

SOLITARIO ZINC CORP.  
Form 10-K  
March 14, 2018  
UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

**FORM 10-K**

(Mark One)

Annual report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 for the fiscal year ended December 31, 2017

or

Transition report pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number **001-32978**

**SOLITARIO ZINC CORP.**

(Exact name of registrant as specified in charter)

**Colorado**

(State or other jurisdiction of incorporation or organization)

**4251 Kipling St. Suite 390, Wheat Ridge, CO**

(Address of principal executive offices)

Registrant's telephone number, including area code

**84-1285791**

(I.R.S. Employer Identification No.)

**80033**

(Zip Code)

**(303) 534-1030**

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of exchange on which registered
<b>Common Stock, \$0.01 par value</b>	<b>NYSE American</b>

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

YES [ ] NO [X]

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.

YES [X] NO [ ]

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

YES  NO

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

YES  NO

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained to the best of registrant's knowledge in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act:

		Non-accelerated filer <input type="checkbox"/>		
Large accelerated filer <input type="checkbox"/>	Accelerated filer <input type="checkbox"/>	(Do not check if a smaller reporting company)	Smaller reporting company <input checked="" type="checkbox"/>	Emerging growth company <input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act).

YES  NO

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of the last business day of the registrant's most recently completed second fiscal quarter, based upon the closing sale price of the registrant's common stock on June 30, 2017 as reported on NYSE American, was approximately \$29,505,000.

There were 58,402,956 shares of common stock, \$0.01 par value, outstanding on March 12, 2018.

## DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for the Registrant's Annual Meeting of Shareholders, which is expected to be filed by April 30, 2018, have been incorporated by reference into Part III of this Annual Report on Form 10-K

**TABLE OF CONTENTS**

	Page
PART I	
Item 1 Business	3
Item 1A Risk Factors	5
Item 1B Unresolved Staff Comments	12
Item 2 Properties	12
Item 3 Legal Proceedings	26
Item 4 Mine Safety Disclosures	26
PART II	
Item 5 Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	
Item 6 Selected Financial Data	29
Item 7 Management's Discussion and Analysis of Financial Condition and Results of Operations	30
Item 7A Quantitative and Qualitative Disclosures about Market Risk	38
Item 8 Financial Statements and Supplementary Data	39
Item 9 Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	61
Item 9A Controls and Procedures	61
Item 9B Other Information	61
PART III	
Item 10 Directors, Executive Officers and Corporate Governance	62
Item 11 Executive Compensation	62
Item 12 Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	62
Item 13 Certain Relationships and Related Transactions, and Director Independence	62
Item 14 Principal Accounting Fees and Services	62
PART IV	
Item 15 Exhibits, Financial Statement Schedules	63
Item 16 Form 10-K Summary	63
SIGNATURES	64

## **PART I**

This Annual Report on Form 10-K contains statements that constitute "forward-looking statements" within the meaning of section 27A of the Securities Act of 1933 and section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). These statements can be identified by the fact that they do not relate strictly to historical information and include the words "expects", "believes", "anticipates", "plans", "may", "will", "intend", "estimate", "continue" or other similar expressions. These forward-looking statements are subject to various risks and uncertainties that could cause actual results to differ materially from those currently anticipated. These risks and uncertainties include, but are not limited to, items discussed below in Item 1A "Risk Factors" in this Form 10-K. Forward-looking statements speak only as of the date made. We undertake no obligation to publicly release or update forward-looking statements, whether as a result of new information, future events or otherwise. You are, however, advised to consult any further disclosures we make on related subjects in our quarterly reports on Form 10-Q and any reports made on Form 8-K to the United States Securities and Exchange Commission (the "SEC").

### **Item 1. Business**

#### The Company

Solitario Zinc Corp ("Solitario," "Company," "we," "us") is an exploration stage company at December 31, 2017 under Industry Guide 7, as issued by the SEC. Solitario was incorporated in the state of Colorado on November 15, 1984 as a wholly-owned subsidiary of Crown Resources Corporation ("Crown"). In July 1994, Solitario became a publicly traded company on the Toronto Stock Exchange (the "TSX") through its initial public offering. We have been actively involved in mineral exploration since 1993. Our primary business is to acquire exploration mineral properties or royalties on mineral properties, and/or to discover economic deposits on our mineral properties and advance these deposits, either on our own or through joint ventures, up to the development stage (development activities include, among other things, completion of a feasibility study for the identification of proven and probable reserves, as well as permitting and preparing a deposit for mining). Upon the completion of the Acquisition (defined below), we have shifted our primary focus toward the acquisition and exploration of zinc-related exploration mineral properties. However, we will continue to evaluate other mineral properties for acquisition and hold a portfolio of mineral exploration properties and assets for future sale, joint venture or to create a royalty prior to the definition of proven and probable reserves. We may attempt to sell a given mineral property, pursue its development either on our own or through a joint venture with a partner that has expertise in mining operations, or obtain a royalty from a third party that continues to advance the property. In addition to focusing on our current assets and the evaluation of mineral properties for the acquisition of royalty interests, we also evaluate potential strategic corporate transactions that could result in Solitario obtaining an interest in precious and base metal properties with exploration potential or other business combinations we determine to be favorable to Solitario.

#### Recent Developments

### Acquisition of Zazu

On July 12, 2017 Solitario completed the acquisition of Zazu Metals Corp. (“Zazu”) pursuant to a definitive arrangement agreement (the “Arrangement Agreement”) whereby we acquired all of the outstanding common shares of Zazu (the “Zazu Shares”) by way of a statutory plan of arrangement (the “Arrangement”) under the *Canada business Corporation Act* (the “Acquisition”). As a result of the Acquisition, Zazu became a wholly-owned subsidiary of Solitario. At closing, we issued 19,788,177 shares of common stock for all of the issued and outstanding Zazu Shares. We also granted options to acquire an aggregate of 1,782,428 shares of Solitario common stock (the “Replacement Options”) in connection with the Acquisition. The total purchase price for the Acquisition was \$16,110,000 and has been allocated to the assets acquired and stock issuance costs, less liabilities. Results of operations for Zazu have been included in our consolidated financial statements from the date of Acquisition.

### Name Change to Solitario Zinc Corp.

Our shareholders voted at our annual meeting of shareholders held on June 29, 2017 in favor of an amendment to Solitario’s Articles of Incorporation to change our name to “Solitario Zinc Corp.” from “Solitario Exploration & Royalty Corp.” The name change was subject to the completion of the Acquisition and became effective on July 17, 2017.

### Corporate Structure

Solitario Zinc Corp. [Colorado]

- Zazu Metals Corp. [Canada] (100%)

- Zazu Metals (AK) Corp [USA – Alaska] (100%)

(table of contents) 3

- Lik Project (50%)
- Minera Chambara, S.A. [Peru] (85%)
- Chambara Project
- Minera Solitario Peru, S.A. [Peru] (100%)
- Minera Bongará, S.A. [Peru] (39%)
- Florida Canyon Project
- Minera Soloco, S.A. [Peru] (100%)

#### Mineral Exploration Properties

As a result of the Acquisition, at December 31, 2017 we hold a 50% operating interest in the Lik zinc-lead-silver deposit in Northwest Alaska, which is considered a large tonnage, high-grade and mineable by open-pit methods. Teck Resources Limited (“Teck”) is a 50% partner with Solitario in the Lik deposit, with Solitario acting as the project manager. Zazu completed a Canadian National Instrument 43-101 compliant Preliminary Economic Assessment (“PEA”) on the Lik deposit in 2014.

Solitario’s other core asset is a 39% interest in the advanced, high-grade, Florida Canyon zinc project located in northern Peru. The project has a significant mineral resource and Solitario is fully carried to production by its joint venture partner Nexa Resources, SA (“Nexa”) a Brazilian company, formerly Votorantim Metais Holdings, SA (“Votorantim”). Solitario and Nexa completed a PEA on the Florida Canyon deposit in August 2017. Nexa is one of the largest zinc producers in Peru. Since inception of the Florida Canyon joint venture in 2006, Nexa, as Votorantim and its subsidiary, Minera Milpo, have funded 100% of project expenditures. Nexa will earn a 70% interest in the project by continuing to solely fund all project expenditures and committing to place the project into production based upon a positive feasibility study. After earning 70%, and at the request of Solitario, Nexa has further agreed to finance Solitario's 30% participating interest for construction. Solitario will repay the loan facility through 50% of its net cash flow distributions.

Solitario also holds an 85% interest in the Chambara exploration project in Peru (Nexa holds the remaining 15%), and a 9.9% equity interest in Vendetta Mining Corp. (“Vendetta”).

At December 31, 2017, we also had the 100% owned La Promesa exploration property and our Yanacocha royalty property in Peru, a retained royalty on the Pedra Branca project in Brazil, a retained royalty on non-producing exploration properties in Mexico, and a royalty on certain non-producing mineral claims in Montana. We are

conducting exploration and property evaluation activities in Peru either on our own using contract geologists, or through joint ventures operated by our partners.

Our exploration activities and those of our joint venture partners are carried out on a property-by-property basis. These activities may include prospecting, geologic mapping, sampling, geophysics and drilling. When we determine that this work indicates a project may not be economic or contain sufficient geologic or economic potential, we may impair or completely write-off the property. A significant factor in the success or failure of our activities is the price of commodities. For example, when the price of zinc or other commodities is down, we may determine that the value of our mineral exploration properties decreases; however, during such down markets it may also become easier and less expensive to locate and acquire new mineral exploration properties.

We have recorded revenue in the past from the sale of mineral properties, joint venture property payments and the sale of a royalty on our formerly-held Mt. Hamilton property. Proceeds from the sale or joint venture of properties, although potentially significant when they occur, have not been a consistent source of cash and may only occur in the future, if at all, on an infrequent basis. Accordingly, while we conduct exploration activities on our projects, we need to maintain and replenish our capital resources. We have met our need for capital in the past through (i) proceeds of the sale of our former Mt. Hamilton project in 2015 for net proceeds of \$24 million (the “Mt. Hamilton Transaction”); (ii) sale of our shares of common stock of Vendetta and Kinross Gold Corporation (“Kinross”); (iii) borrowing in the form of short-term margin debt secured by our investment in Kinross; (iv) borrowing under long-term debt secured by our Mt. Hamilton project (v) joint venture delay rental payments, including payments on our Florida Canyon project; (vi) a royalty sale for \$10,000,000 in 2012; (vii) issuances of common stock; (viii) sale of covered call options on our Kinross common stock; and (ix) interest on short term Treasury Notes and Bank CDs. In the past, we have reduced our exposure to the costs of our exploration activities through the use of joint ventures.

[\(table of contents\)](#) 4



We operate in one segment: mineral exploration. We currently conduct exploration activities in Peru and Alaska and evaluate properties for potential acquisition and evaluation of strategic corporate opportunities throughout North and South America. As of March, 12, 2018, we had five full-time employees located in the United States and no full-time employees outside of the United States. We utilize contract managers, geologists, administrators and laborers to execute our Latin American project work and acquisition evaluations.

A large number of companies are engaged in the acquisition, exploration and development of mineral properties, many of which have substantially greater technical and financial resources than we have and, accordingly, we may be at a disadvantage in being able to compete effectively for the acquisition, exploration and development of mineral properties. We are not aware of any single competitor or group of competitors that dominate the exploration and development of mineral properties. In acquiring mineral properties for exploration and development, we rely on the experience, technical expertise and knowledge of our employees and advisors, which is limited by the size of our company compared to many of our competitors who may have either more employees or employees with more specialized knowledge and experience.

#### Governmental Regulations

Mineral development and exploration activities are subject to various national, state/provincial, and local laws and regulations, which govern prospecting, development, mining, production, exports, taxes, labor standards, occupational health, waste disposal, protection of the environment, mine safety, hazardous substances and other matters. Similarly, if any of our properties are developed and/or mined those activities are also subject to significant governmental regulation and oversight. We are required to obtain the licenses, permits and other authorizations in order to conduct our exploration programs.

#### Environmental Regulations

Our current and planned activities are subject to various national and local laws and regulations governing protection of the environment. These laws are continually changing and, in general, are becoming more restrictive. We are required to conduct our operations in compliance with applicable laws and regulations. Changes to current local, state or federal laws and regulations in each jurisdiction in which we conduct our exploration activities could, in the future, require additional capital expenditures and increased operating and/or reclamation costs. Although we are unable to predict what additional legislation, if any, might be proposed or enacted, additional regulatory requirements could impact the economics of our projects. During 2017, we had no material environmental incidents or non-compliance with any applicable environmental regulations.

## Financial Information about Geographic Areas

Included in the consolidated balance sheets at December 31, 2017 and 2016, are total assets of \$73,000 and \$60,000, respectively, related to Solitario's operations located outside of the United States.

## Available Information

We file our Annual Report on Form 10-K, our quarterly reports on Form 10-Q, current reports on Form 8-K, and any amendments to those reports electronically with the SEC. The public may read and copy any materials we file with the SEC at the SEC's public reference room at 100 F Street NE, Washington, DC 20549 or by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an internet website, <http://www.sec.gov>, which contains reports, proxy information and other information regarding issuers that file electronically with the SEC.

Paper copies of our Annual Report to Shareholders, our Annual Report on Form 10-K, our quarterly reports on Form 10-Q, current reports on Form 8-K, and any amendments to those reports are available free of charge by writing to Solitario at its address on the front of this Form 10-K. In addition, electronic versions of the reports we file with the SEC are available on our website, [www.solitarioxr.com](http://www.solitarioxr.com) as soon as practicable, after filing with the SEC.

## **Item 1A. Risk Factors**

In addition to considering the other information in this Form 10-K, you should consider carefully the following factors. The risks described below are the significant risks we face and include all material risks. Additional risks not presently known to us or risks that we currently consider immaterial may also adversely affect our business.

***Our mineral exploration activities involve a high degree of risk, and a significant portion of our business model envisions the sale or joint venture of mineral properties. If we are unable to sell or joint venture these properties, the money spent on exploration may never be recovered and we could incur an impairment of our investments in our projects.***

(table of contents) 5

The exploration for mineral deposits involves significant financial and other risks over an extended period of time. Few properties that are explored are ultimately developed into producing mines. Major expenditures are required to determine if any of our mineral properties may have the potential to be commercially viable and be salable or joint ventured. Prior to completion of the feasibility study on our former Mt. Hamilton project, we had never established reserves on any of our properties. Significant additional expense and risks, including drilling and determining the feasibility of a project, are required prior to the establishment of reserves. It is impossible to ensure that the current or proposed exploration programs on properties in which we have an interest will be commercially viable or that we will be able to sell, joint venture or develop our properties. Whether a mineral deposit will be *commercially* viable depends on a number of factors, some of which are the particular attributes of the deposit, such as its size and grade, costs and efficiency of the recovery methods that can be employed, proximity to infrastructure, commodity prices, financing costs and governmental regulations, including regulations relating to prices, taxes, royalties, infrastructure, land use, importing and exporting of mineral products and environmental protection.

We believe the data obtained from our own exploration activities or our partners' activities to be reliable; however, the nature of exploration of mineral properties and analysis of geological information is often subjective and data and conclusions are subject to uncertainty. Even if exploration activities determine that a project is commercially viable, it is impossible to ensure that such determination will result in a profitable sale of the project or development either on our own or by a joint venture in the future and that such project will result in profitable commercial mining operations. If we determine that capitalized costs associated with any of our mineral interests are not likely to be recovered, we would incur an impairment of our investment in such property interest. All of these factors may result in losses in relation to amounts spent, which are not recoverable. We have experienced losses of this type from time to time including during 2016 when we wrote down our investments in our exploration projects in Mexico and abandoned our Canta Colorado project in Peru, recording mineral property impairments totaling \$13,000.

***We have no reported mineral reserves and none of our current projects are likely to be monetized in the near future and any projects we may acquire are not likely to offer the opportunity for near term revenues or sale proceeds, and if we are unsuccessful in identifying mineral reserves in the future, we may not be able to realize any profit from these property interests.***

None of our current projects have reported mineral reserves. Any mineral reserves on these projects will only come from extensive additional exploration, engineering and evaluation of existing or future mineral properties. The lack of reserves on these mineral properties could prohibit us from any near-term sale or joint venture of our mineral properties and we would not be able to realize any proceeds and or profit from our interests in such mineral properties, which could materially adversely affect our financial position or results of operations.

***We may not realize the benefits from the Acquisition because of various challenges.***

The Acquisition has, and will continue to involve the integration of companies that previously operated independently. Solitario's ability to realize the anticipated benefits of the Acquisition will depend, in part, upon the following:

- the ability of Solitario to successfully integrate Zazu's business and processes with those of Solitario;
- how efficiently Solitario's officers can manage the operations of the combined company;
- the amount of charges associated with the Acquisition; and
- economic conditions affecting both the general economy and the mining industry in particular.

Some of these factors are also outside of the control of Solitario. One or more of these factors could result in increased operating costs, lower earnings or losses or negative cash flows, any of which could reduce the market price of Solitario's common stock.

Further, achieving the benefits of the Arrangement, including the ability of Solitario to realize any profit from its investment in its interest in the Lik project will depend, among other things, upon meeting the challenges inherent in the successful combination of business enterprises of the size and scope of Solitario and Zazu and the possible resulting diversion of management attention for an extended period of time. There can be no assurance that the combined company will meet these challenges and that such diversion will not negatively impact the operations of the combined company following the closing of the Arrangement.

***The value of Solitario's common stock may be adversely affected by any inability of the combined company to achieve the benefits expected to result from the completion of the Arrangement.***

Achieving the benefits of the Arrangement, including the ability of Solitario to realize any profit from its investment in its interest in the Lik project will depend, among other things, upon meeting the challenges inherent in the successful combination of business enterprises of the size and scope of Solitario and Zazu and the possible resulting diversion of management attention for an extended period of time. There can be no assurance that the combined company will meet these challenges and that such diversion will not negatively impact the operations of the combined company following the closing of the Arrangement.

(table of contents) 6

***Mineral exploration activities are inherently dangerous and could cause us to incur significant unexpected costs, including legal liability for loss of life, damage to property and environmental damage, any of which could materially adversely affect our financial position or results of operations.***

Mining exploration operations are subject to the hazards and risks normally related to exploration of a mineral deposit, including mapping and sampling, drilling, road building, trenching, assaying and analyzing rock samples, transportation over primitive roads or via small contract aircraft or helicopters and severe weather conditions, any of which could result in damage to life or property, environmental damage and possible legal liability for such damage. Any of these risks could cause us to incur significant unexpected costs that could have a material adverse effect on our financial condition and ability to finance our exploration and development activities.

***We have a history of losses and if we do not operate profitably in the future it could have a material adverse effect on our financial position or results of operations and the trading price of our common stock would likely decline.***

We have reported losses in 21 of our 24 years of operations. We can provide no assurance that we will be able to operate profitably in the future or begin to generate significant and consistent sources of revenues or cash flows from operations. We have had net income in only three years in our history; during 2015, as a result of the Mt. Hamilton Transaction, during 2003, as a result of a \$5,438,000 gain on a derivative instrument related to our investment in certain Crown warrants and during 2000, when we sold our former Yanacocha property. We cannot predict when, if ever, we will be profitable again or able to begin generating consistent revenues or cash flows from our operations or assets. If we do not operate profitably or identify and execute on outside sources of funding, we may be unable to fund our current or contemplated exploration activities, acquire new assets, or otherwise further our business plan.

***Our operations outside of the United States of America may be adversely affected by factors outside of our control, such as changing political, local and economic conditions, any of which could materially adversely affect our financial position or results of operations.***

Our mineral properties located in Latin America consist primarily of mineral concessions granted by national governmental agencies and are held 100% by us or in conjunction with our joint venture partners, or under lease, option or purchase agreements. Certain of our mineral properties are located in Peru and we hold royalties on non-producing exploration properties in Peru, Mexico, Brazil and Montana (U.S.). We act as operator on all of our mineral properties that are not held in joint ventures or royalty properties. The success of projects held under joint ventures or royalty properties that are not operated by us is substantially dependent on the joint venture partner, over which we have limited or no control.

Our exploration activities, mineral properties and royalties located outside of the United States are subject to the laws of Peru, Mexico and Brazil and any other countries in which we conduct business. Exploration and potential development activities in these countries are potentially subject to political and economic risks, including:

- cancellation or renegotiation of contracts;
- disadvantages of competing against companies from countries that are not subject to US laws and regulations, including the Foreign Corrupt Practices Act;
- changes in foreign laws or regulations;
- changes in tax laws;
- royalty and tax increases or claims by governmental entities, including retroactive claims;
- expropriation or nationalization of property;
- currency fluctuations (particularly related to declines in the US dollar compared to local currencies);
- foreign exchange controls;
- restrictions on the ability for us to hold US dollars or other foreign currencies in offshore bank accounts;
- import and export regulations;
- environmental controls;
- risks of loss due to community opposition to our activities, civil strife, acts of war, guerrilla activities, insurrection and terrorism; and
- other risks arising out of foreign sovereignty over the areas in which our exploration activities

are conducted.

(table of contents) 7

Accordingly, our current exploration activities outside of the United States may be substantially affected by factors beyond our control, any of which could materially adversely affect the value of certain of our assets or results of operations. Furthermore, in the event of a dispute arising from such activities, we would likely be subject to the exclusive jurisdiction of courts outside of the United States or may not be successful in subjecting persons to the jurisdictions of the courts in the United States, which could adversely affect the outcome of a dispute.

***We may not have sufficient funding for exploration and development, which may impair our profitability and growth.***

The capital required for exploration and development of mineral properties is substantial. In the past we have financed operations through the sale of interests in mineral properties, including the Mt. Hamilton Transaction in 2015, the utilization of joint venture arrangements with third parties (generally providing that the third party will obtain a specified percentage of our interest in a certain property or a subsidiary owning a property in exchange for the expenditure of a specified amount), the sale of other assets, sale of marketable equity securities we hold, short-term margin loans, funds from the long-term debt, and the issuance of common stock. We may need to raise additional capital, or enter into joint venture arrangements, in order to fund the exploration activities required to determine whether mineral deposits on our projects are commercially viable. New financing or acceptable joint venture partners may or may not be available on a basis that is acceptable to us. The inability to obtain new financing or joint venture partners on acceptable terms may prohibit us from continued development or exploration of our mineral properties. Without the successful sale or future development of our mineral properties through joint ventures, or on our own, we will not be able to realize any profit from our interests in such properties, which could have a material adverse effect on our financial position and results of operations.

***A large number of companies are engaged in the exploration and development or sale of mineral properties, many of which have substantially greater technical and financial resources than us and, accordingly, we may be unable to compete effectively in this sector of the mining industry which could have a material adverse effect on our financial position or results of operations.***

We are at a disadvantage with respect to many of our competitors in the acquisition, exploration and development or sale of mining projects. Our competitors with greater financial resources than us will be better able to withstand the uncertainties and fluctuations associated with sustained downturns in the market and to acquire high quality exploration and mining properties when market conditions are favorable. In addition, we compete with other companies in the mineral properties sector to attract and retain key executives and other employees with technical skills and experience in the mineral exploration business. There can be no assurance that we will continue to attract and retain skilled and experienced employees or to acquire additional exploration projects. The realization of any of these risks from competitors could have a material adverse effect on our financial position or results of operations.

***The title to our mineral properties may be defective or challenged which could have a material adverse effect on our financial position or results of operations.***

In connection with the acquisition of our mineral properties, we conduct limited reviews of title and related matters, and obtain certain representations regarding ownership. These limited reviews and representations do not necessarily preclude third parties from challenging our title and, furthermore, our title may be defective. Consequently, there can be no assurance that we hold good and marketable title to all of our mineral interests. Additionally, we have to make annual filings to various government agencies on all of our mineral properties. If we fail to make such filings, or improperly document such filings, the validity of our title to a mineral property could be lost or challenged. If any of our mineral interests were challenged, we could incur significant costs in defending such a challenge. These costs or an adverse ruling with regards to any challenge of our titles could have a material adverse effect on our financial position or results of operations.

***Our operations could be negatively affected by existing laws as well as potential changes in laws and regulatory requirements to which we are subject, including regulation of mineral exploration and ownership, environmental regulations and taxation.***

The exploration and development of mineral properties is subject to federal, state, provincial and local laws and regulations in the countries in which we operate in a variety of ways, including regulation of mineral exploration and land ownership, environmental regulation and taxation. These laws and regulations, as well as future interpretation of or changes to existing laws and regulations, may require substantial increases in capital and operating costs to us and delays, interruptions, or a termination of operations.

(table of contents) 8



In the United States and the other countries in which we operate, in order to obtain permits for exploration or potential future development of mineral properties, environmental regulations generally require a description of the existing environment, including but not limited to natural, archeological and socio-economic environments, at the project site and in the region; an interpretation of the nature and magnitude of potential environmental impacts that might result from such activities; and a description and evaluation of the effectiveness of the operational measures planned to mitigate the environmental impacts. Currently the expenditures to obtain exploration permits to conduct our exploration activities are not material to our total exploration cost.

The laws and regulations in all the countries in which we operate are continually changing and are generally becoming more restrictive, especially environmental laws and regulations. As part of our ongoing exploration activities, we have made expenditures to comply with such laws and regulations, but such expenditures could substantially increase our costs to achieve compliance in the future. Delays in obtaining or failure to obtain government permits and approvals or significant changes in regulation could have a material adverse effect on our exploration activities, our ability to locate economic mineral deposits, and our potential to sell, joint venture or eventually develop our properties, which could have a material adverse effect on our financial position or results of operations.

***Occurrence of events for which we are not insured may materially adversely affect our business.***

Mineral exploration is subject to risks of human injury, environmental liability and loss of assets. We maintain limited insurance coverage to protect ourselves against certain risks related to loss of assets for equipment in our operations and limited corporate liability coverage; however, we have elected not to have insurance for other risks because of the high premiums associated with insuring those risks or for various other reasons including those risks where insurance may not be available. There are additional risks in connection with investments in parts of the world where civil unrest, war, nationalist movements, political violence or economic crisis are possible. These countries may also pose heightened risks of expropriation of assets, business interruption, increased taxation and a unilateral modification of concessions and contracts. We do not maintain insurance against political risk. Occurrence of events for which we are not insured could have a material adverse effect on our financial position or results of operations.

***Severe weather or violent storms could materially affect our operations due to damage or delays caused by such weather.***

Our exploration activities are subject to normal seasonal weather conditions that often hamper and may temporarily prevent exploration or development activities. There is a risk that unexpectedly harsh weather or violent storms could affect areas where we conduct these activities. Delays or damage caused by severe weather could materially affect our operations or our financial position.

***Our business is dependent on the market price of commodities and currency exchange rates over which we have no control.***

Our operations are significantly affected by changes in the market price of commodities since the evaluation of whether a mineral deposit is commercially viable is heavily dependent upon the market price of the commodities related to any specific project, such as gold or zinc. The price of commodities also affects the value of exploration projects we own or may wish to acquire or joint venture. These commodity prices fluctuate on a daily basis and are affected by numerous factors beyond our control. The supply and demand for commodities, the level of interest rates, the rate of inflation, investment decisions by large holders of these commodities, including governmental reserves, and stability of exchange rates can all cause significant fluctuations in prices. Currency exchange rates relative to the United States dollar can affect the cost of doing business in a foreign country in United States dollar terms, which is our functional currency. Consequently, the cost of conducting exploration in the countries where we operate, accounted for in United States dollars, can fluctuate based upon changes in currency exchange rates and may be higher than we anticipate in terms of United States dollars because of a decrease in the relative strength of the United States dollar to currencies of the countries where we operate. We currently do not hedge against currency or commodity fluctuations. The prices of commodities as well as currency exchange rates have fluctuated widely and future significant price declines in commodities or changes in currency exchange rates could have a material adverse effect on our financial position or results of operations.

***Our business is dependent on key executives and the loss of any of our key executives could adversely affect our business, future operations and financial condition.***

We are dependent on the services of key executives, including our Chief Executive Officer, Christopher E. Herald, our Chief Operating Officer, Walter H. Hunt, and our Chief Financial Officer, James R. Maronick. All of those officers have many years of experience and an extensive background with Solitario and in the mining industry in general. We may not be able to replace that experience and knowledge with other individuals. We do not have "Key-Man" life insurance policies on any of our key executives. The loss of these persons or our inability to attract and retain additional highly skilled employees may adversely affect our business, future operations and financial condition.

(table of contents) 9

***Our business model relies significantly on other companies to joint venture our projects and we anticipate continuing this practice in the future. Therefore, our results are subject to the additional risks associated with the financial condition, operational expertise and corporate priorities of our joint venture partners.***

Our Florida Canyon project is joint-ventured with another mining company that manages the exploration and development activities on the project and we are the minority-interest party. Although our joint venture agreement provides certain voting rights and other minority-interest safeguards, the majority partner not only manages operations, but controls most decisions, including budgets and scope and pace of exploration and development activities. Consequently, we are highly dependent on the operational expertise and financial condition of our joint venture partner, as well as its own corporate priorities. For instance, even though our joint venture property may be highly prospective for exploration success, or economically viable based on feasibility studies, our partner may decide to not fund the further exploration or development of our project based on their respective financial condition or other corporate priorities. Therefore, our results are subject to the additional risks associated with the financial condition, operational expertise and corporate priorities of our joint venture partners, which could have a material adverse effect on our financial position or results of operations. Our Lik project is equally owned with another mining company and unanimous consent by the joint venture partners is required for annual budgets in excess of \$1.0 million. Consequently, development of the project could be delayed without unanimous consent.

***We may look to joint venture with another mining company in the future to develop and/or operate one of our foreign projects; therefore, in the future, our results may become subject to additional risks associated with development and production of our foreign mining projects.***

We are not currently involved in mining development or operation at any of our properties. In order to realize a profit from our mineral interests we either have to: (1) sell such properties outright at a profit; (2) form a joint venture for the project with a larger mining company with greater resources, both technical and financial, to further develop and/or operate a project at a profit; (3) develop and operate such projects at a profit on our own; or (4) create and retain a royalty interest in a property with a third party that agrees to advance the property toward development and mining. In the future, if our exploration results show sufficient promise in one of our foreign projects, we may either look to form a joint venture with another mining company to develop and/or operate our projects, or sell the property outright and retain partial ownership or a retained royalty based on the success of such project. Therefore, in the future, our results may become subject to the additional risks associated with development and production of mining projects in general.

***In the future, we may participate in a transaction to acquire a new property, royalty or another company that requires a substantial amount of capital or the issuance of Solitario equity to complete. Acquisition costs may never be recovered due to changing market conditions, or our own miscalculation concerning the recoverability of our acquisition investment. Such an occurrence could adversely affect our business, future operations and financial condition.***

We have evaluated a wide variety of acquisition opportunities involving mineral properties and companies for acquisition and we anticipate evaluating potential acquisition opportunities in the future. Some of these opportunities may involve a substantial amount of capital or the issuance of Solitario equity to successfully acquire. As many of these opportunities do not have reliable feasibility-level studies, we may have to rely on our own estimates for investment analysis. Such estimates, by their very nature, contain substantial uncertainty. In addition, economic assumptions, such as future costs and commodity prices, also contain significant uncertainty. Consequently, if we are successful in acquiring any new opportunities and our estimates prove to be in error, either through miscalculations or changing market conditions, this could have a material adverse effect on our financial position or results of operations.

***The market for shares of our common stock has limited liquidity and the market price of our common stock has fluctuated and may decline.***

An investment in our common stock involves a high degree of risk. The liquidity of our shares, or the ability of a shareholder to buy or sell our common stock, may be significantly limited for various unforeseeable periods. The average combined daily volume of our shares traded on the NYSE American and the TSX during 2017 was approximately 114,000 shares. The market price of our shares has historically fluctuated within a wide range. The price of our common stock may be affected by many factors, including an adverse change in our business, a decline in the price of zinc or other commodity prices, negative news on our projects, negative investment sentiment for mining and commodity equities and general economic trends.

(table of contents) 10

***A significant portion of our liquid assets consist of U.S. Treasuries and bank certificates of deposit. The failure of the financial institutions that issued or hold these financial instruments could have a material adverse impact on the market price of our common stock and our liquidity and capital resources.***

At December 31, 2017, we have invested approximately \$1,247,000 in separate, FDIC insured certificates of deposit with the maximum individual bank exposure of \$250,000. Further, as of December 31, 2017 we have invested \$10,395,000 in United States Treasury securities, with maturities of between 15 days and 19 months and we have approximately \$156,000 of our cash in uninsured deposit accounts including \$105,000 held in brokerage accounts, none of which are covered by FDIC insurance. The failure of either Charles Schwab or the financial institutions holding these funds and assets could have a material impact on the market price of our common stock and our liquidity and capital resources.

***We are dependent upon information technology systems, which are subject to disruption, damage, failure and risks associated with implementation and integration.***

We are dependent upon information technology systems in the conduct of our operations. Our information technology systems are subject to disruption, damage or failure from a variety of sources, including, without limitation, computer viruses, security breaches, cyber-attacks, natural disasters and defects in design. Cybersecurity incidents, in particular, are evolving and include, but are not limited to, malicious software, attempts to gain unauthorized access to data and other electronic security breaches that could lead to disruptions in systems, unauthorized release of confidential or otherwise protected information and the corruption of data. Various measures have been implemented to manage our risks related to information technology systems and network disruptions. However, given the unpredictability of the timing, nature and scope of information technology disruptions, we could potentially be subject to operational delays, the compromising of confidential or otherwise protected information, destruction or corruption of data, security breaches, other manipulation or improper use of our systems and networks or financial losses from remedial actions, any of which could have a material adverse effect on our cash flows, competitive position, financial condition or results of operations.

***Failure to comply with the United States Foreign Corrupt Practices Act (“FCPA”) could subject us to penalties and other adverse consequences.***

As a Colorado corporation, we are subject to the FCPA and similar worldwide anti-bribery laws, which generally prohibit United States companies and their intermediaries from engaging in bribery or other improper payments to foreign officials for the purpose of obtaining or retaining business. Foreign companies, including some that may compete with our company, are not subject to U.S. laws and regulations, including the FCPA, and therefore our exploration, development, production and mine closure activities are subject to the disadvantage of competing against companies from countries that are not subject to these prohibitions.

In addition, we could be adversely affected by violations of the FCPA and similar anti-bribery laws in other jurisdictions. Corruption, extortion, bribery, pay-offs, theft and other fraudulent practices may occur from time-to-time in the countries outside of the United States in which we operate. Our mineral properties are located in countries that may have experienced governmental corruption to some degree and, in certain circumstances, strict compliance with anti-bribery laws may conflict with local customs and practices. Our policies mandate compliance with these anti-bribery laws; however, we cannot assure you that our internal controls and procedures always will protect us from the reckless or criminal acts committed by our employees or agents. We can make no assurance that our employees or other agents will not engage in such conduct for which we might be held responsible. If our employees or other agents are found to have engaged in such practices or we are found to be liable for FCPA violations, we could suffer severe criminal or civil penalties or other sanctions and other consequences that may have a material adverse effect on our business, financial condition and results of operations.

***Recently enacted changes in tax law could materially affect our financial position and results of operations.***

On December 22, 2017, the President of the United States signed into law H.R. 1 (the “U.S. Tax Reform”). We are in the process of determining the impact to our financial statements of all aspects of U.S. Tax Reform and intend to reflect the impact of such reform in the financial statements during the period in which such amounts can be reasonably estimated. The U.S. Tax Reform includes a number of provisions, including the lowering of the U.S. corporate tax rate from 35% to 21%, effective January 1, 2018. There are also provisions that may partially offset the benefit of such rate reduction, such as the repeal of the deduction for domestic production activities. The U.S. Tax Reform also includes international provisions, which generally establish a territorial- style system for taxing foreign-source income of domestic multinational corporations. Financial statement impacts could include adjustments for the measurement of deferred tax assets (liabilities) and the accrual for deemed repatriation tax on unremitted foreign earnings and profits. There is substantial uncertainty regarding the details of the U.S. Tax Reform. The intended and unintended consequences of the U.S. Tax Reform on our business are not yet widely understood and, due to our international business activities, the changes to the taxation of our activities affected by the U.S. Tax Reform could increase our worldwide effective tax rate and could materially impact our financial position or results of operations.

(table of contents) 11

**Item 1B. Unresolved Staff Comments**

None

**Item 2. Properties**

**Florida Canyon Zinc Project (Peru)**

1. Property Description and Location

On August 15, 2006, Solitario signed a Letter Agreement with Votorantim Metais Cajamarquilla, S.A., a wholly-owned subsidiary of Votorantim (now known as Nexa) both companies are referred to in this Item 2 as "Nexa") on Solitario's 100%-owned Florida Canyon zinc project (formerly called the Bongará project), On March 24, 2007, Solitario signed the Framework Agreement with Votorantim for the Exploration and Potential Development of Mining Properties, pursuant to, and replacing, the Florida Canyon Letter Agreement. In 2015 Votorantim transferred its interest in the Florida Canyon project to Compañía Minera Milpo S.A.A. ("Milpo"), an 80%-owned affiliate of Votorantim. In October of 2017, Milpo and Votorantim merged to form Nexa. Nexa completed an IPO raising \$570 million and listed on the NYSE under the trading symbol NEXA and the TSX under the trading symbol NEXA. For the remainder of this Florida Canyon property section, all references to Votorantim, Milpo or Nexa will be collectively referred to as Nexa.

The Florida Canyon project consists of 16 concessions comprising 12,600 hectares of mineral rights originally granted to Minera Bongará S.A., our subsidiary incorporated in Peru. The property is located in the Department of Amazonas, northern Peru. Solitario's and Nexa's property interests are held through the ownership of shares in Minera Bongará S.A., a joint operating company that holds a 100% interest in the mineral rights and other project assets. Solitario currently owns 39% of the shares in Minera Florida Canyon S.A.

During 2015 Nexa completed the steps required to earn a 61% interest in the Florida Canyon project, with Solitario retaining a 39% interest. Nexa may earn an additional 9% interest (up to a 70% shareholding interest) in Minera Bongará S.A., by sole-funding future annual exploration and development expenditures until a production decision is

made. The option to earn the 70% interest can be exercised by Nexa at any time by committing to place the project into production based upon a completed feasibility study. Nexa is the project manager. Once Nexa has committed to place the project into production based upon a feasibility study, it has further agreed to finance Solitario's 30% participating interest until production with a loan facility from Nexa to Solitario. Solitario will repay this loan facility through 50% of Solitario's cash flow distributions from the joint operating company.

According to Peruvian law, concessions may be held indefinitely, subject only to payment of annual fees to the government. In June 2018, payments of approximately \$176,000 to the Peruvian government will be due in order to maintain the Florida Canyon mineral rights of Minera Bongará. Nexa is responsible for paying these costs as part of its earn-in expenditures. Peru imposes a sliding scale royalty varying from 1% to 12% of the operating profit of a mining operation. The percentage royalty is determined by rule based on the operating margin; however, the minimum royalty is 1% of the revenues.

From time to time Nexa may enter into surface rights agreements with individual landowners or communities to provide access for exploration work. Generally, these are short-term agreements.

Environmental permits are required for exploration and development projects in Peru that involve drilling, road building or underground mining. The requisite environmental and archeological studies were completed for all past work, but new studies are required for expanded activities planned for future years. Although we believe that these permits will be obtained in a timely fashion, the timing of government approval of permits remains beyond our control.

## 2. Accessibility, Climate, Local Resources, Infrastructure and Physiology

The Florida Canyon property is accessed from the coastal city of Chiclayo by the paved Carretera Marginal road, which is a heavily travelled paved national highway that passes approximately eight kilometers south of the deposit. The nearest town to the project is Pedro Ruiz located 15 kilometers southeast of the property. The area of the majority of past drilling and the most prospective mineralization, Florida Canyon, was previously inaccessible by road, the work to date having been done by either foot or helicopter access. Nexa has now completed approximately 30 kilometers of access road. Nexa is planning to complete the road access to the mineralized area of the project in 2018. Nexa maintains project field offices in Pedro Ruiz and a drill core processing facility and operations office in the nearby community of Shipasbamba.

(table of contents) 12



The project area elevation ranges between 1,800 and 3,200 meters above sea level. The climate is tropical with an average annual temperature of approximately 25°C. Mean annual rainfall exceeds one meter with up to two meters in the cloud forest at higher elevations. Most precipitation occurs during the rainy season, between November and April. Field work is considerably more difficult in the rainy season. Topography is steep, consisting of prominent escarpments and deep valleys. Dense jungle or forest vegetation covers the project area. With the exception of the partially completed access road and approximately 700 meters of tunneling, no infrastructure facilities have been constructed within the project area.

### 3. History

We discovered the Florida Canyon mineralized zone of the Florida Canyon Project in 1996. Subsequently, we joint ventured the property in December 1996 to Cominco (now Teck Resources). Cominco drilled 80 core holes from 1997-2000. Cominco withdrew from the joint venture in February 2001, and Solitario retained its 100% interest in the project. We maintained the claims from 2001 to 2006, until the Florida Canyon Letter Agreement was signed. Nexa conducted surface drilling on an annual basis from 2006 to 2013 and underground tunneling and drilling from 2010 to 2013. All significant work on the property has been conducted by our joint venture partners: Cominco and Nexa and is described below in Section 5, “Prior Exploration.”

### 4. Geological Setting

The project is located within an extensive belt of Mesozoic carbonate rocks belonging to the Upper Triassic to Lower Jurassic Pucará Group and equivalents. This belt extends through the central and eastern extent of the Peruvian Andes for nearly 1000 km and is the host for many polymetallic and base metal vein and replacement deposits in the Peruvian Mineral Belt. Among these is the San Vicente Mississippi Valley Type (“MVT”) zinc-lead deposit that has many similarities to the Florida Canyon deposit and other MVT occurrences in the Project area.

The geology of the Florida Canyon area is relatively simple consisting of a sequence of Jurassic and Triassic clastic and carbonate rocks which are gently deformed into a broad northwesterly trending domal anticline. The MVT zinc-lead mineralization occurs in the carbonate facies of the Chambara (rock) Formation. This domal anticline is cut on the west by the Sam Fault and to the east by the Tesoro-Florida Fault.

### 5. Prior Exploration

We conducted a regional stream sediment survey and reconnaissance geological surveys leading to the discovery of the Florida Canyon area in 1996. The discovered outcropping mineralization is located in two deeply incised canyons within the limestone stratigraphy.

Subsequent to our initial work, Cominco conducted extensive mapping, soil and rock sampling, stream sediment surveys and drilling. This work was designed to determine the extent and grade of the zinc-lead mineralization, the controls of mineral deposition and to identify areas of potential new mineralization. Nexa began work in the fall of 2006 and drilled annually from 2006 through 2013. Underground exploration operations were conducted from 2011-2013. Since 2013 the most important work conducted consisted of continued access road construction and metallurgical testing. All work performed by us, Cominco, and Nexa was done by direct employees of the respective companies with the exception of the drilling, underground tunneling, helicopter services and road building, all of which were performed by third-party contractors under the direction of Cominco and Nexa.

## 6. Mineralization

Mineralization occurs as massive to semi-massive replacements of sphalerite and galena localized by specific sedimentary facies (rock strata) within the limestone stratigraphy and by structural feeders and karst breccias. More than three-quarters of mineralization is sulfide-dominant with the remainder being oxide-dominant. A total of 11 preferred beds for replacement mineralization have been located within the middle unit of the Chambara Formation. Mineralization is associated with the conversion of limestone to dolomite, which creates porosity and permeability within the rock formations, promoting the passage of mineralizing fluids through the rock formations forming stratigraphically controlled near-horizontal manto deposits. Drilling of stratigraphic targets has shown that certain coarser-grained facies of the stratigraphy are the best hosts for manto mineralization. Stratigraphically controlled mineralization is typically one to several meters in thickness, but often attains thicknesses of five to ten meters.

(table of contents) 13

The laterally extensive manto deposits are strongly related to, and potentially originate from, structurally controlled near-vertical conduits for mineralizing solutions. Replacement deposits occur along these high-angle structures as well as in the stratigraphic mantos at Florida Canyon.

Karst features are localized along the feeder faults and locally produce "breakout zones" where mineralization may extend vertically across thick stratigraphic intervals where collapse breccias have been replaced by ore minerals. Mineralized karst structures are up to 50 meters in width (horizontal), up to 100 meters vertically, and up to hundreds of meters along strike.

Evidence for these breakout zones is provided by the following drill holes from various locations on the property:

<b>Breakout Zone Name</b>	<b>Drill Hole Number</b>	<b>Intercepts (meters)</b>	<b>Zinc %</b>	<b>Lead %</b>	<b>Zinc+Lead %</b>
Sam	GC-17	58.8	12.0	2.8	<b>14.8</b>
	FC-23	81.5	4.8	0.8	<b>5.6</b>
Karen	A-1	36.2	12.8	2.7	<b>15.5</b>
North Zone	V-21	92.0	5.5	1.7	<b>7.2</b>
South Zone	V-44	28.3	15.2	0.8	<b>16.0</b>
	V-169	51.6	7.1	0.7	<b>7.8</b>
San Jorge	V-297	56.6	22.69	1.15	<b>23.84</b>

Dolomitization reaches stratigraphic thicknesses in excess of 100 meters locally. This alteration is thought to be related to the mineralizing event and is an important exploration tool. Continuity of the mineralization is demonstrable in areas of highest drilling density by correlation of mineralization within characteristic sedimentary facies, typical of specific stratigraphic intervals or within through-going observable structural zones in drill core. At Florida Canyon the high-angle mineralization occurs along well-defined northwest and northeast fracture systems. These structures occur in conjugate fractures, with N10°-50°E trends present at a number of mineralized surface outcrops while trends of N50°-80°W are identified at other showings.

## 7. Drilling

From 1997 through 2001, Cominco drilled 80 surface core holes totaling 24,696 meters. From 2006-2013, Nexa completed 309 surface core holes totaling 77,193 meters. From 2011-2013, Nexa completed 95 underground core holes totaling 15,144 meters. The majority of Nexa's surface drilling was infill drilling designed to demonstrate the

continuity and geometry of mineralization, and to a lesser extent, test for extensions of known mineralization. The underground drilling was conducted from 10 drill stations at generally 40-meter centers (two drill stations at 20-meter centers) and entirely within the San Jorge mineralized zone. Anywhere from three to 14 holes were drilled from each of the ten drill stations. The underground drilling was tightly spaced and designed to allow for feasibility-level reserve estimation.

All drilling conducted is within a footprint measuring approximately 2.5 kilometers long in a north-south direction and a little over a kilometer in an east-west direction. The entire drill pattern is within what we have informally labeled the Florida Canyon district. Within this district, several zones of strong zinc mineralization have been defined. The two zones with the largest amount of drilling are the San Jorge and the Karen-Milagros zones. Drilling indicates that, for the most part, the entire Florida Canyon district remains open to expansion and the identified zones are interconnected. Typical drill-hole intercepts are provided in the table below:

Typical Mineralized Intersections

Drill Hole Number	Surface or Underground	Intercept Meters	Zinc (%)	Lead (%)	Zinc + Lead (%)	Silver (grams/t)
V-378	Surface	7.7	14.62	2.11	16.73	15.69
V-386	Surface	16.2	16.20	10.70	12.41	11.13
V-427	Surface	15.1	12.06	2.75	14.81	17.59
V-436	Surface	17.0	11.74	1.08	12.81	18.48
V-451	Surface	30.7	13.06	4.97	18.03	32.64
V-407	Underground	3.6	26.31	1.59	27.90	74.87
V-432	Underground	21.1	8.31	1.71	10.02	12.11
V-433	Underground	5.0	38.22	3.89	42.12	60.76
V-458	Underground	25.5	7.22	0.55	7.77	6.21
V-465	Underground	10.7	45.60	5.25	50.84	106.71

[\(table of contents\)](#) 14

## 8. Sampling, Analysis and Security of Samples

Core samples were transported from the drill by helicopter in sealed boxes to the processing facility in Shipasbamba where they were cut with a diamond saw. Half of the core was taken of intervals selected according to geologic criteria under the supervision of the geologist in charge and shipped in sealed bags by land. Cominco used SGS Laboratories and Nexa used ALS-Chemex, both in Lima, Peru, where all samples were analyzed by ICP. Any samples that contained greater than 1% zinc were then analyzed by wet chemistry assay for zinc and lead to provide a more accurate analysis of grade.

Since 2006, Nexa has been in control of all field activities on the project and is responsible for the security of samples. Nexa has indicated that there have been no breaches in the security of the samples. We have reviewed and engaged SRK Consulting (USA) Inc. ("SRK") (a large independent international mining engineering firm) to review Nexa's sampling procedures and believe that adequate procedures are in place to ensure the future security and integrity of samples. No breaches of security of samples are known to have occurred prior to Nexa's work on the project.

## 9. Prefeasibility Studies

Nexa, either through its engineering staff or contracted independent mining engineering firms, has conducted prefeasibility-level studies to provide estimates of deposit size and grade, mining and processing recoveries, sizing of appropriate scale of operations, infrastructure design, and capital and operating cost estimates at a level of detail varying from preliminary economic assessment to feasibility levels. These studies were generally performed between 2007 and 2014.

Solitario and Nexa jointly completed a PEA for the entire project in 2017 that incorporated a variety of Nexa-generated studies into the analysis. The PEA evaluation included resource estimation, mining and processing recovery estimates, a preliminary mining and processing plan, infrastructure layout, environmental considerations and an economic analysis based on certain base case parameters. The PEA envisioned an underground mining operation with a 2,500 tonne per day floatation mill for processing, resulting in a 12.5 year mine life. It was assumed that concentrates would be trucked to Nexa's Cajamarquilla zinc smelter facility in Lima Peru.

Metallurgical testing to evaluate metal recoveries and various processing options for mineralized material at Florida Canyon was conducted in 2010, 2011 and 2014. Tests to date on composited samples indicate zinc recoveries of 91.8% and lead recoveries of 81.9% in the San Jorge zone and zinc recoveries of 80.3% and lead recoveries of 71.7%

in the Karen-Milagros zone. These recoveries represent averages for each zone based on sulfide dominant mineralization, but oxide material was present in the tested samples. Nexa also conducted a comprehensive geochemical testing program that demonstrated that zinc (and lead) recoveries were significantly affected by the Zn-sulfide/Zn-oxide ratio of mineralization. In general, mineralized material with greater than an 80% ratio of Zn-sulfide/Zn-oxide, recoveries are greater than 90% for Zn. Conversely, for mineralized material, with less than a 20% ratio of Zn-sulfide/Zn-oxide, recoveries are approximately 40% for Zn. Although sulfide recoveries achieved to date are very good, SRK suggests that optimization of processing and metallurgical parameters may result in improved recoveries and concentrate grade.

Other prefeasibility work completed by Nexa included drilling 16 diamond core holes in 2013 to evaluate geotechnical and hydrological parameters of the mineralized areas for both engineering and environmental purposes. In 2016, Nexa completed a geochemical/metallurgical study that more accurately defined the distribution of sulfide/oxide mineralization based on re-assaying of nearly all past drill-hole samples. This information was critical in resource estimation and accurately estimating metal recoveries.

The 2017 Florida Canyon Project PEA was completed by SRK on behalf of Nexa and Solitario in August of 2017. The NI 43-101 compliant study entitled: “*Technical Report, Preliminary Economic Assessment, Florida Canyon Zinc Project,*

*Amazonas Department, Peru; Effective Date: July 13, 2017, Report Date: August 3, 2017;*” can be found in the Company’s Canadian Sedar filings and is furnished in the Company’s U.S. Edgar filings.

(table of contents) 15

## 10. Reserves and Resources

There are no reported mineral reserves.

## 11. Mining Operations

No commercial mining operations to recover metals have occurred on the project. However, in September 2010 Nexa initiated an underground tunneling program to access mineralization and completed its underground work in 2013. As of December 31, 2016, 700 meters of tunneling were completed.

## 12. Planned Exploration and Development

The planned 2018 work program includes: 1) the completion of the access road into the mineralized portion of the project area and, 2) permitting that will allow new underground tunneling, surface drilling and other activities associated with the future development of the project. The terrain at Florida Canyon is steep and all previous project access supporting surface and underground work programs was conducted by helicopter or on foot. The lack of road access restricted the scope of field activities to further advance the project. With the completion of the road, heavy equipment will be able to enter the project area and allow feasibility related activities to proceed efficiently. Important future activities that will be facilitated by the completion of the road are the construction of an underground tunnel into the Karen-Milagros high-grade zinc zone, detailed underground resource/reserve definition drilling, surface drilling designed to increase the project resources and additional feasibility-related studies. Road work is scheduled to begin in May after the rainy season ends and continue until the road is completed.

## **Lik Project (Alaska)**

### 1. Property Description and Location

The Lik property consists of 47 contiguous Alaska state mining claims . The contiguous claims have been grouped together for the purpose of working and operating under a common plan of development for the benefit of all of the claims. The claims cover an area of approximately 6,075 acres (2,460 ha). The claims are located in the southwestern DeLong Mountains in the Wulik River drainage.

(table of contents) 16



To retain the state claims, the Company is required to make annual rental payments to the State of Alaska. The estimated rental payments for 2018 are \$19,000. Property holders are also required to perform assessment work with the amount dependent on the area of the State claims. Excess assessment expenditure credits may be carried forward for a maximum of four years. If required, payments may be made in lieu of work to allow retention of the property for a period of five consecutive years. The geographical coordinates of the Lik deposit are approximately 163° 12' W and 68° 10' N. The figure above illustrates the location of the Lik property.

## 2. Acquisition History and Joint Venture Arrangement

Solitario acquired its 50% interest in the Lik property from the acquisition of Zazu on July 12, 2017. As a result of the Acquisition, Zazu became a wholly-owned subsidiary of Solitario. Prior to that, Zazu acquired its 50% interest in the Lik property from GCO Minerals Company a wholly-owned subsidiary of the International Paper Company (“GCO”), on June 28, 2007 by making a cash payment to GCO of \$20,000,000 and granting GCO a 2% net proceeds interest. GCO also owns an additional 1% net profits interest in the Lik property from a 1997 agreement.

The Company is participating in the exploration and possible development of the Lik property through a joint venture with Teck American, Inc. (“Teck American”), a wholly owned subsidiary of Teck Resources Limited as defined above, “Teck”). The terms of the joint venture were governed by the Lik Block Agreement, made as of January 27, 1983, between Houston Oil & Minerals Exploration Company (“HOMEX”) and GCO (a wholly owned subsidiary of the International Paper Company). HOMEX assigned its interest in the Lik Block Agreement to Echo Bay Mines Ltd., which, in turn, assigned such interest to Teck American.

Under the terms of the Lik Block Agreement, GCO held a 50% interest, and the right to increase its interest to up to 80% provided that GCO met an inflation-adjusted work commitment. The required expenditure amount was originally \$25 million when defined in 1983 and increased with inflation indexing and escalations to approximately \$43 million at the time Solitario closed the Acquisition. As of January 27, 2018, we estimate approximately \$22 million had been incurred towards the inflation adjusted \$43 million expenditure required to earn an additional 30% interest in the property.

As the Company did not spend the full inflation-adjusted expenditure amount by January 27, 2018, the Lik Block Agreement terminated. Consequently Teck American retains its 50% participating interest in the Lik property, and Teck American and Solitario will execute a joint operating agreement governing all further operations relating to the Lik property. Under such joint operating agreement, the Company, as successor to GCO, would be the operator and would have full and exclusive control of the Lik property, its facilities and production as well as the exploration, development and mining undertaken pursuant to the Lik Block Agreement. The current agreement requires unanimous approval by the parties for annual expenditures in excess of \$1 million. The Company and Teck American are currently negotiating a new joint operating agreement that updates and clarifies the language of the original

agreement, but preserves the intent of the original agreements.

### 3. Accessibility, Climate, Local Resources, Infrastructure and Physiology

Access to the Lik property is by air to a gravel surfaced airstrip located on the property. The airstrip is capable of handling multi-engine cargo planes. Charter flights may be arranged from a number of sites in northwestern Alaska. The town of Kotzebue, which is located about 90 miles from the deposit, is a seaport and is serviced by a regular air service from Anchorage. Kotzebue is the center for access to the nearby Red Dog mine operated by Teck American.

The nearest location for which climatic data is available is the town of Kotzebue. The average annual temperature at Kotzebue is 21.6°F, with seasonal extremes ranging between 77°F in summer to -58°F in winter. There is an average of 9 inches of rain per year and a snowfall of 47 inches per year. Snow falls are not extreme, but blowing snow may form significant drifts. Strong winds are common in most parts of Alaska. Currently, diamond drilling is possible at the Lik property between June 1 and October 1.

The exposures of mineralization at the Lik property are located at about 800 feet above sea level. West of the deposit, the land rises steeply to peaks about 2,300 feet above sea level. To the southeast, the land slopes down to the Wulik River where the bottom of the valley is about 700 feet above sea level. There is sufficient space for tailings and waste rock disposal, and sufficient water is expected to be available for any proposed processing. Locally, there is vegetation on the property consisting of tundra grasses and low brush made up of willow, dwarf birch, and alder.

(table of contents) 17

There is a camp located on the Lik property. The camp has been used periodically over the last twelve years and was substantially refurbished as a part the 2007 and 2008 field programs. The supply of electric power and workforce accommodation will have to be developed. There are no local resources adjacent to the Lik property. The Red Dog mine, operated by Teck American, is located about 13.6 miles southeast of the deposit. Potentially, concentrates could be moved along the access road from the Red Dog mine to the port on the Chukchi Sea. The port has a shipping season in excess of 100 days.

Zazu entered into an agreement with Alaska Industrial Development and Export Agency (“AIDEA”) to enable AIDEA to begin due diligence on the proposed expansion of the port and the Red Dog road, the DeLong Mountain Transportation System (“DMTS”), to potentially handle Lik concentrates. AIDEA, as owners of the DMTS, evaluated their possible role in the two parts of the proposed expansion project: the financing of a spur road connecting the Lik project to the DMTS, and the financing of any required modifications at the port. The DMTS is open to multiple users such as the Company. The studied expansion would facilitate both the development of the Lik project, and handle future concentrate production from the project. The DMTS road and port system currently handles all concentrate produced by the Red Dog zinc mine of Teck. Prior to the AIDEA agreement, Zazu received a letter of Non-Objection from the Northwest Arctic Borough (“NWAB”). In this letter, the NWAB formally acknowledged its awareness of the Lik project, and that NWAB had no objection to the project.

In January 2015, AIDEA announced the completion of its study into capacity availability in its DMTS. The report concluded that there is sufficient excess capacity for the Company’s concentrate shipping needs, confirming the assumptions made in Zazu’s 2014 PEA. This study aimed to closely identify the outputs of both Lik and Red Dog, if any modifications are required to the DMTS to support them, and if so, their potential cost. The study concluded that sufficient handling capacity will exist with only minor modifications required to accommodate future planned production from Lik under the analyzed PEA scenario.

#### 4. History

The Red Dog ore deposit was originally discovered in 1970 by a geologist undertaking mapping in the De Long Mountains area on behalf of the United States Geological Survey. GCO, in joint venture with New Jersey Zinc Company and WGM Inc., carried out stream geochemical sampling and reconnaissance for color anomalies. Claims were staked in July 1976 to cover a stream geochemical anomaly on Lik Creek. HOMEX replaced New Jersey Zinc Company in the joint venture in 1976/1977.

Diamond drilling on the Lik property commenced in 1977 and targeted a gossan with a coincident soil and electromagnetic anomaly. The first hole encountered massive lead-zinc-silver-bearing sulfides. By the end of 1977, the joint venture had completed 25 line-miles of ground geophysics, a soil sampling program, and ten diamond drill holes with an aggregate depth of 5,260 feet. In 1978 and 1979, further geological, geochemical and geophysical

surveys were carried out, together with the drilling of another 93 diamond drill holes aggregating 51,200 feet. A mineral resource was estimated. The joint venture continued to work in the district in the period 1980 to 1983. However, only limited diamond drilling activity continued on the Lik property. The Lik Block Agreement was signed in 1984.

In 1984, Noranda optioned the GCO holding of the Lik property. Much of Noranda's activity was concentrated in the Lik North Area where ten diamond drill holes with an aggregate depth of 13,710 feet were completed on four sections. Noranda also drilled holes in the Lik South deposit to better define the deposit. Noranda released its interest in the Lik property after a re-organization of its holdings in the United States. From 1985 through June of 2007, when Zazu acquired its interest in the Lik property, only a limited amount of work was conducted at Lik.

Zazu completed two diamond drilling programs during the 2007 and 2008 summer field seasons, all of it directed to testing the Lik South deposit. In 2009 and 2010, Zazu conducted a suite of economic, engineering, environmental and metallurgical studies on the Lik property, as well as continued exploration and in-fill drilling.

## 5. Geological Setting

The regional geology of the Western Brooks Range area is structurally complex. The sedimentary rocks of the area have been significantly disrupted by thrust sheets. The Lik property and the other zinc-lead deposits of the Brooks Range, including Red Dog, are hosted in the Kuna Formation of the Lisburne Group. In the Western Brooks Range, the Lisburne Group includes both deep and shallow water sedimentary facies and local volcanic rocks. The rocks have been extensively disrupted by thrusting. The deep water facies of the Lisburne Group, the Kuna Formation, are exposed chiefly in the Endicott Mountains.

(table of contents) 18

On a district scale, the Lik property is hosted in the Red Dog plate of the Endicott Mountains thrust sheet. The stratigraphically lowest rocks within the Red Dog plate belong to the Kayak Shale. The top of the Kayak Shale is interbedded with rocks of the Kuna Formation. The Ikalukrok Unit has been divided into a lower laminated black shale sub-unit and an upper medium- to thick-bedded black chert sub-unit. The Ikalukrok Unit hosts all of the massive sulfide deposits in the area.

Locally, the Lik property is hosted in the upper part of the Ikalukrok Unit of the Kuna Formation. The host rocks are carbonaceous and siliceous black shale, with subordinate black chert and fine-grained limestone. These rocks strike broadly north-south and dip at about 25° to 40° to the west. The massive sulfides are overlain conformably by rocks of the Siksikpuk Formation. The sequence is overridden by allochthonous rocks that form high hills north and west of the deposits.

The mineralized sequence is cut by a number of faults. The most significant disruption is the Main Break Fault, which drops the northern end of the Lik deposit down about 500 feet. It is unclear whether there is a change in strike north of the fault, or whether the change is more apparent due to topography. The Main Break Fault strikes east-west and dips north at about 60°. There is another group of steeper faults that tend to strike northerly or northwesterly and which are interpreted as being both normal and reverse with throws of up to 330 feet. The drilling in 2008 appears to demonstrate that several of these faults are non-existent or more minor than previously interpreted.

## 6. Prior Exploration

The Red Dog ore deposit was originally discovered in 1970 by a geologist undertaking mapping in the De Long Mountains area on behalf of the United States Geological Survey. GCO carried out stream geochemical sampling and reconnaissance for color anomalies. Claims were staked in July 1976 to cover a stream geochemical anomaly on Lik Creek. The Lik property was drill tested in the late 1970's and early 1980's and sporadically through the early 1990s. Details of these historical drilling campaigns are discussed above under the heading "History" and below under the heading "Drilling."

Zazu completed significant diamond drilling campaigns in the summers of 2007 and 2008. The details of these programs, and the results of the work, are discussed below under "Drilling". The Company also contracted Zonge Engineering & Research Organization, Inc. to complete a Controlled- and Natural-Source Audio-frequency Magnetotelluric (CSAMT and NSAMT) surveys in 2008.

## 7. Mineralization

The Lik deposit is a black shale-hosted stratiform zinc-lead-silver sedimentary-exhalitive (SEDEX) deposit. Mineralization is syngenetic with respect to sediment deposition. Silicification occurs within and peripheral to the main mass of sulfides. Major sulfides in decreasing order of abundance are pyrite-marcasite, sphalerite and galena. The ore textures are massive, fragmental, chaotic, and veined; they rarely show typical sedimentary layering. The upper portion of the ore body near the surface is oxidized. The deposit is continuous outside the Lik property onto the adjacent 100%-owned Teck American property to the south. The southern continuation of the Lik deposit is referred to as the Su deposit, lying on Teck American's Su property.

Within the Lik property, the deposit is divided into two parts by the Main Break Fault. The main part of the deposit within the existing claims is referred to as the Lik South deposit. As presently tested, the Lik South deposit has a surface footprint of about 3,600 feet long and about 2,000 feet wide. It has been tested down dip to a depth of about 650 feet. The Lik South deposit remains open down dip. North of the Main Break Fault, the Lik North deposit has a surface footprint of about 2,300 feet long and about 1,150 feet wide. It has been tested down dip to a depth of about 1,000 feet. The Lik North deposit remains strongly open down dip and to the north.

The deposits strike northerly and dip westerly at about 25° to 40°. The mineralization comprises irregular, stratiform lenses. The mineralogy of the sulfides is simple and comprises pyrite, marcasite, sphalerite, and galena, with rare tetrahedrite, bournonite and boulangerite. Gangue minerals include quartz (as chert), clay minerals, carbonate and barite. Noranda recognized six different ore types in its logging of drill core. Typical grades of mineralized intersections within the Lik deposit are listed in the table below:

(table of contents) 19

**Typical Mineralized Intersections**

Hole No.	From (m)	To (m)	Length (m)	Zn (%)	Pb (%)	Ag (g/t)
5	54.56	78.79	24.23	19.72	6.27	126.5
16	80.16	94.49	14.33	21.67	0.01	230.4
21	129.54	135.33	5.79	7.07	1.88	8.6
24	40.87	50.14	9.27	11.09	1.44	51.1
38	45.90	63.76	17.86	8.13	1.80	48.0
38	70.53	87.75	17.22	8.92	1.08	28.8
43	35.66	40.69	5.03	17.66	0.62	8.6
43	60.96	80.28	19.32	9.07	1.49	47.7
43	84.73	91.04	6.31	21.07	0.95	111.4
68	32.31	53.43	21.12	13.34	1.85	56.9

Previous work by GCO determined that sulfides were deposited in four distinct cycles. Individual cycles may be quite thin near the margins of the deposit and the thickest accumulation in a single cycle noted to date is about 45 feet. The base of a sulfide cycle begins abruptly with the deposition of sphalerite, galena and pyrite. Typically, the highest grades are found at or within 5-10 feet of the base of a sulfide cycle. In the central portion of the deposit several cycles are stacked and comprise a cumulative thickness of up to 100 feet of mineralization.

**8. Drilling**

All diamond drill programs prior to the 2007 drilling campaign are summarized in the following table.

**Historical Diamond Drilling Campaigns**

Year	Number of Holes	Aggregate Depth (m)	Company
1977	I0	1,603.3	Managed by WGM
1978	O9	10,680.2	Managed by WGM
1979	I4	1,931.1	Managed by GCO
1980	K	102.1	Managed by GCO
1983	I	835.2	Managed by GCO
1984	N	1,643.5	Managed by GCO
1985	I6	1,883.1	Managed by Noranda
1987	I	196.5	Managed by GCO
1990	K	163.4	Managed by Moneta

1992 J	J83.5	Managed by GCO
Totals I35	J6,236.6	

Zazu completed two diamond drilling programs during the 2007 and 2008 summer field seasons, all of it directed to testing the Lik South deposit. The 2007 program was designed to confirm previous drilling results, commence an in-fill drilling program for Lik South and to obtain samples for metallurgical testing. None of the drilling in 2007 or 2008 was designed to test the Lik North deposit. The 2007 program consisted of 11 core holes for a total of 4,572 feet. The 2008 program consisted of 58 drill holes for a total of 22,400 feet. All of the 2008 diamond drilling was HQ-size core. At the end of 2008, most of the Lik South deposit had been tested on lines spaced at 200 ft. with holes spaced at about 100 ft.

The 2011 25-hole core drilling program (12,700 feet) at Lik combined exploration and development drilling. The exploration drilling focused on improving resource definition, in particular near the transition zone between Lik South and Lik North and also Lik North. The development drilling focused on obtaining additional metallurgical samples and geotechnical drilling for the open pit design and foundation information to assist in infrastructure design. By the end of 2011, a total of 125,300 feet of drilling in 229 holes had been completed on the Lik property by the Company and the previous owners. No drilling has been completed on the Lik project since 2011.

(table of contents) 20



## 9. Sampling, Analysis and Security of Samples

### Pre-Zazu Drilling

Core recoveries were typically high within the massive sulfides, but lower, more variable recoveries were obtained in the unmineralized and weakly mineralized sections. The entire core obtained from the Lik deposit, usually NQ-size, was logged on site. All of the core containing sulfide mineralization was sawn using diamond saws and half of the core was sent for assay. Reference samples were not included in the sample stream. Sample lengths in massive sulfides were typically from two to three feet, but occasionally up to nine feet. Sample lengths were probably controlled by geology and the location of depth markers in the core boxes.

Most of the samples were assayed by Bondar Clegg Laboratory Group (“Bondar Clegg”) of Vancouver. At various times, the laboratory maintained preparation facilities in Anchorage and Fairbanks Alaska. In the initial years, when the bulk of the drilling was completed, it is believed that sample preparation and analysis were carried out in Vancouver. Bondar Clegg was not a registered laboratory at that time. However, Bondar Clegg was a recognized, reputable laboratory and was experienced in the use of atomic absorption spectrophotometry.

As the entire core was logged and sampled in an isolated field camp, security was not a major concern because access to the camp was closely controlled. It is noted that four different companies (WGM, GCO, Noranda and Moneta) have completed drilling programs at the Lik property and all of them have obtained consistent results. The work was considered completed to industry standards in use at the time of the work. Sample preparation was completed in the assay laboratory.

### Zazu Drilling

Drill core obtained during the 2007, 2008 and 2011 drilling campaigns was logged on site. The entire core containing sulfide mineralization was sawn using diamond saws and half of the core was sent for assay. All massive and high-sulfide cores were sampled. Visual methods were used to select sample boundaries and lengths. The mineralization at Lik is considered to be appropriately logged and sampled. It is not evident that logging or sampling is leading to any bias in the sample results. An examination of logging showed that core recovery in sulfide areas was generally very high.

Core drilled in 2007 was placed in the sample bags, the air was evacuated and replaced with nitrogen. The samples were sent to Kotzebue by charter and then by licensed carrier to Anchorage. The samples were stored under refrigeration in Anchorage. The samples were dispatched to G & T Metallurgical Services Ltd. (“G & T”) of Kamloops, British Columbia, an ISO 9001:2000 certified laboratory for precious metals and base metals. As well as completing metallurgical testing, G & T crushed and analyzed the samples. The 2008 diamond drill core was not required for metallurgical testing and core was handled normally. Sawn samples were securely bagged and boxed on site and dispatched to a facility of ALS Laboratory Group (“ALS Chemex”) located in Fairbanks, Alaska, for sample preparation. Transportation of the samples was through third-party companies that provided secure transportation services. The pulps were analyzed at ALS Chemex located in Fairbanks or Elko, Nevada. Zazu did not participate in any part of the sample preparation or analysis except for cutting core.

Check samples from the 2007 drilling program and all samples from the 2008 drilling campaign were sent to the preparation and assaying facilities of ALS Chemex (ISO 17025 accreditation). Other QA/QC procedures employed by Zazu included the use of blanks (unmineralized core from outside of the mineralized zone) and quartered core duplicates. Zazu was unable to obtain acceptable reference samples for the 2007 field season and reference samples were not included as part of the 2007 ongoing QA/QC program. Reproducibility between G & T and ALS Chemex was found to be good. A detailed description of QA/QC procedures can be found in the Solitario’s Canadian SEDAR filings and in the Company’s US Edgar filings: Technical Report; Zazu Metals Corporation, Lik Deposit, Alaska, USA; Report Date: April 23, 2014; Effective Date: March 3, 2014; prepared by JDS Energy and Mining Inc (“JDS”).

#### 10. Prefeasibility Studies

Zazu completed a Preliminary Economic Assessment in 2014 that incorporated a variety of prefeasibility level studies into the analysis. These studies included resource estimation, mining and processing recovery estimates, a preliminary mining and processing plan, infrastructure layout, environmental considerations and an economic analysis based on the base case parameters. The PEA envisioned an open pit mining operation with a 5,500 ton per day floatation mill for processing resulting in a nine-year mine life. Concentrates would be handled through the DMTS road and port system that currently handles all

concentrate produced by the nearby Red Dog zinc mine of Teck American. A summary of metallurgical testing and mineral processing is provided below. The PEA analyzed the Lik project as a stand-alone operation building its own independent processing, tailings and port facilities.

(table of contents) 21

Zazu engaged JDS to complete the PEA on the Lik deposit in 2013. The NI 43-101 compliant study entitled: “*Technical Report; Zazu Metals Corporation, Lik Deposit, Alaska, USA; Report Date: April 23, 2014; Effective Date: March 3, 2014;*” can be found in the Company’s Canadian Sedar filings and is furnished in the Company’s U.S. Edgar filings. JDS is a Canadian independent and internationally recognized mining engineering firm providing engineering services internationally.

#### Metallurgical Testing and Mineral Processing

There have been five metallurgical test work reports issued to date on the Lik ores. The most recent and comprehensive processing and metallurgical testing programs include work performed by G&T and by SGS. Samples collected during drilling in 2007 and 2008 were composited into one Master Composite for testing at G&T in 2008, and later testing by SGS was carried out in 2010 on the remainder of the Master Composite. These key testing results have formed the basis for this economic evaluation of the Lik deposit. Results are summarized in the table below:

#### Summary of SGS 2010 and G&T 2008 Metallurgical Test Results

Test	Element	Feed	Lead Concentrate	Zinc Concentrate		
		Grade	Grade	Recovery	Grade	Recovery
SGS 2010	Pb%	2.83	52.00	69.10	1.88	9.70
	Zn%	9.56	7.39	2.91	54.60	83.10
	Ag gpt	37	55	5.5	68	26.6
G&T 2008	Pb%	2.36	70.30	70.3	1.57	9.4
	Zn%	8.47	4.17	1.20	52.20	86.9
	Ag gpt	34	68	4.8	64	26.9
Average Used for Mass Balance and NSR Estimates	Pb%	2.60	61.15	69.7	1.73	9.6
	Zn%	9.02	5.78	2.06	53.40	85.0
	Ag gpt	36	62	5.2	66	26.8

The metallurgical flowsheet for this PEA includes conventional crushing, grinding, and flotation processing methods. Run-of-Mine (ROM) ore will be delivered to a primary crushing plant and stored in a coarse ore stockpile awaiting reclaim into the grinding circuit. Crusher ore will be reclaimed and delivered to a two-stage grinding circuit equipped with a Semi-Autogenous Grinding (SAG) mill and a ball mill in closed circuit with cyclones.

Recoveries from these modeled methods and metallurgical testing conducted to date are anticipated to be 85% of zinc to the zinc concentrate and 69.7% of the lead to the lead concentrate. Silver is also recovered and payable at times in the zinc concentrate and more significantly in the lead concentrate.

## 11. Reserves

There are no reported mineral reserves.

## 12. Mining Operations

No commercial mining operations to recover metals have occurred on the project.

(table of contents) 22

### 13. Planned Exploration and Development

Solitario and Teck American, our 50% joint venture partner, have agreed to jointly fund a gravity geophysical program, continue baseline environmental work for mine permitting previously initiated by Zazu, and rehabilitate the Lik camp for 2018. The objective of the gravity survey is to test for sub-surface gravity anomalies that may be associated with zinc deposits similar in nature to other Red Dog district zinc deposits. Any gravity anomalies that are delineated may be potentially drill tested in 2019. The 2018 program represents the first Teck-Solitario (Zazu) joint exploration effort since inception of the joint venture. Teck American will manage the 2018 program, although Solitario will remain the manager of the joint venture.

#### **Chambara Zinc Property (Peru)**

In April 2008, we signed the Minera Chambara shareholders' agreement with Votorantim on Solitario's 100%-owned Chambara zinc project. In 2015 Votorantim transferred its interest in the Chambara project to Milpo, now Nexa. For the remainder of this Chambara property section, all references to Votorantim, Milpo or Nexa will be collectively referred to as Nexa.

The original purpose of the Chambara joint venture was to collectively pool independently owned Solitario

and Nexa properties into a jointly-held joint venture. These properties were located within a large area of interest in northern Peru measuring approximately 200 by 85 kilometers, but outside of the Florida Canyon property position. Nexa originally contributed 52 mineral concessions within the area of interest totaling 52,000 hectares to Minera Chambara for a 15% interest in Minera Chambara. We contributed 9,600 hectares of mineral claims and an extensive exploration data base in our possession for an 85% interest in Minera Chambara. Existing and future acquired properties subject to the terms of the shareholders' agreement will be controlled by Minera Chambara. Minera Chambara dropped selected concessions in 2013 and 2016 and acquired the rights to 13 new concessions totaling 11,600 hectares in 2017. This resulted in Minera Chambara holding 36,400 hectares of valid concessions that completely surround the Florida Canyon project area held by Minera Bongará. As of December 31, 2016, Minera Chambara's only assets are the properties and Minera Chambara has no debt. Nexa may increase its shareholding interest to 49% through cumulative spending of \$6,250,000, and may further increase its interest to 70% by funding a feasibility study and providing for construction financing for Solitario's interest. If Nexa provides such construction financing, we would repay that financing, including interest, from 80% of Solitario's portion of the project cash flow.

The project has been on care and maintenance in recent years; however reconnaissance prospecting is planned for 2018 following up previously identified geochemical anomalies. Nexa is responsible for maintaining the property in good standing and making all concession payments to the Peruvian government. Concession costs in 2018 to be paid by Nexa are estimated to be \$130,000.

**La Promesa Project (Peru)**

The La Promesa property, acquired in 2008, consists of three concessions totaling 2,600 hectares. Currently, our only holding costs for the mineral rights are annual payments of nine dollars per hectare to the Peruvian government. Total holding costs in 2018 will be approximately \$8,000. A subsidiary of Newmont Mining Corporation holds a 2% net smelter return (“NSR”) on the property.

During 2017 Solitario conducted an active social program with the communities located near the La Promesa project area with the objective of obtaining a community agreement to support exploration activities, including drilling. In Peru, a community agreement is required in order to obtain drilling permits. During 2018 our objectives are to complete an agreement with the local community, to conduct surface exploration, and if warranted, conduct a drilling program.

At least five high-grade polymetallic veins have been identified and sampled at surface. Two of the veins, about 300 meters apart, have been traced for at least 400 meters along strike. There appears to be a systematic trend towards greater vein thickness with depth, as the widest observed vein in outcrop occurs at the lowest elevation sampled to date. Channel sampling along 300 meters of strike length from the best exposed vein yielded the following high-grade results:

Chip Channel #	True Width	Silver gpt	% Zinc	% Lead	Indium gpt
A	2.8	758	19.4	7.2	153
B	1.1	181	21.0	2.4	190
C	0.5	433	10.5	6.3	23
D	0.4	458	10.2	10.8	15
E	1.0	346	5.9	3.4	27
F	1.2	1975	33.1	5.6	430

(table of contents) 23

## **Royalty Properties**

### **Yanacocha Royalty Property (Peru)**

The Yanacocha royalty property consists of 43 concessions totaling approximately 40,500 hectares in northern Peru. The property position, located about 25 kilometers north of the city of Cajamarca, consists of a rectangular-shaped contiguous block of concessions nearly 40 kilometers long in an east-west direction and 25 kilometers wide in a north-south direction. The southern and eastern boundary of the royalty property abuts Newmont Mining Corporation's Minera Yanacocha mining operation, a large gold mine currently in operation. We held 100% interest in the concessions until April 2000, at which time we signed an agreement with Newmont Peru, Ltd., a wholly-owned subsidiary of Newmont Mining Corporation (both companies referred to as "Newmont Peru"), whereby we sold our Yanacocha Property to Newmont Peru for \$6,000,000 and retained a sliding scale NSR royalty ("NSR-Royalty") that varied from two to five percent, depending on the price of gold.

In January 2005 we signed an Amended and Restated Royalty Grant with affiliates of Newmont Peru to modify the NSR-Royalty schedule. The modified royalty structure is classified into several categories, depending on the type of process used to recover each metal and the prices of the commodities subject to the royalty. The royalty payable to Solitario is net of the government royalty burden imposed by Peru on the project ores. Peru's royalty imposes a sliding scale royalty varying from 1% to 12% of the operating profit of a mining operation. The percentage royalty is determined by rule based on the operating margin; however, the minimum royalty is 1% of the revenues.

No resources or reserves have been reported by Newmont Peru, nor has any mining been conducted on the property.

### **Pedra Branca Platinum-Palladium Metals Project (Brazil)**

During 2015 we converted our operating interest in the Pedra Branca project to a 1% NSR interest. The Pedra Branca platinum-palladium project consisted of 46 exploration concessions totaling approximately 51,500 hectares in the Ceará State, Brazil. The property is now owned by Garrison Capital Partners Limited, a Dubai, UAE company, which controls all activities related to the Pedra Branca project.

### **Montana Royalty Property (United States)**

In May 2016 we acquired a 1.5% net smelter royalty on non-producing exploration properties covering 16,548 acres in Montana previously owned by Atna Resources, Ltd.

#### Mexico Royalty Properties

During 2016 we transferred our 100% interest in 13 concessions totaling 3360 hectares in Mexico to a private Mexican party and retained a 1.5% NSR Royalty.

#### Discontinued Projects

During 2017, we abandoned our interests in the Aconchi and Norcan exploration properties in Mexico and we no longer hold any interest in those properties. There was no capitalized mineral property interest in either of the interests and we did not record any mineral property write-downs during 2017.

During 2016, we closed our exploration office in Mexico. Solitario recorded a mineral property write-down of \$10,000 related to the Norcan and Aconchi properties during 2016. During 2016, Solitario abandoned its interest in its Canta Colorado property in Peru and recorded a mineral property write-down expense of \$3,000 related to Canta Colorado.

#### GLOSSARY OF MINING TERMS

“**Allochthonous**” means originating in a place other than a place where it was formed.

“**Assay**” means to test minerals by chemical or other methods for the purpose of determining the amount of valuable metals contained.

“**Anticline**” means folds in which each half of the fold dips away from the crest.

“**Breccia**” means rock consisting of fragments, more or less angular, in a matrix of finer-grained material or of cementing material.

“**Bournonite**” means a mineral of sulfur, antimony, lead and copper.

(table of contents) 24



“**Boulangerite**” means a mineral of sulfur, lead and antimony.

“**Chert**” means a hard, dark opaque rock composed of silica with a microscopic fine-grained texture.

“**Claim**” or “**Concession**” means a mining interest giving its holder the right to prospect, explore for and exploit minerals within a defined area.

“**Clastic**” means pertaining to rock or rocks composed of fragments or particles of older rocks or previously existing solid matter; fragmental.

“**Deposit**” means an informal term for an accumulation of mineral ores.

“**Development**” means work carried out for the purpose of opening up a mineral deposit and making the actual ore extraction possible.

“**Domal**” means of a dome shape.

“**Dolomite**” means calcium magnesium carbonate,  $\text{CaMg}(\text{CO}_3)_2$ , occurring in crystals and in masses.

“**Facies**” means the appearance and characteristics of a sedimentary deposit, especially as they reflect the conditions and environment of deposition and serve to distinguish the deposit from contiguous deposits.

“**Fault**” means a fracture in rock along which there has been displacement of the two sides parallel to the fracture.

“**gpt**” means grams per tonne.

“**Karst**” means a landscape that is characterized by the features of solution weathering and erosion in the subsurface. These features include caves, sinkholes, disappearing streams, subsurface drainage and deeply incised narrow canyons.

“**Magnetotelluric**” means an electromagnetic geophysical method for inferring the earth’s subsurface electro conductivity used in geological interpretation.

“**Manto deposits**” means replacement ore bodies that are strata bound, irregular to rod shaped ore occurrences usually horizontal or near horizontal in attitude.

“**Mineralization**” means the concentration of metals within a body of rock.

“**NSR**” means net smelter return royalty.

“**opt**” or “**oz/ton**” means ounces per ton.

“**Ore**” means material containing minerals that can be economically extracted.

“**Ounce**” means a troy ounce.

“**Reserves**” or “**Ore Reserves**” means that part of a mineral deposit, which could be economically and legally extracted or produced at the time of the reserve determination.

“**Sampling**” means selecting a fractional, but representative, part of a mineral deposit for analysis.

“**Sediment**” means solid material settled from suspension in a liquid.

“**Sedimentary Exhalative Deposits (SEDEX)**” means ore deposits which have been formed by the release of ore-bearing hydrothermal fluids into a water reservoir.

“**Silicification**” means the process in which organic matter becomes saturated with silica (silicon dioxide).

“**Sphalerite**” means a very common mineral, zinc sulfide, usually containing some iron and a little cadmium, occurring in yellow, brown, or black crystals or cleavable masses with resinous luster and it is the principal ore of zinc.

“**Spectrophotometry**” means the quantitative measurement of the reflection properties of a material as a function of its wavelength.

“**Stratiform**” means formed parallel to the bedding places of surrounding rock.

“**Stratigraphy**” means the arrangement of rock strata, especially as to the geographic, chronologic order of sequence (age), classification, characteristics and formation.

“**Strike**” when used as a noun, means the direction, course or bearing of a vein or rock formation measured on a level surface and, when used as a verb, means to take such direction, course or bearing.

“**Sulfide**” means a compound of sulfur and some other element.

“**Syngenetic**” means a mineral deposit that forms at the same time as the surrounding rock.

“**Tetrahedrite**” a gray, typically crystalline mineral consisting of sulfide of antimony, iron, and copper.

“**Ton**” means a short ton (2,000 pounds).

(table of contents) 25

“**Tonne**” means a metric ton that contains 2,204.6 pounds or 1,000 kilograms.

“**Vein**” means a fissure, fault or crack in a rock filled by minerals that have traveled upwards from some deep source.

**Item 3. Legal Proceedings**

None

**Item 4. Mine Safety Disclosures**

Not applicable

(table of contents) 26

**PART II****Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities**

Our common stock trades on the NYSE American exchange under the symbol "XPL" and on the TSX under the symbol "SLR." Since 2008 trading volume of our common stock on NYSE American exchange has exceeded the trading volume of our stock on the TSX by a substantial margin.

The following table sets forth the high and low sales prices on NYSE American exchange for our common stock for the quarterly periods from January 1, 2016 to December 31, 2017:

Period	All prices are in US\$			
	2017		2016	
	High	Low	High	Low
First quarter	\$0.88	\$0.64	\$0.56	\$0.42
Second quarter	0.85	0.65	0.58	0.43
Third quarter	0.79	0.65	0.91	0.60
Fourth quarter	0.73	0.55	0.77	0.58

The following table sets forth the high and low sales prices on the TSX for our common stock for the quarterly periods from January 1, 2016 to December 31, 2017:

Period	All prices are in CDN\$			
	2017		2016	
	High	Low	High	Low
First quarter	\$1.18	\$0.87	\$0.72	\$0.60
Second quarter	1.15	0.81	0.73	0.58
Third quarter	1.03	0.81	1.20	0.73
Fourth quarter	0.88	0.70	0.99	0.76

**Shares authorized for issuance under equity compensation plans**

On June 18, 2013 Solitario's shareholders approved the 2013 Solitario Exploration & Royalty Corp. Omnibus Stock and Incentive Plan (the "2013 Plan"). On June 29, 2017, Solitario shareholders approved an amendment to the 2013

Plan, which increased the number of shares available of common stock for issuance under the 2013 Plan from 1,750,000 to 5,750,000. Under the terms of the 2013 Plan, the Board of Directors may grant awards to directors, officers, employees and consultants. Such awards may take the form of stock options, stock appreciation rights, restricted stock, and restricted stock units. The terms and conditions of the awards are pursuant to the 2013 Plan and options are granted by the Board of Directors or a committee appointed by the Board of Directors. There were no awards outstanding at December 31, 2016.

In connection with the Acquisition, on July 12, 2017, Solitario granted 1,782,428 Replacement Options. The exercise prices of the Replacement Options are between \$2.24 per share and \$0.70 per share with terms between 10 months and 18 months. In accordance with the terms of the Acquisition, the Replacement Options were fully vested upon grant. The Replacement Options had a grant date fair value of \$164,000, based upon Black-Scholes models with an expected volatility of 67% and a risk-free interest rate of 1.00%. The grant date fair value was capitalized as part of the purchase price of the Zazu assets acquired in the Acquisition.

On September 1, 2017, the Board of Directors granted 200,000 stock options under the 2013 Plan. The options have a five-year life, vested 25% on the date of grant and vest 25% on each of the next three anniversary dates of the date of grant, and have an exercise price of \$0.77 per share, and a grant date fair value of \$84,000, based upon a Black-Scholes model with a an expected volatility of 64%, and a risk free interest rate of 1.70%. Solitario recorded stock option compensation related to these options of \$50,000 during 2017.

(table of contents) 27

On September 1, 2017, the Board of Directors granted, subject to shareholder approval at the next meeting of shareholders, an additional 2,300,000 stock options under the 2013 Plan to officers and members of the Board of Directors. These options have a five-year life, and exercise price of \$0.77 per share, and a grant date fair value of \$970,0000, based upon a Black-Scholes model with a volatility of 64%, and a risk free interest rate of 1.70%. Although the options will vest on the schedule of 25% on date of grant and 25% on each of the next three anniversary dates of the date of grant, the options will not become exercisable in whole or in part unless Solitario shareholders approve the option grants, and the option grants will be void if Solitario shareholders do not approve the grants. Solitario will not record any stock option expense related to these options until shareholder approval is received.

Equity Compensation Plan Information as of December 31, 2017:

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (1)	Weighted-average exercise price of outstanding options, warrants and rights (2013 Plan – US\$) (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
2013 Plan	(a)	(b)	(c)
Equity compensation plans approved by security holders	1,982,428	1.64	3,717,010
Equity compensation plans not approved by security holders	—	N/A	—
Total 2013 Plan (1)	1,982,428	1.64	3,717,010

Excludes options granted subject to shareholder approval, discussed above.

Holders of our common stock

As of March 12, 2018, we have approximately 4,234 holders of record our common stock.

Dividend policy

We have not paid a dividend in our history and do not anticipate paying a dividend in the foreseeable future.

Issuer purchases of equity securities

The following table provides information about our purchase of our common shares during the three months ended December 31, 2017.

<b>Period</b>	<b>Total Number of Shares Purchased</b>	<b>Average Price Paid Per Share</b>	<b>Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs<sup>(1)</sup></b>	<b>Maximum number of Shares that May Yet Be Purchased Under the Plans or Programs<sup>(1)</sup></b>
October 1, 2017 – October 31, 2017	-	\$ -	-	1,340,700
November 1, 2017—November 30, 2017	30,300	\$0.59	300	1,340,400
December 1, 2017—December 31, 2017	8,200	\$0.57	8,200	1,332,200

(1) On October 28, 2015, our Board of Directors authorized a share repurchase program pursuant to which we may acquire up to 2 million of our common shares. All purchases listed were made in open-market transactions through a broker dealer. During 2017 our Board of Directors extended the termination date of the repurchase program to December 31, 2018, however the repurchase program may be suspended or discontinued at any time, and does not obligate us to acquire any particular amount of our shares. During the years ended December 31, 2017 and 2016, we purchased 47,200 and 475,600 shares of Solitario common stock, respectively, for an aggregate purchase price of \$32,000 and \$248,000, respectively. As of December 31, 2017, we have purchased a total of 667,800 shares of Solitario common stock for an aggregate purchase price of \$348,000 under the share repurchase program since its inception.

(table of contents) 28

**Item 6. Selected Financial Data**

The following table summarizes the consolidated statements of operations and balance sheet data for our business since January 1, 2013. This data has been derived from our audited consolidated statements of operations for each of the five years ended December 31, 2017 and our audited consolidated balance sheets as of December 31, 2017, 2016, 2015, 2014 and 2013. You should read this information in conjunction with Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and Solitario's historical consolidated financial statements and notes included in Item 8, "Financial Statements and Supplementary Data." The information set forth below is not necessarily indicative of future results.

Balance sheet data: (in thousands)	As of December 31,				
	2017	2016	2015	2014	2013
Total current assets	\$14,613	\$16,797	\$17,990	\$3,217	\$3,784
Total assets	\$30,395	\$17,614	\$18,054	\$19,040	\$19,500
Working capital (deficit) (1)	\$14,472	\$16,671	\$17,811	\$(1,987)	\$2,531
Long-term debt	\$—	\$—	\$—	\$—	\$3,144
Shareholders' equity	\$30,129	\$17,488	\$17,875	\$6,781	\$7,963

  

Statement of operations data: (in thousands, except per share amounts)	Year ended December 31,				
	2017	2016	2015	2014	2013
Property and joint venture revenue	\$—	\$—	\$—	\$200	\$300
Net (loss) income	\$(942)	\$(1,710)	\$8,872	\$(1,833)	\$(2,052)

  

Per share information:	
Basic and diluted	
Net (loss) income	
	\$(0.02) \$(0.04) \$0.23 \$(0.05) \$(0.06)

(1) Working capital consists of current assets less current liabilities.

[\(table of contents\)](#) 29



## **Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations**

The following discussion should be read in conjunction with the information contained in the consolidated financial statements and notes thereto included in Item 8, "Financial Statements and Supplementary Data." Our financial condition and results of operations are not necessarily indicative of what may be expected in future years.

### **(a). Recent Developments**

On July 12, 2017 we completed the acquisition of Zazu pursuant to the Arrangement Agreement and acquired all of the Zazu Shares by way of the Arrangement. As a result of the Acquisition, Zazu became a wholly-owned subsidiary of Solitario. At closing, we issued 19,788,177 shares of common stock for all of the issued and outstanding Zazu Shares. We also granted the Replacement Options in connection with the Acquisition. The Acquisition was recorded as the acquisition of assets in accordance with ASU 2017-01. The total purchase price for the Acquisition was \$16,110,000 and has been allocated to the assets acquired and stock issuance costs, less liabilities. Results of operations for Zazu have been included in our consolidated financial statements from the date of Acquisition.

Effective July 17, 2017 an amendment to our Articles of Incorporation became effective that served to change our name to "Solitario Zinc Corp." from "Solitario Exploration & Royalty Corp." Subsequent to the Acquisition, our core mineral property assets are the 39% interest in the Florida Canyon zinc project in Peru and the 50% ownership interest in the Lik zinc deposit (acquired in the Acquisition). We believe the name "Solitario Zinc Corp." reflects the increased focus of the Company on zinc-related assets.

### **(b). Business Overview and Summary**

We are an exploration stage company at December 31, 2017 under Industry Guide 7, as issued by the SEC. We were incorporated in the state of Colorado on November 15, 1984 as a wholly-owned subsidiary of Crown Resources Corporation ("Crown"). In July 1994, we became a publicly traded company on the Toronto Stock Exchange (the "TSX") through our initial public offering. We have been actively involved in mineral exploration since 1993. Our primary business is to acquire exploration mineral properties or royalties and/or discover economic deposits on our mineral properties and advance these deposits, either on our own or through joint ventures, up to the development stage (development activities include, among other things, completion of a feasibility study for the identification of proven and probable reserves, as well as permitting and preparing a deposit for mining). At that point, or sometime prior to that point, we would likely attempt to sell a given mineral property, pursue its development either on our own, or through a joint venture with a partner that has expertise in mining operations, or obtain a royalty from a third party that continues to advance the property. Upon the completion of the Acquisition, we have shifted our primary focus to the acquisition and exploration of zinc-related exploration mineral properties. In addition to focusing on our current assets and the evaluation of mineral properties for acquisition, we also evaluate potential strategic corporate

transactions for the potential acquisition of new precious and base metal properties and assets with exploration potential or business combinations we determine to be favorable to Solitario.

Our geographic focus for the evaluation of potential mineral property assets is in North and South America; however we have conducted property evaluations for potential acquisition in other parts of the world. Our exploration properties may be developed in the future by us or through a joint venture, although we have never developed a mineral property. At December 31, 2017, we consider our carried interest in our Florida Canyon project in Peru and our recently acquired interest in the Lik project in Alaska to be our core mineral property assets. In addition, at December 31, 2017, we have one exploration property in Peru, and one royalty property in each of Peru, Brazil, United States and Mexico. We are conducting independent exploration activities in Peru and through joint ventures operated by our partners in Peru and the United States. We conduct potential acquisition evaluations in other countries of both South and North America.

As of December 31, 2017, we have significant balances of cash and short-term investments that we anticipate using, in part, to further the development of the Lik project, conduct initial exploration on the La Promesa project in Peru, and to potentially acquire additional mineral property assets. The fluctuations in base and precious metals has contributed to a challenging environment for mineral exploration and development, which has created opportunities as well as challenges for the potential acquisition of advanced mineral exploration projects or other related assets at potentially attractive terms.

In analyzing our activities, the most significant aspect relates to results of our exploration and potential development activities and those of our joint venture partners on a property-by-property basis. When our exploration or development activities, including drilling, sampling and geologic testing, indicate a project may not be economic or contain sufficient geologic or economic potential we may impair or completely write-off the property. Another significant factor in the success or failure of our activities is the price of commodities. For example, when the price of gold is down, the value of gold-bearing

mineral properties decreases; however, when the price of gold is up it may become more difficult and expensive to locate and acquire new gold-bearing mineral properties with potential to have economic deposits.

(table of contents) 30

The potential sale, joint venture or development of our mineral properties will occur, if at all, on an infrequent basis. We have recorded revenues and met our need for capital in the past through (i) the sale of properties; (ii) joint venture payments, including delay rental payments; (iii) a royalty sale on our former Mt. Hamilton property during 2012; (iv) the sale of our shares of Vendetta and Kinross common stock; (v) long-term debt secured by our mineral property; (vi) short-term margin borrowing; and (vii) issuances of common stock. In 2015 we recorded a gain on the sale of our interest in Mount Hamilton LLC (“MHLLC”) of \$12,309,000. During June 2012, we sold a royalty interest in our Mt. Hamilton project to Sandstorm Gold Ltd. for \$10,000,000. Previous to the Mt. Hamilton Transaction, our last significant cash proceeds were recorded in 2000 upon the sale of our former Yanacocha property for \$6,000,000. Proceeds from the sale or joint venture of properties, although significant when they occur, have not been a consistent annual source of cash and would occur in the future, if at all, on an infrequent basis. We have reduced our exposure to the costs of our exploration activities in the past through the use of joint ventures. Although we anticipate the use of joint venture funding for some of our exploration activities will continue for the foreseeable future, we can provide no assurance that these or other sources of capital will be available in sufficient amounts to meet our needs, if at all.

### **(c). Results of Operations**

#### Comparison of the year ended December 31, 2017 to the year ended December 31, 2016

We had a net loss of \$942,000 or \$0.02 per share for the year ended December 31, 2017 compared to a loss of \$1,710,000 or \$0.04 per basic and diluted share for the year ended December 31, 2016. As explained in more detail below, the primary reason for decrease in net loss during 2017 compared to 2016 was the reduction in general and administrative expense to \$1,202,000 during 2017 compared to general and administrative expense of \$2,163,000 during 2016. This decrease was primarily related to a reduction in non-cash stock option expense to \$50,000 during 2017 compared to stock option expense of \$970,000 during 2016. Other factors contributing to the decrease in net loss included (i) an increase in the gain on the sale of marketable equity securities during 2017 to \$578,000 compared to a gain of \$40,000 during 2016; (ii) an increase in interest income during 2017 to \$124,000 compared to interest income of \$44,000 during 2016; (iii) no property abandonment losses were recorded during 2017 compared to property abandonment losses of \$13,000 during 2016 and (iv) no losses on the sale of assets were recorded during 2017 compared to a loss on asset sales of \$14,000 during 2016. Partially offsetting these factors that served to decrease our net loss from operations were (i) an increase in exploration expense to \$699,000 during 2017 compared to exploration expense of \$628,000 during 2016; (ii) a decrease in deferred income tax benefit to nil during 2017 compared to an income tax benefit of \$353,000 during 2016; and (iii) a decrease in gain on derivative instruments to \$271,000 during 2017 compared to a gain on derivative instruments of \$672,000 during 2016. Each of these items is discussed in greater detail below.

On July 12, 2017 we completed the acquisition Zazu pursuant to the Arrangement Agreement, which was a significant focus of our attention during 2017. As part of the Acquisition, we capitalized the purchase price of \$16,110,000, including approximately \$782,000 of transaction costs, including investment banking fees, legal and other costs. The

total purchase price for the Acquisition has been allocated to the assets acquired, less liabilities. Results of operations for Zazu have been included in our consolidated financial statements from the date of Acquisition.

Our other primary activities during 2017 and 2016 was the evaluation of mineral properties and other junior mining companies for possible acquisition and or merger, with an increase in related reconnaissance exploration activities and expense. These activities included the completion of a PEA related to our Florida Canyon project in Peru. The total cost of the PEA was approximately \$243,000 of which our joint venture partner, Nexa paid one-half. During 2017, we evaluated several projects for acquisition, in addition to the Lik project acquired in the Acquisition. We decided to close our Mexico exploration office during 2016; however this reduction in exploration was more than offset by the exploration and evaluation efforts of our staff and contract geologists during 2017. We did no drilling on any of our exploration projects in North or South America during 2017 or 2016. Our 2018 exploration and development expenditure budget is approximately \$792,000, which is expected to be directed toward the exploration of our existing mineral exploration projects as well as the evaluation and potential acquisition of new mineral exploration properties. This expenditure amount could increase significantly if we decide to conduct exploration drilling on any of our existing projects, which is not currently included in the 2018 budget. We cannot predict with certainty that we will acquire new mineral exploration properties during 2018; however, we expect to continue our early-stage exploration activities. Our exploration activities may be modified, as necessary for any drilling programs we may undertake, changes related to potential acquisition of new properties, joint venture funding, commodity prices and deployment of our capital.

(table of contents) 31

Exploration expense (in thousands) by property consisted of the following:

Property Name	2017	2016
Florida Canyon	\$124	\$2
Lik project	54	—
La Promesa	41	81
Reconnaissance exploration activity	480	545
Total exploration expense	\$699	\$628

We believe a discussion of our general and administrative costs should be viewed without the non-cash stock option compensation expense which is discussed below. Excluding these costs, general and administrative costs were \$1,152,000 during 2017 compared to \$1,193,000 during 2016. We reduced salary and benefits expense to \$639,000 during 2017 compared to \$708,000 during 2016 as a result of salary and bonus reductions. In addition, (i) legal and accounting costs increased slightly to \$134,000 during 2017 compared to \$126,000 during 2016; (ii) travel and investor relation costs increased to \$233,000 during 2017 compared to \$177,000 during 2016 as a result of expenses related to our post Acquisition disclosures and market activities; (iii) we recorded additional costs for directors and officer insurance of \$55,000 during 2017 compared to \$5,000 during 2016 as we previously had not carried director and officer insurance; and (iv) other costs related to office, insurance and miscellaneous costs increased slightly to \$98,000 during 2017 compared to \$90,000 during 2016 primarily due to increases in rent and office costs. We anticipate general and administrative costs for 2018 will be comparable to the costs incurred during 2017; however this amount may vary significantly during 2018 depending on the outcome of our property evaluations and any strategic transactions we may attempt to execute upon, which cannot be predicted at this time. We have forecast 2018 general and administrative costs to be approximately \$1,217,000, excluding non-cash stock option compensation expense.

We account for our employee stock options under the provisions of ASC 718. We recognize stock option compensation expense on the date of grant for 25% of the grant date fair value, and subsequently, based upon a straight line amortization of the grant date fair value of each of its outstanding options. During the year ended December 31, 2017, we recorded \$50,000 of non-cash stock option expense for the amortization of our outstanding options grant date fair value with a credit to additional paid-in-capital compared to \$970,000 of non-cash stock option compensation expense during 2016. On August 24, 2016, holders of option awards voluntarily cancelled awards for 390,000 options from our 2006 Plan and 1,699,000 options from our 2013 Plan. No consideration was given or received by the holders of the options to cancel the awards. The cancellation of the awards for 1,699,000 options from our 2013 Plan on June 22, 2016, and the related 25% expense of the grant date fair value on that date, accounted for the increase in the non-cash stock option compensation during 2016 compared to 2017. See Note 9, "Employee Stock Compensation Plans," to our consolidated financial statements in Item 8, "Financial Statements and Supplementary Data" for an analysis of the changes in the fair value of our outstanding stock options and the components that are used to determine the fair value.

During 2017 we received proceeds of \$666,000 and recorded a gain on the sales of \$578,000 from the sale of 3,480,000 Vendetta common shares, and used the bulk of the proceeds of \$666,000 to exercise 7,240,000 warrants to acquire Vendetta common shares for \$578,000. See Note 3, "Marketable Equity Securities," to the consolidated

financial statements in Item 8, “Financial Statements and Supplementary Data” of this Form 10-K for a discussion of the sale of Vendetta shares and the exercise of the Vendetta Warrants (defined below). As of December 31, 2017, we have 11,000,000 shares of Vendetta common stock and no remaining Vendetta Warrants. This compared to the sale of 3,000 shares of Kinross common stock for proceeds of \$10,000 and a gain on sale of \$8,000 and the sale of 250,000 shares of International Lithium Corp marketable equity securities for proceeds of \$45,000 and at a gain of \$32,000 during 2016. We may sell some of our marketable equity securities from time to time during 2018 for working capital needs; however we do not expect to sell all of our holdings of marketable equity securities during 2018. Any proceeds we may receive from sales of marketable equity securities during 2018 will be dependent on the quoted market price of the securities sold on the date of sale and may be at prices below the fair value at December 31, 2017. See “Liquidity and Capital Resources” below.

During 2017 we recorded a gain on derivative instruments of \$271,000 compared to a gain on derivative instruments of \$672,000 during 2016. The gains during 2016 and 2017 were primarily related to our investment in Vendetta Warrants, which were purchased on May 2, 2016, as part of our strategic investment in Vendetta, where we acquired 7,240,000 units for Cdn\$0.05 per unit, with each unit consisting of one share of Vendetta common stock and one Vendetta Warrant. Each Vendetta Warrant entitled Solitario the right to acquire one share of Vendetta common stock at a price of Cdn\$0.10 per share for a period of two years (“Vendetta Warrant”). We recorded a gain on derivative instruments of \$216,000 during 2017 related to the Vendetta Warrants compared to a gain of \$629,000 during 2016 related to the Vendetta Warrants. These gains were primarily as a result of an increase in the price of the underlying Vendetta common shares during 2017 and 2016. The remaining increase in the gain on derivative instruments was related to the sale of Kinross calls during 2017 of \$54,000 and the

sale of Kinross calls during 2016 of \$43,000. We have sold covered calls on a limited portion of our Kinross common stock that we intend to sell within one year, to enhance our return on Kinross common stock in exchange for potential upside in those covered Kinross shares. We may continue to sell covered Kinross call options during 2018. See Note 6, “Derivative Instruments,” to our consolidated financial statements in Item 8, “Financial Statements and Supplementary Data,” for an analysis of the changes in our derivative instruments, and the components that are used to determine the fair value of our derivative instruments.

(table of contents) 32

We recorded \$13,000 of depreciation and amortization during 2017 compared to \$5,000 of depreciation and amortization during 2016. The increase is primarily as a result of additional equipment acquired in the Acquisition at the Lik project being depreciated. We amortize these assets over a five-year period. We anticipate our 2018 depreciation and amortization costs will be higher than the 2017 amount as a result of owning the Lik assets for a full year in 2018.

We recorded interest income of \$124,000 during 2017 compared to interest income of \$44,000 during 2016. The increase during 2017 was related to the investment of the net proceeds from the Mt. Hamilton Transaction in short-term certificates of deposit and United States Treasury notes since the date of the Mt. Hamilton Transaction as well as an increase in nominal interest rates during 2017 compared to 2016. We anticipate our interest income will decrease in 2018 compared to 2017 as a result of the use of our short-term investments and our cash balances for the exploration, evaluation and or acquisition of mineral properties discussed above. See “Liquidity and Capital Resources,” below, for further discussion of our cash and cash equivalent balances.

During 2017 we recorded no deferred tax expense compared to deferred tax expense of \$353,000 during 2016 to other comprehensive income related to the net change in the in the unrealized value of our marketable equity securities, with a corresponding deferred tax credit of \$353,000 to income tax expense in the statement of operations during 2016. See Note 3, “Marketable Equity Securities” and Note 5, “Income Taxes” to our consolidated financial statements in Item 8, “Financial Statements and Supplementary Data of this Form 10-K for additional discussion of our income tax valuation allowance, deferred tax assets and our net operating losses for 2017 and 2016. We continue to provide a valuation allowance for our United States and foreign net operating losses, which are primarily related to our general and administrative expenses and to our exploration activities in Alaska and Peru. We anticipate we will continue to provide a valuation allowance for these net operating losses until we are in a net tax liability position with regards to those countries where we operate or until it is more likely than not that we will be able to realize those net operating losses in the future.

We regularly perform evaluations of our mineral property assets to assess the recoverability of our investments in these assets. All long-lived assets are reviewed for impairment whenever events or circumstances change which indicate the carrying amount of an asset may not be recoverable utilizing guidelines based upon future net cash flows from the asset as well as our estimates of the geologic potential of early stage mineral property and its related value for future sale, joint venture or development by us or others. During 2016, we closed our exploration office in Mexico. Solitario recorded a mineral property write-down of \$10,000 related to the Norcan and Aconchi properties during 2016. During 2016, we abandoned our interest in its Canta Colorado property in Peru and recorded a mineral property write-down expense of \$3,000 related to Canta Colorado. In addition, we recorded a loss on other assets in Mexico of \$14,000 related to the exit from its exploration activities in Mexico during 2016. We had no mineral property impairments during 2017.

#### **(d). Liquidity and Capital Resources**

Cash

As of December 31, 2017 we have \$214,000 in cash. We intend to utilize a portion of this cash and a portion of our short-term investments, discussed below, to fund our exploration activities and the potential acquisition of mineral properties and other assets over the next several years. We may also use a portion of these assets to repurchase shares of our common stock, pursuant to the terms of a stock buy-back program discussed below.

Short-term Investments

As of December 31, 2017, we have \$10,395,000 of our current assets in United States Treasury securities (“USTS”) with maturities of 15 days to eighteen months. The USTS are recorded at their fair value, based upon quoted market prices. The USTS are highly liquid and may be sold in their entirety at any time at their quoted market price and are classified as a current asset. We anticipate we will roll over that portion of our USTS not used for operating costs or mineral property acquisitions as they mature during 2018.

(table of contents) 33



As of December 31, 2017 we have \$1,247,000 in separate bank certificates of deposit (“CDs”) each with a maximum value of \$250,000, and each of which are covered by Federal Deposit Insurance Corporation insurance to the full face value of the CDs. At December 31, 2017, the CDs have maturities of between seven and fifteen months. The CDs are recorded at their

fair value, based upon quoted market prices. The CDs are highly liquid and may be sold in their entirety at any time at their quoted market price and are classified as a current asset. We anticipate we will roll over that portion of our CDs not used for operating costs or mineral property acquisitions as they mature during 2018.

### Marketable Equity Securities

Our marketable equity securities are classified as available-for-sale and are carried at fair value, which is based upon market quotes of the underlying securities. We owned 100,000 shares of Kinross common stock at December 31, 2017. The Kinross shares are recorded at their fair value of \$432,000 at December 31, 2017. As of December 31, 2017, we own 11,000,000 shares of Vendetta common stock recorded at their fair market value of \$2,191,000 based upon quoted market prices. In addition we own other marketable equity securities with a fair value of \$20,000 as of December 31, 2017 based upon quoted market prices. Changes in the fair value of marketable equity securities are recorded as gains and losses in other comprehensive income in shareholders’ equity.

### Working Capital

We had working capital of \$14,472,000 at December 31, 2017 compared to working capital of \$16,671,000 as of December 31, 2016. Our working capital at December 31, 2017 consists primarily of our cash and cash equivalents, our investment in USTS and CDs, discussed above, and our marketable equity securities of \$2,643,000, less our accounts payable of \$141,000. As of December 31, 2017, our cash balances along with our short-term investments and marketable equity securities are adequate to fund our expected expenditures over the next year.

The nature of the mineral exploration business requires significant sources of capital to fund exploration, development and operation of mining projects. We expect we will need additional capital if we decide to develop or operate any of our current exploration projects or any projects or assets we may acquire. We anticipate we would finance any such development through the use of our cash reserves, short-term investments, joint ventures, issuance of debt or equity, or the sale of other exploration projects or assets.

### Stock-Based Compensation Plans

At December 31, 2017, options to acquire 1,982,428 shares of our common stock were outstanding, of which 1,782,428 options were Replacement Options granted in connection with the Acquisition. The options were granted with exercise prices ranging from \$1.74 per share to \$0.54 per share. There are 1,832,428 options that are vested and exercisable at December 31, 2017. Of these options, there are options exercisable to acquire 214,320 shares priced at \$0.54 per share that are in the money with an exercise price below the current market price of a share of Solitario common stock as quoted on the NYSE American exchange. In addition, on September 1, 2017, our Board of Directors granted, subject to shareholder approval at the next meeting of shareholders, an additional 2,300,000 stock options under the 2013 Plan to officers and members of the Board of Directors. These options have a five-year life, an exercise price of \$0.77 per share, and a grant date fair value of \$970,000, based upon a Black-Scholes model with a volatility of 64%, and a risk free interest rate of 1.70%. Although the options will vest on the schedule of 25% on date of grant and 25% on each of the next three anniversary dates of the date of grant, the options will not become exercisable in whole or in part unless our shareholders approve the grants, and the option grants will be void if Solitario shareholders do not approve the grants. See Note 9, "Employee Stock Compensation Plans" to our consolidated financial statements in Item 8, "Financial Statements and Supplementary Data of this Form 10-K for a discussion of the activity in our 2013 Plan and our 2006 Plan during 2017 and 2016. We do not anticipate that stock option exercises will be a significant source of cash during 2018.

#### Share Repurchase Program

On October 28, 2015, our Board of Directors approved a share repurchase program that authorized us to purchase up to two million shares of our outstanding common stock through December 31, 2016. During 2016, our Board of Directors extended the term of the share repurchase program until December 31, 2017. During 2017 our Board of Directors extended the term of the share repurchase program until December 31, 2018. All shares purchased to date have been cancelled and reduced the number of shares of outstanding common stock. The amount and timing of any shares purchased has been and will be determined by our management and the purchases will be effected in the open market or in privately negotiated transactions based upon market conditions and other factors, including price, regulatory requirements and capital availability and in compliance with applicable state and federal securities laws. Purchases may also be made in accordance with Rule 10b-18 of the Exchange Act. The repurchase program does not require the purchase of any minimum number of shares of common stock by the Company, and may be suspended, modified or discontinued at any time without prior notice. No purchases will be made outside of the United States, including on the Toronto Stock Exchange. Payment for shares of common stock repurchased under the program will be funded using the Company's working capital. As of December 31, 2017, since the inception of the share repurchase program, we have purchased a total of 667,800 shares for an aggregate purchase price of \$348,000 and these shares are no longer included in our issued and outstanding shares. We anticipate we will continue to purchase a limited number of shares under the share repurchase plan during 2018 as determined by management.

(table of contents) 34

Off-balance sheet arrangements

As of December 31, 2017 and 2016, we have no off-balance sheet arrangements.

(e). Cash Flows

Net cash used in operations during the year ended December 31, 2017 decreased to \$1,685,000 compared to \$1,835,000 for 2016 primarily as a result of (i) additional interest income of \$124,000 during 2017 compared to \$44,000 during 2016 (ii) a slight reduction in non-stock option general and administrative expenses of \$1,151,000 during 2017 compared to \$1,193,000 during 2016, discussed above under “Results of Operations; and (iii) reduction in prepaid expenses as well as a slight increase in accrued accounts payable during 2017 compared to the change in these accounts during 2016. Partially offsetting this decreased use of cash in operations was an increase in reconnaissance exploration activities to \$699,000 during 2017 compared to exploration expense of \$628,000 during 2016 as discussed in further detail above under “Results of Operations.”

Net cash used in investing activities decreased to \$1,785,000 during 2017 compared to a use of cash of \$15,516,000 during 2016. The primary use of cash during 2016 was the net purchases of CD and USTS short-term investments of \$15,572,000 discussed above in “Liquidity and Capital Resources,” while we used approximately \$3,563,000 of short-term investments to finance our operations during 2017, including the cash costs of the Acquisition. In addition (i) we used \$40,000 of cash for the purchase of a royalty on certain non-producing mineral leases in Montana during 2016 with no similar item during 2017; (ii) during 2017 we used \$578,000 of the proceeds from the sale of Vendetta common stock to exercise the Vendetta Warrants, discussed above, compared the use of \$304,000 of cash during 2016, which was primarily used to acquire the Vendetta units, consisting of Vendetta shares and the Vendetta Warrants; (iii) during 2017 we received \$666,000 from the sale of Vendetta shares, discussed above, of which \$578,000 was used to exercise the Vendetta Warrants, compared to proceeds of \$56,000 in proceeds from the sale of marketable equity securities during 2016; and (iii) we received \$53,000 during 2017 from the sale of derivative instruments related to Kinross calls compared to \$45,000 from the sale of Kinross calls during 2016.

The net cash used in financing activities of \$32,000 during 2017 and the net cash used in financing activities of \$248,000 during 2016 were for the repurchase of common stock for cancellation, discussed above. We do not anticipate the use of a significant amount of cash for the repurchase of shares during 2018.

**(f). Development Activities, Exploration Activities, Environmental Compliance and Contractual Obligations**

Development Activities

As a result of the Mt Hamilton Transaction we no longer have any ongoing development activities.

### Exploration Activities

A historically significant part of our business involves the review of potential property acquisitions and continuing review and analysis of properties in which we have an interest, to determine the exploration and development potential of the properties. In analyzing expected levels of expenditures for work commitments and property payments, our obligations to make such payments fluctuate greatly depending on whether, among other things, we make a decision to sell a property interest, convey a property interest to a joint venture, or allow our interest in a property to lapse by not making the work commitment or payment required. In acquiring many of our interests in mining claims and leases, we have entered into agreements, which generally may be canceled at our option. We are often required to make minimum rental and option payments in order to maintain our interest in certain claims and leases. Our net 2017 mineral and surface property rental and option payments, included in exploration expense, were \$24,000. Our 2018 total exploration property rentals and option payments for properties we own or operate are estimated to be approximately \$322,000. Assuming that our joint ventures continue in their current status and that we do not appreciably change our property positions on existing properties, we estimate that our joint venture partners will pay on our behalf, or reimburse us approximately \$305,000 of these annual payments. These obligations are detailed below under “Contractual Obligations.” In addition, we may be required to make further payments in the future if we elect to exercise our options under those agreements or if we enter into new agreements.

(table of contents) 35

Environmental Compliance

We are subject to various federal, state and local environmental laws and regulations in the countries where we operate. We are required to obtain permits in advance of initiating certain of our exploration activities, to monitor and report on certain activities to appropriate authorities, and to perform remediation of environmental disturbance as a result of certain of our activities. Historically, the nature of our activities of review, acquisition and exploration of properties prior to the establishment of reserves, which may include mapping, sampling, geochemistry and geophysical studies, as well as some limited exploration drilling, has not resulted in significant environmental impacts in the past. We have historically carried on our required environmental remediation expenditures and activities, if any, concurrently with our exploration activities and expenditures. The expenditures to comply with our environmental obligations are included in our exploration expenditures in the statement of operations and have not been material to our capital or exploration expenditures, and have not had a material effect on our financial position. For the years ended December 31, 2017 and 2016, we have not capitalized any costs related to environmental control facilities. We do not anticipate our exploration activities will result in any material new or additional environmental expenditures or liabilities in the near future.

Contractual Obligations

The following table provides an analysis of our contractual obligations:

(in thousands)	As of December 31, 2017				
	Payments due by period				
	Total	Less than 1 year	1–3 years	4–5 years	More than 5 years
Operating Lease Obligations (1)	\$ 43	\$ 39	\$ 4	\$ -	\$ -
Mineral property option and lease payments (2)	\$ 17	\$ 17	\$ -	\$ -	\$ -
		(1) <i>Lease obligation on our Wheat Ridge Colorado office.</i>			
		(2) <i>Mineral property payments under lease and property claim and concession payments for the next year, net of joint venture payments.</i>			

**(g). Exploration Joint Ventures, Royalty and Other Properties**

The following discussion relates to an analysis of our anticipated property exploration plans as of December 31, 2017. Please also see Note 2, “Mineral Properties,” to the consolidated financial statements in Item 8, “Financial Statements and Supplementary Data,” and our discussion of our properties under Item 2, “Properties” of this Annual Report on Form 10-K for a more complete discussion of all of our mineral properties.

Florida Canyon

The Florida Canyon project (formerly known as the Bongará project) is an advanced-stage high-grade zinc project in Peru. Based on extensive exploration and development work conducted to date, we believe the property has excellent potential to be developed into a mine over the next several years. The project is held in a joint venture between Nexa (61%) and Solitario (39%).

Solitario and Nexa jointly completed a PEA in 2017 that incorporated a variety of Nexa-generated prefeasibility studies into the analysis. The PEA evaluation included resource estimation, mining and processing recovery estimates, a preliminary mining and processing plan, infrastructure layout, environmental considerations and an economic analysis based on the certain base case parameters. The PEA envisioned an underground mining operation with a 2,500 tonne per day floatation mill for processing, resulting in a 12.5 year mine life. Concentrates would be trucked to Nexa's Cajamarquilla zinc smelter facility in Lima Peru.

The 2018 Florida Canyon work program includes the completion of the access road into the mineralized portion of the project area and permitting that will allow new underground tunneling, surface drilling and other activities associated with the future development of the project. The terrain at Florida Canyon is steep and all previous project access supporting surface and underground work programs was conducted by helicopter. The lack of road access restricted the scope of field activities to further advance the project. With the completion of the road, heavy equipment will be able to enter the project area and allow feasibility related activities to proceed efficiently. Important future activities that will be facilitated by the completion of the road are the construction of an underground tunnel into the Karen-Milagros high-grade zinc zone, detailed underground resource/reserve definition drilling, surface drilling designed to increase the project resources and additional feasibility-related studies. Road work is scheduled to begin in May after the rainy season ends and continue until the road is completed.

#### Lik project

The Lik project is an advanced-staged high-grade zinc project. The project is held in a joint venture between Teck American (50%) and Solitario (50%).

(table of contents) 36

Zazu completed a PEA in 2014 that incorporated a variety of prefeasibility studies into the analysis. These studies included resource estimation, mining and processing recovery estimates, a preliminary mining and processing plan, infrastructure layout, environmental considerations and an economic analysis based on the base case parameters. The PEA envisioned an open pit mining operation with a 5,500 ton per day floatation mill for processing resulting in a nine-year mine life. Concentrates would be handled through the DMTS road and port system that currently handles all concentrate produced by the nearby Red Dog zinc mine of Teck American. A summary of metallurgical testing and mineral processing is provided below. The PEA analyzed the Lik project as a stand-alone operation building its own independent processing, tailings and port facilities.

Solitario and Teck American, our 50% joint venture partner, have agreed to jointly fund a gravity geophysical program, continue baseline environmental work for mine permitting previously initiated by Zazu, and rehabilitate the Lik camp for 2018. The objective of the gravity survey is to test for sub-surface gravity anomalies that may be associated with zinc deposits similar in nature to other Red Dog district zinc deposits. Any gravity anomalies that are delineated may be potentially drill tested in 2019. The 2018 program represents the first Teck American-Solitario (Zazu) joint exploration effort since inception of the joint venture. Teck American will manage the 2018 program, although Solitario will remain the manager of the joint venture.

#### Royalty Properties

The 40,500-hectare Yanacocha royalty property is located in northern Peru immediately north of Newmont Mining-Buenaventura's Minera Yanacocha Mine, historically one of the largest gold mines in South America. We acquired the property in 1993 and sold it to Newmont Mining Corporation in 2000 for \$6.0 million retaining a sliding scale NSR royalty on the property that varies from two to five percent, depending on the price of gold. In addition, we hold royalties on the Pedra Branca property in Brazil, certain non-producing mineral properties in Mexico and non-producing mineral properties in Montana. We consider all of these royalty properties to be an early-stage exploration properties, and although we believe each may have good potential to host economic mineralization, we will not receive any royalties from any of these properties until such time as their owners develop and place into operation a mine on the properties covered by our royalty. Accordingly, we cannot predict revenue from our royalties in the near future, if ever.

#### Other Properties

We have budgeted 2018 exploration expenditures of \$792,000 for exploration and evaluation of existing and potential new acquisitions of properties primarily in Peru, and to a lesser extent in other regions of North and South America. We expect to carry out limited exploration activities during 2018 utilizing our own employees and contract geologists.

#### **(h). Discontinued Projects**

During 2016, we closed our exploration office in Mexico. Solitario recorded a mineral property write-down of \$10,000 related to the Norcan and Aconchi properties during 2016. During 2016, we abandoned our interest in our Canta Colorado property in Peru and recorded a mineral property write-down expense of \$3,000 related to Canta Colorado. In addition, we recorded a loss on other assets in Mexico of \$14,000 related to the exit from its exploration activities in Mexico during 2016. We had no mineral property impairments during 2017.

**(i). Significant Accounting Policies**

See Note 1, “Business and Summary of Significant Accounting Policies,” in Item 8, “Financial Statements and Supplementary Data” for a discussion of our significant accounting policies.

**(j). Related Party Transactions**

None

**(k). Recent Accounting Pronouncements**

See Note 1, “Business and Summary of Significant Accounting Policies,” in Item 8 “Financial Statements and Supplementary Data” for a discussion of recent accounting pronouncements.

(table of contents) 37



**Item 7A. Quantitative and Qualitative Disclosures about Market Risk**

Smaller reporting companies are not required to provide the information required by this item.

(table of contents) 38

**Item 8. Financial Statements and Supplementary Data**

	Page
Consolidated Financial Statements	
Report of Independent Registered Public Accounting Firm	40
Consolidated Balance Sheets as of December 31, 2017 and 2016	41
Consolidated Statements of Operations for the years ended December 31, 2017 and 2016	42
Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017 and 2016	43
Consolidated Statements of Shareholders' Equity for the years ended December 31, 2017 and 2016	44
Consolidated Statements of Cash Flows for the years ended December 31, 2017 and 2016	45
Notes to Consolidated Financial Statements	46

(table of contents) 39

## **REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

To the Shareholders and Board of Directors

Solitario Zinc Corp.

Wheat Ridge, Colorado

### **OPINION ON THE FINANCIAL STATEMENTS**

We have audited the accompanying consolidated balance sheets of Solitario Zinc Corp. (formerly Solitario Exploration and Royalty Corp., the "Company") as of December 31, 2017 and 2016, and the related consolidated statements of income, comprehensive income, stockholders' equity, and cash flows, for each year in the two-year period ended December 31, 2017, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each year in the two-year period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.

### **BASIS FOR OPINION**

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("PCAOB") and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis

for our opinion.

EKS&H LLLP

March 14, 2018

Denver, Colorado

We have served as the Company's auditor since 2005.

(table of contents) 40

## SOLITARIO ZINC CORP.

## CONSOLIDATED BALANCE SHEETS

(in thousands of U.S. dollars, except share and per share amounts)	December 31, 2017	December 31, 2016
Assets		
Current assets:		
Cash and cash equivalents	\$214	\$119
Short-term investments, at fair value	11,642	15,250
Investments in marketable equity securities, at fair value	2,643	1,339
Prepaid expenses and other	114	89
Total current assets	14,613	16,797
Mineral properties	15,657	46
Other assets	125	771
Total assets	\$30,395	\$17,614
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	\$141	\$124
Other	—	2
Total current liabilities	141	126
Long-term liabilities		
Asset retirement obligation - Lik	125	—
Commitments and contingencies (Notes 2 and 9)		
Shareholders' equity:		
Solitario shareholders' equity		
Preferred stock, \$0.01 par value, authorized 10,000,000 shares (none issued and outstanding at December 31, 2017 and 2016)	—	—
Common stock, \$0.01 par value, authorized, 100,000,000 shares (58,434,566 and 38,693,589, respectively, shares issued and outstanding at December 31, 2017 and 2016)	584	387
Additional paid-in capital	69,312	55,790
Accumulated deficit	(40,343)	(39,401)
Accumulated other comprehensive income	576	712
Total shareholders' equity	30,129	17,488
Total liabilities and shareholders' equity	\$30,395	\$17,614

See Notes to Consolidated Financial Statements.

(table of contents) 41

## SOLITARIO ZINC CORP.

## CONSOLIDATED STATEMENTS OF OPERATIONS

FOR THE YEARS ENDED DECEMBER 31, 2017 AND 2016

(in thousands, except share and per share amounts)	For the year ended	
	2017	2016
Costs, expenses and other		
Exploration expense	\$699	\$628
Depreciation and amortization	13	5
General and administrative	1,202	2,163
Property abandonment and impairment	—	13
Total costs, expenses and other	1,914	2,809
Other (expense) income		
Interest expense and dividend income (net)	123	44
Gain on sale of marketable equity securities	578	40
Gain on derivative instruments	271	672
Loss on sale of assets	—	(14 )
Gain on warrant liability	—	4
Total other income (expense)	972	746
Loss before income tax	(942 )	(2,063 )
Income tax benefit	—	353
Net income (loss)	\$(942 )	\$(1,710 )
Income (loss) per common share		
basic and diluted	\$(0.02 )	\$(0.04 )
Weighted average shares outstanding		
Basic and diluted	47,990	38,906

See Notes to Consolidated Financial Statements.

[\(table of contents\)](#) 42

SOLITARIO ZINC CORP.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

FOR THE YEARS ENDED DECEMBER 31, 2017 AND 2016

(in thousands of U.S. Dollars)	For the year ended December 31,	
	2017	2016
Net loss for the period, before other comprehensive loss	\$(942 )	\$(1,710)
Other comprehensive loss :		
Unrealized gain (loss) on marketable equity securities, net of deferred taxes	(136 )	601
Comprehensive loss	\$(1,078)	\$(1,109)

See Notes to Consolidated Financial Statements.

(table of contents) 43



## SOLITARIO ZINC CORP.

## CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

FOR THE YEARS ENDED DECEMBER 31, 2017 AND 2016

(in thousands, of U.S. Dollars except share amounts)	Common Stock		Additional	Accumulated	Accumulated	Total
	Shares	Amount	Paid-in Capital	Deficit	Other Comprehensive Income	Shareholders' Equity
Balance at December 31, 2015	39,169,189	\$ 392	\$ 55,063	\$ (37,691 )	\$ 111	\$ 17,875
Stock option expense	—	—	970	—	—	970
Repurchase of shares for cancellation	(475,600 )	(5 )	(243 )			(248 )
Net loss	—	—	—	(1,710 )	—	(1,710 )
Net unrealized gain on marketable equity securities (net of deferred taxes)	—	—	—	—	601	601
Balance at December 31, 2016	38,693,589	\$ 387	\$ 55,790	\$ (39,401 )	\$ 712	\$ 17,488
Issuance of shares - Acquisition	19,788,177	198	13,456			13,654
Stock issuance costs - Acquisition			(117 )			(117 )
Replacement options	—	—	164	—	—	164
Stock option expense	—	—	50	—	—	50
Repurchase of shares for cancellation	(47,200 )	(1 )	(31 )			(32 )
Net loss	—	—	—	(942 )	—	(942 )
Net unrealized gain on marketable equity securities (net of deferred taxes)	—	—	—	—	(136 )	(136 )
Balance at December 31, 2017	58,434,566	584	\$ 69,312	\$ (40,343 )	\$ 576	\$ 30,129

See Notes to Consolidated Financial Statements.

[\(table of contents\)](#) 44

## SOLITARIO ZINC CORP.

## CONSOLIDATED STATEMENTS OF CASH FLOWS

FOR THE YEARS ENDED DECEMBER 31, 2017 AND 2016

(in thousands of U.S. Dollars)	For the year ended December 31,	
	2017	2016
Operating activities:		
Net loss	\$(942 )	\$(1,710 )
Adjustments to reconcile net loss to net cash used in operating activities:		
(Gain) loss on asset and equity security sales	(578 )	(26 )
Gain on derivative instruments	(271 )	(672 )
Employee stock option expense	50	970
Depreciation and amortization	13	5
Property abandonment and impairment	—	13
Deferred income taxes	—	(353 )
Gain on warrant liability	—	(4 )
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	52	(7 )
Accounts payable and other current liabilities	18	(51 )
Net cash (used in) operating activities	(1,658 )	(1,835 )
Investing activities:		
Sale (purchase) of short-term investments - net	3,563	(15,272)
Loan to Zazu	(1,500 )	—
Purchase of Zazu, net of cash acquired	(417 )	—
Purchase of marketable equity securities	(578 )	(304 )
Proceeds from sale of marketable equity securities	666	56
Sale of derivative instrument, net	53	45
Additions to other assets	(2 )	(1 )
Purchase of mineral property	—	(40 )
Net cash provided by (used in) investing activities	1,785	(15,516)
Financing activities:		
Repurchase of Solitario common stock for cancellation	(32 )	(248 )
Net cash used in financing activities	(32 )	(248 )
Net (decrease) increase in cash and cash equivalents	95	(17,599)
Cash and cash equivalents, beginning of year	119	17,718
Cash and cash equivalents, end of year	\$214	\$119
Supplemental disclosure of non-cash activities:		
Additions to mining equipment -Zazu, through issuance of stock in Acquisition	\$(100 )	\$—
Additions to mineral property- Zazu, through issuance of stock in Acquisition	\$(15,611)	\$—

Edgar Filing: SOLITARIO ZINC CORP. - Form 10-K

Additions to current assets, net – Zazu, through issuance of stock in Acquisition	\$(42 )	\$—
Issuance of common stock – Zazu acquisition	\$13,654	\$—
Convertible debenture – due from Zazu cancelled	\$1,510	\$—
Asset retirement obligation - Lik	\$125	\$—
Issuance of replacement options – Zazu	\$164	\$—
Transfer of warrant value to marketable equity securities on exercise of Vendetta Warrants	\$949	\$—

See Notes to Consolidated Financial Statements.

(table of contents) 45

SOLITARIO ZINC CORP.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

For the years ended December 31, 2017 and 2016

1. Business and Summary of Significant Accounting Policies

*Business and company formation*

Solitario Zinc Corp. (formerly Solitario Exploration & Royalty Corp., “Solitario,” “Company”) is an exploration stage company as defined in Industry Guide 7, as issued by the United States Securities and Exchange Commission (“SEC”). Solitario was incorporated in the state of Colorado on November 15, 1984 as a wholly-owned subsidiary of Crown Resources Corporation (“Crown”). In July 1994, Solitario became a publicly traded company on the Toronto Stock Exchange (the “TSX”) through its initial public offering. Solitario has been actively involved in mineral exploration since 1993. Solitario’s primary business is to acquire exploration mineral properties or royalties and/or discover economic deposits on its mineral properties and advance these deposits, either on its own or through joint ventures, up to the development stage. At that point, or sometime prior to that point, Solitario would likely attempt to sell its mineral properties, pursue their development either on its own, or through a joint venture with a partner that has expertise in mining operations, or create a royalty with a third party that continues to advance the property. As a result of the Acquisition (defined below under “Recent Developments”), Solitario is now primarily focused on the acquisition and exploration of zinc-related exploration mineral properties. In addition to focusing on its mineral exploration properties and the evaluation of mineral properties for acquisition or purchase of royalty interests, Solitario also evaluates potential strategic corporate transactions for the potential acquisition of new precious and base metal properties and assets with exploration potential or business combinations that Solitario determines to be favorable to Solitario.

Solitario has recorded revenue in the past from the sale of mineral property, including the sale of its former interest in Mount Hamilton LLC (“MHLLC”) the owner of its former Mt. Hamilton project (the “Mt. Hamilton Transaction”), and joint venture property payments and the sale of a royalty on its former Mt. Hamilton project. Revenues from the sale or joint venture of properties, although significant when they occur, have not been a consistent annual source of revenue and would only occur in the future, if at all, on an infrequent basis.

Solitario currently considers its carried interest in the Florida Canyon project and its interest in the Lik project (acquired in the Acquisition) to be its core mineral property assets. Solitario’s joint venture partner is expected to continue the development and furtherance of the Florida Canyon project and Solitario will monitor progress at Florida Canyon. Solitario is currently evaluating the exploration and development plans for the Lik project.

As of December 31, 2017, Solitario has significant balances of cash and short-term investments that Solitario anticipates using, in part, to further the development of the Lik project and to potentially acquire additional mineral property assets. The fluctuations in precious metal and other commodity prices has contributed to a challenging environment for mineral exploration and development, which has created opportunities as well as challenges for the potential acquisition of early-stage and advanced mineral exploration projects or other related assets at potentially attractive terms.

*Financial reporting*

The consolidated financial statements include the accounts of Solitario and its wholly-owned subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation. The consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States of America ("generally accepted accounting principles"), and are expressed in US dollars.

(table of contents) 46

*Recent developments*Purchase of Zazu

On July 12, 2017, Solitario completed the acquisition of Zazu Metals Corp. ("Zazu") pursuant to a definitive arrangement agreement between Solitario and Zazu (the "Arrangement Agreement") whereby Solitario agreed to acquire all of the issued and outstanding common shares of Zazu (the "Zazu Shares") by way of a statutory plan of arrangement (the "Arrangement") under the *Canada Business Corporations Act* (the "Acquisition"). The Arrangement was approved by the Ontario (Canada) Superior Court of Justice on July 7, 2017. Per the Arrangement, Solitario issued 19,788,177 shares of its common stock on July 12, 2017 in exchange for all of the issued and outstanding Zazu Shares, which represented 0.3572

shares of Solitario common stock for each outstanding Zazu Share. Solitario granted stock options to acquire an aggregate of 1,782,428 shares of Solitario common stock to Zazu option holders the ("Replacement Options") in connection with the Acquisition. The total purchase price of \$16,110,000, recorded during the year ended December 31, 2017, is detailed below. Results of operations for Zazu are included in Solitario's consolidated financial statements from the date of the Acquisition.

(in thousands)	July 12, 2017
Issuance of 19,788,177 shares of Solitario common stock	\$13,654
Replacement options	164
Investment banking and transaction costs	782
Convertible debenture due Solitario, cancelled	1,510
Total purchase price	\$16,110

The Acquisition was treated as an asset purchase in accordance with Accounting Standards Update ("ASU") No. 2017-01, "Business Combinations," ("ASU 2017-01"). Solitario adopted the provisions of ASU 2017-01 during the year ended December 31, 2017, which provides guidance on the classification of the treatment of business acquisitions as either the purchase of an asset or the purchase of a business. See "Recent Accounting Pronouncements, below. Accordingly, as the purchase of an asset (essentially the interest in the Lik project in Alaska) Solitario capitalized related transaction costs associated with the Acquisition, including the following costs:

(in thousands)	July 12, 2017
Investment banking fees	\$552
Legal and accounting costs	196
Other costs and fees	34
Total capitalized transaction costs	\$782

The purchase price was allocated to the assets and liabilities acquired from Zazu on the date of the Acquisition as follows:

(in thousands)	July 12, 2017
Cash	\$974
Other current assets	42
Equipment	100
Mineral property	15,611
Accounts payable	(492 )
Asset retirement obligation – Lik	(125 )
Total purchase price	\$16,110

The cash transaction costs less the cash acquired are shown as the cash transaction costs for the year ended December 31, 2017 on the consolidated statement of cash flows. Solitario also incurred stock issuance costs of \$117,000, related to the Acquisition, which were charged to equity.

#### Name Change to Solitario Zinc Corp.

Solitario shareholders voted at an annual meeting of shareholders held on June 29, 2017 in favor of an amendment to Solitario’s Articles of Incorporation to change Solitario’s name to “Solitario Zinc Corp.” from “Solitario Exploration & Royalty Corp.” The name change was subject to the completion of the Acquisition and became effective on July 17, 2017.

#### Convertible Debenture Financing

On April 26, 2017, concurrent with the signing of the Arrangement Agreement, Solitario provided Zazu interim debt financing through a secured convertible debenture issued by Zazu in the principal amount of US\$1.5 million (the "Debenture"). Upon completion of the Acquisition, the Debenture, including accrued interest, was cancelled.

(table of contents) 47

*Revenue recognition*

Solitario records delay rental payments as revenue in the period received. Any payments received for the sale of property interests are recorded as a reduction of the related property's capitalized cost. Proceeds which exceed the capitalized cost of the property without reserves are recognized as revenue. Payments received on the sale of properties with reserves are recognized as revenue to the extent the proceeds exceed the proportionate basis in the assets sold. There were no delay rental payments in either 2017 or 2016.

*Use of estimates*

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates. Some of the more significant estimates included in the preparation of Solitario's financial statements pertain to: (i) Solitario's carrying value of short-term investments; (ii) the recoverability of mineral properties related to its mineral exploration properties and their future exploration potential; (iii) the fair value of stock option grants to employees; (iv) the ability of Solitario to realize its deferred tax assets; and (v) Solitario's investment in marketable equity securities.

In performing its activities, Solitario has incurred certain costs for mineral properties. The recovery of these costs is ultimately dependent upon the sale of mineral property interests or the development of economically recoverable ore reserves and the ability of Solitario to obtain the necessary permits and financing to successfully place the properties into production, and upon future profitable operations, none of which is assured.

*Cash and cash equivalents*

Cash equivalents include investments in highly liquid money-market securities with original maturities of three months or less when purchased. As of December 31, 2017, approximately \$168,000 of Solitario's cash and cash equivalents are held in brokerage accounts and foreign banks, which are not covered under the Federal Deposit Insurance Corporation ("FDIC") rules for the United States.

*Short-term investments*



As of December 31, 2017, Solitario has \$10,395,000 of Solitario's current assets in United States Treasury securities ("USTS") with maturities of 15 days to eighteen months. The USTS are recorded at their fair value, based upon quoted market prices. As of December 31, 2017 Solitario has \$1,247,000 in separate bank certificates of deposit ("CDs") each with a maximum value of \$250,000, and each of which are covered by Federal Deposit Insurance Corporation insurance to the full face value of the CDs. At December 31, 2017, the CDs have maturities of between seven and fifteen months. Solitario's short-term investments are recorded at their fair value, based upon quoted market prices. The short-term investments are highly liquid and may be sold in their entirety at any time at their quoted market price and are classified as a current asset.

### *Mineral properties*

Solitario expenses all exploration costs incurred on its mineral properties prior to the establishment of proven and probable reserves through the completion of a feasibility study. Initial acquisition costs of its mineral properties are capitalized. Solitario regularly performs evaluations of its investment in mineral properties to assess the recoverability and/or the residual value of its investments in these assets. All long-lived assets are reviewed for impairment whenever events or circumstances change which indicate the carrying amount of an asset may not be recoverable, utilizing established guidelines based upon undiscounted future net cash flows from the asset or upon the determination that certain exploration properties do not have sufficient potential for economic mineralization.

### *Derivative instruments*

Solitario accounts for its derivative instruments in accordance with ASC 815, "Accounting for Derivative Instruments and Hedging Activities" ("ASC 815"). Solitario acquired its investment in Vendetta Mining Corp. ("Vendetta") units, including the Vendetta Warrants (defined below) during 2016. During 2017, Solitario exercised all of its Vendetta Warrants and at December 31, 2017 has no Vendetta Warrants. Solitario classified the Vendetta Warrants as derivative instruments under ASC 815 and recorded the Vendetta Warrants at their fair value as other assets on the consolidated balance sheet at December 31, 2016. Changes in fair value of the Vendetta Warrants are recognized in the statement of operations in the period of change as gain or loss on derivative instruments. Solitario has entered into covered calls from time to time on its investment in Kinross marketable equity securities. Solitario has not designated its covered calls as hedging instruments and any changes in the fair value of the covered calls and its warrants are recognized in the statement of operations in the period of the change as gain or loss on derivative instruments.

(table of contents) 48

*Fair value*

FASB ASC 820, "Fair Value Measurements and Disclosures" ("ASC 820") establishes a framework for measuring fair value and requires enhanced disclosures about fair value measurements. ASC 820 clarifies that fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. For certain of Solitario's financial instruments, including cash and cash equivalents and accounts payable, the carrying amounts approximate fair value due to their short-term maturities. Solitario's short-term investments in USTS and CDs, its marketable equity securities and any covered call options against those marketable equity securities are carried at their estimated fair value based on quoted market prices. Solitario's investment in the Vendetta Warrants, at December 31, 2016 was carried at fair value as determined by a Black-Scholes model. See Note 7, "Fair Value of Financial Instruments," below.

*Marketable equity securities*

Solitario's investments in marketable equity securities are classified as available-for-sale and are carried at fair value, which is based upon quoted prices of the securities owned. Solitario records investments in marketable equity securities as available-for-sale for investments in publicly traded marketable equity securities for which it does not exercise significant control and where Solitario has no representation on the board of directors of those companies and exercises no control over the management of those companies. The cost of marketable equity securities sold is determined by the specific identification method. Changes in fair value are recorded in accumulated other comprehensive income (loss) within shareholders' equity, unless a decline in fair value is considered other than temporary, in which case the decline is recognized as a loss in the consolidated statements of operations.

*Foreign exchange*

The United States dollar is the functional currency for all of Solitario's foreign subsidiaries. Although Solitario's South American exploration activities during 2017 and 2016 were conducted primarily in Peru, a portion of the payments for the land, leasehold and exploration agreements as well as certain exploration activities are denominated in United States dollars. Foreign currency gains and losses are included in the results of operations in the period in which they occur.

*Income taxes*

Solitario accounts for income taxes in accordance with ASC 740, "Accounting for Income Taxes" ("ASC 740"). Under ASC 740, income taxes are provided for the tax effects of transactions reported in the financial statements and consist of taxes currently due plus deferred taxes related to certain income and expenses recognized in different periods for financial and income tax reporting purposes. Deferred tax assets and liabilities represent the future tax return consequences of those differences, which will either be taxable or deductible when the assets and liabilities are recovered or settled. Deferred taxes are also recognized for operating losses and tax credits that are available to offset future taxable income and income taxes, respectively. A valuation allowance is provided if it is more likely than not that some portion or all of the deferred tax assets will not be realized.

*Accounting for uncertainty in income taxes*

ASC 740 clarifies the accounting for uncertainty in income taxes recognized in a company's financial statements. ASC 740 prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. ASC 740 also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods, disclosure, and transition. ASC 740 provides that a company's tax position will be considered settled if the taxing authority has completed its examination, the company does not plan to appeal, and it is remote that the taxing authority would reexamine the tax position in the future. These provisions of ASC 740 had no effect on Solitario's financial position or results of operations. See Note 5, "Income Taxes," below.

*Earnings per share*

The calculation of basic and diluted earnings (loss) per share is based on the weighted average number of shares of common stock outstanding during the years ended December 31, 2017 and 2016. Potentially dilutive shares, consisting of

outstanding common stock options for 1,982,428 Solitario common shares, were excluded from the calculation of diluted earnings (loss) per share for the year ended December 31, 2017 because the effects were anti-dilutive. There were no similar potentially dilutive option securities outstanding at December 31, 2016, and accordingly there were no effects of potentially dilutive shares for the year ended December 31, 2016.

(table of contents) 49

*Employee stock compensation and incentive plans*

Solitario classifies all of its stock options as equity options in accordance with the provisions of ASC 718, “Compensation – Stock Compensation.” See Note 9, “Employee Stock Compensation Plans,” below.

*Recent accounting pronouncements*

In May 2014, the FASB issued Accounting Standards Update (“ASU”) 2014-09, *Revenue from Contracts with Customers (Topic 606)*, (“ASU No. 2014-09”), which amended the existing accounting standards for revenue recognition. ASU No. 2014-09 establishes principles for recognizing revenue upon the transfer of promised goods or services to customers, in an amount that reflects the expected consideration received in exchange for those goods or services. In July 2015, the FASB deferred the effective date for annual reporting periods beginning after December 15, 2017. The amendments may be applied retrospectively to each prior period (full retrospective) or retrospectively with the cumulative effect recognized as of the date of initial application (modified retrospective). Solitario will adopt ASU 2014-09 in the first quarter of 2018 and apply the full retrospective approach and does not expect the impact on its consolidated financial statements to be material.

In February 2016, the FASB issued ASU 2016-02, “Leases” (“ASU No. 2016-02”), which will require lessees to recognize a right-of-use asset and a lease liability for all leases that are not short-term in nature. For a lessor, the accounting applied is also largely unchanged from previous guidance. The new rules will be effective for Solitario in the first quarter of 2019. Solitario does not anticipate early adoption. Solitario does not expect the adoption of ASU No. 2016-02 to materially change its current accounting methods and therefore it does not expect the adoption to have a material impact on its consolidated financial position or results of operations.

In January 2016 the FASB issued ASU No 2016-01, *Financial Instruments – Recognition and Measurement of Financial Assets and Financial Liabilities (Topic 825)* (“ASU No. 2016-01”). ASU No. 2016-01 revises the classification and measurement of investment in certain equity investments and the presentation of certain fair value changes for certain financial liabilities measured at fair value. ASU No. 2016-01 requires the change in fair value of many equity investments to be recognized in net income. ASU No. 2016-01 is effective for interim and annual periods beginning after December 15, 2017, with early adoption permitted. Solitario will adopt ASU No. 2016-01 in the first quarter of 2018 which may result in a cumulative effect adjustment to the consolidated statement of equity retained earnings as of the beginning of the year in 2018. Solitario is evaluating the new guidance and has not determined the impact of ASU No. 2016-01 on its consolidated financial statements.

In March 2016, the FASB issued Accounting Standards Update (“ASU”) 2016-09, “Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting” (“ASU 2016-09”), which simplifies several aspects of the accounting for share-based payment award transactions including accounting for income taxes and classification of excess tax benefits on the statement of cash flows, forfeitures and minimum statutory tax withholding requirements. ASU 2016-09 is effective for annual periods beginning after December 15, 2016, and interim periods

within those annual periods. The adoption of ASU 2016-09 in 2017 did not materially change the Solitario's previous accounting methods and therefore did not have a material impact on Solitario's consolidated financial position or results of operation.

On January 5, 2017, the Financial Accounting Standards Board issued ASU 2017-01. ASU 2017-01 clarified the definition of the acquisition of a business or an asset under Accounting Codification Standard 805 ("ASC 804"). ASU 2017-10 utilizes a series of tests or screens to determine if a business combination is the acquisition of a single identifiable asset or of a business. Under the definition of ASU 2017-01, the Acquisition would fall under the classification of the acquisition of an asset. ASU 2017-01 is effective for fiscal years beginning after December 15, 2017, with early adoption permitted. Solitario adopted the provisions of ASU 2017-01 during 2017, and has accounted for the Acquisition in accordance with the provisions of ASU 2017-01. The adoption of ASU 2017-01 had no other effect on Solitario's consolidated financial position.

In February 2018, the FASB issued ASU No. 2018-02, "Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income." ASU 2018-02 allows for a reclassification from accumulated other comprehensive income or loss to retained earnings or accumulated deficit for stranded tax effects resulting from the Tax Cuts and Jobs Act of 2017

("TCJA"). ASU 2018-02 also requires certain related disclosures. ASU 2018-02 is effective for annual periods, and interim periods within those annual periods, beginning after December 15, 2018 and should be applied either in the period of adoption or retrospectively to each period in which the effect of the change in the U.S. federal corporate income tax rate in the TCJA is recognized. Early adoption is permitted. The Solitario is currently evaluating the impact of ASU 2018-02 but does not believe it will have a material effect on the Solitario's financial position or results of operations.

(table of contents) 50

## 2. Mineral Properties:

The following table details Solitario's capitalized investment in exploration mineral property:

(in thousands)	December 31,	
	2017	2016
Exploration		
Lik project (Alaska – US)	\$15,611	\$—
La Promesa (Peru)	6	6
Montana Royalty property (US)	40	40
Total exploration mineral property	\$15,657	\$46

### *Exploration property*

Solitario's exploration mineral properties at December 31, 2017 and 2016 consist of use rights related to its exploration properties, and the value of such assets is primarily driven by the nature and amount of economic mineral ore believed to be contained, or potentially contained, in such properties. The amounts capitalized as mineral properties include concession and lease or option acquisition costs. Capitalized costs related to a mineral property represent its fair value at the time it was acquired. At December 31, 2017, none of Solitario's exploration properties have production (are operating) or contain proven or probable reserves. Solitario's exploration mineral properties represent interests in properties that Solitario believes have exploration and development potential. Solitario's mineral use rights generally are enforceable regardless of whether proven and probable reserves have been established. Solitario acquired the Lik project during 2017 in the Acquisition; see Note 1 "Recent Developments" above.

In addition to its capitalized exploration properties, Solitario has an interest in its Florida Canyon exploration concession, which is currently subject to a joint venture agreement where joint venture partners made stand-by joint venture payments to Solitario prior to January 1, 2015. Solitario recorded joint venture property payment revenue received in excess of capitalized costs. Per the joint venture agreement, as of December 31, 2017, no further stand-by joint-venture payments are due to Solitario on the Florida Canyon project. At December 31, 2017 and 2016, Solitario has no remaining capitalized costs related to its Florida Canyon joint venture.

Solitario previously sold its mineral interests in its Yanacocha exploration projects and retained a royalty interest. Solitario has no capitalized costs related to its Yanacocha royalty interest. During the year ended December 31, 2016, Solitario acquired certain net smelter royalties on non-producing exploration leases in Montana previously owned by Atna Resources, Ltd. for \$40,000.

*Discontinued projects*

During 2017, Solitario abandoned its interests in the Aconchi and Norcan exploration properties in Mexico and Solitario no longer holds any interest in those properties. However, there were no capitalized mineral property costs related to these properties and Solitario did not record any mineral property write-downs during the year ended December 31, 2017.

During 2016, Solitario closed its exploration office in Mexico. Solitario recorded a mineral property write-down of \$10,000 related to the Norcan and Aconchi properties during 2016. During 2016, Solitario abandoned its interest in its Canta Colorado property in Peru and recorded a mineral property write-down expense of \$3,000 related to Canta Colorado. In addition, Solitario recorded a loss on other assets in Mexico of \$14,000 related to the cessation of its exploration activities in Mexico during 2016.

(table of contents) 51

*Exploration Expense*

The following items comprised exploration expense:

	For the year ended December 31,	
(in thousands)	2017	2016
Geologic and field expenses	\$447	\$537
Administrative	252	91
Total exploration expense	\$699	\$628

Asset Retirement Obligation

In connection with the Acquisition, Solitario recorded an asset retirement obligation of \$125,000 for Solitario's estimated reclamation cost of the existing disturbance at the Lik project. This disturbance consists of an exploration camp including certain drill sites and access roads at the camp. The estimate was based upon estimated cash costs for reclamation as determined by the permitting bond required by the State of Alaska, for which Solitario has purchased a reclamation bond insurance policy in the event Solitario or its 50% partner, Teck, do not complete required reclamation.

Solitario has not applied a discount rate to the recorded asset retirement obligation as the estimated time frame for reclamation is not currently known, as reclamation is not expected to occur until the end of the Lik project life, which would follow future development and operations, the start of which cannot be estimated or assured at this time. Additionally, no depreciation will be recorded on the related asset for the asset retirement obligation until the Lik project goes into operation, which cannot be assured.

3. Marketable Equity Securities

On May 2, 2016, Solitario purchased 7,240,000 units of Vendetta for aggregate consideration of \$289,000. Each unit included one common share of Vendetta and one purchase warrant which allow the holder to purchase one share of Vendetta common stock at a price of Cdn\$0.10 per share for a period of two years (the "Vendetta Warrants"). The purchase price of the units of \$289,000 was allocated between the Vendetta common shares and the Vendetta



Warrants based upon total fair values on the date of purchase. The Vendetta common stock was allocated a purchase cost of \$186,000 and the Vendetta Warrants were allocated a purchase cost of \$103,000. As discussed below, during 2017 Solitario exercised all of its Vendetta Warrants, and sold 3,480,000 shares of Vendetta common stock. As of December 31, 2017, Solitario owns 11,000,000 shares of Vendetta common stock which are carried at their fair value based upon the quoted market price of Vendetta, a publicly traded company on the TSX venture exchange, and included in marketable equity securities. .

The following tables summarize Solitario's marketable equity securities and accumulated other comprehensive income related to its marketable equity securities:

(in thousands)	December 31,	
	2017	2016
Marketable equity securities at fair value	\$2,643	\$1,339
Cost	1,714	274
Accumulated other comprehensive income for unrealized holding gains	929	1,065
Deferred taxes on accumulated other comprehensive income for unrealized holding gains	353	353
Accumulated other comprehensive income	\$576	\$712

(table of contents) 52

The following table represents changes in marketable equity securities:

(in thousands)	Year ended	
	December	
	31,	
	2017	2016
Gross cash proceeds from sales	\$666	\$56
Cost	88	16
Gross gain (loss) on sale included in earnings during the period	578	40
Deferred taxes on gross gain on sale included in earnings	(214)	(15)
Reclassification adjustment to unrealized gain in other comprehensive income for net (gain) loss included in earnings	(364)	(25)
Gross unrealized holding gain (loss) arising during the period included in other comprehensive income (loss)	442	994
Deferred taxes on unrealized holding losses included in other comprehensive (income) loss	(214)	(368)
Net unrealized holding gain	228	626
Other comprehensive income from marketable equity securities	\$(136)	\$601

During 2017, Solitario sold 3,480,000 Vendetta common shares, for cash proceeds of \$666,000. In addition, during 2017, Solitario exercised its Vendetta Warrants, also discussed below in Note 4, "Other assets" and received 7,240,000 common shares of Vendetta. Solitario transferred the fair value of the Vendetta Warrants on the date of exercise of \$949,000, along with the cash paid to exercise the Vendetta Warrants of \$578,000 to marketable equity securities as the cost of the 7,240,000 common shares of Vendetta acquired.

#### 4. Other Assets:

The following items comprised other assets:

(in thousands)	December	
	31,	
	2017	2016
Furniture and fixtures, net of accumulated depreciation	\$31	\$32
Lik project equipment, net of accumulated depreciation	90	-
Exploration bonds and other assets	4	4
Vendetta Warrants	—	735
Total other assets	\$125	\$771

During 2017, Solitario acquired \$100,000 of exploration-related equipment at the Lik project as part of the Acquisition. See Note 1, “Recent developments” above. The equipment is being depreciated over a five-year life on a straight-line basis and Solitario recorded depreciation expense of \$10,000 during 2017 related to this equipment.

During 2017, Solitario exercised 7,240,000 of its Vendetta Warrants and received 7,240,000 Vendetta common shares, by paying \$578,000 in cash to Vendetta. As a result, as of December 31, 2017, Solitario no longer owns any Vendetta Warrants. Upon the exercise of the Vendetta Warrants, Solitario transferred the fair value of the Vendetta Warrants on the date of exercise of \$949,000 along with the cash paid to exercise the Vendetta Warrants of \$578,000 to marketable equity securities as the cost of the 7,240,000 common shares of Vendetta acquired. During the year ended December 31, 2017 and 2016, Solitario recorded a gain on derivative instruments of \$216,000 and \$629,000, respectively, related to the Vendetta Warrants; see Note 6, “Derivative Instruments,” below.

5. Income Taxes:

Solitario's income tax expense (benefit) consists of the following as allocated between foreign and United States components:

(in thousands)	2017	2016
Current:		
Federal	\$ —	\$ —
State	—	—
Foreign	—	—
Deferred:		
Federal	—	(309)
State	—	(44 )
Foreign	—	—
Income tax (benefit) expense	\$ —	\$(353)

(table of contents) 53

Income tax (benefit) expense is included in the financial statements as follows:

(in thousands)	2017	2016
Income tax (benefit), Operations	\$ —	\$(353)
Income tax expense, Other Comprehensive Income	\$ —	353

Consolidated loss before income taxes includes losses from foreign operations of \$322,000 and \$154,000 in 2017 and 2016, respectively.

See Note 3, “Marketable Equity Securities,” for detail of the deferred taxes associated with the sale of marketable equity securities and the deferred taxes associated with unrealized gains and losses associated with other comprehensive income related to marketable equity securities.

The net deferred tax assets/liabilities in the December 31, 2017 and 2016 consolidated balance sheets include the following components:

(in thousands)	2017	2016
Deferred tax assets:		
Loss carryovers	\$12,178	\$8,168
Investment in Mineral Property	1,952	—
Capitalized Exploration Costs	1,205	—
Stock option compensation expense	13	—
Royalty	989	1,482
Unrealized loss on derivative securities	28	—
Other	135	105
Valuation allowance	(16,249)	(9,118)
Total deferred tax assets	251	637
Deferred tax liabilities:		
Unrealized gain on derivative securities	—	196
Unrealized gains on marketable equity securities	230	395
Other	21	46
Total deferred tax liabilities	251	637
Net deferred tax liabilities	\$—	\$—

A reconciliation of expected federal income taxes on income (loss) from continuing operations at statutory rates, with the expense for income taxes is as follows:

(in thousands)	2017	2016
Expected income tax benefit	\$(355 )	\$(701 )
Equity based compensation	—	366
Foreign tax rate differences	17	6
State income tax	(27 )	(237 )
Impact of Tax Legislation	4,494	—
Tax attributes of disposed subsidiary	—	1,652
Previously unrecognized basis in disposed subsidiary	—	(1,884)
Change in valuation allowance	(4,120)	547
Permanent differences and other	(9 )	(102 )
Income tax (benefit) expense	\$—	\$(353 )

(table of contents) 54

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 (the “Tax Act”) was signed into law making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a federal corporate tax rate decrease from 35% to 21% for tax years beginning after December 31, 2017, the transition of U.S international taxation from a worldwide tax system to a territorial system, and a one-time transition tax on the mandatory deemed repatriation of foreign earnings. Solitario estimated its provision for income taxes in accordance with the Tax Act and guidance available as of the date of this filing. In accordance with ASC 740, Income Taxes, the impact of a change in tax law is recorded in the period of enactment. Consequently, Solitario has recorded a decrease to its net deferred tax assets of \$4,494,000 with a corresponding net adjustment to the valuation allowance for the year ended December 31, 2017.

While the Tax Act provides for a territorial tax system, beginning in 2018, it includes two new U.S. tax base erosion provisions, the global intangible low-taxed income (“GILTI”) provisions and the base-erosion and anti-abuse tax (“BEAT”) provisions.

The GILTI provisions require the Company to include in its U.S. income tax return foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary’s tangible assets. The Company currently has no profitable foreign subsidiaries. Therefore, this provision currently has no impact on the Company.

The BEAT provisions in the Tax Act eliminates the deduction of certain base-erosion payments made to related foreign corporations, and impose a minimum tax if greater than regular tax. The Company does not expect it will be subject to this tax and therefore has not included any tax impacts of BEAT in its consolidated financial statements for the year ended December 31, 2017.

Based on Solitario’s current interpretation and subject to the release of the related regulations and any future interpretive guidance, Solitario believes the effects of the change in tax law incorporated herein are substantially complete. Additional information that may affect our income tax accounts and disclosures would include further clarification and guidance on how the Internal Revenue Service will implement tax reform, further clarification and guidance on how state taxing authorities will implement tax reform and the related effect on our state income tax returns, completion of our 2017 tax return filings, and the potential for additional guidance from the FASB and SEC related to tax reform.

As a result of the acquisition of Zazu Metals Corporation, Solitario acquired deferred tax assets totaling \$11,202,000 primarily related to US federal and state net operating losses, mineral properties and exploration costs, and Canadian net operating losses. These deferred tax assets were fully offset by a valuation allowance, as the Solitario does not believe it is more likely than not that the assets will be utilized in the future. As a result of the ownership change of Zazu Metals (Alaska) Corp, utilization of its United States Federal and State of Alaska net operating losses will be limited due to the annual limitation provided by Section 382 of the Internal Revenue Code.

During 2017, the valuation account was increased primarily due to the acquisition of Zazu Metals Corporation and the impact of the Tax Act. During 2016, the valuation allowance was decreased primarily due to the removal of deferred tax assets related to abandoned properties in Mexico.

During 2017 and 2016, Solitario recorded other comprehensive (loss) income before income tax in the amounts of \$(136,000) and \$954,000, respectively. In 2017 and 2016 Solitario recognized an income tax benefit (expense) of nil and \$(353,000), respectively, in other comprehensive income (loss) with an offsetting income tax expense (benefit), respectively in the statement of operations. A valuation allowance was provided for the deferred tax assets from losses in both other comprehensive income and the statement of operations during 2017.

At December 31, 2017, Solitario has unused US Federal Net Operating Loss ("NOL") carryovers of \$10,914,000 and unused US State NOL carryovers of \$11,338,000 which begin expiring in 2027. Solitario has unused Capital Loss carryovers of \$11,879,000 for US Federal and US State purposes which begin expiring in 2019. Solitario has Canadian loss carryforwards of \$12,192,000 which begin expiring in 2026. Other foreign loss carryforwards for which Solitario has provided a full valuation allowance related to Solitario's exploration activities in Peru. The Peru losses do not expire.

Solitario adopted ASC 740, which prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. ASC 740 requires that Solitario recognize in its consolidated financial statements, only those tax positions that are "more-likely-than-not" of being sustained as of the adoption date, based on the technical merits of the position. As a result of the implementation of ASC 740, Solitario performed a comprehensive review of its material tax positions in accordance with recognition and measurement standards established by ASC 740. The provisions of ASC 740 had no effect on Solitario's financial position, cash flows or results of operations at December 31, 2017 or December 31, 2016, or for the years then ended as Solitario had no unrecognized

tax benefits.

(table of contents) 55

Solitario and its subsidiaries are subject to the following material taxing jurisdictions: United States Federal, State of Colorado, State of Alaska, Canada and Peru. Solitario's United States federal, Canada and State of Alaska returns for years 2014 and forward and Solitario's Peru and State of Colorado returns for tax years 2013 and forward are subject to examination. Solitario's policy is to recognize interest and penalties related to uncertain tax benefits in income tax expense. Solitario has no accrued interest or penalties related to uncertain tax positions as of December 31, 2017, or December 31, 2016 or for the years then ended

6. Derivative Instruments:

*Covered call options*

From time to time Solitario has sold covered call options against its holdings of Kinross. The business purpose of selling covered calls is to provide additional income on a limited portion of shares of Kinross that Solitario may sell in the near term, which is generally defined as less than one year. Solitario has not designated its covered calls as hedging instruments as described in ASC 815, "Derivatives and Hedging," and any changes in the fair value of its covered calls are recognized in the statement of operations in the period of the change. As of December 31 2017, all of the covered calls had expired unexercised and there were no liabilities related to those calls entered during the year. As of December 31, 2016, Solitario had two covered calls against its holdings of Kinross common stock, which had a fair value of \$2,000.

*Vendetta Warrants*

All of the Vendetta Warrants were exercised during 2017 and there is no remaining asset value as of December 31, 2017 for the Vendetta Warrants; see Note 4, "Other Assets" above.

Solitario recorded the following gain on derivative instruments:

(in thousands)	Year ended	
	December 31,	
	2017	2016
Gain on Kinross calls	\$55	\$43
Gain on Vendetta Warrants	216	629
	\$271	\$672

The following table provides the location and amount of the fair values of Solitario's derivative instruments presented in the consolidated balance sheets as of December 31, 2017 and 2016:



	Derivatives	
(in thousands)	Balance Sheet Location	2017 2016
Vendetta warrants	Other assets	\$ — \$735
Kinross calls	Other current liabilities	\$ — \$2

### 7. Fair Value of Financial Instruments:

For certain of Solitario's financial instruments, including cash and cash equivalents, payables and short-term debt, the carrying amounts approximate fair value due to their short maturities. Solitario's marketable equity securities, including its investment in shares of Kinross common stock, Vendetta common stock and TNR Gold Corp (“TNR”) common stock, are carried at their estimated fair value primarily based on publicly available quoted market prices.

Solitario applies ASC 820, "Fair Value Measurements" (“ASC 820”). ASC 820 establishes a framework for measuring fair value and requires enhanced disclosures about fair value measurements. ASC 820 clarifies that fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. ASC 820 also requires disclosure about how fair value is determined for assets and liabilities and establishes a hierarchy for which these assets and liabilities must be grouped, based on significant levels of inputs as follows:

**Level 1:** Quoted prices in active markets for identical assets or liabilities;

**Level 2:** Quoted prices in active markets for similar assets and liabilities and inputs that are observable for the asset or liability; or

**Level 3:** Unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own assumptions.

(table of contents) 56

The determination of where assets and liabilities fall within this hierarchy is based upon the lowest level of input that is significant to the fair value measurement. During the years ended December 31, 2017 and 2016, there were no reclassifications in financial assets or liabilities between Level 1, 2 or 3 categories.

The following is a listing of Solitario's financial assets and liabilities required to be measured at fair value on a recurring basis and where they are classified within the hierarchy as of December 31, 2017:

(in thousands)	Level 1	Level 2	Level 3	Total
Assets				
Marketable equity securities	\$2,643	\$ —	\$ —	\$2,643

The following is a listing of Solitario's financial assets and liabilities required to be measured at fair value on a recurring basis and where they are classified within the hierarchy as of December 31, 2016:

(in thousands)	Level 1	Level 2	Level 3	Total
Assets				
Marketable equity securities	\$1,339	\$—	\$ —	\$1,339
Vendetta Warrants		735		735
Liabilities				
Kinross calls	—	2	—	2

*Items measured at fair value on a recurring basis:*

**Marketable equity securities:** At December 31, 2017 and 2016, the fair value of Solitario's holdings in shares of Vendetta, Kinross, and TNR marketable equity securities and the Kinross calls are based upon quoted market prices.

**Vendetta Warrants:** The Vendetta Warrants are not traded on any public exchange. Solitario determines the fair value of the Vendetta Warrants using a Black-Scholes pricing model, using inputs, including share price, volatility of Vendetta common stock and discount rates that include an assessment of performance risk, that are readily available from public markets; therefore, they are classified as Level 2 inputs as of December 31, 2016.

During the year ended December 31, 2017, Solitario did not change any of the valuation techniques used to measure its financial assets and liabilities at fair value.

8. Commitments and Contingencies:

In acquiring its interests in mineral claims and leases, Solitario has entered into lease agreements, which may be canceled at its option without penalty. Solitario is required to make minimum rental and option payments in order to maintain its interests in certain claims and leases. See Note 2, "Mineral Properties," above. Solitario estimates its 2018 property rentals and option payments, excluding certain earn-in payments discussed below, for properties Solitario owns or operate to be approximately \$322,000. Assuming that Solitario's joint ventures continue in their current status and that Solitario does not appreciably change its property positions on existing properties, approximately \$305,000 of these annual payments are paid or are reimbursable to us by Solitario's joint venture partners. In addition, Solitario may be required to make further payments in the future if it elects to exercise its options under those agreements or if Solitario enters into new agreements.

Solitario has recorded an asset retirement obligation of \$125,000 related to its Lik project in Alaska. See Note 2, "Mineral Properties," above.

Solitario leases office space under a non-cancelable operating lease for the Wheat Ridge, Colorado office which provides for total minimum annual rent payments of \$43,000 through January of 2019.

(table of contents) 57

## 9. Employee Stock Compensation Plans:

### *The 2006 Plan*

On June 27, 2006, Solitario's shareholders approved the 2006 Stock Option Incentive Plan (the "2006 Plan"). Under the terms of the 2006 Plan, the Board of Directors reserved a total of 2,800,000 shares of Solitario common stock for the potential awards to directors, officers and employees with exercise prices equal to the market price of Solitario's common stock

at the date of grant. The 2006 Plan terminated on June 26, 2016, and in accordance with the terms of the 2006 Plan, no additional awards may be made pursuant to the 2006 Plan. There are no outstanding options under the 2006 Plan as of December 31, 2017 or 2016.

#### a.) 2006 Plan stock option grants

The following table shows the grant date fair value of Solitario's only option grant during 2016 from the 2006 Plan as of the date of grant.

#### Grant date fair value

Grant Date	6/22/16	
Option – grant date price (Cdn\$)	\$0.72	
Options granted	350,000	
Expected life years	5.0	
Expected volatility	63	%
Risk free interest rate	1.0	%
Weighted average fair value	\$0.30	
Grant date fair value	\$105,000	

#### b.) 2006 Plan stock option activity

During 2017 and 2016 there were no shares issued from the exercise of options. The following table summarizes the activity for stock options outstanding under the 2006 Plan as of December 31, 2016:

	2016	Weighted Average Exercise Price (Cdn\$)	Aggregate Intrinsic Value(1)
2006 Plan			
Outstanding, beginning of year	40,000	\$ 1.66	
Granted	350,000	\$ 0.72	
Exercised	—	—	
Cancelled/expired (2)	(390,000)	\$ 0.82	
Forfeited	—	—	
Outstanding, end of year	—	—	\$ —
Exercisable, end of year	—	—	\$ —

(1) There were no options outstanding from the 2006 Plan at December 31, 2017 and 2016.

(2) On August 24, 2016, holders of option awards from the 2006 Plan voluntarily cancelled awards for 350,000 options with an option price of Cdn\$.072 with an expiration date of June 21, 2021 and 40,000 options with an option price of Cdn\$1.66 with an expiration date of August 14, 2019. No consideration was given or received by the holders of the options to cancel the awards.

During the years ended December 31, 2016, Solitario recorded \$120,000, of stock option expense under the 2006 Plan for the amortization of the grant date fair value through the date of cancellation and for any unrecognized grant date fair value on the date of cancellation of each of its outstanding options with a credit to additional paid-in-capital.

#### *The 2013 Plan*

On June 18, 2013, Solitario's shareholders approved the Solitario Resources Corporation Omnibus Stock Incentive Plan (the "2013 Plan"). Under the terms of the 2013 Plan, a total of 1,750,000 shares of Solitario common stock are reserved for awards to Directors, officers, employees and consultants. On June 29, 2017, Solitario shareholders approved an amendment to the 2013 Plan, which increased the number of shares of common stock available for issuance under the 2013 Plan from 1,750,000 to 5,750,000. Awards granted under the 2013 Plan may take the form of stock options, stock appreciation rights, restricted stock, and restricted stock units. The terms and conditions of the awards are pursuant to the 2013 Plan and are granted by the Board of Directors or a committee appointed by the Board of Directors.

(table of contents) 58

a.) 2013 Plan stock option grants

The following table shows the grant date fair value of Solitario's awards during 2017 and 2016 pursuant to the 2013 Plan as of the date of grant.

Grant date fair value

Grant Date	7/28/16 (2)(3)	7/12/17 (1)	7/12/17 (1)	7/12/17 (1)	7/12/17 (1)	9/01/17 (2)
Option – grant date price	\$0.72	\$1.74	\$1.52	\$1.30	\$0.54	\$0.77
Options granted	1,699,000	357,200	425,068	785,840	214,320	200,000
Expected life years	5.0	0.84	1.35	1.50	1.50	5.0
Expected volatility	63%	67%	67%	67%	67%	64%
Risk free interest rate	0.9%	1.0%	1.0%	1.0%	1.0%	1.7%
Weighted average fair value	\$0.50	\$0.02	\$0.08	\$0.12	\$0.36	\$0.42
Grant date fair value	\$850,000	\$7,000	\$26,000	\$72,000	\$59,000	\$126,000

Replacement options, discussed above in Note 1 under "Recent Developments." Options had terms of May, 15, 2018, November 15, 2018, January 12, 2019 and January 12, 2019. The Replacement Options were fully vested on the date of grant. Replacement Options were priced in Canadian Dollars, the grant day prices reflect the US Dollar price exchange rate of .07749 Cdn\$/US\$ on the date of grant.

(1) Options grants have a five-year term, and vest 25% on date of grant and 25% on each of the next three anniversary dates.

(2) Options were cancelled on August 24, 2016, as discussed below.

b.) Stock option activity

During 2017 and 2016 no options granted from the 2013 Plan were exercised. The following table summarizes the activity for stock options outstanding under the 2013 Plan as of December 31, 2017 and 2016:

	2017			2016		
	RSUs/ Options	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)	RSUs/ Options	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)
2013 Plan						
Outstanding, beginning of year	-	-	-	-	-	-
Granted	1,982,428	\$ 1.29	-	1,699,000	\$ 0.72	-
Exercised	—	—	—	—	—	—
Cancelled/expired (2)	—	—	—	(1,699,000)	0.94	—
Forfeited	—	—	—	—	—	—
Outstanding, end of year	1,982,428	\$ 1.29	\$ 9,000	—	—	\$ —

Exercisable, end of year	1,832,428	\$ 1.33	\$ 9,000	—	—	\$ —
--------------------------	-----------	---------	----------	---	---	------

(1) Intrinsic value based upon December 31, 2017 price of a share of Solitario common stock as quoted on the NYSE American exchange of \$0.60 per share, with an exchange ratio (for Canadian priced options) of 0.79659 Cdn\$/US\$. There were no options outstanding at December 31, 2016.

(2) On August 24, 2016, holders of option awards from the 2013 Plan voluntarily cancelled awards for 1,699,000 options with an option price of \$.072 with an expiration date of July 27, 2021 to allow Solitario to have additional financial flexibility. No consideration was given or received by the holders of the options to cancel the awards.

During the years ended December 31, 2017 and 2016, Solitario recorded \$50,000 and \$850,000, respectively, of stock option expense under the 2013 Plan for the amortization of the grant date fair value through the date of cancellation and for any unrecognized grant date fair value on the date of cancellation of each of its outstanding options with a credit to additional paid-in-capital.

On September 1, 2017, the Board of Directors granted, subject to shareholder approval at the next meeting of shareholders, an additional 2,300,000 stock options under the 2013 Plan to officers and members of the Board of Directors. These options have a five-year life, and exercise price of \$0.77 per share, and a grant date fair value of \$970,000, based upon a Black-Scholes model with a volatility of 64%, and a risk free interest rate of 1.70%. Although the options will vest on the schedule of 25% on date of grant and 25% on each of the next three anniversary dates of the date of grant, the options will not become exercisable in whole or in part unless Solitario shareholders approve the grants, and the option grants will be void if Solitario shareholders do not approve the grants. Solitario will not record any stock option expense related to these options until the shareholder approval is received.

(table of contents) 59

10. Share Repurchase Program

On October 28, 2015, Solitario's Board of Directors approved a share repurchase program that initially authorized Solitario to purchase up to two million shares of its outstanding common stock. During 2017 Solitario's Board of Directors extended the expiration date of the share repurchase program through December 31, 2018. During the years ended December 31, 2017 and 2016, Solitario purchased 47,200 and 475,600 shares of Solitario common stock, respectively, for an aggregate purchase price of \$32,000 and \$248,000, respectively. As of December 31, 2017, Solitario has purchased a total of 667,800 shares for an aggregate purchase price of \$348,000 under the share repurchase program since its inception.

(table of contents) 60



**Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure**

None

**Item 9A. Controls and Procedures**

The management of Solitario is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(e) of the Exchange Act). During the fiscal period covered by this report, Solitario's management, with the participation of the Chief Executive Officer and Chief Financial Officer, carried out an evaluation of the effectiveness of Solitario's internal control over financial reporting and the design and operation of Solitario's disclosure controls and procedures (as defined in Rule 13a-15(e) of the Exchange Act). This evaluation of the effectiveness of our internal control over financial reporting was based on the framework and criteria established in *Internal Control – Integrated Framework (2013)*, issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on such evaluations, Solitario's Chief Executive Officer and Chief Financial Officer have concluded that, as of December 31, 2017, Solitario's internal control over financial reporting is effective and that its disclosure controls and procedures are effective to ensure that information required to be disclosed by Solitario in reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported within the required time periods and are designed to ensure that information required to be disclosed in its reports is accumulated and communicated to Solitario's management, including the Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure. There were no changes in internal control over financial reporting during the three months ended December 31, 2017.

This Annual Report does not include an attestation report of our independent registered public accounting firm regarding internal control over financial reporting. As a smaller reporting company, Solitario's management's report was not subject to attestation by our independent registered public accounting firm pursuant to rules of the SEC that permit us to provide only management's report in this annual report.

**Item 9B. Other Information**

None

(table of contents) 61

PART

III

**Item 10. Directors, Executive Officers and Corporate Governance**

The information required under Item 10 is incorporated herein by reference to the information set forth in our definitive proxy statement in connection with the annual meeting of shareholders to be filed with the SEC within 120 days after the end of our fiscal year ended December 31, 2017 pursuant to Section 14(a) of the Exchange Act (the "2018 Proxy").

Item 11. Executive Compensation

The information required under Item 11 is incorporated herein by reference to the information set forth in the 2018 Proxy.

**Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters**

The information with respect to Item 12 is incorporated herein by reference to the information set forth in the 2018 Proxy.

**Item 13. Certain Relationships and Related Transactions, and Director Independence**

The information with respect to Item 13 is incorporated herein by reference to the information set forth in the 2018 Proxy.

Item 14. Principal Accounting Fees and Services

The information required under Item 14 is incorporated herein by reference to the information set forth in the 2018 Proxy.

(table of contents) 62

## **PART IV**

### **Item 15. Exhibits, Financial Statement Schedules**

The following documents are filed as a part of this Annual Report on Form 10-K:

#### **1. Financial Statements**

The following financial statements contained in Part II, Item 8 are filed as part of this Annual Report on Form 10-K:

Consolidated Financial Statements  
Report of Independent Registered Public Accounting Firm  
Consolidated Balance Sheets as of December 31, 2017 and 2016  
Consolidated Statements of Operations for the years ended December 31, 2017 and 2016  
Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017 and 2016  
Consolidated Statements of Shareholders' Equity for the years ended December 31, 2017 and 2016  
Consolidated Statements of Cash Flows for the years ended December 31, 2017 and 2016  
Notes to Consolidated Financial Statements

#### **2. Financial Statement Schedules**

Financial statement schedules are omitted because they are not required or are not applicable, or the required information is provided in the consolidated financial statements or notes thereto described in Item 15(1) above.

#### **3. Exhibits**

The Exhibits listed in the Index to Exhibits, which appears immediately following the signature page and is incorporated herein by reference, are filed as part of this Annual Report on Form 10-K.

### **Item 16. Form 10-K Summary**

None.

(table of contents) 63

**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

SOLITARIO ZINC CORP.

By: /s/ James R. Maronick  
Chief Financial Officer

Date: March 14, 2018

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<b>Signature</b>	<b>Title</b>	<b>Date</b>
<u>/s/ Christopher E. Herald</u> Christopher E. Herald, Chief Executive Officer	Principal Executive Officer and Director	March 14, 2018
<u>/s/ James R. Maronick</u> James R. Maronick, Chief Financial Officer	Principal Financial and Accounting Officer	March 14, 2018
<u>/s/ John Labate</u> John Labate	     A majority of	
<u>/s/ Brian Labadie</u> Brian Labadie	the Board of   Directors	March 14, 2018
<u>/s/ James Hesketh</u> James Hesketh	   	
<u>/s/ Gil Atzmon</u>	 	

Gil Atzmon

|  
|  
|  
└─

-

-

/s/ Joshua D. Crumb

Joshua D. Crumb

By: /s/ James R. Maronick

James R. Maronick,  
Attorney-in-fact

(table of contents) 64

INDEX TO EXHIBITS

Description

- 2.1 Arrangement Agreement and Plan of Arrangement dated April 26, 2017, among Solitario Exploration & Royalty Corp. and Zazu Metals Corporation (incorporated by reference to Exhibit 2.1 to Solitario's Current Report on Form 8-K filed on July 14, 2017)
- 3.1 Amended and Restated Articles of Incorporation of Solitario Exploration & Royalty Corp., as Amended (incorporated by reference to Exhibit 3.1 to Solitario's Form 10-Q filed on August 10, 2010)
- 3.1.1 Articles of Amendment to Restated Articles of Incorporation of Solitario Zinc Corp. (incorporated by reference to Exhibit 3.1 to Solitario's Current Report on Form 8-K filed on July 14, 2017)
- 3.2 Amended and Restated By-laws of Solitario Exploration & Royalty Corp. (incorporated by reference to Exhibit 99.1 to Solitario's Form 8-K filed on March 22, 2013)
- 4.1 Form of Common Stock Certificate of Solitario Zinc (incorporated by reference to Exhibit 4.1 to Solitario's Form 10-Q filed on November 8, 2017)
- 10.1 2013 Solitario Exploration & Royalty Corp. Omnibus Stock and Incentive Plan (incorporated by reference to Exhibit 10.2 to Solitario's Form 8-K filed on June 20, 2013)
- 10.2 Alliance Agreement, dated January 18, 2005, between Solitario Resources Corporation and Newmont Overseas Exploration Limited (incorporated by reference to Exhibit 99.1 to Solitario's Form 8-K filed on January 20, 2005)
- 10.3 Amended and Restated Royalty Grant, dated January 18, 2005, between Solitario Resources Corporation and Minera Los Tapados S.A. (incorporated by reference to Exhibit 99.3 to Solitario's Form 8-K filed on January 20, 2005)
- 10.4 Change in Control Severance Benefits Agreement between Solitario Resources Corporation and Christopher E. Herald, dated as of March 14, 2007 (incorporated by reference to Exhibit 99.1 to Solitario's Form 8-K filed on March 14, 2007)
- 10.5 Change in Control Severance Benefits Agreement between Solitario Resources Corporation and James R. Maronick, dated as of March 14, 2007 (incorporated by reference to Exhibit 99.2 to Solitario's Form 8-K filed on March 14, 2007)
- 10.6 Change in Control Severance Benefits Agreement between Solitario Resources Corporation and Walter W. Hunt, dated as of March 14, 2007 (incorporated by reference to Exhibit 99.3 to Solitario's Form 8-K filed on March 14, 2007)
- 10.7 Framework Agreement for the Exploration and Development of Potential Mining Properties, related to Solitario's 100% owned Florida Canyon project in Peru between Minera Florida Canyon S.A., Minera Solitario Peru S.A.C., Solitario Resources Corporation, and Votorantim Metais – Cajamarquilla S.A., dated March 24, 2007 (incorporated by reference to Exhibit 10.2 to Solitario's Form 8-K filed on October 4, 2007)



Edgar Filing: SOLITARIO ZINC CORP. - Form 10-K

- 10.8 First Amendment to the 2013 Solitario Exploration & Royalty Corp. Omnibus Stock and Incentive Plan (incorporated by reference to Exhibit 10.1 to Solitario's Form 8-K filed on June 29, 2017)
- 14.1 Code of Ethics for the Chief Executive Officer and Senior Financial Officer (incorporated by reference to Exhibit 99.1 to Solitario's Form 8-K filed on July 18, 2006)
- 21.1 \* Subsidiaries of Solitario Zinc Corp.
- 23.1 \* Consent of EKS&H LLLP

(table of contents) 65

24.1 \* Power of Attorney

31.1 \* Certification of Chief Executive Officer pursuant to SEC Rule 13a-14(a)/15d-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

31.2 \* Certification of Chief Financial Officer pursuant to SEC Rule 13a-14(a)/15d-14(a) as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002

32.1 \* Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

101 \* The following financial statements, formatted in XBRL: (i) Consolidated Balance Sheets as of December 31, 2017 and 2016; (ii) Consolidated Statements of Operations for the years ended December 31, 2017 and 2016; (iii) Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017 and 2016; (iv) Consolidated Statements of Shareholders' Equity for the years ended December 31, 2017 and 2016; (v) Consolidated Statements of Cash Flows for the years ended December 31, 2017 and 2016; and (vi) Notes to the Consolidated Financial Statements.

\* Filed herewith