



**PAN AMERICAN**  
— SILVER —

# **Annual Information Form**

**For the Year  
Ended December 31, 2019**

March 12, 2020

1500-625 Howe Street  
Vancouver, British Columbia  
V6C 2T6

*[www.panamericansilver.com](http://www.panamericansilver.com)*

PAN AMERICAN SILVER CORP.  
ANNUAL INFORMATION FORM

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## IMPORTANT INFORMATION ABOUT THIS DOCUMENT

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This annual information form ("AIF") provides important information about Pan American Silver Corp. It describes our business, including our history, our operations and development projects, our mineral reserves and mineral resources, sustainability, the regulatory environment that we operate in, the risks we face, and the market for our products and shares, among other things.

We have prepared this document to meet the requirements of Canadian securities laws, which are different from what US securities laws require.

Throughout this document, the term *Pan American* means Pan American Silver Corp. and the terms *we*, *us*, and *our* mean Pan American and its subsidiaries.

### Reporting Currency and Financial Information

Unless we have specified otherwise, all references to dollar amounts or \$ or USD are United States dollars. Any references to CAD or CAD\$ are Canadian dollars.

All financial information presented in this AIF was prepared in accordance with international financial reporting standards ("IFRS") as issued by the International Accounting Standards Board.

### Non-GAAP Measures

This AIF refers to various non-generally accepted accounting principles ("non-GAAP") measures, such as cash costs per ounce sold, net of by-product credits ("Cash Costs"), all-in sustaining costs per ounce sold ("AISC"), working capital and total debt.

#### *Per Ounce Measures - Cash Costs and AISC*

Cash Costs and AISC are non-GAAP financial measures that do not have any standardized meaning prescribed by IFRS and are therefore unlikely to be comparable to similar measures presented by other companies.

Pan American produces by-product metals incidentally to our silver and gold mining activities. We have adopted the practice of calculating a performance measure with the net cost of producing an ounce of silver and gold, our primary payable metals, after deducting revenues gained from incidental by-product production. This performance measurement has been commonly used in the mining industry for many years and was developed as a relatively simple way of comparing the net production costs of the primary metal for a specific period against the prevailing market price of that metal.

Silver segment Cash Costs and AISC are calculated net of credits for realized revenues from all metals other than silver ("silver segment by-product credits"), and are calculated per ounce of silver sold. Gold segment Cash Costs and AISC are calculated net of credits for realized silver revenues ("gold segment by-product credits"), and are calculated per ounce of gold sold. Consolidated Cash Costs and AISC are based on total silver ounces sold and are net of by-product credits from all metals other than silver ("silver basis consolidated by-product credits").

Prior to 2019, cash costs per ounce reported by Pan American in its AIFs, news releases and other disclosure documents were based on cash costs per ounce of payable silver produced and were net of by-product credits calculated with average market prices applied to all metals produced other than silver. Given the increased complexity of our business with the addition of the new gold operations, we determined that conforming the calculation of Cash Costs with a consistent method to that used for AISC, using realized by-product sales as by-product credits and based on per ounce of silver sold, would provide a more consistent per-ounce measure; as such, the Cash Costs amounts in this AIF have been quantified using the current methodology and are different from those previously reported. Corporate general and administrative expense, and exploration and project development expenses are included in the calculation of consolidated (silver basis) AISC, but are not allocated amongst the operations and thus are not included in either the silver or gold segment AISC totals. In prior years these costs were similarly included only in the consolidated all-in-sustaining costs per silver ounce sold ("AISCOS") metrics and not allocated to each mine's AISCOS; as such, consolidated AISCOS in previous years included such costs, where total

silver or gold segment AISC in the current period does not. A detailed description of how previously reported cash costs were quantified is provided in our management's discussion and analysis for periods prior to 2019.

Cash costs per ounce metrics, net of by-product credits, is used extensively in our internal decision making processes. We believe the metric is also useful to investors because it facilitates comparison, on a mine-by-mine basis, notwithstanding the unique mix of incidental by-product production at each mine, of our operations' relative performance on a period-by-period basis, and against the operations of our peers in the silver industry. Cash costs per ounce is conceptually understood and widely reported in the mining industry.

We believe that AISC, also calculated net of by-products, is a comprehensive measure of the full cost of operating our business, given it includes the cost of replacing silver and gold ounces through exploration, the cost of ongoing capital investments (sustaining capital), general and administrative expenses, as well as other items that affect our consolidated cash flow.

Readers should refer to our management's discussion and analysis for the year ended December 31, 2019 (the "2019 MD&A") for a detailed description and reconciliation of these non-GAAP measures.

### ***Working Capital***

Working capital is a non-GAAP measure calculated as current assets less current liabilities. Working capital does not have any standardized meaning prescribed by IFRS and is therefore unlikely to be comparable to similar measures presented by other companies. Pan American and certain investors use this information to evaluate whether Pan American is able to meet its current obligations using its current assets.

### ***Total Debt***

Total debt is a non-GAAP measure calculated as the total current and non-current portions of long-term debt, finance lease liabilities, and loans payable. Total debt does not have any standardized meaning prescribed by GAAP and is therefore unlikely to be comparable to similar measures presented by other companies. Pan American and certain investors use this information to evaluate the financial debt leverage of Pan American.

## **Glossary of Terms**

The glossary of terms under "Glossary of Terms" of this AIF contains definitions of certain scientific or technical terms used in this AIF that might be useful for your understanding.

## **Caution About Forward-Looking Information**

This AIF includes statements and information about our expectations for the future. When we discuss our strategy, plans and future financial and operating performance, or other things that have not yet taken place, we are making statements considered to be forward-looking information or forward-looking statements under Canadian securities laws and the United States Private Securities Litigation Reform Act of 1995. We refer to such forward-looking information and forward-looking statements together in this AIF as forward-looking information.

Key things to understand about the forward-looking information in this AIF are:

- It typically includes words and phrases about the future, such as *believe, estimate, anticipate, expect, plan, intend, predict, goal, target, forecast, project, scheduled, potential, strategy* and *proposed* (see examples starting on page 4).
- It is based on a number of material assumptions, including, but not limited to, those we have listed below, that may prove to be incorrect.
- Actual results and events may be significantly different from what we currently expect, because of, among other things, the risks associated with our business. We list a number of these material risks below under "Material Risks and Assumptions". We recommend you also review other parts of this AIF, including "Risks Related to Our Business" starting on page 66, and our 2019 MD&A, which includes a discussion of other material risks that could cause our actual results to differ from our current expectations.

Forward-looking information is designed to help you understand management's current views of our near and longer term prospects. It may not be appropriate for other purposes. We do not intend to update forward-looking information unless we are required to do so by applicable securities laws.

### **Examples of Forward-Looking Information in this AIF:**

- the price of silver and other metals;
- the sufficiency of our liquid assets to satisfy our 2020 working capital requirements, fund currently planned capital expenditures (including both sustaining and project capital) for existing operations, and to discharge liabilities as they come due;
- our anticipated operating cash flow and our ability to raise necessary funds;
- our belief that we are well positioned to take advantage of strategic opportunities as they become available;
- the accuracy of mineral reserve and mineral resource estimates, estimates of future production and future cash, and total costs of production, as applicable, at the La Colorada, Dolores, Huaron, Morococha, San Vicente, and Manantial Espejo mines, and the Navidad, Joaquin and other properties;
- estimated production rates for silver and other payable metals we produce, timing of production and estimated cash and total costs of production, including forecast cash costs of production;
- the estimated cost of and availability of funding for working capital requirements and capital replacement, improvement or remediation programs, and for future construction and development projects;
- estimated costs of construction, development and ramp-up of our projects;
- the outcome of the ILO 169 consultation process in Guatemala with respect to the Escobal mine, the resolution of other matters ordered by the courts in Guatemala, and our anticipated engagement with local communities and the Xinka population in Guatemala;
- our ability to successfully restart the Escobal mine and begin production and export therefrom;
- our ability to successfully complete the integration of the operations and employees of Tahoe Resources Inc.;
- the ability to obtain necessary permits and licenses, including for current or future operations, project development and expansion;
- future successful development of the Cap-Oeste Sur Este ("COSE"), Joaquin, Navidad and other development projects;
- the effect of the New Mining Law established by the Bolivian government on the current joint venture agreement with COMIBOL relating to the San Vicente mine, and our intention to take appropriate steps to protect and, if necessary, enforce our rights under our existing agreement with COMIBOL;
- the effects of laws, regulations and government policies affecting our operations, including, without limitation, expectations relating to or the effect of certain highly restrictive laws and regulations applicable to mining in the Province of Chubut, Argentina;
- the estimates of expected or anticipated economic returns from a mining project, as reflected in preliminary economic assessments, pre-feasibility, and feasibility studies or other reports prepared in relation to development of projects;
- estimated exploration expenditures to be incurred on our various silver exploration properties;
- compliance with environmental, health, safety and other regulations;
- our goal to continue to be a responsible company, committed to sustainable development;
- the pursuit of all legal and commercial avenues to collect the amounts owing to us under our contracts with Doe Run Peru and Republic Metals Corporation ("Republic");
- estimated future closure, reclamation and remediation costs;
- forecast capital and non-operating spending;
- estimates of foreign exchange rates and future income tax rates;
- future sales of the metals, concentrates or other products produced by us;
- our ability to maintain relationships of trust with our stakeholders and community support for our activities;

- continued access to necessary infrastructure, including, without limitation, access to power, water, lands and roads to carry on activities as planned;
- that we will be, or will continue to be, the world's premier silver producer and one of the world's leading silver mining companies;
- our intention to acquire or discover silver resources that have the potential to be developed economically and to add meaningfully to our production profile while lowering consolidated units costs of production;
- our plans and expectations for our properties and operations, including, without limitation, production estimates, capital expenditures, exploration drilling and development, forecasts regarding investment activities, and other matters discussed under the heading "Outlook for 2020" and under the headings "Capital and Operating Costs" and "Exploration, Development, and Production" with respect to each of our material properties; and
- the results of investment and development activities at our material mineral properties.

### **Material Risks and Assumptions:**

The forward-looking information in this AIF reflects our current views with respect to future events and is based upon a number of assumptions and estimates that, while considered reasonable by us, are inherently subject to significant business, economic, competitive, political and social uncertainties and contingencies. Many factors, both known and unknown, could cause actual results, performance or achievements to be materially different from the results, performance or achievements that are or may be expressed or implied by forward-looking information in this AIF and documents incorporated by reference herein, and we have made assumptions based on or related to many of these factors.

Such factors include, without limitation:

- fluctuations in spot and forward markets for silver, gold, base metals and certain other commodities (such as natural gas, fuel oil and electricity);
- restrictions on mining in the jurisdictions in which we operate;
- laws and regulations governing our operation, exploration and development activities;
- our ability to obtain or renew the licenses and permits necessary for the operation and expansion of our existing operations and for the development, construction and commencement of new operations, including the license and export permits necessary to operate the Escobal mine which are currently suspended or have not been renewed;
- risks relating to our operations in Mexico, Peru, Bolivia, Argentina, Guatemala and other foreign jurisdictions where we may operate;
- inherent risks associated with tailings facilities and heap leach operations, including failure or leakages;
- work stoppages or other impacts of roadblocks, civil unrest, riots, terrorism and other similar events;
- relations with and claims by indigenous populations;
- relations with and claims by local communities and non-governmental organizations;
- the speculative nature of mineral exploration and development;
- diminishing quantities or grades of mineral reserves as properties are mined;
- the inability to determine, with certainty, the production of metals or the price to be received before mineral reserves or mineral resources are actually mined;
- the inability to determine, with certainty, production and cost estimates;
- inadequate or unreliable infrastructure (such as roads, bridges, power sources and water supplies);
- environmental regulations and legislation;
- our ability to maintain or obtain additional surface rights or other access that are necessary for future operations and planned mine developments;

- risks and hazards associated with the business of mineral exploration, development and mining (including environmental hazards, potential unintended releases of contaminants, industrial accidents, unusual or unexpected geological or structural formations, pressures, cave-ins and flooding);
- reclamation and ongoing post-closure monitoring and maintenance requirements;
- the effects of climate change, extreme weather events, water scarcity, and seismic events, and the effectiveness of strategies to deal with these issues;
- risks relating to the creditworthiness and financial condition of our suppliers, refiners and other parties;
- fluctuations in currency markets (such as the Peruvian nuevo sol (“PEN”), Mexican peso (“MXN”), Argentine peso (“ARS”), the Bolivian boliviano (“BOB”), and the Guatemalan quetzal (“GTQ”) versus the USD and CAD);
- the volatility of the metals markets, and its potential to impact our ability to meet our financial obligations;
- the inability to recruit and retain qualified personnel, or maintain positive relationships with our employees;
- disputes as to the validity of mining or exploration titles or claims or rights, which constitute most of our property holdings;
- our ability to complete and successfully integrate acquisitions;
- increased competition in the mining industry for properties and equipment;
- limited supply of materials and supply chain disruptions;
- the effectiveness of our internal control over financial reporting;
- claims and legal proceedings arising in the ordinary course of business activities; and
- those factors identified under the caption “Risks Related to our Business” in this AIF and the documents incorporated by reference herein, if any.

You should not attribute undue certainty to forward-looking information. Although we have attempted to identify important factors that could cause actual results to differ materially, there may be other factors that cause results not to be as described. We do not intend to update forward-looking information to reflect changes in assumptions or changes in circumstances or any other events affecting such information, other than as required by applicable law.

Please see “Cautionary Note to U.S. Investors Concerning Estimates of Mineral Reserves and Mineral Resources” on page 8 of this AIF.

## Conversion Table

In this AIF, metric units are used with respect to mineral properties located in Mexico, Peru, Bolivia, Argentina and elsewhere, unless otherwise indicated. Conversion rates from imperial measures to metric units and from metric units to imperial measures are provided in the table set out below.

Imperial Measure	=	Metric Unit	Metric Unit	=	Imperial Measure
2.47 acres		1 hectare	0.4047 hectares		1 acre
3.28 feet		1 metre	0.3048 metres		1 foot
0.62 miles		1 kilometre	1.609 kilometres		1 mile
0.032 ounces (troy)		1 gram	31.1 grams		1 ounce (troy)
1.102 tons (short)		1 tonne	0.907 tonnes		1 ton (short)
0.029 ounces (troy)/ ton (short)		1 gram/tonne	34.28 grams/tonne		1 ounce (troy)/ton (short)
2205 pounds		1 tonne			

## Scientific and Technical Information

Scientific and technical disclosure in this AIF for our material properties is based on technical reports prepared for those properties in accordance with NI 43-101 (collectively, the “Technical Reports”). The Technical Reports have been filed on SEDAR at [www.sedar.com](http://www.sedar.com). The technical information in this AIF has been updated with more current information where applicable, such updated scientific and technical information having been prepared under the supervision of, or reviewed by, Christopher Emerson, FAusIMM, our Vice President, Business Development and Geology, and Martin Wafforn, P. Eng., our Senior Vice President, Technical Services and Process Optimization. Scientific or technical information relating to the current and planned exploration programs described in this AIF are prepared and/or designed and carried out under the supervision of, or have been reviewed by, Christopher Emerson.

The Technical Reports are as follows:

- a report relating to the La Colorada mine entitled “Technical Report for the La Colorada Property, Zacatecas, Mexico”, dated effective December 31, 2019 (the “La Colorada Report”) by M. Wafforn, C. Emerson and A. Delgado;
- a report relating to the Dolores mine entitled “Technical Report for the Dolores Property, Chihuahua, Mexico”, dated effective December 31, 2016 (the “Dolores Report”) by M. Wafforn, C. Emerson and A. Delgado;
- a report relating to the Huaron mine entitled “Technical Report for the Huaron Property, Pasco, Peru” dated effective June 30, 2014 (the “Huaron Report”) by M. Steinmann, M. Wafforn and A. Delgado;
- a report relating to the Morococha mine entitled “Technical Report for the Morococha Property, Yauli, Peru” dated effective June 30, 2014 (the “Morococha Report”) by M. Steinmann, M. Wafforn and A. Delgado;
- a report relating to the Shahuindo mine entitled “Technical Report on the Shahuindo Mine, Cajabamba, Peru” dated effective January 1, 2016 (the “Shahuindo Report”) by C. Defilippi, C. Muerhoff, and T. Williams;
- a report relating to the Timmins West mine entitled “National Instrument 43-101 Technical Report, Timmins West Mine, Timmins, Ontario, Canada” dated effective May 15, 2017 (the “Timmins West Report”) by E. Kallio, N. Vaz, and K. Byrnes;
- a report relating to the Bell Creek mine entitled “NI 43-101 Technical Report, Updated Mineral Reserve Estimate For Bell Creek Mine, Hoyle Township, Timmins, Ontario, Canada” dated effective December 31, 2014 (the “Bell Creek Report”) by E. Kallio and N. Vaz;
- a report relating to the Escobal mine entitled “Escobal Mine Guatemala: NI 43-101 Feasibility Study, Southeastern Guatemala” dated effective November 5, 2014 (the “Escobal Report”) by M3 Engineering & Technology Corporation, with authors C. Huss, T. Drielick, D. Roth, P. Tietz, M. Blattman, and J. Caldwell; and
- a report relating to the Navidad property entitled “Pan American Silver Corp.: Navidad Project, Chubut Province, Argentina: Preliminary Assessment” dated January 14, 2011 (the “Navidad Report”) by M. Steinmann, M. Wafforn and P. De Mark.

Each of Michael Steinmann, P. Geo., Martin Wafforn, P. Eng., Chris Emerson, FAusIMM, Pamela De Mark, P. Geo., Americo Delgado, P.Eng., Eric Kallio, P.Geo., Natasha Vaz, P.Eng., Kara Byrnes, P.Geo., Carl Defilippi, M.Sc., Charles Muerhoff, B.Sc., Tim Williams, M.Sc., Conrad Huss, P.Eng., Thomas Drielick, P.Eng., Daniel Roth, P.Eng., Paul Tietz, C.P.G., Matthew Blattman, P.Eng., and Jack Caldwell, P.Eng. is, or was in relation to the Technical Reports, a “Qualified Person” as defined in National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* (“NI 43-101”). A “Qualified Person” means an engineer or geoscientist with a university degree, or equivalent accreditation, in an area of geoscience, or engineering, relating to mineral exploration or mining, with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these, that is relevant to his or her professional degree or area of practice, has experience relevant to the subject matter of the mineral project, and is a member in good standing of a professional association.

Mineral reserve and mineral resource estimates in this AIF relating to the La Colorada, Dolores, Huaron, Morococha, Shahuindo, Timmins West, Bell Creek, and Escobal mines have been prepared by, or under the supervision of, Christopher Emerson and Martin Wafforn. Mineral resource estimates in this AIF relating to the Navidad property were prepared by, or under the supervision of, Pamela De Mark, our Director of Resources.

## Cautionary Note to U.S. Investors Concerning Estimates of Mineral Reserves and Mineral Resources

This AIF and the documents incorporated by reference herein have been prepared and disclosed in accordance with the requirements of Canadian securities laws that differ from the requirements of United States securities laws. Unless otherwise indicated, all mineral reserve and mineral resource estimates included in this AIF and the documents incorporated by reference herein have been disclosed in accordance with NI 43-101 and the Canadian Institute of Mining, Metallurgy and Petroleum (“CIM”) - Definition Standards adopted by the CIM Council. NI 43-101 is an instrument developed by the Canadian Securities Administrators that establishes standards for all public disclosure an issuer makes of scientific and technical information concerning mineral projects.

Canadian public disclosure standards, including NI 43-101, differ significantly from the requirements of the U.S. Securities and Exchange Commission (the “SEC”), and information with respect to mineralization and mineral reserves and mineral resources contained or incorporated by reference herein may not be comparable to similar information disclosed by U.S. companies. In particular, and without limiting the generality of the foregoing, these documents use the terms “Measured Resources”, “Indicated Resources” and “Inferred Resources”. U.S. investors are advised that, while such terms are recognized and required by Canadian securities laws, the SEC does not recognize them. The requirements of NI 43-101 for identification of “reserves” are not the same as those of the SEC, and reserves reported by Pan American in compliance with NI 43-101 may not qualify as “reserves” under SEC standards. Under U.S. standards, mineralization may not be classified as a “reserve” unless the determination has been made that the mineralization could be economically and legally produced or extracted at the time the reserve determination is made. **U.S. investors are cautioned not to assume that any part of a “Measured Resource” or “Indicated Resource” will ever be converted into a “reserve”.** U.S. investors should also understand that “Inferred Resources” have a great amount of uncertainty as to their existence and as to their economic and legal feasibility. **It cannot be assumed that all or any part of “Inferred Resources” exist, are economically or legally mineable or will ever be upgraded to a higher category.** Under Canadian securities laws, “Inferred Resources” may not form the basis of feasibility or pre-feasibility studies except in certain cases. Disclosure of “contained ounces” in a mineral resource is a permitted disclosure under Canadian securities laws, however, the SEC normally only permits issuers to report mineralization that does not constitute “reserves” by SEC standards as in place tonnage and grade, without reference to unit measures. Accordingly, information concerning mineral deposits set forth in this AIF and the documents incorporated by reference herein may not be comparable with information made public by companies that report in accordance with U.S. standards.

## CORPORATE STRUCTURE

### Incorporation

Pan American is the continuing corporation of Pan American Energy Corporation, which was incorporated under the *Company Act* (British Columbia) on March 7, 1979. Pan American underwent two name changes, the last occurring on April 11, 1995, when the present name of Pan American Silver Corp. was adopted. Amendments to the constating documents of Pan American to that date had been limited to name changes and capital alterations. In May 2006, we amended our memorandum and articles in connection with Pan American's required transition under the Business Corporations Act (British Columbia), and in January 2019, we obtained shareholder approval to increase our authorized share capital from 200,000,000 to 400,000,000 common shares without par value ("Common Shares").

Pan American's head office is situated at 1440 - 625 Howe Street, Vancouver, British Columbia, Canada, V6C 2T6 and our registered and records offices are situated at 1200 Waterfront Centre, 200 Burrard Street, Vancouver, British Columbia, Canada, V7X 1T2. Our website is [www.panamericansilver.com](http://www.panamericansilver.com).

### Capital Structure

Pan American's authorized share capital consisted of 400,000,000 Common Shares as at December 31, 2019. The holders of Common Shares are entitled to: (i) one vote per Common Share at all meetings of shareholders; (ii) receive dividends as and when declared by the directors of Pan American; and (iii) receive a pro rata share of the assets of Pan American available for distribution to the shareholders in the event of the liquidation, dissolution or winding-up of Pan American. There are no pre-emptive, conversion or redemption rights attached to the Common Shares.

In connection with Pan American's acquisition of Tahoe Resources Inc. ("Tahoe"), Pan American issued 313,887,490 contingent value rights (each, a "CVR") to Tahoe shareholders. The CVRs are not entitled to any voting or dividend rights, and the CVRs do not represent any equity or ownership interest in Pan American or any of its affiliates. More details about the Tahoe transaction and the CVRs can be found below under the heading, "Business of Pan American".

### Subsidiaries

A significant portion of our business is carried on through various subsidiaries. The table below lists our significant subsidiaries and their jurisdiction of organization, and the chart following shows the structure of our organization as it relates to the countries of our mines. Not all of our operating mines are material properties for the purposes of NI 43-101. This information is provided as at December 31, 2019.

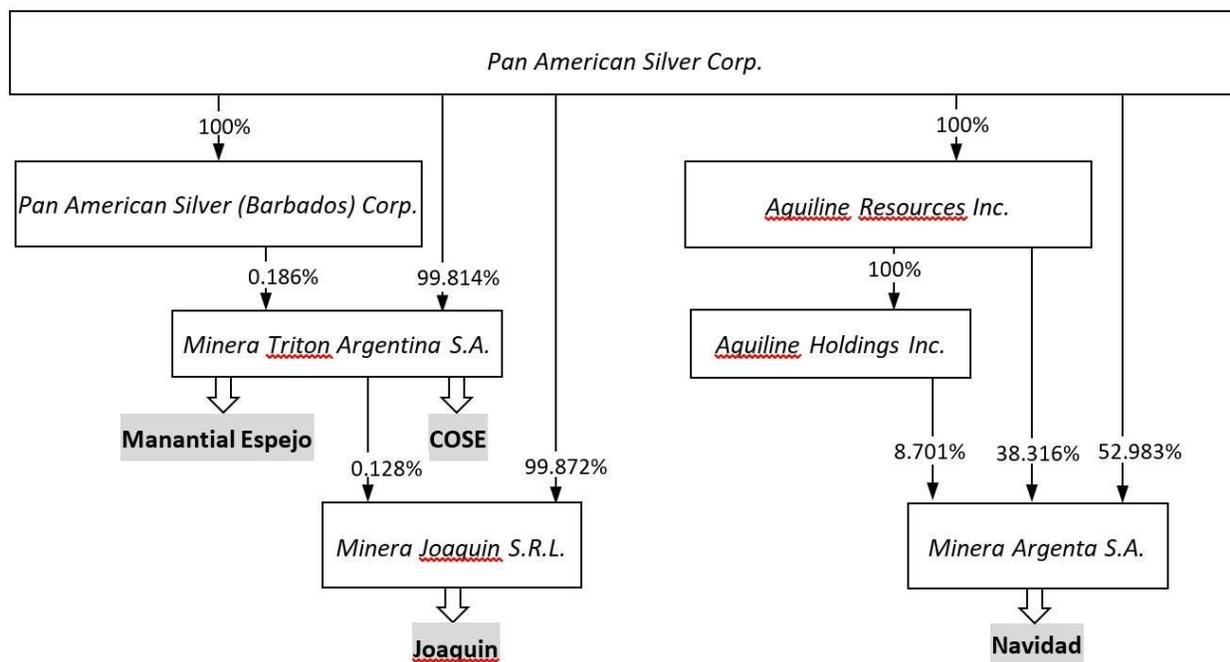
Name of Subsidiary	Jurisdiction
Tahoe Resources Ltd.	Alberta
0799714 B.C. Ltd.	British Columbia
Corner Bay Silver Inc. ("Corner Bay")	Canada
Lake Shore Gold Corp. ("Lake Shore")	Canada
Aquiline Resources Inc. ("Aquiline")	Ontario
Minefinders Corporation Ltd. ("Minefinders")	Ontario
Pan American Silver (Barbados) Corp.	Barbados
Aquiline Holdings Inc.	Barbados
PASCAP Insurance (Barbados) Ltd. ("PASCAP")	Barbados
Escobal Resources Holdings Ltd.	Barbados
Minera Triton Argentina S.A. ("MTA")	Argentina
Minera Argenta S.A. ("MASA")	Argentina

Name of Subsidiary	Jurisdiction
Minera Joaquín S.R.L.	Argentina
Pan American Silver (Bolivia) S.A. (“PASB”)	Bolivia
Minera San Rafael S.A. (“MSR”)	Guatemala
PASMEX, S.A. de C.V.	Mexico
Plata Panamericana S.A. de C.V. (“Plata Panamericana”)	Mexico
Compañía Minera Dolores, S.A. de C.V. (“CMD”)	Mexico
Minera Minefinders S.A. de C.V.	Mexico
Pan American (Netherlands) B.V.	Netherlands
Pan American Silver (Peru) S.A.C. (“Pan American Peru”)	Peru
Pan American Silver Huaron S.A. (“PAS Huaron”)	Peru
Compañía Minera Argentum S.A. (“Argentum”)	Peru
Tahoe Resources Peru S.A.C. (“Tahoe Peru”)	Peru
Shahuindo S.A.C.	Peru
La Arena S.A.	Peru

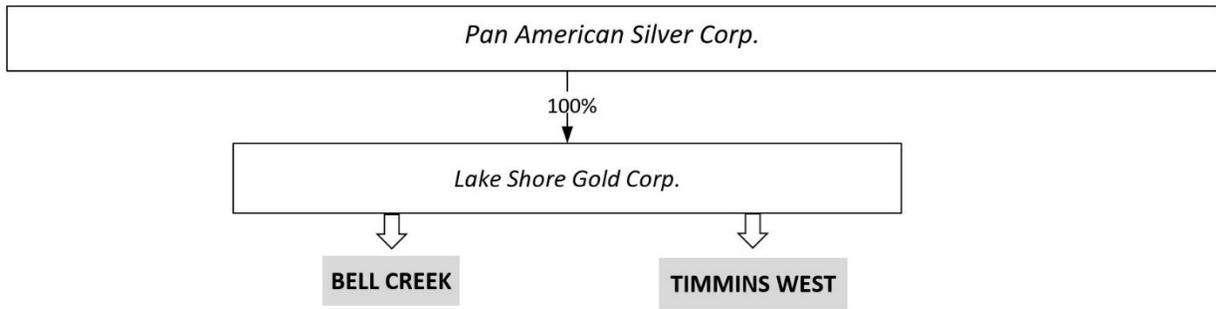
### Corporate Organization by Material Mineral Property Location

The following charts depict the corporate organizational structure of our significant subsidiaries as they relate to the country of our material mineral properties as at December 31, 2019, and identifies the main property asset interests (including non-material properties, as applicable) held by the respective entities<sup>1</sup>.

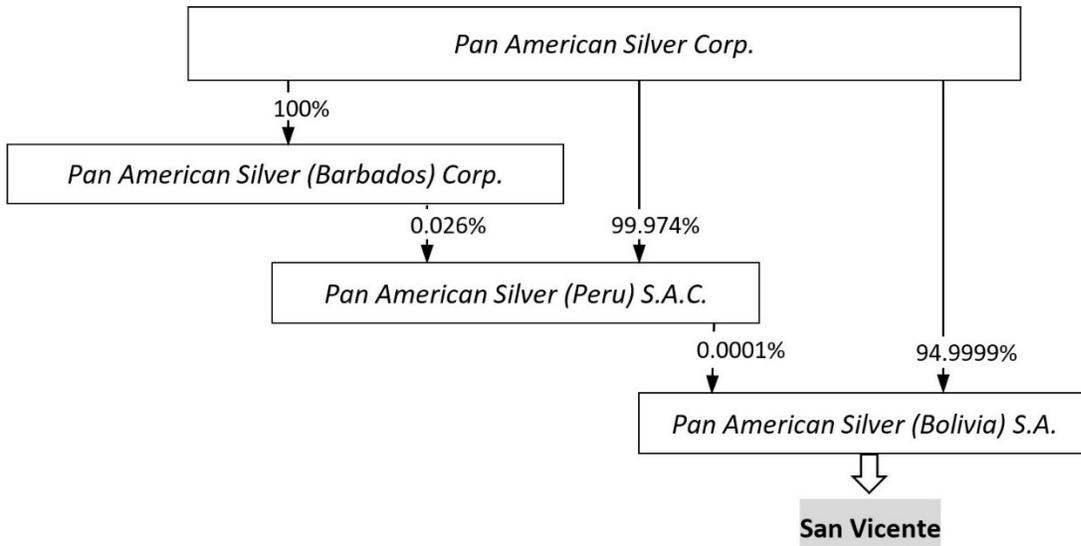
#### Argentina Properties



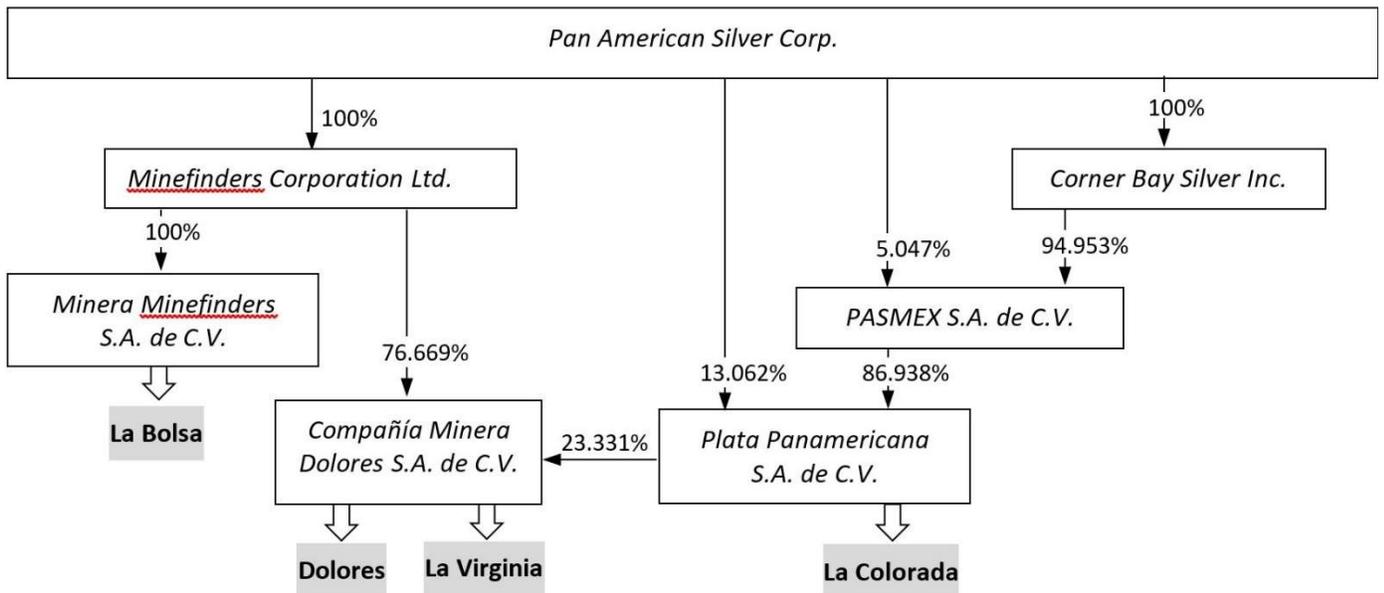
**Canada Properties**



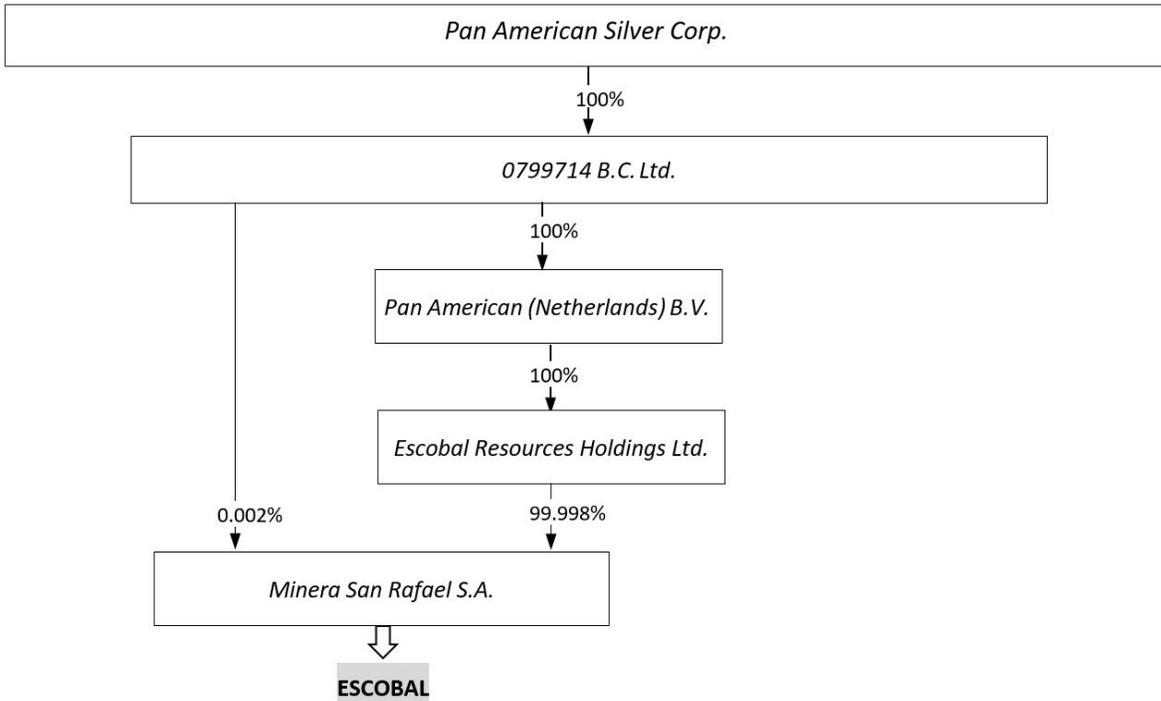
**Bolivia Properties**



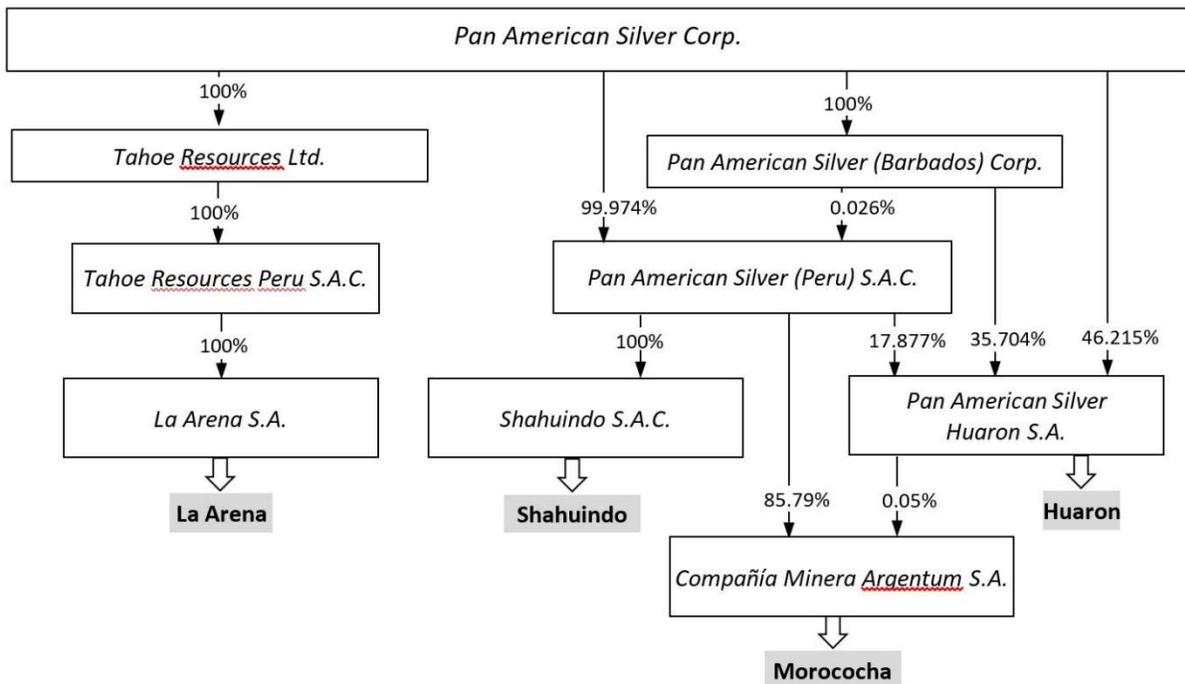
**Mexico Properties**



**Guatemala Properties**



**Peru Properties**



**Note:**

<sup>1</sup> In some jurisdictions in which we operate, laws require that a company operating mineral properties must have more than one shareholder. For those jurisdictions, a nominal interest may be held by an individual or other affiliated entity and this may not be represented on the charts. Percentages shown indicate ownership of common shares and other voting interests and do not include holdings of investment shares in Peru or other non-voting shares. Percentages are rounded (in most cases, to a maximum of three decimal places). Minority interests of less than 0.001% are therefore not shown.

## GENERAL DEVELOPMENT OF THE BUSINESS

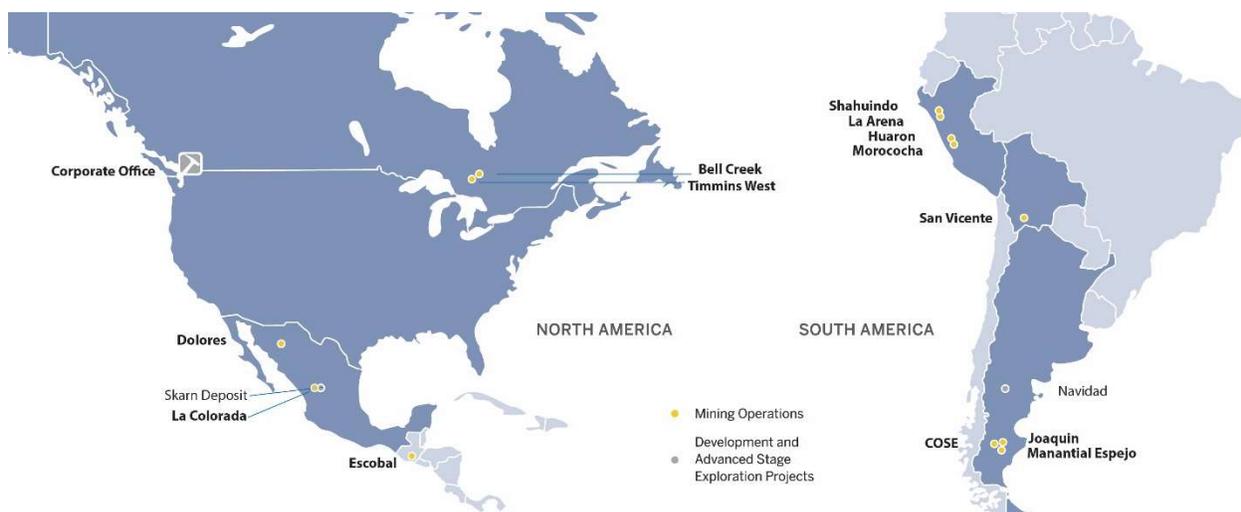
### Business of Pan American

We are principally engaged in the operation and development of, and exploration for, silver and gold producing properties and assets. Our principal products are silver and gold, although we also produce and sell zinc, lead, and copper. As at December 31, 2019, we operated mines and developed mining projects in Mexico, Peru, Canada, Argentina and Bolivia, and had control over non-producing silver assets in each of those jurisdictions, in addition to Guatemala and the United States.

On November 14, 2018, we entered into a definitive agreement for Pan American to acquire all of the outstanding shares of Tahoe pursuant to a plan of arrangement (the “Arrangement”). We completed the Arrangement on February 22, 2019. In aggregate, we paid \$275 million in cash and issued 55,990,512 Common Shares to Tahoe shareholders under the Arrangement. In addition, Tahoe shareholders received an aggregate of 313,887,490 CVRs, each CVR having a term of ten years and being exchangeable for 0.0497 of a Common Share upon first commercial shipment of concentrate following restart of operations at the Escobal mine. Tahoe nominated two directors to Pan American’s board of directors (the “Board of Directors”). As required under Part 8 of National Instrument 51-102 – *Continuous Disclosure Obligations* (“NI 51-102”), we have filed a Form 51-102F4 Business Acquisition Report dated May 3, 2019, in respect of the Tahoe transaction.

With the completion of the Tahoe transaction, we acquired four operating mines in Peru and Canada, as well as the Escobal mining property and facilities in Guatemala. The Escobal mine is one of the most attractive silver assets in the world, but is currently not operating primarily as a result of the suspension of its mining license in July 2017, pending, among other things, the successful completion of an ILO 169 consultation process with Xinka indigenous communities to be undertaken by Guatemala’s Ministry of Energy and Mines. In addition to supporting the consultation process, we believe that it is important to engage with local communities and Xinka populations in an effort to build long-lasting, trusting relationships for the benefit of all stakeholders.

The following map depicts the location of our operating mines and certain of our exploration and non-operating projects as at December 31, 2019.



### Corporate Strategy and Objectives

Our mission is to be the world’s premier silver producer with a reputation for excellence in discovery, engineering, innovation and sustainable development. We will continue to strengthen our position as one of the world’s leading primary silver mining companies by acquiring or discovering silver resources that have the potential to be developed economically and to add meaningfully to our production profile while lowering consolidated unit costs of production.

The key objectives of our strategy are to:

Strategy Objective	Implementation
<p><b>Increase production</b></p>	<p>Since 1995, we have increased annual silver production almost every year. In 2019, we produced 25.9 million ounces of silver, which was over one million ounces more than the 24.8 million ounces produced in 2018. We also increased gold production to a record high 559,200 ounces in 2019, which is over three times the amount of gold that we produced in 2018. 2019 production does not include any production prior to February 22, 2019, from mines acquired through the Tahoe transaction.</p> <p>This long-term growth has been accomplished through a combination of acquisition, exploration, development and expansion efforts, with the latest acquisition of Tahoe on February 22, 2019, contributing significantly to our production, particularly gold. In 2020, Pan American expects to produce between 27.0 and 28.5 million ounces of silver and between 625,000 and 675,000 ounces of gold from its portfolio of assets.</p>
<p><b>Increase mineral reserves and mineral resources</b></p>	<p>Historically, we have achieved annual increases in our mineral reserves and mineral resources through exploration and acquisitions. In addition to mineral reserves and resources added through acquisitions, Pan American's history of replacing silver ounces mined at its operations reflects our ability to invest in mine and near-mine exploration programs throughout the silver price cycle and to the exploration potential of our asset portfolio.</p> <p>Effective June 30, 2019, our proven and probable silver and gold mineral reserves were approximately 557 million and 5.1 million ounces, respectively, up from the 279.8 million ounces of silver and the 1.7 million ounces of gold at the end of 2018.</p> <p>Our measured and indicated mineral resources (excluding mineral reserves) were approximately 797 million ounces of silver and 10.6 million ounces of gold effective the end of June 2019.</p> <p>Please refer to the complete mineral resource and mineral reserve information under each of our material properties contained in this AIF, and to the "Reserves &amp; Resources" page of our website at <a href="http://www.panamericansilver.com">www.panamericansilver.com</a> for additional information.</p>
<p><b>Continue to be a "Low Cost Producer"</b></p>	<p>In 2019, with the acquisition of Tahoe, we began reporting Cash Costs<sup>1</sup> and AISC<sup>1</sup> on both a silver segment and gold segment basis, as well as on a consolidated silver<sup>1</sup> basis, in order to better reflect our assets' production profiles. For 2019, silver segment Cash Costs and AISC were \$6.39 and \$10.46 per silver ounce sold, respectively, and gold segment Cash Costs and AISC in 2019 were \$712 and \$948 per gold ounce sold, respectively. Consolidated silver basis Cash Costs and AISC in 2019 were (\$4.89) and \$4.44 per silver ounce sold, respectively.</p>
<p><b>Acquire additional silver properties</b></p>	<p>We actively investigate and evaluate strategic opportunities to acquire promising silver production, development and exploration properties in those jurisdictions where we are presently active, as well as elsewhere throughout the world.</p> <p>In February 2019, we acquired all of the issued and outstanding shares of Tahoe. Among other assets, Tahoe owned two mines in each of Peru and Canada, as well as the Escobal mine in Guatemala. The Escobal mine is currently suspended pending the completion of an ILO 169 consultation process and further engagement with local communities and indigenous groups, as well as the renewal of certain other permits.</p> <p>In addition to the more recent acquisition of Tahoe, we also acquired the Joaquin and COSE projects in 2017, the Dolores mine and the La Bolsa property by virtue of acquiring Minefinders in 2012, and the Navidad property pursuant to our acquisition of Aquiline in 2010.</p> <p>Please refer to the section of this AIF entitled "Risks Related to Our Business" starting on page 66 for more information about the risks relating to our business and our mining properties, particularly with respect to the Escobal mine, and to our website at <a href="http://www.panamericansilver.com">www.panamericansilver.com</a> for additional information.</p>
<p><b>Maintain strong financial performance from mining operations</b></p>	<p>In an effort to ensure we continue to have a strong and prosperous business, financial performance is monitored against targets for operating earnings and cash flow from operations, as well as against operating measures such as production and cash costs.</p>

Strategy Objective	Implementation
<b>Continue to be a responsible company, committed to sustainable development</b>	<p>We are committed to operating our business in accordance with the highest standards of governance and ethics, and the principles of sustainable development. We also place a high priority and particular emphasis on the health and safety of our personnel. We have operations in a number of countries and across diverse cultures that have the potential to both positively and negatively impact their host communities and nearby populations. Our goal is to minimize the negative impacts and maximize the benefits garnered to local populations, while at the same time achieving success from a business perspective. We conscientiously strive to operate within a framework of moral principles and values and to engage and interact regularly, and in an open and honest way, with governments, shareholders, employees, local communities, business partners and other stakeholders affected by our operations. We have initiated the implementation of the Mining Association of Canada’s “Towards Sustainable Mining”, a project designed to enhance our community engagement processes, drive industry-leading environmental practices and reinforce our commitment to the safety and health of our employees and surrounding communities. We have adopted, among other things, a Global Code of Ethical Conduct and a Global Anti-Corruption Policy, an Environmental Policy and a Corporate Social Responsibility Policy, that formalize how we must conduct our business and interact with stakeholders and others. We are aware that our business is in many ways dependent on these various stakeholders and we view establishing relationships of mutual trust and respect as important. By building such relationships and conducting ourselves in a transparent manner, we can further the exchange of information, address specific concerns of stakeholders and work cooperatively and effectively towards achieving mutual goals. We report annually on our sustainability performance in accordance with the Global Reporting Initiative Standards, with the current report available on Pan American’s website at <a href="http://www.panamericansilver.com">www.panamericansilver.com</a>.</p>

Note:

<sup>1</sup> Cash Costs and AISC are non-GAAP measures and do not have standardized meanings prescribed by IFRS. For additional information, please see “Non-GAAP Measures” on page 2 of this AIF.

## Key Developments Over the Last Three Financial Years

Year	Key Developments
<b>2019</b>	<ul style="list-style-type: none"> <li>• Completed the acquisition of Tahoe on February 22, 2019, whose assets included the Shahuindo and La Arena mines in Peru, the Timmins West and Bell Creek mines in Ontario, Canada, and the Escobal mine (currently suspended) in Guatemala.</li> <li>• Produced 25.9 million ounces of silver and 559,200 ounces of gold. The La Colorada mine continued to lead our silver production with 8.2 million ounces produced in 2019, and the Timmins West and Bell Creek (combined), Shahuindo, La Arena, and Dolores mines each produced over 100,000 ounces of gold during 2019. Reported 2019 production from the mines acquired through the Tahoe transaction does not include any production prior to February 22, 2019.</li> <li>• Reported proven and probable mineral reserves of 557 million ounces of silver and 5.1 million ounces of gold, as well as measured and indicated mineral resources of 797 million ounces of silver and 10.6 million ounces of gold, each as of June 30, 2019.</li> <li>• Reported an initial inferred mineral resource estimate for the La Colorada skarn discovery on December 11, 2019, of 72.5 million tonnes, averaging 44 grams per tonne silver, 0.17% copper, 2.02% lead and 4.40% zinc, assuming a cut-off value of \$60 per tonne after accounting for transportation, smelting and refining costs.</li> <li>• Amended our corporate credit facility to extend the maturity to February 2023 and increase availability from \$300 million to \$500 million.</li> </ul>
<b>2018</b>	<ul style="list-style-type: none"> <li>• Produced 24.8 million ounces of silver and 178,900 ounces of gold. The La Colorada mine continued to be our largest silver producer at approximately 7.6 million ounces for 2018, followed by Dolores with 4.1 million ounces of silver. Dolores also produced 136,600 ounces of gold.</li> <li>• Advanced the Joaquin and COSE project development in Santa Cruz, Argentina, towards expected initial production that was expected in 2019.</li> <li>• Made a major exploration discovery at the La Colorada mine.</li> <li>• Announced the proposed acquisition of Tahoe.</li> <li>• Substantially completed active reclamation at the Alamo Dorado site.</li> </ul>
<b>2017</b>	<ul style="list-style-type: none"> <li>• Produced 25.0 million ounces of silver and 160,000 ounces of gold. The La Colorada mine was our largest silver producer at approximately 7.1 million ounces for 2017, followed by the Dolores mine with 4.2 million ounces of silver. Dolores also produced 103,000 ounces of gold.</li> <li>• Completed the acquisition of the Joaquin and COSE projects in Santa Cruz, Argentina.</li> <li>• Construction of the La Colorada mine expansion was completed. Full design processing rates of 1,800 tonnes per day (“tpd”) were achieved in mid-2017, about six months ahead of schedule. Average throughput exceeded design rates by about 5% during the last six months of 2017.</li> <li>• Construction of the Dolores pulp agglomeration plant was completed and commissioning commenced. Heap leach pad stacking rates achieved 97% of the expanded capacity of 20,000 tpd during the last four months of 2017.</li> <li>• Acquired an approximate 12% interest in New Pacific Metals Corp. (approximately 16% fully diluted), providing exposure to the Silver Sand project in Bolivia.</li> <li>• Final production from the Alamo Dorado mine occurred and mining activities concluded. The mine transitioned into the active reclamation phase.</li> </ul>

## Outlook for 2020

In 2020, we expect to produce between 27.0 and 28.5 million ounces of silver and between 625,000 and 675,000 ounces of gold at consolidated silver basis AISC of between \$4.50 and \$6.50 per ounce of silver. To forecast AISC, Pan American has assumed metal prices of \$17.50/oz for silver, \$1,525/oz for gold, \$2,350/tonne for zinc, \$2,000/tonne for lead, and 6,150/tonne for copper; and average annual exchange rates relative to 1 USD of 19.50 for the MXN, 3.34 for the PEN, 73.64 for the ARS, 6.91 for the BOB, and \$1.30 for the CAD.

In 2020, we plan on incurring project capital expenditures of approximately \$22.0 million to \$27.0 million, relating mostly to: (1) the drilling program, early stage engineering and metallurgical testing for the La Colorada skarn discovery; and (2) an approximate 20% expansion of the Bell Creek mine in Timmins, with the purchase of additional mine equipment and debottlenecking of the plant to optimize improved efficiencies resulting from the commissioning of the Bell Creek shaft in February 2019. We are also focused on capturing additional debottlenecking opportunities at the Shahuindo and La Colorada mines.

Anticipated sustaining capital expenditures of \$225.0 million to \$240.0 million in 2020 include: (1) completion of the substantial heap leach pad expansions at the Dolores and Shahuindo mines; (2) work on the waste rock storage facilities at the La Arena and Shahuindo mines; (3) expansion of tailings storage facilities at the La Colorada and Timmins mines; (4) advancing open pit mine waste pre-stripping activities at the Dolores and La Arena mines; and (5) mine equipment replacement and refurbishments at the Timmins mines and the La Colorada mine.

Exploration expenditures in 2020, including both amounts that will be expensed and capitalized, are expected to total \$37.5 million to \$39.5 million, comprised of: (1) \$18.5 million to \$19.5 million for 186,000 metres of near-mine brownfield exploration drilling for reserve replacement, which is included in the forecast for 2020 sustaining capital expenditures, (2) \$11.5 million to \$12.5 million in regional, greenfield exploration in Peru, Mexico and Canada; and (3) \$7.5 million for 44,000 metres of drilling on the La Colorada skarn discovery, which is included in the forecast for 2020 project capital expenditures.

Cash Costs and AISC are non-GAAP measures and do not have standardized meanings prescribed by Canadian accounting standards. For additional information, please see "Non-GAAP Measures" on page 2 of this AIF.

Please refer to the section of this AIF entitled "Risks Related to Our Business" starting on page 66 for more information about the risks relating to our business and our mining properties, particularly with respect to the Escobal mine.

## NARRATIVE DESCRIPTION OF THE BUSINESS

### Principal Products and Operations

Our principal products and sources of sales are silver and gold doré and silver bearing zinc, lead, and copper concentrates. In 2019, the La Colorada, Dolores, Huaron, Morococha, Shahuindo, La Arena, Timmins West, Bell Creek, Manantial Espejo and San Vicente mines accounted for all of our production of concentrates and doré.

Consolidated production for the year ended December 31, 2019<sup>1</sup> was as follows:

	La Colorada	Dolores	Huaron	Morococha <sup>2</sup>	San Vicente <sup>3</sup>	Manantial Espejo	Shahuindo	La Arena	Timmins <sup>4</sup>	Total <sup>5</sup>
Tonnes Milled <sup>6</sup> Grade	768,700	6,777,000	994,000	686,200	349,700	708,600	11,218,800	11,189,700	1,480,700	34,173,400
Silver - g/t	361	38	142	126	345	127	8			
Gold - g/t		0.60				1.08	0.60	0.41	3.18	
Zinc %	3.10		2.38	3.76	2.16					
Lead %	1.65		1.22	1.21	0.14					
Copper %			0.81	0.44	0.31					
Production										
Ounces Silver <sup>6</sup>	8,206,000	5,122,000	3,796,000	2,456,000	3,528,000	2,599,000	137,000	26,000	18,000	25,886,000
Ounces Gold <sup>6</sup>	4,610	117,600	970	1,390	480	22,410	145,370	122,520	143,770	559,170
Tonnes Zinc <sup>7</sup>	20,970		18,070	22,500	6,010					67,560
Tonnes Lead <sup>7</sup>	11,150		9,220	6,560	420					27,350
Tonnes Copper <sup>7</sup>			6,020	1,830	850					8,700

#### Notes:

- <sup>1</sup> Reflects production subsequent to February 22, 2019, for the Shahuindo, La Arena, Timmins West and Bell Creek mines.
- <sup>2</sup> Morococha data represents our 92.3% interest in mine production based on ownership of the operating entity.
- <sup>3</sup> San Vicente data represents our 95% interest in mine production based on ownership of the operating entity.
- <sup>4</sup> Timmins refers to the Timmins West and Bell Creek mines.
- <sup>5</sup> Totals may not add due to rounding.
- <sup>6</sup> Rounded to the nearest thousand.
- <sup>7</sup> Rounded to the nearest ten.

Our approximate revenue by product category for the financial years ended December 31, 2019 and December 31, 2018 was as follows:

Product Revenue	2019	2018
	(\$000's)	(\$000's)
Silver and Gold Doré	894,202	348,717
Zinc Concentrate	134,992	155,412
Lead Concentrate	183,343	150,832
Copper Concentrate	78,865	86,599
Silver Concentrate	59,357	42,935
<b>Total</b>	<b>1,350,759</b>	<b>784,495</b>

Additional segmented information is set forth in Note 26 to Pan American's Audited Consolidated Financial Statements for the year ended December 31, 2019, and further information on individual mine performance and other metrics is presented in the 2019 MD&A under the heading "Individual Mine Performance".

### ***Silver and Gold Doré***

Our principal buyers of silver and gold doré produced from our La Colorada, Dolores, Manantial Espejo, Shahuindo, La Arena and Timmins mines, once refined, are international bullion banks and traders, except for the gold produced from La Colorada, which is sold to Maverix pursuant to the Maverix Gold Stream as discussed on page 22 herein. Silver and gold doré is delivered to refineries in Canada, Mexico, Germany, and the United States, and subsequently transferred to the accounts of our buyers.

### ***Zinc, Lead, Copper and Silver Concentrates***

The majority of our concentrate production is sold to international concentrate traders and smelters. Concentrate production from the La Colorada mine is delivered to the buyers at the Manzanillo, Mexico, port. Concentrate production from the Huaron and Morococha mines is delivered to the buyers at the port of Callao, Peru, with the exception of a portion of the zinc concentrate which is delivered to the Cajamarquilla smelting facility in Peru. Concentrate production from the San Vicente mine is delivered to the buyers at the port of Antofagasta, Chile, with the exception of a portion of the silver concentrate which is delivered to the Altonorte smelting facility near Antofagasta. From these ports, the concentrates are shipped by the buyers to various international locations.

Please see the discussion under "Risks Relating to Our Business – Trading Activities and Credit Risk".

## **Employees and Contractors**

At the end of 2019, we had approximately 6,800 employees and about 5,450 contractors. The majority of those employees and contractors were working at our operations in South and Central America, Mexico and Canada. Our Peruvian operations had the largest workforce with approximately 6,530 employees and contractors as of December 31, 2019, while our Mexican operations had over 3,050 total employees and contractors. Our Argentina and Bolivia operations had approximately 830 and 670 employees and contractors, respectively, and there were over 300 employees and contractors in Guatemala. In Canada, our operations had nearly 800 employees and contractors, and just over 60 persons worked for Pan American's head office in Vancouver, British Columbia at year-end.

Protecting the health, safety and wellbeing of our employees, contractors, suppliers, and community partners where we operate is always a priority for us. Please refer to the Sustainability page of our website at [www.panamericansilver.com](http://www.panamericansilver.com) for further information on our health and safety programs.

## **Research and Development**

While we conduct feasibility work and operational enhancement evaluations in order to improve production processes and exploration and mining operations, we do not, in the normal course, embark on any research and development activities in relation to products or services. Costs associated with this work would usually be expensed as incurred. As such, we did not incur any significant research and development costs during 2017, 2018, or 2019.

## **Working Capital and Liquidity Position**

As at December 31, 2019, we had cash and cash equivalents and short-term investment balances of \$238.3 million and working capital of \$517.2 million, with \$275.0 million outstanding on our corporate credit facility.

On April 15, 2015, we entered into a senior secured revolving credit facility (the "Facility") with a syndicate of eight lenders. The Facility was a \$300 million secured revolving line of credit available for general corporate purposes, including acquisitions, and originally had a four year term. In 2016, we amended the Facility to extend the term by an additional year. On February 1, 2019, the Facility was increased by \$200 million to \$500 million, and extended to mature on February 1, 2023. At our option, amounts can be drawn under the revolving facility and will incur interest based on Pan American's leverage ratio at either (i) LIBOR plus 1.875% to 2.750%; or (ii) The Bank of

Nova Scotia's Base Rate on U.S. dollar denominated commercial loans plus 0.875% to 1.750%. Undrawn amounts under the revolving facility are subject to a stand-by fee of 0.4219% to 0.6188% per annum, dependent on Pan American's leverage ratio. We drew down \$301 million under the Facility under LIBOR-based interest rates to fund, in part, the cash purchase price under the Arrangement and to repay, in full, and cancel Tahoe's second amended and restated revolving facility, under which \$125 million had been drawn.

Our financial position at December 31, 2019, and the operating cash flows that are expected over the next twelve months lead management to believe that our liquid assets are sufficient to satisfy our 2020 working capital requirements, fund currently planned capital expenditures (including both sustaining and project capital) for existing operations, and to discharge liabilities as they come due. We also remain well positioned to take advantage of further strategic opportunities as they become available.

## **Environment, Community and Sustainability**

We have implemented an environmental policy, a corporate social responsibility policy, and a health and safety policy in which we accept our corporate responsibility to practice environmental stewardship, community engagement and development, and provide a safe and healthy workplace for our employees. We also commit to complying with all relevant industry standards, legislation and regulations in the countries where we carry on business and continue to implement the best practice established under the Mining Association of Canada's ("MAC") Toward Sustainable Mining ("TSM") program at all of our operations.

During 2019, reviews of the environmental and social performance of all our operations were led by Pan American's Senior Vice President of Corporate Affairs and Sustainability, and Vice President, Environment. The reviews included inspections of our mine sites and surrounding areas with key operations personnel, review of monitoring programs and operating procedures and evaluation of the principal environmental and social issues related to each of these operations. The key observations and recommendations from the reviews are reported monthly to senior management and quarterly to the Board of Directors and its Health, Safety, Environment and Communities Committee (the "HSEC Committee"). In addition to the periodic reviews, detailed Corporate Environmental Audits and Corporate Social Audits are conducted at each mine approximately once every two years. We conduct environmental audits to assess the mine's facilities, operating procedures and control systems to ensure that procedures comply with regulations, are consistent with our corporate standards, and that potential risks are being managed. During 2018, environmental audits were undertaken at the San Vicente, Morococha and Huaron mines, and in 2019, the La Arena, Shahuindo and Manantial Espejo mines were audited. In intervening years between audits, the implementation of the corrective actions required by each audit is checked. The San Vicente, Morococha and Huaron mines' corrective actions were found to be satisfactory in 2019.

We conduct social audits to monitor the programs we run in partnership with neighbouring communities, to assess our employees and contractors' camps and facilities, security practices and social performance of programs and to identify opportunities for improvement in our processes. Our tool is based on the ISO 26000 guidance standard on social responsibility and supplemented with company-specific content, industry requirements, and best practices from the TSM Aboriginal and Community Relationship Protocol, the UN Guiding Principles on Business and Human Rights, the Voluntary Principles on Security and Human Rights and Unicef's Child Rights and Security Checklist. Social audits were completed at the La Arena, Shahuindo, Huaron and Morococha mines in 2019. No material issues were identified.

Pan American is continuing the implementation of the Mining Association of Canada's Towards Sustainable Mining, a framework designed to enhance our community engagement processes, drive world-leading environmental practices and reinforce our commitment to the safety and health of our employees and surrounding communities. Sites are also working to align their management systems with the TSM protocols.

In 2019, we adopted a new human rights policy that is based on international best practices and standards. This board-level policy consolidates our existing objectives in the areas of environment, labour, diversity and social responsibility. It formalizes our approach to fostering a positive human rights culture throughout our organization and working to prevent or mitigate any adverse impact of our activities on our employees, communities and other external stakeholders.

We took additional steps to align with international human rights best practise in 2019 and conducted a gap assessment of our security practices against the requirements of the Voluntary Principles on Security and Human Rights and UNICEF’s Child Rights and Security Checklist at two of our three operations with armed security forces: La Colorada in Mexico and Escobal in Guatemala.

All phases of our operations are subject to environmental regulation in the various jurisdictions in which we operate.

Our La Arena, Shahuindo, Huaron, Morococha, La Colorada, Dolores, San Vicente, Escobal, and Manantial Espejo operations were all inspected by government agencies in 2019 and no material environmental issues were recorded as a result of these inspections.

In the financial year-end dated December 31, 2019, our environmental expenditures for concurrent reclamation were approximately \$2.3 million. The closure and decommissioning liabilities were prepared using the standard reclamation cost estimator methodology developed in the State of Nevada, USA, using quantity estimates and cost data obtained at each mine site. Estimates for Timmins, Escobal and Alamo Dorado were developed by each site using direct estimation with site-specific closure plans, engineering estimates, local rates and contractor quotes. We currently estimate the aggregate present value of expenditures required for future closure and decommissioning costs in respect of the Huaron, Morococha, Shahuindo, La Arena, Alamo Dorado, La Colorada, Dolores, Timmins West, Bell Creek, Manantial Espejo, San Vicente, and Escobal mines, along with our pre-existing development properties, to be approximately \$188.5 million.

Other than specific environmental and social concerns discussed in more detail elsewhere in this AIF, we are not aware of any material environment or social related matter requiring significant capital or operating outlays in the immediate future. Closure and reclamation costs and actual costs may vary, perhaps materially, from estimates and investors are cautioned against attributing undue certainty to these estimates. The reclamation and closure costs estimate for each of the operating mines and development projects was updated to reflect the conditions as of December 31, 2019.

We completed our 2019 Sustainability Report in accordance with the Global Reporting Initiative (GRI) Standards: core option and GRI Mining & Metals Sector Disclosures. The report includes detailed information on our environmental, social, socio-economic and health and safety performance. The complete Sustainability Report and information about our sustainability programs is available on our website at [www.panamericansilver.com](http://www.panamericansilver.com).

## **Operating and Development Properties**

Pursuant to NI 51-102, we have identified the following properties and projects as being material as at December 31, 2019: the La Colorada mine, the Dolores mine, the Huaron mine, the Morococha mine, the Shahuindo mine, the Timmins West mine, and the Bell Creek mine. We have also identified the currently-suspended Escobal mine and the Navidad property as material properties for 2019. We do not consider any of our other mines, development or investment properties to be material properties for the purposes of NI 51-102.

Certain statements in the following property summaries are based on and, in some cases, extracted directly from the relevant Technical Reports identified under the heading “Scientific and Technical Information” beginning on page 7.

## **Mineral Reserve and Mineral Resource Estimate Information**

The process for estimating mineral reserves and mineral resources at our properties is described below in each property section. Pan American is exposed to many risks in conducting its business, both known and unknown, and there are numerous uncertainties inherent in estimating mineral reserves and mineral resources. Although we have no current expectation that our mineral reserve and mineral resource estimates will be materially negatively impacted by external factors such as metallurgical, safety, environmental, permitting, title, access, legal, taxation, availability of resources, and other factors disclosed in this AIF, changes in relation to such factors are not uncommon in the mining industry and there can be no assurance that these factors will not have a material impact. There are numerous uncertainties inherent in estimating mineral reserves and mineral resources. The political, economic,

regulatory, judicial and social risks related to conducting business in foreign jurisdictions, and changes in metal and commodity prices, pose particular risk and uncertainty to us and could result in material impacts to our business and performance. In addition to external factors and risks, the accuracy of any mineral reserve and mineral resource estimate is, among other things, the function of the quality and quantity of available data and of engineering and geological interpretation and judgment. Results from drilling, testing, and production, as well as a material change in metal prices or a change in the planned mining method, subsequent to the date of the estimate, may justify revision of such estimates and may differ, perhaps materially, from current estimates, and investors are cautioned against attributing undue certainty to mineral reserves and mineral resources. Readers are encouraged to read the discussion under “Risks Relating to Our Business” in this AIF.

## **I. Operating Properties**

### **A. Mexico**

#### **(i) La Colorada Mine**

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

The La Colorada underground silver mine is located in Zacatecas State, Mexico, approximately 100 kilometres south of the city of Durango and 155 kilometres northwest of the city of Zacatecas. The mine is accessed primarily from the cities of Durango and Zacatecas by paved highway and all weather gravel roads.

Our wholly-owned subsidiary, Plata Panamericana, owns and operates the mine. The La Colorada property, including certain exploration concessions outside the mining area, is comprised of 56 mining claims totalling approximately 8,840 hectares. We pay an annual fee to maintain the claims in good standing, and to our knowledge, we have met all of the necessary obligations to retain the property.

We have control over or rights in respect of approximately 1,300 hectares of surface rights covering the main workings. All of the La Colorada mineral reserves and mineral resources and all of the known mineralized zones, mine workings, the processing plant, effluent management and treatment systems, and tailings disposal areas are located within the mining claims controlled by us.

In 2016, as part of the transaction with Maverix Metals Inc. (“Maverix”), Maverix acquired a gold stream equivalent of one hundred percent (100%) of the payable gold production from the La Colorada mine, less a fixed price of USD\$650 per ounce for the life of the mine (the “Maverix Gold Stream”). In 2019, the Maverix Gold Stream resulted in Maverix acquiring 3,758 ounces of gold (2018 – 3,968 ounces).

To the best of our knowledge, the La Colorada mine is not subject to any other royalties, overrides, back-in rights, payments, or other agreements and encumbrances, other than governmental taxes, fees and duties. Our Mexican operations are subject to governmental taxes, fees and duties, including: (i) a special mining duty (“SMD”) of 7.5% applied to taxable earnings before interest, inflation, taxes, depreciation, and amortization; and (ii) a deductible extraordinary mining duty (“EMD”) of 0.5% that is applied to the sale of gold, silver, and platinum.

In late December 2016, the Zacatecas state government also enacted a new set of ecological taxes which took effect on January 1, 2017 (the “Zacatecas Tax”). The Zacatecas Tax applies broadly across a number of industries in the State of Zacatecas that involve extraction, emissions to the air, soil or water, and deposits of residue or waste. The Zacatecas Tax primarily affects the La Colorada mine in respect of the materials placed in its tailings storage facility. We paid approximately \$2.0 million in respect of the Zacatecas Tax in 2019, however the validity of the Zacatecas Tax has been challenged on constitutional grounds.

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the La Colorada mine, certain community and land ownership rights have been asserted over a portion of our La Colorada surface lands. In addition to claims in the Agrarian Courts in Mexico, a process was initiated before the Secretariat of Agrarian, Territorial and Urban Development (“SEDATU”) in Zacatecas to declare such lands as national property. While we are seeking to protect our rights, there could be a material adverse impact on La Colorada’s future mining operations if we are unable to

maintain access to those surface areas. Please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

The Dorado family operated mines at two locations on the property in 1925. From 1929 to 1955, Candelaria y Canoas S.A., a subsidiary of Fresnillo S.A., installed a flotation plant and worked the old dumps of two previous mines on the La Colorada property. From 1933 to the end of World War II, La Compañía de Industrias Peñoles also conducted mining operations on the property. From 1949 to 1993, Compañía de Minas Victoria Eugenia S.A. de C.V. ("Eugenia") operated a number of mines on the property. In 1994, Minas La Colorada S.A. de C.V. ("MLC") acquired the exploration and exploitation claims and surface rights of Eugenia. Until 1997, MLC conducted mining operations on three of the old mines on the property.

During these time periods, exploration was mainly in the form of development along the veins. Prior to our ownership, 131 diamond drill holes had been drilled. In 1997, we entered into an option agreement with MLC, during which time we conducted exploration and diamond drilling programs as part of our due diligence reviews.

We have been producing from La Colorada since 1998.

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

The La Colorada mine is located in the Sierra Madre Occidental volcanic belt, at the contact between the Lower Volcanic Supergroup and the Upper Volcanic Supergroup. The oldest rocks exposed on the property are Cretaceous limestones of the Cuesta del Cura Formation and calcareous clastic rocks of the Indidura Formation. They are overlain by conglomerates of the early Tertiary Ahuichilla Formation. East to northeast striking faults form the dominant structures at the property and play a strong role in local mineralization.

Economic mineralization is found in veins, replacement mantos, and skarn. The majority of the mineral resources and mineral reserves are sourced from the NC vein series, the HW vein series, Veta 3, the Amolillo vein system, vein and manto mineralization at the Recompensa system, and the new undeveloped skarn deposit.

Most mineralized veins strike east to northeast and dip moderately to steeply to the south. Most of the mineralization of economic significance is located in quartz veins that average 1 metre to 2 metres wide, but may be significantly wider. Amolillo strikes over 1.5 km to the northeast and dips 60° to the southeast, for over 800 metres down dip. The average vein width is 2.2 metres. The NC vein series lies around 700 m to the southeast of Amolillo. The most significant of these veins, NC2, strikes around 1.2 km to the northeast and dips 75° to the southeast, for over 1 km down dip. The average vein width is 1.9 metres. The HW series is the western continuation of the NC series, strikes east-west, and dips 50° to the south, for over 600 m down dip. The average vein width is 1.8 metres. Veta 3 runs parallel to the HW and NC series, strikes for over 900 m to the northeast, and dips 75° to the northwest, for around 400 m down dip. The average vein width is 1.7 metres.

Manto style mineralization is found near vein contacts where the primary host rock is limestone.

A significant skarn deposit was discovered in 2018 at depth and to the east of the NC2 vein. With increasing depth, mineralization styles progress from epithermal style veins, to manto style mineralization in calcareous sediments, skarn, magmatic hydrothermal breccia skarn, proximal skarn, epithermal veins overprinting porphyry, and copper-molybdenum-silver porphyry. Common minerals include galena and sphalerite, with quartz, carbonate, feldspar, pyroxene, and garnet. The deposit, as currently defined, comprises several zones of mineralization located between 600 metres to 1,700 metres below surface, over an area of around 500 metres by 600 metres.

### ***Exploration***

The mine had been working for several decades prior to any specific exploration work and most major structures became known through mine development. Prior to Pan American's ownership, 131 diamond drillholes for a total of 8,665 metres had been completed by MLC, and between September 1997 and March 1998, while the property was under option, Pan American conducted a geophysical survey comprising very low frequency radio and

induced polarization.

Since Pan American acquired the La Colorada mine, staff and consulting structural geologists have carried out near mine surface and underground geological and structural mapping. Underground channel and raise sampling is conducted for grade control and mineral resource and reserve estimates as mining progresses.

### ***Drilling***

All drilling is by diamond drilling from surface and underground using industry standard drill machines and downhole survey tools. Drilling is conducted by both our employees and private drilling contractors under the supervision of the mine geology department. Near mine surface and underground diamond drilling exploration campaigns are ongoing on an annual basis for mineral resource and mineral reserve estimates.

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

The drill core is cut in half with a diamond bladed saw and samples are selected with respect to geological features, at 2 metre lengths or less. Channel samples of approximately one metre in width are taken in ore development areas and stopes. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

The drillhole samples are prepared by the internal La Colorada mine laboratory, which is operated by our employees, and by independent laboratories including SGS of Durango, Activation Laboratories Ltd (“Actlabs”) of Zacatecas, and Bureau Veritas of Hermosillo. Both Actlabs and SGS used fire assay with gravimetric finish for gold and acid digestion with ICP finish for silver, lead, zinc, and copper. Bureau Veritas used fire assay with gravimetric finish for gold and acid digestion with ICP finish for silver, lead, zinc, and copper in their Vancouver, Canada laboratory. The La Colorada mine laboratory used fire assay with gravimetric finish for gold and silver, and acid digestion with atomic absorption (“AA”) finish for lead, zinc, and copper.

The mine geology department conducts a quality assurance/quality control (“QAQC”) program that is independent from the laboratory. The program includes the insertion of certified standards, blanks and duplicate samples. The results of the QAQC samples demonstrate acceptable accuracy and precision and that no significant contamination is occurring at the mine or external laboratories.

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

As part of normal plant operation procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess mill performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves at the La Colorada mine, effective December 31, 2019, are as follows:

<b>La Colorada Mineral Reserves<sup>1, 2, 3</sup></b>					
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>	<b>% Zinc</b>	<b>% Lead</b>
Proven	3.7	395	0.33	3.11	1.72
Probable	5.3	287	0.26	2.44	1.35
<b>TOTAL</b>	<b>9.0</b>	<b>331</b>	<b>0.29</b>	<b>2.72</b>	<b>1.50</b>

**Notes:**

- Estimated using a price of \$17 per ounce of silver, \$1,300 per ounce of gold, \$2,500 per tonne of zinc and \$2,100 per tonne of lead. Totals may not add due to rounding.
- Mineral reserve estimates for La Colorada have been prepared under the supervision or were reviewed by Christopher Emerson, FAusIMM, and Martin Wafforn, P. Eng., as Qualified Persons as that term is defined in NI 43-101.
- Lead and zinc grades shown are the average for the deposit. However, the base metals are only payable in the concentrates produced from the sulphide ores and not in the doré produced from the oxide ores.

Management estimates that mineral resources at the La Colorada mine, effective December 31, 2019, are as follows:

<b>La Colorada Mineral Resources<sup>1, 2, 3</sup></b>						
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>	<b>% Copper</b>	<b>% Zinc</b>	<b>% Lead</b>
Measured	0.5	229	0.24	0.00	1.16	0.65
Indicated	1.6	185	0.15	0.00	1.16	0.56
Inferred	5.0	190	0.16	0.00	4.28	2.16
Inferred skarn	72.5	44	0.00	0.17	4.40	2.02

**Notes:**

- These mineral resources are in addition to mineral reserves. Estimated using a price of \$17 per ounce of silver, \$1,300 per ounce of gold, \$2,500 per tonne of zinc and \$2,100 per tonne of lead, except for the skarn deposit, where metal prices of \$18.50 per ounce of silver, \$6,500 per tonne of copper, \$2,600 per tonne of zinc, and \$2,200 per tonne of lead were used. At the skarn deposit, a cut-off value of \$60 per tonne, which used metallurgical recoveries of 91% silver, 90% lead, 85% zinc, and 38% copper, was used to tabulate resources..
- Mineral resource estimates for the La Colorada mine have been prepared under the supervision, or were reviewed by Christopher Emerson, FAusIMM, and Martin Wafforn, P. Eng., as Qualified Persons, as that term is defined in NI 43-101.
- Lead and zinc grades shown are the average for the deposit. However, the base metals are only payable in the concentrates produced from the sulphide ores and not in the doré produced from the oxide ores.

Resource estimates were made using either two dimensional or three dimensional methods.

Following the two dimensional method, mineral resources are estimated using averaging of the channel and diamond drillhole samples. A long section is produced of each structure and divided into mineable panels. The volume of the panel is estimated from the average width of the vein or mineralization intersection of each drillhole or channel located within a 30 metre radius of the panel. The grade of each panel is estimated by the length weighted average of the sample grade of each intersection within a 30 metre radius of the panel.

Following the three dimensional method, three dimensional interpretations are made in each vein or mineralized structure around spatially continuous trends of drillhole and channel sample grades greater than the sub-marginal cut-off values for each vein. A similar interpretation is made of hangingwall and footwall dilution volumes expected to be mined with each structure. The wireframe interpretations are filled with blocks for the

ordinary kriged estimate.

For both estimation methods, a long section is produced of each structure and divided into mineable panels. Average bulk density values are applied to each mining panel volume to estimate the tonnes of each panel. The volumes are depleted annually for mining in the previous year. Mineral resource confidence classifications are based on the proximity and density of sample information in each block, as well as the interpretation and the experience of the mine geologists. Planned dilution and loss is applied to the estimate and a value per tonne is calculated in each panel. Any panel with a value above the mineral resource cut-off is converted to mineral resources. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources at the La Colorada mine.

### ***Mining Operations***

Underground mining currently takes place utilizing cut and fill and long hole open stoping methods. Ore is hoisted to the surface in a shaft, and when required, may also be hauled to the surface using the two mine access ramps present in both mines.

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

The operation produces both oxide and sulphide ore processed in two separate circuits with a total nominal plant capacity of 2,000 tpd. The oxide plant is a conventional cyanide leach process comprised of crushing, grinding, leaching, Merrill Crowe zinc precipitation, and on-site refining to produce doré. The sulphide plant has a conventional flotation process comprised of crushing, grinding, and selective lead and zinc froth flotation circuits to produce separate precious metal rich lead and zinc concentrates. In the oxide plant, metallurgical recoveries average 84% for silver and 48% for gold. In the sulphide plant, recoveries average 93% for silver, 61% for gold, 88% for lead, and 88% for zinc.

During 2019, we processed 768.7 thousand tonnes, producing 8.2 million ounces of silver, 4.61 thousand ounces of gold, 20.97 thousand tonnes of zinc, and 11.15 thousand tonnes of lead.

All precious metal doré produced at the La Colorada mine is sent to one of two arm's length precious metals refineries for refining under fixed-term contracts. After refining, the silver is sold on the spot market to various bullion traders and banks, and the gold is sold to Maverix pursuant to the Maverix Gold Stream. All lead and zinc concentrates produced at the La Colorada mine are sold to arm's length smelters and concentrate traders under negotiated fixed-term contracts, which consider the presence of any deleterious elements. To date, we have not experienced difficulty with renewing existing or securing new contracts for the sale of the La Colorada doré or concentrates, however, there can be no certainty that we will always be able to do so or what terms will be available in the future. We regularly review the terms of smelting and refining agreements and the terms are considered to be within industry norms. Please see "Risks Related to our Business – Trading Activities and Credit Risk".

The revenues per type of concentrate and doré produced by the La Colorada mine for the past three years were as follows:

<b>2019</b>	<b>Revenue<sup>1,2</sup></b>	<b>Quantity Sold</b>
Silver and Gold in Doré	\$16.8 million	1,145,000 ounces of silver 680 ounces of gold
Lead Concentrate <sup>3</sup>	\$121.4 million	20,986 tonnes
Zinc Concentrate <sup>3</sup>	\$39.5 million	36,221 tonnes

**2018**

Silver and Gold in Doré	\$21.0 million	1,440,000 ounces of silver 757 ounces of gold
Lead Concentrate <sup>3</sup>	\$100.1 million	18,611 tonnes
Zinc Concentrate <sup>3</sup>	\$42.9 million	30,799 tonnes

**2017**

Silver and Gold in Doré	\$21.7 million	1,365,000 ounces of silver 632 ounces of gold
Lead Concentrate <sup>3</sup>	\$112.1 million	20,688 tonnes
Zinc Concentrate <sup>3</sup>	\$37.9 million	26,749 tonnes

Notes:

<sup>1</sup> Consists of sales to arm's length customers.

<sup>2</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

<sup>3</sup> Lead concentrates contain payable silver and gold. Zinc concentrates contain payable silver.

***Infrastructure, Permitting, and Compliance Activities***

The mine workings, processing plant, tailings storage facilities, waste disposal areas, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

The La Colorada mine purchases electrical power from the Mexican national power utility and back up diesel power is also available. Water for the mining operation is supplied from the underground mine dewatering systems.

An environmental impact statement ("EIS") and risk assessment on the La Colorada property was first submitted to the Mexican environmental authorities in early March 1999 and has subsequently been maintained and updated, including a major permit modification for the La Colorada mine expansion in 2017.

The main environmental projects focus on the stability and revegetation of historic tailings facilities. There are no known environmental issues that could materially impact our ability to extract the mineral resources or mineral reserves.

The La Colorada mine voluntarily participates in the Mexican Environmental Protection Authority's "Clean Industry" program, which involves independent verification of compliance with all environmental permits and the implementation of good practice environmental management procedures and practices. The La Colorada mine obtained its first certification in 2008 and is periodically re-certified.

A closure cost estimate for La Colorada prepared according to State of Nevada approved SRCE methodology is updated every year. Pan American has estimated the present value of the final site reclamation costs for the La Colorada mine to be approximately \$8.1 million effective December 31, 2019. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

***Capital and Operating Costs***

In 2019, total capital additions at La Colorada were approximately \$20.8 million, with \$11.1 million invested in expenditures related to the expansion activities, including exploration on the new skarn mineralization.

Capital investments for the La Colorada mine in 2020 will total between \$31.5 million to \$34.5 million. In addition to sustaining capital investments of between \$15.5 million and \$16.5 million relating to underground mechanization equipment additions, mine equipment refurbishments and replacements, underground ventilation

infrastructure improvements, tailing storage facility expansions and near-mine exploration, we also expect to invest between \$16.0 million and \$18.0 million in project capital spending for continued exploration drilling and early stage engineering and metallurgical testing on the newly discovered skarn deposit.

In 2019, direct operating costs at La Colorada were \$74.5 million.

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

In 2020, we anticipate producing between 8.5 million and 8.7 million ounces of silver and between 4.0 thousand and 5.0 thousand ounces of gold from the La Colorada mine. We plan to undertake approximately 65,000 metres of exploration drilling at the La Colorada mine, including the skarn, in 2020.

## **(ii) Dolores Mine**

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

The Dolores open pit and underground silver-gold mine is located in the state of Chihuahua, approximately 250 kilometres west of the city of Chihuahua. The main road access to the property is by maintained dirt access road from Yepachic, Chihuahua. Access is also possible by light aircraft landing on a dirt strip located about eight kilometres from the Dolores mine.

In 2012, Pan American acquired Minefinders and its wholly-owned subsidiary, CMD, that owns and operates the Dolores mine. The mine is comprised of three mineral concessions with an area of approximately 27,700 hectares. We make the required payments to maintain the concessions in good standing, and to our knowledge, we have met all of the necessary obligations to retain the property.

Much of the surface rights on the property are comprised in communal land registered with the National Agrarian Registry of Mexico (such communal land areas are referred to as "ejidos"). We have surface rights agreements with the local ejido community, Ejido Huizopa, and with several individual members of the Ejido Huizopa allowing us irrevocable access and the right to carry out exploration and mining activities for a term of 15 years with a right to extend for a further 15 years. These surface rights provide us with access to our mining operations, waste storage areas, heap leach pad areas, and other facilities.

All of the known mineralized zones, mineral resources and mineral reserves, mine workings, processing plant, effluent management and treatment systems, and heap leach pad areas relating to the Dolores mine are located within the boundaries of the concessions and surface rights.

An NSR royalty of 2% payable on all metal production, plus an additional NSR royalty of 1.25% on gold production, is payable to RG Mexico Inc., a subsidiary of Royal Gold Inc. These royalties are only on the portion of the deposit contained within one of the three concessions. To the best of our knowledge, the Dolores mine is not subject to any other royalties, overrides, back-in rights, payments or other agreements and encumbrances. Our Mexican operations are subject to governmental taxes, fees and duties, including the SMD and the EMD, as described in more detail under "La Colorada – Project Description, Location and Access".

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

Mining began in the region of the Dolores mine in the 1860s. A stamp mill began treating the Dolores ore from 1915 until early 1929, when it was destroyed by fire. Only sporadic production occurred from 1929 to 1931, after which there are no records of any historical production. Incomplete mining records from between 1922 and 1931 indicate that approximately 372,000 tonnes of ore containing over 116,000 ounces of gold and six million ounces of silver were produced from several underground mine operations, including the Dolores mine.

The property lay idle until 1993 when Minefinders began acquiring a land position in the district. Minefinders began a full exploration program in 1995 and commenced diamond drilling and reverse circulation drilling programmes in 1996. In July 1996, Minefinders granted Echo Bay Mines ("Echo Bay") an option in the property and Echo Bay commenced drilling, sampling, environmental data collection, and metallurgical testing. Minefinders bought back the option, including the technical information collected by Echo Bay, in 1997.

Following construction, Minefinders commenced mining in 2008. During the 2008 to 2011 period, Minefinders mined 25.5 million tonnes and stacked 18.3 million tonnes of ore on the leach pads, producing 210,660 ounces of gold and 6.2 million ounces of silver.

We have been producing from Dolores since 2012.

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

Dolores is located in the Sierra Madre Occidental volcanic belt, which comprises calc-alkaline batholiths and volcano sedimentary rocks of the Lower Volcanic Series and ignimbrites of the Upper Volcanic Series.

The San Francisco fault and its footwall host most of the mineralization at Dolores. The immediate footwall and hanging wall of the fault forms a 500 metre wide northwest-striking corridor of igneous intrusions.

Low sulphidation epithermal silver and gold mineralization is hosted in north-northwest trending hydrothermal breccias and sheeted vein zones in the order of 5 metres to 10 metres wide. Most high grade mineralization occurs along three major structures. Silver and gold mineralization identified on the surface lies over an area 4,000 metres long and up to 1,000 metres wide.

The highest grade mineralization occurs within the San Francisco Breccia, a well-defined and continuous hydrothermal breccia and stockwork zone that occurs in the immediate footwall of the San Francisco fault. The breccia trends further away from the fault towards the north until it joins a second major breccia zone known as the Alma Maria Breccia.

Hydrothermal breccias carry the highest silver and gold grades and pass outward into vein stock works. The veins are thin, rarely over 30 mm, and tend to occur as sheeted swarms. Economically mineable grades occur where the veins are sufficiently closely spaced.

### ***Exploration***

Minefinders carried out reconnaissance geological mapping, detailed mapping, and geophysical surveys including induced polarization surveys, resistivity surveys, and magnetic surveys. Minefinders also collected rock chip samples from the surface and underground, and followed up on promising targets with both reverse circulation and diamond drilling. Since we acquired the Dolores mine, we have continued with a program of near mine geological mapping and diamond drilling.

### ***Drilling***

All drilling is by diamond drilling from surface and underground using industry standard drill machines and downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine surface and underground diamond drilling exploration campaigns are ongoing as required for mineral resource and mineral reserve estimates.

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

Reverse circulation drillholes were sampled from the length of each drill rod and diamond drillhole samples are selected according to geological features. Most drill core samples have been taken at 2 metre intervals. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

Minefinders sent samples to Bondar Clegg, ALS Chemex, or Inspectorate laboratories for preparation and analysis. Silver assays were mostly prepared using a multi-acid digestion technique and AA spectrometry. Any assay overlimits were re-assayed using fire assay with gravimetric finish. Gold was analyzed using fire assay with AA finish and with gravimetric finish for any AA overlimits. Since acquiring the Dolores mine, we have sent samples to SGS Laboratories in Durango, Mexico. Samples are assayed for gold using fire assay with AA finish, and by fire assay with gravimetric finish for any AA overlimits. Silver is analysed by three acid digestion with ICP-AES finish for trace silver values, by three acid digest with AA finish for ICP-AES overlimits, and by fire assay with gravimetric finish for any AA overlimits.

The mine geology department conducts a QAQC program that is independent from the laboratory. The program includes the insertion of certified standards, blanks and duplicate samples. The results of the QAQC samples demonstrate acceptable accuracy and precision and that no significant contamination is occurring at the mine or external laboratories.

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

As part of normal mineral processing procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess leaching performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the recovery model, historical performance of the leaching operations and the tonnes, grade and type of material that is planned to be mined.

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

Management estimates that mineral reserves for the Dolores mine, effective June 30, 2019, are as follows:

<b>Dolores Mineral Reserves <sup>1,2</sup></b>			
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>
Proven	35.9	26	0.84
Probable	7.8	28	0.84
<b>TOTAL</b>	<b>43.7</b>	<b>26</b>	<b>0.84</b>

Notes:

- <sup>1</sup> Estimated using a price of \$17 per ounce of silver and \$1,300 per ounce of gold. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Dolores mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at Dolores, effective June 30, 2019, are as follows:

<b>Dolores Mineral Resources <sup>1,2</sup></b>			
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>
Measured	2.0	21	0.35
Indicated	1.5	28	0.56
Inferred	4.0	47	1.22

Notes:

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using metal prices of \$22 per ounce of silver and \$1,400 per ounce of gold.
- <sup>2</sup> Mineral resource estimates for the Dolores mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Mineral resource estimates were prepared using kriging methods within three dimensional geological interpretations. The block model was classified for measured, indicated, and inferred confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate is depleted annually for mining in the previous year. Planned dilution and loss is applied to the block model and a value per tonne is applied to each block. Reserve and resource pits and underground stope shapes were prepared on blocks above the economic cut-off. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation and economic parameters. Increasing costs, lower metal prices or increasing taxation could have a negative impact on the estimated mineral reserves. There are currently no known factors that may have a material negative impact on the estimated mineral reserves or mineral resources at the Dolores mine.

### ***Mining Operations***

Mining at Dolores is by standard open pit methods using shovels, loaders, and haul trucks and by underground methods using sub level open stoping and ramp haulage to the surface.

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

The Dolores mine uses conventional cyanide heap leaching and Merrill-Crowe technology on the crushed ores to produce gold and silver doré. The high grade portion of the ore is processed through the pulp agglomeration treatment plant and is conveyed with the lower grade portion to the heap leach pads for leaching. The pulp agglomeration plant is comprised of crushing, grinding, particle size classification, filtration, agglomeration, and reagent facilities. The average plant throughput is 20,000 tpd.

During 2019, we stacked 6.8 million tonnes on the leach pads and produced approximately 5.1 million ounces of silver and 117.6 thousand ounces of gold.

All production from Dolores is in the form of doré bars, which is refined at arm's length refineries prior to the sale of refined silver and gold to bullion banks and traders. Pan American currently has refining contracts in place with refineries in the USA and Mexico. We have not had any difficulty in securing contracts for the sale of Dolores doré, however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see "Risks Related to Our Business – Trading Activities and Credit Risk".

Pan American's revenue from the doré produced by the Dolores mine was as follows:

<b>2019</b>	<b>Revenue<sup>1,2</sup></b>	<b>Quantity Sold</b>
Silver and Gold in Doré	\$248.7 million	4,924,110 ounces of silver 120,731 ounces of gold
<b>2018</b>		
Silver and Gold in Doré	\$236.8 million	4,205,000 ounces of silver 134,061 ounces of gold
<b>2017</b>		
Silver and Gold in Doré	\$197.7 million	4,088,900 ounces of silver 102,045 ounces of gold

Notes:

<sup>1</sup> Consists of sales to arm's length customers.

<sup>2</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

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

The mine workings, processing facilities, leach pads, waste disposal areas, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Water for the operations is sourced from wells, pit and underground dewatering, and an onsite water storage dam, with a back-up system to supply water from the nearby Rio Tutuaca if required. Power is supplied from the Mexican national grid and backup generators are available when required.

The most significant environmental liabilities associated with the Dolores mine include surface disturbance and reclamation liabilities and issues related to the stability and containment system of heap leach Pad 1, which developed prior to Pan American's acquisition of the Dolores mine. A tear in the liner of Pad 1 developed in June 2010 following movement in the stability berm and significant leakage was collected by the leak collection system. Minefinders ceased stacking and irrigation on Pad 1 and relocated approximately 2 million tonnes of ore to another pad. The pad under the excavated material was examined and stabilized with an additional retaining wall structure, and the damaged liner was repaired. No sodium cyanide was detected in the downstream surface and ground water sampling points as a result of the failure, and continued soil and water sampling below Pad 1 has confirmed that no residual cyanide is present.

Since then, partially spent ore from the northern half of Pad 1 has been relocated to another pad for leaching, the old liner and base materials were removed, and the area was reconstructed and re-lined. Approximately 1.5 million tonnes of partially spent ore remain in the southern part of Pad 1, awaiting transfer to the newly lined area, and allowing the final reconstruction of the southern half of Pad 1.

A closure cost estimate for Dolores prepared according to State of Nevada approved SRCE methodology is updated every year. We have estimated the present value of reclamation costs for the Dolores property at December 31, 2019 to be approximately \$39.1 million. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

In 2019, total capital additions at the Dolores mine were approximately \$50.0 million, including \$49.7 million of sustaining capital, primarily for capitalized pre-stripping and leach pad expansions, as well as \$0.4 million invested for completion of the expansion project.

Capital investments in 2020 will total between \$55.0 million to \$58.0 million. The major components of these investments include heap leach pad and pond expansions, open pit mine waste pre-stripping activities and mine equipment refurbishments.

In 2019, direct operating costs at Dolores were \$175.2 million.

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

In 2020, we anticipate producing between 4.5 million and 5.0 million ounces of silver and between 133.5 thousand and 143.5 thousand ounces of gold from the Dolores mine. Our goal is to ramp up the underground mine to 1,500 tpd. We plan to complete brownfield exploration in 2020 including 6,000 meters of drilling.

## **B. Peru**

### **(i) Huaron Mine**

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

Huaron is an underground silver mine located 320 kilometres northeast of Lima in the province of Pasco in

Peru. The nearest town is Cerro de Pasco, and access from Lima is available by rail or paved highway.

Huaron is 100% owned and operated by PAS Huaron, a Peruvian entity which is approximately 99.94% held (99.8% including investment shares), directly or indirectly, by Pan American. The area of the PAS Huaron concessions spans approximately 29,344 hectares. The concessions owned by us give us exclusive right to explore, develop, exploit, and market all of the products from the Huaron mine. Mining concession titles have been granted by and are registered with the Institute of Geology, Mining, and Metallurgy of Peru, and we pay an annual fee to keep the licenses in good standing.

The known mineralized zones, mineral resources, mineral reserves, mine workings, the processing plant, tailing storage facilities, effluent management and treatment systems, and waste rock storage facilities are located within our concessions.

To the best of our knowledge, the Huaron mine is not subject to any overrides, back-in rights, payments, or other agreements and encumbrances. Our Peruvian operations are subject to governmental taxes, fees and duties, including a mining royalty tax and a special mining tax ("SMT"). The royalty is applied on a company's operating income and is based on a sliding scale with marginal rates ranging from 1% to 12% with a minimum royalty rate of 1% of sales regardless of its profitability.

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

The first underground mine, mill, and supporting villages were originally built in 1912 by a subsidiary of the French Penarroya Company and was sold to Mauricio Hochschild and Cia Ltda ("Hochschild") in 1987. In April 1998, a portion of the bed of the nearby Lake Naticocha collapsed and flooded the neighbouring Animon underground mine and then the Huaron mine through interconnected tunnels, causing its closure. The water level in the lake, which provided the source of floodwater, is currently maintained well below the level where it flooded into the old workings and we do not expect further flooding.

There is no available exploration data collected by previous operators other than diamond drilling. Channel samples were taken by the French Penarroya Company and by Hochschild, but no details on the nature and results of the samples are available, and none of the channel samples collected by previous owners are used in the estimation of mineral resources and mineral reserves.

Prior to our acquisition of the Huaron mine, approximately 22 million tonnes of silver-rich base metal sulphide ore was produced at the property and processed on site.

We have been producing from the Huaron mine since 2001.

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

The Huaron mine is located within the Western Cordillera of the Andes Mountains and the regional geology is dominated by Machay Group limestones and Pocobamba continental sedimentary rocks. These groups have been deformed by the Huaron anticline, the dominant structural feature of the area. The limestones and sedimentary rocks are strongly folded and intruded by quartz monzonites and quartz monzonite dikes with associated fracturing. Following the intrusion of the dikes, the sedimentary rocks were further compressed and fractured, and the fractures were subsequently mineralized by hydrothermal fluids.

The main lithology in the area of Huaron is a sequence of continental redbeds which unconformably overlie massive marine limestones. North-south trending sub-vertical porphyritic quartz monzonite dykes crosscut the mine stratigraphy. The Huaron mine is located within an anticline with an axis striking approximately north-south and plunging gently to the north. There are two main fault systems. One system comprises north-south striking thrust

faults, parallel to the axis of the anticline, and the other comprises east-west striking tensional faults.

The Huaron mine is a hydrothermal polymetallic deposit of silver, lead, zinc, and copper mineralization hosted within structures likely related to the intrusion of monzonite dikes, principally located within the Huaron anticline. Mineralization is encountered in veins parallel to the main fault systems, in replacement bodies known as “mantos” associated with the calcareous sections of the conglomerates and other favourable stratigraphic horizons, and as dissemination in the monzonitic intrusions at vein intersections.

The mineralized veins vary from a few centimetres to up to 10 metres wide, and may extend along strike for up to 1,800 metres. Vein orientations vary but generally trend east-west or north-south.

### ***Exploration***

Exploration work prior to Pan American’s ownership is unknown, but since we acquired the Huaron mine, exploration has comprised underground diamond drilling and channel sampling, which is used to estimate mineral resources and mineral reserves.

### ***Drilling***

All drilling is by diamond drilling from underground using industry standard drill machines and downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine underground diamond drilling exploration campaigns are ongoing on an annual basis for mineral resource and mineral reserve estimates.

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

Diamond drillhole and underground channel samples vary between 0.1 metres and 1.5 metres in length. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

Both the channel and the underground diamond drillhole samples are sent to the on-site laboratory, which is not certified by any standards association but is managed and operated by the international commercial laboratory firm, SGS. Assays for silver, zinc, lead, and copper are performed using acid digestion and AA finish.

The mine geology department conducts a QAQC program that is independent from the laboratory. The program includes the insertion of certified standards, blanks and duplicate samples. The results of the QAQC samples demonstrate acceptable accuracy and precision and that no significant contamination is occurring at the mine or external laboratories.

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

As part of normal plant operation procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess mill performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves at the Huaron mine, effective June 30, 2019, are as follows:

<b>Huaron Mineral Reserves<sup>1,2</sup></b>					
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver</b>			
		<b>per tonne</b>	<b>% Zinc</b>	<b>% Lead</b>	<b>% Copper</b>
Proven	6.2	168	3.02	1.44	0.69
Probable	3.7	170	3.00	1.55	0.33
<b>TOTAL</b>	<b>9.9</b>	<b>168</b>	<b>3.01</b>	<b>1.48</b>	<b>0.56</b>

**Notes:**

- Estimated using a price of \$17 per ounce of silver, \$2,500 per tonne of zinc, \$2,100 per tonne of lead and \$6,000 per tonne of copper. Totals may not add due to rounding.
- Mineral reserve estimates for the Huaron mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at the Huaron mine, effective June 30, 2019, are as follows:

<b>Huaron Mineral Resources<sup>1,2</sup></b>					
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver</b>			
		<b>per tonne</b>	<b>% Zinc</b>	<b>% Lead</b>	<b>% Copper</b>
Measured	2.2	157	2.80	1.50	0.59
Indicated	2.4	155	3.03	1.64	0.61
Inferred	6.2	155	2.77	1.45	0.41

**Notes:**

- These mineral resources are in addition to mineral reserves. Estimated using a price of \$17 per ounce of silver, \$2,500 per tonne of zinc, \$2,100 per tonne of lead and \$6,000 per tonne of copper.
- Mineral resource estimates for the Huaron mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Three dimensional interpretations are made in each vein or mineralized structure around spatially continuous trends of drillhole and channel sample grades greater than the sub-marginal cut-off values for each vein. A similar interpretation is made of hangingwall and footwall dilution volumes expected to be mined with each structure. The wireframe interpretations are filled with blocks for the ordinary kriged estimate.

A long section is produced of each structure and divided into mineable panels. Average bulk density values are applied to each mining panel volume to estimate the tonnes of each panel. The volumes are depleted annually for mining in the previous year. Mineral resource confidence classifications are based on the proximity and density of sample information in each block, as well as the interpretation and the experience of the mine geologists. Planned dilution and loss is applied to the estimate and a value per tonne is calculated in each panel. Any panel with a value above the mineral resource cut-off is converted to mineral resources. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources.

### ***Mining Operations***

Mining is undertaken using primarily mechanized sub-level long hole stoping methods. Ore is brought to the surface using haul trucks, electric locomotives, or hoisted through a shaft.

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

The Huaron mine operates a 2,900 tpd nominal capacity mill using froth induced flotation technology to

produce silver in copper, lead, and zinc concentrates. Metallurgical recoveries average approximately 84% for silver, 77% for zinc, 76% for lead, and 76% for copper.

In 2019, the mill processed approximately 1.0 million tonnes of ore producing approximately 3.8 million ounces of silver, 18.07 thousand tonnes of zinc, 9.22 thousand tonnes of lead, and 6.02 thousand tonnes of copper.

The silver rich zinc, lead, and copper concentrates from the Huaron mine are sold under contracts with arm’s length smelters and concentrate traders, which consider the presence of any deleterious elements. Huaron receives payment for an agreed percentage of the silver, zinc, lead, or copper contained in the concentrates it sells after deduction of smelting and refining costs, based on average spot prices over defined 30-day periods that may differ from the month in which the concentrate was produced. Under these circumstances, we may, from time to time, fix the price for a portion of the payable base metal content during the month that the concentrates are produced. To date, we have been able to secure contracts for the sale of all Huaron concentrates produced, however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see “Risks Related to Our Business – Trading Activities and Credit Risk”.

The revenue per type of concentrate produced by the Huaron mine for the past three years were as follows:

<b>2019</b>	<b>Revenue<sup>1,2</sup></b>	<b>Quantity Sold (Tonnes)</b>
Zinc Concentrate <sup>3</sup>	\$32.0 million	40,059
Lead Concentrate <sup>3</sup>	\$32.5 million	17,755
Copper Concentrate <sup>3</sup>	\$52.7 million	25,428
<b>2018</b>		
Zinc Concentrate <sup>3</sup>	\$39.1 million	38,374
Lead Concentrate <sup>3</sup>	\$29.6 million	15,466
Copper Concentrate <sup>3</sup>	\$46.0 million	22,944
<b>2017</b>		
Zinc Concentrate <sup>3</sup>	\$45.6 million	42,418
Lead Concentrate <sup>3</sup>	\$34.0 million	17,183
Copper Concentrate <sup>3</sup>	\$49.5 million	24,839

Notes:

<sup>1</sup> Consists of sales to arm’s length customers.

<sup>2</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

<sup>3</sup> Zinc and lead concentrates contain payable silver. Copper concentrates contain payable silver and gold.

***Infrastructure, Permitting, and Compliance Activities***

The Huaron mine workings, processing plant, tailings and waste disposal areas, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

We are authorized to source the water necessary for our operations from a system of nearby lakes. The primary source of power for the mine is the Peruvian national power grid.

The original closure plan for the Huaron mine was filed with the Peru Ministry of Energy and Mines (“Peru MEM”) in 2004 and updated in 2006. The closure plan is updated every five years or whenever new infrastructure or modifications are permitted.

The most significant environmental issue currently associated with the mine is relatively high sediment and

metal concentrations in the waters discharged from the mine and the mine's tailings storage facilities. All waters are captured and treated in a treatment plant to achieve compliance with discharge limits.

An agreement signed in 2000 allows Volcan Compañía Minera S.A.'s ("Volcan") Chungar mine, which neighbours the Huaron mine, to discharge water from its mine dewatering into the Huaron drainage tunnel. The agreement also requires Volcan to contribute to the costs of tunnel maintenance and water treatment and discharge, however provisions of the agreement that would enable water quality and flow measurement between the mines were not implemented and no payments have been made. In 2014, an independent consultant engaged jointly by both companies concluded that the flow from the Chungar mine to the Huaron mine represents 19% of the total flow in the drainage tunnel and recommended the installation of a permanent monitoring system for ongoing verification. We continue to negotiate the details of the joint monitoring and any responsibility for costs with Volcan.

A closure cost estimate for the Huaron mine prepared according to State of Nevada approved Standard Reclamation Cost Estimator methodology is updated every year. The current present value of closure expenditures at Huaron as at December 31, 2019, is estimated at \$11.8 million. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

Capital additions at Huaron during 2019 totalled \$10.9 million, primarily on equipment leases, near mine exploration, mine deepening, and equipment replacements and refurbishments.

We have forecast sustaining capital investments of between \$9.0 million and \$10.0 million for 2020, primarily related to mine equipment replacements, mine deepening and near-mine exploration.

In 2019, direct operating costs at the Huaron mine were \$77.0 million.

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

In 2020, the Huaron mine is forecast to produce between approximately 3.8 and 3.9 million ounces of silver and 0.5 thousand ounces of gold. We plan to undertake 20,000 metres of exploration drilling in 2020.

## **(ii) Morococha Mine**

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

The Morococha mine is an underground silver mine located 137 kilometres east of Lima in the province of Yauli. The nearest city is La Oroya, approximately 38 kilometres to the east. Morococha is accessible from Lima via paved highway and an all-weather gravel road.

The Morococha mine is owned and operated by Argentum, a Peruvian company in which Pan American, through our subsidiary Pan American Peru, has a 92.01% voting common share interest (the remaining interest is held by Alejandro Gubbins and Compañía Minera Casapalca S.A.). In addition, we have, directly or indirectly, the majority of the non-voting investment shares resulting in a total ownership interest of approximately 92.3% as at December 31, 2019 (excluding certain investment shares held by Argentum itself).

The Morococha mine is comprised of three economic administrative units ("UEAs") and various concessions held outside of these UEAs, for a total of 541 mining concessions with an area of approximately 10,522 hectares, as well as two processing concessions. The three UEAs contain 454 mining concessions and two processing concessions owned outright by Argentum and 11 concessions transferred to Argentum from Silver Lead Mining Company S. A. There are also 36 concessions under a lease agreement with Corporación Minera Sacracancha S.A.C., 31 concessions under option from Minera Chinalco Peru ("MCP"), and nine concessions held by agreement with different third parties. The majority of the mining concessions comprising the Morococha mine are contiguous.

The known mineralized zones, mineral reserves and mineral resources, mine workings, processing plants,

effluent management and treatment systems, and the mine's tailings and waste storage facilities are contained within the boundaries of these concessions. These mining concessions give us the exclusive right to explore, develop, and exploit, as well as the right to market all of the products from the Morococha mine. Mining concession titles for these properties have been granted by and are registered with the Public Registry of Peru, and we pay an annual fee to keep the licenses in good standing, and to our knowledge, we have met all of the necessary obligations to retain the property. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Argentum did not hold registered legal title to most of the surface lands that overlie the mining concessions which comprise the Morococha mine when we acquired it in 2004, including lands on which Morococha's process plants, shafts and access roads were located. These rights were all formerly owned by Centromin. Centromin granted Argentum a right to use certain of Centromin's surface lands throughout the useful life of its mining operations, provided such use does not interfere with the development of a mine in respect of the Toromocho disseminated copper system, which overlies certain of Argentum's mining concessions and underground mining operations. Argentum had an obligation to pay Centromin \$60,000 (adjusted annually for inflation) quarterly commencing May 28, 2003 as consideration for this right. Argentum's and its predecessors' use of these surface lands have been exercised for decades with Centromin's knowledge and Argentum's claim to its continued use of these surface rights was based on concepts of rights acquired through long term use often referred to as adverse possession.

Peru Copper Inc. ("Peru Copper"), a copper mining company carrying on business in Peru, acquired mining concessions and surface rights to the Toromocho property from Centromin. In June 2007, Aluminum Corporation of China ("Chinalco") purchased 100% of the outstanding shares in Peru Copper and formed MCP.

In 2005, Argentum, with the opposition of Centromin, engaged in a number of administrative and judicial proceedings to obtain legal title to surface lands and underground access that comprise part of the rights that were acquired by Peru Copper from Centromin. Following Peru Copper's acquisition of Centromin's rights, we began preliminary discussions with Peru Copper, and later with Chinalco and MCP, in respect of negotiating a resolution to the surface rights issues between the parties.

In May 2008, MCP acquired certain surface rights from Centromin (currently, Activos Mineros S.A.) covering the main Morococha area that had been reserved for the Toromocho project by the Government of Peru. In addition, MCP acquired rights including surface lands in the Morococha area where the Morococha mine administration and operations are taking place, as well as certain underground areas. Certain of the underground areas acquired by MCP would also provide Pan American with easier and less costly underground access to some areas of the Morococha concessions.

In June 2010, we reached an agreement with MCP that defined each party's long term surface rights and therefore provides certainty to the land situation for the Morococha property. The primary focus of the agreement is on the lands and concessions around the Morococha mine and MCP's Toromocho copper project. Under the terms of the agreement, Argentum is required to relocate the core Morococha facilities, including the administration offices, warehouse, maintenance facilities, mine compressors, and some camp facilities and construct a new concentrator over a five-year period and transfer certain mineral concessions and access rights to MCP that it needs in order to proceed with the development of Toromocho, including the surface lands within the planned open pit mining area of the Toromocho project. In exchange, Argentum is to receive a package of surface rights, easements, and other rights to relocate the facilities and to continue uninterrupted operations, and would also obtain rights to a number of mineral concessions outside the planned Toromocho pit area where high grade silver veins have been identified. Lastly, Argentum is to receive periodic cash payments from MCP totalling \$40 million, which would offset a portion of the capital required for the facility relocation. Pursuant to the agreement, the transfer of lands and rights and the cash payments will occur over a period of time and are dependent on meeting certain milestones. In addition to the foregoing, the parties agreed to dismiss the judicial and administrative claims between them. To date, Minera Argentum has received a total of \$24.0 million (pre-tax) from MCP and has completed a number of phases of the relocation effort. We have completed the abandonment and demolition of all buildings in the Central Shaft area, the construction of the replacement facilities located north of the central highway, but have not yet relocated the plant. We continue to operate the plant, the location of which is projected to eventually interfere with the advance of the Toromocho open pit. Depending on economic justification, mineral reserve growth, and the advance of the

Toromocho open pit, the plant will need to be replaced or relocated. Although no up-to-date engineering studies are available, the estimated cost of a new 800,000 tonne per annum processing plant could be significant. This cost might be partially offset by the remaining payments due from MCP in relation to the June 2010 agreement. Please see "Risks Related to Our Business – Title to Assets".

To the best of our knowledge, and other than as described above, the Morococho mine is not subject to any overrides, back-in rights, payments, or other agreements or encumbrances. Our Peruvian operations are subject to governmental taxes, fees and duties, including the mining royalty tax and the SMT, as described under "Huaron – Project Description, Location and Access".

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the Morococho mine, including permitting and environmental liabilities, other than as described above, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

Mining began in the region around Morococho before the 1500s, and production has been continuous in the district since the late 1800s. Most of the exploration undertaken by former owners of Morococho was limited to underground development along strike of known structures.

Between 1915 and 1918, much of the district was reorganized and incorporated into Cerro de Pasco Mining Company ("Cerro de Pasco"). By 1924, Cerro de Pasco was producing at a rate of 1,500 tpd from primarily copper ores. Between 1929 and 1934, Cerro de Pasco excavated the 11.5 kilometre long Kingsmill Tunnel, successfully dewatering all of the Morococho District mine workings above the elevation of the tunnel. The Kingsmill Tunnel is still in use.

In January 2004, we entered into an agreement to purchase 92.014% of the voting shares of Argentum, a Peruvian corporation that held the Anticona and Manuelita mining units and related infrastructure. The transaction was subject to regulatory approval and a number of conditions, including that 100% of the shares of Argentum would first be listed on the Lima Stock Exchange and then be subject to a successful public bid by us for at least the 92.014% of voting shares. In February 2004, we entered into a further agreement to purchase Empresa Minera Natividad S.A. ("Natividad"), a corporation that held additional mining concessions and operations complementary to the Anticona and Manuelita mining units. The acquisitions closed contemporaneously in August 2004, and in 2005, Argentum amalgamated with Natividad, and then subsequently delisted from the Lima Stock Exchange in 2006. We continue to acquire the non-voting labour shares in Argentum that were formerly listed on the Lima Stock Exchange and are now held either by current workers, former workers or by third parties who have bought labour shares in the free market.

Extensive mining has taken place at the property prior to Pan American's acquisition in 2004, but there are no known reliable historical production figures. For the 15 years between 1989 and 2003, approximately 7.9 million tonnes of ore was mined at a grade of 227 ppm Ag, 0.5% Cu, 1.7% Pb, and 4.6% Zn.

We have been producing from the Morococho mine since 2004.

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

Morococho is located in the Western Cordillera of the Andes. The host rocks for the mineralization in the Morococho district comprise schists, volcanic rocks, and predominantly carbonate sediments cut by a series of intrusions. The structures that account for the majority of the vein mineralization in the Morococho district trend predominantly northeast to east-northeast.

The structural setting of the area is dominated by shallowly northwest plunging folds, the most important of which is a north-northwest trending anticlinal feature referred to as the Yauli Dome. Compression gave rise to early northwest trending shears, and the uplifting effect of the intrusion of quartz monzonite stocks produced an arching of the Yauli Dome and an associated phase of tension faulting generally trending perpendicular to the axis

of the anticline. This latter set is the most heavily mineralized set of fractures and accounts for the majority of fault hosted mineralization in the Morococha District.

Vein mineralization forms along the dominant system of northeast trending tensional faults.

Replacement manto mineralization generally occurs in carbonate horizons intersected by mineralized veins or proximal to pre-mineral intrusives, and some occurs as structurally controlled irregular chimneys. Mantos can have a significant strike extent where the veins are closely spaced, and can range from less than one metre to up to 12 metres in width.

Mineralization at the Morococha mine includes epi-mesothermal silver-zinc-lead-copper veins, bedded silver-base metal replacements or mantos, intrusive/sediment contact skarns, and the quartz porphyry hosted Toromocho disseminated copper system. Shoots range up to 400 metres in length with some traced for over 800 metres down plunge. Economic vein widths range from 0.5 metres to more than 6.0 metres. Vein width averages in the district are on the order of 1.2 metres.

### ***Exploration***

None of the exploration work conducted by previous operators is available. Since Pan American acquired the Morococha mine, exploration has comprised underground diamond drilling and channel sampling, which is used to estimate mineral resources and mineral reserves.

### ***Drilling***

All drilling is by diamond drilling from surface and underground using industry standard drill machines and downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine diamond drilling exploration campaigns are ongoing on an annual basis for mineral resource and reserve estimates.

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

Diamond drill hole and underground channel sample intervals vary in length between 0.10 and 2.0 metres. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the samples' validity or integrity has been compromised.

Both the channel and underground diamond drillhole samples are prepared by the on-site laboratory, which is not certified by any standards association but is managed and operated by the international commercial laboratory firm, SGS. Assays for silver, zinc, lead, and copper are performed using acid digestion and AA finish.

The mine geology department conducts a QAQC program that is independent from the laboratory. The program includes the insertion of certified standards, blanks and duplicate samples. The results of the QAQC samples demonstrate acceptable accuracy and precision and that no significant contamination is occurring at the mine or external laboratories.

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

As part of normal plant operation procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess mill performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves for the Morococha mine, effective June 30, 2019, are as follows:

<b>Morococha Mineral Reserves <sup>1, 2, 3</sup></b>					
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver</b>			
		<b>per tonne</b>	<b>% Zinc</b>	<b>% Lead</b>	<b>% Copper</b>
Proven	4.1	147	4.03	1.38	0.38
Probable	2.2	173	3.26	1.20	0.31
<b>TOTAL</b>	<b>6.3</b>	<b>156</b>	<b>3.76</b>	<b>1.32</b>	<b>0.35</b>

Notes:

- <sup>1</sup> Estimated using a price of \$17 per ounce of silver, \$2,500 per tonne of zinc, \$2,100 per tonne of lead and \$6,000 per tonne of copper. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Morococha mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons, as that term is defined in NI 43-101.
- <sup>3</sup> Tonnes are shown for our 92.3% ownership of the Morococha property.

Management estimates that mineral resources at the Morococha mine, effective June 30, 2019, are as follows:

<b>Morococha Mineral Resources <sup>1, 2, 3</sup></b>					
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver</b>			
		<b>per tonne</b>	<b>% Zinc</b>	<b>% Lead</b>	<b>% Copper</b>
Measured	0.3	138	2.14	0.86	0.29
Indicated	0.3	143	2.09	0.83	0.20
Inferred	4.5	138	3.26	1.02	0.37

Notes:

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using a price of \$17 per ounce of silver, \$2,500 per tonne of zinc, \$2,100 per tonne of lead and \$6,000 per tonne of copper.
- <sup>2</sup> Mineral resource estimates for the Morococha mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.
- <sup>3</sup> Tonnes are shown for our 92.3% ownership of the Morococha property.

Three dimensional interpretations are made in each vein or mineralized structure around spatially continuous trends of drillhole and channel sample grades greater than the sub-marginal cut-off values for each vein. A similar interpretation is made of hangingwall and footwall dilution volumes expected to be mined with each structure. The wireframe interpretations are filled with blocks for the ordinary kriged estimate.

A long section is produced of each structure and divided into mineable panels. Average bulk density values are applied to each mining panel volume to estimate the tonnes of each panel. The volumes are depleted annually for mining in the previous year. Mineral resource confidence classifications are based on the proximity and density of sample information in each block, as well as the interpretation and the experience of the mine geologists. Planned dilution and loss is applied to the estimate and a value per tonne is calculated in each panel. Any panel with a value above the mineral resource cut-off is converted to mineral resources. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources.

### ***Mining Operations***

Underground mining methods at the Morococha mine consist primarily of long hole open stoping and mechanized cut and fill. Ore is either hoisted to the surface in a shaft or trucked to the surface via a haulage ramp.

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

The Morococha mine operates a 2,000 tpd processing plant using froth induced selective flotation technology to produce silver in zinc, lead, and copper concentrates. Metallurgical recoveries average approximately 89% for silver, 24% for gold, 88% for zinc, 80% for lead, and 62% for copper.

In 2019, the mill processed approximately 0.7 million tonnes of ore, producing approximately 2.5 million ounces of silver, 1.39 thousand ounces of gold, 22.50 thousand tonnes of zinc, 6.56 thousand tonnes of lead, and 1.83 thousand tonnes of copper.

The silver-rich zinc, lead, and copper concentrates from the Morococha mine are sold under contracts with arm's length smelters and concentrate traders, which consider the presence of any deleterious elements. Morococha receives payment for an agreed percentage of the silver, zinc, lead, and copper contained in the concentrates it sells, after the deduction of smelting and refining costs. We have not had any difficulty securing contracts for the sale of Morococha concentrates; however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see "Risks Related to Our Business - Trading Activities and Credit Risk".

The revenue per type of concentrate produced by the Morococha mine for the past three years were as follows:

<b>2019</b>	<b>Revenue<sup>1,2</sup></b>	<b>Quantity Sold (Tonnes)</b>
Zinc Concentrate <sup>3</sup>	\$45.9 million	47,732
Lead Concentrate <sup>3</sup>	\$29.4 million	13,111
Copper Concentrate <sup>3</sup>	\$26.2 million	10,171
<b>2018</b>		
Zinc Concentrate <sup>3</sup>	\$55.8 million	46,280
Lead Concentrate <sup>3</sup>	\$21.1 million	9,199
Copper Concentrate <sup>3</sup>	\$40.6 million	17,018
<b>2017</b>		
Zinc Concentrate <sup>3</sup>	\$42.6 million	34,769
Lead Concentrate <sup>3</sup>	\$15.8 million	7,019
Copper Concentrate <sup>3</sup>	\$61.8 million	35,659

Notes:

<sup>1</sup> Consists of sales to arm's length customers.

<sup>2</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

<sup>3</sup> Zinc and lead concentrates contain payable silver. Copper concentrates contain payable silver and gold.

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

The Morococha mine workings, processing plant, tailings and waste disposal areas, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

The original closure plan for the Morococha mine was filed by us with the Peru MEM in 2004 and updated in 2006. The closure plan is updated every five years or whenever new infrastructure or modifications are permitted.

The mine is authorized to source the water necessary for operations from a nearby lake. The primary source of power for the Morococha mine is the Peruvian national power grid.

The most significant environmental liability identified at the Morocochoa mine is the mine's potential share of the cost to operate the Kingsmill Tunnel water treatment plant. The water treatment plant was built and is currently being operated by MCP to treat the water draining from the Kingsmill Tunnel into the Rio Yauli. Morocochoa's share of the cost was defined by a hydrogeological study completed in 1997 which apportioned responsibility for the costs of constructing and operating the treatment plant as follows: (i) Centromin (72.2%); (ii) our Morocochoa operations (12.3%); (iii) Soc. Minera Puquiocochoa (8.5%); (iv) Soc. Minera Austria Duvaz (4.9%); and (v) Minera Centrominas (2.1%). Subsequent to the apportionment of costs, it appears that in connection with the acquisition by MCP of the mining concessions near the Morocochoa mine, MCP assumed the cost of the construction of the Kingsmill water treatment plant.

The treatment and operating costs for the water treatment facility are directly proportional to both constituent load and flow determined in the 1997 study. The distribution of responsibility stated in the 1997 study was accepted by all involved parties. Our potential share of the responsibility for treatment of the baseline flows, 12.3%, was included in the terms of its purchase of the applicable mining concessions. As a purchase contract entered into during 2003 between Natividad and Argentum establishes that the purchaser is responsible for incremental flows in those concessions, subsequent studies in 2004 were carried out to further characterize the baseline flow conditions in order to establish benchmarks for the determination of responsibility for potential future increases. The results of this 2004 study estimated that 38.46% of the baseline flows were derived from Natividad and Corona concessions now under our control. We challenged this estimate but our challenge was not accepted. The scope of the 2004 study and the resulting recommendations exceeded the terms of the study and presented conclusions that conflicted with previous conclusions and the terms of our purchase of the applicable concessions.

A closure cost estimate for the Morocochoa mine prepared according to State of Nevada approved SRCE methodology is updated every year. The current present value of closure expenditures at Morocochoa effective December 31, 2019, is approximately \$7.1 million. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward looking statements related to reclamation costs.

### ***Capital and Operating Costs***

Capital additions at Morocochoa during 2019 totalled \$14.9 million, including \$12.6 million of sustaining capital, primarily on near-mine exploration, equipment replacements and refurbishments, and equipment and office leases, as well as \$2.3 million invested in project capital for the installation of a power-line and advancing engineering and permitting for a future plant relocation.

In 2020, we anticipate investing between approximately \$7.5 million and \$9.0 million in sustaining capital. The sustaining capital expenditure forecast includes near-mine exploration and underground mine equipment additions and replacements. We also expect to incur some expenditures in studies for the potential relocation of the plant.

In 2019, direct operating costs at the Morocochoa mine were \$73.4 million.

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

In 2020, based on an ownership interest of approximately 92.3% of Argentum, our proportionate interest in Morocochoa's production is forecast to be between 2.6 million and 2.8 million ounces of silver and between 1.3 thousand and 1.5 thousand ounces of gold. We plan to undertake approximately 31,500 metres of exploration drilling at the Morocochoa mine in 2020.

### **(iii) Shahuindo Mine**

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

The Shahuindo mine is an open pit gold mine located in northern Peru, 500 kilometres north-northwest of Lima. The project site can be accessed from Cajamarca via approximately 130 kilometres of paved highway, with unimproved roads accessing the site from the highway. There are daily commercial flights between Lima and Cajamarca.

The Shahuindo mine is 100% owned and operated by Pan American's wholly owned subsidiary, Shahuindo S.A.C. The area of the concession is approximately 7,339 hectares in 26 mineral titles. Shahuindo S.A.C. also controls the neighboring Vikingo and Vikingo I concession covering 1,858 hectares. We pay an annual fee to the Peruvian government to keep the concessions in good standing. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

381 surface rights within the Shahuindo mine area cover approximately 2,559 hectares, which is sufficient to operate the mine.

To the best of our knowledge, the Shahuindo mine is not subject to any third-party overrides, back-in rights, payments, or other agreements and encumbrances. Our Peruvian operations are subject to governmental taxes, fees and duties, including the mining royalty tax and the SMT, as described under "Huaron – Project Description, Location and Access".

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, other than as described above, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

#### ***History***

Legal rights to the mineral leases of the Shahuindo mine were in dispute between 1996 and 2009. A number of Peruvian, Mexican and Canadian companies have been involved in numerous legal processes that were eventually settled in 2009 with 100% ownership being legally registered to Sulliden Shahuindo S.A.C., a wholly owned subsidiary of Sulliden Gold Ltd. ("Sulliden"). Rio Alto Gold ("Rio Alto") acquired Sulliden in 2014, and in April 2015, Tahoe completed its acquisition of Rio Alto, thereby acquiring control of Sulliden Shahuindo S.A.C. (renamed Shahuindo S.A.C.). Pan American acquired Tahoe in February 2019.

Exploration and mining activities have taken place on the Shahuindo property since 1945. Between 1945 and 1989, Minera Algamarca S.A. ("Algamarca") conducted mining and exploration work on the property. Between 1990 and 1998, former operators conducted geological mapping, drilling of approximately 200 holes, soil and rock geochemical sampling, and metallurgical testwork. Sulliden conducted a large surface drilling campaign of approximately 640 holes, geophysical surveys, geological mapping and trenching, soil and surface rock sampling, metallurgical testing, and economic analyses between 2002 and 2012. Rio Alto conducted a campaign of 246 holes between 2014 and 2015 and drilling was continued on the property by Tahoe. Mine construction commenced in 2014 and commercial production was achieved in 2016.

We have been producing from the Shahuindo mine since late February 2019.

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

The Shahuindo mine is located in the Western Cordillera of the Andes, within a regional fold and thrust belt of predominantly sedimentary rocks. The principal zone of mineralization in the district occurs in a belt between two large amplitude, regional scale folds. Important structural elements include fold limbs and fold axial surfaces, fold-related fractures, faults and related extension fractures, breccia dikes and irregular bodies, and igneous intrusive contacts. Mineralization is hosted within the siliciclastic sandstone-dominant Farrat formation and the underlying sedimentary Carhuaz formation. These sedimentary rocks have been intruded by at least three felsic stocks which

tend to be located along faults and cores of anticlinal structures.

Mineralization comprises an intermediate-sulfidation epithermal system, with high-sulfidation mineralization at depth and in the core of hydrothermal breccias. Oxidation of mineralization extends to a depth of 150 metres below surface.

### ***Exploration***

Algamarca conducted exploration work on the Shahuindo property prior to 1990, but no records of that work are available. From 1990 to 1998, Alta Tecnología e Inversión Minera y Metalúrgica SA, Asarco LLC, and Southern Peru Copper Corp. explored the Shahuindo project area, completing mapping, geochemical sampling, and reverse circulation and diamond drilling. Val Dór Geofísica Peru conducted magnetic and induced polarization geophysical surveys between 2002 and 2012 on behalf of the prior owners of Shahuindo.

Most of the accessible underground adits located on the concession were sampled prior to 2012. Detailed soil sampling completed by Sulliden between 2003 and 2012 revealed a series of continuous, parallel gold anomalies in the central and northern areas of the concession. Base metal anomalies were found to the northwest and to the southeast of the concession.

Current exploration at the Shahuindo mine consists of surface geological mapping, geochemical sampling, and drilling.

### ***Drilling***

Drilling is by reverse circulation and diamond drilling from surface using industry standard drill machines and downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine drilling exploration campaigns are ongoing on an annual basis for mineral resource and mineral reserve estimates.

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

Limited information is available regarding sample preparation and analyses for the drill programs prior to Sulliden's drilling programs beginning in 2003. That data accounts for a small proportion of the data used in the mineral resource and mineral reserve estimates, and many of the holes drilled prior to Sulliden have been twinned or offset with new drill holes.

From 2003 to 2012, Sulliden sampled diamond drillholes after being cut in half, at typically 1.5 metre intervals or according to geological contacts. Reverse circulation drillholes were sampled according to the length of the drill rod. Sulliden sent their samples to ALS in Lima for preparation and analysis using fire assay with AA finish. A QAQC program supervised by the geology department included the submission of certified standards, duplicates, and blanks to the laboratory.

From 2014 to present, the samples have been analyzed by CERTIMIN in Lima using fire assay with AA finish.

The mine geology department conducts a QAQC program that is independent from the laboratory. The program includes the insertion of certified standards, blanks and duplicate samples. The results of the QAQC samples demonstrate acceptable accuracy and precision and that no significant contamination is occurring at the mine or external laboratories.

The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

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

As part of normal mineral processing procedures, metallurgical analysis and testing is undertaken as

required. The majority of these analyses are to assess leaching performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the recovery model, historical performance of the leaching operations and the tonnes, grade and type of material that is planned to be mined.

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

Management estimates that mineral reserves at the Shahuindo mine, effective June 30, 2019, are as follows:

<b>Shahuindo Mineral Reserves<sup>1,2</sup></b>			
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>
Proven	69.8	6	0.51
Probable	42.8	6	0.46
<b>TOTAL</b>	<b>112.6</b>	<b>6</b>	<b>0.49</b>

**Notes:**

- <sup>1</sup> Estimated using a price of \$17 per ounce of silver and \$1,300 per ounce of gold. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Shahuindo mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at the Shahuindo mine, effective June 30, 2019, are as follows:

<b>Shahuindo Mineral Resources<sup>1,2</sup></b>			
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne<sup>3</sup></b>
Measured	3.7	7	0.53
Indicated	8.4	5	0.46
Inferred	107.3	14	0.71

**Notes:**

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using a price of \$22 per ounce of silver and \$1,400 per ounce of gold except for the Shahuindo Sulphide material which was estimated using a price of \$15 per ounce of silver and \$1,400 per ounce of gold.
- <sup>2</sup> Mineral resource estimates for the Shahuindo mine were prepared under the supervision of, or were reviewed by, Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.
- <sup>3</sup> Inferred resources include both oxide and sulphide.

Mineral resource estimates for the Shahuindo mine were prepared using inverse power of difference interpolation methods within three dimensional geological interpretations. The block model was classified for measured, indicated, and inferred confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate was then depleted for previous mining and planned dilution and ore loss was applied. Reserve and resource pits were prepared on blocks above the economic cut-off. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources at Shahuindo.

### ***Mining Operations***

Mining at the Shahuindo mine is by standard open pit methods using shovels, loaders, and dump trucks.

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

The Shahuindo mine uses conventional cyanide heap leaching and a carbon-in-column adsorption-desorption-regeneration (“ADR”) process to produce a precipitate that is smelted to gold and silver doré. Average throughput is 36,000 tpd. A 36,000 tpd crushing and agglomeration plant is also available but is currently not in use.

Since Pan American began operating the mine in February 2019, a total of 11.2 million tonnes of ore were stacked on the pads. Metal production was approximately 145.37 thousand ounces of gold and 136.62 thousand ounces of silver.

All production from the Shahuindo mine is in the form of doré bars, which is refined at arm’s length refineries prior to the sale of refined silver and gold to bullion banks and traders. Pan American currently has refining contracts in place with refineries in the United States. We have not had any difficulty in securing contracts for the sale of Shahuindo doré, however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see “Risks Related to Our Business – Trading Activities and Credit Risk”.

The revenues per type of doré produced at the Shahuindo mine since our acquisition in February 2019 is as follows:

<b>2019<sup>1</sup></b>	<b>Revenue<sup>2, 3</sup></b>	<b>Quantity Sold</b>
Silver and Gold in Doré	\$189.4 million	83,323 ounces of silver 133,298 ounces of gold

Notes:

<sup>1</sup> Consists of production after February 22, 2019.

<sup>2</sup> Consists of sales to arm’s length customers.

<sup>3</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

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

The Shahuindo mine’s open pit, leach pads, waste rock dumps, ADR plant, ancillary facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining concessions and surface lands owned by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

The Shahuindo mine operates under an environmental impact assessment (“EIA”) approved in 2013 and has been modified to accommodate mine expansion.

The primary source of power for the mine is the Peruvian national power grid. Water for the operation is obtained from water wells, stormwater collection ponds, and pit dewatering.

A closure cost estimate for the Shahuindo mine was prepared according to State of Nevada approved SRCE methodology and will be updated every year. We have estimated the present value of reclamation costs for the Shahuindo property to be approximately \$39.4 million at December 31, 2019. Pan American has not accrued any amounts for any prior existing environmental liabilities. See “Narrative Description of the Business – Environment, Community and Sustainability for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

In 2019, capital additions at the Shahuindo mine totalled \$33.3 million, including \$29.9 million of sustaining capital, consisting primarily of leach pad construction and mining equipment, as well as \$3.4 million invested in project capital to complete the crushing and agglomeration plant started by Tahoe prior to the acquisition.

The expected sustaining capital budget for 2020 at Shahuindo totals between \$63.0 million and \$65.0 million, the major components of which include heap leach pad expansions, waste rock storage facility expansions, lease payments from a fleet expansion initiated in 2019, land purchases and near-mine exploration.

In 2019, direct operating costs at the Shahuindo mine were \$76.9 million.

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

In 2020, we anticipate producing 0.2 million ounces of silver and between 162.0 thousand and 172.5 thousand ounces of gold from the Shahuindo mine. We plan to undertake approximately 21,000 metres of exploration drilling at Shahuindo in 2020.

## **C. Canada**

### **(i) Timmins West Mine**

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

The Timmins West mine is an underground gold mine located approximately 19 kilometres west of the city of Timmins, Ontario. All season road access to the property is provided by provincial Highways 101 and 144.

The Timmins West mine property encompasses a total area of approximately 1,712 hectares, including the Timmins Deposit, Thunder Creek, and Highway-144 properties. Through our wholly-owned subsidiary, Lake Shore, we own a 100% interest in most of the Timmins West mine property, subject to underlying royalties. The exception to this is a 55% interest in eleven unpatented mining claims. We pay an annual fee on the claims to maintain them in good standing. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Surrounding the Timmins West mine property are an additional 276 claims, six leases and 33 patents owned by Lake Shore. In all, there are 89 claims and leases with NSR royalty obligations ranging from 1.5 percent to three percent, many with a buy-back option at Lake Shore's discretion.

In February of 2012 Lake Shore and Franco-Nevada entered into a royalty agreement relating to production from the Timmins West mine. Pursuant to the terms of the royalty agreement, Franco-Nevada paid US\$35 million for a 2.25% NSR royalty on the sale of minerals from the Timmins West mine. The terms of the royalty agreement provide for, among other things, a right of first refusal in respect of any further royalties granted on the Timmins West mine, as well as a preferential processing right with respect to ore from the Timmins West mine being processed at the Bell Creek mill. The preferential processing right ceases to apply once US\$35 million in royalty payments are made under the royalty agreement. As at the end of 2019, approximately US\$24.4 million was paid to Franco-Nevada pursuant to the terms of the royalty. As of the date of this AIF, the preferential processing right has not required any payment to be made with respect to any replacement material. In addition, Sandstorm Gold Ltd. holds a 1% NSR royalty over certain additional claims relating to the Thunder Creek and 144 Gap deposits.

The Timmins West mine is also subject to government taxes, fees and duties including a 10% Ontario Mining Tax, which is applied to profits from the extraction of mineral substances from mines within the province.

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, other than as described above, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

## ***History***

Gold was discovered in 1911 on the property above what is currently the Timmins West mine, and two shallow shafts were sunk between 1911 and 1914. Shortly after, fire storms swept through large parts of the area and the surface plants at the local mines were destroyed. Orpit Mines Limited completed diamond drilling between 1938 and 1944, and Rusk Porcupine Mines excavated several pits and trenches.

Lake Shore began shaft sinking and mine development in 2008, and in January of 2011, commercial production began at the Timmins Deposit and in January of 2012, commercial production began for the Thunder Creek Deposit. Subsequently, the Timmins and Thunder Creek Deposits were combined into a single operation called the Timmins West mine. Tahoe acquired the mine in 2016 with its acquisition of Lake Shore.

We have been producing from Timmins West since late February 2019, following our acquisition of Tahoe.

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

Following the discovery of gold at Timmins West area, exploration conducted by a variety of previous operators included mapping, shaft sinking, pitting, trenching, diamond drilling, geophysics, metallurgical testwork, and resource estimates. Following Lake Shore's acquisition of the property in 2003, exploration on the Timmins, Thunder Creek, and 144 Gap deposits has consisted primarily of diamond drilling, as well as mapping, surface sampling, and soil geochemical surveys.

## ***Drilling***

Exploration drilling in the Timmins West mine area has taken place since 1938, but much of the historical drilling information is not possible to verify. None of the drill data collected prior to 1984 has been considered in the mineral resource and mineral reserve estimates.

Since 2003, all drilling has been by diamond drilling from surface and underground using industry standard drill machines and downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine diamond drilling exploration campaigns are ongoing on an annual basis for mineral resource and mineral reserve estimates.

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

Surface drill core is sampled following splitting with a diamond saw, while whole core samples are selected from underground drillholes. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

All samples are analyzed for gold at various independent commercial laboratories using fire assay with AA finish, except for samples sent to SGS Labs, which analyzes by ICP-MS finish.

A QAQC program supervised by the geology department includes the submission of certified standards, duplicates, and blanks to the laboratory. The results of the QAQC programs indicate that the sample assays are reliable for the estimation of mineral resources and mineral reserves.

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

All ore produced from the Timmins West mine is processed at our Bell Creek mill. As part of normal plant operation procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess mill performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves at Timmins West, effective June 30, 2019, are as follows:

<b>Timmins West Mineral Reserves<sup>1,2</sup></b>		
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Gold per tonne</b>
Proven	0.4	3.66
Probable	4.8	2.98
<b>TOTAL</b>	<b>5.2</b>	<b>3.04</b>

Notes:

- <sup>1</sup> Estimated using prices of \$1,300 per ounce of gold. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Timmins West mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at Timmins West, effective June 30, 2019, are as follows:

<b>Timmins West Mineral Resources<sup>1,2</sup></b>		
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Gold per tonne</b>
Measured	0.4	3.81
Indicated	2.4	3.48
Inferred	0.5	3.85

Notes:

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using prices of \$1,300 per ounce of gold.
- <sup>2</sup> Mineral resource estimates for the Timmins West mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Mineral resource estimates were prepared using inverse power of distance methods within three dimensional geological interpretations. The block model was classified for measured, indicated, and inferred confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate was then depleted for previous mining and planned dilution and loss was applied. Reserve and resource stope shapes were prepared on blocks above the economic cut-off. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources at the Timmins West mine.

### **Mining Operations**

The underground mining method utilized at the Thunder Creek, Timmins, and 144 Gap the deposits at the Timmins West mine is by long hole stoping. Ore is transported to the surface by ramp and shaft.

### **Processing and Recovery Operations**

All ore produced from the Timmins West mine is hauled via surface highway trucks to the Bell Creek mill for processing. Processing, metal production, and revenue are reported for the combined Timmins West and Bell Creek ore. Please see "Bell Creek – Processing and Recovery Operations".

All production from the Timmins West mine is in the form of doré, which is refined at arm's length refineries prior to the sale of refined silver and gold to bullion banks and traders. We have not had any difficulty in securing contracts for the sale of this doré, however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see "Risks Related to our Business – Trading Activities and Credit Risk".

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

The mine workings, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Power is sourced from the provincial mine grid and water is sourced from underground mine dewatering.

Lake Shore and two First Nations, namely Mattagami and Flying Post First Nations, entered into an Impact and Benefits Agreement ("IBA") in February, 2011, which outlines how Lake Shore and the First Nations communities will work together in the following areas: education and training of First Nation community members, employment, business and contracting opportunities, financial benefits and environmental provisions. The IBA was subsequently amended in early 2019.

A closure cost estimate for Timmins West was prepared based on a government-approved closure plan, engineering estimates, local rates, and contractor quotes. The estimate will be updated every year. Pan American has estimated the present value of reclamation costs for the Timmins West mine to be approximately \$2.2 million effective December 31, 2019. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

Capital and operating costs are reported for the combined Timmins West and Bell Creek mines. Please see "Bell Creek – Capital and Operating Costs".

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

Exploration, development and production are reported for the combined Timmins West and Bell Creek mines. Please see "Bell Creek – Exploration, Development, and Production".

## **(ii) Bell Creek Mine**

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

The Bell Creek mine is an underground gold mine located approximately 20 kilometres northeast of Timmins, Ontario. Access to the property is via an all-weather asphalt and gravel road north of Ontario Provincial Highway 101.

The Bell Creek mine is 100% owned by us through our wholly-owned subsidiary Lake Shore. The Bell Creek property is comprised of 12 leases and five veteran lots covering approximately 512 hectares. All claims are either patented, leased mineral claims requiring yearly lease rents and land tax payments, or patented veteran lots which remain valid in perpetuity as long as the annual land and municipal taxes remain paid in full. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Lake Shore signed a 20-year lease for one of the veteran lots in 2005 and we are required to make annual advanced royalty payments of CAD\$50,000 (indexed to inflation) and to pay a 2% NSR royalty once commercial production was achieved at the property.

In December 2007, Lake Shore acquired the Bell Creek mine from Goldcorp Inc. ("Goldcorp"), subject to a

2% NSR royalty payable to the Porcupine Joint Venture comprised of Goldcorp and Kinross Gold Corporation (“Kinross”). Kinross subsequently assigned its rights under the agreement to Goldcorp, and in July 2016, Tahoe acquired the royalty from Goldcorp. Various underlying royalty agreements affect some of the Bell Creek claims including two agreements with net profit interests that can be purchased outright.

Like the Timmins West mine, the Bell Creek mine is also subject to governmental taxes, fees and duties, including the 10% Ontario Mining Tax.

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, other than as described above, please refer to "Risks Related to Our Business" starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

Gold mineralization was first discovered on the Bell Creek property following trenching, drilling, and geophysical surveys, and the mine was built and operated between 1980 and 1982. Falconbridge operated the mine between 1991 and 1992, followed by Kinross in 1993 and 1994 when mining operations ceased. The mine was kept on care and maintenance until 2001, when a decision was made to allow the underground workings to flood.

In 2002, the Porcupine Joint Venture, a joint venture between Placer Dome Canada Ltd. (“Placer”) and Kinross, was formed and in 2005 the property was reactivated. Goldcorp acquired Placer’s interest later that year and became the operator of the Porcupine Joint Venture. Lake Shore acquired the Bell Creek mine in December 2007.

Lake Shore declared commercial production in January 2012. In April 2016, Tahoe acquired the Bell Creek mine as part of its acquisition of Lake Shore, and Tahoe was subsequently acquired by Pan American in February 2019. We have been producing from the Bell Creek mine since our acquisition of Tahoe.

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

The Bell Creek deposit is located in the Southern Abitibi Greenstone Belt, a complex of deformed, usually greenschist facies, volcanic dominated oceanic assemblages. Rocks in the Timmins region belong to volcanic and sedimentary assemblages within the Western Abitibi Subprovince of the Superior Province.

The Bell Creek property is underlain by carbonate altered, greenschist facies metavolcanics and clastic metasedimentary rock units belonging to the Tisdale and Porcupine assemblages. The stratigraphy generally strikes east-west to west-northwest, and is steeply dipping and highly deformed.

In the Porcupine Camp, gold-bearing structures most commonly form in relatively competent volcanics intruded by felsic porphyry stocks and dykes. Porphyries intruded the folded and faulted greenstone sequences and initiated the mesothermal systems.

Mesothermal shear hosted gold mineralization in the Bell Creek mine area occurs along selvages of quartz veins and wall rocks, in stylolitic fractures in quartz veins, in fine grained pyrite, and in association with amorphous carbon. High grade gold mineralization occurs within quartz veins contained in alteration zones.

### ***Exploration***

The nature of any surface exploration programs completed by owners of the Bell Creek mine property prior to Lake Shore is unknown, with the exception of magnetometer surveys. All exploration conducted by Lake Shore and Tahoe comprised surface and underground drilling.

### ***Drilling***

All drilling is by diamond drilling from surface and underground using industry standard drill machines and

downhole survey tools. Drilling is conducted by private drilling contractors under the supervision of the mine geology department. Near mine diamond drilling exploration campaigns are ongoing on an annual basis for mineral resource and mineral reserve estimates.

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

Surface drill core is sampled following splitting with a diamond saw, while whole core samples are selected from underground drillholes. The samples are maintained in secure facilities and are under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised.

All samples are analyzed for gold at various independent commercial laboratories using fire assay with AA finish, except for samples sent to SGS Labs, which analyzes by inductively coupled plasma mass spectrometry.

A QAQC program supervised by the geology department includes the submission of certified standards, duplicates, and blanks to the laboratory. The results of the QAQC programs indicate that the sample assays are reliable for the estimation of mineral resources and mineral reserves.

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

As part of normal plant operation procedures, metallurgical analysis and testing is undertaken as required. The majority of these analyses are to assess mill performance and metallurgical recovery. Metal recovery forecasts used in our mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves at the Bell Creek mine, effective June 30, 2019, are as follows:

<b>Bell Creek Mineral Reserves<sup>1, 2</sup></b>		
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Gold per tonne</b>
Proven	2.3	2.94
Probable	2.4	3.34
<b>TOTAL</b>	<b>4.7</b>	<b>3.15</b>

**Notes:**

- <sup>1</sup> Estimated using prices of \$1,300 per ounce of gold. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Bell Creek mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at the Bell Creek mine, effective June 30, 2019, are as follows:

<b>Bell Creek Mineral Resources<sup>1, 2</sup></b>		
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Gold per tonne</b>
Measured	1.3	3.92
Indicated	2.9	3.35
Inferred	3.2	3.72

**Notes:**

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using prices of \$1,300 per ounce of gold.
- <sup>2</sup> Mineral resource estimates for the Bell Creek mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Mineral resource estimates were prepared using inverse power of distance methods within three dimensional geological interpretations. The block model was classified for measured, indicated, and inferred

confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate was then depleted for previous mining and planned dilution and loss was applied. Reserve and resource stope shapes were prepared on blocks above the economic cut-off. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. There are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources at the Bell Creek mine.

### ***Mining Operations***

Underground mining takes place at the Bell Creek mine using long hole stoping methods. Ore is brought to the surface via ramp and by shaft.

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

Ore from the Bell Creek mine and the Timmins West mine is processed at the Bell Creek mill using grinding, gravity recovery, carbon in leach and carbon in pulp recovery to produce gold doré with minor amounts of silver. The plant has a capacity of 5,000 tpd. Metallurgical recovery averages approximately 95% for gold.

Since we acquired the Bell Creek mine and the Timmins West mines in February 2019, we processed approximately 1.5 million tonnes of ore producing 143.77 thousand ounces of gold and 17.53 thousand ounces of silver from the Timmins West and Bell Creek mines.

All production from the Bell Creek and Timmins West mines is in the form of doré, which is refined at arm's length refineries prior to the sale of refined silver and gold to bullion banks and traders. We have not had any difficulty in securing contracts for the sale of Bell Creek and Timmins West mine doré, however, there can be no certainty that we will always be able to do so or what terms will be available at the time. Please see "Risks Related to our Business – Trading Activities and Credit Risk".

Since February 2019, the revenue produced by the Bell Creek and Timmins West mines is as follows:

<b>2019</b>	<b>Revenue<sup>1, 2</sup></b>	<b>Quantity Sold</b>
Silver and Gold in Doré	\$201.2 million	17,113 ounces of silver 143,300 ounces of gold

Notes:

<sup>1</sup> Consists of sales to arm's length customers.

<sup>2</sup> Calculated as gross revenue plus export credit incentives (as applicable), less treatment and refining charges and export taxes.

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

The mine workings, processing plant, tailings and waste disposal areas, effluent management and treatment facilities, roads, and power and water lines have all been constructed and are located within the boundaries of the mining leases and surface rights controlled by us. To the best of our knowledge, all permits and licenses required to conduct our activities on the property have been obtained and are currently in good standing.

Power is supplied from the provincial power grid and water is sourced from surface and underground dewatering.

Consultations have been undertaken with regulatory agencies, the general public, the Métis Nation of Ontario, Wabun Tribal Council and the First Nation communities of Flying Post First Nation, Mattagami First Nation, and Matachewan First Nation, who are represented by Wabun Tribal Council, and also Wahgoshig First Nation.

Consultation provides an opportunity to identify and address the impacts of our activities on external stakeholders and to expedite the authorization process.

As a result of the consultations undertaken, in November 2016, an IBA was signed relating to the Bell Creek mine and surrounding properties with the Mattagami, Wahgoshig, Matachewan and Flying Post First Nation communities in the Timmins area. The IBA established a framework for continued consultation relating to the existing and future operations in and around Timmins, and provides long-term financial benefits to the four First Nations communities as well as opportunities in such areas as new business ventures, employment, training and education.

A closure cost estimate for the Bell Creek mine was prepared based on a government-approved closure plan, engineering estimates, local rates, and contractor quotes. The estimate will be updated every year. Pan American has estimated the present value of reclamation costs for the Bell Creek mine to be approximately \$9.5 million effective December 31, 2019. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

Capital additions at the Timmins West and Bell Creek mines during 2019 totalled \$13.7 million, including \$11.0 million of sustaining capital, consisting mainly of near mine exploration drilling, equipment rebuilds and infrastructure upgrades, as well as \$2.7 million in project capital investments to complete the mine shaft and paste plant at Bell Creek initiated by Tahoe prior to the acquisition.

Capital investments in 2020 at the Timmins West and Bell Creek mines will total between \$27.0 million and \$30.0 million. Sustaining capital investments of between \$23.0 million and \$25.0 million are primarily related to tailings storage facility expansions, underground mine equipment replacements and refurbishments and near-mine exploration. We also expect to invest between \$4.0 million and \$5.0 million in project capital for an approximate 20% expansion of the Bell Creek mine, including the purchase of additional mine equipment and debottlenecking and upgrading certain components of the plant to maximize the benefits from the improved efficiencies resulting from the commissioning of the Bell Creek mine shaft in February 2019

In 2019, direct operating costs at the Timmins West and Bell Creek mines were \$124.4 million.

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

In 2020, we anticipate producing between 165.0 thousand and 180.0 thousand ounces of gold from the Timmins West and Bell Creek mines. We plan to undertake approximately 98,000 metres of exploration drilling at the mines in 2020.

## **II. Non-Operating and Development Properties**

### **(i) Escobal Mine**

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

The Escobal mine is an underground silver-gold-lead-zinc mine in Guatemala, approximately 40 kilometres east-southeast of Guatemala City and 2 kilometres east of the town of San Rafael Las Flores. Access to the Escobal mine is via 70 kilometres of paved highway from Guatemala City.

The Escobal mine is 100% owned by Pan American through its wholly-owned subsidiary, MSR, and comprises two mineral licenses covering approximately 29.2 km<sup>2</sup>. These include the Escobal Exploitation License (the "Escobal mining license") covering 20 km<sup>2</sup> and the Juan Bosco Exploration License covering 9.2 km<sup>2</sup>. The Escobal Exploitation License is valid for 25 years from receipt of the license on April 3, 2013 and is renewable for an additional 25 years. Exploration licenses in Guatemala are granted for an initial period of three years which can be extended for two additional two-year periods, for a total holding period of seven years; after which, application must be made for an exploitation license or new exploration concession. The Juan Bosco Exploration License was granted on May 9, 2012 for the initial term. As permitted by applicable laws, Tahoe subsequently filed two applications to extend the Juan

Bosco Exploration License with the Guatemalan Ministry of Energy and Mines (“Guatemala MEM”). The Guatemala MEM did not take any action to renew or extend the Juan Bosco Exploration License on the last extension application.

Some communities and NGOs have been vocal and active in their opposition to mining and exploration activities in Guatemala. In July 2017, the Escobal mining license was suspended as a result of a court proceeding initiated by a non-governmental organization (an “NGO”) in Guatemala, based upon the allegation that the Guatemala MEM violated the Xinka indigenous people’s right of consultation. After several decisions and appeals on the matter, a decision of the Constitutional Court of Guatemala was rendered on September 3, 2018, determining that the Escobal mining license would remain suspended until the Guatemala MEM completes an ILO 169 consultation. The consultation process is proceeding, with the pre-consultation stage underway. Normal operations at the Escobal mine remain suspended. Legal challenges to the consultation process have been filed with the Guatemalan Supreme Court and the outcome of those challenges is unknown. The process and timing for completing the ILO 169 consultation remains uncertain. In addition, in June 2017, MSR filed its annual request to renew the Escobal mine’s export credential with the Guatemala MEM. However, the Guatemala MEM did not renew the export credential because its renewal had become contingent on the Supreme Court’s reinstatement of the Escobal mining license. The export credential therefore expired in August 2017 and has not been renewed.

In addition, since June 7, 2017, a group of protesters near the town of Casillas have blocked the primary highway that connects Guatemala City to San Rafael Las Flores and the Escobal mine. Tahoe’s operations were reduced between June 8, 2017 and June 19, 2017 to conserve fuel, and on July 5, 2017, were ceased following the Supreme Court’s provisional decision to suspend the Escobal mining license while the case against the Guatemala MEM was heard on the merits. A second roadblock was initiated in 2018 near the community of Mataquescuintla. While we have been taking steps to regain trust and repair relationships, there is no guarantee that a positive resolution will be reached.

MSR makes annual payments to the Guatemala MEM for each concession. Annual reports documenting exploration and operation activities have been filed with the Guatemala MEM as required.

While Escobal is on care and maintenance, we continue to comply with Escobal’s environmental management plan. As part of these requirements, we are following through on appropriate commitments made by Tahoe; responding to community requests for information and support; completing community engagement activities; and reporting to the Government of Guatemala.

In Guatemala, there is a statutory one percent royalty on precious and base metal production. In addition, MSR paid an additional 4% NSR royalty on concentrates sold from the Escobal mine; of which two percent benefited the local San Rafael municipality; one percent benefited certain outlying municipalities; and one percent benefited MEM. Payments under the Escobal Voluntary Royalty Agreements were suspended in 2017 upon the Escobal license suspension, but some payments of these outstanding royalties have been made more recently to the San Rafael Las Flores municipality under amended agreements.

In addition, MSR established a profit-sharing program that provides a 0.5% NSR royalty to an association of former landowners of the Escobal mine property. Ten percent of this royalty is to be deposited in a special fund, administered by the association’s board of directors, and used for improvements in local communities.

Within the Escobal Exploitation License, MSR owns approximately 300 hectares for the area required for mining operations, processing plant and ancillary facilities, surface operations, and tailings and waste rock disposal.

## ***History***

Activity at the Escobal property dates back to 1996 when Entre Mares, S.A., the Guatemalan subsidiary of Goldcorp, identified high grade gold values associated with surface quartz veins in the western portion of the Escobal vein. In late 2006, significant silver and gold grades were detected from surface sampling along an extensive alteration zone developed over the Escobal vein. Exploration drilling began on the property in 2007 and resource estimates were prepared in 2010.

In June 2010, Tahoe acquired 100% of the Escobal mine project and associated exploration concessions

from Entre Mares, and the Escobal mine was then held by a wholly owned subsidiary of Tahoe, MSR. Mine construction began in 2011, and commercial production began in 2013. The mine produced annually until its suspension in 2017. In February 2019, Pan American acquired Tahoe.

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

The geological setting of Guatemala is comprised of two tectonic terrains juxtaposed across a major tectonic plate boundary. The northern half of Guatemala is on the North American plate, and the southern half is on the Caribbean plate with three major east-west trending faults forming the collision boundary. The Escobal property is situated on the Caribbean plate, south of the faults. The area is characterized by a series of volcanic units derived from multiple eruptive events.

The Escobal deposit is an intermediate sulfidation, fault related vein formed within sedimentary and volcanic rocks. The Escobal vein system hosts silver, gold, lead and zinc, with an associated epithermal suite of elements, within quartz and quartz-carbonate veins. Quartz veins and stockwork up to 50 metres wide, with up to 10% sulfides, form at the core of the Escobal deposit and grade outward through silicification, quartz-sericite, argillic and propylitic alteration zones.

Precious and base metal mineralization has been identified over a 2,400 metre lateral distance and 1,200 metre vertical range in three zones oriented generally east-west, with variable dips.

### ***Exploration***

Exploration at the Escobal mine included surface prospecting, mapping, soil and rock geochemical sampling, geophysical surveys, and drilling.

### ***Drilling***

All drilling undertaken between 2007 and 2017 was by diamond drilling from surface and underground using industry standard drill machines and downhole survey tools. Drilling was conducted by both mine employees and private drilling contractors under the supervision of the mine geology department.

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

The drill core was generally sampled at 1.0 metre to 1.5 metre lengths according to geological features, and cut with a saw. The samples are maintained in secure facilities and were under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been compromised. The samples were prepared by Bureau Veritas at their sample preparation facility in Guatemala City and analyzed at their Reno, Nevada USA facility. In late 2015, a portion of the underground stope definition core was analyzed at the on site laboratory.

Gold was assayed by fire assay with AA finish and silver was assayed by digestion with AA finish. Higher grade samples were completed using fire assay and gravimetric finish. Lead and zinc were analyzed by induced coupled polarization or by digestion with AA finish with high grade samples completed using titration methods.

A QAQC program supervised by the geology department included the submission of certified standards, duplicates, and blanks to the laboratory. The results of the QAQC programs indicate that the sample assays are reliable for the estimation of mineral resources and mineral reserves.

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

As part of normal plant operation procedures, metallurgical analysis and testing were undertaken as required. The majority of these analyses were to assess mill performance and metallurgical recovery. Metal recovery forecasts used in the mine plans are based on the historical performance of the plant operations and the tonnes and grade of material that is planned to be mined.

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

Management estimates that mineral reserves at the Escobal mine, effective June 30, 2019, are as follows:

<b>Escobal Mineral Reserves <sup>1,2</sup></b>			
<b>Reserve Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>
Proven	2.5	486	0.42
Probable	22.1	316	0.34
<b>TOTAL</b>	<b>24.7</b>	<b>334</b>	<b>0.35</b>

Notes:

- <sup>1</sup> Estimated using prices of \$20 per ounce of silver and \$1,300 per ounce of gold. Totals may not add due to rounding.
- <sup>2</sup> Mineral reserve estimates for the Escobal mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Management estimates that mineral resources at the Escobal mine, effective June 30, 2019, are as follows:

<b>Escobal Mineral Resources <sup>1,2</sup></b>			
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>Grams of Gold per tonne</b>
Measured	2.3	251	0.23
Indicated	14.2	201	0.20
Inferred	1.9	180	0.90

Notes:

- <sup>1</sup> These mineral resources are in addition to mineral reserves. Estimated using prices of \$20 per ounce of silver and \$1,300 per ounce of gold.
- <sup>2</sup> Mineral resource estimates for the Escobal mine were prepared under the supervision of, or were reviewed by Christopher Emerson, FAusIMM, and Martin G. Wafforn, P.Eng., as Qualified Persons as that term is defined in NI 43-101.

Mineral resource estimates were prepared using inverse power of distance methods within geological interpretations created in plan and section. The block model was classified for measured, indicated, and inferred confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate was then depleted for previous mining and planned dilution and loss was applied. Reserve and resource stope shapes were prepared on blocks above the economic cut-off. Mineral resources that can be economically mined are converted to mineral reserves.

Mineral reserve estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. Aside from the previously mentioned factors, there are currently no known factors that may have a material negative impact on the estimate of mineral reserves or mineral resources at Escobal.

### **Mining Operations**

Underground mining at Escobal utilized long hole stoping methods, with ore brought to the surface by ramp.

No mining operations have been conducted at Escobal since the Escobal mining license suspension in 2017.

### **Processing and Recovery Operations**

Prior to the suspension of mining operations, ore from the Escobal mine was processed in 4,500 tpd capacity plant using conventional lead-zinc differential flotation to produce silver and gold rich lead and zinc concentrates.

No processing has taken place since the Escobal mining license suspension in 2017.

In 2016, the last full-year period in which there was production from the mine, the Escobal mine produced 22.5 thousand tonnes of lead concentrate and 27.6 thousand tonnes of zinc concentrate, with total contained metal of 21.2 million ounces of silver, 10.7 thousand ounces of gold, 10.3 thousand tonnes of lead, and 17.4 thousand tonnes of zinc. Metallurgical recoveries for the lead concentrate were 80.6% silver, 54% gold, 87.2% lead, and 12.6% zinc, while recoveries for the zinc concentrate were 6.1% silver, 6.2% gold, 3.0% lead, and 78.6% zinc.

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

The Escobal mine workings, processing plant, tailings and waste disposal areas, effluent management and treatment systems, ancillary facilities, roads and power lines have all been constructed and are located within the boundaries of the exploitation license and surface lands owned by us. Power is provided by on-site diesel generation. Water is supplied from mine dewatering and water wells.

The Escobal mine operations have been conducted under an EIS approved by the Ministry of Environment and Natural Resources ("MARN") and an exploitation license issued by the Guatemala MEM. The export of concentrates is licensed through the Guatemala MEM, with annual renewal requirements. Land use changes and vegetation clearing and reforestation are permitted through Guatemala's National Institute of Forests. Archeological clearances were issued by the Ministry of Culture and Sports. Other than an export credential which has not been renewed by the Guatemala MEM following its expiration in August 2017 and the suspension of the Escobal mine mining license, to the best of our knowledge, all other permits and licenses required to conduct its activities at the Escobal Mine have been obtained and are currently in good standing. See "Risks Related to Our Business".

MSR has implemented a comprehensive environmental management plan developed specifically for the conditions at the Escobal mine, which addresses operating, reporting, and mitigation procedures for surface and underground operations.

A closure cost estimate for the Escobal mine was prepared based on a closure plan and engineering estimates. The estimate will be updated every year. Pan American has estimated the present value of reclamation costs for the Escobal mine to be approximately \$2.6 million effective December 31, 2019. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking statements related to reclamation costs.

### ***Capital and Operating Costs***

During 2019, Escobal was in care and maintenance, and incurred \$17.7 million in holding costs.

Capital additions at Escobal during 2019 totalled \$1.1 million.

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

In 2020, we do not anticipate any production from the Escobal mine. We plan to continue with our property and infrastructure maintenance requirements, and have no plans to undertake any exploration work in 2020. All expenditures will be expensed as incurred.

## **(ii) Navidad Property**

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

The Navidad silver development property is located in the Province of Chubut, southern Argentina, 1,580 kilometres southwest of Buenos Aires and 360 kilometres west of Puerto Madryn. The Navidad property is accessible year round by road from the small communities of Gastre and Gan Gan, which are located on a provincial highway. The nearest airport is located in Esquel, about four hours' drive to the southwest by gravel road.

We are the 100% owners of the Navidad project through our wholly owned subsidiary, MASA. The main

Navidad property block containing all of the current mineral resources is comprised of four 2,500 ha blocks granted with Manifestación de Descubrimiento (“MD”) permits. MASA also holds the rights to additional MDs in the Province of Chubut. All of these MDs are in good standing with the mining authorities of the Province of Chubut, and to our knowledge, we have met all of the necessary obligations to retain the property. Our tenements are subject to Argentinean law and policy, which may in the future result in surrender of certain of its tenements outright and/or the reduction in area of our holdings.

We hold surface land rights covering all known mineral resources through MASA. The remaining surface rights belong to several other land holders and access is either in negotiation or has been granted through agreements with the owners.

All of the known mineralized zones and planned mine workings, processing plant, effluent management and treatment systems, and tailings storage areas relating to the property are located within the boundaries of the concessions and surface rights.

Wheaton Precious Metals Corp. (formerly Silver Wheaton Corp.), through its subsidiary, Silverstone Resources (Barbados) Corp., has the right to purchase 12.5% of the life of mine payable silver produced at the Loma de La Plata deposit pursuant to a convertible debenture that, upon conversion, committed to a future “silver stream” agreement. This agreement remains to be negotiated.

There is a provincial royalty of 3% of the “Operating Income” in the Province of Chubut. Operating Income is defined as revenue minus production cost (not including mining costs), treatment and transportation charges.

To the best of our knowledge, the property is not subject to any other royalties, overrides, back-in rights, payments or other agreements and encumbrances. Our operations in Argentina are subject to government taxes, fees and duties.

The Province of Chubut passed a law in 2003 (“Law 5001”) that prohibits open pit mining and the use of cyanide in mineral processing in the entire province, effectively preventing the development of Navidad. To date, this law remains in place. Please see the discussion under “Risks Relating to Our Business – Government Regulation”.

There are material governmental and legal factors that affect the mineral resources at the Navidad property and the conversion of the mineral resources to mineral reserves. Legislation in place in the Province of Chubut currently prohibits open pit mining and the use of cyanide in the entire province. No cyanide will be used to process the material anticipated to be mined from the Navidad property, but given the depth and orientation of the deposits, the economic mine plan involves open pit mining. Because of these governmental and legal factors, the otherwise economically viable portions of the deposit cannot be estimated as mineral reserves at this time.

Since 2011, the Federal Government of Argentina increasingly controlled foreign exchange, imports and exports and the inflow and outflow of capital in response to unfavourable domestic economic trends. With the election of a new Federal Government in Argentina in late 2015, certain of these restrictions have been eased, but it remains uncertain as to whether such changes will be lasting, whether additional changes will be made or how our business will be impacted. See “Risks Related to Our Business – Foreign Operations”.

While there are no known significant factors or risks that we currently expect to be reasonably likely to affect access or title, or the right or ability to perform work on the property, including permitting and environmental liabilities, other than as described herein, please refer to “Risks Related to Our Business” starting on page 66 for a general discussion of the risks relating to our operations.

### ***History***

A regional exploration program by Normandy Argentina in mid-2000 consisting of 1,200 stream sediment samples resulted in the identification of the Navidad property. In December 2002, IMA Exploration Inc. (“IMA”) applied for exploration concessions over the Navidad area and began undertaking a regional exploration program including regional mapping and sampling. From December 2002 to July 2006, IMA conducted diamond drilling, geochemical sampling, geophysical exploration, and mineral resource estimates at the Navidad property. After

acquiring the Normandy assets in 2003, Aquiline Resources Inc. (“Aquiline”) filed a suit against IMA in the Supreme Court of British Columbia in March 2004 claiming that IMA had breached the terms of a confidentiality agreement in obtaining the Navidad concessions. In 2006, the Supreme Court of British Columbia awarded ownership of the Navidad property to Aquiline, and following several appeals, Aquiline obtained full ownership of the Navidad property in 2008. In 2010, we completed the acquisition of Aquiline and with it, the Navidad property.

From 2006, work included diamond drilling, geophysical surveys, geochemical exploration, metallurgical test work, mineral resource estimates, and a preliminary economic assessment for Loma de La Plata. Following our acquisition of the Navidad property, we continued with diamond drilling, metallurgical testing, hydrologic analysis, environmental studies, and completed a preliminary economic assessment of the Navidad property deposits in 2011. No further work has been undertaken since 2011. There has been no production at the Navidad property.

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

The Navidad property is located on the southwest edge of the Northern Patagonia Massif in southern Argentina. At the Navidad property, the sequence consists of ignimbrites, volcanic agglomerates, and lavas of the Lonco Trapial Formation and sandstones, mudstones, and limestones of the Cañadón Asfalto Formation. The latter of these formations hosts the Navidad mineralization.

The basin is defined by three northwest striking major fault zones known as the Navidad, Esperanza, and Argenta trends. The Navidad trend, which includes the bulk of the silver mineralization, occurs in the immediate hanging wall of a major northeast-striking fault known as the Sauzal Fault. Most of the economic mineralization is hosted by the upper of two trachytic andesite lava flows.

The Navidad property comprises eight individual epithermal mineral deposits in the Navidad, Esperanza, and Argenta trends. The six deposits of the Navidad trend occur along strike over a distance of about 5.8 kilometres and are essentially continuous. They comprise, from northwest to southeast: Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, and Barite Hill. The Valle Esperanza deposit occurs on the east flank of the Esperanza Trend, approximately 400 metres south-southwest of Galena Hill. The Loma de La Plata deposit occurs in the north part of the Argenta Trend, approximately 2.2 kilometres southwest from Calcite Hill.

Similar styles of silver and base metal mineralization occur in most of the deposits, however, the proportion of sulphides varies considerably. Loma de La Plata is silver-rich, but is sulphide-poor and contains very low levels of lead, zinc, and copper.

### ***Exploration***

The first exploration on the Navidad property area consisted of a preliminary regional geochemical sampling program conducted by Normandy in mid-2000 that resulted in the identification of anomalies at the Navidad property. Detailed surface mapping took place between 2003 and 2004. Commencing in 2002 and continuing through 2006, soil, rock chip and stream silt samples were collected. The anomalous samples clearly delineate the Navidad, Esperanza and Argenta trends. Between 2006 and 2009, geological mapping and geophysical and geochemical exploration was conducted to provide data for structural interpretation. All of the samples collected during surface exploration have been used to guide the location of diamond drillholes.

### ***Drilling***

All drilling was by diamond drilling from the surface using industry standard drill machines and downhole survey tools. Drilling was conducted by private drilling contractors under the supervision of the mine geology department. The drilling results were used as the basis for mineral resource and mineral reserve estimates.

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

Drill core sample intervals varied from between 1 metre and 3 metres long. The core was cut with a diamond bladed saw. The samples were maintained in secure facilities under the control of our employees or the independent laboratory at all times. We have no reason to believe that the validity and integrity of the samples has been

compromised. Samples were prepared and assayed by Alex Stewart Assayers Argentina S.A. of Mendoza, Argentina.

Assays were performed using fire assay with gravimetric finish for silver and with AA finish for gold and inductively coupled plasma mass spectrometry for base metals.

A QAQC program supervised by the geology department included the submission of certified standards, duplicates, and blanks to the laboratory. The results of the QAQC programs indicate that the sample assays are reliable for the estimation of mineral resources and mineral reserves.

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

Metallurgical testwork on the Navidad mineralization includes mineralogical studies, flotation and recovery, grinding, and variability test work. The results indicate that the material responds well to flotation with acceptable recoveries and concentrate grades. The expected metallurgical performance and recovery algorithms for the Navidad mineralization was determined by laboratory bench-scale flotation test methods and a pilot plant test on one feed type. Two distinct feed types will be produced, including a copper-silver feed and lead-silver feed. Average recoveries of 77.8% for silver, 51.9% for copper, and 56.6% for lead were estimated for the silver-copper feed and average recoveries of 33.6% for silver, 32.6% for copper, and 76.6% for lead were estimated for the silver-lead feed.

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

Management estimates that mineral resources at the Navidad property, effective April 2009, are as follows:

<b>Navidad Mineral Resources<sup>1, 2</sup></b>				
<b>Resource Category</b>	<b>Tonnes (Mt)</b>	<b>Grams of Silver per tonne</b>	<b>% Lead</b>	<b>% Copper</b>
Measured	15.4	137	1.44	0.10
Indicated	139.8	126	0.79	0.04
Inferred	45.9	81	0.57	0.02

**Notes:**

<sup>1</sup> Estimated and reported above a 50 g/t AgEQ using a silver equivalence formula of  $AgEQ = Ag + (Pb \times 10,000/365)$  and a price of \$12.52 per ounce of silver and \$1,100 per tonne of lead. The most likely cut-off grade for these deposits is not known at this time and must be confirmed by the appropriate economic studies. The estimated metal content does not include any consideration of mining, mineral processing, or metallurgical recoveries.

<sup>2</sup> Mineral resource estimates for the Navidad property were prepared by Pamela De Mark, P. Geo., as a Qualified Person as that term is defined in NI 43-101.

Mineral resource estimates were prepared using multiple indicator kriging within three dimensional geological interpretations. The block model was classified for measured, indicated, and inferred confidence categories depending on the location of the block relative to the number of drillhole intersections available to estimate each block, as well as other factors affecting confidence in the estimate.

The mineral resource estimate was then tabulated for blocks above the potentially economic cut-off.

Mineral resource estimates are based on a number of assumptions that include metallurgical, taxation, and economic parameters. Increasing costs or increasing taxation could have a negative impact on the estimation of mineral reserves. Aside from the previously mentioned factors, there are currently no other known factors that may have a material negative impact on the estimate of mineral resources at the Navidad property.

### ***Mining Operations***

The planned future mining methods of the Navidad deposits, which are flat lying and located near surface, will be conventional open pit mining with shovels, loaders, and trucks.

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

The planned future processing method will be by conventional flotation producing a silver rich concentrate and a silver rich lead concentrate. The Navidad Report anticipated a throughput capacity of 15,000 tpd.

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

The planned mine workings, processing plant, tailings and waste storage facilities, effluent management and treatment facilities, roads, and power and water lines are expected to be located within the boundaries of the mining leases and surface rights controlled by us. Permit applications for any future mine at Navidad have not been submitted. To the best of our knowledge, all permits and licenses required to conduct our care and maintenance activities on the property have been obtained and are currently in good standing. Electrical power is provided by generators. We are authorized to use water from several bore holes for camp use.

Environmental and social baseline studies have been completed for the Navidad property and the most recent update to draft baseline and impact studies was completed in 2019.

Currently, Chubut's Law 5001 prohibits open pit mining and the use of cyanide in mineral processing in the entire province. Law 5001 banning open pit mining methods would need to be changed, or rezoning enacted, before permits for the development of the Navidad property can be obtained.

A closure cost estimate for Navidad was prepared according to State of Nevada approved SRCE methodology and is updated every year. We have estimated the present value of reclamation costs for the Navidad development property to be approximately \$0.3 million at December 31, 2019. Minera Argenta holds environmental reclamation insurance for Navidad in accordance with Argentinean law. See "Narrative Description of the Business – Environment, Community and Sustainability" for further disclosure regarding forward-looking information related to reclamation costs.

### ***Capital and Operating Costs***

In 2019, \$5.9 million was spent on activities at Navidad, including work on updating the project's EIA and supplementary environmental baseline monitoring. In 2018, \$3.6 million was spent on activities at Navidad. Over the past year, the Navidad property budget assumed that the law in the Province of Chubut would not be amended in a manner that would encourage further investment at this time and hence, our activities at Navidad were guided by an investment plan that focussed primarily on satisfying the legal requirements necessary to maintain our property interests under the current mining law. We plan to continue with such maintenance requirements. All expenditures will be expensed as incurred.

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

We plan to continue with our maintenance requirements, and have no plans to undertake any exploration drilling at the Navidad property in 2020. All expenditures will be expensed as incurred.

## **III. Non-Material Properties and Interests**

### **Other Operations, Exploration, Resource and Investment Properties**

We own interests in other investment and mineral properties in each of the jurisdictions in which we operate, including the La Arena mine and Pico Machay property in Peru, the San Vicente mine in Bolivia, the Manantial Espejo mine and the Joaquin and COSE properties in Argentina, the La Bolsa property in Mexico, the Waterloo property in the United States, and certain other interests in Canada. Our Alamo Dorado mine in Mexico is in the post-reclamation phase and mining activity has ceased. Pan American does not consider these properties to be material properties for the purposes of NI 51-102 or NI 43-101.

## Metals Trading

We take the view that our precious metals production should not be hedged, thereby allowing the maximum exposure to precious metal prices.

We have engaged in forward sales and hedging of base metals production from our mines over the past several years. The forward sales of base metals in 2017, 2018 and 2019 were as follows:

- During 2019, we had 800 tonnes of copper exercised at an average strike price of \$6,150 per tonne, resulting in a realized gain of \$0.3 million. We had 3,600 tonnes of zinc exercised at a strike price of \$2,600 per tonne, resulting in a realized gain of \$0.9 million.
- During 2018, we had 1,200 tonnes of lead exercised at a strike price of \$2,500 per tonne, resulting in a realized loss of \$0.1 million, and 2,375 tonnes of lead exercised at a strike price of \$2,200 per tonne, resulting in a realized gain of \$0.5 million. We had 360 tonnes of copper exercised at a strike price of \$6,960 per tonne, resulting in a realized gain of \$nil, and 1,950 tonnes of copper exercised at a strike price of \$6,400 per tonne, resulting in a realized gain of \$0.5 million. We had 1,300 tonnes of zinc exercised at a strike price of \$3,350 per tonne, resulting in a realized loss of \$0.2 million, and 6,600 tonnes of zinc exercised at an average strike price of \$2,850 per tonne, resulting in a realized gain of \$1.8 million.
- During 2017, we had 620 tonnes of lead exercised at a strike price of \$1,965 per tonne, resulting in a realized loss of \$0.2 million, and 5,090 tonnes of zinc exercised at an average strike price of approximately \$2,187 per tonne, resulting in a realized loss of \$3.0 million.

Please see the discussion below under “Risks Related to Our Business – Trading Activities and Credit Risk”.

## Mineral Property Expenditures

The following table sets out our acquisition, exploration and development expenditures (rounded, in thousands) for the periods indicated:

		2019	2018	2017
Acquisition	COSE	\$ -	\$ 7,500	\$ 7,497
	Joaquin	-	-	12,722
	Shahuindo <sup>1</sup>	437,275	-	-
	La Arena <sup>1</sup>	192,506	-	-
	Timmins <sup>1</sup>	378,889	-	-
	Escobal <sup>1</sup>	273,838	-	-
	TOTAL <sup>2</sup>	1,282,508	7,500	20,219
Development	Huaron <sup>3</sup>	\$ 8,013	\$ 14,551	\$ 8,412
	Morococha <sup>3</sup>	10,703	10,370	9,283
	Alamo Dorado	-	-	-
	Dolores	47,722	59,480	85,374
	La Colorada	20,139	22,473	21,963
	Manantial Espejo	23,909	29,881	8,590
	Navidad	9	39	27
	San Vicente	4,938	6,949	8,146
	Shahuindo	31,329	-	-
	La Arena	47,557	-	-
	Timmins	10,346	-	-
	Other	125	605	437
	TOTAL <sup>2</sup>	\$ 205,807	\$ 144,348	\$ 142,232
Exploration	Huaron	\$ 13	\$ 660	\$ 1,713
	Morococha	327	598	1,629
	Alamo Dorado	-	-	-
	Dolores	1,105	1,594	2,316
	La Colorada	1,445	880	251
	Manantial Espejo	305	744	4,588
	Navidad	-	3,832	2,894
	San Vicente	-	-	-
	Shahuindo	787	-	-
	La Arena	358	-	-
	Timmins	2,259	-	-
	Other <sup>4</sup>	-	2,830	4,466
TOTAL <sup>2, 5</sup>	\$ 9,803	\$ 11,138	\$ 17,858	

### Notes:

<sup>1</sup> The figures shown relate to the net asset balances as at December 31, 2019.

<sup>2</sup> Numbers may not add due to rounding.

<sup>3</sup> Net of lease advances.

<sup>4</sup> Includes spending on the early stage exploration projects, including with respect to the La Negra option and Joaquin property, as well as other indirect exploration spending.

<sup>5</sup> The amounts for 2017 and 2019 exclude \$1.9 million and \$1.9 million from non-cash project development write-downs.

## RISKS RELATED TO OUR BUSINESS

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*The risk factors described below could materially affect Pan American's future operating results and could cause actual events and results to differ materially from those described in forward-looking statements and forward-looking information. Additional risks not presently known to us, or that we currently consider immaterial, may also impair our operations. Readers are strongly encouraged to review the following identified risks in detail.*

### **Metal Price Fluctuations**

The majority of our revenue is derived from the sale of silver, gold, zinc, copper and lead, and therefore fluctuations in the price of these metals significantly affects our operations and profitability. Our sales are directly dependent on metal prices, and metal prices have historically shown significant volatility and are beyond our control. The Board of Directors continually assesses Pan American's strategy towards our metal exposure, depending on market conditions.

The price of silver and other metals are affected by numerous factors beyond our control, including:

- global and regional levels of supply and demand;
- sales by government holders and other third parties;
- metal stock levels maintained by producers and others;
- increased production due to new mine developments and improved mining and production methods;
- speculative activities;
- inventory carrying costs;
- availability, demand and costs of metal substitutes;
- international economic and political conditions;
- interest rates, inflation and currency values;
- increased demand for silver or other metals for new technologies; and
- reduced demand resulting from obsolescence of technologies and processes utilizing silver and other metals.

In addition to general global economic conditions that can have a severely damaging effect on our business in many ways, declining market prices for metals could materially adversely affect our operations and profitability. A decrease in the market price of silver, gold and other metals could affect the commercial viability of our mines and production at some of our mining properties. Lower prices could also adversely affect future exploration and our ability to develop mineral properties and mines, including the development of capital intensive projects such as Navidad, all of which would have a material adverse impact on our financial condition, results of operations and future prospects. There can be no assurance that the market prices will remain at sustainable levels.

If market prices of gold and silver remain below levels used in Pan American's impairment testing and reserve prices for an extended period of time, Pan American may need to reassess its long-term price assumptions, and a significant decrease in the long-term price assumptions would be an indicator of potential impairment, requiring Pan American to perform an impairment assessment on related assets. Pan American further discusses key assumptions used in measuring the recoverable amounts of its mining assets in Note 13 of Pan American's Audited Consolidated Financial Statements for the year ended December 31, 2019. Due to the sensitivity of the recoverable amounts to long term metal prices, as well as to other factors including changes to mine plans and cost escalations, any significant change in these key assumptions and inputs could result in impairment charges in future periods.

The Board of Directors continually assesses Pan American's strategy towards our metal exposure, depending on market conditions. From time to time, we mitigate the market price risk associated with our base metal production by committing some of our forecast base metal production to forward sales and options contracts. However, decisions relating to hedging may have material adverse effects on our financial performance, financial

position, and results of operations. As at December 31, 2019, Pan American had no outstanding contracts to sell base metal production.

We take the view that our precious metals production should not be hedged, thereby allowing the maximum exposure to precious metal prices. However, in extreme circumstances, the Board of Directors may make exceptions to this approach. Such decisions could have material adverse effects upon our financial performance, financial position, and results of operations.

Please refer to the 2019 MD&A for more details, including a sensitivity analysis of the effect of certain metal prices on revenue and AISC.

## **Foreign Operations**

In 2019, a significant portion of our production and revenues were derived from our operations in Peru, Mexico, Argentina and Bolivia, and, as a result, we are exposed to a number of risks and uncertainties, including:

- expropriation, nationalization, and the cancellation, revocation, renegotiation, or forced modification of existing contracts, permits, licenses, approvals, or title, particularly without adequate compensation;
- changing political and fiscal regimes, sometimes unexpectedly or as a result of precipitous events, and economic and regulatory instability;
- unanticipated adverse changes to laws and policies, including those relating to mineral title, royalties and taxation;
- delays or inability to obtain or maintain necessary permits, licenses or approvals;
- opposition to mine development projects, which include the potential for violence, property damage and frivolous or vexatious claims;
- restrictions on foreign investment;
- limitations on repatriation of operating cash flows, including legal and practical restrictions to transfer funds from foreign jurisdictions
- unreliable or undeveloped infrastructure;
- labour unrest and scarcity;
- human rights violations, including indigenous rights claims;
- difficulty obtaining key equipment and components for equipment;
- regulations and restrictions with respect to imports and exports;
- high rates of inflation;
- extreme fluctuations in currency exchange rates and restrictions on foreign exchange, currencies and repatriation;
- inability to obtain fair dispute resolution or judicial determinations because of bias, corruption or abuse of power;
- abuse of power of foreign governments who impose, or threaten to impose, fines, penalties or other similar mechanisms, without regard to the rule of law;
- difficulties enforcing judgments, particularly judgments obtained in Canada or the United States, with respect to assets located outside of those jurisdictions;
- difficulty understanding and complying with the regulatory and legal framework with respect to mineral properties, mines and mining operations, and permitting;
- violence and the prevalence of criminal activity, including organized crime, theft and illegal mining;
- civil unrest, terrorism and hostage taking;
- military repression and increased likelihood of international conflicts or aggression; and
- increased public health concerns.

Certain of these risks and uncertainties are illustrated well by circumstances in Guatemala and Bolivia.

Some communities and NGOs have been vocal and active in their opposition to mining and exploration activities in Guatemala. In July 2017, the Escobal mining license, was suspended as a result of a court proceeding initiated by an NGO in Guatemala, based upon the allegation that Guatemala's MEM violated the Xinka indigenous people's right of consultation. After several decisions and appeals on the matter, a decision of the Constitutional Court of Guatemala was rendered on September 3, 2018, determining that the Escobal mining license would remain suspended until the Guatemala MEM completes an ILO 169 consultation. The consultation process is proceeding, with the pre-consultation stage underway. Normal operations at Escobal mine remain suspended. Legal challenges to the consultation process have been filed with the Guatemalan Supreme Court and the outcome of those challenges is unknown. The process and timing for completing the ILO 169 consultation remains uncertain. In addition, in June 2017, MSR filed its annual request to renew the Escobal mine's export credential with the Guatemala MEM. However, the Guatemala MEM did not renew the export credential because its renewal had become contingent on the Supreme Court's reinstatement of the Escobal mining license. The export credential therefore expired in August 2017 and has not been renewed.

In early 2009, a new constitution was enacted in Bolivia that further entrenched the government's ability to unilaterally amend or enact laws, and which enshrined the concept that all natural resources belong to the Bolivian people. On May 28, 2014, the Bolivian government enacted the New Mining Law. Among other things, the New Mining Law established a new Bolivian mining authority to provide principal mining oversight (varying the role of COMIBOL) and set out a number of new economic and operational requirements relating to state participation in mining projects. Further, the New Mining Law provided that all pre-existing contracts were to migrate to one of several new forms of agreement within a prescribed period of time. As a result, we anticipate that our current joint venture agreement with COMIBOL relating to the San Vicente mine will be subject to such migration and possible renegotiation of key terms. **The migration process has been delayed by COMIBOL and has not been completed.** The primary effects on the San Vicente operation and our interest therein will not be known until such time as we have, if required to do so, renegotiated the existing contract, and the full impact may only be realized over time. We will take appropriate steps to protect and, if necessary, enforce our rights under our existing agreement with COMIBOL. There is, however, no guarantee that governmental actions, including possible expropriation or additional changes in the law, and the migration of our contract will not impact our involvement in the San Vicente operation in an adverse way and such actions could have a material adverse effect on us and our business.

On June 25, 2015, the Bolivian government further enacted the New Conciliation and Arbitration Law, which endeavors to set out newly prescribed arbitral norms and procedures, including for foreign investors. However, its application is unclear and we await clarification by regulatory authorities in order to assess its impact on our business.

Criminal activity and violence are also prevalent in some areas that we work in. For example, violence in Mexico is well documented and has, over time, been increasing. Conflicts between the drug cartels and violent confrontations with authorities are not uncommon. Operations at our Dolores mine were temporarily curtailed in 2018 as a result of such violence and the threat of violence on the access roads to the mine. Other criminal activity, such as kidnapping and extortion, is also an ongoing concern. Many incidents of crime and violence go unreported and efforts by police and other authorities to reduce criminal activity are challenged by a lack of resources, corruption and the pervasiveness of organized crime. Incidents of criminal activity have occasionally affected our employees and our contractors and their families, as well as the communities in the vicinity of our operations. Such incidents may prevent access to our mines or offices; halt or delay our operations and production; result in harm to employees, contractors, visitors or community members; increase employee absenteeism; create or increase tension in nearby communities; or otherwise adversely affect our ability to conduct business. We can provide no assurance that security incidents, in the future, will not have a material adverse effect on our operations.

Challenges also exist with respect to inconsistent application of the rule of law, and to sometimes unreliable and biased legal systems and judiciary. In April 2012, Pan American sold all of its interest in the Quiruvilca mine ("Quiruvilca") in Peru, which was previously owned by our subsidiary, Huaron. Since the 2012 sale, a substantial number of labour-related claims have been made by persons alleging to be former or then-current employees working at the Quiruvilca mine. Notwithstanding that an overwhelming majority of these claims were made exclusively against the subsequent owners of Quiruvilca, that Huaron has not owned or been involved with Quiruvilca for a number of years, and that Huaron was not afforded the opportunity to participate or challenge the assertions in court, the labour courts in Trujillo, Peru, have in many cases, imputed liability on Huaron. In some cases, the courts

ordered seizure of monies from Huaron's local bank accounts and garnishment of funds due to Huaron from certain of its trading partners. In August 2018, the current owner of Quiruvilca declared bankruptcy, further exacerbating the situation. Huaron has challenged the basis of the labour court's decisions in Trujillo, and in the Commercial Court and Constitutional Courts of Peru. Pan American believes it has a strong legal position against liability for these claims and intends to continue to vigorously challenge them and enforce certain contractual rights to indemnification. However, there can be no assurance that the outcome of the proceedings or any enforcement of our rights will be favorable to us or that it will not have a material adverse impact on our financial position. Huaron will likely be subject to further labour-related claims, and could also be subject to, directly or indirectly, claims by creditors of the current owner of Quiruvilca and claims relating to the now abandoned mine site, which in aggregate could be material.

In most cases, the effect of these risks and uncertainties cannot be accurately predicted and, in many cases, their occurrence is outside of our control. Although we are unable to determine the impact of these risks on our future financial position or results of operations, many of these risks and uncertainties have the potential to substantially affect our exploration, development and production activities and could therefore have a material adverse impact on our operations and profitability.

## **Governmental Regulation**

Our operations, exploration, and development activities are subject to extensive laws and regulations in the jurisdictions in which we conduct our business, including with respect to:

- environmental protection, including carbon emissions;
- permitting;
- management and use of toxic substances and explosives;
- management and use of natural resources, including water and energy supplies;
- management of waste and wastewater;
- exploration, development, production, and post-closure reclamation of mines;
- imports and exports;
- transportation;
- price controls;
- taxation;
- mining royalties;
- labour standards, employee profit-sharing and occupational health and safety, including mine safety;
- human rights;
- social matters, including historic and cultural preservation, engagement and consultation, local hiring and procurement, development funds;
- anti-corruption and anti-money laundering; and
- data protection and privacy.

The costs associated with compliance with these and future laws and regulations can be substantial, and changes to existing laws and regulations (including the imposition of higher taxes and mining royalties) could cause additional expense, capital expenditures, restrictions on or suspensions of our operations and delays in the development of our properties. In addition, the regulatory and legal framework in some jurisdictions in which we operate are out-dated, unclear and at times, inconsistent. A failure to comply with these laws and regulations, including with respect to our past and current operations, and possibly even actions of parties from whom we acquired our mines or properties, could lead to, among other things, the imposition of substantial fines, penalties, sanctions, the revocation of licenses or approvals, expropriation, forced reduction or suspension of operations, and other civil, regulatory or criminal proceedings.

Many of the jurisdictions in which we operate also have certain laws or policies that impose restrictions on mining activities. For example, there are currently laws in the Province of Chubut, Argentina, which, among other

things, prohibit open pit mining and the use of cyanide in mineral processing across the entire Province. As currently enacted, the laws in the Province of Chubut would likely render any future construction and development of the Navidad property uneconomic or not possible at all. There is no guarantee that these restrictions on mining will be removed or that they will not become more restrictive, or that new constraints will not be imposed, including those that might have significant economic impacts on our operations and profitability.

Unanticipated or drastic changes in laws and regulations have affected our operations in the past. For example, under previous political regimes in Argentina, the government intensified the use of severe price, foreign exchange, and import controls in response to unfavourable domestic economic trends. These included informal restrictions on dividend, interest, and service payments abroad and limitations on the ability to convert ARS into USD, exposing us to additional risks of ARS devaluation and high domestic inflation. While some of these restrictions had begun to ease after the elections in 2015, the government introduced a new export duty in 2018 on silver and gold doré exported from Argentina. In 2019, we paid approximately \$3.5 million in export duties, representing an average rate for the export duty of approximately 6%. In 2018, we paid approximately \$1.6 million in export duties. Following elections in 2019, the new government in Argentina has begun reinstating some of the previous unfavourable economic policies, such as strict currency controls.

As governments continue to struggle with deficits and concerns over the effects of depressed economies, the mining and metals sector has been targeted to raise revenue. Taxation and royalties are often subject to change and are vulnerable to increases in both poor and good economic times, especially in many resource rich countries. The addition of new taxes, specifically those aimed at mining companies, could have a material impact on our operations and will directly affect profitability and our financial results.

In late December 2016, for example, the Zacatecas state government in Mexico enacted a new set of ecological taxes which took effect on January 1, 2017. The Zacatecas Tax applies broadly across a number of industries in the State of Zacatecas that involve extraction, emissions to the air, soil or water, and deposits of residue or waste. The Zacatecas Tax primarily effects the La Colorada mine in respect of the materials placed in its tailings storage facility. We paid approximately \$2.0 million in respect of the Zacatecas Tax in 2019 and \$1.2 million in 2018. The validity of the Zacatecas Tax has been challenged on constitutional grounds by various parties, including Pan American.

## **Permits**

We are required to obtain and renew governmental permits for the operation and expansion of existing operations or for the development, construction, and commencement of new operations. Obtaining or renewing the necessary governmental permits can be costly and involve extended timelines. We may not be able to obtain or renew permits that are necessary to our operations, or the cost to obtain or renew permits may exceed our expected recovery from a given property once in production.

Failure to obtain or maintain the necessary permits, or to maintain compliance with any permits, can result in fines, penalties, or suspension or revocation of the permits. Our ability to obtain and renew permits is contingent upon certain variables, some of which are not within our control, including, introduction of new permitting legislation, the interpretation of applicable requirements implemented by the permitting authority, the need for public consultation hearings or approvals, and political or social pressure.

As previously discussed, in July 2017, the Escobal mining license was suspended as a result of a court proceeding initiated by an NGO in Guatemala. After several decisions and appeals on the matter, a decision of the Constitutional Court of Guatemala was rendered on September 3, 2018, that the MSR mining license would remain suspended until the Guatemala MEM completes an ILO 169 consultation. The consultation process is proceeding and the mine remains shut down.

In addition, in June 2017, MSR filed its annual request to renew the export credential with the Guatemala MEM. However, the Guatemala MEM did not renew the credential because its renewal had become contingent on the Supreme Court's reinstatement of the Escobal mining license. The credential therefore expired in August 2017 and has not been renewed.

Any unexpected delays, failure to obtain or renew permits, failure to comply with the terms of the permit, or costs associated with the permitting process could impede or prevent the development or operation of a mine, which could have material adverse impacts on our operations and profitability.

## **Operational Risks**

The ownership, operation, and development of a mine or mineral property involves significant risks and hazards which even the combination of experience, knowledge, and careful evaluation may not be able to overcome.

These risks include:

- environmental and health hazards;
- industrial and equipment accidents, explosions and third party accidents;
- the encountering of unusual or unexpected geological formations;
- ground falls and cave-ins;
- flooding;
- labour disruptions;
- mechanical equipment, machinery, and facility performance problems;
- seismic events; and
- periodic interruptions due to inclement or hazardous weather conditions.

These risks could result in:

- damage to, or destruction of, mineral properties or production facilities;
- personal injury or death;
- environmental damage and liabilities;
- delayed production;
- labour disruptions;
- increased production costs;
- asset write downs;
- abandonment of assets;
- monetary losses;
- civil, regulatory or criminal proceedings, including fines and penalties, relating to health, safety and the environment;
- community unrest, protests, and legal proceedings at local or international levels;
- loss of social acceptance for our activities; and
- other liabilities.

Advancements in science and technology and in mine design, methods, equipment, and training have created the possibility of reducing some of these risks, but there can be no assurances that such occurrences will not take place and that they will not negatively impact us, our operations, and our personnel.

In addition to those other risks identified above, mining operations are also subject to ownership and operating risks relating to the valuable nature of the product being produced. Our Mexican operations have experienced armed robberies of doré within the past three years. We have instituted a number of additional security measures and a more frequent shipping schedule in response to these incidents. We have subsequently renewed our insurance policy to mitigate some of the financial loss that would result from such criminal activities in the future, however, a substantial deductible amount would apply to any such losses in Mexico.

Liabilities that we incur may exceed the policy limits of our insurance coverage or may not be insurable, in which case we could incur significant costs that could adversely impact our business, operations, profitability, or value.

## Title to Assets

The validity of mining or exploration titles or claims or rights, which constitute most of our property holdings, can be uncertain and may be contested. Our properties may be subject to prior unregistered liens, agreements or transfers, indigenous land claims, or undetected title defects. In some cases, we do not own or hold rights to the mineral concessions we mine, including in Bolivia where the government has title to the concessions and our right to mine is contractual in nature. We have not conducted surveys of all the claims in which we hold direct or indirect interests and therefore, the precise area and location of such claims may be in doubt. No assurance can be given that applicable governments will not revoke or significantly alter the conditions of the applicable exploration and mining titles or claims, or that such exploration and mining titles or claims will not be challenged or impugned by third parties. We may be unable to operate our properties as expected, or to enforce our rights to our properties. Any defects in title to our properties, or the revocation of our rights to mine, could have a material adverse effect on our operations and financial condition.

For example, certain individuals have asserted community rights and land ownership over a portion of the La Colorada mine's surface lands in the Agrarian Courts of Mexico. They have also initiated a process before SEDATU in Zacatecas to declare such lands as national property. In 2019, we filed an amparo against such process and obtained an injunction to protect its ownership of these surface rights pending the outcome of the amparo and a further review by SEDATU. If we are unable to acquire or maintain access to those surface rights, there could be material adverse impacts on the La Colorada mine's future mining operations.

Similarly, in Guatemala, the land title system is not well developed and in many cases, relies on informal, hereditary or possessory rights. Such informal systems can create significant uncertainty in obtaining and maintaining ownership or rights of access, in defining precise locations or clear boundaries to properties, and substantiating rights if challenged. It is also difficult to establish the identity of parties who may have, or purport to have, an interest in such property. Many of the surface areas on which the Escobal mine is located are based on such informal rights. MSR is subject to a legal action by an individual claiming to own title to certain lands within the Escobal mine site that MSR had previously purchased. If we are unable to maintain existing lands and access, or to obtain new lands as required, there may be significant adverse impacts to the mine and its operation.

We operate in countries with developing mining laws, and changes in such laws could materially impact our rights or interests to our properties. We are also subject to expropriation risk in a number of countries in which we operate, including the risk of expropriation or extinguishment of property rights based on a perceived lack of development or advancement. There is limited activity at our Navidad property, for example, as a result of legal restrictions relating to mining, and there is a risk that the federal or provincial governments in Argentina are dissatisfied with a lack of advancement. Expropriation, extinguishment of rights and any other such similar governmental actions would likely have a material adverse effect on our operations and profitability.

In many jurisdictions in which we operate, legal rights applicable to mining concessions are different and separate from legal rights applicable to surface lands. Accordingly, title holders of mining concessions in many jurisdictions must agree with surface land owners on compensation in respect of mining activities conducted on such land. We do not hold title to all of the surface lands at many of our operations and rely on contracts or other similar rights to conduct surface activities.

We do not own most of the surface rights to the areas that overlie our mining concessions comprising the Morococha mine, nor to the areas where administration and operations are taking place, but were used by us pursuant to a usufruct agreement. These surface rights have been the subject of various disputes over the many years of operation at the Morococha mine. In June 2010, we reached an agreement with MCP that clearly defines each party's long-term surface rights and provides for the dismissal of the various judicial and administrative claims, therefore providing more certainty to the land situation for our Morococha mine. The primary focus of the agreement is on the lands and concessions around the Morococha mine and MCP's Toromocho copper project. Under the terms of the agreement, Argentum is required to relocate the core Morococha facilities over a 5-year period and transfer certain mineral concessions and access rights to MCP that it needs in order to proceed with the development of the Toromocho project. In exchange, Argentum is to receive periodic cash payments from MCP which would off-set a portion of the capital required for the facility relocation, and a package of surface rights,

easements, and mineral concessions in order to relocate the facilities and to continue uninterrupted operations. Pursuant to the agreement, the transfer of lands and rights and the cash payments would occur over a period of time and are dependent on meeting certain milestones. During the course of the agreement, however, certain adjustments have been made by the parties with respect to the timing of achieving milestones, in some cases informally, and additional adjustments will be required going forward. As of December 31, 2019, the Morocochoa facilities had not been relocated within the time period originally established in the agreement, and the parties had not yet agreed on a revised milestone. Although this agreement has diminished the risks associated with the Morocochoa land situation, there is no certainty that amended milestones can be agreed upon or achieved by the parties, that the relationship will continue in an amicable fashion, and that the future relocation and other costs associated with the commitments in the agreement will not render continued operations at the Morocochoa mine uneconomic.

## **Community Action**

The success of our business is, in many ways, dependent on maintaining positive and respectful relationships with communities in the areas where we work. There is an increasing level of public concern relating to the perceived effects of mining activities, particularly on communities and peoples impacted by such activities. Communities and NGOs have become more vocal and active with respect to mining activities at or near their communities. Some communities and NGOs have taken actions that could have a material adverse effect on our operations, such as setting up road closures and commencing lawsuits. In certain circumstances, such actions might ultimately result in the cessation of mining activities and the revocation of permits and licenses. These actions relate not only to current activities, but are often in respect of past activities by prior owners of mining properties. The manner with which we respond to civil disturbances and other activities can give rise to additional risks where those responses are perceived to be inconsistent with international standards, including those with respect to human rights.

On June 18, 2014, seven plaintiffs filed an action against Tahoe in the British Columbia Supreme Court alleging battery and negligence regarding a security incident that occurred at the Escobal mine on April 27, 2013. The plaintiffs sought compensatory and punitive damages. In April 2017, three of the seven plaintiffs settled their claims against Tahoe. On July 30, 2019, we settled, on behalf of Tahoe, the remaining four plaintiffs' claims and the British Columbia Supreme Court action was dismissed.

Since June 7, 2017, a group of protesters near the town of Casillas has blocked the primary highway that connects Guatemala City to San Rafael Las Flores and the Escobal mine that we recently acquired. Operations were reduced between June 8 and June 19, 2017 to conserve fuel, and on July 5, 2017, were ultimately ceased following the Supreme Court's provisional decision to suspend the Escobal mining license while the case against the Guatemala MEM was heard on the merits. A second roadblock was initiated in 2018 near the community of Mataquesuintla. While we have been taking steps to regain trust and repair relationships, there is no guarantee that a positive resolution will be reached.

Artisanal, or informal, mining is associated with a number of negative impacts, including environmental degradation, human rights abuse and funding of conflict. Additionally, effective local government administration is often lacking in the locations where these miners operate informally or illegally. These activities are largely unregulated and work conditions are often unsafe and present health risks to the artisanal miners and local communities, which while unrelated to our operations, may have a material impact on them. Informal miners are active on land adjacent to our Shahuindo operation. These miners, represented by the Asociación de Mineral Artesanal San Blas ("AMASBA"), are in dialogue with the Peruvian government to formalize their operations. We support formalization and are collaborating with the government, local authorities and AMASBA in this regard.

Pan American is continuing with the implementation of TSM, a program designed to enhance our community engagement processes, drive world-leading environmental practices and reinforce our commitment to the safety and health of our employees and surrounding communities. As part of TSM, we have implemented a response mechanisms which helps us manage our social risks by better understanding and responding to community questions or concerns around the perceived or actual impacts of our activities. While we are committed to operating in a responsible manner, there is no assurance that our efforts will be successful at mitigating adverse impacts to our

operations, and we may suffer material consequences to our business, including among other things, delays and closures, increased costs, and significant reputational damage.

From time to time, individuals or communities may allege that our activities have impacted or are impacting their human rights. For example, we are currently in discussions with certain individuals regarding a 2015 relocation of worker housing at our La Colorada project. This is being done under the observations of the United Nations High Commission on Human Rights office in Mexico. In Canada, recent jurisprudence has permitted foreign claimants to bring legal actions in relation to alleged human rights violations and tort claims which may have occurred in their home country. This includes the adoption of international customary law principles as actionable torts in Canada. In addition, international bodies, such as the Inter-American Commission and the Inter-American Court of Human Rights, may adopt precautionary measures or make orders for member states in respect of human rights violations that could materially impact our operations. In 2019 we established a *Global Human Rights Policy*, which sets out our commitment to respect human rights. We also appointed a human rights officer. To align with international best practices, we have conducted a gap assessment of our security practices against the requirements of the Voluntary Principles on Security and Human Rights and UNICEF's Child Rights and Security Checklist at two of our three operations with armed security forces: La Colorada in Mexico, and Escobal in Guatemala. These initiatives were designed to further reduce the risks of alleged human rights violations. However, there is no assurance that claims of human rights violations will not be asserted against us and we may suffer material consequences to our business, including among other things, damages awards, delays and closures, increased costs, and significant reputational damage.

### **Developments Regarding Aboriginal and Indigenous Peoples**

Some of our operations are near areas presently or previously inhabited or used by aboriginal and indigenous peoples, or have local communities nearby. There are many national and international laws, regulations, conventions, codes and other instruments dealing with the rights of aboriginal and indigenous peoples that impose obligations on governments and entities. Many of these are complex and interwoven in application. These may include a mandate that government consult with indigenous communities surrounding our projects and mines regarding actions affecting local stakeholders, prior to granting us mining rights, permits or approvals. Applicable conventions, such as the ILO Convention 169 which has been ratified by Argentina, Peru and Guatemala, is an example of such an international convention and one that is presently impacting our operations in Guatemala where the Escobal mine has been suspended pending completion of a consultation process. In Canada, our Timmins West and Bell Creek operations have been subject to consultations with local First Nations communities, and Lake Shore is a party to IBAs with certain local First Nation communities which outlines the ongoing relationship between the parties. New or amended laws, regulations and conventions respecting the rights of these peoples, including with respect to the acquisition and use of lands, may alter decades old arrangements or agreements made by prior owners of our mines and properties, or even those made by us in more recent years. There can be no guarantee that we have entered into all agreements with aboriginal and indigenous people and with local communities in accordance with the laws governing aboriginal and indigenous peoples and local communities or that future laws and actions will not have a material adverse effect on our rights or ability to explore or mine, or on our financial position, cash flow, and results of operations. Furthermore, it is not uncommon for local communities and aboriginal and indigenous peoples to challenge agreements or arrangements previously entered into for various reasons. Public opposition, including opposition by NGOs, to mining activities has also increased in recent years, in part due to the perceived effects of those activities on local communities and on aboriginal and indigenous peoples.

If we cannot maintain an agreement or positive relationship with aboriginal or indigenous peoples or with the communities where we operate, there may be significant disruptions in our operations and activities, we may be subject to legal or administrative proceedings, and we may be precluded from operating, or from continuing to operate, in such areas. There could also be significant harm to our reputation. The risks associated with operating or conducting activities in or near areas presently or previously inhabited by aboriginal or indigenous peoples could further impact our ability to acquire or advance development projects and complete, or realize benefits from, future acquisitions.

## **Exploration and Development Risks**

The long-term operation of our business and its profitability is dependent, in part, on the cost and success of our exploration and development programs. Mineral exploration and development is highly speculative and involves significant risks. Few properties that are explored are ultimately developed into producing mines. There is no assurance that our mineral exploration and development programs will result in discoveries of economic quantities of mineralization that are necessary for a property to be brought into commercial production. The commercial viability of a mineral deposit, once discovered, is also dependent upon a number of factors, including, among other things, (i) the particular attributes of the deposit, such as size, grade, and metallurgy; (ii) interpretation of geological data; (iii) feasibility studies; (iv) proximity to infrastructure and availability of labour, power, and water; (v) metal prices; (vi) foreign currency exchange rates; and (vii) government regulations, including regulations relating to development, taxation, royalties, import and export, and environmental protection.

The actual operating results of our projects may differ materially from those we had anticipated due to these and other factors, many of which are beyond our control. There can be no assurance that our acquisition, exploration, and development programs will yield new mineral reserves to replace or expand current mineral reserves, or that they will result in additional production. Unsuccessful exploration or development programs could have a material adverse effect on our operations and profitability.

## **Imprecision in Mineral Reserve and Mineral Resource Estimates**

Our mineral reserves and mineral resources are estimates. No assurances can be given that the estimated levels of mineral reserves or mineral resources are accurate, or that the estimates will result in material being produced or processed profitably. These estimates are expressions of judgment based on knowledge and experience, and are based on assumptions and interpretation of available geological, geochemical and operational data and information. Valid estimates made at a given time may significantly change when new information becomes available. It may take many years from the initial phase of drilling before production occurs, and during that time, the economic feasibility of our projects may change and may ultimately prove unreliable.

Fluctuations in the market price of silver, gold and other metals, as well as increased capital or production costs or reduced recovery rates, may render our mineral reserves uneconomic to develop for a particular project or result in a reduction of mineral reserves. No assurances can be given that any mineral resource estimate will ultimately be reclassified as proven or probable mineral reserves or that mineralization can be mined or processed profitably. Inferred mineral resources have a great amount of uncertainty as to their existence and as to their economic and legal feasibility. Mineral resource estimates may also be recalculated based on actual production experience. The evaluation of mineral reserves or mineral resources is influenced by economic and technological factors, which may change over time. If our mineral reserve or mineral resource figures are reduced in the future, this could have an adverse impact on Pan American's future cash flows, earnings, results of operations, and financial condition.

This AIF and the documents incorporated by reference herein have been prepared and disclosed in accordance with the requirements of Canadian securities laws that differ from the requirements of United States securities laws. Please refer to the section, "Cautionary Note to U.S. Investors Concerning Estimates of Mineral Reserves and Mineral Resources" on page 8.

## **Production and Cost Estimates**

We prepare estimates of future production and future production costs for our operations. No assurance can be given that production and cost estimates will be achieved. These production and cost estimates are based on many factors and assumptions, including: the accuracy of mineral reserve estimates; ground conditions and physical characteristics of ores, such as hardness and the presence or absence of particular metallurgical characteristics; equipment and mechanical availability; labour availability and productivity; access to the mine; facilities and infrastructure; sufficient materials and supplies on hand; and the accuracy of estimated rates and costs of mining and processing, including the cost of human and physical resources required to carry out our activities. Failure to achieve production or cost estimates, or increases in costs, could have an adverse impact on our future cash flows, earnings, results of operations, and financial condition.

Actual production and costs may vary from estimates for a variety of reasons, including actual ore mined varying from estimates of grade, tonnage, dilution and metallurgical and other characteristics; short-term operating factors relating to the mineral reserves, such as the need for sequential development of orebodies and the processing of new or different ore grades; and risks and hazards associated with mining. In addition, there can be no assurance that silver recoveries or other metal recoveries in small scale laboratory tests will be duplicated in larger scale tests under on-site conditions or during production, or that the existing known and experienced recoveries will continue. Costs of production may also be affected by a variety of factors, including changing stripping ratios, ore grade metallurgy, labour costs and productivity, costs of supplies and services (such as, for example, fuel and power), general inflationary pressures, and currency exchange rates. Failure to achieve production estimates could have an adverse impact on our future cash flows, earnings, results of operations, and financial condition.

## **Infrastructure**

Mining, processing, development, and exploration activities depend, to one degree or another, on adequate infrastructure. Reliable roads, bridges, power, and water supply are important determinants for capital and operating costs, and sufficient and functional processing equipment and facilities are critical to our operations. The lack of availability or the delay in the availability of any one or more of these items could prevent or delay the development of our projects, result in the failure to achieve the anticipated production volume, and increase the construction costs and ongoing operating costs associated with our projects and operations. Similarly, continued improvements or replacement of existing infrastructure may require high capital investments and involve significant delays. In addition, unusual weather phenomena, sabotage, government, or other interference in the maintenance or provision of such infrastructure could adversely affect our operations and profitability.

## **Environmental Legislation, Regulations, and Hazards**

We are subject to environmental laws and regulation in the various jurisdictions in which we operate that impose requirements or restrictions on our activities, such as mine development, water management, use of hazardous substances, reclamation, and waste transportation, storage and disposal. Compliance with environmental laws and regulations may require significant costs and may cause material changes or delays in our operations. There is no assurance that we will be in full compliance with environmental legislation at all times. Failure to comply with applicable environmental legislation could lead to adverse consequences, including expropriation, suspension or forced cessation of operations, revocation of or restrictions on permits, fines and other penalties, civil or regulatory proceedings, and, in certain circumstances, criminal proceedings. Furthermore, any such failures could increase costs and extend timelines, requiring additional capital expenditures and remedial actions. These negative consequences could significantly impact our financial condition, operations, and cash flow.

Future environmental legislation could also require stricter standards and mandate increased enforcement, fines and penalties for non-compliance, more stringent environmental assessments of proposed projects and a heightened degree of responsibility for companies and their officers, directors and employees.

Environmental hazards may exist on our properties which are currently unknown to us. We may be liable for losses associated with such hazards, or may be forced to undertake extensive remedial cleanup action or to pay for governmental remedial cleanup actions, even in cases where such hazards have been caused by previous or existing owners or operators of the property, or by the past or present owners of adjacent properties, or by natural conditions. The costs of such cleanup actions may have a material adverse effect on our operations and profitability.

We are subject to environmental reclamation requirements to minimize long-term effects of mining exploitation and exploration disturbance by requiring the operating company to control possible deleterious elements and to re-establish, to some degree, pre-disturbance land forms and vegetation. These environmental reclamation requirements vary depending on the location of the property and the managing governmental agency. We are actively providing for and carrying out reclamation activities on our properties as required. In 2017, we commenced full scale closure and reclamation of the Alamo Dorado mine and have applied some of that experience to closure cost estimates for our other mines. Any significant environmental or social issues that may arise, however, could lead to increased reclamation expenditures and have a material adverse effect on our financial resources.

Our operations at the Dolores, Shahuindo and La Arena mines involve heap leaching and this method of mineral processing may be employed in the future at other mines and projects. Heap leaching often employs sodium cyanide, a hazardous material, to leach metal-bearing ore and then collect the resulting metal-bearing solution. There is an inherent risk of unintended discharge of hazardous materials in the operation of leach pads. Should sodium cyanide escape from a leach pad and collection infrastructure or otherwise be detected in the downstream surface and ground water points, we could become subject to liability for remediation costs, which could be significant and may not be insured against. In addition, metal production could be delayed or halted to prevent further discharges and to allow for remediation. Such delays or cessations in production could be long-term or, in some cases, permanent, and any interference with production could result in a significant reduction in, or loss of, cash flow and value for us. While appropriate steps may be taken to prevent discharges of sodium cyanide and other hazardous materials into the ground water, surface water, and the downstream environment, there is inherent risk in the operation of leach pads and there can be no assurance that a release of hazardous materials would not occur.

We operate seven tailings storage facilities, have one closed dry stack tailings facility at the Alamo Dorado mine, one dry stack tailings facility at the Escobal mine, which is currently suspended, and operate a water dam at the Dolores mine. Between 2014 and 2019 we completed Independent Dam Safety Reviews (“IDSR”) for all our operating tailings facilities. The reviews found that the storage facilities design, construction, operation and monitoring at the tailings and water storage facilities are generally in line with the Canadian Dam Safety Guidelines, TSM Tailings Protocol and Guidelines, and best practice. We continue to actively implement the TSM Tailings Protocol and Guidelines at our sites. Design of all of our tailings and water storage facilities includes detailed consideration of stability under static and dynamic (pseudostatic) seismic conditions to ensure exceedance of relevant safety factors. While we believe that appropriate steps have been taken to prevent safety incidents, there are inherent risks involved with tailings facilities, including among other things, seismic activity, particularly in seismically active regions such as Peru, and the ability of field investigations completed prior to construction to detect weak foundation materials. There can be no assurance that a dam or other tailings facility safety incident will not occur and such an incident could have a material adverse effect on our operations and profitability.

Responsibility for the operation of a water treatment plant for the Kingsmill Tunnel and the tailings mitigation program at Huascacocha Lake, near the Morococha mine, have been apportioned by Water Management Consultants Inc. in environmental studies among the Morococha mine and the mining companies operating neighbouring projects. The continued development of the Toromocho project by MCP may alleviate some of our funding requirements. There can be no guarantee, however, that our proportionate share of the costs of such environmental projects will not change and this may affect cash flow from the Morococha mine operations.

In addition to increasing regulatory requirements and operational risks, claims from local communities and NGOs with respect to real or alleged environmental incidents are becoming more common and may impact operations. In the case of legitimate claims, such actions could result in injunctions, suspensions, or other work stoppages, including revocation of permits, or significant fines or awards of damages. In other cases, we may be subject to frivolous or exaggerated claims made in an effort to obstruct or prevent mining operations or to affect our reputation. We have and continue to face such alleged claims in Guatemala related to the Escobal mine, as well as in Peru.

## **Replacement of Reserves**

The La Colorada, Dolores, Huaron, Morococha, Shahuindo, La Arena, Timmins West, Bell Creek, San Vicente and Manantial Espejo mines accounted for all of our production in 2019. Current life-of-mine plans provide for a defined production life for mining at each of our mines. For example, active mining at the Alamo Dorado mine ended in 2017 and the mine has transitioned to a reclamation phase. There is no assurance that any of our green field or near mine exploration projects will be successful, and substantial expenditures are required to establish mineral reserves. If our mineral reserves are not replaced either by the development or discovery of additional mineral reserves and/or extension of the life-of-mine at our current operating mines or through the acquisition or development of additional producing mines, this could have an adverse impact on our future cash flows, earnings, results of operations, and financial condition, and this may be compounded by requirements to expend funds for reclamation and decommissioning.

## Trading Activities and Credit Risk

The zinc, lead, and copper concentrates produced by us are sold through long-term supply arrangements to metal traders or integrated mining and smelting companies. The terms of the concentrate contracts may require us to deliver concentrate that has a value greater than the payment received at the time of delivery, thereby introducing us to credit risk of the buyers of our concentrates. Should any of these counterparties not honour supply arrangements, or should any of them become insolvent, we may incur losses for products already shipped and be forced to sell our concentrates in the spot market or we may not have a market for our concentrates and therefore our future operating results may be materially adversely impacted. For example, the Doe Run Peru smelter, a significant buyer of our production in Peru, experienced financial difficulties in the first quarter of 2009 and closed. We continued to sell copper concentrates to other buyers but on inferior terms. The Doe Run Peru smelter remains closed and we are owed approximately \$7.6 million under the terms of our contract with Doe Run Peru. We continue to pursue all legal and commercial avenues to collect the amount outstanding.

As at December 31, 2019, we had receivable balances associated with buyers of our concentrates of \$48.8 million (2018 - \$40.8 million) and receivable balances associated with buyers of its doré of \$17.5 million (2018 - \$nil). The vast majority of our concentrate is sold to a limited number of concentrate buyers.

Doré production is refined under long term agreements with fixed refining terms at three separate refineries worldwide. We generally retain the risk and title to the precious metals throughout the process of refining and therefore are exposed to the risk that the refineries will not be able to perform in accordance with the refining contract and that we may not be able to fully recover our precious metals in such circumstances. For example, in November 2018, Republic, a refinery used by us, filed for bankruptcy. At the time of the bankruptcy, Republic had possession of approximately \$4.9 million of our metal and we are pursuing a claim to collect damages, but, like many other creditors, we may also be subject to alleged preference claims against us. As at December 31, 2019, we had approximately \$58.2 million contained in precious metal inventory at refineries (2018 - \$19.7million). We maintain insurance coverage against the loss of precious metals at our mine sites and in-transit to refineries.

Refined silver and gold is sold in the spot market to various bullion traders and banks. Credit risk may arise from these activities if we are not paid for metal at the time it is delivered, as required by spot sale contracts.

We maintain trading facilities with several banks and bullion dealers for the purposes of transacting our trading activities. None of these facilities are subject to margin arrangements. Our trading activities can expose us to our counterparties' credit risk to the extent that our trading positions have a positive mark-to-market value.

Supplier advances for products and services yet to be provided are a common practice in some jurisdictions in which we operate. These advances represent a credit risk to us to the extent that suppliers do not deliver products or perform services as expected. As at December 31, 2019, we had made \$3.4 million of supplier advances (2018 - \$14.4 million), which are reflected in "Trade and other receivables" on Pan American's balance sheet.

Management constantly monitors and assesses the credit risk resulting from our concentrate sales, refining arrangements, and commodity contracts. Furthermore, management carefully considers credit risk when allocating prospective sales and refining business to counterparties. In making allocation decisions, management attempts to avoid unacceptable concentration of credit risk to any single counterparty.

From time to time, we may invest in equity securities of other companies. Just as investing in Pan American is inherent with risks such as those set out in this AIF, by investing in other companies we will be exposed to the risks associated with owning equity securities and those risks inherent in the investee companies.

## Taxation Risks

In addition to the risks relating to taxation discussed under the heading "Risks Related to Our Business – Governmental Regulation", we are also exposed to other tax related risks. In assessing the probability of realizing income tax assets recognized, we make estimates related to expectations of future taxable income, applicable tax planning opportunities, expected timing of reversals of existing temporary differences and the likelihood that tax positions taken will be sustained upon examination by applicable tax authorities. In making its assessments, we give

additional weight to positive and negative evidence that can be objectively verified. Estimates of future taxable income are based on forecasted cash flows from operations and the application of existing tax laws in each jurisdiction. We consider relevant tax planning opportunities that are within our control, are feasible, and within management's ability to implement. Examination by applicable tax authorities is supported based on individual facts and circumstances of the relevant tax position examined in light of all available evidence. Where applicable tax laws and regulations are either unclear or subject to ongoing varying interpretations, it is reasonably possible that changes in these estimates can occur that materially affect the amounts of income tax assets recognized. Also, future changes in tax laws could limit us from realizing the tax benefits from the deferred tax assets. We reassess unrecognized income tax assets at each reporting period.

## **Exchange Rate Risk**

We report our financial statements in USD; however, we operate in jurisdictions that utilize other currencies. As a consequence, the financial results of our operations, as reported in USD, are subject to changes in the value of the USD relative to local currencies. Since our sales are denominated in USD and a portion of our operating costs and capital spending are in local currencies, we are negatively impacted by strengthening local currencies relative to the USD and positively impacted by the inverse.

From time to time, we mitigate part of this currency exposure by accumulating local currencies, entering into contracts designed to fix or limit our exposure to changes in the value of local currencies relative to the USD, or assuming liability positions to offset financial assets subject to currency risk. Pan American held cash and short-term investments of \$123.4 million in CAD, \$5.2 million in MXN, \$2.4 million in PEN, \$3.7 million in ARS, \$0.4 million in QTZ and \$3.4 million in BOB as at December 31, 2019. For the year ended December 31, 2019, we recorded gains of \$1.0 million (2018 - gains of \$0.7 million), \$0.7 million (2018 - \$nil), and \$0.3 million (2018 - \$nil) on MXN, PEN, and CAD derivative contracts, respectively. As at December 31, 2019, Pan American had outstanding positions on \$12.0 million in foreign currency exposure of MXN purchases with put rates of \$19.50 and call rates ranging from \$20.82 to \$21.59 expiring between January 2020 and December 2020. As at December 31, 2019, Pan American had outstanding positions on \$60.0 million in foreign currency exposure of PEN purchases with put rates of \$3.35 and call rates ranging from \$3.40 to \$3.55 expiring between January 2020 and December 2020. As at December 31, 2019, Pan American had outstanding positions on \$30.0 million in foreign currency exposure of CAD purchases with put rates of \$1.30 and call rates of \$1.37 expiring between January 2020 and December 2020.

Our balance sheet contains various monetary assets and liabilities, some of which are denominated in foreign currencies. Accounting convention dictates that these balances are translated at the end of each period, with resulting adjustments being reflected as foreign exchange gains or losses on our income statement.

In addition to the foregoing, governmental restrictions and controls relating to exchange rates also impact our operations. In Argentina, for example, the government has at times established official exchange rates that were significantly different than the unofficial exchange rates more readily utilized locally to determine prices and value. Our investments in Argentina are primarily funded from outside of the country, and therefore conversion of foreign currencies, like USD, at the official exchange rate has had the effect of reducing purchasing power and substantially increasing relative costs in an already high inflationary market. Maintaining monetary assets in ARS also exposes us to the risks of ARS devaluation and high domestic inflation.

Please refer to the 2019 MD&A for a detailed sensitivity analysis of the effect of changes in the exchange rates of certain currencies against the USD on anticipated cost of sales for 2020.

## **Liquidity Risk**

Liquidity risk is the risk that we will not be able to meet our financial obligations as they come due. The volatility of the metals markets can impact our ability to forecast cash flow from operations. We must maintain sufficient liquidity to meet our short-term business requirements, taking into account our anticipated cash flows from operations, our holdings of cash and cash equivalents, and committed loan facilities.

We manage our liquidity risk by continuously monitoring forecasted and actual cash flows. We have in place

a rigorous reporting, planning and budgeting process to help determine the funds required to support our normal operating requirements on an ongoing basis and our expansion plans. We continually evaluate and review capital and operating expenditures in order to identify, decrease, and limit all non-essential expenditures.

We are required to use a portion of our cash flow to service principal and interest on debt, which will limit the cash flow available for other business opportunities. We also maintain and enter into intercompany credit arrangements with our subsidiaries in the normal course. Our ability to make scheduled principal payments, pay interest on or refinance our indebtedness depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Unexpected delays in production, the suspension of our mining licenses, or other operational problems could impact our ability to service the debt and make necessary capital expenditures when the debt becomes due. If we are unable to generate such cash flow to timely repay any debt outstanding, we may be required to adopt one or more alternatives, such as selling assets, restructuring debt or obtaining additional equity capital on terms that may be onerous or highly dilutive. Our ability to refinance our indebtedness will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in a default on our debt obligations.

## **Competitive Conditions**

The mining industry is very competitive, particularly with respect to properties that produce, or are capable of producing, silver, gold, and other metals. Mines have limited lives and, as a result, Pan American continually seeks to replace and expand mineral reserves through the acquisition of new properties. In addition, there is a limited supply of desirable mineral lands available in areas where we would consider conducting exploration and/or production activities. Because we face strong competition for new properties from other mining companies, some of which have greater financial resources than we do, we may be unable to acquire attractive new mining properties on terms that we consider acceptable.

Competition for resources is intense, particularly affecting the availability of manpower, drill rigs, mining equipment, and production equipment. Competition in the mining business for limited sources of capital could adversely impact our ability to acquire and develop suitable silver mines, silver developmental projects, silver producing companies, or properties having significant exploration potential. As a result, there can be no assurance that our acquisition and exploration programs will yield new mineral reserves to replace or expand current mineral reserves, or that we will be able to maintain production levels in the future.

Our competitive position is largely determined by our costs compared to other producers throughout the world and our ability to maintain our financial integrity through the lows of the metal price cycles. Costs are governed to a large extent by the location, grade, and nature of mineral reserves as well as by operating and management skills. In contrast with diversified mining companies, we focus on silver production, development, and exploration, and are therefore subject to unique competitive advantages and disadvantages related to the price of silver and to a lesser extent, the price of gold and base metal by-products. If silver prices substantially increase, we will be in a relatively stronger competitive position than diversified mining companies that produce, develop, and explore for other minerals in addition to silver. Conversely, if silver prices substantially decrease, we may be at a competitive disadvantage to diversified mining companies.

## **Employee Recruitment, Retention and Human Error**

Recruiting and retaining qualified personnel is critical to our success. We are dependent on the services of key executives including Pan American's President and Chief Executive Officer and other highly skilled and experienced executives and personnel focused on managing our interests. The number of persons skilled in acquisition, exploration, and development of mining properties is limited and competition for such persons is intense. As our business activity grows, we will require additional key financial, administrative, and mining personnel as well as additional operations staff. There can be no assurance that we will be successful in attracting, training, and retaining qualified personnel as competition for persons with these skill sets increases. If we are not successful in attracting, training, and retaining qualified personnel, the efficiency of our operations could be impaired, which could have an adverse impact on Pan American's future cash flows, earnings, results of operations, and financial condition.

Even when efforts to attract and retain qualified personnel and consultants to manage our interests are successful, people are fallible and human error and mistakes could result in significant uninsured losses to us. These could include, but are not limited to, loss or forfeiture of mineral claims or other assets for non-payment of fees or taxes, erroneous or incomplete filings or non-fulfillment of other obligations, significant tax liabilities in connection with any tax planning effort we might undertake or mistakes in interpretation and implementation of tax laws and practices, and legal claims for errors or mistakes by our personnel.

## **Employee Relations**

Our employees and contractors are free to pursue collective bargaining and unions have been established at many of our operations. Although we have reached agreements with our various unions and place significant emphasis on maintaining positive relationships with the unions and employees, we have experienced labour strikes and work stoppages in the past. Should they occur, some labour strikes and work stoppages have the potential to materially affect our operations and thereby adversely impact our future cash flows, earnings, production, and financial conditions.

## **Economic Dependence**

We have 23 customers that account for 100% of our concentrate and silver and gold sales revenue. We had 7 customers that accounted for 15%, 15%, 13%, 13%, 9%, 8%, and 8% of total sales in 2019. The loss of certain of these customers or curtailment of purchases by such customers could have a material adverse effect on our results of operations, financial condition, and cash flows.

## **Acquisitions and Integration**

An element of our business strategy is to make selected acquisitions. For example, we completed the acquisition of Tahoe on February 22, 2019, and spent significant time and effort on integrating the Tahoe operations and workforce during the remainder of 2019. Over our history, we have also completed a number of other important acquisitions, including: the La Colorada mine in 1998; Corner Bay (the Alamo Dorado mine) in 2003; Argentum (the Morococha mine) in 2004; the remaining 50% interest in the Manantial Espejo project in 2006; an additional 40% interest in PASB in respect of the San Vicente mine in May 2007; Aquiline (the Navidad property) in 2010; Minefinders (the Dolores mine) in 2012; and in 2017, the Joaquin and COSE properties in Argentina. We expect to continue to evaluate acquisition opportunities on a regular basis and intend to pursue those opportunities that we believe are in our long-term best interests. The success of our acquisitions will depend upon a number of factors, including the adequacy, completeness, analysis and interpretation of information obtained during due diligence, our ability to effectively manage the integration and operations of entities once we complete an acquisition, and our ability, in some cases, to make improvements or advancements that we anticipated. The process of managing acquired businesses may involve unforeseen difficulties and risks, and may require a disproportionate amount of management resources and expenditures. There can be no assurance that we will be able to successfully manage the integration and operations of businesses we acquire, or that the anticipated benefits of our acquisitions will be realized.

In addition to acquisitions, we periodically enter into joint venture, option and similar arrangements which, among other things, also require an investment in time and capital, and are subject to risks associated with due diligence matters. We also occasionally make investments in other mining companies, such as our investments in Maverix Metals Inc. and in New Pacific Metals Corp. Such arrangements may depend, in part, on other parties and may be speculative in nature. There is no guarantee that any of these arrangements will be successful or that we will recover any capital or other investments made in relation thereto.

## **Limited Supplies and Supply Chain Disruptions**

Our operations depend on an uninterrupted supply of reagents (including cyanide at some operations), production inputs, and other supplies and resources such as skilled personnel. Supply may be interrupted due to a shortage or the scarce nature of inputs, especially with regard to chemical reagents. Supply might also be interrupted due to transportation and logistics associated with the remote location of some of our operations, and government restrictions or regulations which delay importation of necessary items. Any interruptions to the procurement and

supply of reagents, production inputs and other supplies, or the availability of skilled personnel could have an adverse impact on our future cash flows, earnings, results of operations, and financial condition.

## **Internal Control over Financial Reporting**

Management of Pan American is responsible for establishing and maintaining an adequate system of internal control, including internal controls over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the President and Chief Executive Officer and the Chief Financial Officer and effected by the Board of Directors, management and other personnel to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with IFRS. Management assesses the effectiveness of our internal control over financial reporting based on the criteria set forth in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”). We also engage an independent registered public accounting firm to audit and provide independent opinions on the effectiveness of our internal control over financial reporting.

We may fail to achieve and maintain the adequacy of our internal control over financial reporting as such standards are modified, supplemented, or amended from time to time, and we may not be able to ensure that we can conclude on an ongoing basis that we have effective internal control over financial reporting. Also, projections of any evaluation of the effectiveness of internal control over financial reporting to future periods are subject to the risk that the controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. No evaluation can provide complete assurance that our internal control over financial reporting will prevent or detect misstatements on a timely basis, or detect or uncover all failures of persons employed by us to disclose material information otherwise required to be reported. The effectiveness of our control and procedures could also be limited by simple errors or faulty judgments. In addition, as we continue to expand, the challenges involved in implementing appropriate internal control over financial reporting will increase and will require that we continue to improve our internal control over financial reporting.

Our failure to satisfy these requirements on a timely basis could result in the loss of investor confidence in the reliability of our financial statements, which in turn could harm our business and negatively impact the trading price of our shares or market value of our other securities. In addition, any failure to implement required new or improved controls, or difficulties encountered in their implementation, could harm our operating results or cause us to fail to meet our reporting obligations. There can be no assurance that we will be able to remediate material weaknesses, if any, identified in future periods, or maintain all of the controls necessary for continued compliance, and there can be no assurance that we will be able to retain sufficient skilled finance and accounting personnel, especially in light of the increased demand for such personnel among publicly traded companies. Future acquisitions of companies may provide us with challenges in implementing the required processes, procedures and controls in our acquired operations. Acquired companies may not have disclosure controls and procedures or internal control over financial reporting that are as thorough or effective as those required by securities laws currently applicable to us.

## **Compliance**

We are subject to complex laws and regulatory regimes that differ in the various jurisdictions in which we operate and are sometimes extra-jurisdictional in application. Ensuring that such laws and regulatory requirements are understood and followed by our personnel is difficult and we may inadvertently fail to comply with such laws and requirements or they may be contravened by our personnel. We have established programs, policies and training to reduce and mitigate risks in certain areas, including anti-corruption compliance. In this respect, we have adopted a Global Code of Ethical Conduct and a Global Anti-Corruption Policy, developed a training program, and taken other steps to reduce the risk of non-compliance with applicable anti-corruption laws, including in the United States and Canada. However, there is no guarantee such programs, policies or training will prevent violations of the law, particularly by individual employees or agents. Violations of such laws, particularly those relating to corruption, could lead to the imposition of substantial fines, penalties or other civil or criminal prosecution or sanctions, and could severely damage our reputation. Such fines, penalties, and sanctions, and any damage to our reputation, could have a material adverse effect on our business.

## **Climate Change**

There is significant evidence of the effects of climate change on our planet and an intensifying focus on addressing these issues. Governments are introducing climate change legislation and treaties at the international, national, and local levels, and regulations relating to emission levels and energy efficiency are evolving and becoming more rigorous. However, the laws and regulatory requirements are not consistent across the jurisdictions in which we operate, and regulatory uncertainty is likely to result in additional complexity and cost in our compliance efforts. Public perception of mining is, in some respects, negative and there is increasing pressure to curtail mining in many jurisdictions as a result, in part, of perceived adverse effects of mining on the environment. Concerns around climate change may also affect the market price of our shares as institutional investors and others may divest interests in industries that are thought to have more environmental impacts. While we are committed to operating responsibly and reducing the negative effects of our operations on the environment, our ability to reduce emissions, energy and water usage by increasing efficiency and by adopting new innovation is constrained by technological advancement, operational factors and economics. Adoption of new technologies, the use of renewable energy, and infrastructure and operational changes necessary to reduce water usage may also increase our costs significantly. Concerns over climate change, and our ability to respond to regulatory requirements and societal pressures, may have significant impacts on our operations and on our reputation, and may even result in reduced demand for our products.

The physical risks of climate change could also adversely impact our operations. These risks include, among other things, extreme weather events, resource shortages, changes in rainfall and in storm patterns and intensities, water shortages, changing sea levels and extreme temperatures. Climate-related events such as mudslides, floods, droughts and fires can have significant impacts, directly and indirectly, on our operations and could result in damage to our facilities, disruptions in accessing our sites with labour and essential materials or in shipping products from our mines, risks to the safety and security of our personnel and to communities, shortages of required supplies such as fuel and chemicals, inability to source enough water to supply our operations, and the temporary or permanent cessation of one or more of our operations. There is no assurance that we will be able to anticipate, respond to, or manage the risks associated with physical climate change events and impacts, and this may result in material adverse consequences to our business and to our financial results.

## **Claims and Legal Proceedings**

We are subject to various claims and legal proceedings covering a wide range of matters that arise in the ordinary course of business activities. Many of these claims are from current or ex-employees, or employees of former or current owners of our operations such as the Quiruvilca-related claims in Peru, some of which involve claims of significant value, and include alleged improper dismissals, workplace illnesses, such as silicosis, and claims for additional profit-sharing and bonuses in prior years. In some cases, we may become subject to class action lawsuits. For example, in mid-2017, Tahoe, which was acquired by us in late February 2019, and certain of its former directors and officers became the subject of three purported class action lawsuits filed in the United States that center primarily around alleged misrepresentations. These U.S. class action lawsuits were later consolidated into one class action suit that is ongoing. In October 2018, Tahoe learned that a similar proposed class action lawsuit had been filed against Tahoe and its former chief executive officer in the Superior Court of Ontario. These lawsuits seek significant damages. Tahoe has disputed the allegations made in these suits, however the outcomes are not determinable at this time. Furthermore, we are in some cases the subject of claims by local communities, indigenous groups or private land owners relating to land and mineral rights, or environmental or social damage, and such claimants may seek sizeable monetary damages against us and/or the return of surface or mineral rights or revocation of permits and licenses that are valuable to us and which may impact our operations and profitability if lost.

Each of these matters is subject to various uncertainties and it is possible that some of these matters may be resolved unfavourably to us. We establish provisions for matters that are probable and can be reasonably estimated. We also carry liability insurance coverage, however such insurance does not cover all risks to which we might be exposed and in other cases, may only partially cover losses incurred by us. In addition, we may be involved in disputes with other parties in the future that may result in litigation, which may result in a material adverse effect on our financial position, cash flow and results of operations.

## Information and Cyber Security

With the increasing dependence and interdependence on electronic data communication and storage, including the use of cloud-based services and personal devices, we are exposed to evolving technological risks relating to its information and data. These risks include targeted attacks on our systems or on systems of third parties that we rely on, failure or non-availability of a key information technology system, or a breach of security measures designed to protect our systems. While we employ security measures in respect of our information and data, we cannot be certain that we will be successful in securing this information and data and there may be instances where we are exposed to malware, cyber-attacks or other unauthorized access or use of our information and data. Any data breach or other improper or unauthorized access or use of our information could have a material adverse effect on our business and could severely damage our reputation.

## General Economic Conditions

General economic conditions may adversely affect our growth, profitability and ability to obtain financing. Events in global financial markets in the past several years have had a profound impact on the global economy. Many industries, including the silver and gold mining industry, have been and continue to be impacted by these market conditions. Some of the key impacts of the current financial market turmoil include contraction in credit markets resulting in a widening of credit risk, devaluations, high volatility in global equity, commodity, foreign exchange and precious metal markets and a lack of market confidence and liquidity. A continued or worsened slowdown in the financial markets or other economic conditions, including but not limited to, consumer spending, employment rates, business conditions, inflation, fuel and energy costs, consumer debt levels, lack of available credit, the state of the financial markets, interest rates and tax rates, may adversely affect our growth, profitability and ability to obtain financing. A number of issues related to economic conditions could have a material adverse effect on our business, financial condition and results of operations, including:

- contraction in credit markets could impact the cost and availability of financing and our overall liquidity;
- the volatility of silver, gold and other metal prices would impact our revenues, profits, losses and cash flow;
- recessionary pressures could adversely impact demand for our production;
- volatile energy, commodity and consumables prices and currency exchange rates could impact our production costs; and
- the devaluation and volatility of global stock markets could impact the valuation of our equity and other securities.

In addition, the current outbreak of the novel coronavirus (COVID-19) that was first reported from Wuhan, China in December 2019, and any future emergence and spread of similar pathogens could have a material adverse effect on global economic conditions which may adversely impact our business and results of operations and the operations of our suppliers, contractors and service providers, including smelter and refining service providers, and the demand for our production. While initially the outbreak was largely concentrated in China and caused significant disruptions to its economy, it has now spread to many other countries and infections have been reported globally. To date, the coronavirus has not spread widely in areas where we have operations. If the coronavirus spreads to those areas, however, it may have a significant adverse impact on our workforce, production levels, and our ability to continue operating some of our mines. Government efforts to curtail the spread of the coronavirus may also result in temporary or long-term suspensions or shut-downs of our operations. The extent to which the coronavirus impacts our operations will depend on future developments, which are highly uncertain and cannot be predicted with confidence, including the duration of the outbreak, new information that may emerge concerning the severity of the coronavirus and the actions taken to contain the coronavirus or treat its impact, among others.

Moreover, the actual and threatened spread of the coronavirus globally could also have a material adverse effect on the regional economies in which we operate, could continue to negatively impact stock markets, including the trading price of our shares, could adversely impact our ability to raise capital, could cause continued interest rate volatility and movements that could make obtaining financing or refinancing our debt obligations more challenging or more expensive and could result in any operations affected by coronavirus becoming subject to quarantine. Any of these developments, and others, could have a material adverse effect on our business and results of operations.

## DIVIDENDS

On February 15, 2010, Pan American's Board of Directors declared its first cash dividend, and has paid a dividend quarterly since that time. Over the past three years, we have declared the following dividends:

Year	Declaration Date	Amount per Common Share
2019	• November 6	• \$0.035
	• August 7	• \$0.035
	• May 8	• \$0.035
	• February 20	• \$0.035
2018	• November 6	• \$0.035
	• August 8	• \$0.035
	• May 9	• \$0.035
	• February 20	• \$0.035
2017	• November 8	• \$0.025
	• August 9	• \$0.025
	• May 9	• \$0.025
	• February 14	• \$0.025

Each of the foregoing dividends was designated to be an eligible dividend for the purposes of the *Income Tax Act* (Canada). The amounts and specific distribution dates of any future dividends will be evaluated and determined by the Board of Directors on an ongoing basis.

## MARKET FOR SECURITIES

Pan American's Common Shares are listed and posted for trading on the Toronto Stock Exchange and The Nasdaq Stock Market ("Nasdaq") under the symbol "PAAS". The majority of trading of our Common Shares takes place on Nasdaq. The following table outlines the closing share price trading range and volume of shares traded by month in 2019:

Toronto Stock Exchange (CAD\$)				Nasdaq Stock Market (USD\$)			
Month	High	Low	Volume	Month	High	Low	Volume
January	\$ 20.55	\$ 17.35	7,327,100	January	\$ 15.53	\$ 13.01	33,571,103
February	\$ 20.16	\$ 17.48	11,458,220	February	\$ 15.24	\$ 13.29	43,274,742
March	\$ 18.59	\$ 16.67	9,882,220	March	\$ 13.86	\$ 12.43	52,763,610
April	\$ 18.41	\$ 16.48	5,843,460	April	\$ 13.69	\$ 12.28	31,126,904
May	\$ 17.20	\$ 13.83	7,937,600	May	\$ 12.84	\$ 10.26	49,021,658
June	\$ 17.92	\$ 14.66	6,938,400	June	\$ 13.62	\$ 11.04	59,661,942
July	\$ 21.71	\$ 16.33	9,794,550	July	\$ 16.54	\$ 12.39	78,035,882
August	\$ 25.32	\$ 19.42	10,423,990	August	\$ 19.06	\$ 14.65	85,519,318
September	\$ 25.99	\$ 20.42	9,554,590	September	\$ 19.48	\$ 15.40	77,241,999
October	\$ 22.71	\$ 20.29	8,133,740	October	\$ 17.39	\$ 15.44	62,946,850
November	\$ 25.70	\$ 21.46	7,020,550	November	\$ 19.34	\$ 16.29	51,611,619
December	\$ 31.23	\$ 25.27	9,085,690	December	\$ 24.02	\$ 19.03	66,052,204

## EXCEPTIONS FROM NASDAQ CORPORATE GOVERNANCE REQUIREMENTS

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Under Rule 4350(a) of Nasdaq Rules (the “Nasdaq Rules”), a foreign private issuer (as defined in Rule 12b-2 under the U.S. Securities Exchange Act of 1934, as amended) may follow its home country practice in lieu of certain of the corporate governance requirements of the Nasdaq Rules.

Pursuant to Rule 4350(a), Pan American follows British Columbia practice with respect to quorum requirements in lieu of Nasdaq Rule 4350(f). Nasdaq Rule 4350(f) requires that the minimum quorum for a shareholder meeting is 33-1/3% of the outstanding common shares, whereas Pan American’s articles provide that the minimum quorum for a meeting of the holders of our Common Shares is two individuals who are shareholders, proxy holders representing shareholders or duly authorized representatives of corporate shareholders personally present and representing shares aggregating not less than 25% of the issued Common Shares of Pan American carrying the right to vote at that meeting. In the event there is only one shareholder, the quorum is one person personally present and being, or representing by proxy, that shareholder, or in the case of a corporate shareholder, a duly authorized representative of that shareholder. Pan American’s quorum requirement complies with the *Business Corporations Act* (British Columbia), which requires that unless the articles otherwise provide, two shareholders entitled to vote at a meeting of shareholders, whether in person or represented by proxy, constitute a quorum. Furthermore, the rules of the Toronto Stock Exchange, upon which our Common Shares are also listed, do not contain specific quorum requirements.

## DIRECTORS AND EXECUTIVE OFFICERS

The names of our directors and executive officers as at December 31, 2019, are set out below, as well as their municipalities of residence, positions with Pan American, and principal occupations for the past five years:

Name and Municipality of Residence	Position with Pan American	Principal Occupation During the Past Five Years
ROSS J. BEATY <sup>5</sup> Vancouver, B.C. Canada	Director and Chairman (director of Pan American since September 30, 1988)	Business Executive and Chairman of Pan American.
MICHAEL CARROLL <sup>1,5</sup> Walnut Creek, California, U.S.A.	Director since January 1, 2011	Corporate Director
NEIL DE GELDER, Q.C. <sup>1,3</sup> Vancouver, B.C. Canada	Director since July 3, 2012	Exec. VP of Stern Partners, a private diversified investment firm.
CHARLES JEANNES <sup>2,4</sup> Reno, Nevada U.S.A.	Director since February 22, 2019	Corporate Director
KEVIN MCARTHUR <sup>5</sup> Reno, Nevada U.S.A.	Director since February 22, 2019	Corporate Director
WALTER T. SEGSWORTH <sup>2,4,6</sup> West Vancouver, B.C. Canada	Director since May 12, 2009	Corporate Director
MICHAEL STEINMANN <sup>4,5</sup> North Vancouver, B.C. Canada	Director (since January 1, 2016) and President and CEO	CEO of Pan American since January 1, 2016; President since February 18, 2015; Exec. VP, Corporate Development & Geology since September 1, 2008.
GILLIAN WINCKLER <sup>1,2,3</sup> Vancouver, B.C. Canada	Director since May 11, 2016	Corporate Director
STEVEN BUSBY Vancouver, B.C. Canada	COO	COO of Pan American since May 13, 2008.
A. ROBERT DOYLE North Vancouver, B.C. Canada	CFO	CFO of Pan American since January 2004.
CHRISTOPHER EMERSON Vancouver, B.C. Canada	VP, Business Development and Geology	VP, Business Development & Geology of Pan American since August 10, 2015; previously Geology Manager for Glencore South America.

Name and Municipality of Residence	Position with Pan American	Principal Occupation During the Past Five Years
GEORGE GREER Surrey, B.C. Canada	Sr. VP, Project Development	Sr. VP, Project Development of Pan American since January 1, 2012.
CHRISTOPHER LEMON Vancouver, B.C. Canada	General Counsel	General Counsel of Pan American since August 2, 2017; previously General Counsel of First Quantum Minerals Ltd.
SEAN MCALEER Guatemala City Guatemala	SVP and Managing Director, Guatemala	SVP and Managing Director, Guatemala since September 2019; SVP, Corporate Affairs since February 2019; VP, Human Resources and Security of Pan American since February 1, 2010.

Notes:

- <sup>1</sup> Member of the Audit Committee.
- <sup>2</sup> Member of the Human Resources and Compensation Committee.
- <sup>3</sup> Member of the Nominating and Governance Committee.
- <sup>4</sup> Member of the Health, Safety, Environment and Communities Committee.
- <sup>5</sup> Member of the Finance Committee.
- <sup>6</sup> Mr. Segsworth is our Lead Independent Director.

The directors of Pan American are elected at each annual general meeting to hold office until the next annual general meeting or until their successors are elected or appointed. As at December 31, 2019, the Board of Directors consisted of eight directors, six of whom, Ross Beaty, Michael Carroll, Neil de Gelder, Charles Jeannes, Walter Segsworth and Gillian Winckler, qualify as unrelated directors who are independent of management. Mr. Steinmann is not independent due to his current management position with us.

On February 22, 2019, Mr. Kevin McArthur and Mr. Charles Jeannes, both of Reno, Nevada, joined Pan American's Board of Directors. Mr. Jeannes is an independent director, however Mr. McArthur is not considered independent due to his position as Executive Chairman of Tahoe prior to the closing of the Arrangement.

The Board of Directors has established five committees: the Audit Committee, the Human Resources and Compensation Committee, the Health, Safety, Environment and Communities Committee, the Nominating and Governance Committee, and the Finance Committee. Detailed information regarding the duties and obligations of the Audit Committee is annexed as Appendix "A" to this AIF. The Board of Directors does not have an Executive Committee. The composition of the various committees as at December 31, 2019, is set forth in the preceding table.

As of the close of business on March 11, 2020, the directors and executive officers of Pan American named above as a group exercised control or direction or beneficially owned, directly or indirectly, 4,110,866 Common Shares, or approximately 1.96 % of the issued and outstanding Common Shares of Pan American.

None of Pan American's directors or executive officers:

- (a) are, as at the date of this AIF, or have been, within 10 years before the date of this AIF, a director, chief executive officer or chief financial officer of any company (including Pan American) that
  - (i) was subject to cease trade order, an order similar to a cease trade order, or an order that denied the relevant company access to any exemption under securities legislation (collectively, 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

- (ii) 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;
- (b) are, as at the date of this AIF, or has been within 10 years before the date of this AIF, a director or executive officer of any company (including Pan American) 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
- (c) have, 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 or executive officer.

In addition, none of Pan American's directors and executive officers has been subject to:

- (d) 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
- (e) any other penalties or sanctions imposed by a court or regulatory body that would likely be considered important to a reasonable shareholder in making an investment decision.

As of the date of this AIF, Pan American is not aware of any shareholder holding a sufficient number of securities of Pan American to affect materially the control of Pan American.

## **Audit Committee**

As at December 31, 2019, the members of the Audit Committee were Michael Carroll (Chair), Neil de Gelder, and Gillian Winckler. The Board of Directors has determined based on the information provided by each director that all members of the Audit Committee meet the independence requirements set out in National Instrument 52-110 – *Audit Committees*, and as defined under Rule 10A-3 of the U.S. Securities Exchange Act of 1934, as amended, and the rules and regulations of the Nasdaq Stock Market. All members of the Audit Committee are financially literate and Michael Carroll, an individual serving on the audit committee of the Board of Directors, is an audit committee financial expert, as that term is defined in General Instruction B(8)(b) of Form 40-F.

The SEC has indicated that the designation of a person as an audit committee financial expert does not make such person an "expert" for any purpose, impose any duties, obligations or liabilities on such person that are greater than those imposed on members of the audit committee and the board of directors who do not carry this designation or affect the duties, obligations or liability of any other member of the audit committee or board of directors.

### ***Relevant Education and Experience of Audit Committee Members***

The relevant education and experience of each member of the Audit Committee that is relevant to the performance of the Audit Committee responsibilities are as follows:

**Michael L. Carroll (Chair)** is a Certified Public Accountant with over 30 years of financial management expertise, primarily with publicly traded mining companies and has previously served on the audit committee of another public company.

**Neil de Gelder, Q.C.**, has over 25 years of experience as a lawyer specializing in corporate, mergers and acquisitions, and financing matters with a major Canadian law firm, frequently advising boards of publicly traded companies. He has been the Executive Director of the British Columbia Securities Commission, and is currently Executive Vice-President of a private diversified investment firm based in Vancouver. In this capacity, he is routinely

involved in reviewing internal management financial reporting and external audited and unaudited financial statements from the perspective of an owner or director. Mr. de Gelder has served on a wide variety of corporate, Crown, charitable, and community boards over the years, including serving on the audit committee of a B.C. venture capital fund.

**Gillian Winckler** is a former mining and business executive with over 25 years of diversified experience in the metals and mining industry and the financial sector. Among other senior positions, Ms. Winckler has been both a Chief Executive Officer and Chief Financial Officer of a Canadian and Australian publicly listed resource company. Ms. Winckler has been extensively involved with corporate and divisional strategy, mergers and acquisitions, divestments, exploration, as well as project evaluation and development. Ms. Winckler is a Chartered Accountant (South Africa), with a BSc and BComm (Hons) obtained in South Africa. Her professional expertise includes strategic planning, mergers, acquisitions and divestments in the mining sector, as well as IFRS, GAAP, risk management and regulatory reporting. Ms. Winckler also currently serves on the audit committee of two other publicly listed companies.

### ***External Auditor Service Fees***

#### Audit Fees

The aggregate fees billed by Deloitte LLP, Pan American's Independent Registered Public Accounting Firm, for the fiscal years ended December 31, 2019 and 2018 for professional services rendered by Deloitte LLP for the audit of Pan American's annual consolidated financial statements or services that are normally provided by Deloitte LLP in connection with statutory and regulatory filings or engagements for such years were approximately \$2,748,500 and \$1,735,700, respectively. The fees in 2019 include amounts related to the audit of Tahoe Resources Inc. for the year ended December 31, 2018, of approximately \$291,100.

#### Audit-Related Fees

The aggregate fees billed by Deloitte LLP for the fiscal years ended December 31, 2019 and 2018 for assurance and related services rendered by it that are reasonably related to the performance of the audit or review of Pan American's consolidated financial statements and are not reported above as audit fees were approximately \$103,900 and \$71,000, respectively. In 2019, these fees primarily related to services performed in connection with the Company's business acquisition report and other filings relating to the acquisition of Tahoe Resources Inc. The fees in both 2019 and 2018 also include amounts with respect to Pan American's Canadian Public Accountability Board fees that are remitted by Deloitte on behalf of Pan American.

#### Tax Fees

The aggregate fees billed by Deloitte LLP for the fiscal years ended December 31, 2019 and 2018 for professional services rendered by it for tax compliance, tax advice, tax planning, and other services were approximately \$2,600 and \$9,100, respectively. In 2019, such fees related primarily to the provision of services related to tax compliance matters.

#### Other Fees

The aggregate fees billed by Deloitte LLP for the fiscal years ended December 31, 2019 and 2018 for products and services provided by Deloitte LLP, other than those services reported in the preceding three paragraphs, were approximately \$38,900 and \$0, respectively. In 2019, such fees related to services provided in respect of the Tahoe integration.

#### Audit Committee Pre-Approval Policies

All audit and non-audit services performed by the Independent Registered Public Accounting Firm are pre-approved by the Audit Committee.

## **CONFLICTS OF INTEREST**

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To the best of our knowledge, and other than as disclosed in this AIF, there are no known existing or potential conflicts of interest between us and any of our directors or officers, except that certain officers and directors of Pan American are officers and directors of, or are associated with, other public or private companies. Such associations may give rise to conflicts of interest from time to time between their duties as an officer or director of Pan American and their duties as an officer or director of such other companies. The directors are aware of laws requiring them to act honestly and in good faith with a view to act in the best interests of Pan American and our shareholders and to disclose any conflicts of interest.

## **LEGAL PROCEEDINGS AND REGULATORY ACTIONS**

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A description of certain legal proceedings to which we are a party appear under the heading "Contingencies" in Note 29 to our Audited Consolidated Financial Statements for the year ended December 31, 2019. We have not been subject to any regulatory penalties or sanctions during the financial year, nor entered into any settlement agreements relating to securities legislation.

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

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Other than as described below, to the best of our knowledge, no director or executive officer of Pan American, nor any person or company that beneficially owns, controls, directs, directly or indirectly, more than 10% of our Common Shares, nor any associate or affiliate of any of the foregoing persons, has or had a material interest 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 Pan American.

Pursuant to the terms of his employment contract with Tahoe, Mr. McArthur, who held the position of Executive Chair and director of Tahoe prior to the Arrangement, received a lump-sum payment equal to approximately US\$1.13 million upon completion of the Arrangement. In addition, in accordance with the Tahoe long term incentive plan, the Tahoe deferred share awards held by Mr. McArthur accelerated and vested in exchange for common shares of Tahoe at the effective time of the Arrangement. These shares were then exchanged for Common Shares of Pan American under the Arrangement.

## **TRANSFER AGENTS AND REGISTRAR**

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The transfer agent and registrar for our Common Shares is Computershare Investor Services Inc. at its principal office in Vancouver, British Columbia, and Computershare Trust Company, N. A. at its office in Denver, Colorado, U.S.A.

## **MATERIAL CONTRACTS**

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Except for contracts entered into in the ordinary course of business, no other material contracts have been entered into by Pan American during the financial year ended December 31, 2019 or before such time which are still in effect.

## INTERESTS OF EXPERTS

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Deloitte LLP, Independent Registered Public Accounting Firm, is the auditor of Pan American and is independent within the meaning of the Rules of Professional Conduct of the Chartered Professional Accountants of British Columbia.

The Qualified Persons as defined by NI 43-101 who have prepared or supervised the preparation of Pan American's mineral reserve and mineral resource estimates effective June 30, 2019, and who supervised the preparation of and approved the scientific and technical information disclosed in this AIF, as described under the heading "Scientific and Technical Information" on page 7.

Michael Steinmann, P. Geo., Martin Wafforn, P. Eng., Chris Emerson, FAusIMM, Pamela De Mark, P. Geo., Americo Delgado, P.Eng., Eric Kallio, P.Geo., Natasha Vaz, P.Eng., Kara Byrnes, P.Geo., Tim Williams, M.Sc., Carl Defilippi, M.Sc., Charles Muerhoff, B.Sc., Conrad Huss, P.Eng., Thomas Drielick, P.Eng., Daniel Roth, P.Eng., Paul Tietz, C.P.G., Matthew Blattman, P.Eng., Jack Caldwell, P.Eng., and M3 Engineering & Technology Corporation are the persons who have prepared or certified a statement, report, or valuation described in this AIF.

To the best of our knowledge, none of Messrs./Mmes. Steinmann, Wafforn, Emerson, De Mark, Delgado, Kallio, Vaz, Byrnes, Williams, Defilippi, Muerhoff, Tietz, Roth, Blattman, Drielick, Huss, Caldwell or M3 Engineering & Technology Corporation beneficially owns, directly or indirectly, 1% or more of any class of Pan American's outstanding securities.

## ADDITIONAL INFORMATION

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Additional information, including directors' and officers' remuneration and indebtedness, principal holders of Pan American's securities, and securities authorized for issuance under equity compensation plans, is contained in our management information circular for the most recent annual meeting of shareholders. Additional financial information is also provided in our audited consolidated financial statements for the years ended December 31, 2019 and 2018, and management's discussion and analysis for the year ended December 31, 2019. The foregoing disclosure documents, along with additional information relating to Pan American, may be found on SEDAR at [www.sedar.com](http://www.sedar.com), on the United States Securities and Exchange Commission website at [www.sec.gov](http://www.sec.gov), or on our website at [www.panamericansilver.com](http://www.panamericansilver.com).

## GLOSSARY OF TERMS

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

*"inferred mineral resource"* - 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.

*"indicated mineral resource"* - 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 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.

*“measured mineral resource”* – 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.

*“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.

*“probable mineral reserve”* - 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.

*“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.



## APPENDIX "A"

### AUDIT COMMITTEE CHARTER

#### PURPOSE

Senior management of Pan American Silver Corp. (the "**Company**"), as overseen by its Board of Directors (the "**Board**"), has primary responsibility for the Company's financial reporting, accounting systems and internal controls. The Audit Committee (the "**Committee**") is a standing committee of the Board established for the purposes of overseeing:

- a. the quality and integrity of the Company's financial and accounting reporting processes and internal accounting and financial control systems;
- b. the external auditor's qualifications and independence;
- c. management's responsibility for assessing the effectiveness of internal controls; and
- d. the Company's compliance with legal and regulatory requirements in connection with financial and accounting matters.

#### COMPOSITION AND OPERATION

- a. The Committee shall be composed of at least three independent directors<sup>1</sup> and all members of the Committee shall, to the satisfaction of the Board, be Financially Literate and at least one member will be a Committee Financial Expert ("**Financially Literate**" and "**Committee Financial Expert**" are defined in the Definitions section of this Charter).
- b. The members of the Committee shall be appointed by the Board, based on the recommendation of the Nominating and Governance Committee, to serve a one-year term and are permitted to serve an unlimited number of consecutive terms.
- c. The Committee shall appoint a chair (the "**Chair**") from among its members who shall be an independent director. If the Chair is not present at any meeting of the Committee, one of the other Committee members present at the meeting shall be chosen to preside at the meeting.
- d. The Committee will make every effort to meet at least five times per year and each member is entitled to request that an additional meeting be called, which will be held within two weeks of the request for such meeting if practicable. A quorum at meetings of the Committee shall be two members present in person or by telephone. The Committee may also act by unanimous written consent of its members as described under the heading "**Authority**" in this Charter.

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<sup>1</sup> In order to be considered "**independent**", the following applies:

Pursuant to the Canadian Securities Administrators' Multilateral Instrument 52-110 "**Audit Committees**", a member of the Committee must not have a direct or indirect material relationship with the Company. A "**material relationship**" is a relationship which could, in the view of the Company's Board, be reasonably expected to interfere with the exercise of a member's independent judgment.

Pursuant to United States securities laws, a member of the Committee may not accept directly or indirectly any consulting, advisory, or other compensatory fee from the Company or any of its subsidiaries; nor be an affiliated person, as such term is defined in Rule 10A-3 of the *Securities and Exchange Act of 1934*, of the Company or any of its subsidiaries.



- e. The external auditor may request the Chair to call a meeting of the Committee to consider any matter that the auditor believes should be brought to the attention of the directors or the shareholders of the Company. In addition to the external auditor, each committee chair, members of board, as well as the Chief Executive Officer or Chief Financial Officer shall be entitled to request the Chair to call a meeting, which meeting shall be held as soon as practicable after receiving the request.
- f. Notice of the time and place of every meeting shall be given in writing or by email communication to each member of the Committee at least 24 hours prior to the time fixed for such meeting.
- g. The Committee shall fix its own procedure at meetings, keep records of its proceedings and provide a verbal report to the Board routinely at the next regularly scheduled Board meeting and shall provide copies of finalized minutes of meetings to the Corporate Secretary to be kept with the official minute books of the Company.
- h. The Committee will review and approve its minutes of meetings and copies will be made available to the external auditor or its members as requested.
- i. In camera sessions will be scheduled for each regularly scheduled quarterly Committee meeting, and as needed from time to time.
- j. On an ad hoc basis, the Committee may also meet separately with head of internal audit, the Chief Executive Officer, the Chief Financial Officer, the General Counsel and such other members of management as they may deem necessary.

## RESPONSIBILITIES AND DUTIES

### Overall Committee:

To fulfill its responsibilities and duties the Committee will:

- a. review this Charter periodically, but at least once per annum, and recommend to the Board any necessary amendments;
- b. review and, where necessary, recommend revisions to the Company's disclosure in the Management Information Circular regarding Committee's composition and responsibilities and how they are discharged;
- c. assist the Board in the discharge of its responsibilities relating to the quality, acceptability and integrity of the Company's accounting policies and principles, reporting practices and internal controls;
- d. review and recommend approval by the Board of all significant and material financial disclosure documents to be released by the Company, including but not limited to, quarterly and annual financial statements and management discussion and analysis, annual reports, Form 40-F, annual information forms, and prospectuses containing material information of a financial nature; and
- e. oversee the relationship and maintain a direct line of communication with the Company's internal and external auditors and assess their respective performance.

### Public Filings, Policies and Procedures:

The Committee is responsible for:

- a. ensuring adequate procedures are in place for the review of the Company's disclosure of financial information extracted or derived from the Company's financial statements and periodically assess the



Company's disclosure controls and procedures, and management's evaluation thereof, to ensure that financial information is recorded, processed, summarized and reported within the time periods required by law;

- b. reviewing disclosures made to the Committee by the Chief Executive Officer and the Chief Financial Officer during their certification process for any significant deficiencies in the design or operation of internal controls or material weaknesses therein and any fraud involving management or other employees who have a significant role in internal controls;
- c. reviewing with management and the external auditor any correspondence with securities regulators or other regulatory or government agencies which raise material issues regarding the Company's financial reporting or accounting policies; and
- d. regularly reviewing with management, the external auditors and the Company's legal counsel, any claim or other contingency, including tax assessments, that could have a material effect upon the financial position or operating results of the Company and the manner in which these matters have been disclosed in the financial statements.

### **External Auditors**

The responsibilities and duties of the Committee as they relate to the external auditor are to:

- a. consider and make recommendations to the Board with respect to the external auditor to be nominated for appointment by shareholders at each annual general meeting of the Company and the compensation of the external auditor;
- b. review the performance of the external auditor and, where appropriate, recommend to the Board the removal of the external auditor;
- c. confirm the independence and effectiveness of the external auditor, which will require receipt from the external auditor of a formal written statement delineating all relationships between the auditor and the Company and any other factors that might affect the independence of the auditor;
- d. oversee the work of the external auditor generally, including review and, as applicable, approval of the following :
  - i. the external auditor's engagement letter and audit plans;
  - ii. the reasonableness of the estimated fees and other compensation to be paid to the external auditor;
  - iii. the form and content of the quarterly and annual audit report, which should include, *inter alia*:
    - a summary of the Company's internal controls and procedures;
    - any material issues raised in the most recent meeting of the Committee; and
    - any other related audit, review or attestation services performed for the Company by the external auditors.
  - iv. form and content of other reports of the auditors.

The Committee shall report to the Board, as necessary, in respect of the above noted matters.



- e. actively engage in dialogue with the external auditor with respect to any disclosed relationships or services that may affect the independence and objectivity of the external auditor and take, or recommend that the Board take, appropriate actions to oversee the independence of the external auditor;
- f. review and pre-approve all non-audit services provided to the Company or its subsidiaries by the external auditor prior to the commencement of such services, and in doing so, the Committee may delegate to one or more independent members of the Committee the authority to pre-approve any such non-audit services, provided that the decision of such member(s) on such non-audit services will be presented to the Committee at its next regularly scheduled meeting, and in all cases, pre-approval of non-audit services must satisfy the requirements set out in National Instrument 52-110 – Audit Committees;
- g. monitor the relationship between management and the external auditor and resolve any disagreements between them regarding financial reporting;
- h. engage the external auditor in discussions regarding any amendments to critical accounting policies and practices; alternative treatments of financial information within generally accepted accounting principles related to material items that have been discussed with management, including any potential ramifications and the preferred treatment by the independent auditor; and lastly, written communication between management and the independent auditor, including but not limited to, the management letter and schedules of adjusted and unadjusted differences, as applicable.

### **Internal Controls and Financial Reporting**

The Committee will:

- a. obtain reasonable assurance from discussions with (and/or reports from) management, and reports from external and internal auditors that the Company's financial and accounting systems are reliable and that the prescribed internal controls are operating effectively;
- b. in consultation with the external auditor, the CEO, the CFO, and where necessary, other members of management, review the integrity of the Company's financial reporting process and the internal control structure;
- c. review the acceptability of the Company's accounting principles and direct the auditors' examinations to particular areas of question or concern, as required;
- d. request the auditors to undertake special examinations (e.g., review compliance with conflict of interest policies) when it deems necessary;
- e. together with management, review control weaknesses identified by the external and internal auditors;
- f. review the appointments of the chief financial officer and key financial executives;
- g. ensure CEO and CFO certifications pursuant to Sarbanes-Oxley Act sections 302 and 906 and pursuant to Canadian securities laws are prepared and filed and will make inquiry and initiate discussion as necessary with management regarding the practices and procedures adopted to permit management's assurance on the underlying controls; and
- h. during the annual audit process, consider if any significant matters regarding the Company's internal controls and procedures over financial reporting, including any significant deficiencies or material



weaknesses in their design or operation, need to be discussed with the external auditor, and review whether internal control recommendations made by the auditor have been implemented by management.

### **Internal Audit**

The Committee shall be responsible for reviewing:

- a. activities, organization structure and qualifications of the internal audit function;
- b. the resources, budget, reporting relationships and planned activities of the internal audit function;
- c. internal audit findings and determine that they are being properly followed up;
- d. the internal audit procedures and recommending changes, if any; and
- e. the adequacy of the line of communication between internal audit and the Committee, ensuring that it is maintained.

### **Ethical and Legal Compliance and Risk Management**

The responsibilities and duties of the Committee as they relate to compliance and risk management are to:

- a. satisfy itself as to the integrity of the CEO and other senior management and that the CEO and other senior management strive to create a culture of integrity throughout the Company;
- b. review the adequacy, appropriateness and effectiveness of the Company's policies and business practices which impact on the integrity, financial and otherwise, of the Company, including those relating to hedging, insurance, accounting, information services and systems, financial controls and management reporting;
- c. receive a report from management on tax issues and planning, including compliance with the Company's source deduction obligations and other remittances under applicable tax or other legislation;
- d. receive a report on the annual policy attestation process for the Company's Global Code of Ethical Conduct (the "Code") and Global Anti-Corruption Policy;
- e. review annually the adequacy and quality of the Company's financial and accounting staffing, including the need for and scope of internal audit reviews (if any);
- f. receiving reports from management and other Board committees, including without limitation the Health Safety, Environment and Community Committee, on the identification, assessment and management of risks;
- g. in conjunction with any other committee designated by the Board from time to time, reviewing major financial, audit and accounting related risks and the policies, guidelines and mechanisms that management has put in place to govern the process of monitoring, controlling and reporting such risks;
- h. establish procedures for:



- i. the receipt, retention and treatment of complaints received by the Company regarding accounting, internal controls, or auditing matters; and
  - ii. the confidential, anonymous submission by employees of the Company of concerns regarding questionable accounting or auditing matters.
- i. review any complaints and concerns received regarding accounting, internal controls, or auditing matters or with respect to the Code, and the investigation and resolution thereof, and provide all relevant information relating to such complaints and concerns to the Nominating and Governance Committee, taking into account complainant confidentiality concerns and the roles and responsibilities of each Committee;
  - j. review and monitor the Company's compliance with applicable legal and regulatory requirements related to financial reporting and disclosure;
  - k. review all related-party transactions; and
  - l. carry the responsibility for reviewing reports from management, internal and external auditors with respect to the Company's compliance with the laws and regulations having a material impact on financial reporting and disclosure, including: tax and financial reporting laws and regulations; legal withholding requirements; environmental protection laws and regulations; and any other laws and regulations which expose directors to liability.

#### AUTHORITY

- a. The Committee shall have the authority to:
  - i. engage independent counsel and other advisors as it determines necessary to carry out its duties;
  - ii. set and pay the compensation for any advisors employed by the Committee; and
  - iii. communicate directly with the internal and external auditors.
- b. The Committee shall have the power, authority and discretion delegated to it by the Board which shall not include the power to change the membership of or fill vacancies in the Committee.
- c. A resolution approved in writing by the members of the Committee shall be valid and effective as if it had been passed at a duly called meeting. Such resolution shall be filed with the minutes of the proceedings of the Committee and shall be effective on the date stated thereon or on the latest date stated in any counterpart.
- d. The Board shall have the power at any time to revoke or override the authority given to or acts done by the Committee except as to acts done before such revocation or act of overriding and to terminate the appointment or change the membership of the Committee or fill vacancies in it as it shall see fit.
- e. The Committee shall have unrestricted and unfettered access to all Company personnel and documents and shall be provided with the resources necessary to carry out its responsibilities.
- f. At the invitation of the Chair, one or more officers or employees of the Company may, and if required by the Committee, shall attend a meeting of the Committee.
- g. The Committee, upon approval by a majority of the members of the Committee, may delegate certain of its duties and responsibilities to subcommittees of the Committee, which must report back to the full Committee.



## DEFINITIONS

Capitalized terms used in this Charter and not otherwise defined have the meaning attributed to them below:

**“Financially Literate”** means the ability to read and understand a set of financial statements that present a breadth and level of complexity of accounting issues that are generally comparable to the breadth and complexity of the issues that can reasonably be expected to be raised in the Company’s financial statements.

**“Committee Financial Expert”** means a person who has the following attributes:

- a. an understanding of generally accepted accounting principles and financial statements;
- b. the ability to assess the general application of such principles in connection with the accounting for estimates, accruals and reserves;
- c. experience preparing, auditing, analyzing or evaluating financial statements that present a breadth and level of complexity of accounting issues that are generally comparable to the breadth and level of complexity of issues that can reasonably be expected to be raised in the Company’s financial statements, or experience actively supervising one or more persons engaged in such activities;
- d. an understanding of internal controls and procedures for financial reporting; and
- e. an understanding of audit committee functions; acquired through any one or more of the following:
  - i. education and experience as a principal financial officer, principal accounting officer, controller, public accountant or auditor or experience in one or more positions that involve the performance of similar functions;
  - ii. experience actively supervising a principal financial officer, principal accounting officer, controller, public accountant, auditor or person performing similar functions; or
  - iii. experience overseeing or assessing the performance of companies or public accountants with respect to the preparation, auditing or evaluation of financial statements; or other relevant experience.