and Facilities

A plan of the site buildings and facilities is provided in Figure 15-1.

15.8.1 Operations and Maintenance Building

The Operations and Maintenance building is a masonry building that provides offices for Mine management, administration, and technical staff, including environmental, administrative management, training, accounting, safety, and security. It includes staff support facilities such as a conference room, printing room, and lunchroom.

The underground mine operations building, electrical room, trackless equipment workshop, tire shop, air compressor shop, maintenance shop, lamp house, lockers, and washrooms are constructed adjacent to the main entrance to the underground mine at a 50 m distance, as approved by Peruvian safety regulations.

To the south of the main entrance to the Mine are the main mine supplies storage, processing plant building, electrical workshop, backfill plant, and laboratory facilities.

15.8.2 Accommodation Facilities

The permanent accommodation complex has been constructed on an approximately 60 ha site north of the Mine infrastructure complex. The accommodation complex incorporates the following camp sites:

- Type A: staff houses, and staff hotel where dormitories are private, single occupancy rooms.
- Type B: three story building blocks are semi-private and have single occupancy rooms with two rooms sharing one shower and a washroom.
- Type C: three story blocks of dormitories are double occupancy rooms with a central shower and washroom facility shared by ten rooms.

The accommodation complex also includes the following facilities:

- Kitchen, bakery, dining hall.
- Recreation, exercise, and entertainment facility including a cinema that can also be used for meetings and training.
- Three soccer fields.
- Workers union building.
- Hospital equipped with trauma treatment facilities as well as life support equipment. The hospital is comprised of a waiting and reception area, doctor's office, operating theatre, two bed wards, washroom facilities, storage room, and ambulance parking.

15.8.3 Explosives Magazine

The explosives magazine has been constructed and operated in accordance with Peruvian Law.

15.8.4 Solid Waste Disposal and Recycling Facility

Non-recyclable, non-toxic solid waste is disposed of in an on-site lined landfill. Used tires are shredded and placed in the landfill.

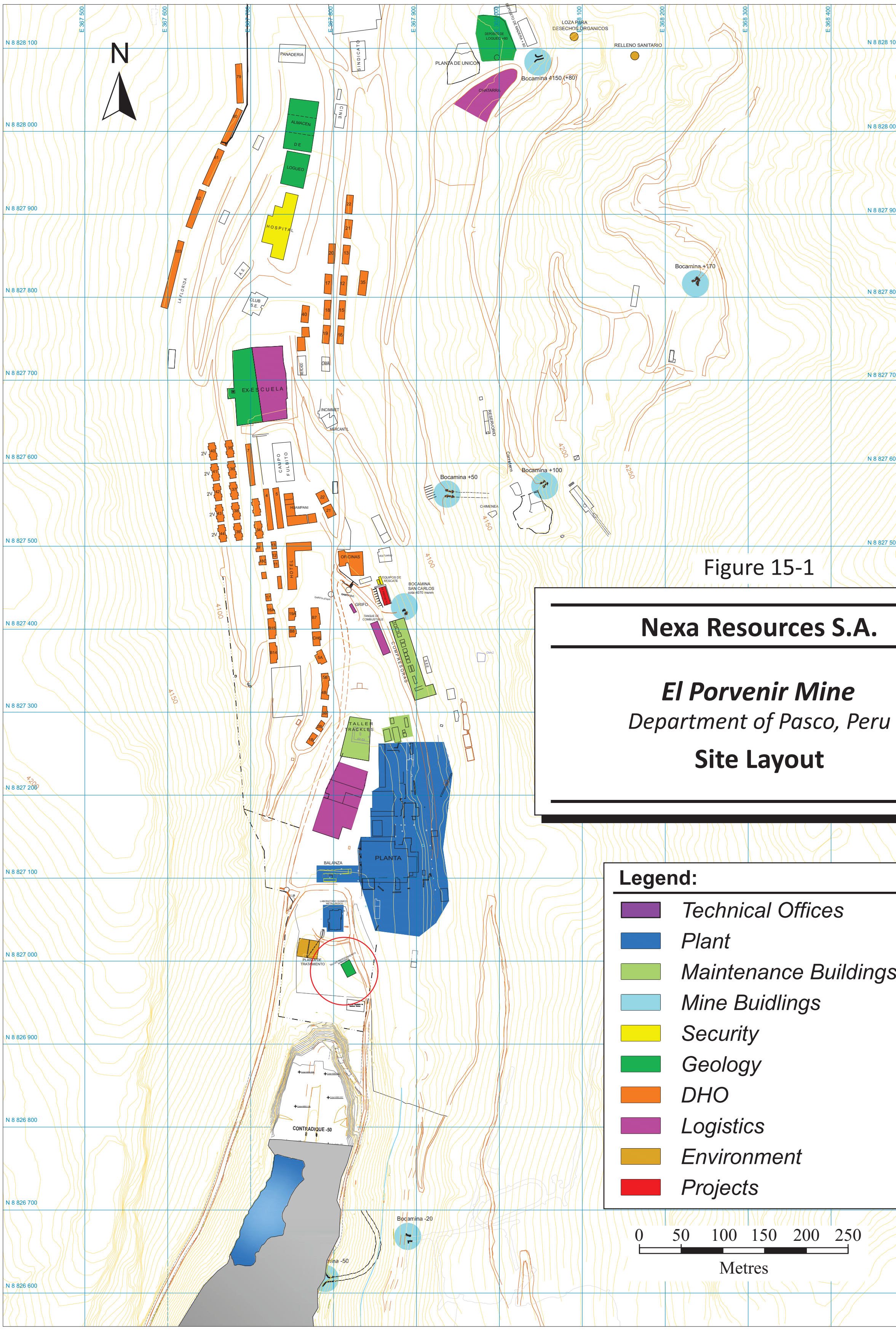


Figure 15-1

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Site Layout

January 2021

Source: Nexa, 2020.

15.9 Tailings Storage

The El Porvenir TSF receives tailings generated by both El Porvenir and Atacocha concentrator plants. A portion of tailings is used for hydraulic backfill at El Porvenir. The El Porvenir TSF was originally constructed in the 1970s, and the current elevation of the dam crest is 4,060 MASL. The downstream toe is inferred to be less than 3,920 m from available plans, resulting in a dam height of 140 m.

Nexa is planning to improve the water management system through construction of a perimeter channel (i.e., upstream water diversion) to intercept clean (non-contact water) surface runoff water preventing its entrance to the TSF. Diverted water will be discharged downstream of the TSF in the Lloclla River gorge.

Contact water is recycled via a decant pumping system to the concentrator for use in the processing facility. The diversion on the western side of the TSF will be raised for the ultimate dam (Ausenco, 2016b). A lined seepage collection monitoring pond is located at the downstream toe of the main embankment to control water quality prior to water release to the environment. The monitoring pond is equipped with an overflow spillway and outlet channel for discharge into a local tributary creek of the Lloclla River.

A decant overflow system located on the left side of the main embankment conveys surplus flows from the tailings pond to the monitoring pond through the Lloclla Tunnel. Operation of a sluice gate at the pond location allows for the diversion of decanted water into the monitoring pond or bypass it, discharging directly into a local tributary creek of the Lloclla River. The water intake of the decant overflow system is a hydraulic structure consisting of two concrete towers with a series of inlets stacked vertically (referred to as “windows” in the Ausenco design reports). Inlets must be progressively blocked and rendered inactive as the deposited tailings reach certain elevation.

A channeling structure, consisting of two breakwaters, direct flows towards the emergency spillway. The spillway is an overflow tunnel located in the right abutment. It is reportedly designed to convey flows from probable maximum precipitation (SRK, 2017). The tunnel discharges via a tunnel daylighting at elevation 4,035 MASL. A lined seepage collection monitoring pond is located at the downstream toe of the main embankment.

The layout of the TSF with its crest elevation of 4,064 MASL is presented in Figure 15-2. The intention is to raise the main embankment in 10 m increments with intermediate raises of four metres. It is noted that the expansion of the TSF to contain the LOM tailings requires a rockfill embankment dam and seepage collection pond at the northeast corner of the TSF to prevent tailings from impacting the concentrator plant area, as well as the northwest where the Tingovado Creek is diverted. The embankment located at the process pond is raised progressively in a downstream direction and its upstream slope is lined with a two millimetre thick high density polyethylene (HDPE) geomembrane. The detailed design of the El Porvenir TSF to its final elevation of 4,100 MASL has been completed (Ausenco, 2016b). Planning is also currently underway to re-activate the Atacocha TSF and construction is underway to raise its embankment to an elevation 4,126 MASL (Ausenco, 2020). Upgrades to the pumping and piping systems at El Porvenir will allow disposal of the El Porvenir tailings, not used for hydraulic backfill, at the Atacocha TSF.

Figure 15-3 shows the main TSF dam with a crest elevation of 4,060 MASL in plan view. The average crest width is approximately 15 m, with an overall downstream fill slope of 2.5H:1V and 1.5H:1V upstream; with an average interbank slope of 2H:1V.

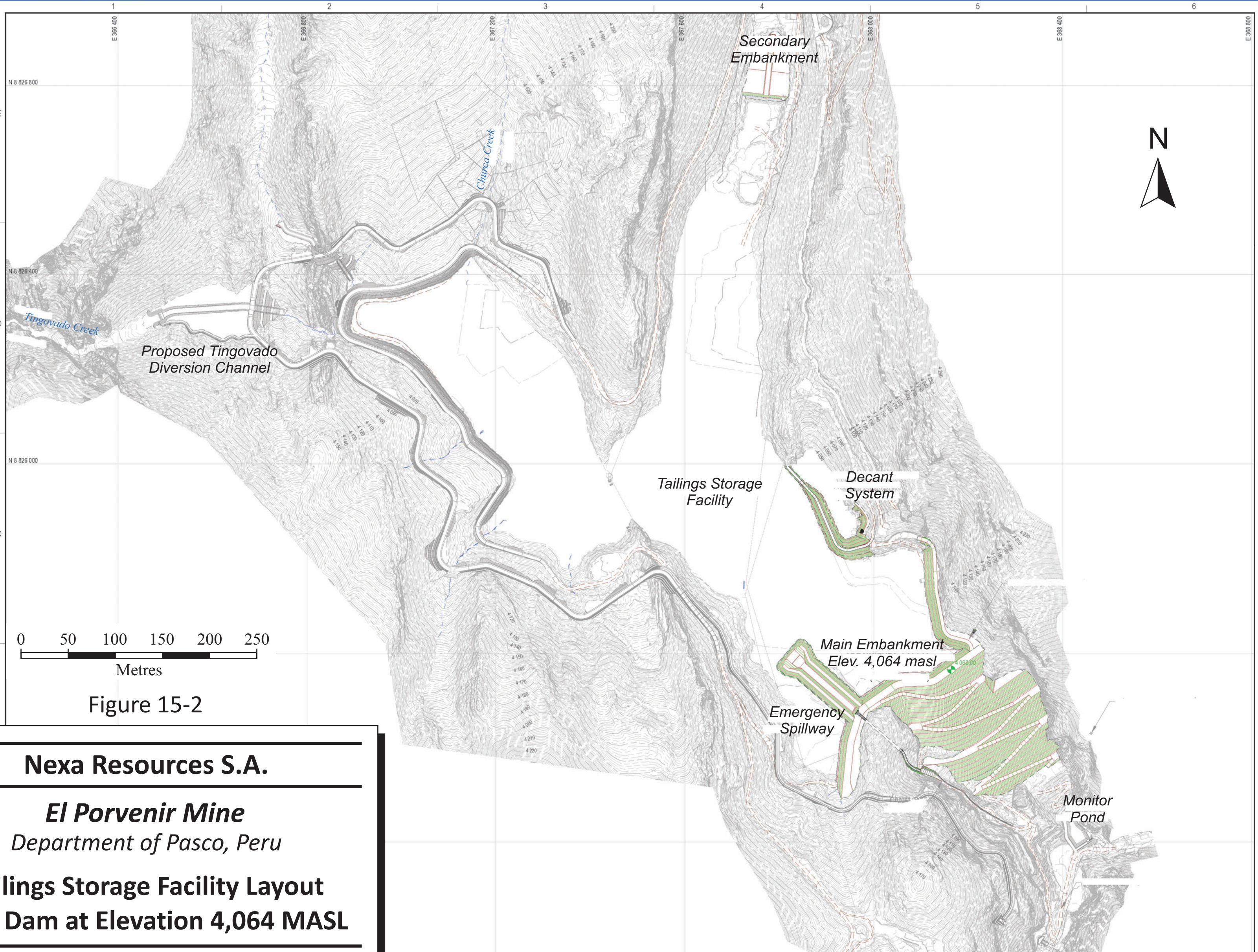


Figure 15-2

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Tailings Storage Facility Layout with Dam at Elevation 4,064 MASL

January 2021

Source: Ausenco, 2018.

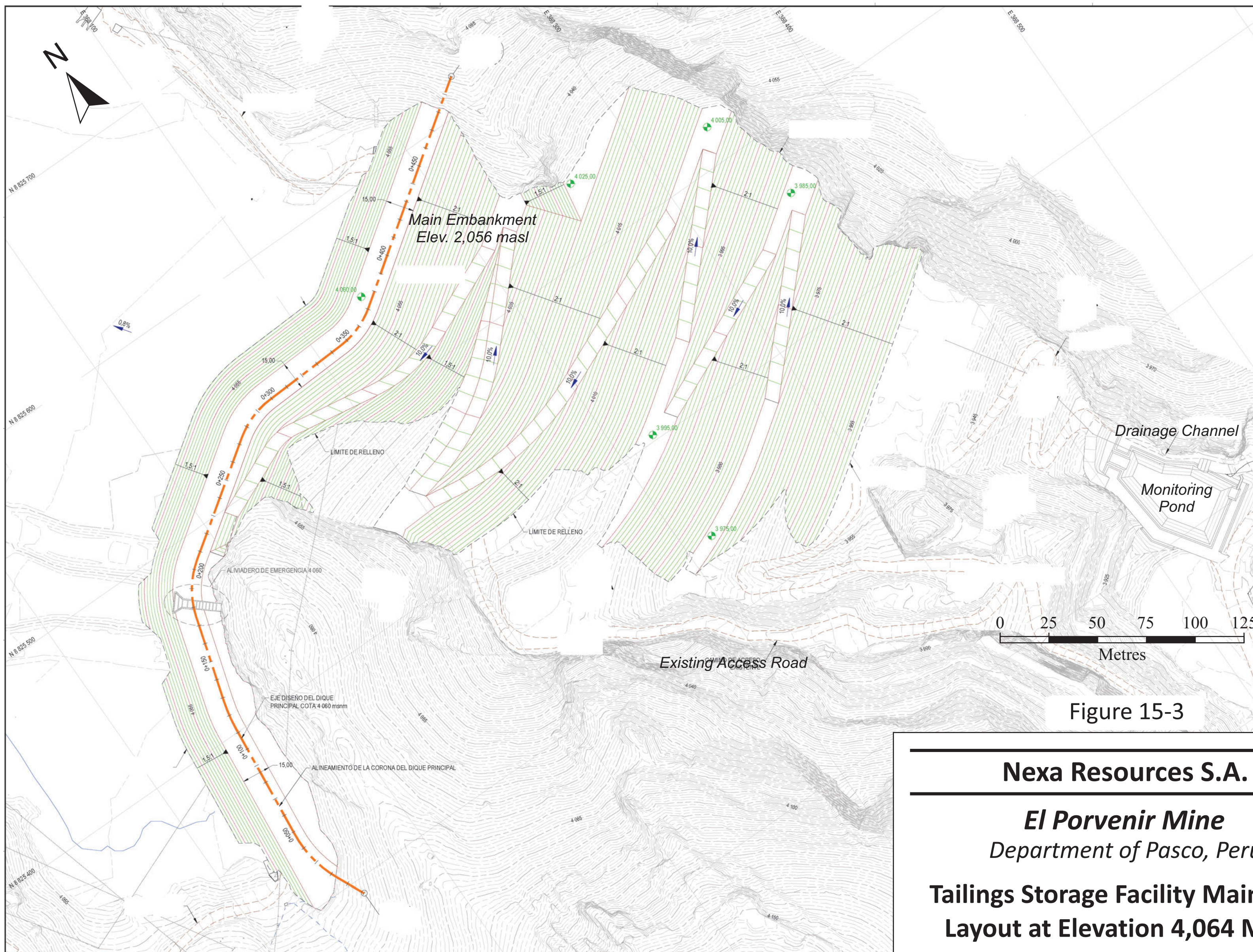


Figure 15-3

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Tailings Storage Facility Main Dam Layout at Elevation 4,064 MASL

January 2021

Source: Ausenco, 2018.

Surface preparation for dam raises includes the removal of topsoil and unsuitable soils and compaction to provide a suitable foundation. For cases where there are cavities, a product of karst processes, the sealing of the openings with mortar or cyclopean concrete is required. To SLR's knowledge the measures to address seepage through karst rocks have been implemented through recent TSF construction including a sandy gravel platform around the perimeter of the TSF (SRK, 2017), and bedrock foundation grouting of the dam abutments in 2015. On-going operations will require continuous tailings deposition planning and pond management to maintain the design beach widths to limit seepage through the permeable dam.

A cross section of the main dam at its ultimate crest elevation is shown on Figure 15-4. The initial TSF dam raises were performed using mainly compacted coarse tailings (cyclone underflow) with the centreline construction method. Due to a shortfall of the coarse fraction of the tailings to be used in the dam raises from 4,043 MASL, further raises used compacted rockfill and structural fill.

The crest of the dam is a horizontal platform of 15 m width and is composed of structural fill, which is mainly made up of sandy gravel. At the final elevation of the dam crest of 4,100 MASL, the height of the dam will be 187 m above the natural ground level of the gorge in which the dam is constructed.

In the design of the TSF, expansion plans considered that the processing rate would increase to 9,000 tpd in 2019 (3.24 Mtpa). Tailings produced would amount to 95.38% of ore processed. The design also considered the integration of El Porvenir with the Atacocha Mine and the disposal of Atacocha tailings in the El Porvenir TSF from 2016 onward. The Atacocha ore processing rate considered was 4,500 tpd (1.62 Mtpa) with plans for this to be increased to 5,000 tpd (1.8 Mtpa). Tailings produced would amount to 95% of ore processed.

Monthly and annual dam safety inspections are currently being conducted by Geoconsultoria Ltda, an external consultant, for both the Atacocha and El Porvenir dams. SLR relies on the conclusions of Geoconsultoria [latest annual report titled *Evaluación Annual de Seguridad – 2018* dated March 20, 2019] and provides no conclusions or opinions regarding the stability of the listed dams and impoundments.

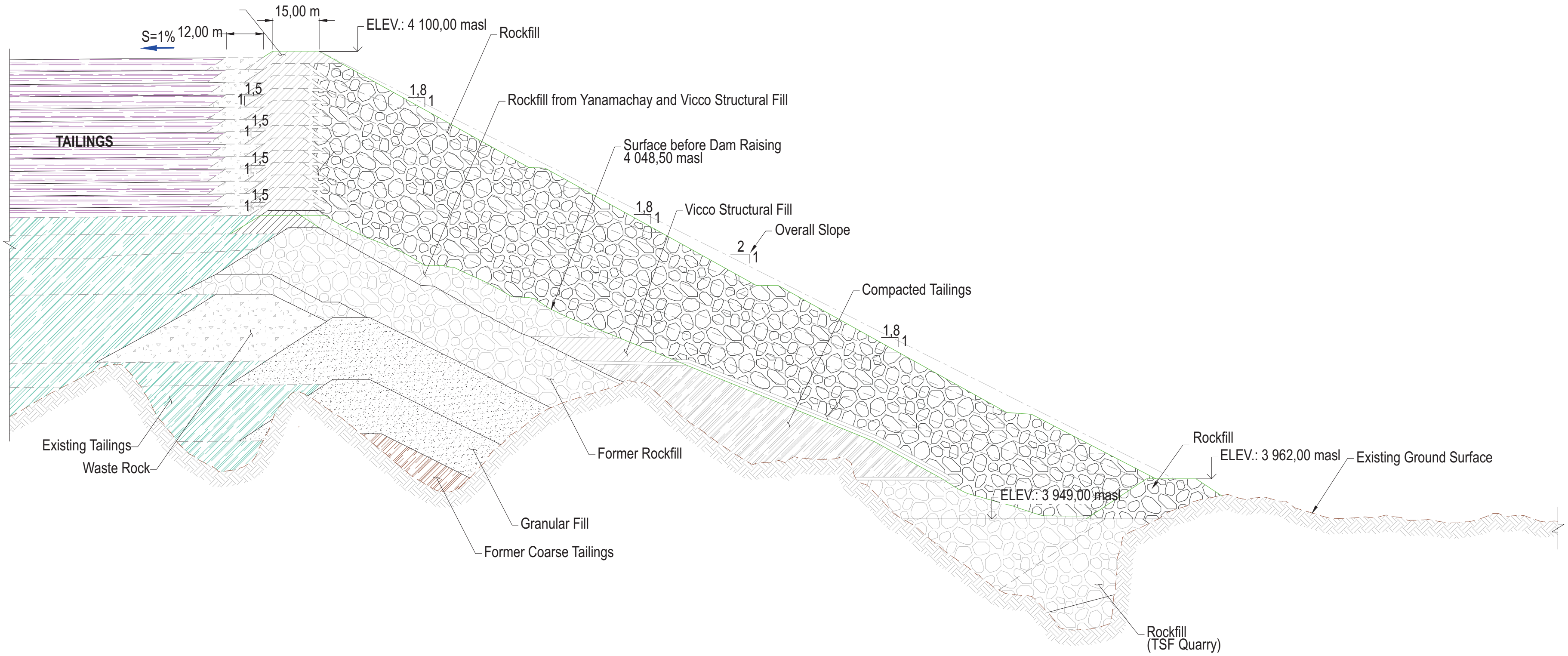


Figure 15-4

Nexa Resources S.A.

El Porvenir Mine

Department of Pasco, Peru

Tailings Storage Facility Main Dam Section to Elevation 4,100 Masl

January 2021

Source: Ausenco, 2016.

15.10 Waste Rock Storage Facilities

Historically, the volume of waste rock deposited on surface has been minor given that the El Porvenir operation is an underground mine. In the past, waste rock has been deposited in two areas within the TSF, and La Quinua waste rock dump (WRD) located outside the TSF. The La Quinua WRD is currently inactive.

Currently, waste rock is only brought to surface for storage if backfilling is not possible. If waste rock is brought to surface in the future, it will be deposited in a designated area near the secondary TSF embankment (southwest of the concentrator plant area), approved in Directorial Resolution R.D. 693-2012 MEM-AAM/LCD/RPP/MPC.

16.0 MARKET STUDIES

16.1 Markets

The principal commodities produced at El Porvenir, zinc, lead, copper, and silver, are freely traded, at prices and terms that are widely known, so that prospects for sale of any Nexa production are virtually assured. Zinc and copper represent 72% of El Porvenir's gross revenue, while lead and silver contribute 28% of the revenue. El Porvenir is an operating mine with concentrate sales contracts in place for copper and lead concentrates, while zinc concentrate is consumed by Nexa's Cajamarquilla smelter according to their internal planning. SLR has reviewed the concentrate terms provided by Nexa and found them to be consistent with current industry norms.

Market information in this section is based on the industry scenario analysis prepared by Nexa's Market Intelligence team in July 2020 based on information sourced from different banks and independent financial institutions, economy and politics research groups, and metals consultants.

Nexa's Market Intelligence team notes that the industry has progressed from volatile markets in 2019 due to US/China trade wars, Brexit, and developing economies slowing down, to more uncertainty in 2020 due to the COVID-19 pandemic, a plunging global economy, the oil crisis, and the US elections. All these factors have affected the market fundamentals.

The SLR QP has reviewed the market studies and analyses and is of the opinion that the results support the assumptions in the Technical Report Summary.

16.1.1 Zinc

16.1.1.1 Demand

The major market drivers for zinc demand are construction and infrastructure, transportation and vehicles production, industrial machinery production, batteries, and renewable energy. All these industries have been affected by the COVID-19 pandemic which has caused the global economy to slow down. As a result, zinc metal demand has also decreased in 2020, by approximately 10% year over year.

Nexa's Market Intelligence team examined several scenarios for demand recovery and future growth and settled on a base case that forecasts pre-COVID-19 levels of demand in the second half of 2022, with a demand compound annual growth rate (CAGR) of approximately 1.3% from 2023 to 2025. In 2019, they had forecasted a CAGR of approximately 1.7% between 2019 and 2024.

16.1.1.2 Supply

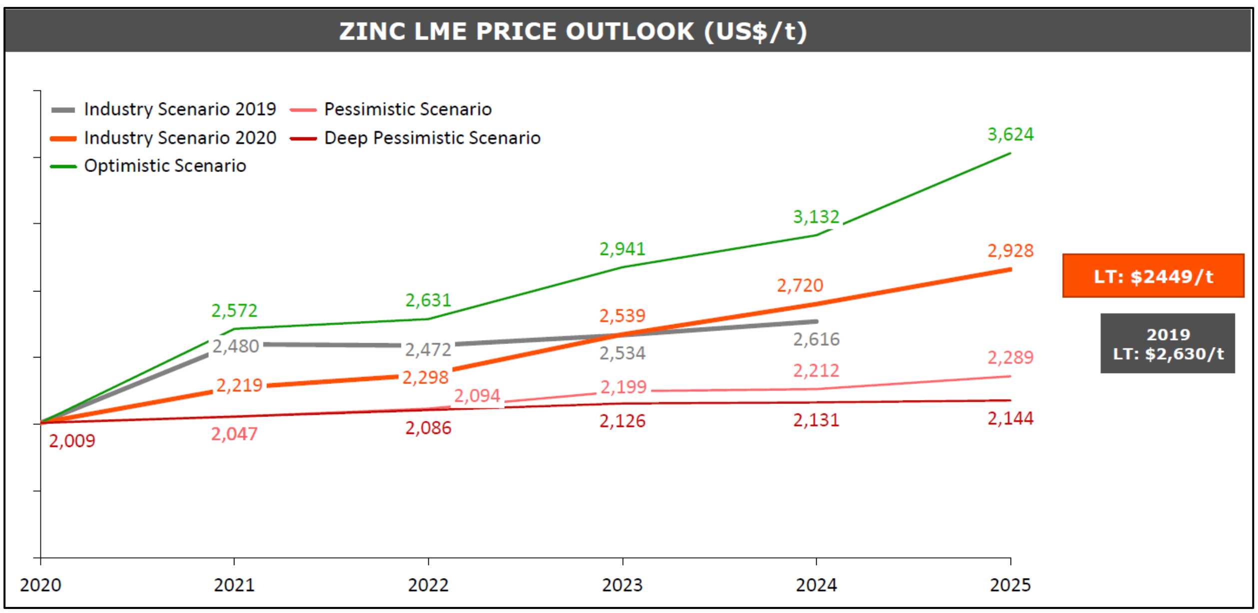
Nexa's Market Intelligence team's supply forecast analysis was based on the following industry information: zinc mine start-up and closure, mine production guidance, disruption allowance evaluation, project pipeline, and cost evaluation for 2020 onwards. Nexa's forecast analysis results are summarized as follows:

- Mine disruption factor: Based on independent data, Nexa has forecast a mine disruption factor of 4% for China and 4% until 2023 and 2% to 3% for 2024 and 2025 for the rest of the world (ROW).
- Project Pipeline: The analysis considered greenfield projects forecast to begin production between 2020 and 2025.

- Zinc concentrate production evolution - Global: Recent market conditions due to the COVID-19 pandemic have affected mines worldwide, reducing investments and causing mine closures. As a result, zinc supply might be limited in the long term.
- China concentrate evolution: China concentrate supply is expected to increase by 3% through the 2020 to 2025 cycle, but significantly depends on the ability of China's small mines to survive amid lower price levels and volatile market conditions.
- Zinc Global Market Balance: Based on the above considerations, Nexa's forecast is for a significant zinc supply surplus in 2020 and 2021, with an increase in demand starting in the second half of 2022. From 2024 onwards, the global demand will exceed zinc supply.

16.1.1.3 Zinc Price Outlook

Zinc prices depend on variations in supply, demand, and the perceived supply/demand balance. The most commonly referenced currency for zinc transactions is US dollars. Based on Nexa's Market Intelligence team's analysis of zinc supply, demand, global balance, and zinc consensus prices, Nexa forecasts stressed zinc prices in 2021 and 2022 as between $2,000/t and $2,300/t, with a potential price increase to greater than $2,700/t starting in 2024 to 2025, and a long term price of $2,449/t. Figure 16-1 shows the results of Nexa's analysis.



Source: Nexa, 2020f

Figure 16-1: Zinc Price Outlook (2020-2025)

16.1.2 Copper

16.1.2.1 Demand

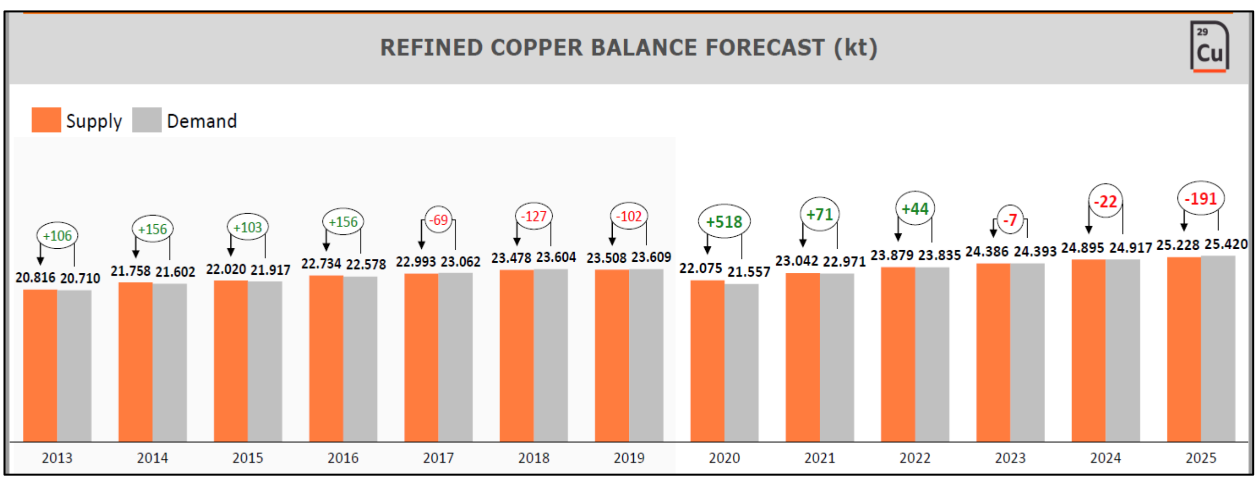
The major market drivers for copper demand are power generation and transmission, construction, factory equipment, and the electronics industry. The COVID-19 pandemic affected copper demand in 2020 and, in the opinion of Nexa's Market Intelligence team, will also impact it in the years ahead (2021 and 2022). In the long term, the Nexa predicts a lower demand growth, mainly reflecting China's economic transition, despite the positive contribution of global trends such as electric vehicles, renewable energy, and urbanization.

Nexa analyzed multiple demand scenarios, with a Base Case forecasting a reduction in copper demand by 9.0% between 2019 and 2020, and starting in the second half of 2020, a slower paced recovery with a demand CAGR of 3.2% between 2020 and 2025. Copper demand is predicted to grow from 26.9 Mt in 2020 to 31.5 Mt by 2025.

16.1.2.2 Supply

Nexa's Market Intelligence team's supply forecast analysis was based on the following industry information: copper mine start-up and closure, mine production guidance, project pipeline, and cost evaluation for 2020 onwards. Nexa's forecast analysis results are summarized as follows:

- Project Pipeline: The pipeline is short, mainly because there are fewer opportunities in mining friendly jurisdictions.
- Copper concentrate (sulphide) production evolution: Nexa considers that the majority of the production will come from sulphide mines. Nexa forecasts a concentrate production CAGR increase of 4.2% between 2020 and 2025. The increase in supply results from the ramp-up of brownfield projects.
- Copper solvent extraction and electrowinning (SXEW) (oxide) production evolution: Nexa forecasts a downward trend for SXEW production. Based on Nexa's analysis, a concentrate production CAGR will decrease by 2.7% between 2020 and 2025, as a result of mine closures and reductions in production.
- Refined Copper Market Balance: the copper market has been in deficit for the last three years, leading to lower stocks, despite lower prices since mid-2018 mainly due to the trade war between the USA and China, and the COVID-19 pandemic outbreak in 2020. Based on the above production assumptions, Nexa provided a forecast for Copper Market Balance between 2020 and 2025, showing a significant copper supply surplus in 2020 and a slightly positive surplus in 2021 and 2022. From 2023 onwards, the global copper demand will create a deficit in copper supply (Figure 16-2).

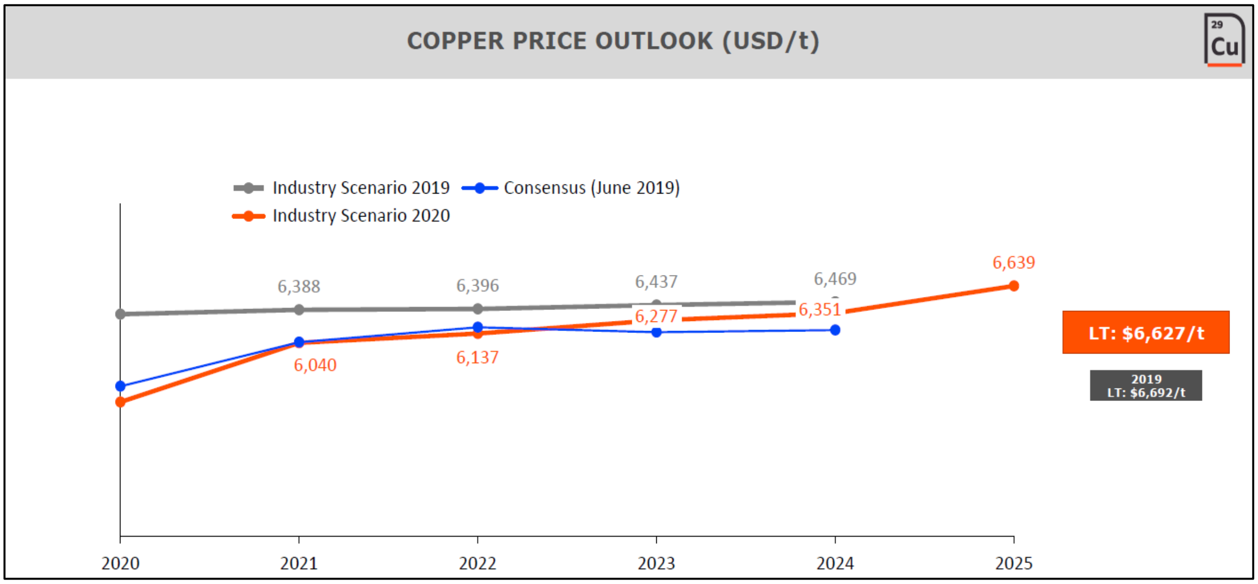


Source: Nexa, 2020f

Figure 16-2: Refined Copper Market Balance (2020-2025)

16.1.2.3 Copper Price Outlook

Copper prices depend on variations in supply, demand, and the perceived supply/demand balance. Based on Nexa's Market Intelligence team's analysis of copper supply, demand, global balance, and copper consensus prices, Nexa forecasts stressed copper prices between 2021 and 2024 as between $6,040/t and $6,351/t, with a potential price increase to higher than $6,500/t after 2024, and a long term price of $6,627/t. Figure 16-3 shows the results of Nexa's analysis.



Source: Nexa, 2020f

Figure 16-3: Copper Price Outlook (2020-2025)

16.1.3 Lead and Silver

Lead and silver in conjunction represent 28% of El Porvenir's gross revenue. Given their impact in the El Porvenir revenue mix, Nexa has based its lead and silver price forecast solely on consensus prices and correlation analysis published by metal market analysts and financial institutions.

16.1.3.1 Lead Price Outlook

Lead represents 11% of El Porvenir's gross revenue. Nexa's lead prices were chosen considering a spread applied on the zinc prices curve. These spreads are commonly used and monitored by the market, based on a strong correlation between the two metals. For the cycle 2021 to 2025 a growing spread between US$ 350/t Pb to US$ 700/t Pb was considered. Nexa forecasts increasing lead prices between 2021 and 2025 (between US$ 1,869/t Pb and US$ 2,247/t Pb), and a lower long term price of US$ 1,910/t Pb. Figure 16-4 presents the results of Nexa's lead analysis.

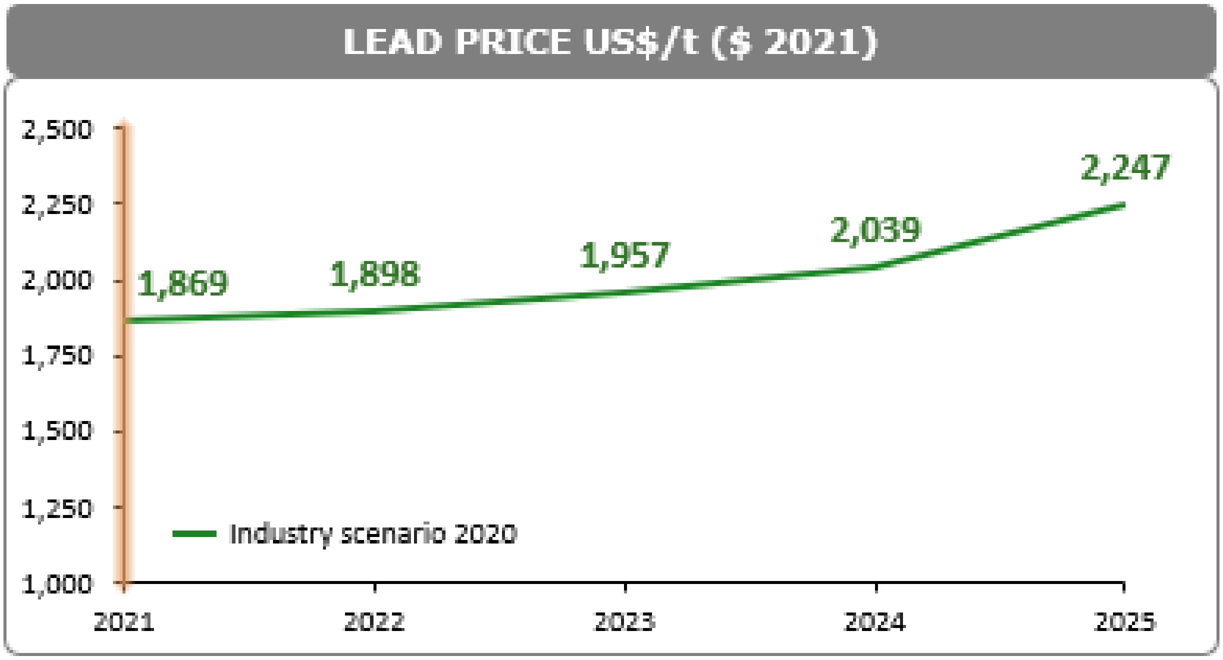


Figure 16-4: Lead Price Outlook (2020-2025)

16.1.3.2 Silver Price Outlook

Silver represents 17% of El Porvenir's gross revenue. Nexa's silver prices were chosen based on the median of consensus quotes/prices published by banks and institutions on a monthly basis. The silver forecast curve in Figure 16-5 presents the median silver price considering 23 different institutional sources. Nexa forecasts declining silver prices between 2021 and 2025 (between US$ 17.30/oz Ag and US$ 16.40/oz Ag), with a potential long term price increase to US$ 16.87/oz Ag.

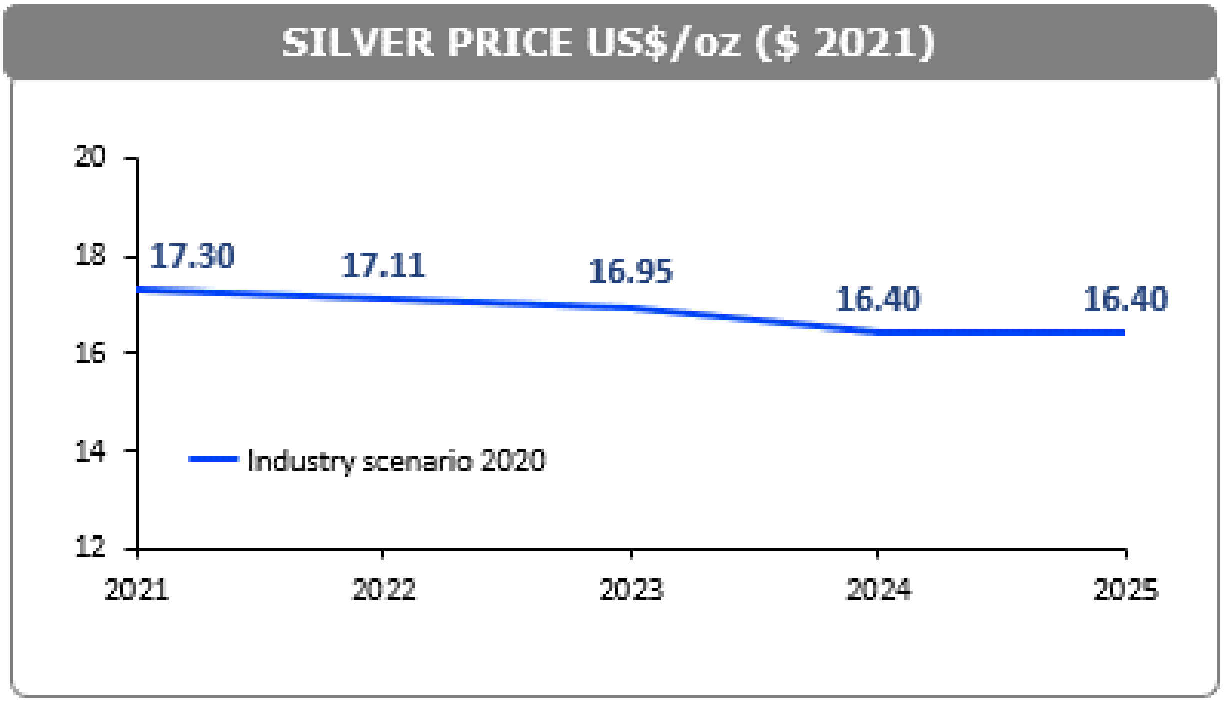


Figure 16-5: Silver Price Outlook (2020-2025)

16.2 Contracts

16.2.1 Streaming Agreement

There are no streaming agreements associated with El Porvenir.

16.2.2 Other Contracts

Various operational support services are provided by contractors, including underground mining, surface tailings haulage and placement, concentrate haulage, catering, security, and the Mine site laboratory.

There are currently 1,794 contractor personnel providing the services as listed in Table 16-1.

Table 16-1: Third Party Contractors
Nexa Resources S.A. - El Porvenir Mine

Contractor	Area	Personnel
A&G Ced S.A.C.	Human Resources	15
Ancro S.R.L.	Environment	6
Antares Mantenimiento Industrial S.A.C.	Plant	17
Ausenco	Projects	2
Biddle Inc S.A.C.	Plant	9
Confipetrol Andina S.A.	Mine	61

Contractor	Area	Personnel
	Plant	145
Constructora Pawer S.R.L.	Health & Safety	3
Corporacion Zafiro Sdj E.I.R.L.	Mine	4
Distribuidora De Mangueras Hidraulicas Sac	Mine	5
Explomin Del Peru S.A. Exploración	Mine	65
Explomin Del Peru S.A. Infill	Mine	62
Exsa S.A.	Mine	56
Ferreyros S.A.	Mine	15
Grupo Alvarado	Information Technology	1
Iesa S.A.	Mine	548
Incimmet S.A.	Mine	24
Inspectorate Services Peru S.A.C.	Plant	19
Operaciones Seprocal S.A.C	Mine	155
	Mine	67
Prosegur	Human Resources	50
Resiter Peru S.A.C.	Mine	6
Salus Laboris S.A.C.	Health & Safety	26
Sandvik Del Peru S.A.	Mine	55
Esermul	Human Resources	101
	Human Resources	13
Sodexo	Human Resources	111
Steo	Health & Safety	8
Transportes Brandito	Environment	5
Transportes Expreso Milpo S R Ltda	Human Resources	12
Tumi Contratistas Mineros S.A.C.	Mine	14
Union De Concreteras S.A.	Mine	114
Total		**1,794**

SLR has reviewed the mine operating costs related to contracts and found these to be reasonable, as long as the production targets are realized.

16.2.3 Quality of Zinc Concentrate

Table 16-2 presents the average quality of the zinc concentrate El Porvenir shipped to the Cajamarquilla smelter in 2019. El Porvenir's concentrate made up to approximately 5% of the smelter's feed in 2019.

Table 16-2: Quality of El Porvenir Zinc Concentrate
Nexa Resources S.A. – El Porvenir Mine

Zn (%)	Cu (%)	Fe (%)	Pb (%)	S (%)	CaO (%)	MgO (%)	Hg (ppm)	Moisture (%)
49.9	1.0	8.1	1.3	32.1	1.2	0.5	7.0	8.0

Source: Nexa 2020d

16.2.4 Concentrate Sales Contracts

El Porvenir has contracts for the sale of its copper and lead concentrates with refineries and global traders. Nexa considers these contracts to be in line with industry norms. El Porvenir ships its zinc concentrate to smelters owned by Nexa.

16.2.5 Penalties

Table 16-3 and Table 16-4 present the schedules of the contaminant element penalties for El Porvenir's lead and copper concentrates, respectively. While no penalties are currently applied to the zinc or lead concentrates, the copper concentrate incurs a penalty of approximately US$17/dmt.

Table 16-3: Contaminant Element Penalties - Lead Concentrate
Nexa Resources S.A. – El Porvenir Mine

As: between $1 and $2 for each 0.1%, when grade is be higher than 0.5%.
Sb: between $1 and $2 for each 0.1%, when grade is be higher than 0.5%.
Bi: between $1 and $1.5 for each 0.01%, when grade is be higher than 0.6% or 1.1% (typically 1.1%)
Mn: There may be penalty scales above 10%, values between $1-$2 for each 0.1%
Pb: when grade is below specification (normally <45%).

Table 16-4: Contaminant Element Penalties - Copper Concentrate
Nexa Resources S.A. – El Porvenir Mine

As: $1.5 for each 0.1% above 0.3%
Sb: $5-$6 for each 0.1% above 0.3%
Bi: $1.5 for each 0.01% above 0.06%
Pb+Zn: $1.5 for each 1% above 9% (this penalty can be separate Pb and Zn, as well)

16.2.6 Concentrate Specifications

The lead concentrate contains, on average, 50% Pb and 2,500 g/t Ag. The copper concentrate contains, on average, 20% Cu and 2,500 g/t Ag.

17.0 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

The information presented in this section is based on documentation provided by Nexa for review. No site visit was conducted in support of the preparation of Section 17 of this Technical Report Summary.

17.1 Environmental Aspects

17.1.1 Mine Operation Overview

El Porvenir is located in the district of San Francisco de Asís de Yarusyacán, in the province of Pasco, Peru, approximately 13 km northeast of the town of Cerro de Pasco. The property is in the central Andes mountains region of Peru, between elevations 3,900 MASL and 4,350 MASL. The El Porvenir LOM currently extends until 2027.

The El Porvenir facilities are located within the micro-basin of the Milpo Creek, which discharges to the Chinchao Creek and this in turn to the Lloclla River. The Lloclla River is formed by the confluence of the Pucayacu and Jabonera creeks, and flows into the Panamarca River, which becomes the Huallaga River further downstream. Consequently, the El Porvenir area belongs to the water system of the upper basin of the Huallaga River (i.e. the Alto Huallaga Inter-basin). Highest flows in the Lloclla River typically occur in March, with lowest flows in July.

The El Porvenir operation is comprised of the following main facilities:

- Underground mine
- Concentrator plant
- TSF
- WRDs (currently inactive)
- Water management facilities and infrastructure
- Ancillary buildings and infrastructure (administration, storage, vehicle maintenance, domestic waste landfill, waste management, etc.)

With the integration of the Atacocha and El Porvenir operations, tailings from Atacocha are deposited in El Porvenir TSF, located approximately four kilometres south of Atacocha. This is the current tailings disposal practice.

El Porvenir operates a conventional concentration processing plant with a nominal capacity of 6,500 tpd of ore. The concentrator plant processes on average approximately 5,800 tpd to 5,900 tpd. The processing flowsheet includes a multistage crushing plant, a conventional ball mill grinding stage, and sequential differential flotation to produce three final mineral concentrates: a zinc concentrate, a lead concentrate, and a copper concentrate (SRK, 2017). Power supply is obtained from the national grid through a 138 KV power line.

Environmentally, El Porvenir is not located within a protected natural area nor its buffer zones (SRK, 2017).

17.1.2 Environmental Baseline

Environmental baseline studies have been completed as part of the EIA. The detailed baseline characterization is included in the EIA reports. A summary of the existing conditions in the El Porvenir area based on information included in Ecotec (2018) and KCB (2020) is presented below.

17.1.2.1 Climate

The climate is cold and dry throughout the year, which is typical of the Central Andes Mountain Region. Approximately 80% of the annual rainfall takes place between October and March. From June to August there are generally minimal rainfalls. Based on data from the Cerro de Pasco regional meteorological station operated by the government (data record from 1975 to 2017), the average temperature ranges from 4°C in July to 6°C in November. The average annual precipitation is 943 mm, with maximum monthly precipitation of 135 mm in March and minimum monthly precipitation of 15 mm in July.

17.1.2.2 Air Quality

Air quality has been characterized using records from eight monitoring stations for the period 2016 to 2018. The monitoring results are compared against national environmental quality standards for air quality (D.S. No. 003-2017-MINAM). Measured concentrations for particulate matter less than 10 µm (PM10), particulate matter less than 2.5 µm (PM2.5), gases (sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, hydrogen sulphide) and benzene were below the limit set in the standard.

17.1.2.3 Surface Water Quality

Characterization of existing conditions presented in Ecotec (2018) and KCB (2020) is based on surface water quality monitoring conducted at five sampling locations in three natural waterbodies (Lloclla River, Tingovado Creek, and Huallaga River). Four of these stations are located upstream of the mining activities and one is located downstream. Surface water quality is compared with the national environmental quality standards for water: D.S. No. 002-2008-MINAM for monitoring records from 2013 and 2014, D.S. No. 015-2015-MINAM for monitoring records from 2015 and 2016, and D.S. No. 004-2017-MINAM for monitoring records from 2017 and 2018. The reference values selected from the standards correspond to class 3-D1 for irrigation of high and low stem crops, and class 4-E2 for the Huallaga River.

Results from monitoring of water quality in the Lloclla and Huallaga rivers indicate a reduction of exceedances over time. Monitoring data from 2016 to 2018 (Ecotec, 2018)indicate some exceedances associated with zinc and lead in the Huallaga River, and some exceedances for pH, lead and manganese in the Lloclla River.

The water quality analysis included in Ecotec (2018) presented an individual discussion for each parameter explaining how the exceedances are associated with geological and morphological conditions inherent to the El Porvenir location. From the data presented in the Ecotec report exceedances are observed for short periods of time and are not simultaneously occurring for all the monitored parameters.

17.1.2.4 Effluent Water Quality

Effluent water quality is monitored at two discharge locations: water discharge from the underground mine to the Huallaga River, and water discharge from the TSF to the Lloclla River. The water quality at the effluent discharge locations complies with the maximum permissible limits established by the current Peruvian Legislation (D.S. No. 010-2010-MINAM and D.S. 003-2010-MINAM).

17.1.2.5 Groundwater Quality

No groundwater quality monitoring has been carried out prior to 2020 with the exception of monitoring at two locations where discharge of groundwater to surface from the aquifer takes place (i.e. springs). According to Ecotec (2018), one of the springs (station 13MM) has the potential to influence concentrations of arsenic, manganese, and lead in the waters of the Lloclla and Huallaga rivers. The second spring (station 14MM) has the potential to influence concentrations of arsenic in the water of the Lloclla and Huallaga rivers. Comparison against national standards is not applicable because no standards for groundwater quality have been developed for Peru.

17.1.2.6 Soils and Land Use

There are two types of soils in the El Porvenir area, mineral and organic, derived from residual and transported soils. Actual land use corresponds to five categories: urban development (populated centers) and private facilities (mining activity), cultivated land, natural pastures, arboreal vegetation, and unproductive land (rock outcrops).

Soils at El Porvenir have concentrations of arsenic, cadmium, and lead that exceed the national environmental quality standards (D.S. No. 011-2017-MINAM for industrial use), at some sampling points. According to the baseline characterization, high values of arsenic and lead could be attributed to the local lithology and mineralization. High values of cadmium could be of natural origin since cadmium is associated with zinc and lead impurities.

17.1.2.7 Noise and Vibrations

Ambient noise has been characterized using records from eight monitoring stations for the period 2016 to 2018. Exceedances were registered in three stations during the day and four stations at night when comparing the monitoring results against the national environmental noise quality standards (D.S. No. 085-2003-PCM) for an Industrial Zone. Exceedances were attributed to human activities and vehicular traffic (Ecotec, 2018). The ambient vibrations monitored at three locations meet international standards used as a reference (BS7385 Part 2-1993).

17.1.2.8 Aquatic Biology

Aquatic communities account for plankton, periphyton, macroinvertebrates (benthos), and fish. According to KCB (2020), during the wet season in 2015 the phytoplankton was represented by 56 species, the zooplankton by 16 species, the periphyton by 45 species, the benthos by 30 species, and the fish by one specie (*Oncorhynchus mykiss* [rainbow trout]). During the wet season in 2016 the phytoplankton was represented by 27 species, zooplankton by nine species, periphyton by 11 species, and benthos by 14 species. None of the species identified in the El Porvenir area of influence are included in the list of protected species within the Peruvian legislation.

17.1.2.9 Flora

There are five species included in the national protection list approved under Supreme Decree D.S. No. 043-2006-AG that are found in the El Porvenir area: *Ephedra rupestris* (CR), *Senecio nivalis* (VU), *Chuquiraga spinosa* (NT), *Baccharis genistelloides* (NT), and *Buddleja coriácea* (CR). One specie was identified as endemic: *Plantago serícea* (Plantaginaceae), and two species are used for medicinal purposes by local communities: *Minthostachys mollis* and *Ephedra rupestris*.

17.1.2.10 Fauna

Fauna in the El Porvenir area is represented by six species of mammals, 34 species of birds, one specie of amphibian, and one specie of reptiles. Four species of mammals, eight species of birds, one specie of amphibian, and one specie of reptiles are included in the national protection list approved under Supreme Decree D.S. No. 004-2014-MINAGRI. The endemic species include two species of mammals, two species of birds, one specie of amphibian, and one specie of reptiles.

17.1.2.11 Fragile Ecosystems

The high elevation wetlands (bofedales in Spanish) are present within the area of indirect influence of El Porvenir (i.e. they are located outside the direct area of influence). Ecosystems considered as fragile in Perú are recognized by Law No. 28611 – Environment General Law.

17.1.2.12 Social

The El Porvenir area of influence encompasses the following rural communities and populated centers (list provided by Nexa through email communication):

- Comunidad de San Francisco de Asís de Yarusyacán (20 Anexos),
- Comunidad de Titaclayán,
- Comunidad de Cajamarquilla,
- Comunidad de Malauchaca,
- Comunidad Santa Rosa de Pitic,
- Comunidad San Miguel,
- Comunidad La Candelaria,
- Centro Poblado La Quinua,
- Comunidad 30 de Agosto,
- Comunidad San Juan de Yanacachi,
- Comunidad San Juan de Jarapampa, and
- Cooperativa Pucayacu.

17.1.3 Environmental Studies and Key Environmental Issues

SLR has been provided with the following documents and reports to conduct its review:

- Modification of the Environmental Impact Assessment for Capacity Expansion of the Concentrator Plant to 5,500 tpd (Compañía Minera Milpo, 2011)
- Modification of the Environmental Impact Assessment for Capacity Expansion to 7,500 tpd (Cesel Ingenieros, 2011)
- Fifth Supporting Technical Report (Quinto Informe Técnico Sustentatorio) for Modification of Auxiliary Components of El Porvenir Mine (Ecotec, 2018)
- Sixth Supporting Technical Report (Sexto Informe Técnico Sustentatorio) for Introduction of Technical Improvements to the Concentrator Plant (Escegis S.R.L, 2020)
- List of approved permits for El Porvenir (updated list provided on November 17, 2020)

- Annual Report on Compliance with the Environmental Management Strategy in 2018 (Nexa, 2019)
- Annual Report on Compliance with the Environmental Management Strategy in 2019 (Nexa, 2020e)
- Quarterly monitoring reports on surface water quality, effluent discharge quality, air quality, non-ionizing radiation, noise and domestic wastewater treatment prepared by SGS del Perú for Nexa in 2019 and 2020
- Bi-annual monitoring reports on terrestrial and aquatic biology (fauna and flora) campaigns carried out in 2019 prepared by RYG Consultora Ambiental for Nexa
- Reports from SGS Perú for 2020 on groundwater quality analysis for samples taken near the TSF dam
- Emergency response plan for El Porvenir (document No. MU-EP-SSM-SSO-003-ES Rev. 1 from 2020)
- Independent Technical Report pursuant to National Instrument 43-101 of the Canadian Securities Administrators for El Porvenir Mine, Perú. Report prepared by SRK Consulting issued on August 15, 2017

El Porvenir is managed according to the environmental and closure considerations presented in four type of documents, which must be approved by directorial resolutions (RD for its acronym in Spanish) from the Peruvian government (see Project Permitting):

- Environmental Adjustment and Management Plan
- EIA and subsequent modifications
- Supporting Technical Reports (ITS for its acronym in Spanish)
- Mine Closure Plan

Various EIA modifications and ITSs have been submitted and approved between 2001 and 2020. The most recent EIA approved in 2012 corresponds to the expansion of the concentrator plant production rate to 7,500 tpd.

The key project effects and associated management strategies are presented in Table 17-1, as described in the EIA and ITS documents reviewed by SLR. Prevention and mitigation measures identified for soils, air quality, water quality, biology, socio-economic aspects, landscape, and archeological remains are presented in the Environmental Management Plans included in the EIA and ITS documents. Mitigation measures against vibrations are not considered in the environmental studies provided to SLR. The monitoring program includes meteorology, air quality, non-ionizing radiation, noise, surface water quality, spring water quality, effluent discharges, flora and fauna, and TSF physical stability. In the SLR QP's opinion, the Environmental Management Plan is adequate to address potential issues related to environmental compliance.

Air quality and ambient noise monitoring are currently conducted at six locations, while monitoring of non-ionizing radiation is conducted at two locations. Water quality monitoring is currently occurring at a total of 14 locations (see Table 17-2). The results of the monitoring program for these environmental aspects are reported to the Peruvian authorities quarterly.

No environmental issues that could materially impact the ability to extract the Mineral Resources and Mineral Reserves were identified by SLR from the documentation available for review.

Table 17-1: Summary of Key Environmental Effects and Management Strategies
Nexa Resources S.A. – El Porvenir Mine

Environmental Component	Potential Impact	Mitigation Measures / Management Strategies
Topography and landscape	Relief alteration changes in landscape's visual quality.	No specific measures or strategies are proposed.
Soils	Changes to soil uses. Changes to soil quality.	Mitigation measures imbedded in the infrastructure design to minimize spill accidents. Appropriate management of industrial and domestic waste. Appropriate management of oils and fuels. Appropriate management of hazardous waste. Development and implementation of spills management plan. Removal of soils exposed to spills and storage in sealed containers for appropriate disposal in agreement with applicable legislation. Activities for vehicle maintenance are restricted to designated areas.
Surface water	Changes to surface water flows. Changes to surface water quality.	Appropriate management of chemical substances. Development and implementation of spills management plan. Domestic wastewater treatment. Mine water sedimentation ponds. Diversion of non-contact water around the TSF. Inspection and maintenance of the TSF diversion channel. Collection of surface runoff in the concentrator plant area. Sediment and erosion control measures. Tailings sub-drainage is captured in a monitoring pond and recirculated or discharged according to its quality, considering sediment control. Monthly water quality monitoring for receiving water bodies and effluent discharges. Currently Nexa reports monitoring results from 11 stations (five of them are effluent discharges). Quarterly reporting of monitoring results.
Groundwater	Changes to phreatic level. Changes to groundwater quality.	No specific measures or strategies are proposed. Monthly water quality monitoring in two springs and one piezometer (see Table 17-2). Quarterly reporting of monitoring results.

Environmental Component	Potential Impact	Mitigation Measures / Management Strategies
Air quality	Changes from particulate and gas emissions.	Regular irrigation of access roads with tanker trucks during the dry season. Wet grinding. Traffic speed control. Regular preventive maintenance of vehicles and equipment. Use of personal protective equipment by mine staff and training. Monitoring of particulate matter (PM10 and PM2.5), metals (lead, arsenic and zinc) and gases during the construction and operation phases. Monthly air quality monitoring at six stations located leeward and windward of the Concentrator Plant and the TSF. Quarterly reporting of monitoring results.
Noise	Disturbances resulting from changes to ambient noise levels.	Use of hearing protection devices in the concentrator plant area. Controlled time of exposition of workers to noise sources. Appropriate planning and scheduling of operation of noise sources. Regular preventive maintenance of vehicles and equipment. Use of vehicle horns limited to emergency situations. Quarterly monitoring at six stations. Quarterly reporting of monitoring results.
Flora and fauna	Changes to vegetation cover. Alterations to habitat. Disturbance of wild fauna.	Prohibition to disturb fauna. Land clearing limited to authorized areas. Prohibition to collect flora. Prohibition to extract species of flora and fauna. Noise control measures. Sediment control measures to protect natural streams. Traffic speed limits. Prohibition to use vehicle horns except in case of emergency. Monitoring of phytoplankton, zooplankton, benthic organisms, perifiton and macrofitas at four stations. Monitoring of metals content in sediment samples. Monitoring of flora at four stations. Monitoring of fauna at four stations. Bi-annual monitoring (dry and wet season).

17.1.4 Environmental Management System

Nexa uses an ISO 14001 compliant environmental management system at El Porvenir to support environmental management, monitoring and compliance with applicable regulatory requirements during operation.

Nexa utilizes an Integrated Dam Management System (referred to as SIGBar) for the TSF, which provides guidelines for document management, monitoring, evaluation, risk analysis, compliance with standards and legislation, training of personnel, operation of structures and other provisions.

The environmental monitoring program established at El Porvenir and the environmental audits performed annually (aiming to identify critical environmental risks in the operations) are the main tools of the El Porvenir's Environmental Management System to track the implementation of high environmental standards and the continuous compliance with the environmental commitments. The environmental audit matrix includes the evaluation of:

- Audit results to comply with legal requirement for environmental audit.
- Environmental monitoring activities.
- Environmental incidents.

Nexa does not have an Environmental Policy for El Porvenir. According to Nexa's website and the Nexa Annual Report on 2019 performance, the company identifies and manages the main risks from both an operational and strategic point of view, reducing and mitigating impacts to maintain business sustainability. Nexa has an integrated management system that establishes the guidelines that govern the conduct of the businesses, with a focus on quality management of environmental, health and workplace safety, and social responsibility issues. In addition, Nexa follows applicable environmental laws and regulations pertaining to its business in each country where it operates (Nexa, 2019).

Nexa has stated the following environmental goals in its Annual Report on 2019 performance:

- 75% recirculation and lower specific use of water.
- Reduce the specific emission of greenhouse gases by 5%.
- Decrease the disposal of tailings in dams and a 50% reduction in the specific generation of mining and smelting waste.
- Ensure that 100% of the units have pre-prepared future use alternative studies and updated decommissioning plans, in line with the sector's benchmark standards.

17.2 Mine Waste and Water Management

17.2.1 Environmental Geochemistry

Geochemical testing of the cyclone tailings underflow by Ausenco (2013) determined that the tailings have a high potential for generating acid drainage in the long term. While the leaching tests do not indicate potential for metal solubilization in the short term, kinetic tests, that demonstrate the evolution of the quality of the leachates over time, have not been completed. Geochemical testing by the Universidad Nacional de Ingenieria (Ausenco 2018) of the waste rock used for dam construction concluded that the rock was non-acid generating.

According to information included in the initial Mine Closure Plan (KCB, 2007), the waste rock deposited on surface (mostly in the La Quinua WRD) is non-acid generating. No geochemistry analysis of the rock walls of the El Porvenir underground mine has been conducted. If the rock is similar to the material disposed in the La Quinua WRD, then it is either non-acid generating or has an uncertain potential for acid generation. Due to high neutralization potential of the rock identified from early testing, no acid rock drainage (ARD) is anticipated to occur in the short or mid term. The Mine Closure Plan recommends carrying out additional geochemical studies to confirm the rock acid generation potential before closure in order to define and appropriate closure strategy and management measures to achieve geochemical stability.

17.2.2 Tailings Management

The safety of operating a centerline raised tailings dam depends on the ability to maintain wide tailings beaches and a low phreatic level in the dam shell for stability. SLR notes that no water balance information was available for review regarding the interaction between the Atacocha and El Porvenir operations, which is significant since the El Porvenir milling operations draws reclaim water from the TSF. The SLR QP is of the opinion that impact of a temporary suspension of El Porvenir milling operations on the El Porvenir TSF water balance should be considered.

Crest settlements at the left side of the dam were reportedly noted in a 2008 report by Golder Associates that was not available for review (SRK, 2017). No issues with regard to crest settlements were noted in recent dam safety monitoring reports. SLR notes however that bedrock foundation grouting of the left and right abutments carried out in 2015 observed very significant grout takes in numerous grouthole stages indicating the filling of voids. A series of seepage collection sub-drainage pipes were also installed on the downstream shell of the dam prior to raising the rockfill to the crest elevation of 4,056 MASL (Ausenco, 2016a).

Tailings disposal at El Porvenir is performed in subaerial conditions which allows a beach with a gentle slope towards the water or supernatant pond (settling pond). Tailings deposition planning considers deposition from three main locations. These discharge locations allow for the settling pond to be centrally located within the TSF and a tailings beach to form in front of the main embankment. The minimum beach width is 150 m. A capacity assessment of the TSF by Nexa (2020) recommends topographic and bathymetric surveys every six months to assess the available capacity.

Dam monitoring at El Porvenir consists of instrument measurements and field inspections. Field inspections (regular routine inspections) are carried out by Nexa personnel responsible for its operation, and monthly by an external consultant (Geoconsultoria). Piezometers and water level indicators are measured every two weeks, surface landmarks monthly, pluviometry, the graduated level of the water level within the TSF, is read daily. The data is reviewed by an external consultant (Geoconsultoria) on a monthly basis. An annual audit report is also completed by Geoconsultoria. Nexa utilizes an Integrated Dam Management System (referred to as SIGBar) which provides guidelines for document management, monitoring, evaluation, risk analysis, compliance with standards and legislation, training of personnel, operation of structures and other provisions.

The latest monthly inspection report by Geoconsultoria, reviewed by SLR was dated 28 April 2020. Geoconsultora (2020) stated that the freeboard and upstream beach width were acceptable, however the emergency spillway channel was covered during the construction of the non-contact diversion ditch, and some damage to a survey monument required repair (the survey monument has been repaired). The last annual audit report by Geoconsultoria reviewed by SLR was dated March 2019. The report concluded that the safety condition of the tailings dam is satisfactory.

The following recommendations are proposed for the El Porvenir TSF:

- Classification of the TSF in terms of the Global Tailings Standard or the Canadian Dam Association. The classification may require more conservative design criteria in terms of flood management and seismic loading.
- A dam breach analysis to inform the TSF classification and emergency preparedness plan.
- A trigger alert response plan (TARP) for the piezometers for inclusion in the monitoring plan.
- Capacity assessments of the TSF completed on a bi-annual basis with topographic and bathymetric surveys.
- Complete long term geochemical kinetic testing of the tailings.
- Implement a groundwater monitoring program at the TSF to determine levels of metals and sulphates.
- Monitor the water quality from the TSF subsurface drains.

17.2.3 Water Management

Freshwater is withdrawn at the Yanamachay pumping station from the Carmen Chico River and the Huarmipuquio Spring for distribution to the potable water tank and three water supply ponds that feed the concentrator plant for industrial processes. These water supply ponds also receive water from the Milpo Creek via the Socorro Pond. Water from the potable water tank is supplied to the mine camp and neighbouring communities (Vista Alegre, San Carlos, San Juan).

Water for underground mine operations activities is taken from the water supply ponds of the concentrator plant. Underground mine water is pumped to the La Quinua Sedimentation Pond to promote settling of solid particles before being discharged to the Huallaga River.

Tailings discharged to the TSF come from the El Porvenir and Atacocha concentrator plants. Tailings water and surface runoff resulting from direct rainfall over the TSF footprint are collected in the tailings pond. Water from the tailings pond is recirculated to the El Porvenir concentrator plant as make-up water for ore processing via the three water supply ponds of the concentrator plant area. Seepage water intercepted by the TSF underdrain system is captured in a lined monitoring pond and recirculated to the tailings pond or discharged into a local tributary of the Lloclla River if the water quality meets the applicable standards for direct discharge to the environment. Surplus water collected in the TSF pond is discharged through a decant overflow system that conveys flows to the monitoring pond. Operation of a sluice gate at that location allows for discharge control of decanted water into the monitoring pond or directly into a local tributary of the Lloclla River. As a contingency measure, the water management system allows conveyance of water collected in the monitoring pond to the sediment ponds located near the La Quinua WRD.

Nexa is planning to improve the TSF water management system through construction of a perimeter channel to intercept non-contact water (freshwater) from the sub-watershed that contributes natural surface runoff towards the TSF footprint. The Chinchao and Tingovado creeks will be intercepted by this diversion channel that will redirect water from the creeks towards the Lloclla River.

Sanitary wastewater generated at El Porvenir is collected and treated in a wastewater treatment plant. Treated water is conveyed to the tailings pond of the TSF for re-use in mine operation activities.

SLR did not find evidence of an integrated site-wide water balance for the El Porvenir and Atacocha operations within the documentation provided for review. Furthermore, it is unclear if the water balance for El Porvenir is continuously tracked during operation to support decision making associated with water management and dam safety. A water balance for ongoing operations to be updated regularly by mine operations personnel (or a designated consultant) is an important tool to ensure that sufficient water is available for ore processing and that pond water levels are adequate for safe operation of the TSF. The water balance makes it possible to track trends and conduct short term predictions through the simulation of variable operating and/or climatic scenarios to support decision making associated with tailings pond operation (e.g., maintaining adequate dam freeboard at all times).

SLR recommends Nexa develop an integrated water balance that reflects the interaction between the El Porvenir and Atacocha operations in regard to water balance, to identify and predict possible scenarios of interruption of mine operations due to water management issues and/or dam safety concerns (e.g., not maintaining adequate dam freeboard).

According to the Nexa 2020 Annual Report on Compliance with the Environmental Management Strategy in 2019, water quality monitoring currently takes place at the 14 locations listed in Table 17-2. Based on the documentation available for review, SLR is not aware of any non-compliance issues raised by the authorities associated with the El Porvenir water quality monitoring program.

Based on the Environmental Management Plans presented in the EIA and ITS documents, only one groundwater quality monitoring location is included in the environmental monitoring program. Monitoring results at this location are not included in the quarterly monitoring reports on water quality. SLR was provided with 11 reports from SGS, a laboratory accredited by the Peruvian authorities, with results of water quality analysis of samples taken between January 2020 and November 2020 at location PH-1 identified as "TSF dam". Each report covers a period of data of approximately one week. No interpretation of analysis results is included in these reports.

Typical practice for environmental monitoring of groundwater involves the installation of wells upstream and downstream of the mine site to compare water quality results and identify potential impacts of the mine operation to groundwater. It is unclear how El Porvenir currently verifies that no changes to groundwater due to mining activities are taking place within the area of influence of the operation. SLR recommends expanding the groundwater quality monitoring program to include additional stations for collection of groundwater quality samples (and subsequent analysis). As a minimum, consideration should be given to the installation of one station upstream of El Porvenir.

Table 17-2: Water Quality Monitoring Locations
Nexa Resources S.A. – El Porvenir Mine

Station ID	Type of Water	Location
5MM	Surface water effluent	Underground mine discharge at La Quinua tunnel outlet.
5AMM	Surface water effluent	Discharge from sedimentation pond to the Huallaga River.
6MM	Surface water effluent	Discharge from the TSF to the Lloclla River.
6CH-F4	Surface water effluent	La Candelaria Hydroelectric Plant - Station 4.
16MM	Surface water effluent	Inflow to the Sanitary Wastewater Treatment Plant from the mine camp.
7MM	Receiving water body	Lloclla River upstream of the TSF.
8MM	Receiving water body	Lloclla River downstream of the TSF.
9MM	Receiving water body	Huallaga River upstream of the La Quinua tunnel outlet.

Station ID	Type of Water	Location
10MM	Receiving water body	Huallaga River downstream of the La Quinua tunnel outlet.
11MM[1]	Diverted water	TSF diversion channel before the discharge to the Lloclla River.
12MM	Surface water body	Tingovado Creek upstream of the diversion channel.
13MM	Groundwater	Spring.
14MM	Groundwater	Spring.
15MM*	Groundwater	Piezometer.

Note:

1. As of December 2019, this station had not been implemented (Nexa, 2020).

17.3 Project Permitting

El Porvenir complies with applicable Peruvian permitting requirements. The permits are RDs issued by the Peruvian authorities upon approval of mining environmental management instruments filed by the mining companies such as EIAs, ITSs, and Mine Closure Plans. The approved permits address the authority's requirements for operation of the El Porvenir underground mine, TSF, concentrator plant, water usage, and effluents discharge.

Nexa maintains an up to date record of the legal permits obtained to date, documenting the approving authority, validity period and expiry dates, status (current, canceled or superseded), and indicating if renewal is required or not. The list of approved legal permits for El Porvenir provided to SLR by Nexa addresses the following aspects:

- EIA certifications
- Water use licences
- Effluent discharge
- Mine closure planning
- Beneficiation concessions
- Tailings management
- Power generation
- Licences for use of explosives
- Absence of archaeological remains

The El Porvenir RDs on environmental certifications, effluent discharge, water use, mine closure and tailings management are listed in Table 17-3. According to the record of the legal permits provided by Nexa in November 2020, the approved environmental certifications (i.e. EIA and ITS) do not have expiry dates and therefore renewal dates are not applicable. The third amendment to the Mine Closure Plan is currently under review process by the Peruvian Authorities in order to renew the mine closure obligations that expired in September 2019.

Table 17-3: Environmental, Mine Closure, and Tailings Disposal Licences Nexa Resources S.A. – El Porvenir Mine

Authority	Obligation/Licence	Date of Issue (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Status
	Environmental Certifications			
MINEM-DGM	PAMA (Programa de Adecuación y Manejo Ambiental) Approval RD 023-1997-EM/DGM	17/1/1997	None	Active
MINEM-DGE	PAMA Approval - Electric System (CH Candelaria + CT Milpo) RD 028-1997-EM/DGE	23/1/1997	None	Active
MINEM-DGAAM	EIA for Production Expansion of the Plant to 3,100 tpd RD 379-2001-EM/DGAA	26/11/2001	None	Active
MINEM-DGM	PAMA Approval of Execution RD 288-2002-MEM/DGM	7/11/2002	None	Active
MINEM-DGAAM	Modification of the EIA for Production Expansion of the Concentrator Plant to 5,500 tpd RD 271-2011-MEM/AAM	2/9/2011	None	Active
MINEM-DGAAM	EIA for Capacity Expansion of the Concentrator Plant to 7,500 tpd and Expansion of Cyclone Tailings RD 203-2012-MEM/AAM	25/6/2012	None	Active
MINEM-DGAAM	1st ITS El Porvenir – Transmission Line 220 kV Substation Paragsha II – Substation El Porvenir and Transmission Line 50 kV RD 159-2014-MEM/DGAAM	2/4/2014	None	Active
MINEM-DGAAM	2nd ITS El Porvenir – Integration Tailings Storage/Tailings Line Atacocha-El Porvenir (El Porvenir Zone) RD 526-2014-MEM/DGAAM	20/10/2014	None	Active
MINEM-DGAAM	IGA Ownership Change Record 647-2015-MEM/DGAAM	2/3/2015	None	Active
MINEM-DGAAM	3rd ITS El Porvenir – Approval "Variant to Ends of Transmission Line 220 kV-S.E. Paragsha II-SE El Porvenir and SE Milpo (El Porvenir), and tension reduction of Transmission Line from 220 kV to 138 kV" RD 271-2015-MEM-DGAAM	9/7/2015	None	Active
SENACE	4th ITS El Porvenir – Capacity Expansion of the Concentrator Plant to 9,0 tpd RD 319-2017-SENACE-DCA dated October 24, 2017	24/10/2017	None	Active

Authority	Obligation/Licence	Date of Issue (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Status
SENACE	5th ITS El Porvenir – Auxiliary Components RD 058-2018-SENACE-PE/DEAR	13/12/2018	None	Active
SENACE	6th ITS El Porvenir – Introduction of Technical Improvements to the Concentrator Plant RD N° 51-2020-SENACE-PE/DEAR	10/3/2020	None	Active
	Effluent Discharge and Reuse Authorizations			
ANA-DGCRH	Authorization for Discharge of Treated Industrial Residual Water from the Concentrator Plant RD 014-2010-ANA-DGCRH	10/8/2010	10/8/2012	Inactive Modified
ANA-DGCRH	Authorization for Domestic Residual Water Reuse for Irrigation RD 005-2013-ANA-DGCRH	7/1/2013	7/1/2015	Inactive Renewed
ANA	Renewal of Authorization for Discharge from LQ and Porvenir Underground Mine Portals RD 172-2015-ANA-DGCRH	15/6/2015	15/6/2019	Expired Not Renewed
AAA-HUALLAGA	Authorization for Water Reuse RD 165-2015-ANA/AAA-HUALLAGA	7/7/2015	7/5/2019	Expired Not Renewed
ANA	Renewal of Authorization for Discharge from LQ and Porvenir Underground Mine Portals RD 192-2019-ANA-DCERH	16/6/2019	16/6/2022	Active
ANA	Renewal of Authorization for Domestic Residual Water Reuse for Mining Purposes (Irrigation) RD 600-2019-ANA/AAA-HUALLAGA	6/7/2019	7/6/2025	Active
	Water Use Licences			
ANA	Mine Water Licence RS 0392-1974-AG	08/4/1974	None	Inactive
ANA	Mine and Camp Water Licence RS 0057-76-AG/DGA	4/3/1976	None	Inactive
ANA	Mine and Population Water Licence RS 307-76-AG/DGA	14/12/1976	None	Inactive
ANA	Power Generation Water Licence RD 0020-92-AG-DGAS	30/6/1992	None	Active
ANA	Power Generation Water Licence RD 0029-92-AG-DGAS	17/7/1992	None	Active
ANA	Population Industrial Water Licence RA 0014-92-SRP-DGA/RN Y DR SAS	13/12/1992	None	Inactive
ANA	Power Generation Water Licence RA 001-93-DGA-SRPRN	15/2/1993	None	Active

Authority	Obligation/Licence	Date of Issue (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Status
ANA	Population Camp Water Licence RA 011-98-AG-DSRAP/INRENA-ATDRP	9/7/1998	None	Inactive
MINAGRI-ANA	Power Water Use Licence (Modification Ar1) RD 127-2006-AG-DRA-P-A-TPDR	22/12/2006	None	Inactive Modified
MINAGRI-ANA	Water for Population Use Licence (Modification Ar1) RD 125-2006-AG-DRA-P/ATPDR	22/12/2006	None	Inactive Modified
MINAGRI-ANA	Water for Mining Use Licence (Modification Ar1) RD 126-2006-AG-DRA-P/ATPDR	22/12/2006	None	Inactive Modified
ANA	Approval of Ownership Change to MAP - Water for Population Use Licence RD 264-2015-ANA-AAA-X-MANTARO	6/4/2015	None	Inactive
ANA/AAA-HUALLAGA	Approval of Ownership Change to MAP – Power Use RD 086-2016-ANA/AAA-HUALLAGA	11/2/2016	None	Not Applicable
ANA	Approval of Ownership Change to MAP - Water for Mining Use Licence RD N° 399-2016-ANA/AAA-HUALLAGA	13/6/2016	None	Inactive
ANA	Approval of Ownership Change to Nexa El Porvenir– Surface Water for Mining Use RA 322-2019-ANA-AAA-HUALLAGA-ALA ALTO HUALLAGA	3/10/2019	None	Active
	Mine Closure Plans			
MINEM-DGAAM	El Porvenir Mine Closure Plan Approval RD 166-2009-MEM/AAM	17/6/2009	9/15/2019	Active Renewable
MINEM-DGAAM	El Porvenir Mine Closure Plan First Amendment RD 286-2011-MEM/AAM	15/9/2011	9/15/2019	Active Renewable
MINEM-DGAAM	El Porvenir Mine Closure Plan Update RD 034-2013-MEM/AAM	30/1/2013	9/15/2019	Active Renewable
MINEM-DGAAM	El Porvenir Mine Closure Plan Second Amendment RD 277-2016-MEM/DGAAM	15/9/2016	9/15/2019	Active Under Renewal
	Tailings Management			
MINEM-DGM	Beneficiation Concession for the Tailings Storage Facility RD 280-97-EM/DGM	12/8/1997	None	Active
MINEM-DGM	Beneficiation Concession for the Tailings Storage Facility RD 281-97-EM/DGM	12/9/1997	None	Active

Authority	Obligation/Licence	Date of Issue (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Status
MINEM-DGM	Construction Authorization for Expansion of Tailings Storage Facility to Dam Elevation 4,043 RD 178-2010-MEM	7/4/2010	None	Active
MINEM-DGM	Authorization for Operation of Tailings Storage Facility to Dam Elevation 4,043 RD 356-2010-MEM-DGM/V	18/9/2010	None	Active
MINEM-DGM	Modification of Schedule for Expansion of the Tailings Storage Facility RD 252-2014-MEM-DGM/V	9/7/2014	None	Active
MINEM-DGM	Construction Authorization for New Components of Tailings Line from Profile Alignment Station 1+524m to El Porvenir Tailings Storage Facility RD 0584-2014-MEM-DGM/V	29/12/2014	None	Active
MINEM-DGM	Authorization for Operation of El Porvenir Tailings Storage Facility to Dam Elevation 4,047 and Expansion of the Beneficiation Concession "Aquiles 1 Accumulation" to 183.28 ha RD 612-2015-MEM/DGM	12/6/2015	None	Active
MINEM-DGM	Authorization for Operation of Tailings Pipeline El Porvenir RD 194-2015-MEM-DGM-DTM/PB	19/6/2015	None	Active
MINEM-DGM	Authorization for Operation of New Components of Tailings Line from Profile Alignment Station 1+524m to El Porvenir Tailings Storage Facility RD 0251-2015-MEM-DGM/V	19/6/2015	None	Active
MINEM-DGM	Authorization for Operation of Tailings Storage Facility Expansion to Dam Elevation 4,048.5 RD 0499-2016-MEM-DGM/V	18/8/2016	None	Active
MINEM-DGM	Construction of Tailings Storage Facility Expansion to Dam Elevation 4,100 and Secondary Embankment at the Process Plant Side RD 006-2017-MEM-DGM/V	9/1/2017	None	Active
MINEM-DGM	Authorization for Operation of Tailings Storage Facility Expansion to Dam Elevation 4,056 and Extension of Diversion Channel RD 828-2017-MEM-DGM/V	25/9/2017	None	Active

Authority	Obligation/Licence	Date of Issue (DD/MM/YYYY)	Expiration Date (DD/MM/YYYY)	Status
MINEM-DGM	Authorization for Operation of Tailings Storage Facility to Dam Elevation 4,060 RD 0498-2019-MEM-DGM/V	7/10/2019	None	Active

17.4 Social or Community Requirements

17.4.1 General Context

Nexa's Cerro Pasco mine complex includes both El Porvenir and the nearby Atacocha. The communities located within the area of direct influence are:

- Comunidad de San Francisco de Asís de Yarusyacán
- Anexo de Machcan
- Anexo San Ramón de Yanapampa
- Comunidad de Titaclayán
- Centro Poblado San Isidro de Yanapampa
- Comunidad de Cajamarquilla
- Comunidad San Antonio de Malauchaca

This subsection presents the results of the social review based on a review of Nexa's policies, programs, social risk management systems, and/or social performance against relevant International Finance Corporation (IFC) Performance Standards (PS). The IFC PSs have been used as a framework but this social review does not represent a detailed audit of Nexa's compliance with IFC PSs or specific guidelines. Nexa's social performance is benchmarked against the following IFC 2012 PSs:

- **PS1: Social and Environmental Assessment and Management Systems** requires that companies identify, assess, and mitigate the social and environmental impacts and risks they generate throughout the lifecycle of their projects and operations. From a social perspective, the requirement includes: a comprehensive social assessment; identification of critical social impacts and risks; community consultation and engagement; information disclosure; mitigation plans to address impacts and risks; and development of an organizational structure with qualified staff and budgets to manage the overall social management system.
- **PS2: Labour and Working Conditions** incorporates the ILO conventions that seek to protect basic worker rights and promote effective worker/management relations.
- **PS4: Community Health and Safety** declares the project's duty to avoid or minimize risks and impacts to community health and safety and addresses priorities and measures to avoid and mitigate project related impacts and risks that might generate community exposure to risks of accidents and diseases.
- **PS5: Land Acquisition and Involuntary Resettlement** considers the need for land acquisition or involuntary resettlement of any individual, family or group; including the potential for economic displacement.
- **PS7: Indigenous Peoples** considers the presence of Indigenous groups, communities, or lands in the area that may be directly or indirectly affected by projects or operations.

- **PS8: Cultural Heritage**. This standard is based on the Convention on the Protection of the World Cultural and Natural Heritage. The objectives are to preserve and protect irreplaceable cultural heritage during a project's operations, whether or not it is legally protected or previously disturbed and promote the equitable sharing of benefits from the use of cultural heritage in business activities.

SLR notes that PS3 Resource Efficiency and Pollution Prevention and PS6 Biodiversity Conservation correspond to environmental performance standards, which have been discussed at the beginning of Section 17 of this Technical Report Summary.

17.4.2 Social and Environmental Assessment and Management Systems

At a corporate level, Nexa has adopted the guidelines of the International Integrated Reporting Council (IIRC) and the standards for the Global Reporting Index (GRI). The IIRC guidelines promote a cohesive and integrated approach to reporting on organizational activities. The GRI standards provide best practices for public reporting on economic, environmental, and social impacts in order to aid Nexa and its shareholders and stakeholders understand their corporate contribution to sustainable development. These standards were reported on in the most recent Nexa Annual Report (Nexa, 2020e). With respect to social issues, the 2019 Annual Report provided details of corporate activities aligning with the following GRI Standards:

- Employment
- Occupational health and safety (OHS)
- Non-discrimination
- Training and education
- Diversity and equal opportunities
- Freedom of association and collective bargaining
- Child labour
- Forced or compulsory labour
- Human rights assessment
- Local communities
- Social assessment of suppliers
- Socio-economic compliance

Nexa's 2019 Annual Report also includes reporting on corporate progress towards several sustainable development goals. With respect to social environment issues, these include:

- Gender equality
- Decent work and economic growth
- Good health and well-being
- Peace, justice, and strong institutions
- Quality education
- Reduced inequalities
- Sustainable cities and communities
- Responsible consumption and production

- Life below water

Nexa has a corporate compliance policy (PC-RCC-CCI-005-EN) meant to guide Nexa representatives and third parties. The compliance policy includes the following policies and procedures:

- Code of Conduct
- Anti-Corruption Policy
- Money Laundering and Financing Terrorism Prevention Policy
- Antitrust/Competition Policy
- Insider Trading Policy
- Disclosure Policy
- Compliance Program Manual
- Money Laundering and Financing Terrorism Prevention Manual
- Gifts and Hospitality Procedure
- Relationships with Government Representatives Procedure
- Travel and Entertainment Procedure
- Integrity Due Diligence Procedure
- Conflict of Interests Procedure

Nexa has developed policies, protocols and operational procedures and practices that aim to address various aspects of the company's social responsibility with regard to its mining operations. These policies, protocols and procedures have been designed to meet host country requirements and comply with IFC standard PS1 ("Environmental and Social Assessment and Management System (ESMS)") requirements. These policies and procedures are updated periodically in response to changing local conditions throughout the mine life.

As required by IFC PS1, Nexa's management system is based on an overarching Corporate policy defining the environmental and social objectives and principles that will guide the project to achieve sound environmental and social performance. Nexa's policy aims to achieve the following:

- Prevent, mitigate, minimize and control environmental impacts, occupational health and safety risks; training, motivating and listening to the opinion of its workers, to foster in them a culture regarding the environment, safety and health of the worker, as well as to its visitors and interested parties.
- Ensure that all workers receive fair compensation according to the work they develop, as well as dignified working conditions, a conducive work environment and oriented to their working skills and personal development.
- Develop activities in favor of the welfare of the populations that live near Nexa's operations, respecting their culture and traditions.
- Promote the continuous improvement of the effectiveness of the Management System, through compliance with environmental standards, quality, occupational safety and health, contained in legal requirements and other accepted by the organization.
- Provide a product that satisfies the quality required by its customers, in a timely manner, optimizing production costs, innovating and being internationally competitive.

Also consistent with IFC PS1, Nexa's Community Relationships Policy (SGI-GRS-P-15) aims to achieve the following:

- Respect for communities' culture, resources, and traditions.
- Treating local communities as strategic allies, seeking to develop activities that are of mutual benefit.
- Promoting local employment and job opportunities with preferential local suppliers.
- Developing local capacities to achieve competitiveness.
- Promoting the social role of the company as an active actor that contributes to the local development under the leadership of the state authority, be it local, regional or national.
- Orienting all social development initiatives in a manner that promotes self-management and sustainability, promoting the contribution of the beneficiaries themselves and co- financing to achieve shared development.
- Establishing the understanding among staff that social responsibility traverses the whole company.
- Encouraging communication about the company's activities in the locality of its operations.
- Generating social and environmental assets from the mining activity.

A social baseline description, assessment of socio-economic impacts, and identification of mitigation actions have been carried out to mitigate negative impacts and maximize positive benefits of the El Porvenir Mine. These components are generally consistent with social impact assessment practices. A Community Relations Plan has been developed (included in the modification of the EIA from 2011) outlining objectives, strategies and specific indicators for the following programs: information and communication; support to social projects and productive investment projects; health services; education; technical training; training for social and environmental participatory monitoring; promotion of environmental awareness; compensation for land use; and improvement of houses in surrounding communities.

Nexa has a permanent information office dedicated to receiving, managing, and addressing complaints, claims, questions and information requests from the communities. To be proactive, Nexa has also developed a communications program that involves the following activities:

- Distribution of informative material (Quarterly).
- Social concern monitoring (Quarterly).
- A complaint management process aimed at preventing and managing possible social conflicts in the area.
- Meetings with local authorities (Quarterly).
- Guided tours (Quarterly).

In 2019 a conflict was registered with Nexa and the community of San Juan de Yanacachi in the Pasco region of Peru, related to land use.

In the SLR QP's opinion the grievance mechanism in place and the Community Relations Plan, in combination with Nexa's Social Management Policy and Management Procedures on negotiation for land access, monitoring of social commitments, management of social crisis, promotion of local hiring, and communication with stakeholders, are adequate to address potential issues related to local communities.

17.4.3 Labour and Working Conditions

Corporately, Nexa has affirmed its commitment to safe and positive labour and working conditions. The relevant Sustainable Development Targets identified by Nexa include, but are not limited to:

- Achieving full and productive employment and decent work for all women and men, including young people and persons with disabilities, and equal pay for work of equal value by 2030.
- Protecting labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular migrant women, and persons in precarious employment.

Nexa has adopted OHS policies to ensure the protection and promotion of the safety, human health, and welfare of employees. Corporately, Nexa reports on its health and safety performance and highlights safety as its greatest asset. Several corporate initiatives are aimed at promoting safety, ensuring workers and contractors are trained, and that processes are in place to address any incidents that arise. Nexa has a management standard that outlines the process to communicate classify, analyze, and record potential accidents (near misses) and accidents in order to improve health and safety measures. Nexa also reports on the health and safety performance at all of their sites.

As approximately 75% of Nexa's Peruvian operations are comprised of outsourced employees, special programs have been developed to ensure health and safety objectives are being met.

In 2017, Nexa created the Peru Safety Plan, which is a program having the objective of eliminating all fatalities, reducing the number and severity of accidents and enhancing the safety culture in the units across Peru. Over two and a half years, 244 initiatives were developed in 30 projects. At the end of 2019, Nexa had completed mapping and a critical analysis of its of activities. The safety of operations in Peru was recognized by the Peruvian Mining Safety Institute (Instituto de Seguridad Minera (Isem)), which recognized the Atacocha unit for the lowest accident rate and absence of fatal accidents in the underground mining category in the last 12 months of operations.

In 2019, Nexa also launched the 100% safe campaign to raise the awareness of employees of partner companies about safe behavior, encouraging reflection on the actions of each person in routine tasks. Despite these efforts, one fatality in its Peruvian operations was reported in Nexa's 2019 Annual Report.

Corporately, Nexa has stated its commitment to internationally recognized human rights and prohibits any violation of human rights in its operations and suppliers. Suppliers are asked to provide information regarding both social responsibility and human rights preservation. Nexa reported that in 2019, there were no complaints of non-compliance with any requirements related to human rights impacts, across all of its operations. Furthermore, Nexa is also seeking to review all outside suppliers for their conformity with human rights ethics. As of 2019, approximately half of its suppliers had been reviewed, with no known records of any human rights violations.

There are procedures in place for employees and contractors to report grievances and ethical violations, including directly to management, via telephone and online. At the time of this writing, there were no specific reports on the number of grievances or ethical violations relevant to the Cerro Pasco mine complex.

Commitments previously established between Milpo and the San Juan de Milpo Community include the prioritization of permanent employment opportunities regardless of gender for the duration of the ongoing mine operations; in the event that a sub-contractor ceases its involvement with the mine operation, Nexa will re-assign personnel from the community to other activities.

As part of the Marco Agreement previously established between Nexa and the San Francisco de Asis de Yarusyacan Community, Nexa is committed to employ 60% of workers from specialized service companies from the community, dependent on employment opportunities required by the mine operations (both El Porvenir and Atacocha) for qualified and non-qualified workforce.

Employees have access to a number of benefits including paid vacations and holidays, financial bonuses, health, education, overtime, living allowance, and other employment bonuses.

17.4.4 Community Health and Safety

Corporately, Nexa has made several commitments to improve community health and safety, as well as the overall well-being of community members.

Nexa supports social health and community well being through a number of community based initiatives in Nexa's areas of influence. The 2018 EIA set out the components of Nexa's social responsibility program, including:

- Communications with local communities and stakeholders.
- Mitigation of social impacts and provision of job opportunities.
- Managing social circumstances that could result in social conflict.
- Promoting local employment, particularly among youth.
- Acquisition of local products, goods and services.
- Enhancing livestock operations.
- Implementing medical campaigns to improve health conditions.
- Provision of school supplies to children.
- Water management.
- Support of local festivities.
- Support for local infrastructure / community projects.
- Strengthening of local capabilities.

For instance, in 2019, to strengthen local development processes Nexa supported the development of spaces for dialogue and interaction with public, private, and community institutions. From this, local governments, service providers and users began to manage drinking water services more sustainably, improving their performance in the management of public services and their role in local development.

In 2019, Nexa implemented a safe school program to improve health conditions of students at five schools located in El Porvenir and Atacocha.

In 2019, Nexa verified its emergency response conditions at all operating units in Peru and an Emergency Response Plan (PAE for its acronym in Spanish) was delivered with management training and simulated exercises. A Global Emergency Response Plan is in development, to align the actions of the individual unit plans with the corporate Crisis and Business Continuity Management Plan.

In 2020, Nexa reported that the authorities of the countries which they operate have adopted policies referring to the COVID-19 pandemic declared by the World Health Organization (WHO), such as the state of emergency declared by the Peruvian government. Nexa has also been in discussions with local stakeholders to develop protocols and programs to monitor and manage the risk of COVID-19 including on-site and with the movement of workers on and off-site.

17.4.5 Land Acquisition and Involuntary Resettlement

At the time of writing, there does not appear to be any land acquisition or involuntary resettlement associated with the Cerro Pasco complex operations. Therefore, the SLR QP is of the opinion that PS5 is not applicable.

17.4.6 Indigenous Peoples

There are no Indigenous Peoples in the vicinity of the Cerro Pasco complex. Therefore, the SLR QP is of th opinion that PS7 does not appear to be applicable.

17.4.7 Cultural Heritage

Projects of archaeological evaluation have been undertaken in the El Porvenir area. A number of certificates of absence of archaeological remains (CIRA for its acronym in Spanish) have been issued to Milpo by the National Ministry of Culture approving the supporting documentation submitted in writing by the mining company to the ministry for review and approval. At the time of writing, no information was available on Chance Find Procedures, which might be applicable as the proposed expansion undergoes construction and expanded operations commence.

17.4.8 Conclusions and Recommendations

SLRs review of social aspects indicates that, at present, Nexa's Cerro Pasco complex, is a positive contribution to sustainability and community well being. Nexa has established and continues to implement its various corporate policies, procedures, and practices in a manner consistent with relevant IFC PSs. Nexa has, and continues to make, a positive contribution to the communities most affected by the site operations and has done a thorough job in documenting potential effects on stakeholders and protecting the rights, health and safety of its employees.

At this time, there are no specific recommendations to improve Nexa's social performance at the Cerro Pasco complex. Outreach, dialogue, and clear documentation should continue, particularly through the COVID-19 pandemic.

17.5 Mine Closure Requirements

17.5.1 Mine Closure Plan and Regulatory Requirements

The Mine Closure Plan is periodically updated over the LOM. A conceptual Mine Closure Plan was prepared in 2006 for the Mine components within the context of the Peruvian legislation (KCB, 2006) and has subsequently been amended or updated four times. The Mine Closure Plan addresses temporary, progressive, and final closure actions, and post-closure inspection and monitoring. Under Article 20 of the Peruvian mine closure regulations, the first update of the Mine Closure Plan must be submitted to the Peruvian Ministry of Energy and Mines (the Ministry) three years after approval of the initial Mine Closure Plan, and every five years thereafter. Two years before final closure, a detailed version of the Mine Closure Plan will have to be prepared and submitted to the Ministry for review and approval. The following is a summary of the El Porvenir Mine Closure Plan updates and modifications to date:

- Initial Closure Plan approved in 2007 by R.D. No. 318-2007-MEM/AAM and prepared according to the modification of Supreme Decree D.S. No. 033-2005-EM (Mine Closure Law).
- Feasibility level Mine Closure Plan approved in 2009 by R.D. No. 166-2009-MEM-AAM.

- First amendment to the Mine Closure Plan approved in 2011 by R.D. No. 286-2011-MEM-AAM.
- Update of the Mine Closure Plan approved in 2013 by R.D. No. 034-2013-MEM-AAM.
- Second amendment to the Mine Closure Plan approved in 2016 by R.D. No. 277-2016-MEM-AAM.
- Third amendment to the Mine Closure Plan prepared in January 2020 and submitted to the Peruvian Ministry of Energy and Mines for approval.

The Conceptual Mine Closure Plan approved in 2007 (KCB, 2006), the R.D. from 2009, the update to the Mine Closure Plan approved in 2013 (Schlumberger Water Services, 2012), and the third amendment to the Mine Closure Plan (KCB, 2020) were available for review.

The approved period for implementation of closure and post-closure in the latest Mine Closure Plan includes seven years of progressive closure (2021 to 2027), two years of final closure (2028 to 2029), and five years of post-closure (2030 to 2034). Post-closure monitoring, assumed to extend for five years after closure, will include monitoring of physical, geochemical, hydrological, and biological stability.

The specific objectives of the El Porvenir Mine Closure Plan are as follows:

- Health and safety – Assure public health and safety during execution of closure and post-closure activities, recovering the original environmental quality of the surroundings and developing feasible rehabilitation works from a biological, technical and financial perspective. Protect the human health and the environment by maintaining physical and chemical stability of Mine components.
- Physical stability – Geotechnical stability of earth structures implementing designs that minimize short term and long term risks of failure following the applicable Peruvian legislation and best international practices.
- Geochemical stability – Feasibility design of encapsulating covers for hazardous materials and materials with potential to cause contamination of the environment. The covers should be designed to employ local materials with physical and geochemical characteristics resistant to degradation and erosion through time. The covers should be compatible with the landscape, favourable to the growth of local vegetation species.
- Hydrological stability – Adequate management of surface runoff. Design flows with adequate return period according to the applicable Peruvian legislation should be evaluated. The need for closure water management structures should be identified.
- Land use – Recovery of original levels for ground surface to the extent feasible in order to make it compatible with predevelopment land uses in the project area.
- Waterbodies use – Maintain equilibrium in the micro-basins located in the mine area, preserving water quantity and quality, and implementing adequate water management.
- Social objectives – Minimize socio-economic impacts creating conditions that promote sustainability for the social stakeholders through execution of social programs.

The Mine Closure Plan promotes to the extent feasible a passive condition that minimizes the efforts required for care and maintenance of the closed Mine components during post-closure.

The closure criteria for each component of El Porvenir are defined according to the following aspects:

- Dismantling
- Demolition, salvage and disposal
- Physical stabilization

- Geochemical stabilization
- Hydrological stability (water management)
- Re-establishing the landscape contour
- Re-vegetation
- Rehabilitation of aquatic habitats
- Social programs
- Post-closure maintenance and monitoring

The Mine Closure Plan concentrates on the decommissioning and closure of primary facilities and elements of infrastructure at El Porvenir, which include:

- Underground mine and associated portal, ventilation shafts, support facilities, and underground infrastructure.
- Processing facilities (concentrator plant and associated infrastructure).
- WRDs.
- TSF.
- Water management facilities and infrastructure.
- Borrow areas and quarries.
- Mine camps (San Juan de Milpo and Carmen Chico) and administrative buildings.
- Access roads.
- Ancillary buildings.
- Ancillary infrastructure including among others:
- Electrical and ventilation systems.
- Transportation systems.
- Communication systems.
- Domestic waste landfill.
- Waste management facilities.
- Organic waste management facilities.
- La Candelaria Hydroelectric Plant.
- Power transmission lines and electrical sub-stations.
- Topsoil deposits.

A summary of the main proposed closure activities is presented in Table 17-4. Of note the that water supply to the San Juan de Milpo community from the Carmen Chico spring will be retained during post-closure.

Table 17-4: Summary of Main Closure Activities
Nexa Resources S.A. – El Porvenir Mine

Mine Component		Closure Activities
Mine	Underground mine	Redirection of underground mine water discharge towards the TSF.

Mine Component		Closure Activities
		Flooding of underground works (recovery of phreatic level). Plugging or filling of mine openings. Disconnection, dismantling and removal of equipment and water management infrastructure. Soil sampling to evaluate contamination. Excavation/removal of contaminated material (including concrete) for appropriate disposal.
Waste disposal facilities	La Quinua WRD	Slope contouring for physical stability. Cover installation and revegetation. Construction of an erosion prevention structure on the slope adjacent of the Huallaga River.
	TSF	Dam reconfiguration, if required for physical stability. Leveling and recontouring of the disposed tailings surface. Cover installation to prevent oxidation of the deposited tailings. Re-vegetation. Replacement of the overflow tunnel with a closure overflow spillway that discharges surface runoff to the Milpo Creek. Improvements to the drainage system near the confluence of the Milpo Creek and the Lloclla River to prevent flooding the area of the San Miguel community.
Other infrastructure	Concentrator plant Shops Water management infrastructure Power transmission lines Hazardous waste storage areas Access roads La Candelaria Hydroelectric Plant	Dismantling, demolition, salvaging and disposal of structures. (Donation of facilities to the local community will be considered on grounds of safety). Disposal of concrete in the underground mine. Removal of equipment for recycling, salvaging or disposal. Removal of contaminated soils. Transportation to authorized disposal areas. Cleaning and purification of tanks and deposits. Removal of Socorro pond. Recontouring of terrain and re-vegetation. Sale of the hydroelectric power plant to a third party that could continue the power supply to local communities.
Staff facilities	Mine camp Administrative buildings Potable water and septic systems	Mobilization of equipment, machinery, and personnel. De-energization. Dismantling and removal of structures and equipment to authorized disposal areas. Dismantling and demolition of concrete structures for disposal in the underground mine. Recontouring of terrain and re-vegetation.

It is noted that the design criteria for the El Porvenir TSF closure planning are to Peruvian Standards, which are less stringent than Canadian dam safety guidelines. For example, the El Porvenir tailings dam has been designed to meet stability requirements for a 2,500 year return earthquake with estimated peak ground acceleration of 0.4 times the acceleration due to gravity, which is significant. Post-seismic stability analyses for El Porvenir dam were carried out by Ausenco (2016) to demonstrate dam stability but no information was provided related to the risk of failure of the emergency spillway inlet control structure and the potential for liquefied tailings release through the spillway tunnel. The ultimate tailings level is some 50 m above the spillway tunnel invert.

The El Porvenir TSF emergency spillway has been designed to pass the Probable Maximum Flood resulting from 146 mm of precipitation in 6 hours, which is appropriate given the size of the dam. It is not clear that the post-closure flood routing assumed the perimeter watershed diversion channels would still be in service in the long term. The risk of diversion channel blockage and potentially higher inflows to the TSF should be evaluated with additional freeboard added to the dam crest, if required, to ensure the dam is not overtopped.

A comprehensive dam safety review is recommended in order to finalize the detailed closure plan prior to moving into the closure stage.

Physical, chemical, hydrological, and biological stability conditions following closure will be verified through implementation of the post-closure maintenance and monitoring program. Monitoring will also support the evaluation and verification of compliance with closure activities, and the identification of deviations leading to the adoption of corrective measures. The monitoring activities will be carried out considering the Peruvian Environmental Quality Standards and Maximum Permissible Limits, as well as criteria set in the Mine Closure Plan for physical, chemical, hydrological, and biological stability.

No specific details of the post-closure monitoring programs for physical stability, water quality, biology and social were found in the Mine Closure Plan reports provided to SLR. Hence, SLR recommends to either confirm if these programs have been sufficiently advanced at a concept level or if details should be incorporated to the next update of the Mine Closure Plan for El Porvenir. As a minimum, it is recommended that post-closure monitoring programs include the following:

- Specific activities and frequency to monitor physical and hydrological stability (mainly focused on inspections).
- Locations and frequency for water quality sampling (surface water and groundwater).
- Biology campaigns and frequency.
- Indicators to track progress with social initiatives and programs implemented during the operations phase towards achieving social objectives at closure and post-closure.
- Proposed documentation and reporting.

17.5.2 Closure Cost Estimate and Financial Assurance for Closure

A closure cost estimate was developed and included in the Mine Closure Plans. The total value estimated in 2020 for the remaining LOM presented in the third amendment to the Mine Closure Plan is as follows (excluding local taxes):

- Progressive Closure (2021 to 2027) US$10,990,121
- Final Closure (2028 to 2029) US$12,583,266
- Post-Closure (2030 to 2034) US$ 1,622,646
- Total US$25,196,033

According to Supreme Decree D.S. N° 262-2012-MEM/DM, the financial assurance is calculated based on inflation and discount rates in order to estimate the net present value (NPV) for the mine closure cost. The total financial assurance (progressive closure, final closure, and post-closure) calculated in 2020 considering an inflation rate of 2.37% and a discount rate of 2.14%, is US$20,635,472 (including local taxes). A detailed breakdown of the cost estimate is provided in the third amendment to the El Porvenir Mine Closure Plan (KCB, 2020).

18.0 CAPITAL AND OPERATING COSTS

For the purpose of this Technical Report Summary, SLR reviewed the capital and operating costs required for the mining and processing of Mineral Reserves at El Porvenir provided by Nexa. The capital and operating cost estimates were prepared based on recent operating performance and the current operating budget for 2020. The cost estimates are accurate to within +/-10%. SLR considers these cost estimates to be reasonable, as long as the production targets are realized. All costs in this section are expressed in Q4 2020 US dollars.

18.1 Capital Costs

Table 18-1 presents the LOM budget for capital expenditures at El Porvenir. The Mine is a current producer, therefore there are no pre-production capital costs. Capital expenditures are considered sustaining capital as they replace existing production assets, maintain current capacity, or are related to safety, health, and the environment. Underground mine development capital is based on a cost per development metre of US$1,396/m. The LOM sustaining capital costs for El Porvenir are estimated to be US$221 million.

Table 18-1: Life of Mine Capital Budget
Nexa Resources S.A. – El Porvenir Mine

Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Tailing Dam & Waste Deposit									
Raising	53,858	10,808	18,149	24,900	-	-	-	-	-
New Dam	13,246	2,700	1,000	-	5,000	4,546	-	-	-
Tailing Treatment	3,782	3,782	-	-	-	-	-	-	-
Heavy Mobile Equipment									
Replacement	23,284	1,838	50	3,567	4,781	5,593	3,641	3,815	-
Addition	3,335	850	1,600	-	-	-	-	-	-
Asset Integrity									
Asset Integrity – Plant	11,365	6,605	2,805	475	575	705	100	100	-
Asset Integrity – Mine	150	-	-	-	-	150	-	-	-
Other Sustaining									
Others	1,340	110	550	250	290	100	0	40	-
Civil Construction	200	200	-	-	-	-	-	-	-
Mining Facilities									
Communication system	2,450	550	700	600	300	300	-	-	-
Pumping	2,500	700	300	300	300	300	300	300	-
Electrical Substation	1,650	1,000	200	450	-	-	-	-	-

Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Ventilation / Cooling	950	100	150	100	150	150	150	150	-
Operation Unit Projects									
Improvements	4,631	1,821	1,110	1,700	-	-	-	-	-
Audit & Inspection	2,380	390	890	1,100	-	-	-	-	-
Other Expenditures									
Expansion Projects	-	-	-	-	-	-	-	-	-
Information Technology	1,020	480	150	130	130	130	-	-	-
Automation Project	2,190	874	1,166	150	-	-	-	-	-
Mine Development Capital Cost									
Underground Mine Development	92,745	17,170	16,073	16,941	18,954	13,124	6,521	1,934	2,030
Total	**221,075**	**49,977**	**44,894**	**50,663**	**30,479**	**25,982**	**10,712**	**6,338**	**2,030**

The Mine Closure Plan was prepared to meet the Peruvian national requirements with the closure and reclamation cost assessed at US$25.2 million. The closure cost should be reviewed and updated regularly to address updates in the national requirements.

18.2 Operating Costs

The El Porvenir operating costs are based on a LOM period of eight years between 2021 and 2028. The operating cost inputs including labour, consumables, and supplies were based on data provided by Nexa and reflect the existing operating status of the Mine. Table 18-2 presents the LOM forecast for operating costs at El Porvenir and Table 18-3 lists Nexa personnel working at the Mine as of December 31, 2020.

Table 18-2: Operating Budget
Nexa Resources S.A. – El Porvenir Mine

All-In Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
Mine Underground	454,350	63,077	64,320	64,742	61,913	55,796	51,610	51,569	41,323
High Zone C&F	127,409	22,074	19,242	20,828	15,955	8,275	13,293	13,374	14,369
High Zone SLS	4,947	301	1,818	2,354	473	-	-	-	-
Intermediate C&F	49,425	19,329	11,914	12,146	4,161	1,874	-	-	-
Intermediate SLS	90,866	8,801	11,734	11,978	21,170	17,064	3,651	3,673	12,795
Low Zone C&F	30,666	11,827	11,445	4,944	13	861	1,577	-	-
Low Zone SLS	8,855	636	366	797	3,358	3,698	-	-	-
Deepening C&F	98,132	-	5	5,621	15,239	19,778	21,641	23,630	12,218
Deepening SLS	44,050	109	7,795	6,074	1,546	4,246	11,448	10,892	1,941
Processing	176,174	23,274	23,452	23,446	22,910	21,808	20,998	20,972	19,314

All-In Cost (US$000)	Total	2021	2022	2023	2024	2025	2026	2027	2028
G&A	101,109	15,774	16,219	16,206	14,861	12,103	10,076	10,011	5,858
Development Operating Cost	90,887	17,162	15,971	14,837	13,065	10,602	8,673	6,244	4,332
Total	**822,519**	**119,288**	**119,961**	**119,231**	**112,750**	**100,309**	**91,356**	**88,797**	**70,827**

Table 18-3: Nexa Personnel at El Porvenir Mine – December 31, 2020
Nexa Resources S.A. – El Porvenir Mine

Department	Personnel
Business Intelligence	12
Human Resources	18
Geology - Mine	26
Management	4
Logistics	8
Maintenance	124
Mine	210
Open Pit Mine	1
Plant	63
Community Relations	5
Safety	13
Technical Services	28
Environment	4
Projects	9
Total	**525**

19.0 ECONOMIC ANALYSIS

The economic analysis contained in this Technical Report Summary is based on El Porvenir's Mineral Reserves reported on a 100% ownership basis (Nexa owns 80.16%), economic assumptions provided by Nexa for El Porvenir, and the capital and operating costs as presented in Section 18 of this Technical Report Summary.

19.1 Economic Criteria

19.1.1 Physicals

- Mine life: 8 years (between 2021 and 2028):
- Underground ore tonnes mined: 13.85 Mt
  - Cu grade: 0.23% Cu
  - Zn grade: 3.75% Zn
  - Pb grade: 0.88% Pb
  - Ag grade: 62.8 g/t Ag
- Processed:
  - Total Ore Feed: 13.85 Mt
    - Cu grade: 0.23% Cu
    - Zn grade: 3.75% Zn
    - Pb grade: 0.88% Pb
    - Ag grade: 62.8 g/t Ag
  - Contained Metal:
    - Cu: 31,500 t Cu
    - Zn: 518,900 t Zn
    - Pb: 122,400 t Pb
    - Ag: 27.966 million ounces (Moz) Ag
  - Metallurgical Recoveries at LOM average grades (recoveries vary as a function of head grade):
    - Cu recovery 14.3%
    - Zn recovery 89.6%
    - Pb recovery 79.2%
    - Ag in Cu recovery 3.8%
    - Ag in Zn recovery 14.6%
    - Ag in Pb recovery 59.1%
  - Recovered Metals:

        - Cu: 4,500 t Cu
        - Zn: 464,700 t Zn
        - Pb: 96,800 t Pb
        - Ag: 21.676 Moz Ag
    - Payable Metals:
        - Cu: 4,300 t Cu
        - Zn: 390,700 t Zn
        - Pb: 91,200 t Pb
        - Ag: 16.664 Moz Ag

19.1.2 Revenue

- Revenue is estimated based on the following LOM weighted average metal prices:
    - Cu price: US$6,388/t Cu
    - Zn price: US$2,511/t Zn
    - Pb price: US$1,977/t Pb
    - Ag price: US$17.20/oz Ag
- Net Revenue includes the benefit of additional US$128.7/t Zn selling price and zinc smelting at cost (rather than at commercial third-party terms), due to integration with Nexa's Cajamarquilla refinery.
- Logistics, Treatment (TC), and Refining (RC) charges:
    - LOM average Transportation/Logistics charges:
        - Cu concentrate: US$127.05/t concentrate for export
        - Zn concentrate: US$38.03/t concentrate to Cajamarquilla refinery
        - Pb concentrate: US$123.84/t concentrate for export
    - Treatment Charges:
        - TC+RC Cu concentrate: US$111.68/t concentrate
        - TC Zn concentrate for export: US$238.72/t concentrate
        - TC Pb concentrate: US$201.68/t concentrate
        - Refined Zn conversion costs at Cajamarquilla: US$509.73/t
    - Refining Charges:
        - Ag in Cu concentrate: US$0.50/oz
        - Ag in Pb concentrate: US$1.00/oz
- NSR Revenue after logistics, treatment, and refining charges is US$1,306 million.

19.1.3 Capital Costs

- LOM sustaining capital costs of US$221.1 million.
- Closure costs of US$25.2 million were included at the end of the Mineral Reserves based LOM in year 2029.

19.1.4 Operating Costs

- LOM unit operating cost average of:
  - Mine Development: US$6.56/t mined
  - Underground Mining: US$32.81/t mined
  - Processing: US$12.72/t milled
  - G&A: US$7.30/t milled
- Total unit operating costs of US$59.39/t milled.
- LOM operating costs of US$822.5 million.

19.1.5 Taxation and Royalties

- Corporate income tax rate in Peru is 29.50%.
- Special Mining Tax (IEM/GEM) LOM average rate: 4.3%.
- Mining royalties LOM average rate: 4.3%.
- Employees participation: 8%.
- SLR has relied on a Nexa taxation model for calculation of income taxes applicable to the cash flow.

19.2 Cash Flow

SLR developed a LOM after-tax cash flow model for El Porvenir to confirm the economics of the Nexa LOM plan. The model is based on Nexa's TR EP 2020 v6 Final model. The model does not take into account the following components:

- Financing costs
- Insurance
- Overhead cost for a corporate office

A cash flow summary is presented in Table 19-1. Production is reported on a 100% ownership basis (Nexa owns 80.16%). All costs are in Q4 2020 US dollars with no allowance for inflation.

Table 19-1: After-Tax Cash Flow Summary
Nexa Resources S.A. – El Porvenir Mine

	INPUTS	UNITS	TOTAL	2021 Year 1	2022 Year 2	2023 Year 3	2024 Year 4	2025 Year 5	2026 Year 6	2027 Year 7	2028 Year 8	2029 Year 9
Operating Days	360	days	2,880	360	360	360	360	360	360	360	360	-
Tonnes milled per day		tonnes / day	4,809	6,002	6,171	6,166	5,655	4,605	3,834	3,809	2,229	-
Production		'000 tonnes	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802	-
Ag Grade		oz/t	2.02	2.33	1.98	2.14	1.99	1.68	1.82	1.90	2.25	-
Cu Grade		%	0.23%	0.17%	0.21%	0.24%	0.25%	0.24%	0.27%	0.28%	0.17%	0.00%
Pb Grade		%	0.88%	1.12%	0.92%	1.02%	0.96%	0.71%	0.67%	0.66%	0.70%	0.00%
Zn Grade		%	3.75%	3.28%	3.69%	3.57%	3.82%	4.11%	4.25%	4.01%	3.39%	0.00%
Waste		'000 tonnes	-	-	-	-	-	-	-	-	-	-
Total Moved		'000 tonnes	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802	-
G												
		'000 tonnes	13,850	2,161	2,222	2,220	2,036	1,658	1,380	1,371	802	-
Ag Grade		oz/t	2.02	2.33	1.98	2.14	1.99	1.68	1.82	1.90	2.25	-
Cu Grade		%	0.23%	0.17%	0.21%	0.24%	0.25%	0.24%	0.27%	0.28%	0.17%	0.00%
Pb Grade		%	0.88%	1.12%	0.92%	1.02%	0.96%	0.71%	0.67%	0.66%	0.70%	0.00%
Zn Grade		%	3.75%	3.28%	3.69%	3.57%	3.82%	4.11%	4.25%	4.01%	3.39%	0.00%
Contained Ag		oz	27,965,761	5,037,666	4,409,638	4,746,118	4,057,486	2,792,588	2,511,290	2,603,951	1,807,025	-
Contained Cu		tonnes	31,463	3,717	4,563	5,355	4,997	3,937	3,680	3,869	1,345	-
Contained Pb		tonnes	122,389	24,185	20,427	22,568	19,543	11,778	9,195	9,057	5,636	-
Contained Zn		tonnes	518,941	70,920	81,954	79,208	77,797	68,200	58,663	55,016	27,184	-
de												
Cu Concentrate	Recovery #1	%										
Ag			3.80%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	3.8%	0.0%
Cu			14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%	0.0%
Pb			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Zn			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pb Concentrate	Recovery #2	%										
Ag			59.1%	59.1%	59.1%	59.1%	59.1%	59.1%	59.1%	59.1%	59.1%	0.0%
Cu			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pb			78.8%	80.5%	79.6%	80.2%	79.9%	77.1%	76.4%	76.3%	77.0%	0.0%
Zn			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Zn Concentrate	Recovery #3	%										
Ag			14.59%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%	0.0%
Cu			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pb			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Zn			89.55%	89.3%	89.6%	89.6%	89.6%	89.6%	89.6%	89.6%	89.4%	0.0%
Net Recovery		%										
Ag			77.5%	78%	78%	78%	78%	78%	78%	78%	78%	0%
Cu			14.3%	14%	14%	14%	14%	14%	14%	14%	14%	0%
Pb			78.8%	81%	80%	80%	80%	77%	76%	76%	77%	0%
Zn			89.5%	89%	90%	90%	90%	90%	90%	90%	89%	0%
Total Average Recovery			77.7%	78%	78%	78%	78%	78%	78%	78%	78%	
mount												
Cu Concentrate	**Recovery #1**											
Ag		**oz**	**1,062,699**	**191,431**	**167,566**	**180,352**	**154,184**	**106,118**	**95,429**	**98,950**	**68,667**	**-**
Cu		**tonnes**	**22,662**	**2,677**	**3,286**	**3,857**	**3,599**	**2,836**	**2,651**	**2,787**	**969**	**-**
Pb		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Zn		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Pb Concentrate	**Recovery #2**											
Ag		**oz**	**16,533,358**	**2,978,268**	**2,606,978**	**2,805,905**	**2,398,786**	**1,650,978**	**1,484,675**	**1,539,456**	**1,068,313**	**-**
Cu		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Pb		**tonnes**	**185,932**	**37,412**	**31,218**	**34,767**	**29,982**	**17,446**	**13,495**	**13,276**	**8,335**	**-**
Zn		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Zn Concentrate	**Recovery #3**											
Ag		**oz**	**4,080,205**	**734,995**	**643,366**	**692,459**	**591,987**	**407,439**	**366,397**	**379,916**	**263,645**	**-**
Cu		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Pb		**tonnes**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Zn		**tonnes**	**925,961**	**126,124**	**146,334**	**141,431**	**138,910**	**121,774**	**104,746**	**98,234**	**48,407**	**-**

	INPUTS	UNITS	TOTAL	2021 Year 1	2022 Year 2	2023 Year 3	2024 Year 4	2025 Year 5	2026 Year 6	2027 Year 7	2028 Year 8	2029 Year 9
centrate												
Cu Concentrate		dmt	22,662	2,677	3,286	3,857	3,599	2,836	2,651	2,787	969	-
Ag grade in concentrate		oz/t	46.89	71.51	50.99	46.76	42.84	37.42	36.00	35.51	70.89	-
Cu grade in concentrate	19.8%	%	19.84%	19.84%	19.84%	19.84%	19.84%	19.84%	19.84%	19.84%	19.84%	19.84%
Pb grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Zn grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Concentrate Moisture	10%			10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Cu Concentrate		wmt	25,179	2,975	3,651	4,286	3,999	3,151	2,945	3,097	1,076	-
Pb Concentrate		dmt	185,932	37,412	31,218	34,767	29,982	17,446	13,495	13,276	8,335	-
Ag grade in concentrate		oz/t	88.92	79.61	84	81	80	95	110	116	128	-
Cu grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Pb grade in concentrate	52.06%	%	52.06%	52.06%	52.06%	52.06%	52.06%	52.06%	52.06%	52.06%	52.06%	52.1%
Zn grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Concentrate Moisture	10%			10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Pb Concentrate		wmt	206,591	41,569	34,686	38,630	33,314	19,384	14,995	14,751	9,261	-
Zn Concentrate		dmt	925,961	126,124	146,334	141,431	138,910	121,774	104,746	98,234	48,407	-
Ag grade in concentrate		oz/t	4.41	5.83	4.40	4.90	4.26	3.35	3.50	3.87	5.45	-
Cu grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Pb grade in concentrate		%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Zn grade in concentrate	50.19%	%	50.19%	50.19%	50.19%	50.19%	50.19%	50.19%	50.19%	50.19%	50.19%	50.19%
Concentrate Moisture	10%			10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Zn Concentrate		wmt	1,028,845	140,137	162,594	157,146	154,345	135,305	116,384	109,149	53,786	-
Total Tonnes Concentrate		dmt	1,134,554	166,212	180,838	180,055	172,492	142,056	120,892	114,297	57,711	-
Total Tonnes Concentrate		wmt	1,260,616	184,680	200,932	200,061	191,657	157,840	134,324	126,997	64,123	-
Total Recovered												
Ag		**oz**	**21,676,261**	**3,904,695**	**3,417,911**	**3,678,716**	**3,144,957**	**2,164,535**	**1,946,501**	**2,018,322**	**1,400,625**	**-**
Cu		**tonnes**	**4,496**	**531**	**652**	**765**	**714**	**563**	**526**	**553**	**192**	**-**
Pb		**tonnes**	**96,796**	**19,477**	**16,252**	**18,100**	**15,609**	**9,082**	**7,026**	**6,912**	**4,339**	**-**
Zn		**tonnes**	**464,740**	**63,301**	**73,445**	**70,984**	**69,719**	**61,119**	**52,572**	**49,304**	**24,295**	**-**
Metal Prices												
LOM Ag		US$/oz	$17.20	19.05	17.11	16.95	16.40	16.40	16.87	16.87	16.87	16.87
LOM Cu		US$/tonne	$6,388.29	6,071	6,137	6,277	6,351	6,639	6,627	6,627	6,627	6,627
LOM Pb		US$/tonne	$1,977.29	1,950	1,898	1,957	2,039	2,247	1,910	1,910	1,910	1,910
LOM Zn		US$/tonne	$2,511.20	2,219	2,298	2,539	2,720	2,928	2,449	2,449	2,449	2,449
Au		US$/oz Au	$1,580.04	$1,901	$1,613	$1,553	$1,466	$1,466	$1,500	$1,500	$1,500	$1,500
Ag		US$/oz Ag	$17.20	$19.05	$17.11	$16.95	$16.40	$16.40	$16.87	$16.87	$16.87	$16.87
Cu		US$/lb Cu	$2.90	$2.75	$2.78	$2.85	$2.88	$3.01	$3.01	$3.01	$3.01	$3.01
Pb		US$/lb Pb	$0.90	$0.88	$0.86	$0.89	$0.92	$1.02	$0.87	$0.87	$0.87	$0.87
Zn		US$/lb Zn	$1.14	$1.01	$1.04	$1.15	$1.23	$1.33	$1.11	$1.11	$1.11	$1.11
Exchange Rate	1.00 US$ = 1.00 C$	US$ 1.00 = X C$	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00
Payable %												
Cu Concentrate Payable %												
Payable Ag Grade		oz/t	42.20	64.36	45.89	42.08	38.56	33.68	32.40	31.95	63.80	-
Payable Cu	18.84%	%		18.8%	18.8%	18.8%	18.8%	18.8%	18.8%	18.8%	18.8%	18.8%
Pb Concentrate Payable %												
Payable Ag Grade		oz/t	84.48	75.63	79.33	76.67	76.01	89.90	104.51	110.16	121.76	-
Payable Pb	49.06%	%		49.06%	49.06%	49.06%	49.06%	49.06%	49.06%	49.06%	49.06%	49.06%
Zn Concentrate Payable %												
Payable Ag Grade		oz/t	0.98	1.98	0.98	1.33	0.88	0.24	0.35	0.61	1.71	-
Payable Zn		%		42.2%	42.2%	42.2%	42.2%	42.2%	42.2%	42.2%	42.2%	42.2%
Payable												
Cu Concentrate Payables												
Payable Ag		oz	956,429	172,288	150,810	162,317	138,766	95,507	85,886	89,055	61,800	-
Payable Cu		tonnes	4,269	504	619	727	678	534	499	525	182	-
Payable Ag		US$/t conc	725.88	1,226.0	785.2	713.3	632.3	552.4	546.6	539.1	1,076.3	-
Payable Cu		US$/t conc	1,204	1,144	1,156	1,183	1,197	1,251	1,249	1,249	1,249	1,249
Pb Concentrate Payables												
Payable Ag		oz	15,706,690	2,829,355	2,476,629	2,665,610	2,278,846	1,568,429	1,410,441	1,462,483	1,014,898	-
Payable Pb		tonnes	91,218	18,354	15,315	17,057	14,709	8,559	6,621	6,513	4,089	-
Payable Ag		US$/t conc.	1,453	1,441	1,357	1,300	1,247	1,474	1,763	1,858	2,054	-
Payable Pb		US$/t conc.	970	957	931	960	1,000	1,102	937	937	937	937

	INPUTS	UNITS	TOTAL	2021 Year 1	2022 Year 2	2023 Year 3	2024 Year 4	2025 Year 5	2026 Year 6	2027 Year 7	2028 Year 8	2029 Year 9
Zn Concentrate Payables												
Payable Ag		oz	912	250	143	188	123	29	37	60	83	-
Payable Zn		tonnes	390,663	53,212	61,738	59,670	58,606	51,377	44,192	41,445	20,423	-
Payable Ag		US$/t conc.	17.17	38	16.7	22.5	14.5	4.0	5.9	10.2	28.9	-
Payable Zn		US$/t conc.	1,059	936	970	1,071	1,148	1,235	1,033	1,033	1,033	1,033
e												
Ag Gross Revenue		US$ '000	$286,605	$57,186	$44,958	$47,937	$39,651	$27,289	$25,244	$26,175	$18,165	$0
Cu Gross Revenue		US$ '000	$27,274	$3,062	$3,800	$4,562	$4,306	$3,547	$3,310	$3,480	$1,209	$0
Pb Gross Revenue		US$ '000	$180,365	$35,795	$29,069	$33,380	$29,992	$19,232	$12,646	$12,440	$7,811	$0
Zn Gross Revenue		US$ '000	$981,034	$118,076	$141,875	$151,501	$159,409	$150,431	$108,227	$101,499	$50,016	$0
Add Zn Gross Revenue - Intgr CJM		US$ '000	$176,872	$28,590	$25,864	$26,104	$25,308	$23,011	$20,013	$18,738	$9,243	$0
Total Gross Revenue		**US$ '000**	**$1,652,150**	**$242,709**	**$245,565**	**$263,484**	**$258,667**	**$223,509**	**$169,439**	**$162,333**	**$86,444**	**$0**
Transport												
Cu Concentrate	C$127.05 / wmt conc	US$ '000	$3,199	$378	$464	$545	$508	$400	$374	$393	$137	$0
Pb Concentrate	C$123.84 / wmt conc	US$ '000	$25,585	$5,148	$4,296	$4,784	$4,126	$2,401	$1,857	$1,827	$1,147	$0
Zn Concentrate	C$38.03 / wmt conc	US$ '000	$39,127	$5,329	$6,183	$5,976	$5,870	$5,146	$4,426	$4,151	$2,045	$0
Treatment												
Cu Concentrate	US$111.68 / dmt conc	US$ '000	$2,519	$249	$336	$411	$435	$334	$312	$328	$114	$0
Pb Concentrate	US$201.68 / dmt conc	US$ '000	$37,909	$7,984	$6,493	$7,023	$6,056	$3,437	$2,659	$2,615	$1,642	$0
Zn Concentrate	US$238.72 / dmt conc	US$ '000	$220,619	$36,510	$34,531	$32,793	$30,364	$26,180	$25,101	$23,540	$11,600	$0
Refining cost												
Ag in Pb	US$1.00 / oz	US$ '000	$15,654	$2,820	$2,468	$2,657	$2,271	$1,563	$1,406	$1,458	$1,012	$0
Ag in Cu	US$0.50 / oz	US$ '000	$478	$86	$75	$81	$69	$48	$43	$45	$31	$0
Cu	US$0.08 / lb	US$ '000	$753	$89	$109	$128	$120	$94	$88	$93	$32	$0
Pb	US$0.00 / lb	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Market Participation												
Cu	NA	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pb	NA	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zn	NA	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Charges		US$ '000	$345,843	$58,593	$54,956	$54,398	$49,819	$39,603	$36,265	$34,450	$17,760	$0
Net Smelter Return		US$ '000	**$1,306,307**	**$184,116**	**$190,609**	**$209,085**	**$208,848**	**$183,906**	**$133,174**	**$127,883**	**$68,684**	**$0**
Royalty NSR	Input Rate Into Proforma	US$ '000	$19,648	$2,920	$3,050	$4,008	$4,121	$2,731	$1,132	$1,091	$594	$0
Net Revenue		US$ '000	**$1,286,659**	**$181,196**	**$187,560**	**$205,077**	**$204,727**	**$181,175**	**$132,042**	**$126,792**	**$68,090**	**$0**
Unit NSR		**US$/t milled**	**$92.90**	**$84**	**$84**	**$92**	**$101**	**$109**	**$96**	**$92**	**$85**	**#DIV/0!**
COST												
Mining (Underground)		US$/t milled	$32.81	$29.2	$29.0	$29.2	$30.4	$33.7	$37.4	$37.6	$51.5	$0.0
Mine Development		US$/t milled	$6.56	$7.9	$7.2	$6.7	$6.4	$6.4	$6.3	$4.6	$5.4	$0.0
Processing		US$/t milled	$12.72	$10.8	$10.6	$10.6	$11.3	$13.2	$15.2	$15.3	$24.1	$0.0
G&A		US$/t milled	$7.30	$7.3	$7.3	$7.3	$7.3	$7.3	$7.3	$7.3	$7.3	$0.0
Total Operating Cost		**US$/t milled**	**$59.39**	**$55.2**	**$54.0**	**$53.7**	**$55.4**	**$60.5**	**$66.2**	**$64.8**	**$88.3**	**$0.0**
Mining (Underground)		US$ '000	$454,350	$63,077	$64,320	$64,742	$61,913	$55,796	$51,610	$51,569	$41,323	$0
Mine Deveopment		US$ '000	$90,887	$17,162	$15,971	$14,837	$13,065	$10,602	$8,673	$6,244	$4,332	$0
Processing		US$ '000	$176,174	$23,274	$23,452	$23,446	$22,910	$21,808	$20,998	$20,972	$19,314	$0
G&A		US$ '000	$101,109	$15,774	$16,219	$16,206	$14,861	$12,103	$10,076	$10,011	$5,858	$0
Total Operating Cost		**US$ '000**	**$822,519**	**$119,288**	**$119,961**	**$119,231**	**$112,750**	**$100,309**	**$91,356**	**$88,797**	**$70,827**	**$0**
Unit Operating Cost		US$/t milled	$84.36	$82.3	$78.7	$78.2	$79.9	$84.4	$92.5	$89.9	$110.4	$0.0
Other Costs		US$ '000	$10,624	$0	$0	$0	$2,981	$2,425	$2,015	$2,011	$1,192	$0
Operating Cashflow		**US$ '000**	**$453,516**	**$61,908**	**$67,599**	**$85,846**	**$88,996**	**$78,441**	**$38,671**	**$35,983**	**-$3,929**	**$0**
			32.75	28.65	30.43	38.67	43.72	47.31	28.02	26.24	-4.90	0.00
ST												
Direct Cost												
Mining		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Processing		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Infrastructure		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailings		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Direct Cost		**US$ '000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

	INPUTS	UNITS	TOTAL	2021 Year 1	2022 Year 2	2023 Year 3	2024 Year 4	2025 Year 5	2026 Year 6	2027 Year 7	2028 Year 8	2029 Year 9
Other Costs												
EPCM / Owners / Indirect Cost	0%	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal Costs		US$ '000	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Contingency	0%	US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Initial Capital Cost		**US$ '000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Sustaining Mine Development		US$ '000	$92,745	$17,170	$16,073	$16,941	$18,954	$13,124	$6,521	$1,934	$2,030	$0
Mine Equipment		US$ '000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Sustaining		US$ '000	$128,330	$32,807	$28,821	$33,722	$11,526	$12,858	$4,191	$4,405	$0	$0
Working Capital		US$ '000	$0	$6,363	$307	$977	$204	-$852	-$2,374	-$228	-$2,572	-$1,825
Reclamation and closure		US$ '000	$25,196	$0	$0	$0	$0	$0	$0	$0	$0	$25,196
Total Capital Cost		**US$ '000**	**$246,271**	**$56,340**	**$45,201**	**$51,639**	**$30,683**	**$25,131**	**$8,338**	**$6,111**	**-$543**	**$23,371**
SH FLOW												
Net Pre-Tax Cashflow		**US$ '000**	**$207,245**	**$5,568**	**$22,398**	**$34,207**	**$58,313**	**$53,310**	**$30,333**	**$29,873**	**-$3,386**	**-$23,371**
Cumulative Pre-Tax Cashflow		US$ '000		$5,568	$27,966	$62,173	$120,486	$173,796	$204,128	$234,001	$230,615	$207,245
Taxes - Income Tax		US$ '000	-$28,339	-$4,631	-$4,757	-$7,391	-$7,753	-$3,808	$0	$0	$0	$0
Taxes - IEM/GEM		US$ '000	-$2,541	-$405	-$417	-$684	-$716	-$319	$0	$0	$0	$0
After-Tax Cashflow		**US$ '000**	**$176,364**	**$532**	**$17,224**	**$26,132**	**$49,845**	**$49,182**	**$30,333**	**$29,873**	**-$3,386**	**-$23,371**
Cumulative After-Tax Cashflow		US$ '000		$532	$17,756	$43,888	$93,733	$142,915	$173,248	$203,121	$199,735	$176,364
ONOMICS			mid-year period	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5
Pre-Tax IRR		%	N/A									
Pre-tax NPV at 7% discounting	7%	US$ '000	$164,845									
Pre-tax NPV at 8% discounting	8%	US$ '000	$159,759									
Pre-tax NPV at 9% discounting	**9%**	**US$ '000**	**$154,883**									
After-Tax IRR		%	N/A									
After-Tax NPV at 7% discounting	7%	US$ '000	$139,026									
After-Tax NPV at 8% discounting	8%	US$ '000	$134,246									
After-tax NPV at 9% discounting	**9%**	**US$ '000**	**$130,143**									

19.2.1 Cash Flow Analysis

Mine economics have been evaluated using the discounted cash flow method, using mid-year discounting convention, and taking into account annual processed tonnages and copper, zinc, lead, and silver grades. The associated process recovery, copper, zinc, and lead concentrate grades, metal prices, operating costs, refining and transportation charges, royalties, and capital expenditures were also considered.

The economic analysis confirmed that the El Porvenir Mineral Reserves are economically viable. The pre-tax net present value (NPV) at an 9% base discount rate is US$155 million and the after-tax NPV at an 9% base discount is US$130 million, on a 100% Mine basis (Nexa own 80.16%).

The summary of the results of the cash flow analysis is presented in Table 19-2.

Table 19-2: Cash Flow Analysis
Nexa Resources S.A. – El Porvenir Mine

Item	Discount Rate	Units	Value
Pre-tax NPV at 7% discount	7%	US$ million	165
Pre-tax NPV at 8% discount	8%	US$ million	160
Pre-tax NPV at 9% discount	**9%**	**US$ million**	**155**
After-Tax NPV at 7% discount	7%	US$ million	139
After-Tax NPV at 8% discount	8%	US$ million	134
After-tax NPV at 9% discount	**9%**	**US$ million**	**130**

The undiscounted pre-tax cash flow is US$207 million, and the undiscounted after-tax cash flow is US$177 million. For this cash flow analysis, the internal rate of return (IRR) and payback are not applicable as there is no negative initial cash flow (no initial investment to be recovered).

19.3 Sensitivity Analysis

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities on after-tax NPV at an 9% discount rate. The following items were examined:

- Metal prices
- Head grade
- Metallurgical recovery
- Operating costs
- Capital costs

After-tax sensitivity over the base case has been calculated for -20% to +20% (for head grade), -10% to +5% (for recoveries), -20% to +20% (for metal prices), and -5% to +15% (operating costs and capital costs) variations to determine the most sensitive parameter of this project. The sensitivities are shown in Table 19-3 and Figure 19-1.

Table 19-3: After-Tax Sensitivity Analysis
Nexa Resources S.A. – El Porvenir Mine

	Head Grade	NPV at 9% (US$ million)
80%	Cu:0.18% Zn:3.00% Pb:0.71% Ag:50.24 g/t	-33
90%	Cu:0.20% Zn:3.37% Pb:0.80% Ag:56.52 g/t	57
100%	**Cu:0.23% Zn:3.75% Pb:0.88% Ag:62.8 g/t**	**130**
110%	Cu:0.25% Zn:4.12% Pb:0.97% Ag:69.8 g/t	202
120%	Cu:0.27% Zn:4.50% Pb:1.06% Ag:75.4 g/t	270
	Net Average Recovery (all metals)	**NPV at 9% (US$ million)**
90%	81%	57
98%	85%	94
100%	**90%**	**130**
103%	92%	148
105%	94%	166
	Metal Prices	**NPV at 9% (US$ million)**
80%	Cu:$2.32/lb Zn:$0.91/lb Pb:$0.72/lb Ag:$13.76/oz	-77
90%	Cu:$2.61/lb Zn:$1.03/lb Pb:$0.81/lb Ag:$15.48/oz	40
100%	**Cu:$2.90/lb Zn:$1.14/lb Pb:$0.90/lb Ag:$17.20/oz**	**130**
110%	Cu:$3.19/lb Zn:$1.25/lb Pb:$0.99/lb Ag:$18.92/oz	215
120%	Cu:$3.48/lb Zn:$1.37/lb Pb:$1.08/lb Ag:$20.64/oz	294
	Operating Costs (US$ million)	**NPV at 9% (US$ million)**
95.0%	781	152
97.5%	802	141
100.0%	**823**	**130**
107.5%	884	97
115.0%	946	64
	Total Capital Costs (US$ million)	**NPV at 9% (US$ million)**
95.0%	234	140
97.5%	240	135
100.0%	**246**	**130**
107.5%	264	116
115.0%	283	101

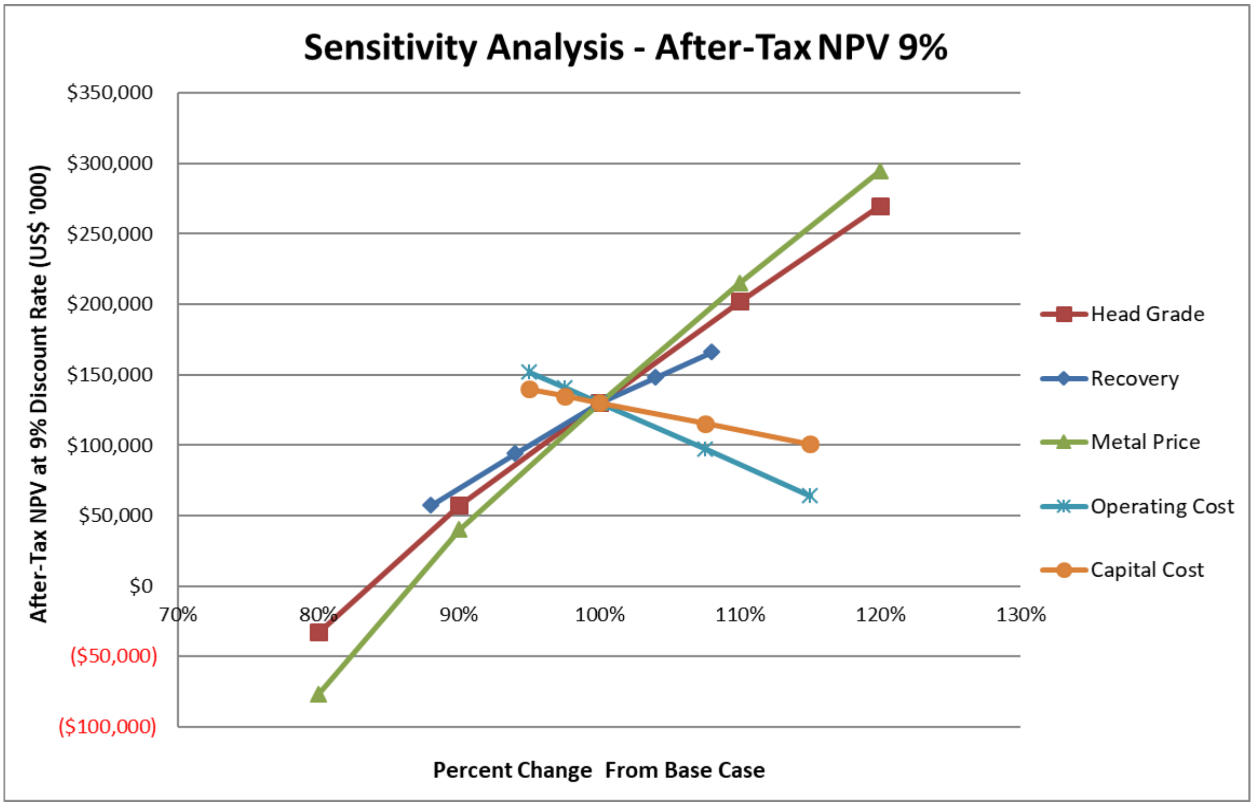


Figure 19-1: After-Tax NPV Sensitivity Graph

The after-tax NPV is most sensitive to metal prices, then to head grade, followed by metallurgical recoveries, operating costs, and capital costs.

20.0 ADJACENT PROPERTIES

El Porvenir is situated adjacent to the Atacocha mining operation. The Atacocha property consists of 147 concessions covering approximately 2,872.5 ha and a processing plant (RPA, 2019). The mining site consists of 1,343.0 ha, and other surface property includes the TSF, accommodations, and other ancillary infrastructure. Atacocha is a polymetallic mining operation that consists of the Atacocha underground mine, the San Gerardo open pit, and the Chicrin 2 processing plant, which has a 4,500 tpd capacity. Atacocha is wholly owned by Nexa Resources Atacocha S.A.A. (formerly Compañía Minera Atacocha), in which Nexa Peru has a 66.62% equity interest. Nexa directly and indirectly owns 80.24% of the latter company. Table 20-1 presents Atacocha's production from 2018 to 2020.

Table 20-1: Production - Atacocha Mine
Nexa Resources S.A. – El Porvenir Mine

	YE 2020	YE 2019	YE 2018
Treatment ore (in tonnes)	1,065,363	1,505,428	1,551,472
Average ore grade			
Zinc (%)	1.20	1.43	1.43
Copper (%)	0.05	0.08	0.10
Lead (%)	1.15	1.30	1.18
Silver (ounces per tonne)	1.39	1.52	1.42
Gold (ounces per tonne)	0.01	0.01	0.02
Metal contained in concentrate production			
Zinc (in tonnes)	9,614	16,668	17,323
Copper (in tonnes)	0	40	125
Lead (in tonnes)	10,210	16,464	15,595
Silver (in oz)	1,184,750	1,882,138	1,678,920
Gold (in oz)	6,260	9,306	15,431
Cash cost, net of by-product credits (in US$/t)	17.8	1,052.0	1,115.5
Cash cost, net of by-product credits (in US$/lb)	0.8	0.48	0.51
Capital expenditures (in millions of US$)	15.3	11.8	16.9

Source: Nexa, 2020g

Together, El Porvenir and Atacocha form the Cerro Pasco Mining Complex. In 2013, Nexa initiated a project to integrate the two mines to streamline their operations, which has included the following areas:

- Administrative functions
- TSF
- Electric power supply

As indicated in Figure 20-1, El Porvenir is surrounded by other mineral properties. The following companies that hold properties in the vicinity are subsidiaries of the Volcan Group:

- Compañía Minera Vichaycocha
- Empresa Exploradora de Vinchos
- Empresa Minera Paragsha
- Minera San Sabastián AMC S.C.R.L.

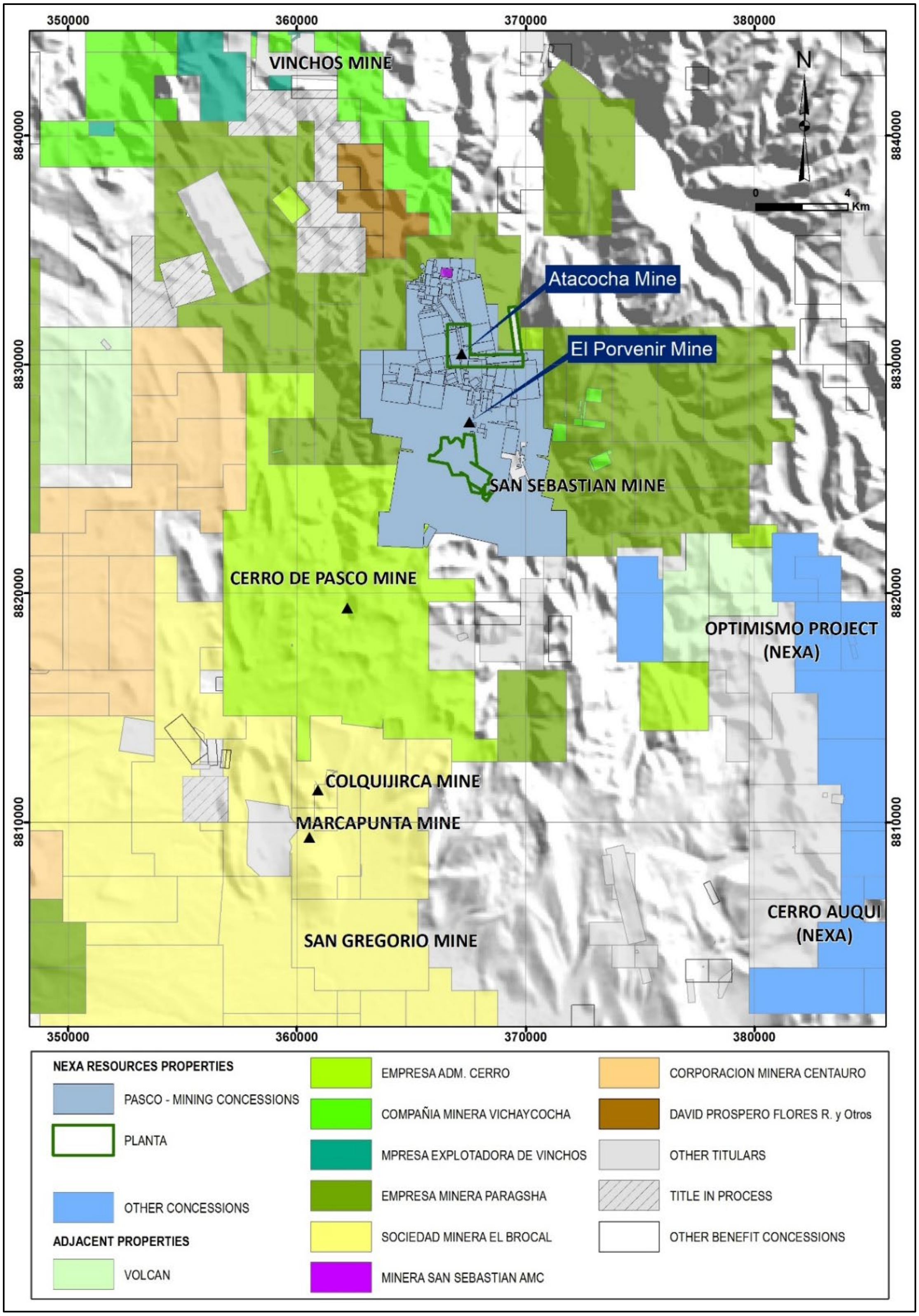
The Volcan Group operates the Cerro de Pasco Mine in the nearby city of Cerro de Pasco. Nexa maintains a group of mining concessions located within the boundaries of some of the Volcan Group's properties.

Other local property holders include:

- Sociedad Minera El Brocal
- David Prospero Rudas y otros
- Corporación Minera Centauro S.A.C. (Centauro)

Centauro is a Peruvian capital corporation that focuses on exploration, mining, and processing of polymetallic minerals, such as gold, silver, and copper.

SLR has not independently verified this information and this information is not necessarily indicative of the mineralization at El Porvenir.



Source: Nexa, 2020

Figure 20-1: Mining Concessions in the Vicinity of El Porvenir

21.0 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report Summary understandable and not misleading.

22.0 INTERPRETATION AND CONCLUSIONS

SLR has the following conclusions by area.

22.1 Geology and Mineral Resources

- As of December 31, 2020, exclusive of Mineral Reserves, Measured Mineral Resources are estimated to total 0.18 Mt at 2.59% Zn, 0.99% Pb, 0.23% Cu, and 63.46 g/t Ag and Indicated Mineral Resources are estimated to total 1.07 Mt at 2.93% Zn, 0.89% Pb, 0.20% Cu, and 63.33 g/t Ag. In addition, Inferred Mineral Resources are estimated to total 6.79 Mt at 3.60% Zn, 0.95% Pb, 0.23% Cu, and 78.37 g/t Ag. Mineral Resources are reported on an 80.16% Nexa attributable ownership basis.
- El Porvenir has features of skarn, hydrothermal vein/breccia-style, and stratabound deposits.
- The control of mineralization is lithological, mineralogical, and structural.
- Protocols for drilling, sampling, analysis, verification, and security meet industry standard practices. The drill hole database was verified by SLR and is suitable for Mineral Resource estimation.
- The geological models are reasonably constructed using available geological information and are appropriate for Mineral Resource estimation.
- The assumptions, parameters, and methodology used for the El Porvenir Mineral Resource estimate are appropriate for the style of mineralization and proposed mining methods.
- Nexa's exploration strategy, practices, and procedures are in line with industry standards.
- A number of polymetallic prospects located near the deposits have been outlined and warrant additional exploration.

22.2 Mining and Mineral Reserves

- As of December 31, 2020, Proven and Probable Mineral Reserves are estimated to total 11.10 Mt at 3.75% Zn, 0.88% Pb, 0.23% Cu, and 63 g/t Ag. Mineral Reserves are reported on an 80.16% Nexa attributable ownership basis.
- The assumptions, parameters, and methodology used for the El Porvenir Mineral Reserve estimate meet industry standard practices and are appropriate for the style of mineralization and proposed mining methods.
- Most of El Porvenir's ore production comes from mechanized C&F, which has proven to be an effective method for mining its deposits for decades. An increasing share of the Mine's production comes from SLS in those areas that are suitable for the method. SLS is a lower-cost method than C&F, and provides an efficient means for disposing of development waste. According to the LOM plan, SLS's share of El Porvenir's output will increase from approximately 16% in 2021 to 46% in 2025.

22.3 Mineral Processing

- Test work has been conducted in order to produce a geometallurgical model to predict metallurgical response during future processing at El Porvenir and relationships based on the ore source at El Porvenir having been derived to predict throughput, grinding media consumption, recovery, and concentrate quality.

- Review of historical production indicates that recoveries of copper, lead, and zinc are related to their head grades, while the majority of silver is recovered to the lead concentrate.
- Average LOM planned head grades of zinc and copper are forecast to be similar to or higher than average head grades for the past three years, while the average planned lead head grade is forecast to decrease slightly compared to recent head grades. Forecast recoveries are in line with those achieved in recent years.
- No fundamental changes to the concentrator feed are anticipated, and in the SLR QP's opinion, based on recent processing plant performance, the forecast recoveries and concentrate qualities for the near future are reasonable.

22.4 Environmental, Permitting and Social Considerations

- No environmental issues were identified from the documentation available for review that could materially impact the ability to extract the Mineral Resources and Mineral Reserves. The El Porvenir operation complies with applicable Peruvian permitting requirements. The approved permits address the authority's requirements for operation of the underground mine, TSFs, WRD, concentrator plant, water usage, and effluents discharge.
- The monitoring program at El Porvenir includes meteorology, air quality, non-ionized radiation, noise, surface water quality, groundwater quality (only one location), spring water quality, effluent discharges, fauna and flora, and TSF physical stability. El Porvenir reports the results of its monitoring program to the authorities according to the frequency stated in the approved resolutions. SLR is not aware of any non-compliance issues raised by the authorities.
- In the SLR QP's opinion, the Environmental Management Plan for El Porvenir is adequate to address potential issues related to environmental compliance. A recommendation has been provided regarding the groundwater quality monitoring program (see Section 1.1.2.4).
- Nexa utilizes an Integrated Dam Management System (referred to as SIGBar) for the El Porvenir TSF, which provides guidelines for document management, monitoring, evaluation, risk analysis, compliance with standards and legislation, training of personnel, operation of structures and other provisions.
- The safety of operating a centerline raised tailings dam depends on the ability to maintain wide tailings beaches and a low phreatic level in the dam shell for stability. No issues with regard to crest settlements were noted in recent dam safety monitoring reports. SLR notes, however, that bedrock foundation grouting of the left and right abutments carried out in 2015 observed very significant grout takes in numerous grouthole stages indicating the filling of voids. A series of seepage collection sub-drainage pipes were also installed on the downstream shell of the dam prior to raising the rockfill to crest elevation 4,056 MASL. The dam monitoring consists of instrument measurements and field inspections.
- A Mine Closure Plan has been developed for all the Mine components within the context of Peruvian legislation and is periodically updated. The most recent modification to the Mine Closure Plan and update to the closure cost estimate are from January 2020.
- SLR's social review indicates that, at present, Nexa's operations at El Porvenir are a positive contribution to sustainability and community well-being. Nexa has established and continues to implement its various corporate policies, procedures, and practices in a manner consistent with

relevant IFC Performance Standards. Nexa has, and continues to make, a positive contribution to the communities most affected by the site operations and has done a thorough job in documenting potential effects on stakeholders and protecting the rights, health, and safety of its employees.

- In the SLR QP's opinion the grievance mechanism in place and the Community Relations Plan, in combination with Nexa's Social Management Policy and Nexa's Management Procedures on negotiation for land access, monitoring of social commitments, management of social crisis, promotion of local hiring, and communication with stakeholders, are adequate to address potential issues related to local communities.
- Nexa established commitments with the communities San Juan de Milpo and San Francisco de Asis de Yarusyacan to employ direct and indirect local workforce, dependent on employment opportunities required by the mine operations for qualified and non-qualified workforce.

22.5 Costs and Economic Analysis

- The LOM operating cost forecast reflects the existing operating status of the Mine. The SLR QP has reviewed recent operating costs and is of the opinion that the forecast is appropriate for the El Porvenir operation. Nexa also continue to assess operating efficiencies and approaches in efforts to improve operating costs in the different cost centres.
- The economics of the El Porvenir operation are positive over the LOM, confirming that the Mineral Reserves are economically viable. The economic analysis shows an after-tax NPV, at an 9% base discount rate, of $130 million, on a 100% Mine basis (Nexa owns 80.16%).

23.0 RECOMMENDATIONS

SLR has the following recommendations by area.

23.1 Geology and Mineral Resources

1. Improve the reconciliation processes by implementing a formal procedure and forming a multi-disciplinary team to organize and analyze reconciliation results so that production data can be used to calibrate future resource and reserve models.
2. Divide mineralization domains where groups of wireframes have been merged to avoid sharing of samples.
3. Review the inclusion of additional grade domains considering spatial and statistical correlations, to prevent smearing of high grades into low grade areas and vice versa.
4. Update the 2018 lithological model and build a litho-structural model with the main lithologies and faults that are controlling the mineralization to help define the geometry and boundaries of the mineralization. An updated lithological model would also be beneficial to evaluate and define density values by rock and by domain.
5. Until there is a well-established reconciliation process, monitor the silver and lead grades in the model with grade control and head grade to calibrate capping values and confirm if the higher silver and lead capping values are appropriate.
6. Investigate if capping levels should be applied based on high grade and low grade domains for zinc, lead, copper, and silver.
7. Increase the number of density samples in areas that currently have insufficient density tests available.
8. Use the production data to monitor the chosen drill spacing for the minor continuity zones to determine if sufficient confidence is provided to support detailed mine planning, as these domains show less grade and geological continuity.
9. Review and adjust resource and reserve shapes to follow the mineralization trend. Currently, there are a small number of shapes that do not follow the mineralization trend.
10. Re-evaluate some of the zones that were not included in the Mineral Resources and Mineral Reserves, on an ongoing basis, to potentially include part of these tonnes with continuous blocks that have the potential to be recoverable, to generate resource shapes and possibly reserve stopes.
11. Document all the supporting data used to define non-recoverable solids and document any changes.
12. Improve the survey accuracy of the mineralized mined-out stopes and development to guide the mineralization solid geometries and trends, and clean up the mined-out solids, particularly, overlapping areas.
13. Complete the 2021 exploration program, consisting of a 18,000 m drill program to define new Inferred Resources. The 2021 exploration program budget is approximately US$3.1 million.

23.2 Mining and Mineral Reserves

1. Consider upgrading the Mine's underground communication system by replacing the present leaky-feeder system with a high speed digital network based on Wi-Fi or LTE technology. The upgrade would permit implementing the following:
    - Centralized control and monitoring of underground operations from a control room on surface, including real-time tracking of personnel and equipment, telemetry, VOD, seismic monitoring, and closed-circuit television, among other applications.
    - Automated and tele-remote technology to operate equipment from control stations on surface for mucking development headings during shift changes, crushing, and operating rockbreakers, among other applications.
2. As the Mine has extensive existing workings, a private 4G-LTE network could be an attractive option. A private 4G-LTE network can provide substantial level coverage with a lower installation requirement than alternative systems as it sends a reliable signal over long distances without coaxial cables, amplifiers, or access points. Furthermore, it is not limited to line-of-site transmission.

23.3 Mineral Processing

1. Evaluate the potential benefits that may be derived from a geometallurgical model to determine whether additional test work and further development of a geometallurgical model will provide more valuable information than what is already available from test work results.

23.4 Environmental, Permitting and Social Considerations

1. Due to uncertainty regarding the potential for acid generation of the waste rock, geochemical evaluation (including static and kinetic geochemical testing on waste rock samples) should be carried out prior to closure to inform closure planning and water quality predictions for post-closure. Water quality monitoring should continue during operations to verify compliance with the national environmental standards and the appropriateness of the waste rock disposal and water management procedures that are in place.
2. Expand the groundwater quality monitoring program to include additional stations for collection of groundwater quality samples (and subsequent analysis). At a minimum, consideration should be given to the installation of one station upstream of the El Porvenir site.
3. Implement a water balance for ongoing operations to be updated by Mine personnel using meteorological and water monitored data on a regular basis (at least monthly). The water balance is an important tool to track trends and conduct short term predictions through simulation of variable operating and/or climatic scenarios to support decision making associated with tailings pond operation (e.g., maintaining adequate freeboard at all times).
4. Develop an integrated water balance that reflects the interaction between the El Porvenir and Atacocha operations from a water balance perspective to identify and predict possible scenarios of interruption of mine operations due to water management issues and/or dam safety concerns (e.g., not maintaining adequate dam freeboard).
5. Investigate opportunities for optimization of construction, tailings deposition, and water management between the Atacocha and El Porvenir operations in order to prevent situations

where potential problems with one of the tailings dams could impact continuity of the sister operation.

6. The following recommendations are proposed for the TSF:
   - Classification of the TSF in terms of the Global Tailings Standard or the Canadian Dam Association. The classification may require more conservative design criteria in terms of flood management and seismic loading.
   - A dam breach analysis to inform the TSF classification and emergency preparedness plan.
   - A TARP for the piezometers for inclusion in the monitoring plan.
   - Capacity assessments of the TSF completed on a bi-annual basis with topographic and bathymetric surveys.
   - Complete long term geochemical kinetic testing of the tailings.
   - Implement a groundwater monitoring program at the TSF to determine levels of metals and sulphates.
   - Monitor the water quality from the TSF subsurface drains.

23.5 Costs and Economic Analysis

1. Continuously monitor costs and lock in costs as soon as possible to eliminate economic uncertainty.
2. Continue efforts towards improving efficiencies and approaches to mining and development operations as opportunities arise in these areas.

24.0 REFERENCES

Amphos 21 Consulting Perú S.A.C., 2013-2019:

- El Porvenir: Estudio Hidrogeológico Preliminar para - Profundización del Pique Picasso, prepared for Compañía Minera Milpo S.A., December 2016.
- UM El Porvenir: Análisis Hidrogeológico para Estimación de Caudales durante la Construcción del Pique Winze, prepared for Compañía Minera Milpo S.A., October 2014.
- UM El Porvenir: Análisis Hidrogeológico para Estimación de Caudales durante la Construcción del Pique Winze, prepared for Compañía Minera Milpo S.A., October 2014.
- Modificación del Estudio de Impacto Ambiental de la UM Atacocha - Estudio Hidrológico e Hidrogeológico, prepared for Compañía Minera Milpo S.A., July 2018.
- Estudio Hidrogeológico y Soporte a Balance Hídrico para el Recrecimiento Presa de Relaves El Porvenir hasta la Cota 4,100 msnm, El Porvenir Mine, prepared for Compañía Minera Milpo S.A., August 2019.

Ausenco Vector, 2013, Ingeniería de Detalle para el Crecimiento de la Presa de Relaves El Porvenir, Anexo F – Caracterización Geoquí0ica del Relave Cicloneado, Report No. J09.82.12.03 Rev. 0 prepared for Compañía Minería Milpo S.A.A., February 2013.

Ausenco, 2016a: Milpo Andina Perú S.A.C. Ingeniería de Detalle Recrecimiento del Dique El Porvenir – Cota 4056. Report No. 101521-01-RPT-005 Rev. B, prepared for Compañía Minería Milpo S.A.A., August 2016.

Ausenco, 2016b: Milpo Andina Perú S.A.C. Ingeniería de Detalle del Recrecimiento de la Presa de Relaves El Porvenir – Cota 4100. Report No. 101521-01-RPT-002 Rev. 0, prepared for Compañía Minería Milpo S.A.A., August 2016.

Ausenco, 2018: Milpo Andina Perú S.A.C. Ingeniería de Detalle Recrecimiento del Dique El Porvenir – Cota 4064. Report No. 102378-01-RPT-004 Rev. 1, prepared for Compañía Minería Milpo S.A.A., September 7, 2018.

Ausenco, 2020: Compañía Minera Atacocha S.A.A. Ingeniería de Detalle del Recrecimiento de la Relavera Atacocha desde la Cota 4110 a la Cota 4128. Report No. 102377-01-RPT-006 Rev. 0, prepared for Compañía Minera Atacocha S.A.A., March 17, 2020.

Bardales, M., 2020, Legal Opinion on Section 4 of Technical Report (Memo), Nexa Resources, August 16, 2020.

Baumgartner, R., Fontboté, L., and Vennemann, T., 2008, Mineral Zoning and Geochemistry of Epithermal Polymetallic Zn-Pb-Ag-Cu-Bi Mineralization at Cerro de Pasco. Economic Geology, Vol. 103, pp 493-537.

Benavides-Caceres, V.,1999, Orogenic Evolution of the Peruvian Andes. *in* Geology and Ore Deposits of the Central Andes, Soc. Econ. Geo. Special Pub. No. 7, Skinner, B.J. (Ed), pp. 61-107.

Calixto, F., 2020, Evaluación del Peligro Sísmico en U. M. El Porvenir, Institute of Mine Seismology, December 24, 2020.

Canadian Institute of Mining, Metallurgy and Petroleum (CIM), 2014, CIM Definition Standards for Mineral Resources and Mineral Reserves, adopted by the CIM Council on May 10, 2014.

Clark, A.H., Farrar, E., Kontak, D.J., Langridge, R.J., Arena, F., Francem L.J., McBride, S.L., Woodman, P.L., Wasteneys, H.A., Sandeman, H.A. and Archibald, D.A., 1990, Geologic and Geochronological Constraints on the Metallogenic Evolution of the Andes of Southern Peru. Econ. Geo., Vol. 85, pp. 1520-1583.

Cesel Ingenieros, 2011, Modificación del EIA para la Ampliación de la Capacidad Instalas a 7,500 TMD Unidad Minera El Porvenir, prepared for Compañía Minería Milpo S.A.A., December 2011.

Climaco, R., 2020, Market Assumptions (Memo), Nexa Resources, October 2020

Cobeñas, B.G.R., 2008, Cinturonas metalogénicos cenozoicos en Pasy y Huánuco: tipos de yacimientos y naturaleza geoquímica de los magmas asociados: Universidad Nacional Mayor do San Marcos, Facultad de Ingeniera Geologica, Minera, Metalurgica y Geografica, Tesis, 75 p.

De Pinha Taranto, 2020, D., Smelter Terms (Memo), Nexa Resources, October 2020.

Ecotec, 2018, Quinto Informe Técnico Sustentatorio (ITS) para la Modificación de Componentes Auxiliares de la Unidad Minera El Porvenir, Report No. 290463-200-103-INF-001 Rev. 1 prepared for Nexa Resources El Porvenir S.A.C., December 4, 2018.

Ellison, R.A., Klink, B.A., and Hawkins, 1989, Deformation events in the Andean cycle in the Altiplano and Western Cordillera, southern Peru. Journal of South American Earth Sciences, Vol. 3 pp. 263-276.

Engler, A., 2009, The Geology of South America. GEOLOGY Vol. IV, pp. 374-405.

Escegis, 2020, Sexto Informe Técnico Sustentatorio de la Unidad Minera El Porvenir, prepared for Nexa Resources El Porvenir S.A.C., January 2020.

Form 20-F for fiscal year ended December 31, 2019 for Nexa Resources S.A., United States Securities and Exchange Commission, filed March 20, 2020.

Form 20-F for fiscal year ended December 31, 2018 for Nexa Resources S.A., United States Securities and Exchange Commission, filed April 3, 2019.

Geoconsultoria, 2020, Formulario De Registro De Inspección (FRI), April 28, 2020.

Geoconsultoria, 2018, Nexa, El Porvenir, Presa de relaves - Evaluación Anual de Seguridad - 2017 MP05RT09 Rev. 0, January 2018.

Gilbert, J.M., and Lowell, J.D., 1974, Variations in zoning patterns pattern in porphyry ore deposits: Can. Inst. Mining Metall., v. 67, no. 742, pp. 99-104.

Global Mining Guidelines Group (GMG), 2018, Underground Mine Communications Infrastructure Guidelines, Part III: General Guidelines, version date September 21, 2018.

Hammarstrom, J.M., Kotlyar, B.B., Theodore, T.G., Elliott, J.E., John, D.A., Doebrich, J.L., Nash, J.T., Carlson, R.R., Lee, G.K., Livo, K.E., and Klein, D.P., 1991, Cu-Au and Zn-Pb Skarn Deposits: U.S. Geological Survey Open File Report 95-0831, Ch. 12, pp. 90-111.

Klohn Crippen Berger (KCB), 2006, Plan de Cierre Conceptual de la U.E.A. Milpo No. 1, prepared for Compañía Minería Milpo S.A.A., August 16, 2006.

KCB, 2020, Tercera Modificación de Plan de Cierre El Porvenir, Report No. ZC1365A01 prepared for Nexa Resources El Porvenir S.A.C., January 2020.

Mégard, F., 1968, Geologia de Cuadrángulo de Huandayo: Boletin del Servicio de Geologia y Mineria 18, 123p.

Nexa Resources S.A., 2019a, Corporate Policies.

Nexa Resources S.A., 2019b, Informe de Validación de Base de Datos Atacocha.

Nexa Resources, 2019c, Estudio Geomecánico de Implementación de la Cartilla Geomecánica de Sostenimiento, Prepared by the Departamento De Geomecánica, El Porvenir Mine, August 2019.

Nexa Resources S.A., 2020a, An Internal legal opinion by Magaly Bardales, Legal Corporate Manager and Institutional Affairs, Nexa, a letter to RPA expressing an opinion on Section 4 content of Technical Report (August 16, 2020).

Nexa Resources S.A., 2020b, Reporte de Recursos Minerales U.M. El Porvenir, Pasco, Peru, Reporte Interno (July 22, 2020).

Nexa Resources S.A., 2020c, Estudio de la Vida Útil da estrutura: Barragem de Relaves de la Unidad El Porvenir.

Nexa Resources S.A., 2020d, Plan de minado 2020 El Porvenir, including:

- Ventilación El Porvenir (Memo),
- Sistema de drenaje y bombeo (Memo)
- Relleno hidráulico (Memo)
- Sistema de suministro de energía eléctrica (Memo)
- Marketing and Metal Price Assumptions (Memo)
- Smelter Terms and Concentrate Marketing (Memo)

Nexa Resources S.A., 2020e, Informe Anual – Aseguramiento y Control de Calidad 2020.

Nexa Resources S.A., 2020f: Market Intelligence team, Industry Scenario 2020 – Supply and Costs presentation (July 2020).

Nexa Resources S.A., 2020g: Form 20-F for fiscal year end December 31, 2019 filed with United States Securities and Exchange Commission

Nexa Resources S.A., 2020h, Geotechnical Studies, including:

- Analisis de Estabilidad para la Aplicación del Metodo de Minado Sub Level Stoping en la Veta CN-03 Nv. -890/-910, El Porvenir Mine, April 15, 2020.
- Analisis de Estabilidad para la Aplicación del Metodo de Minado Sub Level Stoping en la Veta Carmen Cola Nv. 3470/3450., El Porvenir Mine, December 14, 2020.
- Determinación del Pilar Veta Éxito NV. 3550 (Rib Pillar), El Porvenir Mine September 2020.
- Determinación de la Longitud Maxima Abierta para El Minado SLS de la Veta Éxito NV. 3370, El Porvenir Mine, May 2020.
- Determinación del Pilar Corona para el Minado del Stope Porvenir 3 – Zona Alta, El Porvenir Mine, March 2020.

Nexa Resources S.A., 2021, Estudio Geomecánico Cuerpo Don Ernesto, El Porvenir Mine, January 2021.

Peterson, U., 1999, Magmatic and metallogenic evolution of the Central Andes. In Geology and ore deposits of the Central Andes (Skinner, B.; editor). Society of Economic Geology, Special Publication, No. 7, pp. 109-153.

Roscoe Postle Associates Inc. (RPA), 2019: Technical Report on the Atacocha Mine, Pasco Province, Central Peru, a NI 43-101 Technical Report prepared for Nexa Resources S.A., March 22, 2019.

Saez, F. et al, 2017, Independent Technical Report pursuant to NI 43-101 of Canadian Sec. Admin. For El Porvenir Mine, Peru, SRK Consulting (Peru) S.A., effective date June 30, 2017.

Schlumberger Water Services, 2012, Actualización de Plan de Cierre de Minas Unidad Minera El Porvenir (U.E.A. Milpo No. 1), Report No. 51739 prepared for Compañía Minería Milpo S.A.A., June 2012.

Soler and Bonhomme, 1988: Oligocene magmatic activity and associated mineralization in the polymetallic belt of central Peru. Economic Geology, 83(3), 657-663.

SRK Consulting (Peru) S.A., 2017, Independent Technical Report pursuant to National Instrument 43-101 of the Canadian Securities Administrators for El Porvenir Mine, Perú, prepared for VM Holding S.A., filed on SEDAR/ available at www.sedar.com (August 15, 2017).

Stuart, L., 2020, Getting the message across, CIM Magazine.

Transmin Metallurgical Consultants, 2018, Estudio Geometalúrgico Preliminar para Unidad Minera El Porvenir, prepared for Nexa Resources S.A. (June 15, 2018).

Transmin Metallurgical Consultants, 2019, Estudio Geometalúrgico Fase 2 para Unidad Minera El Porvenir, prepared for Nexa Resources Peru S.A. (April 29, 2019).

Transmin Metallurgical Consultants, 2020, Estudio Geometalúrgico Fase 3 para Unidad Minera El Porvenir, prepared for Nexa Resources Peru S.A. (May 18, 2020).

US Securities and Exchanges Commission, 2018: Regulation S-K, Subpart 229.1300, Item 1300 Disclosure by Registrants Engaged in Mining Operations.

US Securities and Exchange Commission, Form 20-F Nexa Resources S.A., for fiscal year end December 31, 2019.

25.0 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

This report has been prepared by SLR for Nexa. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to SLR at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Nexa and other third party sources.

For the purposes of the Summary and Section 3 of this Technical Report Summary, SLR has relied on ownership information provided in an internal legal opinion by Magaly Bardales, Legal Corporate Manager and Institutional Affairs dated August 16, 2020 (Nexa, 2020a). SLR has not researched property title or mineral rights for the El Porvenir Mine as we consider it reasonable to rely on Nexa's legal counsel who is responsible for maintaining this information.

SLR has relied on Nexa for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Mine in the Summary and Section 19. As the Mine has been in operation for over ten years, Nexa has considerable experience in this area.

The Qualified Persons have taken all appropriate steps, in their professional opinion, to ensure that the above information from Nexa is sound.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

26.0 DATE AND SIGNATURE PAGE

This report titled “Technical Report Summary on the El Porvenir Mine, Department of Pasco, Peru” with an effective date of December 31, 2020 was prepared and signed by:

SLR Consulting (Canada) Ltd. **(Signed) *SLR Consulting (Canada) Ltd.***

Dated at Toronto, ON
January 15, 2021

www.slrconsulting.com