



**Annual Information Form**  
**For the Year Ended December 31, 2018**  
**March 29, 2019**

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## DEFINITIONS

In this Annual Information Form all units are presented in accordance with the International System of Units (i.e., metric) unless otherwise noted. Abbreviations are as defined below unless the context otherwise indicates:

**\$** means United States dollars.

**€** means the Euro.

**2022 Notes** means the Company's 7.7875% senior secured notes in the aggregate principal amount of \$450 million due 2022, which were repaid in full on November 21, 2018.

**Ag** means silver.

**Aguablanca** or **Aguablanca Mine** means the Aguablanca nickel and copper mine located approximately 100 km north of Seville in the Extremadura region of southern Spain, which was disposed of during 2016.

**AIF** means this Annual Information Form.

**BHR** or **BHR Partners** means BHR Newwood Investment Management Limited, a British Virgin Islands company.

**Board** or **Board of Directors** means the board of directors of the Company.

**C\$** means Canadian dollars.

**Candelaria** or **Candelaria Mine** or **Candelaria Copper Mining Complex** means the open pit and underground mines and related infrastructure located near Copiapó in the Atacama Province, Region III of Chile owned by Minera Candelaria and Minera Ojos del Salado.

**Candelaria 2030 EIA** means the EIA entitled "Candelaria 2030 - Project Operational Continuity", which was submitted to the environmental authorities in September 2013 and approved on July 23, 2015.

**Candelaria Report** means the NI 43-101 technical report entitled "Technical Report for the Candelaria Copper Mining Complex, Atacama Region, Region III, Chile" dated effective November 28, 2018 prepared for Lundin Mining by Glen Cole, PGeo, Benny Zhang, PEng, John Nilsson, PEng, Adrian Dance, PEng, and Cameron C. Scott, PEng, each of whom is a Qualified Person.

**Cash costs** means the costs of mining, milling and concentrating, onsite administration and general expenses, property and production royalties not related to revenues or profits, metal concentrate treatment charges, and freight and marketing costs less the net value of by-product credits. Cash costs are a non-GAAP financial measure. See "Introduction – Non-GAAP Performance Measures".

**CBCA** means the *Canada Business Corporations Act*.

**CCAA** means *Companies' Creditors Arrangement Act*.

**CIM** means the Canadian Institute of Mining, Metallurgy and Petroleum.

**CIM Standards** means the definitions adopted by the CIM Council on May 10, 2014, which are utilized by the Canadian Securities Administrators in NI 43-101.

**CLP** means Chilean Peso.

**CMOC** means China Molybdenum Co., Ltd.

**Company** or **Lundin Mining** means Lundin Mining Corporation, and where applicable, includes its subsidiaries.

**Credit Agreement** means the amended and restated credit agreement dated October 7, 2013, as amended on October 27, 2014, January 13, 2015, April 27, 2015, October 19, 2016 and October 19, 2018, between the Company and a banking syndicate comprised of The Bank of Nova Scotia, ING Capital LLC, Bank of Montreal, The Toronto-Dominion Bank, Export Development Canada, Bank of America, N.A., Canada Branch, Société Générale and Skandinaviska Enskilda Banken AB.

**Cu** means copper.

**DRC** means Democratic Republic of the Congo.

**Eagle** or **Eagle Mine** or **Eagle Project** means the Eagle nickel and copper mine located in the Upper Peninsula of Michigan, USA, in Michigamme Township, Marquette County.

**Eagle East** means the high-grade massive and semi-massive nickel-copper sulphide mineralisation approximately 2 km east of the Eagle deposit.

**Eagle Report** means the NI 43-101 technical report entitled “NI 43-101 Technical Report on the Eagle Mine, Michigan, USA” dated April 26, 2017, prepared for Lundin Mining by Graham G. Clow, PEng, Normand L. Lecuyer, P.Eng, David W. Rennie, P.Eng, and Brenna J.Y. Scholey, P.Eng, each of whom is a Qualified Person.

**EDM** means Empresa de Desenvolvimento Mineiro, SA.

**EIA** means, with respect to Candelaria, Environmental Impact Study (Estudio de Impacto Ambiental) and, with respect to Neves-Corvo, an Environmental Impact Study.

**EuroZinc** means EuroZinc Mining Corporation, which was acquired by the Company on October 31, 2006 and subsequently amalgamated with the Company effective November 30, 2006.

**Feasibility Study** is as defined by CIM and contained in the CIM Standards.

**Freeport** means Freeport-McMoRan Inc., a US-based international mining company, which owns Freeport Cobalt and owned the majority interest in TF Holdings to November 16, 2016 and was indirectly the majority owner and operator of TFM and, where applicable, includes its subsidiaries to November 16, 2016.

**Franco-Nevada** means Franco-Nevada Corporation.



**Freeport Cobalt** means Freeport Cobalt Oy, a large-scale cobalt chemical refinery located in Kokkola, Finland and its related sales and marketing companies.

**Galmoy** or **Galmoy Mine** means the Galmoy mine located in County Kilkenny, Ireland, which was disposed of by Lundin Mining in March 2017.

**Gécamines** means La Générale des Carrières et des Mines, the government of the DRC state mining company.

**G&A** means general and administrative.

**ha** means hectare.

**Indenture** means the indenture dated October 27, 2014 between the Company and U.S. Bank National Association, as trustee.

**IOCG** means iron oxide copper gold.

**km** means kilometre.

**Lakota** means Lakota Resources Inc.

**LOM** means life of mine estimate.

**Lundin DRC Holdings Ltd.** means a Bermuda company indirectly owned by the Company that owned 30% of TF Holdings and was disposed of in April 2017.

**m** means metre.

**mamsl** means metres above mean sea level and is a standard metric measurement in metres of vertical distance (height, elevation or altitude) of a location in reference to a historic mean sea level taken as a vertical datum.

**Mandate** means the Company's audit committee mandate.

**MCP** means mine closure plan.

**MD&A** means Management's Discussion and Analysis of results of operations and financial condition of the Company.

**Minera Candelaria** or **CCMC** means Compañía Contractual Minera Candelaria.

**Minera Ojos del Salado** or **CCMO** means Compañía Contractual Minera Ojos del Salado.

**Mineral Reserves** are defined under the CIM Standards as set out under "Introduction – CIM Definition Standards".

**Mineral Resources** are defined under the CIM Standards as set out under "Introduction – CIM Definition Standards".

**mm** means millimetre.

**Modifying Factors** are defined under the CIM Standards as set out under “Introduction – CIM Definition Standards”.

**mtpa** means million tonnes per annum.

**Neves-Corvo** or **Neves-Corvo Mine** means the copper and zinc mine situated approximately 220 km southeast of Lisbon in the Alentejo district of southern Portugal.

**Neves-Corvo Report** means the NI 43-101 technical report entitled “NI 43-101 Technical Report for the Neves-Corvo Mine, Portugal” dated June 23, 2017 prepared for Lundin Mining by Richard Ellis, BSc, MSc (MCSM), CGeol, EurGeol, FGS, and Phil Newall, BSc (ARSM), PhD (ACSM), CEng, FIMMM, each of whom is a Qualified Person.

**Ni** means nickel.

**NI 43-101** means National Instrument 43-101 “Standards for Disclosure for Mineral Projects” adopted by the Canadian Securities Administrators.

**NI 52-110** means National Instrument 52-110 “Audit Committees” adopted by the Canadian Securities Administrators.

**North Australia** means North Limited of Australia.

**NSR** means net smelter return.

**Ojos Mine** means the Santos and Alcaparrosa underground mines and related infrastructure owned by Minera Ojos del Salado and forming part of the Candelaria Copper Mining Complex.

**Order** means (i) a cease trade order; (ii) an order similar to a cease trade order; or (iii) an order that denied the relevant company access to any exemption under securities legislation that was in effect for a period of more than 30 consecutive days.

**oz** means one troy ounce weighing 31.10348 grams.

**PAC** means Pedro Aguirre Cerde, a concentrator located at Candelaria.

**Pb** means lead.

**PGM** means platinum group metals.

**Phelps Dodge** means Phelps Dodge Corporation, a copper mining company which was acquired by Freeport in 2007.

**Preliminary Economic Assessment** or **PEA** is as defined in NI 43-101.

**Purchase and Sale Agreement** means the purchase and sale agreement dated October 6, 2014 among the Company, LMC Bermuda Ltd., Franco-Nevada and Franco-Nevada (Barbados) Corporation effective as of July 28, 2015 and as amended on November 4, 2016 and June 20, 2017.

**QA/QC** is the combination of quality assurance, the process or set of processes used to measure and assure the quality of a product, and quality control, the process of ensuring products and services meet consumer expectations.

**QEMSCAN™** Quantitative Evaluation of Minerals by SCANNing electron microscopy.

**Qualified Person** means a qualified person as defined in NI 43-101.

**RBI** means RB Energy Inc.

**Rio Tinto** means the Rio Tinto Group.

**SAG** means semi-autogenous grinding.

**SEC Guide 7** means the United States Securities and Exchange Commission Guide 7 under the United States Securities Act of 1933, as amended.

**SEDAR** means the System for Electronic Document Analysis and Retrieval.

**SEK** means Swedish kronor.

**SERNAGEOMIN** means Chile's Servicio Nacional de Geología y Minería.

**SG** means specific gravity.

**Sirocco** means Sirocco Mining Inc.

**Somincor** means Sociedade Mineira de Neves-Corvo, S.A. (Portugal), a wholly-owned indirect subsidiary of the Company that owns the Neves-Corvo Mine located in Portugal.

**Stock Purchase Agreement** means the definitive stock purchase agreement dated October 6, 2014 between the Company and a subsidiary of Freeport for the purchase of Candelaria from Freeport which was completed on November 3, 2014.

**Stock Purchase Agreement – BHR** means the definitive stock purchase agreement dated November 15, 2016 between the Company, Tenke Holdings Ltd. and BHR for the sale of the Company's indirect interest in TF Holdings.

**Sumitomo** means Sumitomo Metal Mining Co., Ltd. and Sumitomo Corporation and, where applicable, includes their subsidiaries.

**TC/RC** means Treatment Charge (TC) and Refining Charge (RC).

**Technical Reports** means the Candelaria Report, Eagle Report, Neves-Corvo Report, and Zinkgruvan Report.

**Tenke or Tenke Fungurume or Tenke Fungurume Mine** means the Tenke copper and cobalt mine located in the southeast region of the DRC (formerly, Katanga Province), which was disposed of by the Company during 2017.

**TF Holdings** means TF Holdings Limited (formerly, Lundin Holdings Ltd.), a Bermuda company owned 30% by Lundin DRC Holdings Ltd. and 70% by CMOC International DRC Holding Ltd., a wholly-owned subsidiary of CMOC, which owns a controlling 80% interest in TFM.

**TFM** means Tenke Fungurume Mining SA, a Congolese company that owns the Tenke Fungurume mine.

**tpa** means tonnes per annum.

**tpd** means tonnes per day.

**TSF** means tailings storage facility.

**TSX** means the Toronto Stock Exchange.

**TSX-V** means the TSX Venture Exchange.

**US** means the United States.

**Wheaton PMC** means Wheaton Precious Metals Corporation (formerly Silver Wheaton Corp. and Silverstone Resources Corp.).

**ZEP or Zinc Expansion Project** means the construction project at Neves-Corvo to increase zinc mining and processing capacity to approximately 2.5 mtpa generating an average of 150,000 tonnes per annum of zinc in concentrate over 10 years.

**Zinkgruvan or Zinkgruvan Mine** means the Zinkgruvan zinc and lead mine located approximately 250 km south-west of Stockholm in south-central Sweden.

**Zinkgruvan Report** means the NI 43-101 technical report entitled “NI 43-101 Technical Report for the Zinkgruvan Mine, Sweden” dated November 30, 2017 prepared for Lundin Mining by Richard Ellis, BSc, MSc (MCSM), CGeol, EurGeol, FGS, Philip King, BSc, CEng, FIMMM, and Tim Daffern, BEng, CEng, MBA, FIMMM, FAusIMM, MSME, MCIM, ACSM, each of whom is a Qualified Person.

**Zn** means zinc.

## CAUTIONARY STATEMENT ON FORWARD-LOOKING INFORMATION

Certain of the statements made and information contained herein is “forward-looking information” within the meaning of applicable Canadian securities laws. All statements other than statements of historical facts included in this AIF, including but not limited to statements regarding the prospects of the industry and the Company’s prospects, plans, future financial and operating performance and business strategy, constitute forward-looking information. Forward-looking information is based on current expectations, estimates, forecasts and projections as well as beliefs and assumptions made by the Company’s management. Such statements include, in particular, statements about the Company’s plans, prospects, position, future results, and business strategies; the timing and amount of future production; costs of production; permitting timelines; timing and possible outcome of pending litigation (including but not limited to that described under “Legal Proceedings” section of this AIF); the Company’s Technical Reports, or any Preliminary Economic Assessment (or PEA) or Feasibility Study, including, without limitation, with respect to Mineral Resource and Mineral Reserve estimates, life of mine estimates (or LOM), and mine and mine closure plans (or MCPs); the parameters and assumptions underlying the Mineral Resource and Mineral Reserve estimates and financial analysis; anticipated market prices of metals, currency exchange rates, and interest rates; the Company’s anticipated capital and operating costs for its material mineral properties; the development and implementation of the Company’s Responsible Mining Management System; the Company’s ability to comply with contractual and permitting or other regulatory requirements; the receipt and maintenance of all necessary permitting and approvals; the Company’s intentions with respect to exploration and development activities at its projects (including but not limited to Eagle East and ZEP at Neves-Corvo); and expectations regarding the results of operations and production at the Company’s mines. Words such as “anticipate”, “assumption”, “continue”, “contingent”, “endeavour”, “estimate”, “expect”, “exploration”, “feasibility”, “flexibility”, “forecast”, “focus”, “foresee”, “future”, “guidance”, “initiative”, “intend”, “likely”, “model”, “objective”, “opportunity”, “option”, “outlook”, “PEA”, “phase”, “plan”, “potential”, “predict”, “preliminary”, “project”, “probable”, “proposed”, “prospect”, “risk”, “seek”, “strategy”, “study”, “target” or “uncertainty”, or any similar terminology or statements that certain actions, events or results “could”, “may”, “might”, “should”, “would”, or “will” be taken, occur, or be achieved, or the negatives or variations of any of the foregoing terms or expressions, are intended to identify such forward-looking information. Forward-looking information is based on various factors and assumptions including, without limitation, the expectations and beliefs of management that the Company can access financing, appropriate equipment and sufficient labour, future price of metals, anticipated costs, ability to achieve goals, and that the political environment in which the Company operates will continue to support the development and operation of mining projects. Certain important factors that could cause actual results, performance or achievements to differ materially from those in the forward-looking statements include, among others, metal price volatility, discrepancies between actual and estimated production, Mineral Reserve and Mineral Resource estimates, and metallurgical recoveries, mining operational and development risks, litigation risks, regulatory restrictions (including environmental regulatory restrictions and liability), changes in national and local government legislation, taxation, controls or regulations and/or change in the administration of laws, policies and practices, expropriation or nationalization of property and political or economic developments in jurisdictions in which the Company carries on business, or may carry on business in the future, delays, suspensions or technical challenges associated with capital projects, higher prices for fuel, steel, power, labour and other consumables, currency fluctuations, the speculative nature of mineral exploration, the global economic climate, dilution, share price volatility, competition, loss of key employees, additional funding requirements and defective title to mineral claims or property. Although the Company believes that the expectations reflected in the forward-looking information contained herein are reasonable, these statements, by their nature, involve risks and uncertainties and are not guarantees of future performance. Although the Company has attempted to identify important factors that could cause actual results to differ materially from those contained in forward-looking information, there may be other factors that cause results not to be as anticipated, estimated, forecast or intended.

Forward-looking information and statements are subject to a variety of known and unknown risks and uncertainties, and ultimately, actual events or results may differ materially from those reflected in the forward-looking information. Risks and uncertainties that may impact the Company’s performance include, without limitation, risks associated with operating in foreign countries; uncertain political and economic environments; community activism, shareholder activism and risks related to negative publicity with respect to the Company or the mining industry in general; changes in laws, regulations or policies including but not limited to those related to permitting and approvals, environmental management, labour, trade relations, and transportation; risks associated with business arrangements and partners over which the Company does not have full control; risks associated with acquisitions and related integration efforts; competition; development or mining results not being consistent with the Company’s expectations; estimates of future production; operating and cash costs estimates; allocation of resources and capital; litigation; uninsurable risks; volatility in metal prices; the estimation of asset carrying values; funding requirements and availability of financing; indebtedness; foreign currency fluctuations; interest rate volatility; changes in the Company’s share price, and equity markets, in general; changing taxation regimes; counterparty and credit risks; health and safety risks; risks related to the environmental impact of the Company’s operations and products and management thereof; unavailable or inaccessible infrastructure and risks related to ageing infrastructure; risks inherent in mining including but not limited to risks to the environment, industrial accidents, catastrophic equipment failures, unusual or unexpected geological formations, or unstable ground conditions; actual ore mined varying from estimates of grade, tonnage, dilution and metallurgical and other characteristics; ore processing efficiency; risks relating to attracting and retaining of highly skilled employees; ability to retain key personnel; the potential for and effects of labour disputes (including but not limited to at Neves-Corvo) or other unanticipated difficulties with or shortages of labour or interruptions in production; the price and availability of energy and key operating supplies or services; the inherent uncertainty of exploration and development, and the potential for unexpected costs and expenses; risks associated with the estimation of Mineral Resources and Mineral Reserves and the geology, grade and continuity of mineral deposits including but not limited to models relating thereto; natural phenomena such as earthquakes, flooding, and unusually severe weather; potential for the allegation of fraud and corruption involving the Company, its customers, suppliers or employees, or the allegation of improper or discriminatory employment practices, or human rights violations; security at the Company’s operations; breach or compromise of key information technology systems; materially increased or unanticipated reclamation obligations; risks related to mine closure activities; risks related to closed and historical sites; title risk and the potential of undetected encumbrances; risks associated with the structural stability of waste rock dumps or tailings storage facilities; and other risks and uncertainties, including but not limited to those described in the “Risk and Uncertainties” section of this AIF and the “Managing Risks” section of the Company’s annual MD&A, which are available on SEDAR at [www.sedar.com](http://www.sedar.com) under the Company’s profile. Readers are cautioned that the foregoing list is not exhaustive of all factors and assumptions which may have been used. Should one or more of these risks and uncertainties materialize, or should underlying assumptions prove incorrect, actual results may vary materially from those described in forward-looking information. Accordingly, there can be no assurance that forward-looking information will prove to be accurate, and so readers are advised not to place undue reliance on forward-looking information. The forward-looking information contained herein speaks only as of the date of this AIF. The Company does not undertake to update such forward-looking information unless required under applicable laws.

## 1. INTRODUCTION

### 1.1 Date of Information

All information in this AIF is as of December 31, 2018 unless otherwise indicated.

### 1.2 Currency

The Company reports its financial results and prepares its financial statements in US dollars. All currency amounts in this AIF are expressed in US dollars, unless otherwise indicated. The period-end US dollar exchange rates for the Company's principal operating currencies and for the Canadian dollar were as follows:

<b>As at December 31</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>
Canadian dollar (C\$)	1.3642	1.2518	1.3427
Chilean Peso (CLP)	694.77	614.75	669.47
Euro (€)	0.8734	0.8338	0.9487
Swedish krona (SEK)	8.9710	8.2322	9.0971

### 1.3 Accounting Policies and Financial Information

Financial information is presented in accordance with International Financial Reporting Standards as issued by the International Accounting Standards Board and with interpretations of the International Financial Reporting Interpretations Committee which the Canadian Accounting Standards Board has approved for incorporation into Part 1 of the CPA Canada Handbook – Accounting.

### 1.4 Technical Information

Where Mineral Resources are stated alongside Mineral Reserves, those Mineral Resources are inclusive of, and not in addition to, the stated Mineral Reserves. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. The estimates of Mineral Reserves and Mineral Resources discussed in this AIF may be affected by environmental, permitting, legal, title, taxation, sociopolitical, marketing and other relevant issues. The Company's current Technical Reports, which are available on SEDAR under the Company's profile at [www.sedar.com](http://www.sedar.com), contain further details regarding Mineral Reserve and Mineral Resource estimates, classification, reporting parameters, key assumptions and risks for each of the Company's material mineral properties.

Any Preliminary Economic Assessment is preliminary in nature and this AIF refers to Preliminary Economic Assessments that are based on Inferred Mineral Resources that are considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves and there is no certainty that the Preliminary Economic Assessment will be realized.



Unless otherwise stated, the scientific and technical information in this AIF has been reviewed and approved by Mr. Stephen Gatley, Vice President, Technical Services of Lundin Mining and Mr. Graham Greenway, Group Resource Geologist of Lundin Mining. Each is a “Qualified Person” under NI 43-101. Messrs. Gatley and Greenway are not independent of Lundin Mining for purposes of NI 43-101 as Mr. Gatley is an officer of Lundin Mining and Mr. Greenway is Group Resource Geologist of the Company.

## 1.5 CIM Definition Standards

In this AIF, the definitions of Proven and Probable Mineral Reserves and Measured, Indicated and Inferred Mineral Resources are those used by Canadian Securities Administrators and conform to the definitions utilized by the CIM in the CIM Standards. The Mineral Reserves and Mineral Resources estimations for the Candelaria, Eagle, Neves-Corvo and Zinkgruvan mines have been prepared in accordance with the CIM Standards that are incorporated by reference in NI 43-101. The following definitions are reproduced from the CIM Standards:

A “**Mineral Resource**” is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

An “**Inferred Mineral Resource**” is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An “**Indicated Mineral Resource**” is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors (as defined below) in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

A “**Measured Mineral Resource**” is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.

A “**Mineral Reserve**” is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at pre-feasibility or feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported. The public disclosure of a Mineral Reserve must be demonstrated by a pre-feasibility study or feasibility study.

A “**Probable Mineral Reserve**” is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.

A “**Proven Mineral Reserve**” is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.

For the purposes of the CIM Definition Standards, “**Modifying Factors**” are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social and governmental factors.

## 1.6 Non-GAAP Performance Measures

The Company uses certain performance measures in its analysis. These performance measures have no meaning within generally accepted accounting principles under International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board and, therefore, amounts presented may not be comparable to similar data presented by other mining companies. This data is intended to provide additional information and should not be considered in isolation or as a substitute for measures of performance prepared in accordance with IFRS. The following are non-GAAP measures that the Company uses as key performance indicators: net cash, operating cash flow per share, capital expenditures and cash cost per pound and all-in sustaining costs per pound. For a description and reconciliation of non-GAAP measures, please refer to Lundin Mining’s MD&A which is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).

## 1.7 Other

The Company’s website is provided herein for informational purposes only. Information contained on the Company’s website should not be deemed to be a part of this AIF.



## 2. CORPORATE STRUCTURE

### 2.1 Name, Address and Incorporation

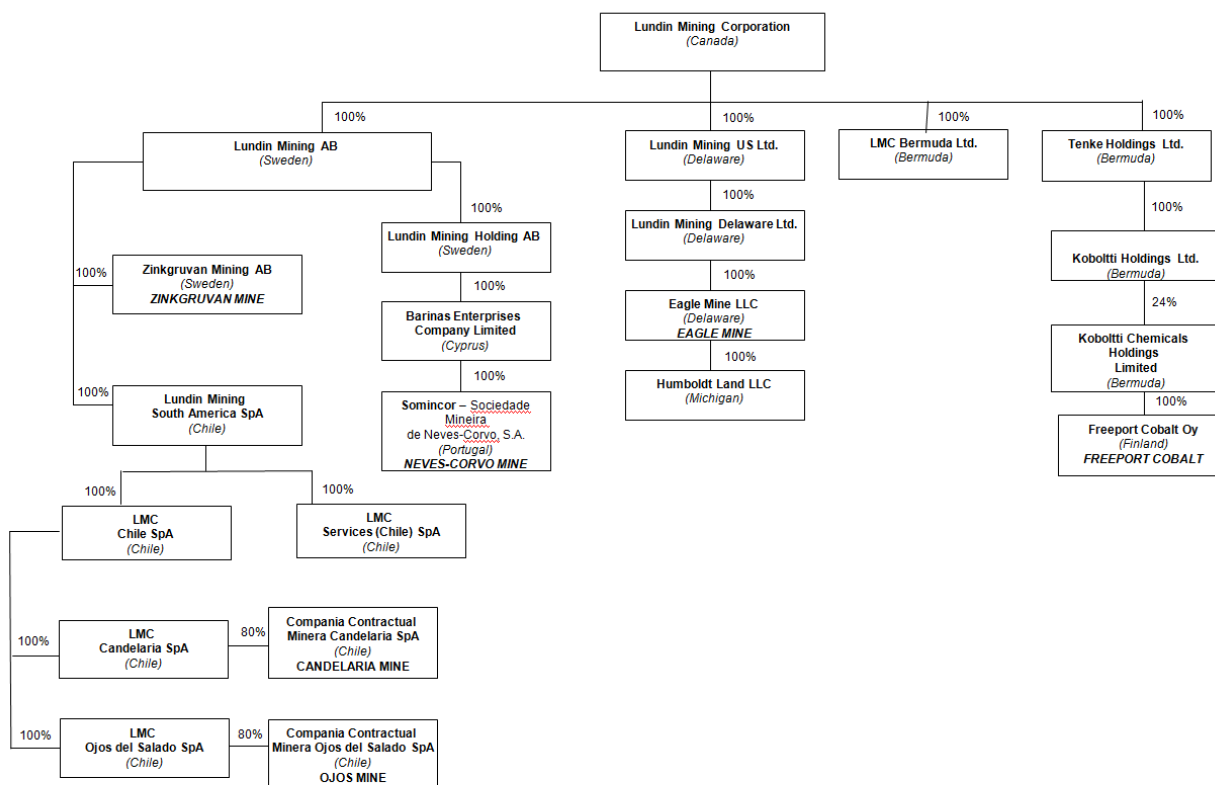
Lundin Mining was incorporated by Articles of Incorporation on September 9, 1994, under the CBCA as “South Atlantic Diamonds Corp.” and subsequently changed its name to “South Atlantic Resources Ltd.” on July 30, 1996, and to “South Atlantic Ventures Ltd.” on March 25, 2002. The Company changed its name to “Lundin Mining Corporation” on August 12, 2004.

The Company amalgamated with EuroZinc effective November 30, 2006 and with Tenke Mining Corp. effective July 31, 2007.

The Company’s registered and records office and corporate head office is located at 150 King Street West, Suite 2200, Toronto, Ontario, Canada M5H 1J9.

### 2.2 Inter-Corporate Relationships

A significant portion of the Company’s business is carried on through its various subsidiaries. The following chart illustrates the Company’s material subsidiaries, including their respective jurisdiction of incorporation and the percentage of votes attaching to all voting securities of each subsidiary that are beneficially owned, controlled or directed, directly or indirectly, by the Company as at December 31, 2018:



### **3. GENERAL DEVELOPMENT OF THE BUSINESS**

#### **3.1 Three Year History**

##### **Recent Developments Subsequent to 2018**

- On January 9, 2019, Candelaria secured a fixed term loan (the “loan”) in the amount of \$35 million. The loan accrues interest at a rate of 3.1% per annum, with interest payable upon maturity, on January 6, 2020.

##### **2018**

- On April 26, 2018, pursuant to the 2022 Notes Indenture, the Company issued a tender to purchase any and all of its \$450 million aggregate principal amount of 2022 Notes at par plus accrued interest. A principal amount of \$10.8 million was tendered and accepted.
- On July 25, 2018, the Company announced that Paul Conibear, President and Chief Executive Officer, would retire by the end of the year and that following the Board’s succession planning process, Marie Inkster, Senior Vice-President and Chief Financial Officer was selected to assume the role of President and Chief Executive Officer upon his retirement. Mr. Conibear’s retirement and the appointment of Ms Inkster occurred on September 30, 2018.
- On July 26, 2018, the Company announced it had formally commenced an offer to acquire all of the issued and outstanding shares of Nevsun Resources Ltd. (“Nevsun”) for C\$4.75/share in cash. The bid expired on November 9, 2018 in accordance with its terms and no shares were taken up.
- On September 6, 2018, the Company reported its Mineral Resource and Mineral Reserve estimates as at June 30, 2018. On a consolidated and attributable basis, estimated contained metal in the Proven and Probable Mineral Reserve categories totaled 3,672,000 tonnes of copper, 3,374,000 tonnes of zinc and 108,000 tonnes of nickel. See Schedule “A” attached to this AIF.
- On October 1, 2018, the Company announced the appointment of Jinhee Magie, previously Lundin Mining’s Vice President of Finance, as Senior Vice President and Chief Financial Officer and Peter Rockandel as Senior Vice President, Corporate Development and Investor Relations.
- On October 22, 2018, the Company issued a notice for early redemption of the remaining 2022 Notes in accordance with the Indenture. It was also announced that the Company had executed an amending agreement to its revolving credit facility (the “Facility”) that increased the Facility to \$550 million with a \$50 million accordion option, reducing the costs of borrowing and extending the term to October 2022, from June 2020.
- On November 21, 2018, the redemption of all of the outstanding 2022 Notes was completed at a redemption price of 103.94% of the principal amount plus accrued and unpaid interest.

- On November 28, 2018 the Company filed an updated Technical Report for the Candelaria Copper Mining Complex in Chile.
- On December 4, 2018, the Company announced that the TSX had accepted notice of the Company's intention to commence a normal course issuer bid ("NCIB"). The approval allows the Company to purchase up to 63,718,842 common shares of the Company over a period of twelve months commencing on December 7, 2018, though no shares have been purchased to date. The NCIB will expire no later than December 6, 2019.

## 2017

- On February 22, 2017, the Company declared its first dividend of C\$0.03 per share for payment in April 2017.
- On March 22, 2017, all of the issued and outstanding shares of Galmoy Mines Limited, the owner of the Galmoy Mine, were sold to an affiliate of the Lanes Group plc, who assumed all of the assets and liabilities of Galmoy Mines Limited.
- On April 19, 2017 the Company completed the sale of its indirect interest in TF Holdings to an affiliate of BHR Partners for \$1.136 billion. The Company's effective 24% interest in Tenke was held through its 30% indirect interest in TF Holdings.
- On April 27, 2017, the Company filed an updated Technical Report for the Eagle Mine. The Eagle Report incorporates updates to Eagle Mine's operations and the results of a Feasibility Study on the high-grade Eagle East nickel/copper mineralization. Refer to the news release of the same date entitled "Lundin Mining Files Updated Technical Report for the Eagle Mine, which is available on SEDAR under the Company's profile at [www.sedar.com](http://www.sedar.com).
- On May 11, 2017, the Company reported the results of a Feasibility Study on the ZEP at its Neves-Corvo mine. Refer to the news release of the same date entitled "Lundin Mining Announces Neves-Corvo Zinc Expansion Project Feasibility Study Results", which is available on SEDAR under the Company's profile at [www.sedar.com](http://www.sedar.com). On June 23, 2017, the Company filed an updated Technical Report for the Neves-Corvo Mine in Portugal, incorporating the results of the Zinc Expansion Project Feasibility Study previously announced on May 11, 2017. Refer to the news release entitled "Lundin Mining Files Updated Technical Report for the Neves-Corvo Mine" dated June 23, 2017, which is available on SEDAR under the Company's profile at [www.sedar.com](http://www.sedar.com).
- On November 20, 2017, the Company redeemed all of its 7.50% Senior Secured Notes due 2020 at the redemption price of 103.75% of the principal amount of the 7.50% Senior Secured Notes due 2020 for a total redemption price of \$570.6 million plus accrued and unpaid interest in accordance with the Indenture.
- On November 30, 2017, the Company filed an updated Technical Report for the Candelaria Copper Mining Complex in Chile, and an updated Technical Report for the Zinkgruvan Mine in Sweden. Refer to the news release of the same date entitled

“Lundin Mining Files Updated Technical Reports for Candelaria and Zinkgruvan”, which is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).

## 2016

- On May 9, 2016, the Company received notice from Freeport that it had entered into an agreement to sell its indirect interest in TF Holdings to CMOC, subject to the Company’s right of first offer to acquire Freeport’s indirect interest in TF Holdings.
- On June 29, 2016, the Company reported a maiden Inferred Mineral Resource estimate for Eagle East. Eagle East is located 2 km east and 650 m below the Eagle deposit. The Company also announced the results of a Preliminary Economic Assessment that indicated the Inferred Mineral Resources could potentially be mined with no significant changes to then current mine, ore transport, mill and tailings disposal infrastructure. Given the results of the Preliminary Economic Assessment, the Company initiated a Feasibility Study on Eagle East. Refer to the news release of the same date entitled “Lundin Mining Announces Eagle East Mineral Resources, PEA Results and Project Commencement”, which is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).
- On October 20, 2016, the Company executed an amending agreement to its \$350 million revolving credit facility that reduced the costs of borrowing and extended the term to June 2020, from October 2017.
- On November 15, 2016, the Company entered into the Stock Purchase Agreement - BHR to sell its indirect interest in the Tenke Fungurume Mine by selling its indirect shareholdings in TF Holdings to an affiliate of BHR Partners, a Chinese private equity firm, for \$1.136 billion in cash and contingent consideration of up to \$51.4 million, consisting of \$25.7 million if the average copper price exceeds \$3.50 per pound and \$25.7 million if the average cobalt price exceeds \$20 per pound, both during a 24-month period beginning on January 1, 2018. In connection with its announced sale, Lundin Mining waived its right of first offer which allowed Freeport to complete its sale of its interest to CMOC on November 16, 2016.
- On November 30, 2016, the Company announced that the Board of Directors approved a dividend policy (the “Dividend Policy”) providing for the payment of a regular quarterly dividend of C\$0.03 per common share commencing in 2017, subject to Board approval.
- On November 29, 2016, the Company divested of Aguablanca in Spain through the transfer of all the shares of Rio Narcea Recursos S.A. (“RNR”) to Valoriza Minería, a subsidiary of Grupo Sacyr. The assets of RNR included the Aguablanca nickel and copper mine in Southern Spain, and other exploration licenses. The Company provided funding of approximately €30 million to support environmental, employee and other liabilities.

## 4. DESCRIPTION OF THE BUSINESS

Lundin Mining is a diversified Canadian base metals mining company with operations in Chile, the US, Portugal, and Sweden, primarily producing copper, zinc and nickel. In addition, Lundin Mining holds an indirect 24% equity stake in the Freeport Cobalt business, which includes a cobalt refinery located in Kokkola, Finland.

### 4.1 Principal Products and Operations

Lundin Mining's principal products and sources of sales are copper, zinc, and nickel concentrates from Candelaria, Eagle, Neves-Corvo and Zinkgruvan. Lundin Mining also holds a minority interest in Freeport Cobalt. Information related to Lundin Mining's segmented information is set forth in Note 25 to the annual consolidated financial statements for the year ended December 31, 2018 and the MD&A for the year ended December 31, 2018, which discuss each operation that is separately defined as a segment. Both of these documents are filed on the Company's SEDAR profile at [www.sedar.com](http://www.sedar.com).

Production from operations was as follows:

<b>Contained metal in concentrate (tonnes)</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>
Copper <sup>(1)(2)</sup>	199,630	252,693	290,298
Zinc	152,041	149,319	148,050
Nickel	17,573	22,081	24,114

(1) Reflects 100% Candelaria production, which prior to 2018 was disclosed at 80% attributable.

(2) Inclusive of 24% of Tenke Fungurume Mine's copper production through to the sale, which was completed on April 19, 2017.

### 4.2 Employees

As of December 31, 2018, Lundin Mining had a total of approximately 3,347 employees and 5,556 contract employees located in Canada, Chile, Portugal, Sweden, United Kingdom, United States and other exploration locations for a total equivalent full-time employment of 8,903 people. This includes temporary personnel working on Eagle East, Candelaria Mill Optimization, Neves-Corvo Zinc Expansion Project and other company projects. The Company's success at mining and marketing its minerals is reliant on the services of key employees and contractors, as well as the development and continued relationships with certain third parties, including geologists, engineers, metallurgists and other personnel with specialized skill and knowledge. There remains demand for highly skilled, experienced and diverse workers in our industry despite the ongoing volatility in the resource industry. See "Risks and Uncertainties" below.

### 4.3 Foreign Operations

The Company currently owns, among other interests, 80% of Candelaria in Chile, 100% of Eagle Mine in the US, 100% of Neves-Corvo in Portugal, 100% of Zinkgruvan in Sweden and 24% of Freeport Cobalt in Finland. Candelaria, Eagle, Neves-Corvo and Zinkgruvan made up approximately 67.4%, 9.0%, 22.9% and 0.7%, respectively, of the Company's 2018 copper production. Neves-Corvo and Zinkgruvan made up approximately 49.6% and 50.4%, respectively, of the Company's 2018 zinc production. Eagle made up 100% of the Company's 2018 nickel production. The Company's operations are exposed to various levels of political, economic and other risks and uncertainties. These risks and uncertainties vary from country to country. Future development and operations may be affected in varying degrees by such factors as government

regulations (or changes thereto) with respect to restrictions on production, export controls, import restrictions, such as restrictions applicable to, among other things, equipment, services and supplies, taxes, expropriation of property, repatriation of profits, environmental legislation, land use, water use, surface land access, land claims of local people and mine safety. The effect of these factors cannot be accurately predicted. See “Risks and Uncertainties” below.

#### **4.4 Environmental Protection Requirements**

The Company’s mining, exploration and development activities are subject to various levels of federal, provincial, state and local laws and regulations relating to the protection of the environment, including requirements for other closure and reclamation of mining properties. The Company’s total liability for reclamation and closure cost obligations at December 31, 2018 was \$292 million. Reclamation payments for the year ended December 31, 2018 were \$11.8 million. See “Responsible Mining” below and the disclosure regarding environmental matters under the respective descriptions of the Company’s material mineral properties herein for further details regarding environmental matters.

#### **4.5 Responsible Mining**

Lundin Mining has adopted a responsible mining approach to managing health, safety, environment and communities (HSEC). This approach integrates HSEC considerations into all aspects of the business throughout all stages of the mining life-cycle.

Our Responsible Mining Policy (RMP) establishes the HSEC principles and commitments that guide the Company’s approach to responsibly operating and managing the Company’s business. These principles address key elements of responsible mining that include health and safety, environmental stewardship, social performance, economic contribution, compliance, and governance. The RMP was first issued in 2015 and was most recently updated in 2018.

The commitments established by the RMP are operationalized through the implementation of a Responsible Mining Management System (RMMS) standard. This standard sets specific HSEC management system requirements which are applicable to all Lundin Mining operations. The RMMS requirements are further supported through the issuance of specific technical standards that address key operational activities and risks such as community engagement, air quality, closure planning, fatality prevention, water management and tailings stewardship.

For the purpose of assurance, Company management regularly monitors, audits and reviews operational activities and performance against internal and external requirements, and the Company’s publicly report on the Company’s HSEC performance against objectives and targets.

For additional information on Lundin Mining’s RMP, RMMS and responsible mining performance, please consult the most recent Sustainability Report which is available on the Company’s website at [www.lundinmining.com](http://www.lundinmining.com).

#### **4.6 Competitive Conditions**

The Company competes with numerous other companies and individuals in the search for and the acquisition of financially attractive mineral properties. Lundin Mining’s ability to acquire mineral properties in the future will depend not only on its ability to develop its present properties, but also on its ability to select and acquire suitable producing properties or prospects for development or exploration. In addition, Lundin Mining also competes with other companies when sourcing goods



and services and supplies used in connection with mining operations, as well as for skilled experienced workers. See “Risks and Uncertainties”.

## **4.7 Description of Properties**

Lundin Mining’s material mineral properties are Candelaria, Eagle, Neves-Corvo and Zinkgruvan. The following summaries below are derived, in part, from the Technical Reports. The information below in this section has been prepared by Mr. Stephen Gatley, Vice President, Technical Services of the Company and Mr. Graham Greenway, Group Resource Geologist of the Company, each of whom is a Qualified Person. For more detailed information in respect of Lundin Mining’s material mineral properties, refer to the Technical Reports.

### **4.7.1 Candelaria Mine**

The Candelaria Mine is located in Chile and is indirectly owned by Lundin Mining (80%) and Sumitomo (20%). The scientific and technical information in the following section has been derived, in part, from the Candelaria Report. The Candelaria Report is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).

#### **4.7.1.1 Project Description, Location and Access**

The Candelaria Copper Mining Complex comprises two adjacent copper mining operations, Candelaria and Ojos del Salado, that produce copper concentrates from open pit and underground mines. Candelaria is an open pit and underground mine providing copper ore to an on-site flotation concentrator with a nominal processing capacity of 75,000 tpd, and Minera Ojos del Salado comprises two underground mines: Santos and Alcaparrosa. The Santos mine provides copper ore to the Pedro Aguirre Cerda (PAC) flotation concentrator plant with a capacity of 3,800 tpd, the remainder of ore extracted from the Santos and Alcaparrosa mines is treated at the Minera Candelaria processing plant.

Candelaria is located in Chile’s Atacama Region, at an elevation of approximately 650 m above sea level, 20 km south of the city of Copiapó and 650 km north of Santiago. The properties are easily accessed using the public road system. Employees and contractors come primarily from the Copiapó region. Copiapó is a modern city with all regular services and a population of approximately 160,000. The regional Atacama airport is serviced by daily commercial flights from Santiago and other destinations.

The mineral concentrate products from the two processing plants are transported by road to a domestic smelter in Chile or to Candelaria’s concentrate storage facility and marine terminal at Punta Padrones, located approximately 110 km from the mining complex on the Pacific coast and adjacent to the community of Caldera. Punta Padrones is also the site of a desalination plant that the Company built in 2013, that supplies process water to Candelaria via a dedicated pipeline.

The Minera Candelaria property within the Candelaria District comprises 210 mining exploitation concessions (approximately 5,991 ha) and 32 mining exploration concessions (approximately 6,680 ha). The Ojos del Salado property comprises 195 mining exploitation concessions (approximately 9,287 ha) and 57 mining exploration concessions (approximately 10,748 ha). The tenements are free of material mortgages, encumbrances, prohibitions, injunctions, and litigation. The tenements containing the active and future mining activities are not affected by material royalties. Exploration concessions have a duration of two years and the titleholder must pay a fee of approximately \$1.60 per hectare to the Chilean Treasury. At the end of this period, they may:

(i) be renewed as an exploration concession for two additional years in which case at least 50% of the surface area must be renounced, or (ii) be converted, totally or partially, into exploitation concessions. Exploitation concessions are of indefinite duration and an annual fee is payable to the Chilean Treasury of approximately \$8 per hectare.

#### **4.7.1.2 History**

The Candelaria sulphide deposit was discovered by Phelps Dodge in 1987. A Feasibility Study was completed in 1990 and, following approval by the Chilean government, construction started in October of 1992. Sumitomo acquired a 20% stake in the property in 1992. Production commenced in early 1995.

In 2007, property ownership changed when Freeport acquired Phelps Dodge.

During 2011, a pipeline was completed to bring water from a nearby sewage treatment facility to the Candelaria Mine. A desalination plant at the port of Caldera was built and commissioned in 2013 at a capacity of 500 litres per second.

The Santos underground mine has been in production since 1929, with processing taking place at the Pedro Aguirre Cerda (PAC) plant. Phelps Dodge became sole owner of Minera Ojos del Salado and the Santos mine and PAC plant in 1985. The PAC plant has been expanded several times to its current capacity of 3,800 tpd. Sumitomo acquired its 20% interest in Minera Ojos del Salado in 2005.

In early 1996, production from the Alcaparrosa underground mine commenced.

Between October 1998 and 2004, the Santos, Alcaparrosa and PAC plant operations were suspended due to the weak copper price environment.

In November 2014, Lundin Mining acquired Freeport's interest in the Candelaria Copper Mining Complex.

In 2015, the Candelaria 2030 project, including the new Los Diques tailings management facility, received environmental approval from Chilean regulators. Construction of Los Diques commenced in 2016 after the receipt of the major construction permits. Construction continued throughout 2017 and first tailings were placed during the first quarter 2018.

During 2018, exploration success led to the first declaration of Mineral Resource and Mineral Reserves on the Española deposit.

Candelaria has been a significant producer of copper since the mid-1990s. In the last four years, annual payable copper and gold metal in concentrates sold varied between 133 and 179 kilotonnes, and 76,000 and 100,000 oz, respectively.

#### **4.7.1.3 Geological Setting, Mineralisation and Deposit Type**

The Candelaria sulphide deposit is located at the boundary between the Coastal Cordillera and the Copiapó Precordillera. The Coastal Cordillera of Chañaral and Copiapó is composed of Permian to Lower Cretaceous intrusions within a basement of metasedimentary rocks of Devonian to Carboniferous age. Volcanic, volcanoclastic, and marine carbonate rocks represent intra- and back-arc sequences that were deposited during early to mid-Cretaceous period.



The Candelaria, Santos, and Alcaparrosa mines are located in the district of Punta del Cobre. The polymetallic sulphide deposits are hosted in volcanic rocks of the Punta del Cobre Formation. Polymetallic sulphide deposits in the Punta del Cobre district are located to the east of the main branches of the Atacama fault zone, a subduction-linked strike-slip fault system stretching over 1,000 km along the Chilean coast and active at least since the Jurassic period. The dominant structural elements of the Punta del Cobre area are the northeast-trending Tierra Amarilla Anticlinorium, a southeast verging fold-and-thrust system, and a series of north-northwest to northwest-trending high-angle faults.

The copper-gold sulphide mineralization found at the Candelaria Copper Mining Complex, which is generally referred to as IOCG mineralization, is located within the thermal aureole of the Lower Cretaceous magmatic arc plutonic suite in the Candelaria-Punta del Cobre district. Depending on lithology and the structural setting, the polymetallic sulphide mineralization can occur as veins, hydrothermal breccias, replacement mantos, and calcic skarns within andesite and tuff units. There are also some localized controls to mineralization in the form of faults, breccias, veins, and foliation. Candelaria has become an exploration model for Andean-type IOCG deposits that display close relationships to the plutonic complexes and broadly coeval fault systems.

The main mineralized body at the Candelaria mine is up to 400 m thick in its central part and thins towards the edges. In east-west sections, the mineralization has a lenticular, downward concave shape with a steep eastern limb and a shallowly dipping western limb. The shape of the mineralized body in north-south section is irregular. In plan view, the extent of the mineralization is approximately 1,400 m by 2,400 m. The mineralized body was folded after its formation. The north-northeast-trending fold axis corresponds to the Tierra Amarilla Anticline.

In the Santos mine, three styles of mineralized bodies are observed: veins, mantos, and breccia bodies. An important vein in the Santos mine is the Isabel Vein, which has a northwest striking orientation, and extends over 1 km in length and between 4 and 30 m in width. Manto-type mineralization occurs as tabular bodies located at two sedimentary horizons located in the floor and roof of the albitophyre. The manto mineralization is characterized by variable iron contents with magnetite common in the north and deeper areas, and specular hematite in the south. Mineralization occurs within breccia bodies which are typically contained with the albitoforo and lower andesite and is formed by steeply west-dipping and north-northwest- to northwest-striking bodies.

Mineralization at the Alcaparrosa mine principally occurs as mantos that trend to the northeast and dip to the west. Ore mineralogy consists of chalcopyrite, pyrite, and magnetite, with trace pyrrhotite, molybdenite, and arsenopyrite. Mineralization at the Alcaparrosa mine also occurs as veinlets defining dense stockwork, breccias as well as fine dissemination in biotite meta-andesites. High-grade bodies are also found in massive veins striking north-northwest, north, and east.

In the Española project area, mineralization occurs within mantos hosted mainly in a brown garnet skarn, and in lesser proportions within silica hornfels. Chalcopyrite is the primary copper sulphide mineral found as clusters and in disseminated form, commonly associated with brown garnet porphyroblasts. Near the surface and down to a depth of approximately 70 m, the mineralization is oxidized, characterized by the presence of chrysocolla, malachite, native copper, diogenite and bornite.

#### **4.7.1.4 Exploration**

Ongoing exploration is conducted by Candelaria with the primary purpose of supporting mining and increasing estimated Mineral Resources and Mineral Reserves available for mining. Exploration is focused on the known mantos, veins, and breccia masses in proximity to existing underground infrastructure. Historically, this strategy has proven very effective in defining new estimated Mineral Resources and Mineral Reserves available for underground mining. Much of the exploration is conducted from underground, requiring significant underground development to provide adequate drilling stations. Regional exploration is also undertaken on the large properties surrounding the mines to identify targets and define new areas with Mineral Resource estimates. All existing exploration information is being compiled into a comprehensive 3D model to allow for evaluation and prioritization of exploration efforts.

From 2010 to December 2018, more than \$229 million was invested in exploration primarily in the proximity of the Candelaria open pit, the Española project area, and at the three underground mines. This exploration has resulted in a significant expansion of the Mineral Resource and Mineral Reserve estimates of the underground mines and contributed to the extension of their LOM.

#### **4.7.1.5 Drilling**

Mineral Resources are estimated based on information obtained from surface and underground drill holes. In 2018, 21 diamond drill holes have been drilled in and around the Candelaria open pit mine. In the Santos and Alcaparrosa mines, 87 and 86 diamond drill holes were drilled, respectively, and 176 holes were drilled in Candelaria underground (North and South sectors). There were also 85 brownfield exploration holes drilled in the district during 2018 with 77 of those in the Española project area. Up to 15 drill rigs were employed during the year and a total of 127,794 m was drilled. The drilling and sampling procedures used are consistent with generally recognized industry best practices.

Exploration drilling on north and south sectors from Candelaria confirmed the extension of mineralization with some areas already included in the infill program for near future mine planning. The Santos surface exploration program confirmed the extension of mineralization, showing good correlation along trend with undrilled geophysical anomalies defined in 2018. Alcaparrosa drilling confirmed mineralized extensions along the Rocio fault

#### **4.7.1.6 Sampling, Analysis and Data Verification**

Analytical samples informing the Candelaria open pit Mineral Resources were prepared and assayed at the Candelaria mine site. Analytical samples informing the Ojos del Salado Mineral Resource estimates were prepared and assayed by Intertek (formerly Vigalab) in Paipote, Chile, an independent laboratory. Minera Candelaria uses Intertek in Paipote as an umpire laboratory. Assays are conducted for copper, silver, gold, zinc and iron. SG is measured systematically over the full sample intervals. The results of the drill program are described in the Candelaria Technical report.

All drilling assay samples are collected by a contractor under the direct supervision of a mine geologist. Samples from Candelaria are processed and analyzed entirely at the mine site. Samples from Ojos del Salado are shipped directly from the property to the Intertek laboratory in Tierra Amarilla, an independent laboratory. In each case, established procedures were used to ensure the security of samples during transportation between the drill rig and the laboratories.

Quality assurance procedures, data verification and assay protocols used in connection with drilling and sampling conform to industry accepted quality control methods.

The analytical quality control program implemented at Candelaria and Ojos del Salado includes the use of control samples (coarse and pulp duplicate samples and reference material samples) inserted within all batches submitted for assaying.

Since 2016, exploration data are managed through an AcQuire database, which includes quality control management features for sample coordinates from borehole surveys and data management tools. Sample numbering and labelling is controlled through AcQuire, including insertion of quality control samples and consignment notes to the primary laboratories. Analytical results are received electronically and managed through AcQuire with quality control filters. Samples outside defined limits are rejected by AcQuire and flagged for further investigation. The AcQuire system includes features for reporting analytical results and preparing bias charts and time series plots.

#### **4.7.1.7 Mineral Processing and Metallurgical Testing**

The Candelaria Copper Mining Complex maintains regular metallurgical testing programs that are incorporated with historical testing results and mill performance into a statistical model to predict and improve the complex's processing performance in terms of mill throughput, metal recovery to concentrate, and final concentrate grade. Metallurgical tests are executed in a number of specialized in-house and commercial facilities. Testing includes rock hardness classification, mineralogy using QEMSCAN™ technology and bench scale flotation testing that is correlated with industrial scale performance in order to predict mill throughput and metallurgical performance. A similar but less intense program is underway for the PAC plant.

New metallurgical tests were initiated in late 2016 as part of a Feasibility Study to evaluate potential throughput increases at the Candelaria mill. The material tested was a blend of ore considered representative of future feedstock. Testwork included SAG and ball mill pilot testing, specific SAG design tests, bench scale flotation kinetic modelling and automated scanning electron microscopy. Results and analysis from this testwork programme were evaluated using the Ausenco Ausgrind methodology to improve confidence in the estimated throughput for the Life of Mine plan.

In parallel with the mill expansion study, a number of process initiatives have commenced focusing on debottlenecking and improving the existing facilities. As a part of these initiatives, further variability testwork programs were initiated. The Mine-to-Mill study is evaluating potential improvements in primary crusher feed size from blasting (both underground and the open pit) and the effect on overall comminution specific energy. This is combined with a geo-metallurgical initiative to characterize different geological zones, adding to the existing database and incorporating more underground sections. The Candelaria Mill Optimization Project includes upgrades in grinding, classification and flotation circuit capacity. The anticipated improvement in copper recovery will substantially address the shortfalls associated with previous expansions in plant throughput.

#### **4.7.1.8 Mineral Resource and Mineral Reserve Estimates**

The Mineral Resources at the Candelaria Copper Mining Complex are estimated from core drilling information stored in a secure central database and were evaluated using a geostatistical block modelling approach. Separate models were prepared for the Candelaria open pit mine and

Candelaria underground (South sector) and the three underground mines (Candelaria North sector, Santos, and Alcaparrosa) using slightly different methodologies and assumptions. During 2018, the Mineral Resource models for the Alcaparrosa mines have each been integrated into one block model. A new block model was generated in 2018 for the Española open pit mine.

The open pit Mineral Reserve estimates for both Candelaria and Española are based on a mine plan and open pit designs developed using modifying parameters including metal prices, metal recovery based on performance of the processing plant, actual operating and sustaining capital cost estimates based on the production schedule and equipment requirements. Open pit optimizations are carried out using Minesight® and Datamine software.

Underground Mineral Reserve estimates at Candelaria underground (North and South sectors), Alcaparrosa and Santos are based on mine plans and designs developed using modifying parameters including metal prices, metal recovery based on performance of the processing plant, actual operating and sustaining capital cost estimates based on the production schedule and equipment requirements. Stope layouts and development plans are developed in MineSight® software with CAE Mine Stope Optimizer used for stope design.

Factors which may affect the Mineral Resources and Mineral Reserve estimates include: dilution and mining recovery, metal prices, smelter, refining and shipping terms, metallurgical performance, geotechnical characteristics of the rock mass, capital and operating cost estimates, and the likelihood of obtaining land title, required permits and environmental, social and legal licenses. To the extent such factors are within the control of or capable of influence by the Company, these factors are managed through industry accepted practices and procedures and well as maintaining an engaged and constructive dialogue with the local communities and government authorities.

Details of the June 30, 2018 Mineral Resource and Mineral Reserve estimate for the Candelaria Copper Mining Complex are included in Schedule "A", attached to this AIF.

#### **4.7.1.9 Mining Operations**

The Candelaria and Española open pits will operate with an overall mining rate of approximately 310,000 tonnes per day for the next ten years. As the final waste stripping is completed, the overall mining rate will decline. A stockpile strategy has been developed to maximize the grade of material going to the processing facility. Direct milling ore will average 0.59% Cu from Candelaria and 0.43% Cu from Española. Lower grade stockpile ore will be recovered to meet the plant capacity as required. The mine currently operates five electric shovels, approximately forty haulage trucks, eight production drills, and a fleet of support equipment. A major mine re-capitalization programme is underway that will see several of the existing rope shovels replaced with new hydraulic units and the majority of the truck fleet changed for latest generation Caterpillar 793F trucks. Similar upgrades and replacements are underway to the mine's service and ancillary vehicle fleet.

The Candelaria open pit was designed to be mined in several phases of development. As of June 2018, five phases of development remain in the LOM plan (Phases 9 to 13). The overall strip ratio is 2.45:1 including ore delivered to stockpiles. The total in-pit waste is 939.6 million tonnes and the LOM of the open pit mine is 17 years. The Española total in-pit waste is 83.2 million tonnes and the overall life estimated is 7 years.

The Candelaria underground (North and South Sectors) is planned to ramp up from 11,000 ore tonnes per day in 2019 to a steady state of 14,000 ore tonnes per day by 2021. Access and infrastructure development to the South sector commenced in 2017 and ramp up to 4,000 ore tonnes per day by 2021. 60 tonne capacity underground trucks have been introduced to replace the existing contractor operated 30 tonne capacity fleet in both mines. The estimated average grade of the combined Candelaria underground mines is 0.85% Cu in the LOM.

The Alcaparrosa underground mine produces 4,300 tpd of ore with an average grade of 0.79% Cu. The Santos underground mine produces 5,200 tpd of ore with an estimated average grade of 0.91% Cu over the remaining LOM. The three underground mines utilize a sublevel stoping mining method for ore extraction. This method is ideal for relatively large, vertical, as well as thick deposits with favourable and stable host rock. The stopes range in sizes from 100,000 tonnes to 1 million tonnes of ore and material is extracted at 1,000 tonnes per day up to 3,000 tonnes per day depending on the number of draw points and broken ore flow characteristics.

#### **4.7.1.10 Processing and Recovery Operations**

Minera Candelaria and Minera Ojos del Salado manage and operate two processing plants. The Candelaria processing plant receives ore from the open pit and Candelaria, Alcaparrosa and Santos underground mines. It has a nominal capacity of 75,000 tpd. The PAC processing plant receives ore from the Santos underground mine and has a design capacity of 3,800 tpd.

The Candelaria processing plant flowsheet is conventional comprising two parallel process lines for grinding and flotation followed by common final concentrate filtration and shipping of bulk copper concentrates. Run of mine ore is trucked to a primary gyratory crusher which then feeds a SAG grinding mill – ball mill circuit with pebble extraction and crushing. The secondary ball mill cyclone overflow constitutes feed to the rougher flotation bank. Rougher concentrate is reground prior to two stage cleaning in column flotation cells. Final flotation copper concentrate with gold and silver by-product metals is thickened, filtered, and stored on site. Final flotation tails are conventionally thickened and disposed in an existing rockfill embankment tailings storage facility. In 2018, tailings disposal will transfer to the new Los Diques facility. The historical processing performance of Candelaria from 2000 to mid-2018 averaged metallurgical recovery of 94 percent for copper, 75 percent for gold, and 83 percent for silver.

A Feasibility Study was undertaken to evaluate potential debottlenecking expansions of the main Candelaria processing plant to add approximately 15-20% throughput capacity. The expansion of the plant has not been advanced, but a number of process improvement initiatives, highlighted during the study, have been initiated. These include upgrades to the primary crusher motor, ball mill repowering, cyclone and cyclone feed pump upgrades, flotation upgrades and pebble crushing circuit upgrades. The forecast cumulative impact of these upgrades is an additional 4,000 tpd of throughput and 1.7% copper recovery. Completion of these upgrades is expected in late 2019.

The PAC concentrator has been in operation since 1929 and upgraded several times to the current capacity of 3,800 tonnes per day. The PAC concentrator flowsheet comprises a conventional three stage crushing plant. The grinding circuit has three closed circuit ball mills operating in parallel. The ball mill cyclone overflow constitutes feed to the rougher flotation bank. Rougher concentrates are reground prior to cleaning in a column cell with the tailings scavenged with conventional mechanical flotation cells. Final concentrate is thickened and filtered using a ceramic disc filter. Final flotation tailings from the PAC plant are pumped to the main Candelaria tailings storage facilities. The historical processing performance of Candelaria from 2000 to mid-



2018 averaged metallurgical recovery of 94 percent for copper, 75 percent for gold, and 83 percent for silver.

Copper concentrates containing precious metals are sold on contract to local smelter or trucked to the Punta Padrones port, near Caldera, for export to overseas smelters. Demand for copper concentrates produced by the Candelaria Copper Mining Complex is strong as they have very low content of critical elements such as lead, arsenic, antimony, bismuth, and mercury which make them good base feed for smelters.

Candelaria Copper Mining Complex has an agreement with a third-party company to process Candelaria's flotation tailings to produce a magnetite concentrate and this produces an additional source of by-product revenue subject to favourable iron ore prices.

#### **4.7.1.11 Infrastructure, Permitting and Compliance Activities**

The mines of the Candelaria Copper Mining Complex receive electrical power through long-term contracts with AES Gener S.A., a local energy company. The main water supply comes from a desalination plant, which was commissioned in 2013 and is located adjacent to the Punta Padrones port facility. Local treated sewage water is also used by the mines. Copper concentrate is shipped from the Punta Padrones port facility at the port of Caldera. Both the desalination plant and the Punta Padrones port are owned by Minera Candelaria.

The Candelaria tailings storage facility currently receives the flotation tails from the PAC processing plant. The remaining tailings storage capacity at the end of December 2018 was estimated at 11 million cubic metres including the additional storage obtained by a reduction in the freeboard from 5.0 to 1.5 metres that was permitted in 2016. Plans are in place to extend the PAC tailings pipeline to Los Diques and to fill the remaining capacity in the existing tailings storage facility with tailings from the Candelaria processing plant.

A new tailings storage facility, known as Los Diques, has been constructed to replace the Candelaria tailings storage facility. The Los Diques facility is located to the southwest of the open pit and plant sites and has a designed capacity of approximately 600 million tonnes. The Los Diques tailings management facility was a key part of the Candelaria 2030 EIA that was submitted to the environmental authorities in September 2013 and was approved in July 2015. Engineering was completed during 2016, and after receipt of key sectorial permits, construction of the starter dam was initiated. During 2018, the initial construction and commissioning phases of the Los Diques tailings facility were completed and first tailings were placed. Los Diques can now receive the full flotation tailings from the Candelaria processing plant. Future phases of the Los Diques Main dam planned to start in 2019 have been initiated ahead of schedule, taking advantage of synergies with the original project and the availability of mine waste from the open pit.

Chile has established a comprehensive regulatory framework for mining and other industrial activities, dating from the mid-1990's that has been updated several times since then. Although the Candelaria and Ojos de Salado facilities were permitted and developed prior to the modern framework being in place, both hold numerous environmental approvals stemming from modifications to the original developments and are compliant with current regulatory requirements. In addition, the two companies hold more than 1,000 permits for construction and operation of the mining and milling facilities, and related infrastructure.

The most recently completed major environmental assessment process was initiated in September 2013 with the submittal of the Candelaria 2030 EIA. This included, among other

things, an extension of the operating life of the facilities and the Los Diques tailings storage facility. The EIA received regulatory approval with conditions in July 2015. Following receipt of the necessary permits, the Company built and commissioned Los Diques, and received the final operating permit during 2018.

The Alcaparrosa mine received environmental approval in 1996 with subsequent amendments, most recently an EIA to support the extension of the mine operation through 2022. Candelaria has commenced preparations for the next major environmental permitting exercise, which is expected to include an extension to the mine life, expanded underground mining production, development of the La Española satellite deposit and other mine optimization initiatives

The Environmental Management Systems of Minera Candelaria and Minera Ojos del Salado have been certified for many years under the international ISO 14001 Standard. Minera Candelaria and Ojos del Salados' s re-certification (completed in March 2018), are valid until March 2021.

Separate Mine Closure Plans (MCP) are in place for Minera Candelaria and Minera Ojos del Salado and both have been approved by SERNAGEOMIN. The approved closure costs are \$153.3 million for Minera Candelaria and \$7.9 million for Minera Ojos del Salado. The closure cost estimate for Minera Candelaria reflect the developments recently permitted under the Candelaria 2030 EIA, including the Los Diques tailings facility, and was approved in September 2018. The Ojos del Salado MCP does not include Alcaparrosa, which was recently re-approved to 2022. The associated Alcaparrosa MCP update was submitted for regulatory review in December 2017 and is expected to be approved in 2019. The financial guarantees for both MCPs were updated.

The social performance team engages with stakeholders in the communities nearest the mine and port facilities, namely Tierra Amarilla, Caldera and Copiapó. Outreach offices are located in each of these municipalities; engagement occurs throughout the year and is focused on managing social impacts, risks and opportunities specific to each community. The team bases its activities on a 5-year social performance strategic plan and systems which reflect best practice and international standards in stakeholder engagement, grievance procedures, risk management and community investment.

In 2018, Minera Candelaria dedicated approximately \$8.3 million to strategic community investments focused on education, health services, housing, economic development and cultural heritage.

#### 4.7.1.12 Capital and Operating Costs

Total forecast Candelaria cash costs for 2019 are tabulated below using a forecast US dollar/CLP exchange rate of 620. Unit operating costs have fallen from 2018 primarily as a result of higher forecast copper production in 2019 on improving copper head grades. Forecast cash costs for 2019 are \$1.60/lb Cu.

<b>Candelaria (\$/lb Cu)<sup>(1)(2)(3)</sup></b>	<b>2019</b>
Mining costs	0.74
Milling costs	0.61
G&A and other costs	0.26
TC/RCs	0.23
By-product credit, net of TC/RCs	(0.24)
<b>Cash Cost per payable pound of Copper</b>	<b>1.60</b>

- (1) Includes the impact of the Franco Nevada streaming agreement but excludes any allocation of upfront cash received under the streaming agreement, and capitalized stripping costs.
- (2) Cash costs are based on various assumptions and estimates, including but not limited to: production volumes, as noted above, commodity prices (Cu: \$2.80/lb), foreign exchange rates (USD/CLP: 620) and operating costs.
- (3) 68% of Candelaria's total gold and silver production are subject to a streaming agreement and as such cash costs are calculated based on receipt of \$408/oz and \$4.08/oz, respectively, on gold and silver sales in the year.

Total forecast capital costs for Candelaria 2019 are tabulated below. Expenditure will continue on the new replacement open pit equipment fleet and on the mill optimisation project. Underground development will continue on the Candelaria South Sector with first production due to commence in the second half of 2019. Future lifts of the Los Diques TSF will continue to take advantage of synergies with the initial project and the availability of mines waste.

The Company capitalizes waste stripping costs when experienced strip ratios are above the average planned strip ratio for each open pit phase under development. During the production phase of the Candelaria open pit mine, waste stripping costs, which provide probable future economic benefits and improved access to the orebody are capitalized to mineral properties. In 2019, capitalized waste stripping is forecast at \$130 million.

<b>Candelaria Capital Costs</b>	<b>Unit</b>	<b>2019</b>
Los Diques TSF	\$M	10.0
New Mine Fleet Investment	\$M	75.0
Mill Optimisation Project	\$M	50.0
Candelaria Underground South	\$M	40.0
Other Sustaining	\$M	70.0
<b>Total</b>	<b>\$M</b>	<b>245.0</b>
<b>Capitalized Waste Stripping</b>	<b>\$M</b>	<b>130.0</b>
<b>Total Cost</b>	<b>\$M</b>	<b>375.0</b>

The information presented in this section is forward looking information. See "Cautionary Statement on Forward-Looking Information" and "Risks and Uncertainties".



#### 4.7.1.13 Exploration, Development, and Production

During 2019, the planned exploration program at the Candelaria Mining Complex is expected to total 47,900 m of diamond drilling. A total of 940 m of exploration tunnelling is also planned for the year. Drilling will continue to target lateral extensions of the mineralization, with the objective of generating additional Mineral Resources and Mineral Reserves in open pit and underground mines.

A district exploration program will continue in 2019, building upon the district-wide database and 3D model developed in 2016 with an emphasis on development of new target areas, and possible extensions to known mineralization. Total exploration expenditure in 2019 is forecast at approximately \$14 million.

In 2018, the Candelaria Copper Mining Complex produced 134,578 tonnes of copper in concentrate (100% basis). For 2019, forecast production is as tabulated below.

<b>Candelaria (100%)</b>	<b>Unit</b>	<b>2019</b>
Copper Production	'000 Tonnes	145 – 155

The current forecast LOM of the Candelaria open pit and stockpiles is to 2040, the Española open pit is to 2030 while the underground mines, Candelaria (North and South sectors), Alcaparrosa and Alcaparrosa and Santos, have mine LOMs to 2037, 2027 and 2028, respectively.

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

#### 4.7.2 Eagle Mine

The Eagle Mine is located in the Upper Peninsula of Michigan, USA, in Michigamme Township, Marquette County and the Eagle Mine, including Eagle East, is 100% owned by Lundin Mining. The scientific and technical information in the following section has been derived, in part, from the Eagle Report. The Eagle Report is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).

##### 4.7.2.1 Project Description, Location and Access

The property is on the watershed divide of the Yellow Dog River and Salmon Trout River. The closest community to the mine site is Big Bay, 24 km from the property by road. Big Bay is an unincorporated community within Powell Township, Marquette County and has limited services. The closest full-service community is Marquette, approximately 53 km by road from the property. Marquette provides a regional airport, rail and shipping facilities, and a full range of commercial services.

The Humboldt mill property, a former iron ore processing facility, occupying approximately 142 ha, is located approximately 61 km west of Marquette, Michigan. The facility is located in the township of Humboldt, Marquette County, Michigan. Ore from the Eagle Mine is trucked approximately 105 km to the Humboldt mill for processing.

Road access to the mine property is by means of paved roads from the communities of Big Bay to the east, and Marquette to the south. The Humboldt mill is located close to the main US Route 41.

The surface of the Eagle Mine is on company owned property or property leased from the State of Michigan. The surface lease is valid until July 2023 but is extendable by production and reclamation/post closure monitoring requirements. The land on which the Humboldt mill is located is held by the Company through a series of deeds. The Eagle and Eagle East mineral deposits are covered by both state and private mineral leases with the Mineral Resource estimates split approximately 50:50 between them. The state leases expire in July 2023 but are extendable by production, while the private leases have various expiry dates that are extendable by continued payments or production. Eagle Mine has obligations under state and private royalty agreements ranging from 1.0% to 7.0%.

#### **4.7.2.2 History**

The Eagle deposit was first drilled in 2002 as part of a nickel exploration program commenced by Rio Tinto in 2000. Following further drilling an initial Mineral Resource was estimated in early 2004.

Following further drilling, feasibility studies, and the receipt of all relevant permits Rio Tinto began construction of the Eagle Mine site in 2010 and began underground development in September 2011. The re-construction work at the Humboldt mill also commenced in 2011.

In July 2013, Lundin Mining acquired the Eagle Mine project from Rio Tinto and accelerated construction activities. Construction was completed in mid-2014 and commercial production of nickel and copper concentrates was achieved in November of 2014.

In July 2015, the discovery of high-grade Ni-Cu mineralisation at Eagle East was announced and in June 2016, an Inferred Mineral Resource estimate was released, and a Preliminary Economic Assessment published. Access ramp development was commenced at this time. In April 2017, the results of the Eagle East Feasibility Study were released, and a Mineral Reserve estimate reported. At the end of 2018, the Eagle East development was well advanced and underground infill drilling had commenced. First ore from Eagle East is forecast in the fourth quarter of 2019.

#### **4.7.2.3 Geological Setting, Mineralization and Deposit Type**

Eagle and Eagle East are part of the same ultramafic intrusive system that hosts high-grade primary magmatic Ni/Cu sulphide mineralization. These intrusions are related to the feeder system for the Keweenawan flood basalts, a Large Igneous Province resulting from mantle-tapping extension during the Midcontinent Rift. Mineralization styles are similar at Eagle and Eagle East, consisting of intrusions of mineralized peridotite with concentrations of sulphide mineralization, mostly within the intrusion, resulting in the accumulation of semi-massive sulphide, and a central core zone of massive sulphide.

The Eagle and Eagle East peridotite intrusives are hosted in Paleoproterozoic metasediments of the Baraga Basin, which rest unconformably on the Archean basement rocks. These sediments are assigned to the Upper Fossum Creek Unit and are mainly composed of an upper siltstone sequence with fine grained turbiditic greywacke sandstone interbeds. The principal host rocks are near-vertical dykes of pyroxene to peridotite composition, which strike in an east-west direction.

Eagle East is located deeper than the Eagle deposit approximately 840 m to 990 m below surface. The host sediments encountered in the surroundings of the Eagle East mineralized zone are mainly siltstones with low proportions of sandstone interbeds. Bedding and foliation are the main structural features present in the sediments and represent the weakest planar orientation found.

Two types of potentially economic mineralization are found in the Eagle and Eagle East deposits: semi-massive sulphides and massive sulphides. The sulphide bodies are tabular, pipe-like, or irregular in shape and, although complexly interrelated, are broadly concordant with the host ultramafic. Contacts between the massive and semi-massive sulphides are relatively sharp. Massive sulphides are observed to extend outward of the host dykes, into the sedimentary country rock where they form flat-lying sills.

Most of the nickel is in pentlandite with a small portion in millerite group minerals and secondary violarite. The majority of pentlandite occurs in granular form with less than 1% to 2% as flame or exsolution lamellae. Copper is primarily in chalcopyrite with lesser secondary cubanite. The distribution of PGMs, gold, and cobalt is still poorly understood; however, assay and metallurgical test correlations indicate that the cobalt is associated with the pyrrhotite/pentlandite. PGMs and gold appear to be related to late stage veining/intrusion and tend to be most abundant in areas with chalcopyrite enrichment. With the exception of cobalt, Eagle East is significantly higher in grade for both precious and base metals than Eagle. Average nickel and copper grade estimates are in the order of 60% higher at Eagle East compared to Eagle.

#### **4.7.2.4 Exploration**

Exploration activities at Eagle have included geological mapping, geochemistry (indicator mineral sampling and Mobile Metal Ion (MMI) studies from basal tills, dyke litho-geochemistry, sulphur isotope studies, QEMSCAN™ studies), and geophysics (airborne, surface, and underground borehole resistivity and gravity). The main and most successful exploration tool has been diamond drilling in combination with a very robust and predictive deposit model.

Using the conduit model, the most direct and expedient exploration target was to follow the mineralized peridotite conduit at Eagle East to depth with directional drilling. With Eagle as a model, the Eagle East conduit was traced downward to a location where the conduit flattened to horizontal and high metal tenor sulphide droplets had settled to the base of the conduit.

Surface exploration drilling in 2018 focused on tracing extensions of the Eagle East conduit and on new targets in the Eagle orbit generated using a combination of litho-geochemistry, geophysics (primarily seismic data) and structural modeling. No significant results have been reported from this work.

#### **4.7.2.5 Drilling**

Surface and underground exploration drilling is an ongoing operation at the mine with the work undertaken by contractors. The nominal hole spacing of the underground diamond drilling averages 15 m, with surface drilling averaging a spacing of less than 25 m within the Eagle deposit. Drilling at Eagle and Eagle East is restricted to diamond core using various size tools. Down hole surveys at Eagle and Eagle East are predominantly either north seeking (rate) gyros or normal gyro surveys.

In 2018, 39,158 m of surface exploration drilling was completed in efforts to trace the extension of the Eagle East conduit system. Devico directional systems continued to be employed. From

underground, 420 m of definition/delineation drilling of the Eagle orebody was completed with 5 holes and 11,986 m with 45 holes in Eagle East. No significant results have been reported from this drilling.

#### **4.7.2.6 Sampling, Analysis and Data Verification**

The entire Mineral Resource estimate at Eagle and Eagle East is based on drill core samples.

Eagle follows documented protocols for core handling and sample preparation. The sampling takes place at an exploration facility in Negaunee. Surface drill holes are split using a diamond saw, while for underground holes the entire core is sampled. In strongly mineralized intervals, quarter-core metallurgical samples are taken. The metallurgical samples are not used in Mineral Resource estimation.

Standardized protocols of QA/QC sample insertion using certified reference material, blanks, and duplicates have been used throughout the history of the Eagle project to monitor the quality of the sampling process and assay results. Standards are inserted every tenth sample, blanks also every tenth sample as well as after noticeably high-grade samples. Duplicates are taken every tenth sample, offset by four or five from the nearest standard.

Prior to 2003, drill core samples were shipped to ALS in Reno, Nevada, an independent laboratory, for crushing, splitting, and pulverization. From 2004 to 2015, samples were prepped for analysis at ALS in Thunder Bay, an independent laboratory, and from 2015 onwards, some of the samples have been sent to Minerals Processing Corporation (MPC), located in Carney, Michigan, an independent laboratory.

Sample preparation takes place at either the ALS laboratory in Thunder Bay, Ontario, or at MPC. Both facilities have standard procedures and quality controls for sample preparation to ensure compliance with industry and client standards. Pulps are sent to the ALS laboratory in Vancouver, British Columbia for analysis. Samples are analyzed for multi-elements, oxides and SG.

In each case, established procedures were used to ensure the security of samples during transportation between the drill rig and the laboratories. Quality assurance procedures, data verification and assay protocols used in connection with drilling and sampling conform to industry accepted quality control methods.

#### **4.7.2.7 Mineral Processing and Metallurgical Testing**

Eagle maintains regular metallurgical testing programs that are incorporated with historical testing results and mill performance into a statistical model to predict and improve the complex's processing performance in terms of mill throughput, metal recovery to concentrates, and final concentrate grades. Metallurgical tests are executed in a number of specialized in-house and commercial facilities. Testing includes work index determination, mineralogy using optical and QEMSCAN™ technology and bench scale flotation testing that is correlated with industrial scale performance in order to predict mill throughput and metallurgical performance.

Metallurgical testwork was conducted on the Eagle East sulphide mineralization to confirm the applicability of the Humboldt Mill process flowsheet for grinding, flotation and metal recovery. This testwork, which was carried out on and off site consisted of mineralogical analyses, batch grinding and flotation testing and locked cycle testing. The testwork indicated that the Eagle East mineralization could be successfully treated in the Humboldt mill.

#### **4.7.2.8 Mineral Resource and Mineral Reserve Estimates**

Mineral Resources at Eagle are estimated using 3D block modelling with Maptek Vulcan® mining software. Ordinary Kriging is used for grade and density estimation. Mineral Resources at Eagle East are estimated using Datamine Studio RM software. Grades and density values were estimated using the Inverse Power Distance method.

Eagle Mineral Reserves are estimated from the Mineral Resources by designing stopes and sill layouts using Vulcan® software. Eagle East Mineral Reserves are estimated using the same methodology in the Deswik software. A separate NSR cut-off is applied to the two orebodies together with dilution and mining recovery factors.

Factors which may affect the Mineral Resources and Mineral Reserve estimates include: dilution and mining recovery, metal prices, smelter, refining and shipping terms, metallurgical performance, geotechnical characteristics of the rock mass, capital and operating cost estimates, and the likelihood of obtaining land title, required permits and environmental, social and legal licenses.

Details of the June 30, 2018 Mineral Resource and Mineral Reserve estimate for Eagle and Eagle East are included in Schedule "A", attached to this AIF.

#### **4.7.2.9 Mining Operations**

Eagle is a relatively shallow underground mine with access gained via a surface ramp that also serves as the route for waste, ore and backfill haulage. The mine employs transverse bench-and-fill stoping with mining in an up-dip primary secondary sequence. Backfilling is undertaken using cemented and uncemented rockfill. The bench and fill mining method with backfill was selected as it provides the advantages of bulk mining, while maintaining a degree of selectivity and flexibility for the high value, variable and generally competent Eagle mineralisation. Two ventilation shafts are in place, with the downcast shaft also equipped for emergency egress. Ore from the mine is stored in a covered coarse ore stockpile facility prior to transport by road 105 km to the Humboldt mill site.

Eagle East will be accessed by ramp from the bottom of the Eagle mine, with the mine services and infrastructure being extended from Eagle. Eagle East will require no new surface infrastructure and, following geotechnical assessment, will use the cut and fill mining method. Ore, waste and backfill will be hauled through the ramp in conventional mine trucks.

#### **4.7.2.10 Processing and Recovery Operations**

The Humboldt mill is a former iron ore processing plant that has been converted for processing Eagle ore. From a covered coarse ore storage facility, the ore is processed using a conventional three stage crushing and single stage ball milling process followed by differential flotation to produce separate nickel and copper concentrates. Metallurgical recoveries of nickel and copper average 84% and 97% respectively. Tailings from the plant are deposited sub-aqueously in the adjacent former Humboldt iron ore open pit. No modifications to the process plant are necessary for the treatment of the Eagle East ore which will be blended with that from Eagle over the final years of the LOM.

Nickel and copper concentrates are stored in a covered concentrate building on site prior to being transported via rail car direct to smelter facilities within North America or to ports for shipment overseas.

#### **4.7.2.11 Infrastructure, Permitting, and Compliance Activities**

The Eagle Mine and Humboldt Mill areas are accessible via an extensive and established network of paved roads, a regional airport, rail services, excellent telecommunications facilities, national grid electricity, an ample supply of freshwater and a highly educated work force. Eagle concentrate is transported offsite from the mill by rail to a central CN rail yard in Michigan, where it is staged for on-transportation by rail to smelters in Canada and to the Port of Trois-Rivières, Québec for transport overseas.

Both the mine and mill operate under several local, state and federal permits. All permits are in place for the mine and mill operations, and Eagle has maintained full compliance with the corresponding requirements. In addition to adhering with all legal requirements, Eagle Mine operates using a management system that is aligned with the Lundin Mining's health, safety and environment system standards. This system undergoes annual third-party auditing to ensure continued compliance with all corporate standards and guidance documents.

In late 2018, the Michigan Department of Environmental Quality (MDEQ) issued approvals for the amendment of the existing Humboldt Part 632 Mining Permit, to allow placement of additional tailings in the former Humboldt open pit, as well as the NPDES Mill WTP Discharge Permit. In association with these two submissions, routine public meetings were conducted by Eagle in August 2018, with no significant public commentary received. MDEQ also provided temporary approval for the Escanaba River Intake System, pending the Water Withdrawal Registration and the completion of wetland studies, as required by the approvals process. The Eagle Mine Groundwater Discharge Permit renewal submission, a routine process required every 5 years, continued under review by MDEQ in 2018. Eagle provided additional information to MDEQ in late 2018 to supplement information on the Eagle East "wastewater" stream and is currently awaiting a reply on draft permit conditions.

In mid-2018, two legislative bills to clarify existing laws and associated permitting requirements (specifically to Parts 632 and Part 301), under which the mine and Humboldt Tailings Disposal facility (HTDF) currently operate, were proposed by Eagle, and received full support from regulators. The two bills were successfully signed into law by the Governor in 2018, after undergoing a full review process. The proposed changes result in the exemption of the HTDF from dual regulation and in a more streamlined and efficient regulatory process, whereby MDEQ is empowered to determine permitting processes based on the significance or environmental impact of an amendment request.

The social performance team engages with stakeholders in the communities nearest to the mine and in areas where the company is undertaking exploration activities; an outreach office is located in downtown Marquette. Engagement occurs throughout the year and is focused on managing social impacts, risks and opportunities. The team bases their activities on a 5-year social performance strategic plan and systems which reflect best practice and international standards in stakeholder engagement, grievance procedures, risk management and community investment. A



community perception survey conducted in 2018 demonstrated that stakeholders have a high level of trust and support the mine's activities.

In 2018, Eagle Mine dedicated approximately \$588,000 to strategic community investments focused on education, environment, and economic development. The social performance team continues to engage constructively and respectfully with the Native American communities in the region. As a result of these and other engagements and community investments, Eagle Mine has sustained strong stakeholder relationships and promoted socioeconomic development in the communities nearest to the mine.

#### 4.7.2.12 Capital and Operating Costs

Total forecast Eagle cash costs for 2019 are tabulated below. Unit operating costs are forecast to rise in 2019 primarily as a result of lower nickel production and lower copper by-product credits from the planned reduced head grades from the mine. Forecast cash costs for 2019 are \$2.20/lb Ni, assuming a Cu by-product credit priced at \$2.80/lb.

<b>Eagle (\$/lb Ni)</b>	<b>2019</b>
Mining costs	1.51
Milling costs	0.97
G&A and other costs	1.85
TC/RCs	1.26
By-product credit, net of TC/RCs	(3.39)
<b>Cash Cost per payable pound of Nickel</b>	<b>2.20</b>

Total forecast capital costs for Eagle for 2019 are tabulated below. Sustaining capital includes primarily development to access new upper areas of the Eagle orebody and the mill water treatment plant. The Eagle East expansionary capital covers the final ramp access development and equipment purchases and infrastructure. Eagle East ore is expected into the mill in the fourth quarter of 2019.

<b>Eagle</b>	<b>Unit</b>	<b>2019</b>
Sustaining	\$M	15.0
Eagle East	\$M	30.0
<b>Total</b>	<b>\$M</b>	<b>45.0</b>

The information presented in this section is forward looking information. See "Cautionary Statement on Forward-Looking Information" and "Risks and Uncertainties".

#### 4.7.2.13 Exploration, Development, and Production

In 2019, surface exploration will focus on newly generated targets both near mine and regionally. A total of up to 40,000 m of drilling from surface are projected. The 2019 underground drilling campaign will include 36,610 m in 160 holes to improve the definition of the Eagle East deposit.

The total exploration expenditure for 2019 is forecast at \$23 million.

In 2018, Eagle produced 17,573 tonnes of nickel in concentrate and 17,974 tonnes of copper in concentrate, respectively. For 2019, forecast production is as tabulated below.

<b>Eagle</b>	<b>Unit</b>	<b>2019</b>
Nickel Production	'000 Tonnes	12 – 15
Copper Production	'000 Tonnes	12 – 15

Current estimated Mineral Reserves at Eagle and Eagle East are sufficient for a LOM to mid-2024.

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

### **4.7.3 Neves-Corvo Mine**

The Neves-Corvo Mine is located in Portugal and is owned and operated by the Portuguese company Somincor, which is a 100% owned subsidiary of Lundin Mining. The scientific and technical information in the following section has been derived, in part, from the Neves-Corvo Report. The Neves-Corvo Report is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com)

#### **4.7.3.1 Project Description, Location and Access**

The Neves-Corvo Mine is situated approximately 220 km southeast of Lisbon in the Alentejo district of southern Portugal. The mine site is located approximately 15 km southeast of the town of Castro Verde and exploits five major orebodies from an underground mine. The ore is processed on-site, and tailings are disposed of in the Cerro de Lobo impoundment approximately 3 km from the plant. Concentrates are dispatched by rail and road for onward shipping to customers.

Neves-Corvo has good connections to the national road network which links with Faro to the south and Lisbon to the north. The mine has a dedicated rail link into the Portuguese rail network and to the port of Setúbal.

There are no major centres of population close to the mine, although a number of small villages with populations numbered in the hundreds are located within the mining concession. Most employees travel to the mine by Company-provided buses or private cars.

The mining operations are contained within a mining concession contract between the Portuguese government (government) and Somincor that, as of July 1, 2014, covers an area of 28.9 km<sup>2</sup> and are located in the parishes of Santa Bárbara de Padrões and Senhora da Graça de Padrões, counties of Castro Verde and Almodôvar, district of Beja. The concession comprises the Neves-Corvo area with 13.5 km<sup>2</sup> and the Semblana area, covering the Semblana Deposit, with 15.4 km<sup>2</sup>. The concession provides the rights to exploit the Neves-Corvo deposits for copper, zinc, lead, silver, gold, tin and cobalt for an initial period of fifty years (from November 24, 1994) with two further extensions of twenty years each. The mining concession provides sufficient surface rights to accommodate the existing mine infrastructure and allow expansion if required.



An exploration concession of 140.6 km<sup>2</sup> that surrounds the combined Neves-Corvo mining concession and exploration targets in the district was granted to Somincor in June 2018 and is valid for an initial period of three years with one extension of two years.

Royalties for the Neves-Corvo area of the mining concession are either a profit-related royalty of 10%, or a revenue-based royalty of 1% (at the government's discretion). Royalties on the Semblana area are a 4% revenue based royalty for copper and associated payable metals and 3.5% for zinc and associated payable metals. The Semblana royalty payments may be reduced by between 2% and 6% of Somincor expenditure on mining related research, social projects and the granting of scholarships.

#### **4.7.3.2 History**

The Neves-Corvo ore bodies were discovered in 1977. The Portuguese company Somincor was established to exploit the deposit and by 1983, the Corvo, Graça, Neves and Zambujal sulphide deposits had been partially outlined, covering an area of approximately 1.5 km by 2 km. Rio Tinto became involved in the project in 1985, effectively forming a 49%/51% joint venture with the Portuguese government-owned company EDM. The project was reappraised with eventual first production commencing from the Upper Corvo and Graça orebodies in January 1989.

During the development of the mine, high-grade tin ores were discovered, associated with the copper mineralization, which led to the rapid construction of a tin plant that was commissioned in 1990.

The railway link between Neves-Corvo and Setúbal was constructed between 1990 and 1992 for the shipment of concentrates and the hauling of sand for backfill on the return journey. This was followed between 1992 and 1994 by a major mine deepening exercise to access the Lower Corvo orebody through the installation of an inclined conveyor ramp linking the 700 and 550 levels.

In June 2004, EuroZinc acquired a 100% interest in Somincor for consideration of €128 million. In October 2006, EuroZinc merged with Lundin Mining and the Lundin Mining name was retained.

In January 2005 an agreement was signed between Somincor and EDM whereby EDM retained the right to acquire up to 15% in mining projects located in Somincor exploration concessions located outside the original mining concession area A. This agreement had an original term of ten years and was extended to January 13, 2020.

In 2006, zinc production was commenced at Neves-Corvo with processing through the modified tin plant. In June 2007, Wheaton PMC agreed to acquire 100% of the life-of-mine payable silver production from the mine, within the limits of the original concession, as the mine produces around 0.5 million ounces of silver per year in copper concentrate. Zinc production was suspended in November 2008 due to the low prevailing zinc price. In September 2009, the decision was made to expand the zinc plant to a design capacity of 50,000 tpa zinc in concentrate and first zinc production was achieved from the expanded plant in mid-2011.

In mid-2009, a copper tailings retreatment circuit was commissioned to recover both copper and zinc, and in late 2010, tailings disposal changed from subaqueous to paste methods at the Cerro do Lobo facility.

In October 2010, the copper rich Semblana deposit was discovered 1 km to the northeast of the Zambujal copper-zinc orebody within the Castro Verde exploration concession. In December

2011, following extensive diamond drilling, an initial Inferred Mineral Resource estimate was published, which was further updated in June 2012. A pre-feasibility study of the Semblana Project was delivered to EDM in August 2013.

In December 2014 EDM exercised its right to a definitive 15% interest in the Semblana Project and an area designated as the mining concession area B, an area that was previously known as the Castro Verde exploration concession. No further work has taken place on the Semblana Project since the pre-feasibility study has been completed in 2013.

An updated Feasibility Study examining an expansion of the zinc operations to 2.5 mtpa throughput was completed early 2017 and the project approved in May 2017. The Zinc Expansion Project contemplates increasing zinc mining and processing capacity from 1.1 to 2.5 mtpa generating an average of 150,000 tpa of zinc in concentrate over 10 years. Approval of the ZEP EIA was granted in July 2017, with engineering and underground work commencing thereafter. The forecast total capital expenditure on the ZEP is now estimated at €320 million (\$385 million) and completion and commencement of commissioning is anticipated in early 2020.

#### **4.7.3.3 Geological Setting, Mineralization and Deposit Types**

Neves-Corvo is located in the western part of the Iberian Pyrite Belt (IPB), which stretches through southern Spain into Portugal and which has historically hosted numerous major stratiform volcano-sedimentary massive sulphide deposits. At the base, the IPB consists of a pre-orogenic sequence of shales and arenites (phyllites and quartzites) conformably overlain by a 200 to 700 m thick volcanic-sedimentary succession, the Volcanic Siliceous Complex (VSC) of Late Devonian-Early Carboniferous age, 360-342 Ma. The VSC comprises fine grained clastic sediments and felsic to mafic (bimodal) volcanic rocks. The entire sequence shows pervasive hydrothermal alteration.

The Neves-Corvo deposits occur within the VSC. Overlying the mineralization, there is a thrust-faulted repetition of volcano-sedimentary and flysch units. The whole assemblage has been folded into a gentle anticline-oriented northwest to southeast plunging to the southeast, resulting in orebodies distributed on both limbs of the fold. All the deposits have been affected by both sub-vertical and low angle thrust faults, causing repetition in some areas.

The mineral deposits at Neves-Corvo are classified as volcano-sedimentary massive sulphide. They typically occur as lenses of polymetallic (Cu, Zn, Sn, Pb) massive sulphides that formed at or near the seafloor in submarine volcanic environments. They formed from accumulations of the focussed discharges of hot metal-enriched fluids associated with seafloor hydrothermal convection, typically in tectonic areas of active submarine volcanism, including rift spreading centres and island arc subduction zones

Seven massive sulphide lenses have been defined at Neves-Corvo comprising Neves, Corvo, Graça, Zambujal, Lombador, Semblana and Monte Branco. The base metal grades are segregated by the strong metal zoning into copper, tin and zinc zones, as well as barren massive pyrite. The massive sulphide deposits are typically underlain by stockwork sulphide zones, which form an important part of the copper orebodies.

The mineralized zones lie on both flanks of the Roário-Neves-Corvo anticline. The mineralised zones of Neves, Corvo, Graça, Zambujal and Lombador are connected by thin massive sulphide “bridges” over the crest of the fold and are conformable with the stratigraphy. Within the area of

these five main deposits, this has resulted in an almost continuous complex volume of mineralised rock showing a large range in both style of mineralisation and geological structure.

The Corvo orebody lies between 230-800 m below surface, dips to the northeast at 10-40° and has a strike of approximately 600 m. The orebody attains a maximum thickness of 95 m and consists of a basal layer of copper ore up to 30 m thick, overlain by barren pyrite containing intermittent lenses of copper mineralisation.

The Graça orebody is up to 80 m thick, extends for 700 m along strike, 500 m down dip and ranges in depth below surface from 230-450 m. The orebody is linked to Corvo by a bridge of thin continuous sulphide mineralization. As with Corvo, much of the copper ore occurs as a basal layer overlain by barren pyrite in which there are also intercalations of copper ore.

The Neves deposit consists of two lenses of mineralization, joined by a thin bridge, which dip north at 0-35°. The maximum true thickness is 55 m with a strike length of 1,200 m and 700 m down dip. The southern lens, Neves South, contains mostly of zinc ore with significant lead, silver and copper grades and minor barren pyrite, underlain by copper ore, which is locally tin-bearing.

The Zambujal orebody comprises significant copper and zinc mineralization straddling the crest of the Neves-Corvo Anticline. It has a thickness of 53 m and plan dimensions of 550 m on strike and 600 m on dip. It contains a succession of zinc rich lenses containing some massive copper mineralisation.

The Lombador deposit is the largest of the five massive sulphide deposits at Neves-Corvo situated on the north-eastern flank of the anticline. It is located at a depth of 400 m at its western end and extends down to a depth of 1,200 m below surface. It dips to the northeast at approximately 35° but steepens at depth and has a shallow plunge to the northwest. The sulphide lens has dimensions of up to 15 m in thickness and extends for approximately 1,400 m down dip and at least 1,600 m along strike.

The Monte Branco deposit was discovered in 2011 from surface exploration drilling. The deposit is located approximately 1.2 km to the south of Semblana and just west of the Cerro do Lobo TSF and comprises six discontinuous lenses that have been strongly affected by tectonic shearing. Monte Branco represents a new centre of strong, concentrated sulphide mineralisation, currently covering approximately 250 m by 200 m in area and at depths of between 540 m and 700 m below surface.

The Semblana deposit is almost flat and has gentle dip (15-20°) to the north and is located at a depth of 790 m below surface. Most drill holes have intersected copper bearing stockwork mineralization, although several small zones of massive copper in lenses have also been identified. The massive copper zone measures approximately 150 m north to south and 100 m east to west, although it is open to the east and west. Stockwork occurs as one continuous zone measuring approximately 700 m north to south and 250 m east to west.

#### **4.7.3.4 Exploration**

Exploration surrounding the Neves-Corvo mine has focused on the search for further blind massive sulphide deposits. Exploration techniques employed by Somincor at Neves-Corvo include soil geochemistry, geological mapping and various geophysical techniques including magnetics, gravity, electromagnetic and seismic surveys, in addition to exploration drilling.

In 2018, exploration work was concentrated on drill testing near-mine targets and regional geophysical targets outlined and prioritized during 2017. A total of 18,268 m of surface exploration drilling was undertaken, 13,416 m of which were drilled inside the mining concession focusing in the surrounding area of the Graça, Lombador, Neves and Monte Branco orebodies, and 4,852 m testing regional targets in the exploration concession. Interpretation of the results of this drilling program are pending.

#### **4.7.3.5 Drilling**

Drilling is undertaken using both surface and underground drilling methods. Underground drilling is a continuous activity at Neves-Corvo focusing on the delineating and upgrading of existing Mineral Resource estimates as well as the exploration of peripheral Inferred Mineral Resource estimates. Surface drilling campaigns have been important over the years in stepping out beyond the limits of underground development to explore extensions to mineralisation. Underground drilling is typically undertaken on 35 m spacing, whereas surface drilling is typically undertaken on 70 m to 100 m spacing or greater.

Underground production drilling was largely executed with a 10 m spacing between sections in order to better define the shape and grades of the production panels. As a standard procedure, drill holes are surveyed with a Reflex EZ-Shot tool at 30 m intervals, which provides an accurate location of the drill intersections.

In 2018, 483 underground diamond drill holes were drilled providing a total of 52,514 m made up of 44,596 m (460 drill holes) of underground production drilling and 7,918 m (23 drill holes) of evaluation drilling. Drill intercepts of copper mineralization were intersected in an area east of Zambujal within the mining concession area A and is referred to as Zambujal extension east. Follow-up drilling is planned in 2019 to determine the extent of mineralization and if any modifications to the design of Semblana Project ramp access must be done prior to initiating any development.

#### **4.7.3.6 Sampling, Analysis and Data Verification**

The sampling methodology, preparation and analyses differ depending on whether the sample is drill core or face sample. All samples are collected by Somincor geological staff with all sample preparation and analysis currently undertaken at the Neves-Corvo mine site and laboratory.

Sample preparation is conducted at the Neves-Corvo sample preparation facility located within the mine site for all samples with the exception of drill core from the Semblana exploration drilling where sample preparation was undertaken at the ALS laboratory in Seville, Spain, an independent laboratory.

Sample analyses is conducted at the Neves-Corvo analytical laboratory located within the mine site for all samples with the exception of drill core from the Semblana exploration drilling. Following sample preparation at ALS, Seville, the Semblana samples were then sent for analysis at ALS, Vancouver, an independent laboratory for analysis.

Laboratory samples were historically analysed using Atomic Absorption and X-Ray Fluorescence (“XRF”) methods. Since April 2011 analysis by Inductive Coupled Plasma (“ICP”) is also undertaken. Assay results based solely on the XRF analysis for Cu, Pb, Zn, S, Fe, As, Sn, Sb, Bi, Se and In are used for the purposes of Mineral Resource estimation.

Sample collection and transportation of drill core and face samples is undertaken by Somincor Geology Department staff. Somincor conduct a comprehensive QA/QC programme by the routine insertion of certified reference material, blanks and duplicates to monitor the sampling, sample preparation and analytical process. Analysis of QA/QC data is made to assess the reliability of sample assay data and the confidence in the data used for the estimation.

Data entry, validation, storage and database maintenance is carried out by Somincor staff using established procedures. All data are stored in a central SQL database located at the Neves-Corvo mine offices. The SQL database has a series of automated validation tools during import and export for error identification.

Industry standard exploration drill core splitting, sampling, insertion of quality control samples and density measurement protocols and procedures are in place at Neves-Corvo. In addition to drill core sampling, underground grade control sampling is carried out using face sampling in the areas subject to drift-and-fill mining and short diamond drill holes in the bench-and-fill areas. Samples are prepared on-site and analyzed at either the mine's fully accredited assay laboratory facility or by the independent ALS Chemex laboratory in Vancouver, Canada.

Data verification, sample security and QA/QC procedures that conform to industry standards are in place at Neves-Corvo. All drill cores are logged and photographed, and the cores and sampling splits are stored on-site, except for production holes where the entire core, is crushed and sent to be assayed. Traceability records prevent errors of identification and ensure sample history can be followed.

#### **4.7.3.7 Mineral Processing and Metallurgical Testing**

Neves-Corvo maintains regular metallurgical testing programs that are incorporated with historical testing results and mill performance into statistical models to predict and improve the complex's processing performance. Model outputs are mill throughput, grind requirements, metal recovery to concentrate, and final concentrate grade. Metallurgical tests are executed in a number of specialized in-house and commercial facilities. Testing includes milling work indices, mineralogy using optical QEMSCAN™ and MLA techniques and bench scale flotation testing that is correlated with industrial scale performance in order to predict mill throughput and metallurgical performance.

A comprehensive suite of metallurgical testwork programmes and studies were completed as a part of the ZEP Feasibility Study. These studies included mineralogical, comminution and flotation programmes on representative samples obtained from drill core. These programmes were carried out at Somincor and third-party facilities, and demonstrated that acceptable zinc recoveries and concentrate specifications could be achieved from the proposed processing circuit.

#### **4.7.3.8 Mineral Resource and Mineral Reserve Estimates**

Mineral Resources at Neves-Corvo are estimated using three-dimensional interpretation and modelling methods with calculations performed using specialized software Leapfrog® and Vulcan® 3D. The ordinary kriging method of interpolation is used to estimate metal grades and a simple regression formula using the estimated sulphur grades is used to estimate density.

Mineral Reserves are estimated by the Neves-Corvo Mine planning department primarily using Vulcan® 3D software. Stopping volumes are cognizant of the method of access to allow for the

cut-off grade boundary and include an allowance for planned and unplanned dilution and ore loss. An effective minimum mining width of 5 m is applied.

The Semblana Mineral Resource was modelled and estimated using Datamine Studio software. Metal grades were estimated using ordinary kriging or inverse distance weighting. Bulk density was estimated using inverse distance weighting.

Factors which may affect the Mineral Resources and Mineral Reserve estimates include: dilution and mining recovery, metal prices, smelter, refining and shipping terms, metallurgical performance, geotechnical characteristics of the rock mass, capital and operating cost estimates, and the likelihood of obtaining land title, required permits and environmental, social and legal licenses. To the extent such factors are within the control of or capable of influence by the Company, these factors are managed through industry accepted practices and procedures and well as maintaining an engaged and constructive dialogue with the local communities and government authorities.

Details of the June 30, 2018 Mineral Resource and Mineral Reserve estimates for Neves-Corvo and Semblana are included in Schedule "A", attached to this AIF.

#### **4.7.3.9 Mining Operations**

Neves-Corvo is a major underground mine. The principal means of mine access are provided by one vertical 5 m diameter shaft and a ramp from surface. The shaft is used to hoist ore from the 700 m level. The surface is nominally 1,220 m above datum, or 220 mamsl. A conveyor decline descends from the 700 m level to the 550 m level and provides ore hoisting from the deeper levels of the mine. The mine is highly mechanized, and a number of different stoping methods are employed but the most significant are bench-and-fill, uphole longhole stoping, and drift-and-fill. Backfill is provided by hydraulically placed sand, paste tailings and internally generated waste rock.

New mine infrastructure for ZEP includes a new crusher station on the 260 m level, a conveyor system connecting this to the 700 shaft hoisting facilities, an upgrade to the main hoisting shaft together with extensions to the mines ventilation, pumping and electrical distribution systems. Much of the zinc ore for the ZEP will be mined in deep areas of the Lombador orebody using primarily bench and fill mining methods, with limited amounts of drift and fill.

#### **4.7.3.10 Processing and Recovery Operations**

The treatment facility at Neves-Corvo comprises two processing plants. The copper plant processes copper ores and has a maximum capacity of approximately 2.6 mtpa and the zinc plant, which treats zinc or copper ores was expanded to 1.0 mtpa capacity during 2011. Both processing plants comprise conventional crushing, rod and ball mill grinding circuits with flotation cells and concentrate thickening and dewatering. In mid-2009, modifications to the copper plant were completed to regrind and recover additional copper and zinc concentrate from the copper tailings stream. A similar modification to the zinc plant was commissioned in late 2014.

Modifications to the existing zinc plant for the ZEP project include new surface stockpile and feeder facilities, an expanded grinding circuit including a new SAG with reconfiguring of the existing rod mill to a secondary ball mill, expanded flotation capacity, expanded zinc and lead thickeners and filters and associated expansions and upgrades to ancillary services.



Copper and zinc concentrates are transported by rail to a dedicated port facility at Setúbal, Portugal from where they are shipped to smelter customers. Lead concentrate is containerised and trucked to ports for overseas shipment.

Copper and zinc concentrates are transported by rail to a dedicated port facility at Setúbal, Portugal from where they are shipped to smelter customers. Lead concentrate is containerised and trucked to ports for overseas shipment.

Tailings disposal was changed from subaqueous to sub-aerial paste deposition during 2010 following approval by the Portuguese authorities. Tailings are thickened and pumped from a facility located at the Cerro de Lobo tailings impoundment, 3 km from the mine site. Detailed design is underway on expanding the tailings facilities to accommodate the additional tailings from the expanded processing facilities.

Copper, zinc and lead concentrates from the mine are sold to a variety of smelter customers that are primarily European based. Multi-year sales contracts are normally agreed with customers and treatment, refining and penalty charges are typical of those for copper, zinc and lead sulphide concentrates.

#### **4.7.3.11 Infrastructure, Permitting and Compliance Activities**

The Neves-Corvo Mine is in an area of southern Portugal that is easily accessible via a dedicated railhead to the mine site, excellent roads, a major highway within 25 km, and an international airport at Faro, approximately 80km to the south.

Fresh water is supplied to the mine via a 400 mm diameter pipeline from the Santa Clara reservoir, located approximately 40 km west of the mine. Supply capacity is 600 m<sup>3</sup>/hr and storage facilities close to the mine hold 30 days' supply requirements. The total water requirement for the mine and plant is estimated at over 350 m<sup>3</sup>/hr, with up to 75% of the volume being reused. The mine is connected to the national energy grid by a single 150 kV, 50 MVA rated, overhead power line, approximately 22.5 km in length.

Neves-Corvo operates under an Integrated Pollution Prevention and Control Licence, granted by the Portuguese Environmental Agency, Agência Portuguesa do Ambiente ("APA"), in 2008. The Licence includes conditions covering environmental management systems, tailings and waste rock disposal, water and energy consumption, emissions to atmosphere, emissions to water courses and water treatment, noise, industrial waste disposal, emergency and closure planning.

Key environmental issues being managed by the mine include the acid-generating potential of the ore and waste rocks; the proximity of the Oeiras River to the mine site; the presence of an area groundwater system that is part of a significant aquifer, connecting to local water supplies and the Oeiras River; and the dispersal of dust and noise from the mine site. To support effective environmental management, Neves-Corvo is progressing various environmental studies, including a site-wide hydrogeological investigation. In 2018, Neves-Corvo commenced the update of the Mine Closure Plan (MCP), a regulatory requirement to be completed every five years, and including the review of closure costs to cover the final closure process.

Neves-Corvo submitted an Environmental Impact Study (Portuguese acronym "EIA") in late November 2016 to the Portuguese authorities, in support of the Zinc Expansion Project (ZEP). The ZEP EIA was reviewed by APA, and their approval was received in July 2017. Following on the receipt of the EIA approval, or DIA, the ZEP team commenced to the next step in the permitting



process, the submission of a Relatório de Conformidade Ambiental do Projecto de Execução (“RECAPE”). The RECAPE is a detailed review of basic engineering data to confirm consistency with the project definition as presented in the EIA, with respect to environmental impacts. Neves-Corvo completed the RECAPE documentation submission for ZEP in October 2017. The project received regulatory approval, referred to as a DCAPE, in 2018. The associated RECAPE1 Municipal Construction permit application package was also submitted to municipal authorities in December 2017, with approval received in early 2018.

Preparations for the ZEP-associated tailings facility expansion permitting process, which will be submitted as a separate RECAPE, referred to as RECAPE2, continued in 2018, with the permitting package due for submission in mid-2019.

The new Environmental License, referred to as the Single Environmental Title (“SET”) or Título Único Ambiental (“TUA”), was issued in August 2017 and will be updated in 2019 to incorporate consideration of the Zinc Expansion Project.

The social performance team engages with stakeholders in the communities nearest the mine, namely Castro Verde, Almodôvar, Aljustrel, Mértola and Ourique. Engagement occurs throughout the year and is focused on managing social impacts, risks and opportunities specific to each community. The team bases their activities on a 5-year social performance strategic plan and systems which reflect best practice and international standards in stakeholder engagement, grievance procedures, risk management and community investment.

In 2018, Somincor dedicated approximately \$380,000 to strategic community investments focused on education, wildlife protection, economic diversification, and community safety.

#### 4.7.3.12 Capital and Operating Costs

Total forecast Neves-Corvo cash costs for 2019 are tabulated below using a forecast exchange rate of US dollar/€: 0.8333. Unit operating costs are forecast to increase from 2018 largely as a result of lower by-product credits. Forecast cash costs for 2019 are \$1.70/lb Cu, assuming a Zn by-product credit priced at \$1.10/lb.

<b>Neves-Corvo (\$/lb Cu)</b>	<b>2019</b>
Mining costs	1.43
Milling costs	0.56
G&A and other costs	0.76
TC/RCs	0.34
By-product credit, net of TC/RCs	(1.39)
<b>Cash Cost per payable pound of Copper</b>	<b>1.70</b>

Total forecast capital costs for Neves-Corvo for 2019 are tabulated below. ZEP capital expenditure is forecast at \$210 million while sustaining capital includes primarily underground development, water treatment infrastructure and replacement and upgrades of the underground mining equipment.

<b>Neves-Corvo</b>	<b>Unit</b>	<b>2019</b>
Sustaining	\$M	65.0
ZEP Project	\$M	210.0
<b>Total</b>	<b>\$M</b>	<b>275.0</b>

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

#### **4.7.3.13 Exploration, Development, and Production**

The 2019 underground drilling plan includes 45,625 m of production drill holes to improve the definition of the mining panels in the Lower Corvo, Neves North and South, Zambujal and Lombador North and South orebodies.

Plans for 2019 surface exploration include a combined total of 30,000 m of drilling between both the mining and exploration concessions, along with subsequent borehole electro-magnetic surveys. Targeting will continue to be based on updates to the 3D integrated model, including new and revised geologic cross sections along with re-interpretation from the 3D seismic data. A targeting review session is planned to be held in 2019 and the total drilling meterage may be increased or decreased depending on results. The total forecast exploration expenditure in 2019 is \$7 million.

In 2018, Neves-Corvo produced 45,692 tonnes of copper in concentrate and 75,435 tonnes of zinc in concentrate. For 2019, forecast production is as tabulated below.

<b>Neves-Corvo</b>	<b>Unit</b>	<b>2019</b>
Copper Production	'000 Tonnes	40 - 45
Zinc Production	'000 Tonnes	71 - 76

The current copper and zinc Mineral Reserves at Neves-Corvo will support a LOM of over 10 years with copper production, based on current Mineral Reserves estimates, gradually decreasing, and planned zinc production, with the completion of the ZEP project, substantially increasing.

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

#### **4.7.4 Zinkgruvan Mine**

The Zinkgruvan Mine is located in south central Sweden and is owned and operated by Zinkgruvan Mining AB (“ZMAB”) which is a 100% indirect subsidiary of Lundin Mining. The scientific and technical information in the following section has been derived, in part, from the Zinkgruvan Report. The Zinkgruvan Report is available on SEDAR under the Company’s profile at [www.sedar.com](http://www.sedar.com).

##### **4.7.4.1 Project Description, Location and Access**

The Zinkgruvan Mine is located approximately 200 km southwest of Stockholm. The mine site is approximately 15 km from the town of Askersund and comprises a deep underground mine, a processing plant and associated infrastructure and tailings disposal facilities. Concentrates are trucked from the mine to the inland port of Otterbäcken on Lake Vänern from where they are shipped via canal and sea to European smelter customers.

Zinkgruvan has good local road access and is close to the main E18 highway linking Stockholm and Oslo. Rail and air links are available at the town of Örebro some 60 km distant. Lake Vänern, the largest lake in Sweden, is 100 km distant and provides access to coastal shipping via a series of inland canals and the port of Göteborg.

The mining operations are contained within two exploitation concessions covering the deposit and its immediate area. The Zinkgruvan concession was amalgamated from a large number of smaller rights in 2000, has an area of 254 ha and is valid until 2025. The neighbouring Klara concession was granted in 2002, has an area of 355 ha and is valid until 2027. A third mining concession, the Marketorp concession, which is 40 km due east of Zinkgruvan, has an area of 70 ha and is valid until 2026, although no mining operations exist on this property. These exploitation concessions are automatically extendable for periods of 10 years provided the concession is being regularly exploited.

In addition, the mine currently holds five exploration concessions in the area totaling 5,700 ha with a variety of expiry dates. Initially, an exploration concession is valid for three years. During this time, if the holder wishes to extend the concession period, an application to the Mining Inspectorate must be submitted. If adequate exploration is deemed to have been undertaken by the Mining Inspectorate during the initial three years, then a first renewal of the concession can be applied for. The first renewal period is for three years. A second renewal of up to 4 years can then be applied for if special reasons for the second renewal can be demonstrated by the applicant. A third renewal of up to 5 years can be granted by the Mining Inspectorate if exceptional reasons can be demonstrated and that extensive work has been undertaken within the concession and that further exploration will likely result in conversion to an exploitation concession.

For exploitation concessions granted before 2005, there are no mining royalties in Sweden. The corporation tax rate in Sweden is 22%. The Zinkgruvan Mine owns sufficient freehold surface land to accommodate the existing and planned mine infrastructure.

The Zinkgruvan Mine is operating under a recently extended environmental licence that is valid until 2026.

#### 4.7.4.2 History

The Zinkgruvan deposit has been known since the 16th century but it was not until 1857 that large scale production commenced under the ownership of the Belgian company Vieille Montagne. The initial processing plant for these operations from the 1850s to the late 1970s was in Åmmeberg on the shores of Lake Vättern with ore transported approximately 5 km from the mine site by narrow gauge railway.

In the mid-1970s, Vieille Montagne made a decision to significantly expand production to 600,000 tpa. A new shaft, named P2, was sunk to access deeper ore and the Åmmeberg facilities were replaced by a new concentrator and tailings facility built adjacent to the mine site.

In 1990, Vieille Montagne merged into Union Miniere of Belgium, and in 1995, North Australia acquired the Zinkgruvan Mine. In August 2000, Rio Tinto became the owner of the mine following its acquisition of North Australia. In June 2004, Lundin Mining purchased the mine from Rio Tinto.

In December 2004, Wheaton PMC agreed to purchase the LOM silver production from the Zinkgruvan Mine. In October 2007, the Company announced the Zinkgruvan expansion program to increase ore production by 300,000 tpa through the addition of copper to the zinc-lead production.

In late 2010, the copper plant was commissioned and, during 2011, modifications were made to allow the plant's 300,000 tpa ore capacity to be used to also treat zinc/lead ores. In November 2010, an access ramp from the surface to the underground workings was completed, allowing a significant increase in the mine's operational flexibility. In 2015, a low-cost project was approved to increase the overall mill capacity by approximately 10%. This investment, which focused primarily on increased grinding capacity and improved plant availability, was completed in June 2017. Expansion of the existing Enemossen tailings storage facility was initiated in 2016, with the new and adjacent Enemossen East facility receiving first tailings in October 2017.

Increased exploration drilling in 2018, resulted in the delineation of additional Inferred Mineral Resources in the Dalby area of the mine. Infill and exploration drilling is ongoing and conceptual feasibility study work has commenced.

#### 4.7.4.3 Geological Setting, Mineralization and Deposit Types

The Zinkgruvan deposit is located in the southern part of the Bergslagen province of south-central Sweden. The province comprises a Proterozoic aged (1.9 giga-annum or Ga) greenstone belt and hosts massive Zn-Pb, Cu and Ag sulphide ores and banded iron formations. The supracrustal rocks are dominated by felsic metavolcanics successions with limestones and calcsilicates commonly found within the metavolcanics. The province was folded and metamorphosed to upper amphibolite facies during the Svecofennian orogeny (1.9-1.8 Ga).

The Zinkgruvan deposit comprises a stratiform, massive Zn-Pb deposit situated in an east-west striking synclinal structure within the lower Proterozoic Svecofennian supracrustal sequence (1.90 Ga - 1.88 Ga). The deposit exhibits distinctive stratification and extends for more than 5,000 m along strike and to depths of 1,600 m. The orebody thickness ranges from 3 to 40 m. In the central part of the deposit the zinc-lead mineralisation is stratigraphically underlain by a substratiform copper stockwork. Deformation during the Svecofennian orogeny included isoclinal folding resulting in the stratigraphy of the area being overturned. A regional north-northeast to south-southwest trending fault (the Knalla fault) is present in the centre of the property and separates

the deposit into two areas. The Nygruvan area, which provided most of the historical mine production, is located to the east and strikes northwest to southeast and dips subvertically to the northeast. The Knalla area is located to the west of the fault and strikes northeast to southwest and dips variably to the northwest. The Knalla area is further sub-divided into the following areas from northeast to southwest: Burkland, Lindängen (now predominantly depleted by mining), Sävsjön, Mellanby, Dalby, Cecilia and Borta Bakom.

The Zinkgruvan orebodies are dominated by sphalerite and galena and are generally massive, well banded and stratiform. Remobilization of galena and silver has occurred in response to metamorphism and deformation, and is most pronounced in the lead-rich western extension of Nygruvan and in the Burkland area.

Copper stockwork mineralization occurs in the structural hanging wall of the Burkland deposit. Chalcopyrite is the main copper mineral and occurs as coarse disseminations and patches within a marble host rock.

General consensus exists on a syngenetic-exhalative origin for the Zinkgruvan deposit in which lenses of polymetallic (Zn, Pb, Ag (and Cu)) sulphides formed at or near the seafloor in submarine hot spring environments. They formed from accumulations of the focussed discharges of metal-enriched fluids associated with seafloor hydrothermal convection, potentially associated with areas of active submarine volcanism including rift spreading centres.

#### **4.7.4.4 Exploration**

Drilling is the principle means of near mine exploration. Historical exploration comprised a heliborne magnetic and radiometric survey covering an area of 223 km<sup>2</sup> including the mine site and immediate area was carried out, a GEOTEM® air borne electromagnetic survey covering an area of 236 km<sup>2</sup> was flown, extensive ground geophysical surveys including magnetic, horizontal-loop electromagnetic and induced polarization were undertaken while geological mapping, conventional till sampling and MMI geochemical surveying were also carried out. A number of possible targets were identified during the exploration programme; however, none of these were tested by drilling and no further work was undertaken on them prior to 2000. Since 2000, exploration has predominantly been focussed on near mine targets rather than regional.

Exploration has focused primarily on replacing mining depletion with new Mineral Resources, initially by exploring the continuation of the Burkland and the Dalby areas at depth. Due to the depth of the exploration areas and the relatively complex geometry, exploration is mostly done by underground drilling. Underground development has been done in the Mellanby/Dalby area at depths of 650 m and 1,125 m to provide platforms for drilling to test for possible extensions and further evaluate the potential of these areas. More recently, significant exploration has been done from surface on the Dalby area to the mine. A 2D seismic survey was also completed to help with the interpretation of the geology at depth.

#### **4.7.4.5 Drilling**

Underground exploration, comprising Mineral Resource estimation and stope definition drilling, is carried out on an ongoing basis. Stope definition holes are drilled from underground with intersections typically on 15 m by 20 m centres. Drill holes are surveyed at 3 m intervals using gyro surveying equipment which provides an accurate location of the drill intersections.

Underground drilling has focussed on the deep levels of Nygruvan, Burkland (including the copper stockwork), Mellanby, Dalby and Borta Bakom. Surface drilling focussed on identifying near surface along strike extensions of Nygruvan and most recently on targeting deep down dip extensions of the Dalby area.

In 2018, 41,414 m of exploration drilling was completed, with 18,689 m from underground and 22,725 m from surface, to explore the possible continuation of the Western field and the Burkland and Nygruvan areas at depth. In addition, a total of 33,950 m of infill and definition drilling was completed underground.

#### **4.7.4.6 Sampling, Analysis and Data Verification**

All samples are collected by ZMAB geological staff and all sample preparation is undertaken at the Zinkgruvan mine site facility. Sampling procedures are the same for both underground and surface drill core. Core boxes are transported from the drill sites to the on-site logging facilities at Zinkgruvan mine. Core sample intervals selected for analyses are halved with splitting performed by an Almonte® core saw.

Sample preparation is carried out on-site at the Zinkgruvan. Jaw crushing is undertaken in a facility located adjacent to the core logging facility while all further stages of sample preparation are undertaken within a section of the Zinkgruvan analytical laboratory. All geological samples are assayed at ACME Analytical Laboratories, Vancouver, Canada, an independent laboratory. The laboratory runs assays using ICP to analyse for 23 elements, including: Zn, Pb, Ag, Cu, Co, Ni, Al, As, Bi, Ca, Cd, Cr, Fe, Hg, K, Mg, Mn, Mo, Na, P, Sb, Sr, and W.

A systematic QA/QC programme was implemented during 2001. The same QA/QC procedures have been in place at Zinkgruvan since 2001 and includes insertion of duplicates, standards and blanks into the sample stream prior to shipment to ACME. External assay checks are carried out by ALS Chemex, Vancouver, an independent laboratory. The results of the assaying are continually reviewed by Zinkgruvan geological staff.

Data entry, validation, storage and database maintenance is carried out by ZMAB geological staff using established procedures. The data used for Mineral Resource estimation is based on only diamond core produced from either surface or underground drilling of generally 56 mm diameter core size. All data are stored in a central Oracle database located at the ZMAB mine offices. Assay values are uploaded into the database from Excel worksheets that have been sent from ACME. Prior to uploading of the assay data, a statistical check of the QA/QC data is undertaken by ZMAB geological staff. In addition, the Oracle database has a series of automated validation tools during import and export for error identification.

In each case, established procedures were used to ensure the security of samples during transportation between the drill rig and the laboratories. Quality assurance procedures, data verification and assay protocols used in connection with drilling and sampling conform to industry accepted quality control methods.

#### **4.7.4.7 Mineral Processing and Metallurgical Testing**

Zinkgruvan makes significant use of historical testing results and mill performance to predict and improve the complex's processing performance in terms of mill throughput, metal recovery to concentrate, and final concentrate grade. Metallurgical tests are also executed in a number of specialized academic and commercial facilities. Testing includes grindability work indices,



mineralogy using optical and QEMSCAN™ technology when necessary and bench scale flotation testing. This testwork, coupled with industrial scale performance, has demonstrated that the Zinkgruvan processing plant is amenable to treating future ore sources and that the mill throughput and metallurgical performance is predictable.

#### **4.7.4.8 Mineral Resource and Mineral Reserve Estimates**

Mineral Resources at Zinkgruvan are estimated using 3D block modelling in Leapfrog Geo and Maptek Vulcan software. Ordinary kriging, Radial Base Function and inverse distance weighting methods are used for grade estimation. Density is estimated using a regression formula based on estimated metal grades.

Mineral Reserves are estimated from Mineral Resource estimates using Vulcan® and Deswik® software. In estimating the Mineral Reserves, the mine uses a NSR based variable cut off value together with dilution and mining recovery factors that are based on the mine's long operating experience.

Factors which may affect the Mineral Resources and Mineral Reserve estimates include: dilution and mining recovery, metal prices, smelter, refining and shipping terms, metallurgical performance, geotechnical characteristics of the rock mass, capital and operating cost estimates, and the likelihood of obtaining land title, required permits and environmental, social and legal licenses. To the extent such factors are within the control of or capable of influence by the Company, these factors are managed through industry accepted practices and procedures and well as maintaining an engaged and constructive dialogue with the local communities and government authorities.

Details of the June 30, 2018 Mineral Resource and Mineral Reserve estimates for Zinkgruvan are included in Schedule "A", attached to this AIF.

#### **4.7.4.9 Mining Operations**

Zinkgruvan is an underground mine with a long history. Mine access is currently via three shafts, with the principal P2 shaft providing hoisting and man access to the 800 m and 850 m levels with the shaft bottom at 900 m. A ramp connecting the underground workings with surface was completed in 2010 and now provides vehicle access direct to the mine. A system of ramps is employed to exploit estimated Mineral Reserves below the shaft and the deepest mine level is now at approximately 1,250 m below surface. The mine is highly mechanized and uses longhole primary secondary panel stoping in the Burkland area of the mine, and sublevel benching in the Nygruvan area and in the Cecilia area. Recently underhand panel stoping has been introduced to the lower sections of the Burkland and Nygruvan orebodies. All stopes are backfilled with either paste tailings and cement or waste rock.

#### **4.7.4.10 Processing and Recovery Operations**

The processing plant is located adjacent to the P2 shaft. The run-of-mine zinc/lead ore is milled in two single stage closed-circuit autogenous grinding mills. A bulk flotation stage is followed by lead-zinc separation in the cleaner flotation section to produce separate zinc and lead concentrates. The concentrates are thickened and filtered and then stockpiled under cover. Metallurgical recoveries average approximately 90% for zinc and 82% for lead. Tailings are pumped some 4 km to a dedicated tailings impoundment from which decant water is returned to the process.



A separate 0.3 mtpa copper treatment line in the processing plant was commissioned during 2010. This line was further modified during 2011 to allow it the flexibility to treat zinc-lead ore as well as copper ore. Metallurgical recoveries of copper average 90%.

Zinc, lead and copper concentrates from the mine are sold to a variety of European smelters. Multi-year sales contracts are normally agreed upon with customers and treatment, refining and penalty charges are typical of those for zinc, lead and copper sulphide concentrates. The lead concentrates are particularly high-grade and contain elevated levels of silver.

#### **4.7.4.11 Infrastructure, Permitting and Compliance Activities**

Zinkgruvan is accessible by good system of local roads, with rail and air access at the town of Örebro, located approximately 60 km from the mine. Lake Vänern is located 100 km from the mine and provides access to coastal shipping, via a series of inland canals to the Port of Göteborg. The mine has ready access to grid power, domestic water and industrial water sources and communications systems.

Zinkgruvan Mine is operating under an Environmental Licence that is valid until 2026. The Licence includes conditions covering production levels, tailings disposal, water discharge limits, hazardous materials, process chemicals, water recirculation, noise levels, blast-induced vibrations, dust pollution, waste handling, energy use and closure planning. Closure Plan updates were initiated in 2018 and are in process.

Throughout 2018, Zinkgruvan submitted environmental study reports (e.g. noise, dust emissions and water discharge quality) in compliance with the conditions of the Enemossen Environmental Licence. These reports are in various stages of review and response with the relevant authorities. In addition, Zinkgruvan submitted a Mine Concession application to the Mine Inspectorate for the Dalby property in June 2018.

The social performance team engages with stakeholders in the communities nearest the mine, namely Zinkgruvan, Åmmeberg and Askersund. Engagement occurs throughout the year and is focused on managing social impacts, risks and opportunities specific to each community. The team bases their activities on a 5-year social performance strategic plan and systems which reflect best practice and international standards in stakeholder engagement, grievance procedures, risk management and community investment. A community perception survey conducted in 2018 demonstrated that stakeholders have a high level of trust and support the mine's activities.

#### 4.7.4.12 Capital and Operating Costs

Total forecast Zinkgruvan cash costs for 2019 are tabulated below using a forecast exchange rate of US dollar/SEK: 8.00. Unit operating costs have decreased marginally over 2018 as a result of lower operating costs and improved by-product credits. Forecast cash costs for 2019 are \$0.40/lb Zn, assuming a Pb and Cu by-product credit priced at \$0.95/lb and \$2.80/lb, respectively.

<b>Zinkgruvan (\$/lb Zn)</b>	<b>2019</b>
Mining costs	0.34
Milling costs	0.15
G&A and other costs	0.19
TC/RCs	0.21
By-product credit, net of TC/RCs	(0.49)
<b>Cash Cost per payable pound of Zinc</b>	<b>0.40</b>

Total forecast capital costs for Zinkgruvan for 2019 are estimated at \$50 million, as tabulated below. The capital forecast includes approximately \$19 million for mine development and \$11 million for production and capacity improvements.

<b>Zinkgruvan</b>	<b>Unit</b>	<b>2019</b>
Underground development	\$M	19.0
Production and capacity improvements	\$M	11.0
Other sustaining	\$M	20.0
<b>Total</b>	<b>\$M</b>	<b>50.0</b>

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

#### 4.7.4.13 Exploration, Development, and Production

Exploration activities in 2019 will focus on in-fill, definition and step-out drilling mainly in the Burkland, Nygruvan and Western Field areas, including Dalby, to define new Mineral Resource estimates. To establish underground drill platforms for drilling of deeper and northerly extensions of the Dalby orebody, a total of 845 m of development in the Dalby exploration drive at 1,125 m below surface is planned for 2019. To position for drilling the extensions of ore lenses in the Western field, a total of 150 m of development in the Mellanby exploration drive at 650 m below surface is also planned for 2019. A total of 175 m of development is planned in exploration drives in both the Burkland and the Nygruvan areas adding to a total of 1,170 m of exploration development in 2019.

In total, 73,000 m of exploration drilling is planned with 23,000 m to be completed from underground and 50,000 m from surface, primarily in the Dalby and Flaxen areas. A total of 33,000 m of infill and definition drilling, all from underground, is also planned. Total exploration expenditure in 2019 is forecast at approximately \$23 million.

In 2018, Zinkgruvan produced 76,606 tonnes of zinc, 24,613 tonnes of lead and 1,386 tonnes of copper in concentrate. For 2019, forecast production is as tabulated below.

<b>Zinkgruvan</b>	<b>Unit</b>	<b>2019</b>
Zinc Production	'000 Tonnes	76 – 81
Copper Production	'000 Tonnes	2 – 3

The current zinc/lead and copper Mineral Reserve estimates at Zinkgruvan are able to support a LOM in excess of 10 years.

The information presented in this section is forward looking information. See “Cautionary Statement on Forward-Looking Information” and “Risks and Uncertainties”.

#### **4.7.5 Other Properties**

##### **4.7.5.1 Freeport Cobalt**

During 2013, Lundin Mining acquired, in partnership with Freeport, a large-scale cobalt chemical refinery located in Kokkola, Finland and the related sales and marketing business. Lundin Mining holds an effective 24% ownership interest, with Freeport holding an effective 56% ownership interest and acting as operator and Gécamines holding a 20% interest. Initial consideration of \$348 million, net of cash acquired, was paid at closing. Lundin Mining’s share of the investment is based on a 30/70% split with Freeport and will be repaid in full prior to any distributions. Under the terms of the agreement, there was the potential for additional consideration contingent upon the achievement of revenue-based performance targets over a three year period, which period expired in 2016 with no payments for additional consideration having been required.

Subsequent to the acquisition, the operations were re-branded Freeport Cobalt.

The refinery located on the Baltic Sea in Finland processes unrefined cobalt and related metals and manufactures advanced inorganic products for use in a variety of applications in fast-growing end use markets. Freeport Cobalt is one of the world’s largest suppliers of cobalt chemicals and powders for use in batteries, pigments, chemicals, catalysts and ceramics and powder metallurgy.

The Kokkola refinery has been in operation since 1968. It has an experienced management team and, employees, and a global sales and marketing footprint that services customers in Asia, Europe and the Americas.

#### **4.7.6 Closed and Historical Sites**

The Company continues to monitor the Storliden site in northern Sweden, where production ceased in 2008. During 2018, in response to a communication from the local county board (VCAB), ZMAB initiated additional groundwater monitoring around the sealed decline. Monitoring data are being analyzed to determine what, if any, additional action may be required to support site relinquishment.

The Company’s Zinkgruvan operations are located in an area where mining and related operations have been ongoing for over 160 years. As a result, the Company’s operations are in the vicinity of historical industrial sites which the Company does not own and which were reclaimed by other unrelated companies many years ago. As a responsible mining company, the

Company monitors both its sites and, at the request of the applicable local county board, those proximate to the Company's operations but not owned by it.

Separately, ZMAB continues to work with local regulatory authorities and local communities at the historical Åmmeberg site, where Belgian company Vieille Montagne processed Zinkgruvan ore from the 1850s until the late 1970s. The historic processing facilities and tailings storage site were reclaimed by Vieille Montagne during the 1980s and are currently used primarily as a golf course and marina facility. In June 2018 ZMAB submitted to the local county board (OCAB) a site-specific risk assessment addressing potential residual human health and ecological risks associated with the reclaimed industrial properties. OCAB has not responded or requested any additional information as of the date of this AIF.

## **5. RISKS AND UNCERTAINTIES**

The Company's business activities are subject to risks, including those described below. Every investor or potential investor in the Company's securities should carefully consider these risks. Any of the following risks could have an adverse effect on the Company, its business and prospects, and could cause actual outcomes and results to differ materially from those described in the forward-looking statements relating to the Company. Additional risks related to the Company's material properties are discussed in the Technical Reports filed by the Company from time to time under the Company's profile on SEDAR at [www.sedar.com](http://www.sedar.com). In addition, other risks and uncertainties not presently known by management of the Company or that management currently believes are immaterial could affect the Company, its business and prospects.

The following section discusses various risks to which the Company is exposed. These risks are listed under three main categories: Strategic/External Risks related to the external environment in which the Company operates and/or the Company's business strategies; Financial Risks related to economic, market, and financial counterparty conditions, among other; and Operational Risks including all people, process and system aspects of operations management.

### **5.1 STRATEGIC/EXTERNAL RISKS**

#### **5.1.1 External Stakeholder Relations**

The Company places great importance on establishing and maintaining positive relationships with its stakeholders, including the communities in which the Company operates, local indigenous groups, regulators and other stakeholders. There is an increasing level of public concern relating to the perceived effect of mining activities on certain environmental and social aspects such as water consumption and water quality, land use, noise and vibration, dust and air quality, mine closure, and employment and economic development opportunities. Increased awareness, globally, for the impacts of climate change has contributed to this growing public concern. Opposition to mining activities by communities or indigenous groups may ultimately affect permitting, operations, and the Company's reputation. Publicity adverse to the Company's operations, partners, or extractive industries generally, could have an adverse effect on the Company and may affect its ability to operate. Further, sustained periods of stress on local economies may increase scrutiny of and pressure on mining operations. The Company maintains active dialogue with stakeholder groups and regularly reviews stakeholder engagement plans. In addition, the Company undertakes various initiatives involving or for the benefit of stakeholder groups in accordance with its responsible mining strategies. While the Company is committed to operating in a socially responsible manner, there can be no assurance that its efforts, in this respect, will mitigate this potential risk.

#### **5.1.2 Activist Shareholders**

In recent years, publicly-traded companies have been increasingly subject to demands from activist shareholders advocating for changes to corporate governance practices, such as executive compensation practices, social issues, or for certain corporate actions or reorganizations. There can be no assurances that activist shareholders will not publicly advocate for the Company to make certain corporate governance changes or engage in certain corporate actions. Responding to challenges from activist shareholders, such as proxy contests, media campaigns or other activities, could be costly and time consuming and could have an adverse effect on the Company's reputation and divert the attention and resources of the Company's management and Board, which could have an adverse effect on the Company's business and

results of operations. Even if the Company does undertake such corporate governance changes or corporate actions, activist shareholders may continue to promote or attempt to effect further changes, and may attempt to acquire control of the Company to implement such changes. If shareholder activists seeking to increase short-term shareholder value are elected to the Board, this could adversely affect the Company's business and future operations. Additionally, shareholder activism could create uncertainty about the Company's future strategic direction, resulting in loss of future business opportunities, which could adversely affect the Company's business, future operations, profitability and the Company's ability to attract and retain qualified personnel.

### **5.1.3 Regulatory Environment, and Permitting**

The Company has mining operations in Chile, Portugal, Sweden, and the United States, exploration and inactive mine properties in various countries and a minority interest in a cobalt refinery in Finland. These operations are subject to various political, economic and social uncertainties, and local laws and regulations. The implementation of new, or the amendment of, existing laws and regulations affecting the mining and metals industry could have an adverse impact on the Company. Further, global initiatives such as those related to climate change, may result in new restrictions affecting not only the mining sector but also key supply chain partners, such as the shipping industry where new requirements to curb greenhouse gas emissions have been promulgated. The potential inability to timely secure approvals and permits required for the development and operation of the Company's mining assets, as well as licenses and approvals necessary to advance its exploration efforts presents a key risk for the Company. Each phase of a mine life cycle requires certain approvals, permits and licenses, and material delays in or inability to obtain these could result in loss of invested exploration and development capital; inability to develop mining assets along with curtailed mine life; significant increases in operating costs; potential impacts on labour, community, and government relations; and erosion of shareholder value.

Risks related to permitting and approvals may be materially influenced by external stakeholder relations and changes to the regulatory environment in the jurisdictions in which the Company explores and operates. For example, member countries of the European Union and Chile, among other Latin American countries have ratified the Paris Accord on Climate Change thereby confirming their commitment to implement measures designed to prepare for and mitigate the effects of climate change. While the Company is dedicated to maintaining mutually rewarding relationships with all of its stakeholders, there can be no assurance that required key approvals, permits or licenses will be obtained when and as necessary.

The Company is presently complying in all material respects with necessary licenses and permits under applicable laws and regulations to conduct its current operations. However, licenses and permits are subject to change in various circumstances, permits and approvals may require renewal from time to time, and new permits may need to be obtained in the future.

At Candelaria, the Company is preparing for submission of an environmental permit that will reflect the continued growth in reserves and further extension to the operating life. The new EIA is expected to be submitted in late 2019 or early 2020. In 2018, Eagle was successful in obtaining amendments to its existing mining permit to allow placement of additional tailings in the former Humboldt open pit as well as the mill discharge permit. Temporary approval was received for the river intake system pending completion of wetland studies and water withdrawal registration. Review of the groundwater discharge permit by the MDEQ continued in 2018 and currently awaiting a reply on draft permit conditions. In Portugal, Somincor obtained regulatory approval

on the ZEP project from the Portuguese authorities. The municipal construction permit application package also received approval in 2018. The ZEP-associated tailings facility expansion permit is due for submission in mid-2019. Details of the permitting activities can be found at each of the operating site's respective sections.

The granting, renewal and continued effectiveness of permits and approvals are subject to discretion by the applicable regulatory authority. Certain governmental approval and permitting processes are subject to public comment and can be challenged by project opponents, which may result in significant delays or in approvals being withheld or withdrawn. There can be no assurance that the Company will be able to obtain or maintain all necessary licenses and permits as are required to explore and develop its properties, commence construction or operate mining facilities. Any of these factors could have an adverse effect on the Company, including, but not limited to its results of operations and financial position.

Non-compliance with applicable laws, regulations and permitting requirements (including allegations of such) may result in enforcement actions, including orders issued by regulatory or judicial authorities causing operations to cease or be curtailed or causing the withdrawal of mining licenses, and the imposition of corrective measures requiring material capital expenditure or remedial action resulting in materially increased costs of compliance, reputational damage and potentially impaired ability to secure future approvals and permits. The Company may be required to compensate third parties for loss or damage and may have civil or criminal fines or penalties imposed for violations of applicable laws or regulations.

#### **5.1.4 Acquisition and Integration**

The strategic acquisition of a mining company, property or asset may change the scale of the Company's business and operation, exposing the Company to new geographic, political, legal, regulatory, operational and financial risks. The Company's assessment and valuation of an acquisition target may be based on estimates or assumptions that ultimately prove to be incorrect. For example, there may be a significant change in commodity prices after the Company has committed to complete an acquisition and established the purchase price or share exchange ratio; or a material ore body may prove to be below expectations. The Company may discover it has acquired a substantial undisclosed liability with little recourse against the seller. Such liabilities could have an adverse impact on the Company's business, financial condition, results of operations and cash flows. Following an acquisition, the Company may have difficulty integrating and assimilating the operations and personnel, realizing anticipated synergies, maintaining uniform standards, policies and procedures, and maximizing the financial and strategic position of the combined enterprise. Integration efforts may cause an interruption of, or a slowdown in, the activities of the Company's business, or affect the Company's ability to adequately resource its expanded portfolio.

The Company may not succeed in identifying suitable acquisition candidates, completing effective due diligence activities, negotiating acceptable terms, and integrating the acquired operations into the Company. There can be no assurance that investments made will yield expected returns. A capital-intensive acquisition may also materially weaken the Company's balance sheet.

Disposition of assets may result in reduction of the Company's production and consolidated mineral reserves and resources.



### **5.1.5 Business Arrangements**

The Company has business arrangements involving partners for various investments such as Candelaria and Freeport Cobalt. There may be risks associated with the Company's partners in these arrangements which include, but are not limited to: disagreement on how to develop, operate or finance projects; differences between partners in economic or business goals; lack of compliance with agreements and laws; insolvency of a partner; limits placed on the Company's ability to control decision-making and possible limitations on its ability to sell its interest in a particular project. The Company still holds a minority interest in a cobalt refinery in Finland. There can be no assurance the Company will be able to agree with its investment partners on terms of divestiture for this asset should it elect to do so. Further, as the Company seeks to increase its asset portfolio, should it acquire a new asset in partnership with another entity, there can be no assurance that such new partnership will not result in material increased risks for the Company.

### **5.1.6 Competition**

There is competition within the mining industry for the discovery and acquisition of properties considered to have commercial potential. The Company competes with other mining companies, many of which have greater financial resources than the Company, for the acquisition of mineral claims, leases and other mineral interests as well as for the recruitment and retention of qualified employees and other personnel.

### **5.1.7 Mine Development Risks**

The Company's ability to maintain, or increase, its annual production of copper, nickel, zinc and other metals is dependent, in significant part, on its ability to bring new mines into production and to expand existing mines. Significant expansion projects over the next few years include the Zinc Expansion Project at Neves-Corvo, development of the Eagle East access ramp, the Candelaria Mill Optimization Project and development of the South Sector at Candelaria. Details of the development projects can be found at each of the operating site's respective sections. Although the Company utilizes the operating history of its existing mines to derive estimates of future operating costs and capital requirements, such estimates may differ materially from actual operating results. The economic feasibility analysis with respect to any individual project is based upon, among other things, the interpretation of geological data obtained from drill holes and other sampling techniques, feasibility studies (which derive estimates of cash operating costs based upon anticipated tonnage and grades of ore to be mined and processed), and base metals price assumptions, the configuration of the orebody, expected recovery rates of metals from the ore, comparable facility and equipment costs, anticipated climatic conditions, estimates of labour, productivity, royalty or other ownership requirements and other factors. Development projects are also subject to issuance of necessary permits and other governmental approvals, sourcing suitable power and water requirements, confirming the availability of appropriate local area infrastructure, receipt of adequate financing and addressing local stakeholder concerns.

The capital expenditures and timeline needed to develop a new mine or expansion are considerable and the economics of and the ability to complete a project can be affected by many factors, including; inability to complete construction and related infrastructure in a timely manner; changes in the legal and regulatory environment; currency fluctuations; industrial disputes, availability of parts, machinery or operators; delays in the delivery of major process plant equipment; inability to obtain, renew or maintain the necessary permits, licenses or approvals; unforeseen natural events and political and other factors. Factors such as changes to technical specifications, failure to enter into agreements with contractors or suppliers in a timely manner,

and shortage of capital may also delay the completion of construction or commencement of production or require the expenditure of additional funds. Capital expenditure and timeline estimates for development projects are based on assumptions and analyses made by the Company's management. These estimates and assumptions, which are based on numerous factors believed to be appropriate in the circumstances, are subject to various risks, uncertainties and other factors that could cause actual expenditures and timelines to differ materially from those estimated.

The actual operating results of development projects may differ materially from those anticipated, and uncertainties related to operations are even greater in the case of development projects. There can be no assurance that development projects will be able to be developed successfully or economically or that they will not be subject to the other risks described in this section.

#### **5.1.8 Resource Allocation**

Exploration, acquisition, development and operation activities require significant investment of resources and capital. The Company allocates such resources and capital to support business objectives, and the availability of required resources and capital is subject to market conditions and the Company's financial position. There can be no assurance that the Company will not be forced to curtail investments in the growth of the Company, due to changing economic conditions, geo-political events or other factors, and this may impact the Company's future profitability. The Company may not have sufficient personnel with required expertise to successfully deliver on all business objectives, and this may also impact the Company's results.

#### **5.1.9 Litigation**

The Company is subject to various claims, legal proceedings, investigations and complaints arising in the ordinary course of business from time to time and may be involved in disputes with other parties in the future, any of which may result in litigation. Defense and settlement costs associated with litigation can be substantial, even with respect to claims that are frivolous or have no merit. In December 2017, a class action was filed in Ontario against Lundin Mining and certain of its officers and directors and, in January 2018, a second overlapping action was filed in Quebec, both seeking damages and asserting various claims including alleged misrepresentations and/or failure to make timely disclosure of allegedly material information about Candelaria, in defense of which the Company and other defendants have engaged external counsel. In August 2018, the Quebec Superior Court granted a stay to the Quebec action. The proceeding for the Ontario action is still in progress. The Company cannot predict the outcome of these pending or threatened proceedings or actions or any other litigation (see also "Legal Proceedings" below). If the Company cannot resolve disputes favourably, or if there is significant reputational damage as a result of any real or frivolous claim, the Company's activities, financial condition, results of operations, future prospects and share price may be adversely affected.

#### **5.1.10 Closed and Historical Sites**

Some of the Company's properties may have been used for mining and related operations for many years before they were acquired and were acquired as is or with assumed environmental liabilities from previous owners or operators. Environmental conditions may exist on these properties that are unknown and/or have been caused by previous or existing owners or operators of such properties, but the remediation of which may be the Company's responsibility. As the Company grows, it may acquire exploration licenses or operating assets that include old mine workings or closed facilities within the licensed concession. Such sites may be subject to local

government existing or new requirements for their remediation and care and, where impaired environmental conditions are identified, the Company may be required to resolve these to satisfy regulatory requirements and/or key stakeholders. Such requirements may impose significant conditions and costs on the Company. The Zinkgruvan Mine in Sweden, has been in operation for over 160 years, and a historic processing and tailing storage site in nearby Åmmeberg, where an unrelated Belgian company, Vieille Montagne, processed Zinkgruvan ore from the 1850s until the late 1970s. Vieille Montagne reclaimed the historical operating and tailing storage area in the 1980s and they are currently operated primarily as a golf course and marina facility. In 2018 the Company conducted and submitted a site-specific risk assessment addressing potential residual human health and ecological risks associated with the reclaimed industrial properties owned and operated by Vieille Montagne. The local county board has not responded or requested any additional information as of the date of this AIF, but it may be determined that the affected properties require additional incremental remediation. The Company will continue to work with local regulatory authorities and local communities to assess these conditions and is committed to adhering to its responsible mining practices. However, there can be no assurance that additional, potentially onerous requirements will not be asked of or imposed on the Company in the future. See also “4.7.6 Closed and Historical Sites” above.

#### **5.1.11 Country Risk**

The Company’s current asset portfolio includes operating assets in Chile, Portugal, Sweden and the United States of America, along with a minority interest in a refinery in Finland, and exploration licenses in Peru.

While country risk exposure is currently considered low, there can be no assurance that the Company’s existing or future assets will not be subject to government limitations, restrictions or requirements not presently foreseen. Changes in policy that alter laws regulating the mining industry could have an adverse effect on the Company. There can be no assurance that the Company’s assets will not be subject to nationalization, requisition or confiscation, whether legitimate or not, or undue taxation by an authority or body.

Political instability or civil unrest in target jurisdictions for exploration and business development may also curtail the Company’s growth efforts.

In addition, in the event of a dispute arising from foreign operations, the Company may be subject to the exclusive jurisdiction of foreign courts or may not be successful in subjecting foreign persons to the jurisdiction of courts in Canada. The Company’s ability to enforce its right or its potential exposure to the enforcement in Canada or locally of judgements or decisions from foreign courts or agencies could have an adverse effect on its cash flows, earnings, results of operations and financial condition. Changes in policy stance by key sovereign players may result in trade restrictions, increased taxation, or operating costs.

It is not possible for the Company to accurately predict such developments or changes in laws or policy or to what extent any such developments or changes may have an adverse effect on the Company, including, but not limited to, its operations.

#### **5.1.12 Uninsurable Risks**

Exploration, development and production operations on mineral properties involve numerous risks, including unexpected or unusual geological operating conditions, work force health issues, contaminations, labour disputes, changes in regulatory environment, rock bursts, cave-ins, fires,

floods, droughts, earthquakes, severe weather events and other natural phenomena, as well as political and social instability. Certain risks may not currently be insurable or may become uninsurable or required insurance will not be sufficient or available at affordable premiums. The Company may decide not to insure against certain risks as the potential loss associated with risk events is deemed acceptable or as the costs of insurance are deemed excessive for the protection provided. The Company does not maintain insurance against political risks.

In some situations, if they occur, these risks could result in damage to, or destruction of, mineral properties or production facilities, personal injury or death, environmental damage to the Company's properties or the properties of others, delays in mining, monetary losses and possible legal liability.

### **5.1.13 Climate Change**

Governments and regulatory bodies at the international, national, regional and local levels have introduced or may introduce legislative changes to respond to the potential impacts of climate change. Additional government action to regulate and price climate change, including regulations on carbon emissions (such as carbon taxes) and greenhouse gas emissions, energy and water use, could increase the direct and indirect costs of the Company's operations and may have material adverse effect on the Company's business.

Despite efforts to anticipate and mitigate against hazards and risks of climate change, the risks may impact production forecasts, results of operations, financial condition, corporate strategy and share price.

## **5.2 FINANCIAL RISKS**

### **5.2.1 Commodity Prices**

Commodity prices, primarily copper, zinc and nickel, are key performance drivers and fluctuations in the prices of these commodities can have a dramatic effect on the results of operations. Prices can fluctuate widely and are affected by numerous factors beyond the Company's control. The prices of metals are influenced by supply and demand, exchange rates, interest rates and interest rate expectations, inflation or deflation and expectations with respect to inflation or deflation, speculative activities, changes in global economies, and geo-political, social and other factors. The supply of metals consists of a combination of new mine production, recycling and existing stocks held by governments, producers and consumers.

If the market prices for metals fall below the Company's full production costs and remain at such levels for any sustained period, the Company may experience losses and may decide to discontinue mining operations or development of a project at one or more of its properties. If the prices drop significantly, the economic prospects of the mines and projects in which the Company has an interest could be significantly reduced or rendered uneconomic. Low metal prices will affect the Company's liquidity, and if they persist for an extended period, the Company may have to look for other sources of cash flow to maintain liquidity until metal prices recover. A sustained and material impact on the Company's liquidity may also impact the Company's ability to comply with financial covenants under its credit facilities. The Company does not currently hedge metal prices. Any hedging activity requires approval of the Company's Board of Directors. The Company will not hold or issue derivative instruments for speculation or trading purposes.

## 5.2.2 Asset Valuation

The Company annually undertakes a detailed review of the LOM plans for its operating properties and an evaluation of the Company's portfolio of development projects, exploration projects and other assets. The recoverability of the Company's carrying values of these operating and development properties may be affected by a number of factors including, but not limited to, metal prices, foreign exchange rates, capital cost estimates, mining, processing and other operating costs, metallurgical characteristics of ore, mine design and timing of production.

If the Company fails to achieve its valuation assumptions or if any of its property, plant and equipment, exploration and evaluation assets or cash generating units have experienced a decline in fair value, an impairment charge may be required to be recorded, causing a reduction in the Company's earnings.

Conversely, if there are observable indicators that any of its property, plant and equipment, exploration and evaluation assets or cash generating units have experienced an increase in fair value, a reversal of a prior impairment may be required to be recorded, causing an increase in the Company's earnings.

## 5.2.3 Liquidity and Financing

The Company does not have unlimited financial resources and there is no assurance that sufficient additional funding or financing will be available to the Company or its direct and indirect subsidiaries on acceptable terms, or at all, for further exploration or development of its properties or to fulfill its obligations under any applicable agreements. Lundin Mining is a multinational company and relies on financial institutions worldwide to fund its corporate and project needs. Instability of large financial institutions may impact the ability of the Company to obtain equity or debt financing in the future and, if obtained, on terms favourable to the Company. Disruptions in the capital and credit markets as a result of uncertainty, geo-political events, changing or increased regulation of financial institutions, reduced alternatives or failures of significant financial institutions could adversely affect the Company's access to the liquidity needed for the business in the longer term. Failure to obtain such additional funding could result in the delay or indefinite postponement of the exploration and development of the Company's properties.

The Company may incur substantial debt from time to time to finance working capital, capital expenditures, investments or acquisitions or for other purposes. If the Company does so, the risks related to the Company's indebtedness could intensify, including: (i) increased difficulty in satisfying existing debt obligations; (ii) limitations on the ability to obtain additional financing, or imposed requirements to make non-strategic divestitures; (iii) imposed hedging requirements, (iv) imposed restrictions on the Company's cash flows, for debt repayment; (v) increased vulnerability to general adverse economic and industry conditions; (vi) interest rate risk exposure as borrowings may be at variable rates of interest; (vii) decreased flexibility in planning for and reacting to changes in the industry in which it competes; (viii) reduced competitiveness as compared to less leveraged competitors; and (ix) increased cost of borrowing.

In addition, the Company's existing credit facilities and other agreements may contain restrictive covenants that limit the Company's ability to engage in activities that may be in the Company's long-term best interest. The Company's failure to comply with those covenants could result in an event of default which, if not cured or waived, could result in the acceleration of repayment of the Company's debt. The Company's ability to make scheduled payments on or refinance its debt obligations, depends on the Company's financial condition and operating performance, which are



subject to prevailing economic and competitive conditions and to various external and other risks as outlined elsewhere in this “Risks and Uncertainties” section.

#### **5.2.4 Foreign Currencies**

The Company’s revenue from operations is received in US dollars while a significant portion of its operating expenses are incurred in CLP, EUR, SEK, and other currencies. Accordingly, foreign currency fluctuations may adversely affect the Company’s financial position and operating results. The Company regularly reviews its exposure to currency price volatility as part of its financial risk management efforts. Hedging activities approved by the Board of Directors may be undertaken, from time to time, to mitigate the potential impact of currency price volatility.

#### **5.2.5 Interest Rates**

The Company holds various financial assets, the value of which may be impacted by changes in interest rates. Interest rates may also affect the Company’s credit arrangements over time. The Company does not currently hedge interest rate exposure. Any hedging activity requires approval of the Company’s Board of Directors. The Company will not hold or issue derivative instruments for speculation or trading purposes.

#### **5.2.6 Equity Markets**

The Company’s share price may be significantly affected by factors unrelated to the Company’s performance. Macro-economic, geo-political, and industry-related events, speculation about the Company in the press or investment community, changes in valuation of similar companies, additions or departures of key personnel, strategic acquisitions by competitors and regulatory changes, among others, may affect investor sentiment and have an impact on the price of the Company’s common shares. The market price of the Company’s common shares may not accurately reflect its long-term value.

#### **5.2.7 Taxation**

The Company’s operations are subject to local tax regimes which may be complex and subject to changes. In particular, in 2018, the Chilean IRS issued a tax assessment denying a tax deduction related to interest expenses arising from an intercompany debt for the taxation years 2014 and 2015. While not yet assessed by the IRS, a similar position would deny tax refunds related to 2016 and 2017. While the Company believes the claims are inconsistent with Chilean tax law and without merit and accordingly has filed an appeal, if the assessments are upheld, it may have a material adverse effect on the Company. Any change in taxation laws or regulations, or any review or assessment thereof could result in higher taxes being payable by the Company and could have future adverse effects on the Company’s financial performance. The Company may also be the object of a tax audit by regulators, and such audit may result in an adverse tax ruling. Repatriation of earnings to Canada from other countries may be constrained or subject to withholding taxes. The Company has no control over changes in tax laws or regulations and withholding tax rates. Any such occurrence may have a material adverse effect on the Company.

#### **5.2.8 Counterparties**

The Company is subject to credit risk and customer concentration risk associated with trade receivables, with three customers representing a significant portion of sales. The Company manages this risk through evaluation and monitoring of industry and economic conditions and

assessment of customers' financial reports. The Company transacts with credit-worthy customers to minimize credit risk and if necessary, employs pre-payment arrangements and the use of letters of credit, where appropriate, but cannot always be assured of the solvency of its customers over time.

The Company's access to funds under its credit facilities or other debt arrangements is dependent on the ability of the financial institutions that are counterparties to the facilities to meet their funding commitments. Those financial institutions may not be able to meet their funding requirements. Default by financial institutions could require the Company to take measures to conserve cash until the markets stabilize or until alternative credit or other funding arrangements for the Company's business needs can be obtained.

The Company maintains relationships with various banking partners for its operating activities in the jurisdictions in which the Company operates. One or more partners may experience a deteriorating financial condition ultimately resulting in their failure or default. The Company regularly monitors the financial position of its key partners.

## **5.3 OPERATIONAL RISKS**

### **5.3.1 Health and Safety**

By their nature, exploration and mining activities present a variety of hazards and associated health and safety risks. Because of this, the health and safety of employees and contractors is of paramount importance and is held as the top priority in all that the company does. The operational objective of the company is 'Zero Harm', and the goal is to send everyone home healthy and safe every day. The overall management of health and safety is governed in accordance with the requirements of Lundin Mining's Responsible Mining Policy and the Responsible Mining Management System standard. Additional health and safety controls are implemented based on workplace hazard identification and mitigation requirements, qualitative and quantitative risk assessments, mandatory fatality prevention standards called High Consequence Protocols, safe work procedures and permit systems, safe work observations, occupational exposure limits, incident reporting and investigations, applicable legislation, and local workplace health and safety regulation.

Potentially significant health and safety risks can include, but are not limited to underground mine fires, underground rock falls, mobile equipment and vehicle incidents, falls from heights, contact with electricity or other sources of energy, blasting incidents, geotechnical stability incidents, equipment or structural fires, and incidents related to cranes and rigging. Potentially significant occupational health risks can include uncontrolled or unmanaged exposure to chemical, biological, physical or ergonomic agents. In addition, personnel involved with remote activities such those associated with exploration may be exposed to risks related to wildlife, environmental conditions or civil unrest.

While every effort is made to control and eliminate potential health and safety risks, incidents may still occur. Incidents resulting in serious injury or death, or those having a negative impact on surrounding communities (real or perceived) could result in litigation and/or regulatory action (including, but not limited to suspension of operations and/or fines and penalties), or otherwise adversely affect the Company's reputation and ability to meet its objectives.



### **5.3.2 Environment**

All phases of mining and exploration operations are subject to extensive environmental regulation. These regulations mandate, among other things, the preparation of environmental assessments before commencing certain operations, the maintenance of air and water quality standards, and land reclamation. They also set forth limitations on the generation, transportation, storage and disposal of solid and hazardous waste. The transportation and treatment of the Company's concentrates may also be affected by increasingly stringent environmental regulation such as amendments to laws that may impose restrictions on products shipped by maritime vessel or on the processing of our concentrates. Some laws and regulations may impose penalties for environmental contamination, which could subject the Company to liability for the conduct of others or for its own actions that were in compliance with all applicable laws at the time such actions were taken. The Company may need to address contamination at its properties in the future, either for existing environmental conditions or for leaks or discharges that may arise from ongoing operations or other contingencies. Contamination from hazardous substances for which the Company is responsible, may subject it to material liability for the investigation or remediation of contamination, as well as for claims seeking to recover for related property damage, personal injury or damage to natural resources.

Environmental legislation is evolving in a manner that will result in stricter standards and enforcement, increased fines and penalties for non-compliance, more stringent environmental assessments of proposed projects and mine closure plans, and a heightened degree of responsibility for companies and their officers, directors and employees. Any new environmental declarations or future changes in environmental regulation could adversely affect the Company's ability to conduct its operations. For example, the general area in which the Candelaria mine is located is arid, contains limited natural vegetation and hosts a number of other industrial and agricultural operations, resulting in considerable latent dust and particulates in the air. The Company's Candelaria operations employ processes and technology to monitor and manage air quality impacts and regularly reviews and updates them. In January 2019, Candelaria became aware that the Ministry of the Environment (SEREMI) had commenced a technical review of the air quality of the Copiapo and Tierra Amarilla areas to determine if the areas might be declared a saturated zone for purposes of Chilean law. The declaration of a saturation zone involves considerable technical review and input, as well as subsequent legislative and executive consideration and approval processes which can take a significant amount of time with no certainty on the outcome. If a saturation zone declaration is approved, it would trigger an obligation for the State to prepare and enforce a decontamination plan in the area. A decontamination plan could require Candelaria to implement additional controls or measures or modify existing ones, which could adversely affect Candelaria activities and profitability.

### **5.3.3 Mining and Processing**

The Company's business operations are subject to risks and hazards inherent in the mining industry, including, but not limited to, unanticipated variations in grade and other geological problems, surface and ground water conditions, water balance and water chemistry, backfill quality or availability, underground conditions, metallurgy, ore hardness and other processing issues, critical equipment or process failure, the lack of availability of input materials and equipment, disruption to water or power supply, ground subsidence, the occurrence of rock wall or ramp collapses, underground fires, accidents, labour force disruptions, supply chain/logistics disruptions, force majeure events, unanticipated transportation costs, and weather conditions, any of which can materially and adversely affect, among other things, the safety of personnel, the development of properties, production quantities and rates, concentrate quality/marketability,

costs and expenditures, production commencement dates, project completion, contractual obligations and financial covenants.

The Company's processing facilities are dependent upon continuous mine feed to remain in operation. Significant disruption in either mine feed or processing throughput, whether due to equipment failures, adverse weather conditions, supply interruptions, labour force disruptions or other causes, may have an immediate adverse effect on results of operations of the Company.

#### **5.3.4 Production Estimates**

The Company prepares estimates and projections of future production, which information is forward-looking. There can be no assurance that such projections will be realized. Lundin Mining prepares production guidance based on existing mine plans and certain assumptions which change from time to time, including the availability, accessibility, sufficiency and quality of Mineral Reserve estimates, costs of production, ability to sustain and increase production levels, the sufficiency of infrastructure, the performance of workforce and equipment, ability to maintain and obtain mining interests and permits and compliance with laws and regulations. Lundin Mining's actual production may vary from estimates for a variety of reasons discussed in this AIF, including: actual ore mined varying from estimates of grade, tonnage, dilution and metallurgical and other characteristics; short-term operating factors relating to the reserves, such as the need for sequential development of orebodies and the processing of new or different ore grades; revisions to mine plans; unusual or unexpected orebody formations; risks and hazards associated with mining; natural phenomena, such as inclement weather conditions, water availability, ground instability, floods, and earthquakes; and unexpected labour shortages, strikes, local community opposition or blockades. Failure to achieve the estimated production guidance could have an adverse impact on future cash flows, business, results of operations and financial condition.

#### **5.3.5 Labour Relations**

A prolonged labour disruption by employees or suppliers at any of the Company's mining operations or distribution channels (i.e. product transporters) could have an adverse effect on the Company's ability to achieve its objectives with respect to such properties and its operations as a whole. 2018 was a quiet year with the exception of a 48-hour labour stoppage at Candelaria. Workers belonging to one of the unions active at the mine staged a 48-hour protest restricting mine access in late 2018 due to workforce reductions that had taken place. The situation resolved itself without material incident. All other mine sites generally experienced good labour relations throughout 2018.

#### **5.3.6 Infrastructure**

Mining, processing, development and exploration activities depend, to one degree or another, on adequate infrastructure. Reliable roads, bridges and power and water supplies are important determinants which affect capital and operating costs. Extreme weather damage, sabotage or government or other interference in the maintenance or provision of such infrastructure could adversely affect the activities and profitability of the Company.

#### **5.3.7 Price and Availability of Energy and Key Operating Supplies/Services**

The Company's mining operations and facilities are intensive users of electricity and carbon-based fuels. Energy prices can be affected by numerous factors beyond the Company's control, including global and regional supply and demand, weather patterns, political, geo-political and

economic conditions and applicable regulatory regimes. The availability of energy and water may be negatively impacted due to a variety of reasons including, fluctuations in climate, severe weather conditions, inadequate infrastructure capacity, equipment failure or the ability to extend supply contracts on economical terms. A catastrophic failure of Candelaria's desalination plant would materially impair water supply to the operation which, until corrected, would result in partial or total suspension of the operations. The prices and various sources of energy the Company relies on may be negatively impacted and any such change could have an adverse effect on profitability.

Key operating supplies such as explosives, reagents, tires and spare parts are necessary for the ongoing operations of the Company's mines and mills. If these supplies become unavailable or their costs increase significantly, the profitability of the Company's operations would be negatively impacted.

Concentrate treatment and transportation costs are a significant component of costs. Increases in treatment costs, rates, or lack of available ocean vessels or rail cars may have an adverse impact on results of operations, cash flows and financial position.

### **5.3.8 Exploration**

Exploration of mineral properties involves significant risk. Very few properties that are explored are later developed into operating mines. Whether a mineral deposit will be commercially viable depends on a number of factors, including: the particular attributes of the deposit, such as size, grade and proximity to infrastructure; metal recoverability; metal prices, which are highly cyclical; and government regulation, including regulations relating to prices, taxes, royalties, land tenure, land use, importing and exporting of minerals and environment protection. In addition, political instability and/or community opposition to mining activities in certain jurisdictions may restrict the Company's ability to explore. Furthermore, growing awareness and concern with respect to the impacts of climate change may ultimately result in restrictions with respect to areas where exploration is permitted, for example in regions already under climate-induced stress. The Company cannot provide assurance that its exploration efforts will result in any new commercial mining operations or yield new Mineral Resource and Mineral Reserve estimates.

### **5.3.9 Mineral Resource and Mineral Reserve Estimates**

The Company's reported Mineral Resources and Mineral Reserves are only estimates. No assurance can be given that the estimated Mineral Resources and Mineral Reserves will be recovered or that they will be recovered at the rates estimated. Mineral Resource and Mineral Reserve estimates are based on limited sampling, and, consequently, are uncertain because the samples may not be representative. Mineral Resource and Mineral Reserve estimates may require revision based on actual production experience. Market fluctuations in the price of metals, as well as increased production costs, reduced recovery rates or deteriorating ground conditions may render certain Mineral Reserves estimates uneconomic and may ultimately result in a restatement of estimated Mineral Resources and/or Mineral Reserves. Short-term operating factors relating to the estimated Mineral Resources and Mineral Reserves, such as the need for sequential development of ore bodies and the processing of new or different ore grades or types, may adversely affect the Company's profitability. Resequencing of mining activities may ultimately impair the LOM.

### **5.3.10 Staffing**

Attracting, motivating, and retaining highly skilled employees is essential to the success of the Company. From time to time, the mining industry and/or specific operations can experience a shortage of skilled or experienced personnel due to such factors as low availability, alternative demand, diminishing mine life, retirement eligibility and other factors. There can be no assurance that the Company will successfully retain current key personnel or attract additional qualified personnel to manage the Company's current or future needs.

### **5.3.11 Natural Phenomena**

Certain Company operations are located in regions considered to be at high risk of severe natural phenomena such as earthquakes, windstorms, tsunamis and severe precipitation. The Company regularly reviews its emergency response and crisis management plans. Infrastructure at high-risk locations has been constructed to meet construction standards designed for regions of high seismicity. Chilean operations, in particular, have been the subject of numerous studies to assess the robustness of various mine structures, including tailings management facilities and waste rock dumps. In addition to monitoring equipment in place to detect unusual movement, or presence of water, regular geotechnical reviews are carried out at all Company operations. There is no assurance that a significant natural event may not result in catastrophic losses having an adverse affect on the Company, including, but not limited to its personnel and assets.

Severe drought conditions impacting the regions in which the Company operates may affect its access to adequate water to sustain operations in the normal course, may result in conflict with local communities, or may materially increase operating costs. Conversely, extraordinary storm events may result in localized flooding directly or indirectly impacting mine personnel and operations. The scientific community has predicted an increase, over time, in the frequency and severity of extraordinary or catastrophic natural phenomena as a result of climate change. Thus, the risk for regions already exposed can be considered more severe.

### **5.3.12 Fraud and Corruption**

The Company's operations are governed by, and involve interactions with, many levels of government in numerous countries. The Company is required to comply with anti-corruption and anti-bribery laws, including the Canadian Corruption of Foreign Public Officials Act, as well as similar laws in the countries in which the Company conducts business. In recent years, there has been a general increase in both the frequency of enforcement and the severity of penalties under such laws, resulting in greater scrutiny and punishment to companies convicted of violating anti-corruption and anti-bribery laws. Furthermore, a company may be found liable for violations by not only its employees, but also by its contractors and third-party agents. The Company's internal procedures and programs may not always be effective in ensuring that the Company, its employees, contractors or third-party agents will comply strictly with such laws. If the Company becomes subject to an enforcement action or in violation of such laws, this may have a material adverse effect on the Company's reputation, result in significant penalties, fines, monitoring and investigation costs and/or sanctions imposed on us, and/or have a material adverse effect on the Company's operations.

### **5.3.13 Ethics and Business Practices**

The Company maintains and requires adherence to policies governing ethical business conduct and practices, including prohibition of illegal payments, and respect for human rights and the

individual. All personnel are expected to promote a respectful and inclusive workplace environment irrespective of ethnic background, gender, age or experience. Nevertheless, there is no assurance of compliance and the Company may be subject to allegations of discriminatory practices, harassment, unethical behavior, or breach of human rights.

#### **5.3.14 Security**

A number of the Company's operations are located within reasonable proximity of communities, and each operation maintains security controls to prevent illegal ingress onto its property. There is no assurance, however, that unauthorized access onto an exploration or mining concession will not occur. Such illegal ingress may result in injury to personnel or third parties and/or damage to property, as well as illegal mining and theft.

#### **5.3.15 Cyber Security**

The Company and its operations rely heavily on various operating and financial systems and data. Cybersecurity risk is increasingly difficult to identify and quantify and cannot be fully mitigated because of the rapid evolving nature of the threats, targets and consequences. A breach of the Company's information or operational technology systems may result in disruption of business activities, loss of confidential or proprietary data, failure of internal controls over financial reporting, failure to meet obligations and reputational damage. Such a breach may also expose the Company to legal and regulatory action. Policies and procedures are maintained to ensure the security of its information technology systems, and data and system security controls are regularly tested and audited. The Company also relies on third-party service providers for the storage and processing of various data. These third parties are the subject of external audits and the Company annually reviews the reports of such audits. There can be no assurance, however, that the Company will not suffer a business disruption or loss or corruption of proprietary data, whether inadvertent or otherwise.

#### **5.3.16 Mine Closure**

Closure activities typically include ground stabilization, infrastructure demolition and removal, topsoil replacement, regrading and revegetation. Mine closure may have significant impacts on local communities and site remediation activities may not be supported by local stakeholders. To mitigate this risk, the Company develops and regularly updates MCPs for all operations over the LOM, giving consideration to where post-mining land use may benefit local communities. In addition to immediate closure activities, closed mining operations may require long-term surveillance and monitoring.

MCPs are developed in accordance with the Company's corporate standards and to comply with local regulatory requirements. Future remediation costs for inactive mines are estimated at the end of each financial reporting period, including ongoing care, maintenance and monitoring costs. Actual costs realized in satisfaction of mine closure obligations may vary materially from management's estimates. From time to time, regulatory approval for amendments to MCPs and associated permits may be sought, and these could have a significant impact on mine closure costs.

As at December 31, 2018, the Company had \$44.4 million in restricted cash that will be used to fund future site reclamation and mine closure costs at Neves-Corvo. The Company will continue to contribute to these funds as required, based on an estimate of the future site reclamation, regulatory requirements and mine closure costs as detailed in the approved MCPs. Changes in



environmental laws, regulations and standards can create uncertainty with regards to future reclamation costs and affect the funding requirements. There can be no assurance that the reclamation funds set aside will be sufficient to meet the needs of actual reclamation work in the future.

### **5.3.17 Tailings and Waste Management**

The mining and milling processes generate waste rock and tailings and the disposal of these materials is subject to substantial regulation and involve significant environmental risks. Tailings are the sand like materials that remain from the extraction process. Tailings are stored in engineered facilities that are designed, constructed, operated and closed in conformance with local requirements and best practices.

Waste rock dumps and tailings impoundments may be subject to ground movements or deteriorating ground conditions, or extraordinary weather events that may result in structure instability, or impoundment overflow, requiring that deposition activities be suspended. The tailings storage facility infrastructure, including pipelines, pumps, liners, etc. may fail or rupture. The occurrence of such an event may result in environmental release, extended business interruption, damage or harm to third parties, regulatory fines and penalties, revocation or suspension of permits or licenses, material impact to cash flows, balance sheet, share price and reputational damage.

Environmental and regulatory authorities in the applicable jurisdictions of operation conduct periodic or annual inspections of the relevant mine. As a result of these inspections, the Company is from time to time required to modify its waste and water management programs, complete additional monitoring work or take remedial actions with respect to the operations as it pertains to waste or water management. Liabilities resulting from non-compliance, damage, regulatory orders or demands, or similar, could adversely and materially affect the Company's business, results of operations and financial condition. Moreover, in the event that the Company is deemed liable for any damage caused by a breach, failure or overflow, the Company's losses or consequences of regulatory action might not be covered by insurance policies.

### **5.3.18 Title**

Although the Company has investigated the right to explore and exploit its various properties and obtained records from government offices with respect to all the mineral claims, licenses, concessions and other rights in and to lands comprising its properties, there is no guarantee of title. Other parties may dispute the title to a property or the property may be subject to prior unregistered agreements and transfers or land claims by aboriginal, native, or indigenous peoples. The title to the Company's properties may be affected by undetected encumbrances or defects or governmental actions. The Company has not conducted surveys of all of its properties and the precise area and location of claims or the properties may be challenged. Title insurance is generally not available for mineral properties. Failure by the Company to meet its payment and other obligations pursuant to laws governing its mineral claims, licenses, concessions and other forms of land and mineral tenure could result in the loss of its material property interests which could have a material adverse effect on the Company, which could cause a significant decline in the Company's stock price.



## 6. DIVIDENDS AND DISTRIBUTIONS

On November 30, 2016, the Company's Board approved a Dividend Policy. The Company's Dividend Policy anticipates paying four cash dividends per calendar year, the first declared with the release of year-end results; the second declared with the release of first quarter results; the third declared with the release of second quarter results; and the fourth declared with the release of the third quarter results. The declaration, timing, amount and payment of all dividends remain at the discretion of the Board.

In 2018, the Company paid an aggregate cash dividend of C\$0.12 per common share: C\$0.03 in April, C\$0.03 in June, C\$0.03 in September, C\$0.03 in December.

In 2017, the Company paid an aggregate cash dividend of C\$0.12 per common share: C\$0.03 in April, C\$0.03 in June, C\$0.03 in September and C\$0.03 in December.

The Board of Directors reviews the dividend quarterly based on, among other things, the Company's current and projected liquidity profile.

## 7. DESCRIPTION OF CAPITAL STRUCTURE

As at December 31, 2018, the authorized share capital of the Company consisted of an unlimited number of common shares without nominal or par value of which 728,418,632 common shares were issued and outstanding, and one special share without nominal or par value. The special share is not issued and outstanding at this time.

The holders of common shares are entitled to receive notice of and attend all meetings of shareholders with each common share entitling the holder to one vote on any resolution to be passed at such shareholder meetings. The holders of common shares are entitled to dividends if, as and when declared by the Board of Directors. The common shares are entitled, upon liquidation, dissolution or winding up of the Company, to receive the remaining assets of the Company available for distribution to shareholders.

The special share is a non-voting share and the holder thereof is not entitled to received notice of or attend any meeting of the shareholders of the Company or to vote at any such meeting. The special share is redeemable at the option of either the Company or the holder at an amount determined by the Board of Directors prior to or concurrently with the issuance of the special share (the "**Redemption Amount**"). The holder of the special share is entitled to receive, in priority to the common shares, a fixed, non-cumulative, preferential dividend at the rate of 8% per annum on the Redemption Amount. The holder of the special share is entitled, upon liquidation, dissolution or winding up of the Company, to receive from the assets of the Company a sum equivalent to the Redemption Amount before any amount is paid or any property or assets of the Company are distributed to holders of common shares or shares of any other class ranking junior to the special share. No dividend or other payment or distribution by the Company may be made if such payment or distribution would result in the net realizable value of the Company's assets being less than the Redemption Amount.

## 8. MARKET FOR SECURITIES

### 8.1 Exchange Listings

In Canada, the common shares of the Company are listed on the TSX under the symbol “LUN”. The common shares of the Company are also listed on the Nasdaq Stockholm Exchange under the symbol “LUMI”. In addition to trading on the TSX and Nasdaq Stockholm, the Company’s common shares also traded on various alternative Canadian and foreign exchanges which cumulatively traded significant volume over the course of the year.

### 8.2 Trading Price and Volume

The following table provides information as to the price ranges and volume traded by month during the year ended December 31, 2018 on the TSX.

<b>Month</b>	<b>High (C\$)</b>	<b>Low (C\$)</b>	<b>Volume</b>
January 2018	9.21	8.07	128,978,368
February 2018	9.07	7.57	130,856,265
March 2018	9.09	7.97	102,055,157
April 2018	8.89	7.91	94,042,768
May 2018	8.88	7.87	88,116,661
June 2018	8.96	7.06	90,146,880
July 2018	7.76	7.00	104,063,104
August 2018	7.10	6.05	93,905,068
September 2018	7.28	6.00	100,707,091
October 2018	7.02	4.70	139,626,598
November 2018	6.20	5.12	96,543,282
December 2018	6.52	5.30	101,394,605

## 9. DIRECTORS AND OFFICERS

### 9.1 Name, Address, Occupation and Security Holding of Directors and Officers

The Board of Directors currently comprises eight directors who are elected annually and whose term of office will expire at the Company's annual shareholders' meeting scheduled to be held on or about May 10, 2019. Each director holds office until the next Annual Meeting of Shareholders or until his/her successor is duly elected unless his/her office is earlier vacated in accordance with the by-laws of the Company. The names, provinces and countries of residence of each of the directors and executive officers of the Company as at the date of this AIF, their respective positions and offices held with the Company, their principal occupations within the preceding five years and the number of securities of the Company owned by them as at the date of this AIF are set forth in the following table:

<b>Name, residence and current position(s) held in the Company</b>	<b>Principal occupations for last five years</b>	<b>Served as director since</b>	<b>Number of securities beneficially owned, or controlled or directed</b>
<b>Lukas H. Lundin</b> Vaud, Switzerland <i>Chairman and Director</i>	Chairman and Director of the Company since September 1994; chairman, president and/or director of a number of publicly traded resource-based companies.	September 9, 1994	2,271,449 common shares
<b>Marie Inkster</b> Ontario, Canada <i>President, Chief Executive Officer and Director</i>	President and Chief Executive Officer, and Director of the Company since September 30, 2018; and Senior Vice President and Chief Financial Officer of the Company from May 2009 to September 2018.	September 30, 2018	324,960 common shares
<b>Donald K. Charter</b> Ontario, Canada <i>Director</i>	A corporate director since 2006 with experience in executive leadership positions in mining and financial services as well as mergers and acquisitions and finance. He was the President and Chief Executive Officer of Corsa Coal Corp. from August 2010 to July 2013. Currently a director of, IAMGold, Dream Industrial Real Estate Investment Trust and International Petroleum Corp.	October 31, 2006	67,424 common shares
<b>John H. Craig</b> Ontario, Canada <i>Director</i>	Lawyer, partner of Cassels Brock & Blackwell LLP until December 31, 2016, and Counsel since January 1, 2017. Also, a director of a number of publicly traded companies.	June 11, 2003	213,849 common shares
<b>Peter C. Jones</b> Alberta, Canada <i>Director</i>	Corporate director and retired executive with over 40 years of experience in the global mining industry. Mr. Jones served as Interim President and CEO of IAMGOLD Corporation from January 2010 to November 2010, President and Chief Operating Officer of Inco Ltd. from 2001 to 2006, and President and Chief Executive Officer of Hudson Bay Mining & Smelting Co.	September 20, 2013	76,482 common shares

Name, residence and current position(s) held in the Company	Principal occupations for last five years	Served as director since	Number of securities beneficially owned, or controlled or directed
	Mr. Jones has been a director of public companies for over 25 years.		
<b>Dale C. Peniuk</b> British Columbia, Canada <i>Director</i>	Chartered Professional Accountant (CPA, CA) and corporate director; formerly an assurance partner with KPMG LLP from 1996 to 2006; director of a number of publicly traded companies since 2006.	October 31, 2006	50,000 common shares
<b>William A. Rand</b> British Columbia, Canada <i>(Lead) Director</i>	President and Director of Rand Investments Ltd. since July 1986; director of a number of publicly traded companies.	September 9, 1994	233,424 common shares
<b>Catherine J. G. Stefan</b> Ontario, Canada <i>Director</i>	Corporate director since October 2016. President, Stefan & Associates, a consulting firm, between 1990 and October 2016. Prior thereto, Managing Partner, Tivona Capital Corporation, a private investment firm, from 1999-2008; director of another public company for more than 10 years.	May 8, 2015	55,000 common shares
<b>Stephen T. Gatley</b> United Kingdom <i>Vice President, Technical Services</i>	Vice President, Technical Services of the Company since June 2012;	N/A	98,000 common shares
<b>Andrew Hastings</b> Ontario, Canada <i>Senior Vice President and General Counsel</i>	Senior Vice President and General Counsel since February 27, 2019; Vice-President, Joint Venture Governance (May 2018 to February 2019), Vice President and Senior Counsel (June 2015 to April 2018) and Senior Counsel (January 2014 to May 2015) of Barrick Gold Corporation.	N/A	Nil common shares
<b>Jean-Claude Lalumiere</b> Ontario, Canada <i>Senior Vice President, Human Resources</i>	Senior Vice President, Human Resources since January 1, 2019; Vice President, Human Resources from March 20, 2018 to December 2018; Senior Vice President and Chief Human Resources Officer of Empire Life from June 2017 to March 2018; Vice President, Human Resources of Iron Ore Company of Canada from May 2015 to March 2017; and Vice President, Human Resources Inmet Mining Corporation from November 2010 to January 2014.	N/A	Nil common shares
<b>Annie Laurenson</b> Ontario, Canada <i>Corporate Secretary</i>	Corporate Secretary of the Company since April 2018. Assistant Corporate Secretary of the Company from March 2017 to April 2018, Manager Bank Board Services and Assistant Corporate Secretary, Bank of Montreal from	N/A	Nil common shares

Name, residence and current position(s) held in the Company	Principal occupations for last five years	Served as director since	Number of securities beneficially owned, or controlled or directed
	October 2015 to March 2017, Manager Administration and Corporate Secretary, Chieftain Metals Corp. from December 2010 to October 2015		
<b>Jinhee Magie</b> Ontario, Canada <i>Senior Vice President, Chief Financial Officer</i>	Senior Vice President and Chief Financial Officer of the Company since September 30, 2018; Vice President, Finance of the Company from May 2009 to September 2018.	N/A	101,000 common shares
<b>Peter Richardson</b> Ontario, Canada <i>Senior Vice President, Chief Operating Officer</i>	Senior Vice President and Chief Operating Officer since October 2018; Vice President and Chief Operating Officer from January 2018 to October 2018; and Chief Operating Officer of the Company since September 2017; General Manager at Eagle Mine from August 2015 to September 2017; held various senior management roles with Boliden AB, Sweden from March 1995 to August 2015.	N/A	15,180 common shares
<b>Derek Riehm</b> Ontario, Canada <i>Vice President, Environment</i>	Vice President, Environment of the Company since January 1, 2015; Vice President, Approvals & Permitting of Barrick Gold Corporation from 2011 to 2014.	N/A	56,000 common shares
<b>Peter Rockandel</b> Ontario, Canada <i>Senior Vice President, Corporate Development and Investor Relations</i>	Senior Vice President, Corporate Development and Investor Relations since September 5, 2018. Managing Director, Investment Banking at GMP Securities from September 2017 to August 2018; GMP Securities, Institutional Equities, April 2003 to September 2017.	N/A	Nil common shares
<b>J. Mikael Schauman</b> Stockholm, Sweden <i>Senior Vice President, Commercial</i>	Senior Vice President, Commercial of the Company since January 1, 2019. Vice President, Marketing of the Company from February 2007 to December 2018.	N/A	42,000 common shares
<b>Ciara Talbot</b> Ontario, Canada <i>Vice President, Exploration</i>	Vice President, Exploration of the Company since March 1, 2018; Director, Exploration (and various other senior exploration roles) from September 1, 2012 to February 1, 2018.	N/A	10,045 Common Shares

Certain directors of the Company have other business interests and do not devote all of their time to the affairs of the Company. See “Conflicts of Interest” below.

The directors and officers of the Company, as a group, beneficially own, or control or direct, directly or indirectly, a total of 3,614,813 common shares, representing approximately 0.49% of the number of common shares of the Company issued and outstanding as of the date of this AIF.

There are currently four standing committees of the Board of Directors. These committees are the Audit Committee, the Corporate Governance and Nominating Committee, the Health, Safety, Environment and Community Committee and the Human Resources/Compensation Committee. The following table identifies the members of each of these Committees:

<b>Audit Committee</b>	<b>Human Resources/ Compensation Committee</b>	<b>Corporate Governance and Nominating Committee</b>	<b>Health, Safety, Environment and Community Committee</b>
Dale C. Peniuk (Chair)	Donald K. Charter (Chair)	Catherine J. G. Stefan (Chair)	Peter C. Jones (Chair)
William A. Rand	Peter C. Jones	Donald K. Charter	John H. Craig
Catherine J. G. Stefan	William A. Rand	Dale C. Peniuk	Marie Inkster

## 9.2 Corporate Cease Trade Orders or Bankruptcies

Except as noted below, no director or executive officer of the Company is, as at the date of this AIF, or was within 10 years before the date of this AIF, a director, chief executive officer or chief financial officer of any company (including Lundin Mining), that:

- (a) was subject to an Order that was issued while the director or executive officer was acting in the capacity as director, chief executive officer or chief financial officer, or
- (b) was subject to an Order that was issued after the director or executive officer ceased to be a director, chief executive officer or chief financial officer and which resulted from an event that occurred while that person was acting in the capacity as director, chief executive officer or chief financial officer.

Mr. Jones was a director of Lakota between September 2008 and October 2009. In May and August 2009, cease trade orders were issued against Lakota for failure to file financial statements on July 13, 2009. The company was delisted from the TSX-V for failure to maintain the continued listing requirements of the TSX-V. The cease trade order was revoked in 2011.

Except as noted below, no director or executive officer of the Company, or a shareholder holding a sufficient number of securities of the Company to affect materially the control of the Company:

- (a) is, as at the date of this AIF, or has been within the 10 years before the date of this AIF, a director or executive officer of any company (including Lundin Mining) that, while that person was acting in that capacity, or within a year of that person ceasing to act in that capacity, became bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency or was subject to or instituted any proceedings, arrangement or compromise with creditors or had a receiver, receiver manager or trustee appointed to hold its assets; or
- (b) has, within the 10 years before the date of this AIF, become bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency, or become subject to or instituted any proceedings, arrangement or compromise with



creditors, or had a receiver, receiver manager or trustee appointed to hold the assets of the director, executive officer or shareholder.

Messrs. Craig and Lundin were directors of Sirocco. Pursuant to a plan of arrangement completed on January 31, 2014, Canadian Lithium Corp. acquired Sirocco. Under the plan of arrangement, Canadian Lithium Corp. amalgamated with Sirocco to form RBI.

In October 2014, RBI commenced proceedings under the *Companies' Creditors Arrangement Act* (the CCAA). CCAA proceedings continued in 2015 and a receiver was appointed in May 2015. The TSX de-listed RBI's common shares in November 24, 2014 for failure to meet the continued listing requirements of the TSX.

Messrs. Craig and Lundin were never directors, officers or insiders of RBI. Messrs. Craig and Lundin, however, were directors of Sirocco within the 12-month period prior to RBI filing under the CCAA.

The foregoing information, not being within the knowledge of the Company, has been furnished by the respective directors, officers and controlling shareholders of the Company individually.

### **9.3 Penalties or Sanctions**

No director or executive officer of the Company, or a shareholder holding a sufficient number of securities of the Company to affect materially the control of the Company, has been subject to:

- (a) any penalties or sanctions imposed by a court relating to securities legislation or by a securities regulatory authority or has entered into a settlement agreement with a securities regulatory authority; or
- (b) any other penalties or sanctions imposed by a court or regulatory body that would likely be considered important to a reasonable investor in making an investment decision.

### **9.4 Conflicts of Interest**

The Company's directors and officers may serve as directors or officers of other companies or have significant shareholdings in other resource companies and, to the extent that such other companies may participate in ventures in which the Company may participate, the directors of the Company may have a conflict of interest in negotiating and concluding terms respecting the extent of such participation. In the event that such a conflict of interest arises at a meeting of the Company's directors, a director who has such a conflict will abstain from voting for or against the approval of such participation or the terms of such participation. From time to time, several companies may participate in the acquisition, exploration and development of natural resource properties, thereby allowing for their participation in larger programs, the involvement in a greater number of programs or a reduction in financial exposure in respect of any one program. It may also occur that a particular company will assign all or a portion of its interest in a particular program to another of these companies due to the financial position of the company making the assignment. In accordance with the laws of Canada, the directors of the Company are required to act honestly, in good faith and in the best interests of the Company. In determining whether or not the Company will participate in a particular program and the interest therein to be acquired by it, the directors will primarily consider the degree of risk to which the Company may be exposed and the financial position at that time.

The directors and officers of the Company are aware of the existence of laws governing the accountability of directors and officers for corporate opportunity and requiring disclosure by the directors and officers of conflicts of interest and the Company will rely upon such laws in respect of any directors' and officers' conflicts of interest or in respect of any breaches of duty by any of its directors and officers. All such conflicts will be disclosed by such directors or officers in accordance with the CBCA and they will govern themselves in respect thereof to the best of their ability in accordance with the obligations imposed upon them by law. Other than as disclosed herein, the directors and officers of the Company are not aware of any such conflicts of interest in any existing or contemplated contracts with or transactions involving the Company.

## **10. AUDIT COMMITTEE**

### **10.1 Overview**

The Audit Committee of the Board of Directors oversees the accounting and financial reporting processes of the Company and its subsidiaries and all external audits and interim reviews of the financial statements of the Company, on behalf of the Board, and has general responsibility for oversight of internal controls, and accounting and auditing activities of the Company and its subsidiaries. All auditing services and non-audit services to be provided to the Company by the Company's auditors are pre-approved by the Audit Committee. The Audit Committee reviews, on a regular basis, any reports prepared by the Company's external auditors relating to the Company's accounting policies and procedures, as well as internal control procedures and systems. The Audit Committee is also responsible for reviewing all financial information, including annual and quarterly financial statements, MD&A and press releases regarding earnings, prepared for securities commissions and similar regulatory bodies, and recommending approval thereof to the Board, prior to public dissemination or delivery of the same. The Audit Committee also oversees the work of the external auditor on the annual audit process, the quarterly review engagements, the Company's internal accounting controls, the resolution of issues identified by the Corporation's external auditors, the Company's Whistleblower Policy, any complaints and concerns regarding any known or suspected accounting, financial or auditing irregularities or, in conjunction with the Corporate Governance and Nominating Committee, any known or suspected violations of the Company's Code of Conduct, Ethical Values and Anti-Corruption Policy. The Audit Committee recommends to the Board annually the firm of independent auditors to be nominated for appointment by the shareholders at the annual general meeting of shareholders and approves the compensation of such external auditor.

### **10.2 Audit Committee Mandate/Charter**

The Board of Directors has adopted the Mandate which sets out the Audit Committee's purpose, procedures, organization, powers, roles and responsibilities. The complete Mandate is attached as Schedule "B" to this AIF.

### **10.3 Composition of the Audit Committee**

Below are the details of each Audit Committee member, including his/her name, whether he/she is independent and financially literate as such terms are defined under NI 52-110 and his/her education and experience as it relates to the performance of his/her duties as an Audit Committee member. The qualifications and independence of each member is discussed below.

Member Name	Independent <sup>(1)</sup>	Financially Literate <sup>(2)</sup>	Education and Experience Relevant to Performance of Audit Committee Duties
Dale C. Peniuk (Chair)	Yes	Yes	Mr. Peniuk is a Chartered Professional Accountant (CPA, CA) and holds a B.Comm (Accounting and Management Information Systems). He was formerly an audit/assurance partner of KPMG LLP Chartered Accountants and led KPMG Vancouver's Mining industry practice. In addition to Lundin Mining, he is presently a director and audit committee chair of Argonaut Gold Inc., Capstone Mining Corp., and Miramont Resources Corp. and has been the audit committee chair of a number of other reporting issuers since 2006. Mr. Peniuk is the designated financial expert on the Audit Committee.
William A. Rand	Yes	Yes	Mr. Rand is a retired corporate and securities lawyer and mining executive with a B.Comm. from McGill University (Honours in Economics and Major in Accounting), who has been a member of a number of boards and audit committees of public companies for over 30 years. Through this education and experience, Mr. Rand has experience overseeing and assessing the performance of companies and public accountants with respect to the preparation, auditing and evaluation of financial statements.
Catherine J. G. Stefan	Yes	Yes	Ms. Stefan is a Chartered Professional Accountant (CPA, CA) and B. Comm. She held the position of Chief Operating Officer, O&Y Properties Inc., President of Stefan & Associates, Executive Vice-President of Bramalea Group and Chair, Tax Committee of Canadian Institute of Public Real Estate Companies (CIPREC). In addition to Lundin Mining, she is presently a director and audit committee chair of Denison Mines Corp.

- (1) A member of an audit committee is independent if the member has no direct or indirect material relationship with the Company which could, in the view of the Board of Directors, reasonably interfere with the exercise of a member's independent judgment, or is otherwise deemed to have a material relationship pursuant to NI 52-110.
- (2) An individual is financially literate if he has the ability to read and understand a set of financial statements that present a breadth of complexity of accounting issues that are generally comparable to the breadth and complexity of the issues and can reasonably be expected to be raised by the Company's financial statements.

#### 10.4 Audit Committee Oversight

Since the commencement of the Company's most recently completed financial year, there has not been a recommendation of the Audit Committee to nominate or compensate an external auditor which was not adopted by the Board of Directors.

#### 10.5 Pre-Approval Policies and Procedures

All audit and non-audit services performed by the external auditor are pre-approved by the Audit Committee.

## 10.6 External Auditor Service Fees

The following table discloses the fees billed to the Company by its external auditors during the financial years ended December 31, 2018 and 2016. Services billed in C\$, SEK or € were translated using average exchange rates that prevailed during 2018 and 2017.

<b>Fiscal Year Ending</b>	<b>Audit Fees<sup>(1)</sup></b>	<b>Audit-Related Fees<sup>(2)</sup></b>	<b>Tax Fees<sup>(3)</sup></b>	<b>All other Fees<sup>(4)</sup></b>
December 31, 2018	\$1,113,662	\$12,428	\$12,533	\$35,619
December 31, 2017	\$1,077,665	\$180,966	\$10,164	\$81,795

(1) Audit fees represent fees billed by the Company's auditors for audit services.

(2) Audit-related fees represent fees billed for assurance and related services by the Company's auditors that are reasonably related to the performance of the audit or review of the Company's financial statements and not disclosed in the Audit Fees column.

(3) Tax fees represent fees billed for professional services rendered by the Company's auditor for tax compliance, tax advice and tax planning.

(4) All other fees represent fees billed for products and services provided by the Company's auditors other than services reported under clauses (1), (2) and (3) above.

## 11. LEGAL PROCEEDINGS AND REGULATORY ACTIONS

### 11.1 Legal Proceedings

Lundin Mining and its subsidiaries are, from time to time, involved in various claims, legal proceedings, investigations and complaints arising in the ordinary course of business. The results of these pending or threatened proceedings cannot be predicted with certainty. Other than as disclosed below, to the best of the Company's knowledge, the Company is not and was not, during the year ended December 31, 2018, a party to any legal proceedings which may be material, nor is any of its property, nor was any of its property during the year ended December 31, 2018, the subject of any such legal proceedings and as at the date hereof, no such legal proceedings are known to be contemplated.

#### ***Canadian Securities Class Action***

Two proposed class actions were filed against Lundin Mining and certain officers and directors. The first, in the province of Ontario, on December 7, 2017 (Markowich v. Lundin Mining Corporation et al) and a second overlapping action in the Province of Québec on January 18, 2018 (Prévreau v. Lundin Mining Corporation et al). Both proposed class actions seek damages of C\$175 million (approximately \$130 million) and punitive damages of C\$10 million (approximately \$7 million) and assert various statutory and other claims related to, among other things, alleged misrepresentations and/or failure to make timely disclosure of material information about the Company's business and operations and, in particular, the operations of the Candelaria Mine and a rock slide at the Candelaria Mine on October 31, 2017. The proposed Ontario class action asserts claims on behalf of a putative class comprising persons who acquired securities of the Company between October 25, 2017, and November 29, 2017, whereas the proposed Québec class action asserts claims on behalf of only such persons who are resident or domiciled in Québec. In June 2018, counsel to the plaintiffs in the Québec action agreed to a stay (i.e., indefinite cessation) of that proceeding in light of the Ontario action. On August 30, 2018, the Québec Superior Court, on consent of the parties, stayed the Québec action indefinitely. It is not possible at this time for the Company to predict an outcome of the class action proceedings. Lundin Mining believes the class actions are without merit and intends to vigorously defend itself.

### ***Candelaria – Caldera Fishermen Civil Action***

On January 18, 2018, a claim was filed against Minera Candelaria in the Copiapó Court of Appeals on behalf of three Caldera fishermen. The claim alleges contamination of marine habitat as a result of vessel loading activities at the Punta Padrones port operations owned by Candelaria. Further, the claim alleges that this contamination has caused harm to fishermen and local communities including impact on health and livelihood. In the following months, a further four claims making the same arguments were filed by the same Chilean lawyer on behalf of an aggregate of an additional 452 Caldera fishermen, although Candelaria was not formally notified of these claims (i.e., served) until several weeks after each of the claims was filed. In aggregate, the five claims seek damages totaling approximately CLP 27.3 billion (\$39.3 million) which equates to approximately CLP 60 million (\$86,000) per each of the 455 claimants. The five claims were consolidated into a single proceeding on June 11, 2018.

In mid-2018, Minera Candelaria filed a response with the Copiapó Court of Appeals against the claims made. The response sought dismissal of the claims based primarily on the lack of evidence supporting the environmental damage caused by the port facility, the imprecise nature of the monetary claims being made and the absence of actual damages (i.e. no reduction in fishing levels). On February 25, 2019, the presiding judge issued a ruling dismissing all claims made by the plaintiff Caldera fishermen. On March 9, 2019, Minera Candelaria became aware that the plaintiff Caldera fishermen had filed an appeal with the Valparaiso Court of Appeals. The Company expects to file a response within the applicable time period.

### ***Candelaria – SMA Regulatory Sanctions***

In May 2015, Minera Candelaria was notified by the Chilean Environmental Superintendent (Superintendencia de Medio Ambiente, or “SMA”) of 16 charges associated with alleged infractions of its environmental approvals. The charges, which originate from two inspections carried out by SMA in June 2013 and July 2014, relate to issues including dust control, road maintenance and signage, disposal of used tires, brine management at the desalination plant, fresh water consumption and the footprint of the mining operations, among others. Minera Candelaria followed the process established by the SMA for responding to the charges, which continued for approximately 18 months. On November 30, 2016, SMA issued a resolution clearing some of the charges and sanctioning Minera Candelaria with a fine of approximately \$4 million for others. The majority of the fine relates to alleged water management issues. On December 7, 2016, former legal representatives of Tierra Amarilla community submitted an independent administrative appeal with SMA requesting that certain charges be reclassified from “serious” to “very serious” which, if successful, was likely to result in increased fines; however, this appeal was denied. On December 23, 2016, Minera Candelaria filed an appeal of the sanctioning resolution with the Environmental Court (EC). On June 15, 2017, a hearing was held before the Environmental Court. On June 5, 2018 Minera Candelaria was advised by the EC that it had rejected the appeal of and corresponding fines imposed by the SMA. On June 25, 2018, Minera Candelaria submitted an appeal of the EC’s decision requesting that it approve submission of the appeal to the Supreme Court and, concurrently, requested that the fines be suspended pending such appeal. On July 4, 2018, the EC granted Minera Candelaria’s request for appeal, but rejected the request for suspension of the fines. Outstanding fines of \$4.4 million were paid on July 18, 2018 but remain subject to a right of reimbursement if successful on appeal to the Supreme Court. A decision of the Supreme Court on the appeal is still pending.

### **Neves-Corvo – ACT Regulatory Sanction**

In late May 2018, the Company became aware that the Portuguese Authority for Working Conditions (*Autoridade para as Condições do Trabalho* or “ACT”) had issued a number of criminal and administrative complaints against the Company’s wholly-owned subsidiary Somincor and certain of Somincor’s current and former management and directors in respect of certain labour actions involving mill personnel at the Neves-Corvo mine in December 2017 and March 2018.

In late 2018, ACT determined that the administrative complaints related to the December 2017 and March 2018 labor actions were valid and issued separate fine notices for immaterial amounts to each of Somincor and the affected directors, which Somincor and the affected directors promptly appealed. A hearing on this appeal is scheduled for May 2019.

All criminal complaints have been referred to the public prosecutor’s office and remain under investigation to determine if there is any legal basis to bring criminal charges. To date, no criminal charges have been laid against Somincor or any specific individual(s) in connection with either incident. Somincor believes that there is no legal or factual basis to sustain a criminal conviction, in which case, no charges will be brought and the complaints in question will be referred back to ACT for a determination as an administrative matter with the potential for further fines for Somincor and the affected current and former management and directors.

### **11.2 Regulatory Actions**

No penalties or sanctions were imposed against the Company by a court relating to securities legislation or by a securities regulatory authority during the year ended December 31, 2018, nor were there any other penalties or sanctions imposed by a court or regulatory body against the Company that would likely be considered important to a reasonable investor in making an investment decision, nor were any settlement agreements entered into by the Company before a court relating to securities legislation or with a securities regulatory authority during the year ended December 31, 2018.

## **12. INTEREST OF MANAGEMENT AND OTHERS IN MATERIAL TRANSACTIONS**

To the best of the Company’s knowledge, none of the directors or executive officers of the Company, nor any person or company that beneficially owns, controls or directs, directly or indirectly, more than 10% of any class or series of outstanding voting securities of the Company, nor any associate or affiliate of any of the foregoing persons, has or has had any material interest, direct or indirect, in any transaction within the three most recently completed financial years or during the current financial year that has materially affected or is reasonably expected to materially affect the Company.

## **13. TRANSFER AGENTS AND REGISTRARS**

The transfer agent and registrar for the common shares of the Company is Computershare Investor Services Inc. at its principal offices in Toronto, Ontario.

## **14. MATERIAL CONTRACTS**

The only material contracts entered into by the Company, other than those entered into in the ordinary course of business, within the most recently completed financial year, or before the most



recently completed financial year but are still in effect, are set forth below. Copies of these material contracts are available under the Company's SEDAR profile at [www.sedar.com](http://www.sedar.com).

- (a) **Credit Agreement.** A second amended and restated credit agreement dated October 7, 2013 (as the same has been amended from time to time) among the Company and Lundin Mining AB, as borrowers, The Bank of Nova Scotia, as administrative agent and a lender, and ING Capital LLC, Bank of Montreal, The Toronto-Dominion Bank, Bank of America, N.A. (Canada Branch), Société Générale and Skandinaviska Enskilda Banken AB (publ), as lenders. The agreement bears interest on US dollar denominated drawn funds at rates of LIBOR + 1.875% to 3.0%, and matures on October 19, 2022.
- (b) **Stock Purchase Agreement.** On October 6, 2014, the Company and Freeport entered into a definitive Stock Purchase Agreement, which was completed on November 3, 2014, to purchase an 80% ownership interest in Candelaria and supporting infrastructure for cash consideration of \$1.8 billion, plus customary adjustments. In addition, contingent consideration of up to \$200 million in aggregate is payable, calculated as 5% of net copper revenues in any annual period over five years from the date of acquisition if the realized copper price exceeds \$4 per pound.
- (c) **Purchase and Sale Agreement.** On October 6, 2014, the Company, LMC Bermuda Ltd., Franco-Nevada and Franco-Nevada (Barbados) Corporation effective as of July 28, 2015 and as amended on November 4, 2016 and June 20, 2017, entered into the Purchase and Sale Agreement to sell to Franco-Nevada a gold and silver stream from Candelaria for an upfront deposit of \$648 million, subject to expected post-closing adjustments. In addition to the upfront deposit, Franco-Nevada will make ongoing payments upon delivery of the stream.
- (d) **Stock Purchase Agreement - BHR.** On November 15, 2016, the Company entered into the Stock Purchase Agreement - BHR to sell its indirect interest in the Tenke Fungurume Mine by selling its indirect shareholdings in TF Holdings to an affiliate of BHR Partners, a Chinese private equity firm, for \$1.136 billion in cash and contingent consideration of up to \$51.4 million, consisting of \$25.7 million if the average copper price exceeds \$3.50 per pound and \$25.7 million if the average cobalt price exceeds \$20 per pound, both during a 24-month period beginning on January 1, 2018. In connection with its announced sale, Lundin Mining waived its right of first offer which allowed Freeport to complete its sale of its interest to CMOC on November 16, 2016. On April 19, 2017, the Company completed the sale of its indirect interest in TF Holdings.

## 15. INTERESTS OF EXPERTS

The Qualified Persons who have supervised the preparation of the Company's Mineral Reserve and Mineral Resource estimates during the year ended December 31, 2018 or authored portions of the Technical Reports disclosed in this AIF are as follows:

### *Candelaria Mine:*

- Messrs. Patricio Calderón, Registered Member, Chilean Mining Commission, Superintendent Resource Estimation, Candelaria Mine, in respect of the Candelaria

Mineral Resource estimates and Cristian Erazo, Registered Member, Chilean Mining Commission, Open Pit Mine Engineer and Patricio Vega, Registered Member, Chilean Mining Commission, Underground Mine Engineer, Candelaria Mine, in respect of the Mineral Reserve estimates;

- Messrs. Glen Cole, P.Geo., Benny Zhang PEng, Adrian Dance, P.Eng., and Cameron C. Scott, P.Eng, of SRK Consulting (Canada) Inc. and John Nilsson, P.Eng., of Nilsson Mine Services Ltd., in respect of the Candelaria Report;

#### *Neves-Corvo Mine*

- Messrs. Nelson Pacheco, EurGeol, Chief Geologist, Neves-Corvo, and Antonio Salvador, CEng MIMMM, Group Mining Engineer, Lundin Mining, in respect of the Neves-Corvo Mineral Resource and Mineral Reserve estimate;
- Mr. Graham Greenway, Pr.Sci.Nat., Group Resource Geologist, Lundin Mining, in respect of the Semblana deposit Mineral Resource estimate;
- Mr. Richard Ellis, CGeol, EurGeol, and Dr. Phil Newall, CEng, FIMMM, of Wardell Armstrong International Ltd., in respect of the Neves-Corvo Report;

#### *Zinkgruvan Mine*

- Mr. Graham Greenway, Pr.Sci.Nat., Group Resource Geologist, Lundin Mining, and Dr. David Allison, CEng, MIMMM, Group Mining Engineer, Lundin Mining, in respect of the Zinkgruvan Mineral Resource and Mineral Reserve estimate;
- Messrs. Richard Ellis, CGeol, EurGeol, Philip King, CEng, FIMMM, and Tim Daffern, CEng, FIMMM, of Wardell Armstrong International Ltd., in respect of the Zinkgruvan Report;

#### *Eagle Mine*

- Mr. Robert Mahin, CPG, Exploration Manager, Eagle Mine, and Mr. Josh Lam, P.Eng, Senior Mine Engineer, Lundin Mining, in respect of the Eagle Mineral Resource and Mineral Reserve estimates;
- Mr. Graham Greenway, Pr.Sci.Nat., Group Resource Geologist, Lundin Mining, and Mr. Josh Lam, P.Eng, in respect of the Eagle East Mineral Resource and Mineral Reserve estimate; and
- Graham Clow, P.Eng., David Rennie, P.Eng., Brenna Scholey, P.Eng., and Normand Lecuyer, P.Eng., of Roscoe Postle Associates Inc, in respect of the Eagle Report.

#### *General*

- Unless otherwise stated, the scientific and technical information in this AIF has been reviewed and approved by Mr. Stephen Gately, Vice President, Technical Services of Lundin Mining and Mr. Graham Greenway, Group Resource Geologist of Lundin Mining, each of whom is a qualified person under NI 43-101.

Each of the aforementioned firms or persons held less than 1% of the outstanding securities of the same class of the Company or of any associate or affiliate of the Company when such expert prepared the reports or the Mineral Resource or Mineral Reserve estimates referred to, and held less than 1% of the outstanding securities of the same class of the Company following the preparation of such reports or data.

None of the aforementioned firms or persons, nor any directors, officers or employees of such firms, are currently expected to be elected, appointed or employed as a director, officer or employee of the Company or of any associate or affiliate of the Corporation, other than Messrs. Gatley, Greenway, Calderón, Erazo, Pacheco, Salvador, Lam, Allison and Mahin who are each currently employed by Lundin Mining or one of its subsidiaries.

The Company's independent auditors, PricewaterhouseCoopers LLP, Chartered Professional Accountants, Licensed Public Accountants, issued an independent auditor's report dated February 14, 2019 in respect of the Company's annual consolidated financial statements as at December 31, 2018 and December 31, 2017 and for each of the years then ended. PricewaterhouseCoopers LLP has advised that they are independent with respect to the Company within the meaning of the Chartered Professional Accountants of Ontario, CPA Code of Professional Conduct.

## **16. ADDITIONAL INFORMATION**

Additional information regarding the Company is available on SEDAR at [www.sedar.com](http://www.sedar.com). Additional information, including directors' and officers' remuneration and indebtedness, principal holders of the Company's securities, if any, and securities authorized for issuance under equity compensation plans is contained in the Company's management information circular dated March 22, 2019 prepared in connection with the annual meeting of shareholders held on May 10, 2019.

The Company's management information circular for the year ended December 31, 2018 will be prepared and filed in connection with its annual meeting of shareholders, which is expected to be held on or about May 10, 2019. Additional financial information is provided in the Company's annual consolidated financial statements for the years ended December 31, 2018 and 2017, together with the auditors' report thereon and the notes thereto, and MD&A for the year ended December 31, 2018.

## SCHEDULE A

### Mineral Resource and Mineral Reserve Estimates – June 30, 2018

#### Mineral Reserves

Category		000's Tonnes	Cu %	Zn %	Pb %	Au g/t	Ag g/t	Ni %	Co %	Contained Metal 000's (Ounces millions)										
										Cu t	Zn t	Pb t	Au Oz	Ag Oz	Ni t	Co t	Lundin Mining Interest			
<b>Copper</b>																				
Candelaria	Proven	357,302	0.5			0.1	2				1,760			1.3	18		80%			
Open Pit	Proven (Stockpile)	84,460	0.3			0.1	1				278			0.2	4		80%			
	Probable	26,448	0.4			0.1	1				101			0.1	1		80%			
	<b>Total</b>	<b>468,209</b>	<b>0.5</b>			<b>0.1</b>	<b>2</b>				<b>2,139</b>			<b>1.6</b>	<b>23</b>		<b>80%</b>			
Candelaria	Proven	19,014	0.4			0.1	0				82			0.1	0		80%			
La Espanola	Probable	12,704	0.4			0.1	0				53			0.0	0		80%			
	<b>Total</b>	<b>31,719</b>	<b>0.4</b>			<b>0.1</b>	<b>0</b>				<b>135</b>			<b>0.1</b>	<b>0</b>		<b>80%</b>			
Candelaria	Proven	71,876	0.9			0.2	3				634			0.5	8		80%			
Underground	Proven (Stockpile)	44	1.2			0.2	3				1			-	-		80%			
	Probable	62,130	0.8			0.2	2				504			0.4	5		80%			
	<b>Total</b>	<b>134,050</b>	<b>0.8</b>			<b>0.2</b>	<b>3</b>				<b>1,139</b>			<b>0.8</b>	<b>12</b>		<b>80%</b>			
Neves-Corvo	Proven	5,742	3.6	0.9	0.2		39				208	52	11		7		100%			
	Probable	24,607	1.9	0.7	0.2		34				477	165	50		27		100%			
	<b>Total</b>	<b>30,349</b>	<b>2.3</b>	<b>0.7</b>	<b>0.2</b>		<b>35</b>				<b>685</b>	<b>217</b>	<b>61</b>		<b>34</b>		<b>100%</b>			
Zinkgruvan	Proven	2,932	1.9	0.3			32				57	8			3		100%			
	Probable	313	1.6	0.5			33				5	2			-		100%			
	<b>Total</b>	<b>3,245</b>	<b>1.9</b>	<b>0.3</b>			<b>32</b>				<b>62</b>	<b>10</b>			<b>3</b>		<b>100%</b>			
<b>Zinc</b>																				
Neves-Corvo	Proven	5,076	0.3	8.8	2.2		78				15	446	113		13		100%			
	Probable	25,309	0.3	7.4	1.7		63				87	1,885	436		51		100%			
	<b>Total</b>	<b>30,384</b>	<b>0.3</b>	<b>7.7</b>	<b>1.8</b>		<b>65</b>				<b>102</b>	<b>2,331</b>	<b>549</b>		<b>64</b>		<b>100%</b>			
Zinkgruvan	Proven	5,059		8.1	3.4		78				409	172			13		100%			
	Probable	5,255		7.7	4.2		89				407	218			15		100%			
	<b>Total</b>	<b>10,314</b>		<b>7.9</b>	<b>3.8</b>		<b>84</b>				<b>816</b>	<b>390</b>			<b>28</b>		<b>100%</b>			
<b>Nickel</b>																				
Eagle	Proven	1,711	2.1			0.2		2.1	0.1		35				37	1	100%			
	Probable	833	1.3			0.1		1.7	0.0		11				14	0	100%			
	Probable Eagle East	1,544	3.0			0.4	11	3.7	0.1		47			1	57	1	100%			
	<b>Total</b>	<b>4,088</b>	<b>2.3</b>			<b>0.3</b>	<b>4</b>	<b>2.6</b>	<b>0.1</b>		<b>93</b>			<b>0</b>	<b>1</b>	<b>108</b>	<b>3</b>	<b>100%</b>		
Note: totals may not summate correctly due to rounding										<b>Lundin Mining's share</b>			3,672	3,374	1,000	2	158	108	3	

#### Mineral Resources - inclusive of Mineral Reserves

Category		000's Tonnes	Cu %	Zn %	Pb %	Au g/t	Ag g/t	Ni %	Co %	Contained Metal 000's (Ounces millions)										
										Cu t	Zn t	Pb t	Au Oz	Ag Oz	Ni t	Co t	Lundin Mining Interest			
<b>Copper</b>																				
Candelaria	Measured	444,914	0.5			0.1	2				2,121			1.6	22		80%			
Open Pit	Measured (Stockpile)	84,460	0.3			0.1	1				278			0.2	4		80%			
	Indicated	37,725	0.4			0.1	1				138			0.1	2		80%			
	Inferred	6,617	0.2			0.1	1				16			-	-		80%			
Candelaria	Measured	23,325	0.4			0.1	0				99			0.1	-		80%			
La Espanola	Indicated	28,031	0.4			0.1	0				113			0.1	-		80%			
	Inferred	27,801	0.4			0.1	0				112			0.1	-		80%			
Underground	Measured	222,957	1.0			0.2	3				2,330			1.7	23		80%			
	Measured (Stockpile)	44	1.2			0.2	3				1			-	-		80%			
	Indicated	111,018	1.0			0.2	3				1,066			0.8	10		80%			
	Inferred	18,301	1.1			0.2	2				196			0.1	1		80%			
Neves-Corvo	Measured	9,931	3.4	1.1	0.3		49				338	109	30		16		100%			
	Indicated	52,046	2.2	0.8	0.3		44				1,145	416	156		74		100%			
	Inferred	10,463	1.9	1.0	0.3		38				199	105	31		13		100%			
Semblana	Inferred	7,807	2.9				25				223				6		100%			
Zinkgruvan	Measured	4,540	2.2	0.3			35				98	12			5		100%			
	Indicated	428	2.1	0.8			42				9	3			1		100%			
	Inferred	424	1.8	0.3			27				8	1			-		100%			
<b>Zinc</b>																				
Neves-Corvo	Measured	15,302	0.3	7.1	1.6		64				46	1,086	245		31		100%			
	Indicated	88,214	0.4	5.8	1.2		56				353	5,116	1,059		159		100%			
	Inferred	14,083	0.4	4.3	0.9		52				56	606	127		24		100%			
Zinkgruvan	Measured	7,056		8.7	3.4		79				616	237			18		100%			
	Indicated	8,095		8.1	3.6		80				654	287			21		100%			
	Inferred	16,329		7.4	3.3		76				1,208	539			40		100%			
<b>Nickel</b>																				
Eagle	Measured	1,868	2.4			0.3		2.6	0.1		44				48	1	100%			
	Indicated	820	1.8			0.2		2.4	0.1		15				20	1	100%			
	Indicated Eagle East	1,293	4.2			0.5	15	5.2	0.1		54			1	67	1	100%			
	Inferred	23	0.9			0.1		1.0	0.0		-			-	-	-	100%			
	Inferred Eagle East	290	1.4			0.2	6	1.7			4			-	5	-	100%			
Note: totals may not summate correctly due to rounding										<b>Lundin Mining's share</b> not including Inferred Resources			7,018	8,014	2,014	4	374	135	3	

## Notes on Mineral Reserves and Mineral Resources Table

Mineral Resources and Mineral Reserve estimates are shown on a 100% basis for each mine. The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce the Mineral Reserves. All estimates are prepared as at June 30, 2018.

Estimates for all operations are prepared by or under the supervision of a Qualified Person as defined in NI 43-101 or have been audited by independent Qualified Persons on behalf of Lundin Mining.

Mineral Reserves have been calculated using metal prices of US\$2.75/lb copper, US\$1.00/lb zinc, US\$1.00/lb lead, US\$8.00/lb nickel, US\$1,000/oz gold and exchange rates of EUR/US\$ 1.25, US\$/SEK 7.00 and Chilean Peso/US\$ 550.

### Candelaria and Ojos

Candelaria open pit Mineral Resource estimates are reported within a conceptual pit shell based on metal prices of US\$3.16/lb copper and US\$1,000/oz gold and are estimated at a cut-off grade of 0.15% copper. La Española open pit Mineral Resource estimates are reported within a conceptual pit shell based on metal prices of US\$3.16/lb copper and US\$1,000/oz gold and are estimated at a cut-off grade of 0.20% copper. Underground Mineral Resources are estimated at a cut-off grade of 0.55% copper. Mineral Reserves for the Candelaria open pit, Española open pit and underground for the Candelaria property are estimated at cut-off grades of 0.17%, 0.21% and 0.57% copper, respectively. Underground Mineral Reserves for the Ojos del Salado property (Santos and Alcaparrosa mines) are estimated at cut-off grades of 0.59% and 0.64% copper, respectively. Patricio Calderón, Superintendent Resource Estimation, Patricio Vega, Open Pit Mine Engineer and Cristian Erazo, Underground Mine Engineer, each of whom is a Registered Member, Chilean Mining Commission, employed by the Candelaria mining complex and is a Qualified Person as defined under NI 43-101, supervised the preparation of and verified the Mineral Resource estimate, open pit Mineral Reserve and underground Mineral Reserve estimates respectively.

### Neves-Corvo and Semblana

The Mineral Resources are estimated above cut-off grades of 1.0% for copper and 3.0% for zinc. The copper and zinc Mineral Reserve estimates have been calculated using variable Net Smelter Return (NSR) values based on area and mining method. The NSR is calculated on a recovered payable basis taking in to account copper, lead, zinc and silver grades, metallurgical recoveries, prices and realization costs. The copper Mineral Reserves are estimated above a site average cut-off of EUR 39/t (grade equivalent to 1.3% copper). For zinc Mineral Reserve estimates a site average cut-off of EUR 47/t (grade equivalent to 5.5% zinc) is used. Mineral Reserves and Mineral Resources for Neves-Corvo were estimated by the mine geology and mine engineering departments at Neves-Corvo under the guidance of Nelson Pacheco, EurGeol, Chief Geologist, and Fernando Cartaxo, Chief Mine Planning Engineer at the Neves-Corvo mine. Nelson Pacheco EurGeol, prepared the Neves-Corvo Mineral Resource estimate and Antonio Salvador, CEng MIMMM, Group Mining Engineer, Lundin Mining, reviewed and verified the Mineral Reserve estimate. Both Messrs. Pacheco and Salvador are Qualified Persons as defined under NI 43-101.

The Mineral Resources at Semblana are estimated above a cut-off grade of 1.0% copper. The Mineral Resource estimate was prepared by Graham Greenway, Pr.Sci.Nat., Group Resource Geologist, Lundin Mining, who is a Qualified Person as defined under NI 43-101.

### **Zinkgruvan**

The zinc Mineral Resources are estimates within geological volumes based at a nominal NSR cut-off of SEK335/t (equivalent to 3.7% zinc) and a minimum mining width of 5 m. The copper Mineral Resource is estimated above a cut-off grades of 1.0% Cu. The zinc and copper Mineral Reserves are estimated above a site average NSR cut-off grade of SEK445/t (equivalent to 5.2% zinc and 1.4% copper respectively). The NSR is calculated on a recovered payable basis taking in to account copper, lead, zinc and silver grades, metallurgical recoveries, prices and realization costs. The Zinkgruvan Mineral Resource and Mineral Reserve estimates are prepared by the mine's geology and mine engineering department under the supervision of Anja Hagerud, Resource Manager, and Angelique Bohm, Section Manager Mine Planning, both employed by Zinkgruvan mine. The estimates were reviewed and verified by Graham Greenway, Pr.Sci.Nat., and David Allison, Group Mining Engineer, CEng MIMMM, Lundin Mining. Both Messrs. Greenway and Allison are Qualified Persons as defined under NI 43-101.

### **Eagle and Eagle East**

The Eagle Mineral Resources and Reserves are reported above a fixed NSR cut-off of US\$116/t. The Eagle East Mineral Resources and Reserves are reported above a fixed NSR cut-offs of US\$142/t and US\$160/t respectively. The NSR is calculated on a recovered payable basis taking in to account nickel, copper, cobalt, gold and PGM grades, metallurgical recoveries, prices and realization costs. The Eagle Mineral Resource and Reserve estimates are prepared by the mine's geology and mine engineering department under the guidance of Robert Mahin, Chief Geologist and Josh Lam, PEng, Senior Mine Engineer, both of whom are employees of Eagle Mine. The Eagle East Mineral Resource estimate was prepared by Graham Greenway, Pr.Sci.Nat., Group Resource Geologist, Lundin Mining. Robert Mahin, CPG, prepared the Eagle Mineral Resource estimate and reviewed and verified the Eagle East Mineral Resource estimate. Josh Lam, PEng, reviewed and verified the Eagle and Eagle East Mineral Reserve estimates. Messrs. Greenway, Mahin and Lam are Qualified Persons as defined under NI 43-101.



## **SCHEDULE B**

### **AUDIT COMMITTEE MANDATE**

#### **A. PURPOSE**

The overall purpose of the Audit Committee (the “Committee”) is to ensure that the Corporation’s management has designed and implemented an effective system of internal financial controls, to review and report on the integrity of the consolidated financial statements of the Corporation and to review the Corporation’s compliance with regulatory and statutory requirements as they relate to financial statements, taxation matters and disclosure of material facts.

#### **B. COMPOSITION, PROCEDURES AND ORGANIZATION**

1. The Committee shall consist of at least three members of the Board of Directors (the “Board”), all of whom shall be “independent directors”, as that term is defined in Multilateral Instrument 52-110, “Audit Committees”.
2. All of the members of the Committee shall be “financially literate” (i.e. able to read and understand a set of financial statements that present a breadth and level of complexity of the issues that can reasonably be expected to be raised by the Corporation’s financial statements).
3. At least one member of the Committee shall have accounting or related financial expertise (i.e. able to analyze and interpret a full set of financial statements, including the notes thereto, in accordance with generally accepted accounting principles).
4. The Board, at its organizational meeting held in conjunction with each annual general meeting of the shareholders, shall appoint the members of the Committee for the ensuing year. The Board may at any time remove or replace any member of the Committee and may fill any vacancy in the Committee.
5. Unless the Board shall have appointed a chair of the Committee or in the event of the absence of the chair, the members of the Committee shall elect a chair from among their number.
6. The secretary of the Committee shall be designated from time to time from one of the members of the Committee or, failing that, shall be the Corporation’s Corporate Secretary, unless otherwise determined by the Committee.
7. The quorum for meetings shall be a majority of the members of the Committee, present in person or by telephone or other telecommunication device that permits all persons participating in the meeting to speak and to hear each other.
8. The Committee shall have access to such officers and employees of the Corporation and to the Corporation’s external auditors, and to such information respecting the Corporation, as it considers to be necessary or advisable in order to perform its duties and responsibilities.

9. Meetings of the Committee shall be conducted as follows:
- (a) the Committee shall meet at least four times annually at such times and at such locations as may be requested by the Chair of the Committee. The external auditors or any member of the Committee may request a meeting of the Committee;
  - (b) the external auditors shall receive notice of and have the right to attend all meetings of the Committee;
  - (c) the Chair of the Committee shall be responsible for developing and setting the agenda for Committee meetings and determining the time and place of such meetings;
  - (d) the following management representatives shall be invited to attend all meetings, except executive sessions and private sessions with the external auditors:
    - (i) Chief Executive Officer; and
    - (ii) Chief Financial Officer.
  - (e) other management representatives shall be invited to attend as necessary; and
  - (f) notice of the time and place of every meeting of the Committee shall be given in writing to each member of the Committee a reasonable time before the meeting.
10. The internal auditors and the external auditors shall have a direct line of communication to the Committee through its Chair and may bypass management if deemed necessary. The Committee, through its Chair, may contact directly any employee in the Corporation as it deems necessary, and any employee may bring before the Committee any matter involving questionable, illegal or improper financial practices or transactions.
11. The Committee shall have authority to engage independent counsel and other advisors as it determines necessary to carry out its duties, to set and pay the compensation for any advisors employed by the Audit Committee and to communicate directly with the internal and external auditors.

## **C. ROLES AND RESPONSIBILITIES**

1. The overall duties and responsibilities of the Committee shall be as follows:
- (a) to assist the Board in the discharge of its responsibilities relating to the Corporation's accounting principles, reporting practices and internal controls and its approval of the Corporation's annual and quarterly consolidated financial statements;
  - (b) to establish and maintain a direct line of communication with the Corporation's internal and external auditors and assess their performance;
  - (c) to ensure that the management of the Corporation has designed, implemented and is maintaining an effective system of internal financial controls; and
  - (d) to report regularly to the Board on the fulfilment of its duties and responsibilities.

2. The duties and responsibilities of the Committee as they relate to the external auditors shall be as follows:
  - (a) to recommend to the Board a firm of external auditors to be engaged by the Corporation, and to verify the independence of such external auditors;
  - (b) to review and approve the fee, scope and timing of the audit and other related services rendered by the external auditors;
  - (c) review the audit plan of the external auditors prior to the commencement of the audit;
  - (d) to review with the external auditors, upon completion of their audit:
    - (i) contents of their report;
    - (ii) scope and quality of the audit work performed;
    - (iii) adequacy of the Corporation's financial and auditing personnel;
    - (iv) co-operation received from the Corporation's personnel during the audit;
    - (v) internal resources used;
    - (vi) significant transactions outside of the normal business of the Corporation;
    - (vii) significant proposed adjustments and recommendations for improving internal accounting controls, accounting principles or management systems; and
    - (viii) the non-audit services provided by the external auditors;
  - (e) to discuss with the external auditors the quality and not just the acceptability of the Corporation's accounting principles; and
  - (f) to implement structures and procedures to ensure that the Committee meets the external auditors on a regular basis in the absence of management.
3. The duties and responsibilities of the Committee as they relate to the Corporation's internal auditors are to:
  - (a) periodically review the internal audit function with respect to the organization, staffing and effectiveness of the internal audit department;
  - (b) review and approve the internal audit plan; and
  - (c) review significant internal audit findings and recommendations, and management's response thereto.

4. The duties and responsibilities of the Committee as they relate to the internal control procedures of the Corporation are to:
  - (a) review the appropriateness and effectiveness of the Corporation's policies and business practices which impact on the financial integrity of the Corporation, including those relating to internal auditing, insurance, accounting, information services and systems and financial controls, management reporting and risk management;
  - (b) review compliance under the Corporation's Code of Conduct, Ethical Values and Anti-Corruption Policy;
  - (c) review any unresolved issues between management and the external auditors that could affect the financial reporting or internal controls of the Corporation; and
  - (d) periodically review the Corporation's financial and auditing procedures and the extent to which recommendations made by the internal audit staff or by the external auditors have been implemented.
  
5. The Committee is also charged with the responsibility to:
  - (a) review the Corporation's quarterly statements of earnings, including the impact of unusual items and changes in accounting principles and estimates and report to the Board with respect thereto;
  - (b) review and recommend to the Board for approval of the financial sections of:
    - (i) the annual report to shareholders;
    - (ii) the annual information form;
    - (iii) prospectuses; and
    - (iv) other public reports requiring approval by the Board,and report to the Board with respect thereto;
  - (c) review regulatory filings and decisions as they relate to the Corporation's consolidated financial statements;
  - (d) review the appropriateness of the policies and procedures used in the preparation of the Corporation's consolidated financial statements and other required disclosure documents, and consider recommendations for any material change to such policies;
  - (e) review and report on the integrity of the Corporation's consolidated financial statements;
  - (f) review the minutes of any audit committee meeting of subsidiary companies;

- (g) review with management, the external auditors and, if necessary, with legal counsel, any litigation, claim or other contingency, including tax assessments that could have a material effect upon the financial position or operating results of the Corporation and the manner in which such matters have been disclosed in the consolidated financial statements;
- (h) review the Corporation's compliance with regulatory and statutory requirements as they relate to financial statements, tax matters and disclosure of material facts;
- (i) develop a calendar of activities to be undertaken by the Committee for each ensuing year and to submit the calendar in the appropriate format to the Board of Directors following each annual general meeting of shareholders; and
- (j) establish procedures for:
  - (i) the receipt, retention and treatment of complaints received by the Corporation regarding accounting, internal accounting controls, or auditing matters; and
  - (ii) the confidential, anonymous submission by employees of the Corporation of concerns regarding questionable accounting or auditing matters.

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