

# ANNUAL INFORMATION FORM



**ALEXCO**

## **ALEXCO RESOURCE CORP.**

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For the year ended December 31, 2016

Dated March 29, 2017

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## PRELIMINARY NOTES

In this Annual Information Form (“**AIF**”), Alexco Resource Corp. is referred to as the “**Corporation**” or “**Alexco**”. All information contained herein is as at and for the year ended December 31, 2016, unless otherwise specified. All dollar amounts in this AIF are expressed in Canadian dollars unless otherwise indicated.

### Cautionary Statement Regarding Forward-Looking Statements

This AIF contains forward-looking statements within the meaning of the United States Private Securities Litigation Reform Act of 1995 and forward-looking information within the meaning of applicable Canadian securities laws (together, “**forward-looking statements**”) concerning the Corporation’s business plans, including but not limited to anticipated results and developments in the Corporation’s operations in future periods, planned exploration and development of its mineral properties, plans related to its business and other matters that may occur in the future, made as of the date of this AIF. Forward-looking statements may include, but are not limited to, statements with respect to amendments to the silver purchase agreement (“SPA” or the “Silver Purchase Agreement”) with Silver Wheaton Corp. (“**Silver Wheaton**”) and its impact on the Corporation, the resulting effect on pricing and other terms of the SPA, additional capital requirements to fund further exploration and development work on the Corporation’s properties, future remediation and reclamation activities, future mineral exploration, the estimation of mineral reserves and mineral resources, the realization of mineral reserve and mineral resource estimates, future mine construction and development activities, future mine operation and production, the timing of activities, the amount of estimated revenues and expenses, the success of exploration activities, permitting time lines, requirements for additional capital and sources and uses of funds. Any statements that express or involve discussions with respect to predictions, expectations, beliefs, plans, projections, objectives, assumptions or future events or performance (often, but not always, using words or phrases such as “expects”, “anticipates”, “plans”, “estimates”, “intends”, “strategy”, “goals”, “objectives” or stating that certain actions, events or results “may”, “could”, “would”, “might” or “will” be taken, occur or be achieved, or the negative of any of these terms and similar expressions) are not statements of historical fact and may be “forward-looking statements”.

Forward-looking statements are subject to a variety of known and unknown risks, uncertainties and other factors which could cause actual events or results to differ from those expressed or implied by the forward-looking statements. Such factors include, but are not limited to, risks related to actual results and timing of exploration and development activities; actual results and timing of mining activities; actual results and timing of environmental services operations; actual results and timing of remediation and reclamation activities; conclusions of economic evaluations; changes in project parameters as plans continue to be refined; future prices of silver, gold, lead, zinc and other commodities; possible variations in resources, grade or recovery rates; failure of plant, equipment or processes to operate as anticipated; accidents, labour disputes and other risks of the mining industry; First Nation rights and title; continued capitalization and commercial viability; global economic conditions; competition; delays in obtaining governmental approvals or financing or in the completion of development activities, and inability of the Company to obtain additional financing needed to fund certain contingent payment obligations on reasonable terms or at all. Furthermore, forward-looking statements are statements about the future and are inherently uncertain, and actual achievements of the Corporation or other future events or conditions may differ materially from those reflected in the forward-looking statements due to a variety of risks, uncertainties and other factors, including but not limited to those referred to in this AIF under the heading “Risk Factors” and elsewhere.

Forward-looking statements are based on certain assumptions that management believes are reasonable at the time they are made. In making the forward-looking statements included in this AIF, the Corporation has applied several material assumptions, including, but not limited to, the assumption that: (1) additional financing needed to fund certain contingent payment obligations to Silver Wheaton; (2) additional financing needed for the capacity related refund under the SPA with Silver Wheaton will be available on reasonable terms; (3) additional financing needed for further exploration and development work on the Corporation’s properties will be available on reasonable terms; (4) the proposed development of its mineral projects will be viable operationally and economically and proceed as planned; (5) market fundamentals will result in sustained silver, gold, lead and zinc demand and prices, and such prices will

not be materially lower than those estimated by management in preparing the annual financial statements for the year ended December 31, 2016; (6) market fundamentals will result in sustained silver, gold, lead and zinc demand and prices, and such prices will be materially consistent with or more favourable than those anticipated in the Preliminary Economic Assessment (“**PEA**”) (as defined under “Description of the Business – KHSD Property”); (7) the actual nature, size and grade of its mineral resources are materially consistent with the resource estimates reported in the supporting technical reports; (8) labor and other industry services will be available to the Corporation at prices consistent with internal estimates; (9) the continuances of existing and, in certain circumstances, proposed tax and royalty regimes; and (10) that other parties will continue to meet and satisfy their contractual obligations to the Corporation. Statements concerning mineral reserve and resource estimates may also be deemed to constitute forward-looking information to the extent that they involve estimates of the mineralization that will be encountered if the property is developed. Other material factors and assumptions are discussed throughout this AIF and, in particular, under the heading “Risk Factors”.

The Corporation's forward-looking statements are based on the beliefs, expectations and opinions of management on the date the statements are made and should not be relied on as representing the Corporation's views on any subsequent date. While the Corporation anticipates that subsequent events may cause its views to change, the Corporation specifically disclaims any intention or any obligation to update forward-looking statements if circumstances or management's beliefs, expectations or opinions should change, except as required by applicable law. For the reasons set forth above, investors should not place undue reliance on forward-looking statements.

#### Cautionary Note to U.S. Investors – Information Concerning Preparation of Resource Estimates

This AIF has been prepared in accordance with the requirements of the securities laws in effect in Canada, which differ from the requirements of United States securities laws. The terms “mineral reserve”, “proven mineral reserve” and “probable mineral reserve” are Canadian mining terms as defined in accordance with Canadian National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* (“**NI 43-101**”) and the Canadian Institute of Mining, Metallurgy and Petroleum (the “**CIM**”) – *CIM Definition Standards on Mineral Resources and Mineral Reserves*, adopted by the CIM Council, as amended. These definitions differ materially from the definitions in the United States Securities and Exchange Commission’s (“**SEC**”) Industry Guide 7 under the United States Securities Act of 1933, as amended. Under SEC Industry Guide 7 standards, mineralization cannot be classified as a “reserve” unless the determination has been made that the mineralization could be economically and legally extracted at the time the reserve determination is made. As applied under SEC Industry Guide 7, a “final” or “bankable” feasibility study is required to report reserves, the three-year historical average price is used in any reserve or cash flow analysis to designate reserves, and the primary environmental analysis or report must be filed with the appropriate governmental authority.

In addition, the terms “mineral resource”, “measured mineral resource”, “indicated mineral resource” and “inferred mineral resource” are defined in and required to be disclosed by NI 43-101; however, these terms are not defined terms under SEC Industry Guide 7 and are normally not permitted to be used in reports and registration statements filed with the SEC. Investors are cautioned not to assume that all or any part of a mineral deposit in these categories will ever be converted into SEC Industry Guide 7 reserves. “Inferred mineral resources” have a great amount of uncertainty as to their existence, and great uncertainty as to their economic and legal feasibility. It cannot be assumed that all or any part of an inferred mineral resource will ever be upgraded to a higher category. Under Canadian rules, estimates of inferred mineral resources may not form the basis of feasibility or pre-feasibility studies, except in rare cases. Investors are cautioned not to assume that all or any part of an inferred mineral resource exists or is economically or legally mineable. Disclosure of “contained ounces” in a resource is permitted disclosure under Canadian regulations; however, the SEC normally only permits issuers to report mineralization that does not constitute “reserves” by SEC Industry Guide 7 standards as in place tonnage and grade without reference to unit measures.

Accordingly, information concerning mineral deposits contained in this AIF may not be comparable to similar information made public by U.S. companies subject to the reporting and disclosure requirements under the United States federal securities laws and the rules and regulations thereunder, including SEC Industry Guide 7.

### Qualified Person Under NI 43-101

Except where specifically indicated otherwise, the disclosure in this AIF of scientific and technical information regarding exploration projects on Alexco's mineral properties has been reviewed and approved by Alan McOnie, FAusIMM, Vice President, Exploration, while that regarding mine development and operations has been reviewed and approved by Scott Smith, P.Eng., former Bellekeno Mine Manager, both of whom are Qualified Persons as defined by NI 43-101.

### **GLOSSARY OF TECHNICAL TERMS**

The following is a glossary of certain mining terms used in this AIF:

<b>Acre</b>	An area of 4,840 square yards or 43,560 square feet.
<b>Ag</b>	Silver.
<b>Assay</b>	In economic geology, to analyze the proportions of metal in a rock or overburden sample; to test an ore or mineral for composition, purity, weight or other properties of commercial interest.
<b>Au</b>	Gold.
<b>CIM</b>	Canadian Institute of Mining and Metallurgy.
<b>Deposit</b>	A mineralized body which has been physically delineated by sufficient drilling, trenching, and/or underground work, and found to contain a sufficient average grade of metal or metals to warrant further exploration and/or development expenditures; such a deposit does not qualify as a commercially mineable ore body or as containing ore reserves, until final legal, technical, and economic factors have been resolved.
<b>Dip</b>	The angle at which a stratum is inclined from the horizontal.
<b>Fold</b>	A bend in strata or any planar structure.
<b>g/t Au</b>	Grams per tonne gold.
<b>g/t Ag</b>	Grams per tonne silver.
<b>Grade</b>	The amount of valuable metal in each tonne of mineralized rock, expressed as grams per tonne (g/t) for precious metals, as percent (%) for copper, lead, zinc and nickel.
<b>Hectare</b>	An area equal to 100 meters by 100 meters.
<b>km</b>	Kilometers.
<b>m</b>	Meters.
<b>Mineral Reserve, Proven Mineral Reserve, Probable Mineral Reserve</b>	Under CIM standards, a Mineral Reserve is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by a preliminary feasibility study or feasibility study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined.

The terms "Mineral Reserve", "Proven Mineral Reserve" and "Probable Mineral

Reserve” used in this AIF are mining terms defined under CIM standards and used in accordance with NI 43-101. Mineral Reserves, Proven Mineral Reserves and Probable Mineral Reserves presented under CIM standards may not conform with the definitions of “reserves” or “proven reserves” or “probable reserves” under United States Industry Guide 7. See “Preliminary Notes – Cautionary Note to U.S. Investors – Information Concerning Preparation of Resource Estimates”.

Mineral Reserves under CIM standards are those parts of Mineral Resources which, after the application of all mining factors, result in an estimated tonnage and grade which, in the opinion of the qualified person(s) making the estimates, is the basis of an economically viable project after taking account of all relevant processing, metallurgical, economic, marketing, legal, environment, socio-economic and government factors. Mineral Reserves are inclusive of diluting material that will be mined in conjunction with the Mineral Reserves and delivered to the treatment plant or equivalent facility. The term ‘Mineral Reserve’ needs not necessarily signify that extraction facilities are in place or operative or that all governmental approvals have been received. It does signify that there are reasonable expectations of such approvals.

Under CIM standards, Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve.

**Proven Mineral Reserve:** A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource demonstrated by at least a preliminary feasibility study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that the economic extraction can be justified.

**Probable Mineral Reserve:** A Probable Mineral Reserve is the economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource demonstrated by at least a preliminary feasibility study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that the economic extraction can be justified.

**Mineral Resource,  
Measured Mineral  
Resource, Indicated  
Mineral Resource,  
Inferred Mineral  
Resource**

Under CIM standards, Mineral Resource is a concentration or occurrence of natural, solid, inorganic or fossilized organic material in or on the earth’s crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

The terms “mineral resource”, “measured mineral resource”, “indicated mineral resource”, and “inferred mineral resource” used in this AIF are mining terms defined under CIM standards and used in accordance with NI 43-101. They are not defined terms under United States Industry Guide 7 and generally may not be used in documents filed with the SEC by U.S. companies. See “Preliminary Notes – Cautionary Note to U.S. Investors – Information Concerning Preparation of Resource Estimates”.

A mineral resource estimate is based on information on the geology of the deposit and the continuity of mineralization. Assumptions concerning economic and operating parameters, including cut-off grades and economic mining widths, based on factors typical for the type of deposit, may be used if these factors have not been specifically established for the deposit at the time of the mineral

resource estimate. A mineral resource is categorized on the basis of the degree of confidence in the estimate of quantity and grade or quality of the deposit, as follows:

**Inferred Mineral Resource:** Under CIM standards, an Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

**Indicated Mineral Resource:** Under CIM standards, an Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

**Measured Mineral Resource:** Under CIM standards, a Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity.

<b>Mineralization</b>	The concentration of metals and their chemical compounds within a body of rock.
<b>Ore</b>	A metal or mineral or a combination of these of sufficient value as to quality and quantity to enable it to be mined at a profit.
<b>Ounce or oz</b>	A troy ounce or twenty penny weights or 480 grains or 31.103 grams.
<b>Outcrop</b>	An exposure of bedrock at the surface.
<b>Pb</b>	Lead.
<b>Quartz</b>	A mineral composed of silicon dioxide.
<b>Strike</b>	Direction or trend of a geologic structure as it intersects the horizontal.
<b>Ton</b>	Also referred to as "short ton", a United States unit of weight equivalent to 2,000 pounds.
<b>Tonne</b>	A metric unit of weight equivalent to volume multiplied by specific gravity; equivalent to 1.102 tons or 1,000 kilograms (2,204.6 pounds).
<b>Vein</b>	Thin sheet-like intrusion into a fissure or crack, commonly bearing quartz.
<b>Zn</b>	Zinc.



### **Metric Equivalents**

The following table sets forth the factors for converting between Imperial measurements and metric equivalents:

<b>To Convert From</b>	<b>To</b>	<b>Multiply By</b>
Feet	Meters	0.305
Meters	Feet	3.281
Miles	Kilometers (“ <b>km</b> ”)	1.609
Kilometers	Miles	0.6214
Acres	Hectares (“ <b>ha</b> ”)	0.405
Hectares	Acres	2.471
Grams	Ounces (Troy)	0.03215
Grams/Tonnes	Ounces (Troy)/Short Ton	0.02917
Tonnes (metric)	Pounds	2,205
Tonnes (metric)	Short Tons	1.1023

## CORPORATE STRUCTURE

The Corporation was incorporated under the *Business Corporations Act* (Yukon) on December 3, 2004 under the name "Alexco Resource Corp." Effective December 28, 2007, it was continued under the *Business Corporations Act* (British Columbia).

The Corporation's head office is located at Suite 1225, Two Bentall Centre, 555 Burrard Street, Box 216, Vancouver, British Columbia, V7X 1M9, Canada, and its registered and records office is located at 10th Floor, 595 Howe Street, Vancouver, British Columbia, V6C 2T5, Canada.

At the end of its most recently completed financial year, the Corporation had the following wholly-owned subsidiaries:

- Alexco Keno Hill Mining Corp., organized under the laws of British Columbia;
- Alexco Exploration Canada Corp., organized under the laws of British Columbia;
- Elsa Reclamation & Development Company Ltd., organized under the laws of Yukon ("**ERDC**");
- Alexco Environmental Group Inc. (formerly Access Mining Consultants Ltd.), organized under the laws of Yukon ("**AEG Canada**");
- Alexco Environmental Group (US) Inc. (formerly Alexco Resource U.S. Corp.), organized under the laws of Colorado ("**AEG US**"); and
- Alexco Financial Guaranty Corp., organized under the laws of Colorado.

Unless otherwise indicated or the context otherwise requires, reference to the term the "Corporation" or "Alexco" in this AIF includes Alexco Resource Corp. and its subsidiaries.

## GENERAL DEVELOPMENT OF THE BUSINESS

### Formation of the Corporation

In 2005, the Corporation completed a series of transactions pursuant to which it acquired a number of mineral property interests and rights to certain operating contracts in Yukon Territory and British Columbia, the most significant of which properties are located in Yukon Territory's Keno Hill Silver District.

Alexco operates two principal businesses: (i) a mining business, comprised of mineral exploration and mine development and operation in Canada, primarily in Yukon Territory; and (ii) through its Alexco Environmental Group Division (through AEG Canada and AEG US), provision of a variety of mine and industrial site related environmental services including management of the regulatory and environmental permitting process, environmental assessments, and reclamation and closure planning in Canada, the United States and elsewhere.

### Three Year History and Significant Acquisitions

In June 2005, the Corporation was selected as the preferred purchaser of the assets of United Keno Hill Mines Limited and UKH Minerals Limited (collectively, "**UKHM**") by a court appointed interim receiver and receiver-manager of UKHM. In February 2006, following negotiation of a subsidiary agreement (the "**Subsidiary Agreement**") between the Government of Canada, the Government of Yukon (collectively, the "**Government Group**") and the Corporation, the Supreme Court of Yukon conditionally approved the purchase of the assets of UKHM by Alexco through its wholly-owned subsidiary, ERDC, final closing of which acquisition was effected in December 2007. Under the terms of the Subsidiary Agreement, the Corporation is indemnified by the Government of Canada for all liabilities, including environmental liabilities, arising directly or indirectly as a result of the pre-existing condition of the Keno Hill mineral rights and other assets acquired from UKHM. The Subsidiary Agreement provides that ERDC may bring

any mine into production on the UKHM Mineral Rights (as hereinafter defined) by designating a production unit from the mineral rights relevant to that purpose and then assuming responsibility for all costs of the production unit's water related care and maintenance and water related components of closure reclamation. The Subsidiary Agreement further requires ERDC to pay into a separate reclamation trust a 1.5% net smelter return royalty, up to an aggregate maximum of \$4 million for all production units, from any future production from the UKHM Mineral Rights, commencing once earnings from mining before interest, taxes and depreciation exceed actual exploration costs, up to a maximum of \$6.2 million, plus actual development and construction capital.

Also under the Subsidiary Agreement, ERDC is retained through the Government Group as a paid contractor responsible on a continuing basis for the environmental care and maintenance and ultimate closure reclamation of the former UKHM Mineral Rights. The original Subsidiary Agreement provided that ERDC was responsible for the development of the ultimate closure reclamation plan for fees of 65% of agreed commercial contractor rates, and this plan development is currently ongoing. Upon acceptance and regulatory approval, the closure reclamation plan will be implemented by ERDC at full agreed commercial contractor rates. During the period required to develop the plan, the original Subsidiary Agreement also provided that ERDC was responsible for carrying out the environmental care and maintenance of the UKHM Mineral Rights for a reducing fixed annual fee adjusted each year for certain operating and inflationary factors.

In July 2013, an amended and restated Subsidiary Agreement (the "ARSA") was executed with the Government of Canada. Recognizing that developing the closure reclamation plan is more complicated than originally anticipated, the ARSA provides for the Government of Canada to contribute a higher proportion of closure plan development costs than provided for under the Subsidiary Agreement, retroactive to 2009. Going forward, ERDC will receive 95% of agreed commercial contractor rates for ongoing development of the closure reclamation plan. Furthermore, with respect to care and maintenance activity during the closure reclamation planning phase, the original reducing fee scale is replaced by a fixed fee of \$850,000 per year, representing approximately 50% of estimated fully-billable care and maintenance fees.

Since 2006, the Corporation has carried out exploration activities on several of its properties within the Keno Hill District, with a significant component of that activity having been focused on the Bellekeno property and the Bellekeno mine, which commenced commercial production effective January 1, 2011.

Under terms of the original Silver Purchase Agreement (entered into on October 2, 2008 and subsequently amended on October 20, 2008, December 10, 2008, December 22, 2009, March 31, 2010, January 15, 2013, March 11, 2014 and June 16, 2014, respectively):

- the Corporation and certain of its subsidiaries received up-front deposit payments from Silver Wheaton totaling US\$50 million, and received further payments of the lesser of US \$3.90 (increasing by 1% per annum after the third year of full production) and the prevailing market price for each ounce of payable silver delivered, if as and when delivered;
- Silver Wheaton would receive 25% of the life of mine silver produced by the Corporation from its Keno Hill Silver District properties; and
- the initial silver deliveries were to come from the Bellekeno mine.

In light of a sharply reduced silver price environment, Bellekeno mining operations were suspended as of September 30, 2013.

On March 29, 2017 the Corporation and certain of its subsidiaries and Silver Wheaton entered into an amendment agreement to the Silver Purchase Agreement (the "Amended SPA") pursuant to which, among other things, the following amendments were made to the Silver Purchase Agreement:

- Silver Wheaton will continue to receive 25% of the life of mine payable silver from the KHSD. The production payment (originally US\$3.90 per ounce) will be based on monthly silver head grade and monthly silver price:
- The actual monthly production payment will fall within a defined grade and pricing range governed by upper and lower numeric criteria (ceiling grade/price and floor grade/price) according to the following formula:

$$\frac{(\text{Ceiling Grade} - \text{Deemed Shipment Head Grade})}{(\text{Ceiling Grade} - \text{Floor Grade})} \times \frac{(\text{Ceiling Price} - \text{Deemed Shipment Silver Price})}{(\text{Ceiling Price} - \text{Floor Price})} \times \text{Market Price}$$

Floor Grade	=	600 g/t Ag
Floor Price	=	US\$13/oz Ag
Ceiling Grade	=	1,400 g/t Ag
Ceiling Price	=	US\$25/oz Ag
Deemed Shipment Head Grade	=	Calculated monthly mill silver head grade
Deemed Shipment Silver Price	=	Average monthly silver price
Market Price	=	Spot silver price prior to day of sale

- The date for completion of the 400 tonne per day mine and mill completion test date was extended to December 31, 2019;
- The Silver Wheaton area of interest remains one (1) km around existing Alexco holdings in the KHSD.

In consideration of the foregoing amendments, the Corporation has agreed, subject to TSX and NYSE-MKT approval, to issue 3,000,000 shares to Silver Wheaton with an approximate fair value of US\$4,934,948.

In addition to the mining business described above, the Corporation also operates an environmental services business through its Alexco Environmental Group division (“**AEG**”). Primarily through AEG Canada, AEG US and ERDC, AEG provides a variety of mine and industrial site related environmental services including management of the regulatory and environmental permitting process, environmental assessments and reclamation and closure planning. AEG operations also include the care and maintenance and closure reclamation activities being conducted by the Corporation in the Keno Hill District under the Subsidiary Agreement. Alexco also owns certain patents (the “**Patents**”) registered or in the process of being registered in the U.S., Canada and various other countries around the world, with terms that expire variously between 2017 and 2020. The Patents generally pertain to the in situ immobilization of metals, and are specifically suited to mine closure related remediation.

Further particulars relating to the business of AEG, including activities being conducted under the Subsidiary Agreement, are described below under “Description of the Business – Environmental Services”.

## DESCRIPTION OF THE BUSINESS

The Corporation operates two principal businesses: a mining business, comprised of mineral exploration and mine development and operation in Canada, primarily in Yukon Territory; and through AEG an environmental services business, providing consulting, remediation solutions and project management services in respect of environmental permitting and compliance and site remediation, in Canada, the United States and elsewhere.

At December 31, 2016, the Corporation had 53 permanent and seasonal employees. A total of 7 were employed in the care and maintenance of the Bellekeno mine and mill site care and maintenance, and a

further 2 were employed in mineral exploration and evaluation activities. A total of 37 were employed in the environmental services business, with the remaining 7 employed in respect of executive management and administrative support. Significant aspects of both the mining business and the environmental services business require specialized skills and knowledge in areas that include geology, mining, metallurgy, engineering, environmental contamination treatment, permitting and regulatory compliance, as well as environmental and social policy issues. Any re-start of Alexco's mining operations will necessitate the hiring of additional mine and mill personnel.

## **Mining Business**

The Corporation's principal mining business activities are currently being carried out within the Keno Hill District in Yukon Territory. The Keno Hill District (the "**District**") is a storied silver mining region in Canada, encompassing over 35 former mines that produced variously from approximately 1918 through 1988, with published information from the Yukon Government's Minfile database reporting more than 217 million ounces of silver produced at average grades of 40.5 ounces per ton silver, 5.6% lead and 3.1% zinc.

The Corporation's mineral property holdings within the District span a significant majority of the regional area, and most of the former mines. The Keno Hill Silver District (the "KHSD") property comprises the Flame & Moth, Bellekeno, Onek, Birmingham and Lucky Queen deposits as well as the Elsa Tailings properties. The Corporation holds several other less advanced property interests within the District, including but not limited to the Silver King, Husky and McQuesten properties, which may potentially become material properties depending on the results of exploration programs the Corporation may carry out on them in the future. In aggregate, Alexco's various mineral properties within the Keno Hill District are comprised of mineral rights totaling approximately 725 surveyed quartz mining leases, 872 unsurveyed quartz mining claims, eight (8) placer claims and two (2) crown grants, in addition to five (5) fee simple lots and seven (7) surface leases. Of those, the mineral rights acquired from UKHM (the "**UKHM Mineral Rights**") and therefore subject to the capped 1.5% net smelter return royalty provided for under the Subsidiary Agreement (see "General Development of the Business – Three Year History and Significant Acquisitions") total 676 quartz mining leases, 121 quartz mining claims and two crown grants.

Other non-material mineral property interests of the Corporation include the Sprogge and Harlan properties in the Yukon, and certain net smelter return royalties in respect of the Brewery Creek and Ida-Oro (formerly Klondike) properties in the Yukon and the Telegraph Creek, Iskut River, Kiniskan Lake and Manson Creek properties in British Columbia.

## **KHSD Property**

The Corporation's 100% owned KHSD property encompasses the Bellekeno, Flame & Moth, Lucky Queen, Onek and Birmingham deposits and comprises 703 surveyed quartz mining leases and 866 unsurveyed quartz mining claims and two Crown Grants, half of which are UKHM Mineral Rights.

An independent technical report dated March 29, 2017 with an effective date of January 3, 2017 prepared by Roscoe Postle Associates Inc. ("**RPA**") entitled "Preliminary Economic Assessment of the Keno Hill Silver District Project, Yukon, Canada" (the "**PEA**") was filed and is available on SEDAR under the Corporation's profile at [www.sedar.com](http://www.sedar.com).

Attached as Schedule "A" to this AIF is the summary contained in the PEA, which summary has been updated and conformed to be consistent with other disclosure within this AIF.

The detailed disclosure contained in the PEA is hereby incorporated by reference. It is noted that the PEA contains references and/or assumptions relating to the dates for re-starting or continuing mining operations or development work at certain of Alexco's mineral properties. Notwithstanding the incorporation by reference herein of the PEA and reproduction of the summary section in Schedule "A" hereto, such dates were projections made at the time the PEA was prepared and are not necessarily reflective of Alexco's current plans. Re-start of mining operations and/or development work is dependent on a number of factors, including sustained improvements in silver markets and the effectiveness of cost

structure reduction measures. Accordingly, there is no certainty as to when these factors will be achieved or that mining operations or development work will re-start.

## **Environmental Services**

### ***General***

The Corporation's environmental services division, AEG, is in the business of managing risk and unlocking value at mature, closed or abandoned sites through integration and implementation of the Corporation's core competencies, which include management of environmental services, implementation of innovative treatment technologies, execution of site reclamation and closure operations, and, if appropriate, rejuvenation of exploration and development activity. The Corporation's principal markets for these services are in Canada, the United States and the Americas, with the Canadian market serviced primarily through AEG Canada and ERDC, the U.S. market through AEG US, and the balance of the Americas through either AEG Canada or AEG US. The Corporation provides its services to a range of industrial sectors, but with a particular focus on current and former mine sites.

The Corporation offers its clients a unique combination of environmental remediation expertise in the area of site reclamation and closure, an ability to manage complex permitting and regulatory programs on a turnkey basis, and strong operations management. In addition, the Corporation seeks to strategically leverage off its environmental services group, accessing opportunities to enhance asset value through effective liability risk management and efficient site operations. This is accomplished through unlocking potential exploration and development opportunities at contaminated or abandoned sites through cost effective and responsible environmental remediation and liability transfer.

The Corporation executes its environmental services business plan by using and applying the intellectual property assets, including the Patents, and the specialized skill sets and knowledge it maintains in-house. While there are a significant number of firms providing environmental services in North America, these assets, skill sets and knowledge provide Alexco with a strong competitive advantage. Consolidated revenue from environmental services for the year ended December 31, 2016 totaled \$11,361,000, compared to \$14,662,000 in 2015, all of which was derived from sales to external unrelated parties. During the year ended December 31, 2016, the Corporation recorded revenues from three customers representing 10% or more of total environmental services revenue, in the amounts of \$3,220,000, \$3,044,000 and \$1,746,000. During 2015, AEG had two customers representing 10% or more of total revenue, in the amounts of \$4,731,000 and \$2,556,000. AEG's largest single customer is the Government of Canada, with a substantial component of Government revenues earned from the Government of Canada's Indian and Northern Affairs Canada.

### ***Keno Hill Project***

As described above (see "General Development of the Business – Three Year History and Significant Acquisitions"), under the Subsidiary Agreement, Alexco's subsidiary ERDC was retained through the Government Group as a paid contractor responsible on a continuing basis for the environmental care and maintenance and ultimate closure reclamation of the former UKHM Mineral Rights.

Pursuant to the Subsidiary Agreement, ERDC shares the responsibility for the development of the ultimate closure reclamation plan with the Government of Canada, for which it would receive fees of 65% of agreed commercial contractor rates, and this plan development is currently ongoing. Upon acceptance and regulatory approval, the closure reclamation plan will be implemented by ERDC at full agreed contractor rates. During the period required to develop the plan and until the closure plan is executed, ERDC is also responsible for carrying out the environmental care and maintenance at various sites within the UKHM Mineral Rights, for a fixed annual fee adjusted each year for certain operating and inflationary factors and determined on a site-by-site basis. Under the Subsidiary Agreement, the portion of the annual fee amount so determined which was billable by ERDC in respect of each site reduced by 15% each year until all site-specific care and maintenance activities were replaced by closure reclamation activities; provided however that should a closure reclamation plan be prepared but not accepted and approved, the portion of annual fees billable by ERDC would revert to 85% until the Subsidiary Agreement was either amended or terminated. ERDC receives agreed commercial contractor rates when

retained by the Government Group to provide environmental services in the Keno Hill District outside the scope of care and maintenance and closure reclamation planning under the Subsidiary Agreement. As a result of these terms, the Corporation has previously recognized an environmental services contract loss provision to reflect aggregate future losses estimated to be realized with respect to care and maintenance activity during the closure planning phase.

In July 2013, the Corporation executed an amended and restated Subsidiary Agreement, the ARSA, with the Government of Canada. Recognizing that developing the closure reclamation plan is more complicated than originally anticipated, the ARSA provides for the Government of Canada to contribute a higher proportion of those costs than provided for under the Subsidiary Agreement, retroactive to 2009. As a result, included in revenues for AEG for 2013 is \$1,983,000 in one-time retroactive fees. Going forward, ERDC receives 95% of agreed commercial contractor rates for ongoing development of the closure reclamation plan. Furthermore, with respect to care and maintenance activity during the closure planning phase, the original reducing fee scale was replaced by a fixed fee of \$850,000 per year, representing approximately 50% of estimated fully-billable fees. As a result, included in AEG cost of sales in 2013 was an \$850,000 reduction in the Corporation's environmental services contract loss provision, partially offset by a \$107,000 increase due to an extension of the estimated date by which the care and maintenance phase will end to August 2018.

### **Social and Environmental Policies**

The Corporation maintains a written Code of Business Conduct and Ethics (the "**Code**"), compliance with which is mandatory for all directors, officers and employees, and the full text of which may be viewed at the Corporation's web site. Included within the Code is a requirement that all directors, officers and employees comply with all laws and governmental regulations applicable to Alexco's activities, including but not limited to maintaining a safe and healthy work environment, promoting a workplace that is free from discrimination or harassment and conducting all activities in full compliance with all applicable environmental laws. All directors, officers and employees are required to certify in writing their acknowledgement of and compliance with the Code, at the time of hiring and at least annually thereafter. A senior executive of the Corporation is formally appointed the role of Company Ethics Officer, responsible for ensuring adherence to the Code, investigating any reported violations, and ensuring appropriate responses, including corrective action and preventative measures, are taken when required.

### **RISK FACTORS**

The following are major risk factors management has identified which relate to the Corporation's business activities. Such risk factors could materially affect the Corporation's future financial results, and could cause events to differ materially from those described in forward-looking statements relating to the Corporation. Though the following are major risk factors identified by management, they do not comprise a definitive list of all risk factors related to the Corporation's business and operations. Other specific risk factors are discussed elsewhere in this AIF, as well as in the Corporation's consolidated financial statements (under the headings "Description of Business and Nature of Operations", "Significant Accounting Policies" and "Financial Instruments" and elsewhere within that document) and in management's discussion and analysis (under the headings "Critical Accounting Estimates" and "Risk Factors" and elsewhere within that document) for its most recently completed financial year, being the year ended December 31, 2016, and its other disclosure documents, all as filed on the SEDAR website at [www.sedar.com](http://www.sedar.com).

### **Negative Cash Flow From Operating Activities**

The Corporation has not yet consistently achieved positive operating cash flow, and there are no assurances that the Corporation will not experience negative cash flow from operations in the future. The Corporation has incurred net losses in the past and may incur losses in the future and will continue to incur losses until and unless it can derive sufficient revenues from its mineral projects. Such future losses could have an adverse effect on the market price of the Corporation's common shares, which could cause investors to lose part or all of their investment.

## **Forward-Looking Statements May Prove Inaccurate**

Readers are cautioned not to place undue reliance on forward-looking statements. By their nature, forward-looking statements involve numerous assumptions, known and unknown risks and uncertainties, of both a general and specific nature, that could cause actual results to differ materially from those suggested by the forward-looking statements. See "Preliminary Notes – Cautionary Statement Regarding Forward-Looking Statements".

## **Dilution**

The Corporation expects to require additional funds to finance its growth and development strategy. If the Corporation elects to raise additional funds by issuing additional equity securities, such financing may substantially dilute the interests of the Corporation's shareholders. The Corporation may also issue additional securities in the future pursuant to existing and new agreements in respect of its projects or other acquisitions and pursuant to existing securities of the Corporation.

## **Exploration, Evaluation and Development**

Mineral exploration, evaluation and development involves a high degree of risk and few properties which are explored are ultimately developed into producing mines. With respect to the Corporation's properties, should any ore reserves exist, substantial expenditures will be required to confirm ore reserves which are sufficient to commercially mine, and to obtain the required environmental approvals and permitting required to commence commercial operations. Should any mineral resource be defined on such properties there can be no assurance that the mineral resource on such properties can be commercially mined or that the metallurgical processing will produce economically viable and saleable products. The decision as to whether a property contains a commercial mineral deposit and should be brought into production will depend upon the results of exploration programs and/or technical studies, and the recommendations of duly qualified engineers and/or geologists, all of which involves significant expense. This decision will involve consideration and evaluation of several significant factors including, but not limited to: (1) costs of bringing a property into production, including exploration and development work, preparation of appropriate technical studies and construction of production facilities; (2) availability and costs of financing; (3) ongoing costs of production; (4) market prices for the minerals to be produced; (5) environmental compliance regulations and restraints (including potential environmental liabilities associated with historical exploration activities); and (6) political climate and/or governmental regulation and control.

The ability of the Corporation to sell, and profit from the sale of any eventual production from any of the Corporation's properties will be subject to the prevailing conditions in the marketplace at the time of sale. Many of these factors are beyond the control of the Corporation and therefore represent a market risk which could impact the long term viability of the Corporation and its operations.

## **Figures for the Corporation's Resources are Estimates Based on Interpretation and Assumptions and May Yield Less Mineral Production Under Actual Conditions than is Currently Estimated**

In making determinations about whether to advance any of its projects to development, the Corporation must rely upon estimated calculations as to the mineral resources and grades of mineralization on its properties. Until ore is actually mined and processed, mineral resources and grades of mineralization must be considered as estimates only. Mineral resource estimates are imprecise and depend upon geological interpretation and statistical inferences drawn from drilling and sampling which may prove to be unreliable. Alexco cannot be certain that:

- reserve, resource or other mineralization estimates will be accurate; or
- mineralization can be mined or processed profitably.

Any material changes in mineral resource estimates and grades of mineralization will affect the economic viability of placing a property into production and a property's return on capital. The Corporation's resource estimates have been determined and valued based on assumed future prices, cut-off grades



and operating costs that may prove to be inaccurate. Extended declines in market prices for silver, gold, lead, zinc and other commodities may render portions of the Corporation's mineralization uneconomic and result in reduced reported mineral resources.

### **Amendments to Share Purchase Agreement with Silver Wheaton**

The March 29, 2017 amendments to the SPA with Silver Wheaton, requires that to satisfy the completion test under the Amended SPA, the Corporation will need to recommence operations on the KHSD Property and operate the mine and mill at 400 tonnes per day on or before December 31, 2019. If the completion test is not satisfied by December 31, 2019, the outcome could materially adversely affect the Corporation as it would be required to pay a capacity related refund to Silver Wheaton in the maximum amount of US\$8.8 million. The Corporation would need to raise additional capital to finance the capacity related refund and there is no guarantee that the Corporation will be able to raise such additional capital. In the event that the Corporation cannot raise such additional capital, the Corporation will default under the terms of the Amended SPA.

### **Keno Hill District**

While the Corporation has conducted exploration activities in the Keno Hill District, further review of historical records and/or additional exploration and geological testing will be required to determine whether any of the mineral deposits it contains are economically recoverable. There is no assurance that such exploration and testing will result in favourable results. The history of the Keno Hill District has been one of fluctuating fortunes, with new technologies and concepts reviving the District numerous times from probable closure until 1989, when it did ultimately close down for a variety of economic and technical reasons. Many or all of these economic and technical issues will need to be addressed prior to the commencement of any future production on the Keno Hill properties.

### **Mining Operations**

Decisions by the Corporation to proceed with the construction and development of mines, including Bellekeno, are based on development plans which include estimates for metal production and capital and operating costs. Until completely mined and processed, no assurance can be given that such estimates will be achieved. Failure to achieve such production and capital and operating cost estimates or material increases in costs could have an adverse impact on the Corporation's future cash flows, profitability, results of operations and financial condition. The Corporation's actual production and capital and operating costs may vary from estimates for a variety of reasons, including: actual resources mined varying from estimates of grade, tonnage, dilution and metallurgical and other characteristics; short-term operating factors, such as the need for sequential development of resource bodies and the processing of new or different resource grades; revisions to mine plans; risks and hazards associated with mining; natural phenomena, such as inclement weather conditions, water availability, floods fire, rock falls and earthquakes, equipment failure and failure of retaining dams around tailings disposal areas which may result in, among other adverse effects, environmental pollution and consequent liability; and unexpected labour shortages or strikes. Costs of production may also be affected by a variety of factors, including changing waste ratios, metallurgical recoveries, labour costs, commodity costs, general inflationary pressures and currency rates. In addition, the risks arising from these factors are further increased while any such mine is progressing through the ramp-up phase of its operations and has not yet established a consistent production track record.

Furthermore, mining operations at the Bellekeno mine project were suspended as of early September 2013 as a result of sharp and significant declines in precious metals prices during the second quarter of 2013. Re-start of mining operations is dependent on a number of factors, including sustained improvements in silver markets and the effectiveness of cost structure reduction measures, and the uncertainties around the achievement of these factors are significant.

### **Employee Recruitment and Retention**

Recruitment and retention of skilled and experienced employees is a challenge facing the mining sector as a whole. During the late 1990s and early 2000s, with unprecedented growth in the technology sector

and an extended cyclical downturn in the mining sector, the number of new workers entering the mining sector was depressed and significant number of existing workers departed, leading to a so-called “generational gap” within the industry. Since the mid-2000s, this factor was exacerbated by competitive pressures as the mining sector experienced an extended cyclical upturn. Additional exacerbating factors specific to Alexco include competitive pressures in labour force demand from the oil sands sector in northern Alberta and the mining and oil & gas sectors in British Columbia, and the fact that Alexco’s Keno Hill District is a fly-in/fly-out operation. Alexco has experienced employee recruitment and retention challenges, particularly with respect to mill operators in 2011 and through the first three quarters of 2012. There can be no assurance that such challenges won’t continue or resurface, not only with respect to the mill but in other District operational areas as well including mining and exploration. Furthermore, any re-start of mining operations will necessitate the re-hiring of mine and mill personnel.

### **Permitting and Environmental Risks and Other Regulatory Requirements**

The current or future operations of the Corporation, including development activities, commencement of production on its properties and activities associated with the Corporation’s mine reclamation and remediation business, require permits or licenses from various federal, territorial and other governmental authorities, and such operations are and will be governed by laws, regulations and agreements governing prospecting, development, mining, production, taxes, labour standards, occupational health, waste disposal, toxic substances, land use, environmental protection, mine safety and other matters. Companies engaged in the development and operation of mines and related facilities and in mine reclamation and remediation activities generally experience increased costs and delays as a result of the need to comply with the applicable laws, regulations and permits. There can be no assurance that all permits and permit modifications which the Corporation may require for the conduct of its operations will be obtainable on reasonable terms or that such laws and regulations would not have an adverse effect on any project which the Corporation might undertake.

Any failure by the Corporation to comply with applicable laws, regulations and permitting requirements may result in enforcement actions including orders issued by regulatory or judicial authorities causing operations to cease or be curtailed, and may include corrective measures requiring capital expenditures, installation of additional equipment or remedial actions against the Corporation. The Corporation may be required to compensate those suffering loss or damage by reason of the Corporation’s mining operations or mine reclamation and remediation activities and may have civil or criminal fines or penalties imposed upon it for violation of applicable laws or regulations.

Amendments to current laws, regulations and permits governing operations and activities of mining companies and mine reclamation and remediation activities could have a material adverse impact on the Corporation. As well, policy changes and political pressures within and on federal, territorial and First Nation governments having jurisdiction over or dealings with the Corporation could change the implementation and interpretation of such laws, regulations and permits, also having a material adverse impact on the Corporation. Such impacts could result in one or more of increases in capital expenditures or production costs, reductions in levels of production at producing properties or abandonment or delays in the development of new mining properties.

### **Environmental Services**

A material decline in the level of activity or reduction in industry willingness to spend capital on mine reclamation, remediation or environmental services could adversely affect demand for AEG’s environmental services. Likewise, a material change in mining product commodity prices, the ability of mining companies to raise capital or changes in domestic or international political, regulatory and economic conditions could adversely affect demand for AEG’s services.

Two of AEG’s customers accounted for 28.3% and 26.8%, respectively, of environmental services revenues in the 2016 fiscal year. The loss of, or a significant reduction in the volume of business conducted with, either of these customers could have a significant detrimental effect on AEG’s environmental services business and the Corporation.

The patents which the Corporation owns or has access to or other proprietary technology may not prevent AEG's competitors from developing substantially similar technology, which may reduce AEG's competitive advantage. Similarly, the loss of access to any of such patents or other proprietary technology or claims from third parties that such patents or other proprietary technology infringe upon proprietary rights which they may claim or hold would be detrimental to AEG's reclamation and remediation business and a material adverse impact on the Corporation.

AEG may not be able to keep pace with continual and rapid technological developments that characterize the market for AEG's environmental services, and AEG's failure to do so may result in a loss of its market share. Similarly, changes in existing regulations relating to mine reclamation and remediation activities could require AEG to change the way it conducts its business.

AEG is dependent on the professional skill sets of its employees, some of whom would be difficult to replace. The loss of any such employees could significantly affect AEG's ability to service existing clients, its profitability and its ability to grow its business.

### **Potential Profitability of Mineral Properties Depends Upon Factors Beyond the Control of the Corporation**

The potential profitability of mineral properties is dependent upon many factors beyond the Corporation's control. For instance, world prices of and markets for gold, silver, lead and zinc are unpredictable, highly volatile, potentially subject to governmental fixing, pegging and/or controls and respond to changes in domestic, international, political, social and economic environments. Another factor is that rates of recovery may vary from the rate experienced in tests and a reduction in the recovery rate will adversely affect profitability and, possibly, the economic viability of a property. Profitability also depends on the costs of operations, including costs of labour, materials, equipment, electricity, environmental compliance or other production inputs. Such costs will fluctuate in ways the Corporation cannot predict and are beyond the Corporation's control, and such fluctuations will impact on profitability and may eliminate profitability altogether. Additionally, due to worldwide economic uncertainty, the availability and cost of funds for development and other costs have become increasingly difficult, if not impossible, to project. These changes and events may materially affect the financial performance of the Corporation.

### **First Nation Rights and Title**

The nature and extent of First Nation rights and title remains the subject of active debate, claims and litigation in Canada, including in the Yukon and including with respect to intergovernmental relations between First Nation authorities and federal, provincial and territorial authorities. There can be no guarantee that such claims will not cause permitting delays, unexpected interruptions or additional costs for the Corporation's projects. These risks may have increased after the Supreme Court of Canada decision of June 26, 2014 in *Tsilhqot'in Nation v. British Columbia*.

### **Title to Mineral Properties**

The acquisition of title to mineral properties is a complicated and uncertain process. The properties may be subject to prior unregistered agreements of transfer or land claims, and title may be affected by undetected defects. Although the Corporation has made efforts to ensure that legal title to its properties is properly recorded in the name of the Corporation, there can be no assurance that such title will ultimately be secured. As a result, the Corporation be constrained in its ability to operate its mineral properties or unable to enforce its rights with respect to its mineral properties. An impairment to or defect in the Corporation's title to its mineral properties would adversely affect the Corporation's business and financial condition.

### **Capitalization and Commercial Viability**

The Corporation will require additional funds to further explore, develop and mine its properties. The Corporation has limited financial resources, and there is no assurance that additional funding will be available to the Corporation to carry out the completion of all proposed activities, for additional exploration or for the substantial capital that is typically required in order to place a property into commercial

production. Although the Corporation has been successful in the past in obtaining financing through the sale of equity securities, there can be no assurance that the Corporation will be able to obtain adequate financing in the future or that the terms of such financing will be favourable. Failure to obtain such additional financing could result in the delay or indefinite postponement of further exploration and development of its properties.

### **General Economic Conditions May Adversely Affect the Corporation's Growth and Profitability**

The unprecedented events in global financial markets since 2008 have had a profound impact on the global economy and led to increased levels of volatility. Many industries, including the mining industry, are impacted by these market conditions. Some of the impacts of the current financial market turmoil include contraction in credit markets resulting in a widening of credit risk, devaluations and high volatility in global equity, commodity, foreign currency exchange and precious metal markets, and a lack of market liquidity. If the current turmoil and volatility levels continue they may adversely affect the Corporation's growth and profitability. Specifically:

- a global credit/liquidity or foreign currency exchange crisis could impact the cost and availability of financing and the Corporation's overall liquidity;
- the volatility of silver and other commodity prices would impact the Corporation's revenues, profits, losses and cash flow;
- volatile energy prices, commodity and consumables prices and currency exchange rates would impact the Corporation's operating costs; and
- the devaluation and volatility of global stock markets could impact the valuation of the Corporation's equity and other securities.

These factors could have a material adverse effect on Alexco's financial condition and results of operations.

### **Operating Hazards and Risks**

In the course of exploration, development and production of mineral properties, certain risks, particularly including but not limited to unexpected or unusual geological operating conditions including rock bursts, cave-ins, fires, flooding and earthquakes, may occur. It is not always possible to fully insure against such risks and the Corporation may decide not to insure against such risks as a result of high premiums or other reasons. Should such liabilities arise, they could reduce or eliminate any future profitability and result in increasing costs and a decline in the value of the securities of the Corporation.

Adverse weather conditions could also disrupt the Corporation's environmental services business and/or reduce demand for the Corporation's services.

### **Competition**

Significant and increasing competition exists for mining opportunities internationally. There are a number of large established mining companies with substantial capabilities and far greater financial and technical resources than the Corporation. The Corporation may be unable to acquire additional attractive mining properties on terms it considers acceptable and there can be no assurance that the Corporation's exploration and acquisition programs will yield any reserves or result in any commercial mining operation.

### **Certain of the Corporation's Directors and Officers are Involved with Other Natural Resource Companies, Which May Create Conflicts of Interest from Time to Time**

Some of the Corporation's directors and officers are directors or officers of other natural resource or mining-related companies. These associations may give rise to conflicts of interest from time to time. As a result of these conflicts of interest, the Corporation may miss the opportunity to participate in certain transactions.

### **The Corporation May Fail to Maintain Adequate Internal Control Over Financial Reporting Pursuant to the Requirements of the Sarbanes-Oxley Act**

Section 404 of the Sarbanes-Oxley Act (“**SOX**”) requires an annual assessment by management of the effectiveness of the Corporation’s internal control over financial reporting. The Corporation may fail to maintain the adequacy of its internal control over financial reporting as such standards are modified, supplemented or amended from time to time, and the Corporation may not be able to ensure that it can conclude, on an ongoing basis, that it has effective internal control over financial reporting in accordance with Section 404 of SOX. The Corporation’s failure to satisfy the requirements of Section 404 of SOX on an ongoing, timely basis could result in the loss of investor confidence in the reliability of its financial statements, which in turn could harm the Corporation’s business and negatively impact the trading price or the market value of its securities. In addition, any failure to implement required new or improved controls, or difficulties encountered in their implementation, could harm the Corporation’s operating results or cause it to fail to meet its reporting obligations. Future acquisitions of companies, if any, may provide the Corporation with challenges in implementing the required processes, procedures and controls in its acquired operations. No evaluation can provide complete assurance that the Corporation’s internal control over financial reporting will detect or uncover all failures of persons within the Corporation to disclose material information otherwise required to be reported. The effectiveness of the Corporation’s processes, procedures and controls could also be limited by simple errors or faulty judgments. Although the Corporation intends to expend substantial time and incur substantial costs, as necessary, to ensure ongoing compliance, there is no certainty that it will be successful in complying with Section 404 of SOX.

### **As a “foreign private issuer”, the Corporation is exempt from Section 14 proxy rules and Section 16 of the *Securities Exchange Act of 1934***

The Corporation is a “foreign private issuer” as defined in Rule 3b-4 under the United States Securities Exchange Act of 1934, as amended (the “U.S. Exchange Act”). Equity securities of the Corporation are accordingly exempt from Sections 14(a), 14(b), 14(c), 14(f) and 16 of the U.S. Exchange Act pursuant to Rule 3a12-3 of the U.S. Exchange Act. Therefore, the Corporation is not required to file a Schedule 14A proxy statement in relation to the annual meeting of shareholders. The submission of proxy and annual meeting of shareholder information on Form 6-K may result in shareholders having less complete and timely information in connection with shareholder actions. The exemption from Section 16 rules regarding reports of beneficial ownership and purchases and sales of common shares by insiders and restrictions on insider trading in our securities may result in shareholders having less data and there being fewer restrictions on insiders’ activities in our securities.

### **It may be difficult to enforce judgments or bring actions outside the United States against the Corporation and certain of our directors**

The Corporation is a Canadian corporation and certain of its directors, officers and experts are neither citizens nor residents of the United States. A substantial part of the assets of the Corporation and of certain of these persons are located outside the United States. As a result, it may be difficult or impossible for an investor:

- to enforce in courts outside the United States judgments obtained in United States courts based upon the civil liability provisions of United States federal securities laws against these persons and the Corporation; or
- to bring in courts outside the United States an original action to enforce liabilities based upon United States federal securities laws against these persons and the Corporation.

### **DIVIDENDS**

The Corporation has not paid any dividends on its common shares since its incorporation. Any decision to pay dividends on common shares in the future will be made by the board of directors on the basis of the earnings, financial requirements and other conditions existing at such time.

## DESCRIPTION OF CAPITAL STRUCTURE

The authorized capital of the Corporation consists of an unlimited number of common shares, without par value.

There are no special rights or restrictions of any nature attached to any of the common shares, which all rank equally as to all benefits which might accrue to the holders of the common shares.

## MARKET FOR SECURITIES

### Trading Price and Volume

The common shares of the Corporation are listed and posted for trading on the Toronto Stock Exchange (the "TSX") under the symbol "AXR", and on the NYSE-MKT Equities Exchange (the "NYSE MKT") under the symbol "AXU". The following tables set forth the market price range and trading volumes of the Corporation's common shares on each of the TSX and NYSE MKT for the periods indicated.

#### TSX

Period	Volume	High (C\$)	Low (C\$)
December 2016	1,882,900	\$2.07	\$1.47
November 2016	3,633,900	\$2.63	\$1.72
October 2016	3,361,300	\$2.53	\$1.91
September 2016	3,601,000	\$2.80	\$2.17
August 2016	4,609,300	\$3.31	\$2.15
July 2016	4,320,900	\$2.73	\$2.04
June 2016	3,239,100	\$2.16	\$1.36
May 2016	4,618,400	\$1.84	\$1.31
April 2016	7,104,900	\$1.62	\$1.19
March 2016	3,495,800	\$1.52	\$0.86
February 2016	2,322,300	\$1.14	\$0.51
January 2016	1,529,800	\$0.56	\$0.35

#### NYSE MKT

Period	Volume	High (US\$)	Low (US\$)
December 2016	9,931,900	\$1.55	\$1.10
November 2016	13,842,900	\$1.97	\$1.27
October 2016	8,033,500	\$1.90	\$1.45
September 2016	13,546,500	\$2.19	\$1.65
August 2016	20,742,700	\$2.54	\$1.62
July 2016	17,503,100	\$2.07	\$1.52
June 2016	11,753,400	\$1.66	\$1.03
May 2016	12,161,600	\$1.42	\$1.02
April 2016	14,440,700	\$1.30	\$0.87
March 2016	9,104,800	\$1.17	\$0.64
February 2016	7,218,000	\$0.83	\$0.37

Period	Volume	High (US\$)	Low (US\$)
January 2016	4,324,600	\$0.40	\$0.22

### Securities Not Listed or Quoted

The only classes of securities of the Corporation that are not listed or quoted on a marketplace are stock options, restricted shares units (“RSU”) and broker warrants. During the year ended December 31, 2016, 2,537,500 stock options, 295,000 RSUs and 5,645,286 warrants were issued.

### DIRECTORS AND OFFICERS

#### Name, Occupation and Security Holding

The name, province or state, country of residence, position or office held with the Corporation and principal occupation during the past five years of each director and executive officer of the Corporation as at December 31, 2016 and as at the date hereof are described as follows:

Name and Address <sup>(1)</sup>	Office or Position Held	Principal Occupation During the Past Five Years	Previous Service as a Director
Clynton R. Nauman Washington, USA	President, Chief Executive Officer and Director <sup>(4)</sup>	President and Chief Executive Officer of the Corporation, since December 2004.	Since December 3, 2004
Michael Winn California, USA	Chairman and Director <sup>(2)(5)</sup>	President of Seaboard Capital Corp., providing investment analysis and financial services to companies in the oil & gas, mining and energy sectors, since January 2013; President of Terrasearch Inc., a consulting company providing analysis on mining and energy companies, from 1997 through 2012.	Since January 11, 2005
Rick Van Nieuwenhuyse British Columbia, Canada	Director <sup>(3)(4)</sup>	President and Chief Executive Officer of Trilogy Metals Inc. (formerly NovaCopper Inc.), a mineral exploration and development company, since November 2011; President and Chief Executive Officer of NovaGold Resources Inc., a mineral exploration and development company, from May 1999 to November 2011.	Since January 11, 2005
Terry Krepiakovich British Columbia, Canada	Director <sup>(2)(3)(5)</sup>	Member of the Board of Directors of several publicly-listed and private companies since July 2011; Chief Financial Officer of SouthGobi Resources Ltd., a mining company, from June 2006 to July 2011.	Since July 22, 2009
Richard N. Zimmer British Columbia, Canada	Director <sup>(4)(5)</sup>	Member of the Board of Directors of one other publicly-listed and two private companies since June 2011; President and Chief Executive Officer of Far West Mining Ltd., a mining company, from 2008 to June 2011.	Since May 2, 2012
Elaine Sanders British Columbia, Canada	Director <sup>(2)(3)(4)</sup>	VP and Chief Financial Officer of Trilogy Metals Inc. (formerly NovaCopper Inc.), a mineral exploration and development company, since November 2011; Former Vice President and Chief Financial Officer of NovaGold Resources Inc.	Since June 28, 2016
Bradley Thrall Washington, USA	Executive Vice President and Chief Operating Officer	Chief Operating Officer of the Corporation, since December 2004.	N/A
Michael Clark British Columbia, Canada	Chief Financial Officer, Corporate Secretary and Company Ethics Officer	Chief Financial Officer of the Corporation, since December 2014.	N/A

Name and Address <sup>(1)</sup>	Office or Position Held	Principal Occupation During the Past Five Years	Previous Service as a Director
Alan McOnie Bay of Plenty, New Zealand	Vice President, Exploration	Vice President, Exploration of the Corporation, since December 2010; consulting geologist from 2002 to December 2010.	N/A

- (1) The information as to the jurisdiction of residence and principal occupation, not being within the knowledge of the Corporation, has been furnished by the respective individuals individually.
- (2) Member of the Audit Committee.
- (3) Member of the Nominating & Corporate Governance Committee.
- (4) Member of the Environmental, Health, Safety & Technical Committee.
- (5) Member of the Compensation Committee.

Each of the Corporation's directors is elected by the Corporation's shareholders at an annual meeting to serve until the next annual meeting of shareholders or until a successor is elected or appointed. The board of directors appoints the Corporation's executive officers annually after each annual meeting, to serve at the discretion of the board of directors.

Based on information provided by such persons, as at the date hereof the directors and executive officers of the Corporation as a group beneficially owned, directly or indirectly, or exercised control or direction over, an aggregate of 5,051,211 common shares of the Corporation (including 1,940,299 shares owned by ALM Investments ULC (formerly Asset Liability Management Group ULC), a company controlled by Mr. Nauman), representing approximately 5.4% of the issued and outstanding common shares of the Corporation. In addition, the directors and executive officers of the Corporation as a group held stock options for the purchase of an aggregate of 4,769,166 common shares in the capital of the Corporation, representing approximately 66% of all outstanding options. In addition, the directors and executive officers of the Corporation as a group held RSUs that can be settled by way of shares issued from treasury for a further 451,657 common shares.

#### Cease Trade Orders, Bankruptcies, Penalties or Sanctions

To the knowledge of the Corporation, none of the Corporation's directors or executive officers is, as at the date of this AIF, or has been, within ten years before the date of this AIF, a director, chief executive officer or chief financial officer of any Corporation (including the Corporation) that:

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

"Order" means a cease trade order, an order similar to a cease trade order, or an order that denied the relevant Corporation access to any exemption under securities legislation and, in each case, that was in effect for a period of more than 30 consecutive days.

None of the Corporation's directors or executive officers or, to the Corporation's knowledge, any shareholder holding a sufficient number of securities of the Corporation to affect materially the control of the Corporation:

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



- (b) has, within the 10 years before the date of this AIF, become bankrupt, made a proposal under any legislation relating to bankruptcy or insolvency, or become subject to or instituted any proceedings, arrangement or compromise with creditors, or had a receiver, receiver manager or trustee appointed to hold the assets of the proposed director; or
- (c) has been subject to:
  - (i) 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
  - (ii) any other penalties or sanctions imposed by a court or regulatory body that would likely be considered important to a reasonable investor in making an investment decision.

### **Conflicts of Interest**

The directors of the Corporation are required by law to act honestly and in good faith with a view to the best interest of the Corporation and to disclose any interests which they may have in any project or opportunity of the Corporation. If a conflict of interest arises at a meeting of the board of directors, any director in a conflict will disclose his interest and abstain from voting on such matter. In determining whether or not the Corporation will participate in any project or opportunity, that director will primarily consider the degree of risk to which the Corporation may be exposed and its financial position at that time.

To the best of the Corporation's knowledge, there are no known existing or potential conflicts of interest among the Corporation, its promoters, directors, officers or other members of management of the Corporation as a result of their outside business interests except that certain of the directors, officers, promoters and other members of management serve as directors, officers, promoters and members of management of other public companies, and therefore it is possible that a conflict may arise between their duties as a director, officer, promoter or member of management of such other companies.

The directors and officers of the Corporation are aware of the existence of laws governing accountability of directors and officers for corporate opportunity and requiring disclosures by directors of conflicts of interest and the Corporation relies upon such laws in respect of any directors' and officers' conflicts of interest or in respect of any breaches of duty by any of its directors or officers. Such directors or officers in accordance with the *Business Corporations Act* (British Columbia) are required to disclose all such conflicts and to govern themselves in respect thereof to the best of their ability in accordance with the obligations imposed upon them by law.

### **AUDIT COMMITTEE INFORMATION**

#### **Audit Committee Charter**

The following is the text of the Audit Committee's Charter:

#### **GENERAL**

The primary function of the Audit Committee, under the supervision of the Board, is to assist the Board in fulfilling its oversight responsibilities regarding the integrity of the Company's accounting and financial reporting processes and provision of financial information to the shareholders and others, the systems of internal controls and disclosure controls, the Company's internal and external audit process, the Company's policies with regard to ethics and business practices, and monitoring compliance with the Company's legal and regulatory requirements with respect to its financial statements.

The Audit Committee is accountable to the Board. In the course of fulfilling its specific responsibilities hereunder, the Audit Committee is expected to maintain open communications between the Company's external auditor, senior management and the Board.

The Audit Committee does not plan or perform audits or warrant or attest to the accuracy or completeness of the Company's financial statements or financial disclosure or compliance with generally accepted accounting procedures as these are the responsibilities of management and the external auditor.

### **COMPOSITION**

The Audit Committee shall be comprised of at least three directors, who generally shall be appointed or confirmed by the Board annually. The Chair of the Audit Committee shall be appointed by the Board, failing which the members of the Audit Committee may designate a Chair by a majority vote of the full Audit Committee membership. All members of the Audit Committee shall be directors and shall meet the independence, financial literacy and experience requirements under applicable laws, rules and regulations binding on the Company from time to time, including without limitation the applicable rules of any stock exchanges upon which the Company's shares are listed and the requirements for independence and financial literacy under National Instrument 52-110 *Audit Committees* ("NI 52-110") in Canada, Section 803A of the NYSE MKT Company Guide and Rule 10A-3 of the United States Securities Exchange Act of 1934, as amended (the "**Exchange Act**"). Furthermore, at least one member of the Audit Committee shall qualify as a "financial expert" as such term is defined in Item 407 of Regulation S-K under the Exchange Act.

### **PROCEDURAL MATTERS**

The Audit Committee:

- (a) Shall meet at least four times per year on a quarterly basis, either by telephone conference or in person. Any member of the Audit Committee may call such a meeting. A majority of the members appointed to the Audit Committee shall constitute a quorum. For clarity, quorum may be reached in person, or by telephone, video conference, or other communication facilities acceptable to the Board. Matters decided by the Audit Committee shall be decided by majority votes, and the Chair of the Audit Committee shall only have an ordinary vote with no additional tie-breaking powers.
- (b) May invite the Company's external auditor, the CFO, and such other persons as deemed appropriate by the Audit Committee to attend meetings of the Audit Committee. As part of its mandate to foster open communication, the Audit Committee shall meet at least annually with the CFO and the external auditor in separate sessions, and to that end the Audit Committee generally shall have as a standing agenda item an in-camera meeting with the external auditors for any meeting at which they attend.
- (c) Shall report material decisions and actions of the Audit Committee to the Board, together with such recommendations as the Audit Committee may deem appropriate, at the next Board meeting.
- (d) Shall review the performance of the Audit Committee on an annual basis and report the results of such review to the Nominating & Corporate Governance Committee.
- (e) Shall review and assess this Charter for the Audit Committee at least annually and submit any proposed revisions to the Board for approval.
- (f) Has the power to conduct or authorize investigations into any matter within the scope of its responsibilities. The Audit Committee has the right to engage independent counsel and other advisors as it determines necessary to carry out its duties, and the right to set and pay, without restriction, the compensation for any such counsel or advisors engaged by the Audit Committee.
- (g) Has the right to communicate directly with the CFO and other members of management who have responsibility for the audit process ("**Internal Audit Management**"), as well as directly with the external auditor.
- (h) Has the right to require payment of (i) compensation to any external auditor engaged for the purpose of preparing or issuing an audit report or performing audit, review or attest services for the Company and (ii) all ordinary expenses of the Audit Committee that are necessary or appropriate in carrying out its duties.

## **RESPONSIBILITIES**

Subject to the powers and duties of the Board, the Board hereby delegates to the Audit Committee the following powers and duties to be performed by the Audit Committee on behalf of and for the Board.

### *Financial Reporting, Accounting and Financial Management*

The Audit Committee has primary responsibility for overseeing the actions of management in all aspects of financial management and reporting. The Audit Committee shall:

- (a) Review and recommend to the Board for approval the Company's annual and interim financial statements, annual and interim Management's Discussion and Analysis, Annual Information Form, annual report filed pursuant to the Exchange Act on Form 40-F (or such other form as may apply), future-oriented financial information or pro-forma information, and other financial disclosure in continuous disclosure documents, including within any annual or interim profit or loss press releases, and any certification, report, opinion or review rendered by the external auditor, before the Company publicly discloses such information. (See also "*Interim Financial Statements*" below.)
- (b) Ensure that it is satisfied that adequate procedures are in place for the review of the Company's public disclosure of financial information extracted or derived from the Company's financial statements (other than public disclosure referred to in subsection (a) immediately above) and periodically assess the adequacy of those procedures as necessary.
- (c) Review material financial risks with management, the plan that management has implemented to monitor and deal with such risks, and the success of management in following the plan.
- (d) Consult annually and otherwise as required with the Company's CEO and CFO respecting the adequacy of the internal controls and review any breaches or deficiencies.
- (e) Review as necessary the process with regard to certifications, and ensure certifications by the CEO and CFO attesting to disclosure controls and procedures and internal control over financial reporting are obtained and filed as required under National Instrument 52-109 *Certification of Disclosure In Issuers' Annual and Interim Filings* and the Exchange Act in connection with the Company's annual and interim financial reporting filings.
- (f) Review management's response to significant written reports and recommendations issued by the external auditor and the extent to which such recommendations have been implemented by management. Review such responses with the external auditor as necessary.
- (g) Review with management the Company's compliance with applicable laws and regulations respecting financial matters.
- (h) Review with management proposed regulatory changes and their impact on the Company.
- (i) Review with management and approve public disclosure of the Audit Committee Charter.

### *External Auditor*

The Audit Committee has primary responsibility for the selection, appointment, dismissal, compensation and oversight of the external auditor, subject to the overall approval of the Board. For this purpose, the Audit Committee may consult with management, but the external auditor shall report directly to the Audit Committee. The specific responsibilities of the Audit Committee with regard to the external auditor are to:

- (a) Recommend to the Board annually:
  - (i) the external auditor to be nominated (whether the current external auditor or a suitable alternative) for the purpose of preparing or issuing an auditor's report or performing other audit, review, or attest services for the Company; and
  - (ii) the compensation of the external auditor.
- (b) Oversee the work of the external auditor engaged for the purpose of preparing or issuing an auditor's report or performing other audit, review or attest services for the Company.
- (c) Resolve disagreements, if any, between management and the external auditor regarding financial reporting. To resolve such disagreements, the Audit Committee shall query management and the external auditor and take other steps as necessary. The Audit Committee shall provide the Board with such recommendations and reports with respect to the financial statements of the Company as it deems advisable.
- (d) Take reasonable steps to confirm the independence of the external auditor, including but not limited to ensuring receipt from the external auditor of a formal written statement delineating all relationships between the external auditor and the Company, actively engaging in a dialogue with the auditor with respect to any disclosed relationship or services and pre-approving any non-audit related services provided by the external auditor to the Company or the Company's subsidiaries, if any, with a view to ensuring independence of the auditor. If necessary, recommend to the Board to take appropriate corrective action to ensure the independence of the external auditor.
- (e) Review and pre-approve all audit and audit-related services and the fees related thereto, provided by the Company's external auditor.
- (f) Review and pre-approve all non-audit services to be performed by the Company's external auditor in accordance with any applicable regulatory requirements, including but not limited to NI 52-110, the Exchange Act and the requirements of any stock exchange upon which the Company's shares are listed. The Audit Committee may delegate pre-approval authority for non-audit services to one or more independent members of the Audit Committee provided that any such pre-approval decisions must be presented to the full Audit Committee at its next meeting thereafter. The Audit Committee may also satisfy this pre-approval requirement if it first adopts specific policies and procedures respecting same in accordance with NI 52-110 such that the pre-approval policies and procedures are detailed as to the particular service, the Audit Committee is informed of each such non-audit service, and the procedures do not include delegation of the Audit Committee's responsibilities to management.
- (g) Obtain from the external auditor confirmation that the external auditor is a 'participating audit' firm for the purpose of National Instrument 52-108 *Auditor Oversight* and is registered with the Public Company Accounting Oversight Board in the United States, and is otherwise in compliance with all applicable governing regulations.
- (h) Review and evaluate the performance of the external auditor.
- (i) Review and approve the Company's hiring policies regarding partners, employees and former partners and employees of the Company's present and former external auditors.

#### *Audit and Financial Reporting Process*

The Audit Committee has a duty to receive, review and make any inquiry regarding the completeness, accuracy and presentation of the Company's financial statements to ensure that the financial statements fairly present the financial position and risks of the organization and are prepared in accordance with the applicable generally accepted accounting principles. To accomplish this, the Audit Committee shall:

- (a) Review at least annually the Company's internal system of audit and financial controls, internal audit procedures and results of such audits, and receive regular, generally quarterly, updates from management on such controls, procedures and audit activities.

- (b) Prior to the annual audit by the external auditor, consider the scope and general extent of the external auditor's review, including its engagement letter. Review with management the external auditor's audit plan and intended template for financial statements.
- (c) Ensure the external auditor has full, unrestricted access to required information and has the cooperation of management.
- (d) Review with the external auditor, in advance of the audit, the audit process and standards, as well as regulatory or Company-initiated changes in accounting practices and policies and the financial impact thereof, and selection or application of appropriate accounting principles.
- (e) Review with the external auditor and, if necessary, legal counsel, any litigation, claim or contingency, including tax assessments, or significant judgments made by management that could have a material effect upon the financial position of the Company and the manner in which these matters are being disclosed in the financial statements. Review the appropriateness and disclosure of any off-balance sheet matters. Review disclosure of any related-party transactions.
- (f) Receive and review with the external auditor, the external auditor's audit report and the audited financial statements. Make recommendations to the Board respecting approval of the audited financial statements.
- (g) Review annually the integrity of the Company's internal and external financial reporting and accounting principles, including the clarity, completeness and accuracy of financial disclosure and the degree of conservatism or aggressiveness of the accounting policies and estimates, performance of Internal Audit Management, any significant disagreements or difficulties in obtaining information, adequacy of internal controls over financial reporting and the degree of compliance of the Company with prior recommendations of the external auditor. The Audit Committee shall direct management to implement such changes as the Audit Committee considers appropriate, subject to any required approvals of the Board arising out of the review.
- (h) Meet at least annually with the external auditor, independent of management, consider external auditor's judgments about the quality and appropriateness of the Company's accounting principles and practices, and report to the Board on such meetings.

#### *Interim Financial Statements*

Pursuant to its mandate, the Board shall generally approve the Company's annual and interim financial statements. Notwithstanding the foregoing, on an exceptions basis the Board may from time to time delegate to the Audit Committee the power to approve the Company's interim financial statements.

The Audit Committee shall:

- (a) Review on an annual basis the Company's practice with respect to review of interim financial statements by the external auditor.
- (b) Review the interim financial statements with the external auditor if the external auditor conducts a review of the interim financial statements.
- (c) Conduct all such reviews and discussions with the external auditor and management as the Audit Committee deems appropriate.
- (d) Review and, if such authority has been delegated to the Audit Committee by the Board, approve the interim financial statements.
- (e) If authority to approve the interim financial statements has not been delegated to the Audit Committee, make appropriate recommendation to the Board respecting approval of the interim financial statements.

### *Code of Ethics*

The Audit Committee has primary responsibility for overseeing the application of, and compliance with, the Company's Code of Business Conduct and Ethics (the "**Code**"). The Audit Committee shall review at least annually:

- (a) the Code,
- (b) management's approach to business ethics and corporate conduct; and
- (c) programs used by management to monitor compliance with the Code.

### **COMPLAINTS UNDER WHISTLEBLOWER POLICY**

To ensure that the Company has adequate procedures in place for the confidential and anonymous (where permitted by law) receipt, retention, and treatment of complaints received by the Company regarding (a) accounting, internal accounting controls, or auditing matters, and (b) compliance with the Code and all applicable government laws, rules and regulations, the Committee has recommended and the Board has adopted a Company Whistleblower Policy. All such complaints shall be dealt with under the terms of that Policy."

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

As at December 31, 2016 and the date of this AIF, the members of the Audit Committee are Terry Krepiakevich, Michael Winn and Elaine Sanders, with Mr. Krepiakevich serving as the Chair of the Audit Committee. All of these members are financially literate and independent for the purposes of National Instrument 52-110 ("**NI 52-110**").

Mr. Krepiakevich qualifies as a financial expert and is financially sophisticated, in that he has an understanding of generally accepted accounting principles and financial statements; is able to assess the general application of accounting principles in connection with the accounting for estimates, accruals and reserves; has experience analyzing or evaluating financial statements that entail accounting issues of equal complexity to the Corporation's financial statements (or actively supervising another person who did so); and has a general understanding of internal controls and procedures for financial reporting and an understanding of audit committee functions.

Mr. Krepiakevich is a member of the Board of Directors of several publicly-listed and private companies since July 2011. From June 2006 to July 2011, Mr. Krepiakevich was the Chief Financial Officer of SouthGobi Resources Ltd., a publicly-listed mining company focused on exploring and developing coal deposits in Mongolia's South Gobi Region. Previously, Mr. Krepiakevich was Chief Financial Officer for Extreme CCTV Inc., a publicly traded company on the TSX involved in manufacturing high tech surveillance equipment, and Vice-President Finance and Chief Financial Officer of Maynards Industries Ltd., a private firm specializing in retailing, auctioneering, liquidating, and mergers and acquisition services. Prior to his position with Maynards, Mr. Krepiakevich was a senior officer in a number of private and public issuers. He is a Canadian qualified Chartered Professional Accountant and was employed with the international accounting firm Peat Marwick Thorne (KPMG), where he worked with a number of companies in mining and related industries.

Mr. Winn is currently President of Seabord Capital Corp., and was previously President of Terrasearch Inc., both consulting companies providing investment analysis and financial services to companies in the oil and gas, mining and energy sectors. He is also a member of the Board of Directors of several publicly-listed companies, serving for certain of which as a member of the audit committee. Mr. Winn has worked in the oil and gas industry since 1983 and the mining industry since 1992. He completed graduate course work in accounting and finance and received a BSc in geology from the University of Southern California. Mr. Winn is financially literate, possessing extensive senior management experience within the natural resource sectors including experience as a public company audit committee member.

Ms. Sanders is the Vice President, Chief Financial Officer and Corporate Secretary for Trilogy Metals Inc. (formerly NovaCopper Inc.). Prior to Trilogy Metals Inc. Ms. Sanders served as Vice President, Chief

Financial Officer and Corporate Secretary for NovaGold Resources Inc. Ms. Sanders has over 20 years of experience in audit, finance, and accounting with public and private companies and Bachelor of Commerce degree from the University of Alberta, is a Canadian qualified Chartered Professional Accountant and a Certified Public Accountant in the United States.

### Reliance on Certain Exemptions

At no time since the commencement of the Corporation's most recently completed financial year has the Corporation relied on the exemption in Section 2.4 of NI 52-110 (De Minimis Non-audit Services), Section 3.2 of NI 52-110 (Initial Public Offerings), Section 3.3(2) of NI 52-110 (Controlled Companies), Section 3.4 of NI 52-110 (Events Outside Control of Member), Section 3.5 of NI 52-110 (Death, Disability or Resignation of Audit Committee Member), Section 3.6 of NI 52-110 (Temporary Exemption for Limited and Exceptional Circumstances) or Section 3.8 of NI 52-110 (Acquisition of Financial Literacy), or an exemption from NI 52-110, in whole or in part, granted under Part 8 of NI 52-110 (Exemptions).

### Audit Committee Oversight

At no time since the commencement of the Corporation's most recently completed financial year was a recommendation of the Committee to nominate or compensate an external auditor not adopted by the board of directors.

### Pre-Approval Policies and Procedures

The Audit Committee nominates and engages the independent auditors to audit the financial statements, and approves all audit, audit-related services, tax services and other services provided by the Corporation's independent auditors, PricewaterhouseCoopers LLP, Chartered Professional Accountants ("PwC"). Any services provided by PwC that are not specifically included within the scope of the audit must be pre-approved by the audit committee prior to any engagement. The audit committee is permitted to approve certain fees for audit-related services, tax services and other services pursuant to a de minimus exception before the completion of the engagement. No fees paid to PwC in either of the fiscal years ended December 31, 2016 or 2015 were approved pursuant to the de minimus exception.

### External Auditor Service Fees (By Category)

PwC, serve as the independent auditors for the Corporation and have acted as the Corporation's independent auditor for the years ended December 31, 2016 and 2015. The chart below sets forth the total amount billed the Corporation by PwC for services performed in these periods and breaks down these amounts by category of service (for audit fees, audit-related fees, tax fees and all other fees):

#### External Auditor Service Fees (By Category)

Financial Period	Audit Fees	Audit Related Fees	Tax Fees	All Other Fees
Year ended December 31, 2016	\$242,500	\$45,000	\$Nil	\$Nil
Year ended December 31, 2015	\$190,000	\$45,000	\$Nil	\$Nil

"Audit Fees" are the aggregate fees billed by PwC for the audits of the Corporation's consolidated annual financial statements and internal control over financial reporting that are provided in connection with statutory and regulatory filings or engagements.

"Audit-Related Fees" are fees charged by PwC for assurance and related services that are reasonably related to the performance of the audit or review of the Corporation's financial statements and are not reported under "Audit Fees". This category includes but is not limited to fees billed for independent accountant review of the interim financial statements, advisory services associated with the Corporation's financial reporting and fees charged for services rendered in connection with registration statements and other securities offering documents.

"Tax Fees" are fees for professional services rendered by PwC for tax compliance, tax advice on actual or contemplated transactions.

"All Other Fees" include all fees charged by PwC for products or services other than those charged for "Audit Fees", "Audit-Related Fees" and "Tax Fees".

## **LEGAL PROCEEDINGS AND REGULATORY ACTIONS**

The Corporation is not a party to any legal proceedings involving a claim for damages in excess of ten percent of the Corporation's current assets, nor is a party to any regulatory actions, and is not aware of any such proceedings or actions known to be contemplated.

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

The directors, executive officers and principal shareholders of the Corporation or any associate or affiliate of the foregoing have had no material interest, direct or indirect, in any transactions in which the Corporation has participated within the three most recently completed financial periods prior to the date of this AIF or in the current financial year, and do not have any material interest in any proposed transaction, which has materially affected or is reasonably expected to materially affect the Corporation, except as set out elsewhere in this AIF or as follows:

Certain directors and/or officers of the Corporation have subscribed for common shares of the Corporation pursuant to the public and private placement financings of the Corporation.

## **TRANSFER AGENTS AND REGISTRARS**

The registrar and transfer agent for the common shares of the Corporation in British Columbia and Ontario is Computershare Investor Services Inc., Vancouver, British Columbia.

## **MATERIAL CONTRACTS**

The Silver Wheaton SPA, as amended (as described under the heading "General Development of the Business – Three Year History and Significant Acquisitions"), is the only material contracts entered into by the Corporation within the year ended December 31, 2016 or before such time that are still in effect, other than in the ordinary course of business. The SPA and subsequent amendments are available on the SEDAR website at [www.sedar.com](http://www.sedar.com) under the Corporation's profile.

## **INTERESTS OF EXPERTS**

### **Names of Experts**

The following sets forth each person named as having prepared or certified a report, valuation, statement or opinion described or included in a filing (including this AIF), or referred to in a filing, made under National Instrument 51-102 by the Corporation during, or relating to, its most recently completed financial year and whose profession or business gives authority to the report, valuation, statement or opinion made by the person or company:

- Torben Jensen, P.Eng. and R. Dennis Bergen, P.Eng. of Roscoe Postle Associates Inc., Jeff Austin, P. Eng of International Metallurgical and Environmental Inc., Gilles Arseneau, Ph.D., P.Geo. of SRK Consulting (Canada) Inc. and David Farrow, Pr.Sci.Nat, P.Geo. of Geostat Consulting Inc. prepared the PEA described under "Description of the Business – KHSD Property".
- Alan McOnie, FAusIMM, Vice President, Exploration of the Corporation, and Scott Smith, P.Eng., consulting engineer to the Corporation, are responsible for certain information of a scientific or technical nature relating to the Corporation's properties in this AIF.



- PricewaterhouseCoopers LLP ("**PwC**"), Chartered Professional Accountants prepared the auditors' report in respect of the annual financial statements of the Company for the year ended December 31, 2016.

### **Interests of Experts**

Based on information provided by the experts named above, other than with respect to Alan McOnie and Scott Smith as described below, none of the experts named under "Names of Experts", when or after they prepared the statement, report or valuation, has received any registered or beneficial interests, direct or indirect, in any securities or other property of the Corporation or of one of the Corporation's associates or affiliates (based on information provided to the Corporation by the experts) or is or is expected to be elected, appointed or employed as a director, officer or employee of the Corporation or of any associate or affiliate of the Corporation.

Alan McOnie is currently an executive officer and Scott Smith was formerly the Bellekeno Mine Manager and is currently a consulting engineer of the Corporation, as described above. Both Alan McOnie and Scott Smith have been granted stock options of the Corporation through the course of their respective employments; however, the individual interests held by each of them throughout their respective employment terms at all times represented less than one percent of the issued and outstanding common shares of the Corporation.

PwC are the independent auditors of the Corporation. PwC have advised the Corporation that they are independent with respect to the Corporation within the meaning of the Rules of Professional Conduct of the Institute of Chartered Professional Accountants of British Columbia and the rules and standards of the Public Company Accounting Oversight Board ("PCAOB") and the securities laws and regulations administered by the SEC.

### **ADDITIONAL INFORMATION**

Additional information relating to the Corporation may be found on SEDAR at [www.sedar.com](http://www.sedar.com), as well as at the Corporation's web site at [www.alexcoresource.com](http://www.alexcoresource.com).

Additional information, including directors' and officers' remuneration and indebtedness, principal holders of the Corporation's securities, and securities authorized for issuance under equity compensation plans, where applicable, is contained in the Corporation's information circular for its most recent annual general meeting of securityholders that involved the election of directors.

Additional financial information is provided in the Corporation's consolidated financial statements and management's discussion and analysis for its most recently completed financial period, being the year ended December 31, 2016.

## **SCHEDULE "A"**

### **Summary from PEA**

#### **"1 SUMMARY**

##### **EXECUTIVE SUMMARY**

Roscoe Postle Associates Inc. (RPA) was retained by Alexco Resource Corp. (Alexco) to prepare a Preliminary Economic Assessment (PEA or the Study) on the Keno Hill Silver District Project (the Project), located in the Yukon Territory, Canada. The purpose of this report is to disclose the results of the PEA. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. RPA carried out a site visit from September 12 to 14, 2016.

Alexco is a public company with its headquarters in Vancouver, B.C. Alexco, through wholly owned subsidiaries, owns the mineral rights for the Keno Hill Silver District (KHSD) following its successful bid for the assets of the bankrupt United Keno Hill Mines Ltd in 2006. Alexco obtained the properties with all pre-existing liabilities subject to indemnification. Alexco also owns an environmental consulting company, Alexco Environmental Group (AEG), which provides environmental services to Alexco and the mining and mineral exploration industry.

The Project comprises:

- A network of public and private roads connecting the mines, process plants and other facilities.
- Crushing plant and flotation processing plant with a design capacity of 408 tpd.
- Dry stack tailings facility (DSTF) located adjacent to the process plant.
- Process and potable water sources.
- Electrical power available from the Yukon Electric grid.
- Administration, maintenance, and camp facilities near the town of Elsa.
- Mobile equipment to support activity at the site.
- Mine workings at the Bellekeno Mine.
- Collar of a portal for Flame & Moth.
- Mine workings and minor surface buildings at the Lucky Queen.
- Waste rock storage facility at Lucky Queen.
- Mine workings, ventilation fans, and dewatering pumps at the Bellekeno mine.
- Waste rock storage at the Bellekeno mine.

In 2008, Alexco entered into a Silver Purchase Agreement (SPA) with Silver Wheaton Corp. (Silver Wheaton) whereby 25% of all future silver production from the KHSD properties owned

or controlled by Alexco at the time of the consummation of the SPA will be delivered to Silver Wheaton in exchange for a payment of US\$3.90 per ounce as well as a payment by Silver Wheaton of US\$50 million. The SPA has been renegotiated on several occasions and effective March 29, 2017, the Company entered into an agreement with Silver Wheaton to amend the SPA whereby Silver Wheaton will continue to receive 25% of the LOM payable silver from the KHSD with the production payment (originally US\$3.90 per ounce) to be based on monthly silver head grade and monthly silver price. The actual monthly production payment will fall within a defined grade and pricing range governed by upper and lower numeric criteria (ceiling grade/price and floor grade/price) pursuant to the following formula:

$$\frac{(\text{Ceiling Grade} - \text{Deemed Shipment Head Grade})}{(\text{Ceiling Grade} - \text{Floor Grade})} \times \frac{(\text{Ceiling Price} - \text{Deemed Shipment Silver Price})}{(\text{Ceiling Price} - \text{Floor Price})} \times \text{Market Price}$$

Floor Grade	=	600 g/t Ag
Floor Price	=	US\$13/oz Ag
Ceiling Grade	=	1,400 g/t Ag
Ceiling Price	=	US\$25/oz Ag
Deemed Shipment Head Grade	=	Calculated monthly mill silver head grade
Deemed Shipment Silver Price	=	Average monthly silver price
Market Price	=	Spot silver price prior to day of sale

Mining at Bellekeno was suspended in September 2013, before all of the conditions of the SPA were met by Alexco.

Alexco used the funds from the SPA for development on the property, the 2010 construction of a 408 tonne per day (tpd) capacity flotation processing plant and the commencement of mining at the Bellekeno deposit. In 2014, a PEA was published for the Bellekeno, Flame & Moth, and Lucky Queen deposits. Since 2013 Alexco has maintained the Project on a care and maintenance status and focussed on additional exploration leading to increases in the Mineral Resources for the Bermingham and Flame & Moth deposits. The revised Bermingham Mineral Resource has been included in this PEA study for a 400 tpd operation including the Flame & Moth, Bellekeno, Bermingham, and Lucky Queen deposits.

In addition to the development of the PEA, the Mineral Resource estimates for the Onek, Lucky Queen, Flame & Moth, and Bermingham deposits have been updated to a single reference date and with the same metal price and foreign exchange rates.

This report is considered by RPA to meet the requirements of a Preliminary Economic Assessment as defined in Canadian NI 43-101 regulations. The economic analysis contained in this report is based, in part, on Inferred Mineral Resources, and is preliminary in nature. Inferred Mineral Resources are considered to be too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. There is no certainty that economic forecasts on which this PEA is based will be realized.

A summary of the Mineral Resource at the KHSD is shown in Table 1-1.

**TABLE 1-1 SUMMARY OF MINERAL RESOURCE ESTIMATES AS AT JANUARY 3, 2017**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

<b>Deposit</b>	<b>Classification</b>	<b>Tonnes</b>	<b>Ag (g/t)</b>	<b>Pb (%)</b>	<b>Zn (%)</b>	<b>Au g/t</b>
Bellekeno	Indicated	262,000	585	3.50	5.30	n/a
	Inferred	243,000	428	4.10	5.10	n/a
Lucky Queen	Indicated	132,300	1,167	2.43	1.63	0.16
	Inferred	257,900	473	1.04	0.80	0.13
Flame & moth	Indicated	1,679,000	498	1.85	5.33	0.42
	Inferred	365,200	356	0.47	4.25	0.26
Onek	Indicated	700,200	191	1.24	11.85	0.6
	Inferred	285,100	118	1.15	8.26	0.42
Birmingham	Indicated	858,000	628	2.40	1.65	0.13
	Inferred	220,000	770	2.13	2.21	0.15
<b>Total</b>	<b>Indicated</b>	<b>3,631,500</b>	<b>500</b>	<b>2.00</b>	<b>5.60</b>	<b>0.30</b>
	<b>Inferred</b>	<b>1,371,200</b>	<b>408</b>	<b>1.63</b>	<b>4.26</b>	<b>0.21</b>

Notes:

1. Bellekeno estimate is at September 30, 2013 and reflects the September 30, 2012 estimate less estimated depletion from mining to September 30, 2013.
2. CIM definitions were followed for Mineral Resources.
3. Mineral Resources are estimated at a net smelter return (NSR) cut-off value of \$185/tonne.
4. Bellekeno Mineral Resources are estimated using metal prices of US\$22.50/oz Ag, US\$0.85/lb Pb, US\$0.95/lb Zn, and US\$1,300/oz Au and a US\$/C\$ exchange rate of 0.96.
5. Lucky Queen, Onek, Flame & Moth and Birmingham Mineral Resources are estimated using metal prices of US\$20.00/oz Ag, US\$0.95/lb Pb, US\$1.00/lb Zn and US\$1,300/oz Au and a US\$/C\$ exchange rate of 0.80.
6. Bulk density estimated by regression analysis for Bellekeno, Lucky Queen, and Onek and from core and pulp sampling for Flame & Moth and Birmingham.
7. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
8. Numbers may not add due to rounding.

Conclusions

RPA offers the following conclusions:

- The Mineral Resources at the KHSD have been estimated in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standard Definitions for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions).
- The resource evaluations reported herein are a reasonable representation of the global polymetallic Mineral Resources for the listed deposits at the current level of sampling.
- This study has been completed to a PEA level of study. The mine designs, mine dewatering designs, mining plans, and processing assumptions are based upon preliminary evaluations.
- The areas requiring further study and design are:
  - Geotechnical conditions.
  - Hydrological conditions.
  - Mine access design.
  - Mine ventilation design.
  - Stope designs and pillar recovery alternatives.
  - Metallurgical testing of samples and a blend of samples.
  - Waste rock characterization to determine the quantities of potential acid generation (PAG) waste.
  - Design of waste storage facilities for the PAG waste.
  - Expansion of the DSTF.
- The Project has the potential to generate an after tax 5% NPV of \$79 million and a 75% IRR from the mining and processing of 1.02 million tonnes of mineralization grading 843 g/t Ag, 4.6% Zn, 3.3% Pb and 0.4 g/t Au over a nine year mine life using an exchange rate C\$1.00 = US\$0.76 in years 1 to 3 and C\$1.00 = US\$0.79 thereafter; metal prices of US\$18.60/oz for silver in year 2 and US\$19.35/oz thereafter; US\$ 1.20/lb zinc for years 2 to 4 and US\$1.00 thereafter, US\$1.00/lb lead for years 2 to 4 and US\$0.94/lb thereafter and US\$1,300.00/oz for gold. There is 25% of silver sold to Silver Wheaton under a streaming agreement at prices ranging from US\$3.54/oz to US\$8.18/oz silver.
- The estimated economic returns based upon the PEA support further study to restart the plant and mine from the Bellekeno, Flame & Moth, Bermingham, and Lucky Queen deposits.
- The planned exploration drive to the Bermingham deposit will provide additional resource information as well as geotechnical and hydrologic information related to the deposit.
- Initial studies should focus on the expected conditions along the planned Flame & Moth and Bermingham access development and ventilation raises.
- The LOM schedule is based on the specific strategy selected, however, there are other possible scenarios for defining an overall production schedule that may warrant further study, particularly if changing metal prices or exploration results alter the mine planning context.
- The Lucky Queen mining rate in 2024 is considered to be a high production rate for the planned extent of the Lucky Queen mining.
- The current PEA study assumes the mill facility production will increase to a nominal rate of 400 tpd once an additional ball mill is commissioned.

- Metallurgical recoveries are not based on testing of blending samples from the different deposits.
- Only one composite sample has been metallurgically tested with variable results.
- Additional metallurgical testing on the Flame & Moth mineralization is warranted.
- A model of the overall recovery was generated using open circuit flotation tests.
  - The life of mine silver recovery is estimated at 93%.
  - The life of mine zinc recovery is estimated at 88%.
  - The life of mine lead recovery is estimated at 94%.
- Blending of various zones prior to processing is not expected to impact the metallurgical performance of the blended mill feed. Metallurgical test work has not been completed to confirm the performance of a blended mill feed.
- Zinc losses in the lead circuit are expected to be the only significant metallurgical shortfall.
- Completion of the installation of the additional grinding mill is planned to achieve the 400 tpd operating rate.
- The construction of the DSTF expansion will be required for the Project.
- The processing of the Flame & Moth mineralization requires an amendment to the Water Licence and the mining and processing of the Birmingham mineralization will require amendments to the Quartz Mining Licence and to the Water Licence.

#### Recommendations

RPA provides the following recommendations:

- Carry out investigation of the ground conditions expected along the Flame & Moth ventilation raise and Birmingham access ramps and ventilation raises before development commences.
- Undertake the planned exploration development and drilling at the Birmingham deposit.
- Complete geotechnical studies of the Flame & Moth, Birmingham, and Lucky Queen deposits as development advances to refine the mine plans, stope dimension recommendations, and ground support requirements.
- Study the hydrology of the Flame & Moth and Birmingham deposits to confirm the expected ground water inflows and ground water chemistry.
- Update the ground support criteria to reflect localized conditions at the Flame & Moth, Birmingham, and Lucky Queen deposits as those deposits are advanced.

- Advance the mine planning, optimize the designs and review stope plans to ensure a positive economic benefit from each stope.
- Review the planned Lucky Queen mining rate well in advance of the commencement of mining operations at Lucky Queen.
- Review the LOM production schedule with a view to reducing the variations in feed tonnage in the later years of the plan.
- Undertake metallurgical test work to confirm:
  - The metallurgical performance of the Flame & Moth mineralization.
  - The expected good performance of a blended mill feed.
  - Options to reduce expected zinc losses in the lead circuit.
  - Settling and geochemical characteristics of the mineralization.
- Use the results of the recommended work to advance the Project level of study.

## Economic Analysis

The economic analysis contained in this report is based, in part, on Inferred Resources, and is preliminary in nature. Inferred Resources are considered too geologically speculative to have mining and economic considerations applied to them and to be categorized as Mineral Reserves. There is no certainty that economic forecasts on which this Preliminary Economic Assessment is based will be realized. Inferred Mineral Resources form the basis of 2% of the “potentially mineable tonnes” included in the plant feed schedule of this PEA.

A pre-tax Cash Flow Projection (base case) has been generated from the life of mine (LOM) production schedule and capital and operating cost estimates, and is summarized in Table 1-2. A summary of the key criteria is provided below.

## **ECONOMIC CRITERIA**

### ***REVENUE***

- 400 tonnes per day mining from underground (146,000 tonnes per year).
- Mill recovery based on experience and as indicated by testwork, averaging 97.1% silver, 88.4% zinc, 94.6% lead, and 50% gold recovered in two concentrates.
- Lead – silver concentrate and zinc concentrate shipped to smelter for treatment.
- Exchange rate C\$1.00 = US\$0.76 in years 1 to 3 and C\$1.00 = US\$0.79 thereafter.
- Long term metal prices of US\$18.60/oz for silver in year 2 and US\$19.35/oz thereafter, US\$ 1.20/lb zinc for years 2 to 4 and US\$1.00 thereafter, US\$1.00/lb lead for years 2 to 4 and US\$0.94/lb thereafter and US\$1300.00/oz for gold.
- 25% of silver is sold to Silver Wheaton under a streaming agreement at prices ranging from US\$3.54/oz to US\$8.18/oz silver.
- NSR includes shipping, treatment and refining costs.

- There is a 1.5% NSR (to a maximum of \$4 million) to the Government of Canada.
- Revenue is recognized at the time of production.

### **COSTS**

- Pre-production period: 20 months (March 2017 to December 2018).
- Mine life: nine years.
- LOM production plan as summarized in Table 16-10.
- Pre-production capital of \$27 million (accounting for revenue generated in 2018) and sustaining capital of \$62.9 million.
- Average operating cost over the mine life is \$324.93 per tonne milled.

RPA has relied upon Alexco and its tax advisors for the calculation of the taxes in the economic model.



**TABLE 1-2 CASH FLOW SUMMARY**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

Date:	UNITS	TOTAL	2017 Year 1	2018 Year 2	2019 Year 3	2020 Year 4	2021 Year 5	2022 Year 6	2023 Year 7	2024 Year 8	2025 Year 9	2026 Year 10	2027 Year 11	2028 Year 12
<b>MINING</b>														
<b>Underground</b>														
Operating Days	days	3,150	350	350	350	350	350	350	350	350	350	350		
Tonnes milled per day	tonnes / day	324	-	185	417	417	417	417	319	407	338			
Production	'000 tonnes	1,021	-	65	146	146	146	146	112	142	118			
Waste	'000 tonnes	811	25	187	161	108	123	53	95	33	26			
Total Moved	'000 tonnes	1,832	25	252	307	254	269	199	207	175	145			
<b>PROCESSING</b>														
<b>Mill Feed</b>														
Au Grade	g/t	0.4	-	0.1	0.4	0.4	0.5	0.3	0.4	0.4	0.5	-		
Ag Grade	g/t	843.00	-	931	1,089	919	788	681	743	812	798			
Pb Grade	%	3.3%	-	7.7%	3.3%	3.1%	3.3%	2.8%	3.6%	2.2%	2.9%			
Zn Grade	%	4.6%	-	5.7%	4.5%	4.7%	4.8%	5.2%	4.7%	3.3%	4.7%			
<b>Recovery</b>														
<b>Pb Concentrate</b>														
Au	%	50%	-	50%	50%	50%	50%	50%	50%	50%	50%			
Ag		93.6%	-	94.3%	95.5%	94.2%	93.0%	91.9%	92.5%	93.2%	93.1%			
Pb		94.5%	-	95.9%	94.6%	94.5%	94.6%	94.4%	94.7%	94.0%	94.4%			
<b>Zn Concentrate</b>														
Ag		3.6%	-	2.70%	1.46%	2.80%	4.00%	5.14%	4.46%	3.77%	3.91%			
Zn		88.4%	-	87.6%	88.4%	88.5%	88.5%	88.6%	88.4%	88.5%	88.5%			
<b>Recovered Metal</b>														
<b>Pb Concentrate</b>														
Au	oz	6,350	-	131	847	999	1,064	766	767	918	857	-		
Ag	oz (000)	25,906	-	1,825	4,884	4,063	3,438	2,938	2,468	3,464	2,825	-		
Pb	tonnes	32,008	-	4,792	4,544	4,226	4,608	3,908	3,778	2,886	3,266	-		
Zn	tonnes	4,058	-	349	568	585	601	640	448	397	470	-		
<b>Zn Concentrate</b>														
Au	oz	2,540	-	52	339	400	426	306	307	367	343	-		
Ag	oz	937,571	-	52,175	74,800	120,590	148,042	164,394	119,102	139,944	118,524	-		
Pb	tonnes	779	-	56	115	112	116	108	91	93	89	-		
Zn	tonnes	41,726	-	3,247	5,859	6,076	6,221	6,712	4,598	4,121	4,892	-		
<b>REVENUE</b>														
<b>Metal Prices</b>														
Au	US\$/oz Au	\$1,300		\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300	\$1,300			
Ag	US\$/oz Ag	\$19.30		\$18.60	\$19.35	\$19.35	\$19.35	\$19.35	\$19.35	\$19.35	\$19.35			
Ag (SW)	US\$/oz Ag	\$6.37		\$5.82	\$3.54	\$5.48	\$6.97	\$8.18	\$7.49	\$6.70	\$6.86			
Pb	US\$/lb Pb	\$0.96		\$1.00	\$1.00	\$1.00	\$0.94	\$0.94	\$0.94	\$0.94	\$0.94			
Zn	US\$/lb Zn	\$1.07		\$1.20	\$1.20	\$1.20	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00			
Exchange Rate	US\$:C\$	\$0.78		\$0.76	\$0.76	\$0.79	\$0.79	\$0.79	\$0.79	\$0.79	\$0.79			
<b>Concentrate Payable</b>														
<b>Pb Concentrate Payable</b>														
Payable Au	oz	4,872		-	622	790	837	572	580	775	696			
Payable Ag	oz	24,611,086		1,734,015	4,639,857	3,859,875	3,266,001	2,791,275	2,345,027	3,291,058	2,683,978			
Payable Pb	tonnes	30,408		4,552	4,317	4,014	4,377	3,713	3,589	2,742	3,102			
<b>Zn Concentrate Payable</b>														
Payable Ag	oz	446,688		21,250	25,770	54,687	71,965	80,681	59,483	74,891	57,961			
Payable Zn	tonnes	35,050		2,728	4,922	5,104	5,226	5,638	3,863	3,462	4,110			



## CASH FLOW ANALYSIS

Considering the Project on a stand-alone basis, the undiscounted after tax cash flow totals \$107.7 million over the mine life, and simple payback occurs approximately one year from start of production.

The after-tax Net Present Value (NPV) at a 5% discount rate is \$79.4 million, and the after-tax Internal Rate of Return (IRR) is 75%.

## SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities:

- Silver price
- Exchange rate
- Silver head grade
- Operating costs
- Capital costs

IRR sensitivity over the base case has been calculated for a range of variations. The after tax sensitivities are shown in Table 1-3, Figure 1-1 and Figure 1-2.

**TABLE 1-3 AFTER-TAX SENSITIVITY**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

<b>Factor</b>	<b>Silver Grade (g/t)</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.8	674	37	40%
0.9	759	59	59%
<b>1.0</b>	<b>843</b>	79	75%
1.1	927	99	90%
1.2	1,012	117	103%

<b>Factor</b>	<b>Recovery (%)</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.80	74.9%	68	66%
0.90	84.3%	74	71%
<b>1.00</b>	<b>93.6%</b>	79	75%
1.01	94.6	80	76%
1.02	95.5	81	76%

<b>Factor</b>	<b>Silver Price (US\$/oz)</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.8	15.41	41	41%
0.9	17.33	61	59%

<b>1.0</b>	19.26	79	75%
1.1	21.18	96	89%
1.2	23.11	110	102%

<b>Factor</b>	<b>Exchange Rate</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.8	0.63	150	133%
0.9	0.71	111	101%
<b>1.0</b>	<b>0.78</b>	79	75%
1.1	0.86	53	53%
1.2	0.94	29	32%

<b>Factor</b>	<b>Operating Cost (\$/t)</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.85	276	118	104%
0.93	301	97	88%
<b>1.00</b>	<b>325</b>	79	75%
1.18	382	34	40%
1.35	439	(10)	(12%)

<b>Factor</b>	<b>Capital Cost (\$M)</b>	<b>5% NPV (\$M)</b>	<b>IRR (%)</b>
0.85	87	92	97%
0.93	95	85	85%
<b>1.00</b>	<b>103</b>	79	75%
1.18	121	64	55%
1.35	138	50	40%

FIGURE 1-1 AFTER-TAX 5% NPV SENSITIVITY

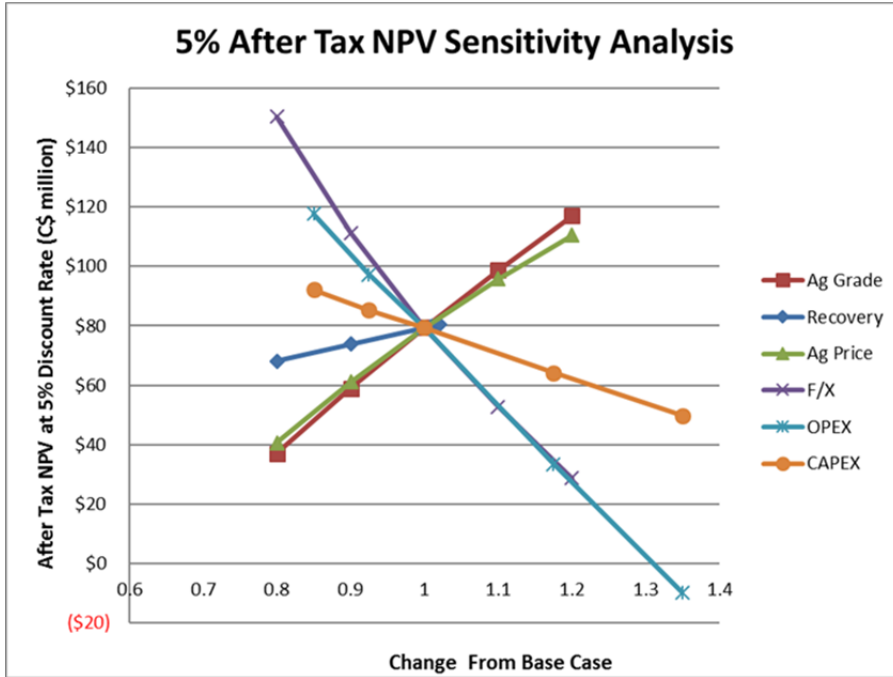
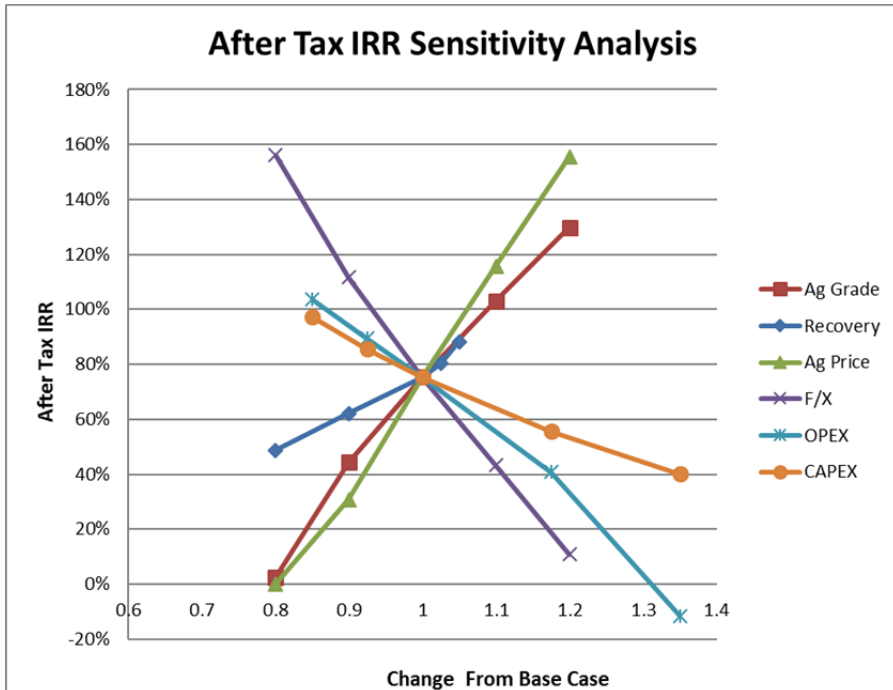


FIGURE 1-2 AFTER-TAX IRR SENSITIVITY



## **TECHNICAL SUMMARY**

### **PROPERTY DESCRIPTION AND LOCATION**

The Project is located approximately 350 km north of Whitehorse, Yukon, Canada near Elsa and Keno City. Alexco has exploration, maintenance, and camp facilities near Elsa, and administration, mill and mine facilities at the mill complex located near Keno City. The area is covered by NTS map sheets 105M/13 and 105M/14.

The KHSD Project consists of a 237.44 km<sup>2</sup> property package consisting of claims and leases. There are numerous silver, lead, and zinc deposits and mines on the property. There are Mineral Resource estimates on the Bellekeno mine and the Onek, Flame & Moth, Bermingham and Lucky Queen deposits. This PEA is based upon underground mining and processing of mineralization from the Bellekeno, Flame & Moth, Bermingham, and Lucky Queen deposits.

### **ACCESSIBILITY, CLIMATE, LOCAL RESOURCES AND PHYSIOGRAPHY**

The closest sizable town is Mayo, located approximately 40 km to the southwest. Mayo is accessible from Whitehorse via a 460 km all-weather road and is also serviced by the Mayo airport. An all-weather gravel road known as the Silver Trail Highway leads from Mayo to the Project, the historic company town of Elsa, and the village of Keno City.

The central Yukon is characterized by a subarctic continental climate with cold winters and warm summers. Exploration and mining work can be carried out year-round. Annual precipitation averages 28 cm. Half of this amount falls as snow, which starts to accumulate in October and remains into May or June.

The KHSD is well connected by a network of public and private gravel roads. A large number of roads constructed for past mining operations are still serviceable.

Local resources in terms of manpower, rental equipment, materials, and supplies are very limited. Electrical power is available from Yukon utility.

The landscape surrounding the KHSD is characterized by rolling hills and mountains with a relief of up to 1,600 m. The highest elevation is Keno Hill at 1,975 m. Slopes are gentle except the north slopes of Keno Hill and Sourdough Hill.

## **HISTORY**

The Keno Hill mining camp area has a rich history of exploration and mining dating back to the beginning of the 1900s. Key dates include:

- Early gold prospecting near Mayo, particularly after the Klondike gold rush of 1898.
- The first silver was found in 1903, with assay from 1905 yielding more than 11 kilograms per tonne (kg/t) silver.
- Small-scale mining commenced in 1913 with the first shipment of 50 t of vein material to a smelter in San Francisco.
- The end of the First World War and high silver prices led to successful exploration activity in the area with the Yukon Gold Company and later Keno Hill Limited as the first truly commercial operators. Success at the Keno mine led to a staking rush, resulting in the discovery of a number of rich deposits.
- In the early 1920s, the Treadwell Yukon Company Limited (TYC) started mining. After the Second World War a new company, Keno Hill Mining Company Ltd. (later UKHM), purchased all TYC properties and started production. Very good results led to another staking rush and the formation of a large number of junior exploration companies, many of which were purchased by UKHM.
- The 1950s proved to be the most successful period, starting in the early 1960s, new discoveries, and additions to mineral inventory were less than production.
- The Husky underground mine went into production in 1972, with open pit operations introduced in 1977 to recover crown pillars. From 1982 to 1985 (Sadie-Ladue and Shamrock mines) and 1989 to 1990 (Shamrock, Silver King, Hector-Calumet, Lucky Queen, and Keno mines) were mined on a small scale basis.
- UKHM stopped production from the Keno Hill District permanently in early 1989.
- Alexco acquired the KHSD in 2006, and produced from Bellekeno mine from 2011 to 2013. Exploration has resulted in development and identification of the Lucky Queen, Flame & Moth, Onek, and Bermingham deposits.

## **GEOLOGICAL SETTING AND MINERALIZATION**

The Keno Hill mining camp is located in the northwestern part of the Selwyn Basin in an area characterized by the Robert Service and Tombstone Thrust Sheets that are overlapping and trend northwest. The area is underlain by Upper Proterozoic to Mississippian rocks that were deposited in a shelf environment during the formation of the northern Cordilleran continental margin. The Keno Hill Silver District geology is dominated by the Mississippian Keno Hill Quartzite comprising the Basal Quartzite Member and conformably overlying Sourdough Hill

Member. The unit is overthrust in the south by the Upper Proterozoic Hyland Group Yusezyu Formation and is conformably underlain in the north by the Devonian Earn Group.

Mineralization is of the polymetallic silver-lead-zinc vein type that typically exhibits a succession of hydrothermally precipitated minerals from the vein wall towards the vein centre. However, in the Keno Hill Silver District, multiple pulses of hydrothermal fluids or fluid boiling, probably related to repeated reactivation and breccia formation along the host fault structures, have formed a series of vein stages with differing mineral assemblages and textures. Supergene alteration may have further changed the nature of the mineralogy in the veins. Much of the supergene zone may have been removed due to glacial erosion.

In general, common gangue minerals include (manganiferous) siderite and, to a lesser extent, quartz and calcite. Silver predominantly occurs in argentiferous galena and argentiferous tetrahedrite (freibergite). In some assemblages, silver is also found as native silver, in polybasite, stephanite, and pyrargyrite. Lead occurs in galena and zinc in sphalerite, which at the KHSD can be either an iron-rich or iron-poor variety. Other sulphides include pyrite, pyrrhotite, arsenopyrite, and chalcopyrite.

## **DEPOSIT TYPES**

The Keno Hill mining camp has long been recognized as a polymetallic silver-lead-zinc vein district with characteristics possibly similar to other well-known mining districts in the world. Examples of this type of mineralization include the Kokanee Range (Slocan), British Columbia; Coeur d'Alene, Idaho; Freiberg and the Harz Mountains, Germany; and Příbram, Czech Republic.

In the Keno Hill Silver District, the largest accumulation of minerals of economic interest occur in areas of increased hydrothermal fluid flow in structurally prepared competent rocks such as the Basal Quartzite Member and Triassic Greenstone. Incompetent rocks like phyllites tend to produce fewer and smaller (if any) open spaces, limiting fluid flow and resulting mineral precipitation.

## **EXPLORATION**

The exploration conducted by Alexco since 2005 is the first comprehensive exploration effort in the Keno Hill Silver District since 1997. The work has included a program of geologic data compilation, aerial geophysical surveying, geological mapping, and surface core drilling.



Alexco converted the historic maps and documents from nearly 70 years of mining in the district to digital form. The digital data has been used to construct district scale maps and three-dimensional (3D) mine models.

Exploration drilling by Alexco has primarily been conducted to test targets immediately adjacent to historic resource areas and, to a lesser extent, to evaluate targets based on interpretation of exploration data. The objective has been to locate structurally controlled vein mineralization.

## **DRILLING**

Alexco has completed several core drilling campaigns using Canadian diamond drilling contractors. The campaigns resulted in a total of 673 surface drill holes for a total of 160,810 m. In addition, a total of 407 underground holes for 25,460 m was also completed mainly at Bellekeno. Apart from 34 RC holes and some minor RC pre-collaring at Flame & Moth, drill holes have essentially all been diamond cored in HQ size.

Surface drill hole collars were surveyed with either an Ashtech GPS device utilizing post-processing software or a Sokkia GRX1 RTK GPS. All underground collars and drill stations were surveyed by underground surveyors. Downhole surveys are recorded using Reflex survey tools at regular intervals of between 15 m and 30 m depending on the hole location and geologic conditions.

Standard logging and sampling conventions are used to capture information from the drill core. Between 2006 and 2010 core was logged in detail using paper forms and then entered into an electronic database. Since 2010 all core logging data has been directly digitally entered to the geology database with data including comments captured in separate tables including:

- Lithology: rock type, faults and mineralized vein-faults, and textural modifiers
- Structure: type of structure and measurements relative to core axis
- Mineralization type, intensity of oxidation, phases and abundance of veining
- Alteration
- Stratigraphy: units consistent with the surface mapping
- Geotechnical: percentage recovery and rock quality determination and fracture intensity.

Alexco systematically measured core bulk density (CBD) of mineralized material as well as basic rock types. Pulp bulk density (PBD) measurements were obtained by pycnometry on select assay intervals of mineralized zones by ALS Laboratories and AGAT Laboratories.

***2006–2013 ALEXCO DRILLING AT THE BELLEKENO MINE***

A total of 43,784 m of drilling from both surface and underground (excluding service holes) was completed at the Bellekeno deposit between 2006 and 2013.

The 2006 drilling was to confirm and test the historical mineral inventory and block model, as well as to extend the known mineralization. Between 2006 and 2009, 200 drill holes focussed on the 48 and 49 vein structures from underground and surface platforms. Later core drilling on the Bellekeno property has focussed on resource definition, and to a lesser degree exploration programs.

***2006–2012 ALEXCO DRILLING AT LUCKY QUEEN***

Alexco conducted surface core drilling programs at Lucky Queen from 2006 to 2010 with 47 core drill holes totalling 11,104 m drilled. The drilling was designed to test along strike and down-plunge of the historical workings.

***2010–2014 ALEXCO DRILLING AT ONEK***

Alexco conducted surface diamond drilling programs at Onek in 2007, 2008, 2010, and 2011 with 78 core holes totalling 11,981 m drilled. The drilling was designed to confirm and test historic reserve/resource blocks and extend known mineralization along strike and down plunge.

A 220 m decline was driven towards the Onek deposit in 2012 and 2013. In 2013, twelve underground core holes (975 m) were drilled.

***2010–2016 ALEXCO DRILLING AT FLAME & MOTH***

Alexco conducted surface core drilling programs at Flame & Moth in from 2010 to 2014, for a total of 151 holes for 35,244 m for resource estimation. The exploration drilling was initially designed to test geologically derived targets in the vicinity of the historical Flame & Moth workings. Following new discoveries, additional drilling was successful in outlining two zones on the Flame vein.

In 2016, following the initial development of the Flame portal, 17 underground drill holes were drilled along the proposed decline trace, for a total of 572 m.

### **2009–2016 ALEXCO DRILLING AT BIRMINGHAM**

Alexco conducted surface diamond drilling programs at Birmingham between 2009 and 2011 with 36 core holes totalling 10,456.2 m drilled to test along strike and down plunge of historic resource, open pit workings, and around the historic underground mine workings. Drilling was successful in outlining an area of silver-lead-zinc mineralization developed in the hangingwall of the Mastiff Fault.

Drilling between 2012 and 2016 of 28,220.4 m in 83 holes led to the discovery and definition of high grade vein deposits. To date the interpretation of the consolidated drilling results has identified four mineralized veins that splay and change orientation along strike within the north-northeast striking and moderately to steeply southeast dipping Birmingham vein-fault structural corridor. This structural corridor is divided into the Etta Zone in the hangingwall of the post-mineral Mastiff Fault and the Arctic Zone in its footwall. The main through-going Birmingham and Birmingham Footwall veins occur in both the Etta and Arctic zones, while the Bear vein and associated newly identified conjugate West Dipper vein set occur only within the Arctic Zone in a position controlled by a flexure in the Birmingham vein-fault.

### **SAMPLE PREPARATION, ANALYSES AND SECURITY**

Core logging and sampling is completed by Alexco staff, where a logging geologist marks the sample intervals and cutting orientation normal to veins on the core. After logging, the core is digitally photographed and sawn in half lengthwise using a diamond saw where possible. One half is returned to the core box for storage at the site and the other bagged for sample shipment.

Each 20-sample batch sent for assaying includes three control samples: a commercial standard reference material (SRM), a blank, and a duplicate. The blank is commercially purchased “landscape rock”. An empty sample bag is inserted at the location of the duplicate, which is prepared during sample preparation at the laboratory prep facility. The duplicate consists of a coarse reject split of the preceding sample.

### **DATA VERIFICATION**

Dr. Gilles Arseneau and Chris Elliott of SRK carried out a visit to examine the Lucky Queen, Bellekeno, and Onek deposits. In total, SRK spent two and half days at the sites between July 26 and 28, 2010 examining drill core, core logging and sampling procedures; visiting drill sites; and examining the mineralization exposed in surface cuts. Alexco provided SRK with

information related to these activities during the site visit. Dr. Arseneau carried out a second site visit on May 7 and 8, 2012 and a third site visit on September 12, 13, and 14, 2016 to examine the surface geology and drill core for the Birmingham deposit.

## **MINERAL PROCESSING AND METALLURGICAL TESTING**

Metallurgical testwork has been conducted independently on each of the three deposits included in the production plan. Testwork performed from 1996 through 2009 was the basis for the design and construction of the mill facility in 2010. The Bellekeno mine and mill complex achieved commercial production in January 2011, processing an average of 253 tpd in 2012. Since 2011, samples from Lucky Queen, Flame & Moth, and Birmingham deposits were tested to assess flotation performance.

The PEA LOM schedule indicates that significant blending of the different deposits is planned. To date, no testwork has been conducted on a blended sample from any of the three deposits. While there is little information related to the blending and processing of different mineralized zones, there is no expectation that blending of ores will harm the metallurgical response of individual materials. The deposits vary widely in terms of base and precious metals and all samples have responded well to flotation processes for the production of saleable concentrates.

## **MINERAL RESOURCE ESTIMATE**

Definitions for resource categories used in this report are consistent with the CIM definitions incorporated by reference into NI 43-101. A summary of the Mineral Resource at the Project is shown in Table 1-1.

Mineral Resources are not Mineral Reserves and have not demonstrated economic viability. There is no certainty that all or any part of the Mineral Resource will be converted into Mineral Reserve.

The resource evaluations reported herein are a reasonable representation of the global polymetallic mineral resources in the Bellekeno, Lucky Queen, Flame & Moth, Onek, and Birmingham deposits given the current level of sampling.

## **RESOURCE ESTIMATION PROCEDURES**

The resource evaluation methodology for the five deposits employed the following procedures:

- Database compilation and verification.
- Construction of wireframe models for the boundaries of the polymetallic mineralization.
- Definition of resource domains.
- Estimation of bulk density.
- Data conditioning (compositing and capping) for geostatistical analysis and variography.
- Block modelling and grade interpolation.
- Resource classification and validation.
- Assessment of “reasonable prospects for eventual economic extraction” and selection of appropriate cut-off grades.
- Preparation of the Mineral Resource Statement.

### ***SOLID BODY MODELLING***

3D wireframe solids were constructed by Alexco to accurately represent the geometry of the Bellekeno mine, Lucky Queen, Flame & Moth, Onek, and Bermingham vein structures. These wireframes were reviewed and validated by the QP before Mineral Resource estimation.

### ***MINERAL RESOURCE CLASSIFICATION***

Blocks estimated during the first estimation run considering full variogram ranges can be classified in the Indicated category. Blocks estimated during the second pass considering search neighbourhoods set at twice the variogram ranges should be appropriately classified in the Inferred category.

### **MINERAL RESERVE ESTIMATE**

There are no Mineral Reserve estimates at the KHSD.

### **MINING METHODS**

The KHSD is historically known for locally challenging ground conditions encountered that limit the applicable mining methods to fully supported methods with limited spans, such as cut and fill or very small scale longhole. For most of its mining life, the most successful method was square set stoping with timber.

The deposits considered for production in this PEA are the Flame & Moth, Bermingham, Bellekeno, and Lucky Queen deposits. All of the mining in this PEA is planned to be underground mining using rubber tired mobile equipment and adit entries. The dominant recommended mining method is mechanized overhand cut and fill (MCF) or drift and fill in wider

areas. Longhole stoping with backfill has been recommended in wider areas interpreted to have intact hangingwall and footwall intersections.

The backfill is planned to be a mixture of waste rock fill and tailings from the DSTF with cement added as required.

### ***GEOTECHNICAL EVALUATION***

SRK completed preliminary geotechnical evaluations for the Bellekeno, Lucky Queen, Flame & Moth, and Bermingham deposits. The evaluations considered the mineralized veins, hangingwall and footwall zones adjacent to planned mining, and general areas for proposed infrastructure development. Based on these assessments, recommendations for mining methods, stope design, and support requirements have been provided.

Information available for the evaluations included drill hole databases, core photographs, Gemcom models, and information collected by SRK during various site visits. Only the Bellekeno review has the benefit of underground observations.

Further geotechnical studies are recommended to confirm the pillar requirements and the mine design details. RPA recommends that the initial geotechnical reviews focus on the Flame & Moth and Bermingham access drives and ventilation raises to assess conditions along the planned alignments.

### ***HYDROGEOLOGICAL CONDITIONS***

The Bellekeno and Lucky Queen proposed mining zones are located above the valley floor, which tends to limit the occurrence and impact of adverse hydrogeological conditions. In contrast, the Flame & Moth deposit is situated such that there is a possibility of water inflow to the planned workings. Preliminary investigations have been used to estimate inflows for the Flame & Moth deposits.

### ***POTENTIALLY MINEABLE TONNES***

In the first pass of mine planning, the stope shapes and mining areas were reviewed based upon an NSR value per tonne cut-off of \$290. The stopes were then reviewed based upon the revised operating cost estimate of \$325/tonne. This review removed from stopes and some stoping areas that were either unprofitable, had a very low overall margin, and/or required significant additional development for access to the area. Mining recovery was applied at 95% for Bellekeno, Flame & Moth, and Lucky Queen which is in line with Alexco's historic operational

experience. For Bermingham, mining recovery was applied at 90%, which is in recognition of anticipated challenging ground conditions.

A mining recovery of 50% was applied to the geotechnical pillars at Flame & Moth. A different approach was used for geotechnical pillars at Bermingham, where ground support costs were doubled for excavations located within 5m of large faults (in addition to the 90% mining recovery outlined above). These different approaches reflect the level of geotechnical understanding at these deposits.

Estimated potentially mineable tonnes were tabulated for each deposit and arranged to support production scheduling. Table 1-4 shows the estimate of potentially mineable tonnes for the four deposits contributing to the updated PEA plant feed.

**TABLE 0-4 POTENTIALLY MINEABLE TONNES FOR PEA PLANT FEED**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

<b>Mine</b>	<b>Diluted (‘000 t)</b>	<b>Ag (g/t)</b>	<b>Au (g/t)</b>	<b>Pb (%)</b>	<b>Zn (%)</b>
Bellekeno	37	747	n/a	10.6	5.9
Lucky Queen	81	1,206	0.1	2.6	1.63
Flame & Moth	683	666	0.5	2.8	5.8
Bermingham	220	1,276	0.2	4.1	2.1
<b>Total PEA Plant Feed</b>	<b>1,021</b>	<b>843</b>	<b>0.4</b>	<b>3.3</b>	<b>4.6</b>

RPA worked with Alexco on an overall strategy to guide the development of the PEA production plan. This involved considering various combinations of the four deposits, that would achieve a sustainable plant feed rate of 400 tpd as early as possible and give priority to the highest grade and largest potential tonnage deposits.

***PLANNED PRODUCTION RATES***

RPA and Alexco estimated maximum production rates to be respected during production scheduling. They were estimated based on mining method, vein thickness, mining shape geometry, and the layout of the vein access crosscut. The overall scheduling was based upon taking the Bellekeno material first as readily accessible material to create a stockpile for the initial mill start up.

The balance of the mine plan was based upon operating two mines most of the time and limiting the time spent trying to run three mines at one time. The schedule was set based upon the

planned timing of the permits for Birmingham so that the Birmingham and Flame & Moth deposits commence mill feed production at the same time.

The KHSD mill processing rate is limited by permits to 400 tpd.

### ***DEVELOPMENT AND PRODUCTION SCHEDULES***

A development and production schedule was prepared for each deposit using Deswik software.

For the Flame & Moth and Birmingham, the main ramp from surface has been scheduled at advance rates of three to four metres per day line advance, based upon rates that are considered to be achievable by well-organized owner's crews.

The production schedule includes some time allowances for vein water drainage after the vein has been intersected by access crosscuts. Production stoping is not scheduled to begin until a second route out of the mine has been established to that location.

### **RECOVERY METHODS**

#### ***PROCESS FLOWSHEET***

The process facility is based on traditional unit operations for the recovery of silver, lead, and zinc into sulphide mineral concentrates. The lead concentrates typically contain approximately 90 to 95 percent of the mill feed silver values. Detailed analysis of test work results indicates that lead and silver recoveries are typically dependent on the respective head grades for these two metals. Zinc recovery is typically defined or affected by the ratio of lead to zinc.

Unit operations within the Alexco facilities include crushing of run-of-mine material, grinding for preparation of flotation feed, selective flotation for the production of lead and zinc concentrates, concentrate dewatering and tailings thickening and filtration. Concentrates are shipped off site for smelting and tailings are stored in the DSTF.

#### ***DESIGN CRITERIA***

The mill facility was designed to process 408 tpd at an overall plant availability of 92%. The target grind size was at P80 size of 174 µm and the 2010 Project design included the option of a regrind mill before the lead cleaner circuit. The plant was built without the lead regrind mill.



### ***2012 MILL PERFORMANCE***

In 2012, the mill facility processed 94,800 t of Bellekeno vein material generating 13,000 t of lead-silver concentrate and 5,700 t of zinc concentrate. The average daily throughput was 260 tpd at 89% availability. The maximum monthly throughput for the year was 320 tpd, with peak production in September and October.

The 2012 mill facility lead recoveries ranged from 84% to 98% with a concentrate lead grade of 55% to 68%. The silver recoveries to silver-lead concentrate ranged from 83% to 97% with silver grades from 4,231 g/t to 5,270 g/t.

The zinc recovery to zinc concentrate ranged from 46% to 64% with a final zinc grade of 40% to 49% zinc. Zinc metallurgical performance did not meet design criteria nor was it comparable to test work results.

### ***PLANT MODIFICATIONS***

With the current equipment, the mill facility has not demonstrated the ability to achieve the target throughput of 400 tpd. Based on plant testing, the installation of a second ball mill in series after the existing mill was recommended. Installation commenced in 2013 but was not completed. As part of the Project the mill installation is to be completed along with modifications to the classification circuit.

On-going evaluation of the flotation process will be required as the plant is optimized and operated on a long term basis. Technical support should include a flotation engineer and a metallurgical technician to support the operating staff.

## **PROJECT INFRASTRUCTURE**

### ***ELSA FACILITIES***

The administrative offices and first aid facilities are currently based in Elsa, Yukon in a large facility that also accommodates the exploration group offices and core processing area. Maintenance and warehouse facilities are also located at Elsa. The warehouse building in Elsa is a two-story building with warehousing on both levels and a fully serviced maintenance shop on the northern end of the bottom floor. This building is used as a centralized warehouse/surface equipment facility for the Project operations.

### ***FLAT CREEK FACILITIES***

The currently licensed Flat Creek camp facilities include a trailer camp, kitchen facility, and drillers dry assembled at the old Flat Creek town site (part of Elsa). The camp has a total capacity of 90 permanent beds. There are four refurbished houses located nearby with a total of 28 rooms, and an additional 20 rooms available in a bunkhouse. A fourth bunkhouse located adjacent to the houses is primarily used for seasonal surface exploration programs. The entire capacity of the camp facilities is 140 rooms. The facilities will require expansion to accommodate the estimated 230 operations employees in addition to the ongoing surface exploration employees and contractors.

Alexco is licensed to draw water from Flat Creek and an existing groundwater well for domestic use. Alexco has two sewage disposal permits at Elsa: one for the Flat Creek camp and one for the houses.

### ***MILL FACILITY***

The current facilities at the mill facility include mine and mill offices and dry, an assay lab, first aid facilities, and the mill and DSTF complex. The mine geology and engineering office buildings from Bellekeno were moved to the mill area to serve as a central office and dry facility for all mining operations. A metallurgical and assay laboratory conducts all basic testwork to monitor and improve the process flowsheet metallurgy and efficiency, and to support environmental monitoring.

The assay laboratory was constructed as a pre-packaged unit consisting of two retrofitted 40-foot shipping containers converted into laboratory modules. The laboratory is equipped with the necessary analytical instruments to provide all routine assays for the mine, plant, and environmental quality control monitoring.

### ***AREA HAUL ROAD SYSTEM***

Alexco has constructed a series of access and haul roads to route mine traffic around the Keno City community. All traffic between Elsa and the mill facility and/or the Bellekeno mine is routed along the Christal Lake road and subsequently the Bellekeno haul road.

During mine production, heavy truck traffic from Lucky Queen will be routed along the Keno City bypass road to/from the Bellekeno haul road. Light truck traffic from Lucky Queen will continue to be routed through Keno City during mine operations.

### ***ELECTRICAL POWER***

Electrical power is available at the Project from the Yukon electrical utility.

### **MARKET STUDIES AND CONTRACTS**

The principal commodities at KHSD are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured.

#### ***CONCENTRATE SALES CONTRACTS***

Previously, the production of both the silver/lead concentrate and the zinc concentrate from the mill facility was being sold under contract with Glencore Ltd. The terms of the contract were reviewed and renegotiated annually to reflect current market conditions.

The terms of the current contract are included in the economic model in order to generate NSR values for the LOM plan.

#### ***OTHER CONTRACTS***

Alexco has entered into contracts with the following companies to support the operations of the Project:

- Canadian Lynden Transport is contracted by Alexco to transport lead and zinc concentrates to a smelter in North America and to back haul supplies to the site.
- Yukon Energy provides power under contract to various substations and to the Bellekeno mine and mill facility.
- Superior Propane provides propane under contract to Bellekeno with the largest consumption for mine air heating in the winter.

### **ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT**

The Project area includes a number of historical mines and processing operations within the Keno Hill Silver District spread out over 237.44 km<sup>2</sup>. These include nine major mines, three tailings disposal areas, and dozens of different shafts and adits. The Bellekeno, Lucky Queen and Birmingham sites have historical mine workings, waste rock storage areas, and mine water discharges, whereas the Flame & Moth site only has minor historical surface mine workings and a waste rock storage area that were reclaimed during the construction of the Keno District Mill.

Alexco and its subsidiary, ERDC, have a unique arrangement with the Government of Canada in which Alexco is responsible for the care, maintenance, and closure of the historical mines,

with government and company funding provided to address the historical liabilities. Alexco is indemnified from the historic environmental liabilities. The company, along with territorial, federal, and First Nation governments, is responsible for developing a district-wide closure plan that addresses these historic environmental liabilities arising from past mining activities. Some high priority activities have already been implemented. Currently, active water treatment is carried out at five locations in the Keno Hill Silver District.

Alexco is responsible for environmental assessment, permitting, compliance, and costs associated with its ongoing exploration and new mine development activities. Additionally, if a new mine is brought into production including the use of infrastructure associated with a historic mine, terrestrial liabilities (i.e., waste rock storage areas and roads) and water related liabilities located within a designated "Production Unit" become the responsibility of Alexco. At this time, Bellekeno is the only area that has been defined as an active Production Unit. However, once commercial operations commence, the Lucky Queen, Flame & Moth and Bermingham mining areas would be classified as Production Units for which Alexco would be responsible for historic terrestrial and water related liabilities that are contained within the new active mining footprint.

#### ***ENVIRONMENTAL ASSESSMENT AND PERMITTING***

Existing approvals for the care and maintenance, exploration, and mine development activities cover all aspects of the mine development at the Bellekeno, Lucky Queen, and Flame & Moth mines.

The Bellekeno and Lucky Queen mines have all permits and authorizations in place to commence full scale mine production. The Flame & Moth deposit has in place an amended Quartz Mining License QML-0009 which authorizes mine development to commence. Before milling of material from the Flame & Moth deposit, an amendment to Water Use Licence QZ09-092 is required. Additional minor approvals will also be required.

The terms and conditions for the Flame & Moth development, outlined in the Decision Document, include additional water treatment requirements, provision for a liner under the DSTF, additional equipment to reduce noise from the mill area crusher, and increased air quality and noise monitoring, and community consultation to address community concerns regarding air quality and noise related issues. The water license amendment process is well advanced and the final permitting phase for Flame & Moth is to hold a public hearing. The public hearing process is expected in early Q2 2017 followed by issuance of the water license amendment in Q2 2017.

The Bermingham deposit has in place a Class IV Mining Land Use permit that authorizes surface exploration to occur. Underground development and advanced exploration drilling, will commence under an amendment to the current Class IV authorizations. It is assumed that underground development will need to be assessed through YESAB and that the water license will be amended to allow commercial milling of material from the Bermingham deposit. The Bermingham permitting timeline includes a two-step process which includes first permitting Bermingham to allow underground decline construction and bulk sampling followed by permitting to allow milling and tailings storage in the DSTF.

A 21 month period is estimated for the Bermingham deposit environmental assessment, permitting, and water licence amendment so that processing could begin in Q4 2018.

#### ***NOISE, VIBRATION, DUST AND TRAFFIC CONSIDERATIONS***

Several specific issues were raised during the review process, and have been included in the Quartz Mining Licence. Mitigation measures that have been implemented or proposed by the company include limiting certain activities (e.g. crusher operations) and types of traffic to the hours of 7 am to 7 pm, constructing a building around the crusher and installing a sound dampening enclosure around the Flame & Moth ventilation fan.

Traffic-related issues have resulted in the construction of bypass roads and signage to separate public traffic from mine operations in key areas.

#### ***LAND, RESOURCE USE AND HERITAGE RESOURCES***

The local community and First Nations have expressed concerns regarding continued access for recreation and tourism in the area, subsistence harvesting and traditional use, sport and commercial hunting, fishing and trapping, mineral development, and preservation of historical resources. Although impacts are expected to be minor, Alexco is working with the various stakeholders to address these concerns.

#### ***COMMUNITY AND FIRST NATIONS RELATIONS***

The Keno Hill Silver District is situated in the traditional territory of the First Nation of Na-cho Nyak Dun (FNNND). Alexco has met regularly with stakeholders and First Nations regarding their ongoing operations as well as the new plans, presenting detailed information about the Project and seeking expression of concerns.

Alexco has signed a Comprehensive Cooperation and Benefits Agreement (CCBA) with the FNNND that recognizes the rights, obligations, and opportunities of the two parties. The Agreement includes detailed discussion about respecting and protecting the environment, including enhanced opportunities for FNNND to be involved in environmental management of all operations, from mining through to closure and reclamation. The CCBA was reviewed and amended in May 2016 and there are no material changes to the CCBA.

#### ***WASTE AND WATER MANAGEMENT PLANS***

Waste rock from the deposits can have the potential for acid generation and/or metal leaching (P-AML). The P-AML rock is stored in specific designed facilities. Non P-AML is stored on surface or is used for construction as needed.

Water from mining operations is discharged to ponds and if necessary treated before discharge.

#### ***TAILINGS***

Tailings will continue to be deposited in the licensed DSTF or used as backfill in the operating mines. Geochemical testing on tailings from Birmingham have not been completed, however, for the purpose of this PEA, it is assumed that the Flame & Moth and Birmingham tailings will be geochemically similar to the already licensed tailings and that no additional measures will be required to control metal leaching/acid rock drainage.

#### ***MINE RECLAMATION AND CLOSURE***

An updated Reclamation and Closure Plan was approved by the Government of Yukon in 2016 that encompasses all of the active mining and processing activities in the Keno Hill Silver District. Some key aspects of the closure plan are listed as below:

- P-AML waste rock will either be placed as backfill in the mine or sloped to shed water and then covered with a 0.5 m layer of low permeability borrow material.
- N-AML waste rock storage facilities will be regraded, scarified, and revegetated.
- Adits and raises will be sealed to prevent access.
- At the Bellekeno mine, in-pool treatment measures will be implemented to reduce metal loadings if required. The active treatment system will be converted to a passive bioreactor system.
- All buildings and equipment will be removed from the portal areas.
- Linear disturbances (roads) will be subject to standard decommissioning measures.

- The Flat Creek camp will be downsized as needed to support ongoing care and maintenance activities in the KHSD.
- Buildings and other infrastructure in the mill area will be dismantled and removed.
- The DSTF will be covered. If monitoring indicates that it is necessary, meteoric water will be directed to a passive biological treatment system for polishing prior to discharge.
- Various monitoring activities will continue until the performance of the closure measures has been verified.

## CAPITAL AND OPERATING COSTS

The capital cost estimate for the Project is summarized in Table 1-5. The capital costs include the restart of the Bellekeno mine, development of the Flame & Moth deposit, development of the Birmingham deposit and the reopening of the Lucky Queen mine plus the necessary process plant and infrastructure for the restart of operations. Pre-production is considered to be year 1 and year 2 (2017 and 2018) of the plan. The capital costs are based on Q4 2016 estimates.

**TABLE 1-5 CAPITAL COST SUMMARY**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

		Total	Year 1	Year 2	Year 3	Year 4	Year 5	Yr 6-9
Mining	C\$ '000	75,754	8,663	19,323	10,392	6,369	7,231	23,775
Processing	C\$ '000	951	205	746	-	-	-	-
Infrastructure	C\$ '000	7,947	364	3,691	1,386	210	298	1,998
Tailings	C\$ '000	821	-	47	119	118	118	419
Total Capital Cost	C\$ '000	85,473	9,232	23,808	11,897	6,697	7,647	26,192
								-
Contingency	C\$ '000	17,095	1,846	4,762	2,379	1,339	1,529	5,238
Total Capital Cost	C\$ '000	102,568	11,078	28,569	14,277	8,037	9,176	31,431

The capital cost estimates were generated by Alexco and were reviewed and modified based upon detailed review by RPA. RPA considers the accuracy of capital cost estimate components to be at a scoping level. A 20% contingency has been included in the capital cost estimate based upon a review of the capital details.

The sustaining capital is mainly the major mine development in the deposits to be mined.

Exclusions from the capital cost estimate include, but are not limited to, the following:

- Study costs to advance the Project engineering.
- All sunk costs to the end of 2016.

- Project financing and interest charges.
- Working capital.
- Escalation during construction and operation.

Table 1-6 shows the LOM site operating cost estimate. It is based on LOM plant feed of 1,021 kt and operating at a rate of 146,000 tpa.

**TABLE 1-6 LOM SITE OPERATING COST SUMMARY**  
**Alexco Resource Corp. – Keno Hill Silver District Project**

<b>Area</b>	<b>LOM Site Opex (\$M)</b>	<b>Unit Cost (\$/t)</b>
Mine	197.3	193.25
Mill	61.9	61.89
G&A	69.8	69.79
<b>LOM Total Site</b>	<b>331.8</b>	<b>324.93</b>

The operation is planned to be a fly-in fly out operation with employees remaining in camp for their work rotation. The manpower will range from 197 to 235 persons over the Project life.