

**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, 2022

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	Trading symbol	Name of exchange on which registered
Common Stock, \$0.01 par value	XPL	NYSE American

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 [X] NO []

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files).

YES [X] NO []

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:

Large accelerated filer []	Accelerated filer []	Non-accelerated filer [X]	Smaller reporting company [X]	Emerging growth company []
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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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

YES [] NO [X]

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to 240.10§D-1(b).

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

YES [] NO [X]

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

YES [] NO [X]

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, 2022 as reported on NYSE American, was approximately \$33,511,000.

There were 64,801,373 shares of common stock, \$0.01 par value, outstanding on March 15, 2023.

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, 2023, have been incorporated by reference into Part III of this Annual Report on Form 10-K.

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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 Annual Report on 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 current reports made on Form 8-K to the United States Securities and Exchange Commission (the "SEC").

Item 1. Business

Business and Company Formation

Solitario Zinc Corp. ("Solitario" or the "Company") is an exploration stage company as defined by rules 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. Solitario has been actively involved in mineral exploration since 1993. Solitario's primary business is to acquire exploration mineral properties 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 of the project. 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. Solitario has never developed a property. Solitario's primary focus is on the acquisition and exploration of precious metal, zinc and other base metal exploration mineral properties. In addition to focusing on its mineral exploration properties and the evaluation of mineral properties for acquisition, Solitario also evaluates potential strategic transactions as a means to acquire an interest in new precious and base metal properties and assets with exploration potential or other potential corporate transactions that Solitario determines to be favorable to Solitario.

Solitario has recorded revenue in the past from the sale of mineral properties, including the sale of certain mineral royalties. Revenues and / or proceeds from the sale or joint venture of properties or assets, although significant when they occur, have not been a consistent annual source of cash and would only occur in the future, if at all, on an infrequent basis.

Solitario currently considers its Golden Crest project in South Dakota, its carried interest in the Florida Canyon project in Peru, and its interest in the Lik project in Alaska to be its core mineral property assets. Nexa Resources, Ltd. ("Nexa"), Solitario's joint venture partner at Florida Canyon, is continuing the furtherance of the Florida Canyon project and Solitario is monitoring the progress at Florida Canyon. Solitario is working with its 50% joint venture partner, Teck American Inc., a wholly owned subsidiary of Teck Resources Limited (both companies are referred to in this Annual Report as "Teck") at its Lik project. Teck completed a drilling program and conducted mapping and ground gravity geophysical activities at the Lik project during 2022. Solitario is conducting mineral exploration on its Golden Crest project on its own.

As of December 31, 2022, Solitario anticipates using its cash and short-term investments, in part, to further fund the exploration of its Golden Crest, Florida Canyon, and Lik projects and to potentially acquire additional mineral property assets. The fluctuations in precious metal and other commodity prices contribute 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 on potentially attractive terms.

Human Capital Management

As of December 31, 2022, Solitario had three full-time employees and three part-time seasonal employees. In addition, we use consultants and contractors with specific skills to assist with exploration activities, administration, due diligence, environmental and regulatory compliance, corporate governance, and asset and operations management.

Our compensation programs are designed to align compensation of our employees with Solitario's corporate objectives and performance and are designed to provide incentives to attract, retain and motivate our employees and contractors to achieve their highest potential over both the short-term and long-term.

The health and safety of our employees and others is a priority in how we manage and operate our business. Overall oversight of the operations is the responsibility of Solitario's Chief Executive Officer and the Board of Directors. Officers and employees are required to review Solitario's Code of Business Conduct and Ethics and acknowledge their understanding of the content and intent to comply on a periodic basis.

Solitario values the diversity and talents of its employees working together to achieve corporate goals and personal and professional goals and objectives. We seek to cultivate a culture that is sensitive to the importance of diversity and inclusion in the workplace and are committed to continuous improvement in these areas.

Environmental, Social and Governance

Solitario has a long history of committed environmental, social and responsible governance ("ESG") of its business. ESG issues are important to Solitario's investors, employees, and stakeholders, including communities in which we work. Solitario pledges to operate our business in a manner that supports environmental and social initiatives and responsible corporate governance. We work closely with our employees, government agencies, local communities and other stakeholders in the areas where we operate to include their interests and concerns to arrive at environmentally sound and socially responsible outcomes related to all of our operations. We believe our joint venture partners not only value the importance of ESG issues in the conduct of their activities on our projects but are also industry leaders on these important issues.

Risks and Uncertainties

Solitario faces risks related to health epidemics and other outbreaks of communicable diseases, which could significantly disrupt its operations and may materially and adversely affect its business and financial conditions.

Solitario's business could be adversely impacted by the on-going effects of the coronavirus ("COVID-19") or other epidemics or pandemics. Solitario continues to evaluate the effects of COVID-19 on its operations and at times during the pandemic took pro-active steps to address the impacts on its operations, including at times reducing costs, in response to the economic uncertainty associated with potential risks from COVID-19. These prior cost reductions included implementing salary reductions and evaluating and reducing certain planned 2021 exploration programs through our joint venture partners at the Florida Canyon and Lik exploration projects. Certain of Solitario's joint venture partners have, from time to time, modified plans with respect to the projects in which Solitario holds an interest in response to the COVID-19 pandemic. Also, Solitario has evaluated the potential impacts on its ability to access future traditional funding sources on the same or reasonably similar terms as in past periods. Solitario will continue to monitor the effects of COVID-19 on its operations, financial condition, and liquidity. However, the extent to which the COVID-19 pandemic or other epidemics or pandemics ultimately impacts Solitario's business, including our exploration and other activities and the market for our securities, will depend on future developments, which are highly uncertain and cannot be predicted at this time, and include the duration, severity and scope of new outbreaks and governmental actions taken to contain or treat any such outbreak.

Corporate Structure

- Solitario Zinc Corp. [Colorado]
 - Golden Crest Project [South Dakota]
- Zazu Metals Corporation. [Canada] (100%)
- Zazu Metals (AK) Corp. [Alaska] (100%)
 - 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

We hold a 50% operating interest in the Lik zinc-lead-silver property in northwest Alaska, which is estimated to contain a large tonnage, high-grade deposit potentially mineable by open-pit methods. Teck is a 50% partner with Solitario in the Lik deposit, with Teck acting as the project manager from 2018 through 2023. In late 2021 Solitario engaged Gustavson & Associates to complete a S-K 1300 Technical Report Summary on the Lik project (the "*S-K 1300 Lik TRS*") which was completed in March 2022. A Preliminary Economic Assessment ("PEA") was completed on the Lik deposit in 2014.

Solitario also has 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, formerly Votorantim Metais Holdings, SA (“Votorantim”) and Compañía Minera Milpo S.A.A. (“Milpo”). Nexa is one of the largest zinc producers in Peru. In late 2021 Solitario engaged Gustavson & Associates to complete a S-K 1300 Technical Report Summary on the Florida Canyon Project (*the “S-K 1300 Florida Canyon TRS”*) which was completed in March 2022. Solitario and Nexa completed a PEA on the Florida Canyon deposit in August 2017. Except for the 2018-2019 drilling program for which Solitario voluntarily funded \$1,580,000 of the 39-hole 17,033-meter drilling program, Nexa has funded 100% of project expenditures since the inception of the Florida Canyon joint venture in 2006. Nexa will increase its ownership to a 70% interest in the project from its current ownership of 61%, 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, in the event Nexa makes the decision to develop the Florida Canyon project, Nexa has agreed to finance Solitario's 30% participating interest for any development costs through a future loan facility to Solitario. Solitario would then repay the loan facility through 50% of its net cash flow distributions from the project.

During 2021 Solitario entered into a lease agreement (the “Golden Crest Agreement”) whereby Solitario acquired exclusive exploration rights in certain claims (the “GC Claims”) in the Black Hills region of South Dakota. The GC Claims are part of Solitario’s Golden Crest project. Terms of the Golden Crest Agreement include scheduled payments by Solitario to the underlying owner of \$65,000 (paid upon signing) and an obligation to pay the underlying owner \$60,000 at the first anniversary date which was paid in June 2022. Solitario recorded an initial acquisition cost of \$125,000 during 2021 related to these required payments. In addition, to continue the lease, Solitario has agreed to pay, at its option, the underlying owner escalating annual payments that over five years total \$340,000 and annual payments of \$150,000 thereafter, which will be expensed as paid. Solitario has agreed to pay the underlying owner an additional success fee of \$1.00 per ounce of gold in the event Solitario files a 43-101 qualified resource of up to 1.5 million ounces of gold or a maximum of \$1,500,000. Solitario has agreed to escalating work commitments, at Solitario’s option, on the GC Claims and a related area of interest around the GC Claims totaling \$3,000,000 during the first five years of the lease, with the first-year minimum expenditures totaling \$200,000 ending June 2022. Solitario has exceeded the minimum exploration expenditures required in 2022. The term of the Golden Crest Agreement is for twenty years and is automatically extended as long as Solitario is performing any exploration, development or mining activities on the GC Claims. The underlying owner retained a 2.0% Net Smelter Return royalty. Solitario will have the option, but not the obligation, to reduce the Net Smelter Return royalty to 1.0% by paying the owner \$1,000,000.

In addition, Solitario staked additional mineral claims, including some claims included in the area of interest of the GC Claims and claims not related to the GC Claims, as part of the Golden Crest project. As of December 31, 2022, Solitario has incurred costs for staking, filing fees, legal and other costs totaling \$1,035,000 capitalized as initial acquisition costs related to claims on the Golden Crest project.

At December 31, 2022, Solitario also holds an 85% interest in the Chambara exploration project in Peru. Nexa holds the remaining 15%.

We conduct exploration and property evaluation activities in Peru and in the United States in Alaska and South Dakota 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 economically feasible 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 and assets, joint venture property payments and the sale of royalties. Proceeds from the sale or joint venture of properties and royalty sales, 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. Historically, we have met our need for capital through (i) the sale of our investments in, and interest on, our short-term treasury notes and bank certificates of deposit (“CDs”); (ii) issuances of common stock; (iii) sales of our shares of common stock of Vendetta Mining Corp. (“Vendetta”), Vox Royalty Corp. (“Vox”) and Kinross Gold Corporation (“Kinross”); (iv) sales of covered call options on common stock of Kinross we hold; and (v) sale of mineral property interests and assets. In certain cases, we have reduced our exposure to the costs of our exploration activities through the use of joint ventures.

We operate in one segment: mineral exploration. We currently conduct exploration activities in Peru, Alaska and South Dakota and evaluate properties for potential acquisition and evaluation of strategic corporate opportunities throughout

North and South America. As of March 15, 2023, we had three 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 part-time laborers to execute our Latin American and North 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, contractors and advisors, which is limited by the size of our company compared to many of our competitors who may have greater resources, including 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 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. We have reviewed and considered current federal legislation relating to climate change and do not believe it to currently have a material effect on our operations. Future changes in U.S. federal or state laws or regulations could have a material adverse effect upon us and our results of operations. 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 2022, we had no material environmental incidents or known non-compliance with any applicable environmental regulations.

Financial Information about Geographic Areas

Included in the consolidated balance sheets at December 31, 2022 and 2021, are total assets of \$31,000 and \$19,000, 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 SEC maintains a website (<http://www.sec.gov>) that contains periodic reports, proxy and information statements and other information regarding registrants, including the Company, 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 Annual Report on Form 10-K. In addition, electronic versions of the reports we file with the SEC are available on our website, 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 Annual Report on 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 of which we are aware. Additional risks not presently known to us or risks that we currently consider immaterial may also adversely affect our business.

Risks Related to Our Business and Industry

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 acquisition and exploration of our mineral properties may never be recovered and we could incur an impairment of our investments in our projects.

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, be salable or joint ventured. From time to time, we may acquire a mineral property asset and later determine to abandon that project for various reasons, and as a result costs incurred to acquire the asset, and any costs incurred for initial exploration efforts will be lost. Moreover, significant expenses 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 in the past and may record mineral property impairments in the future.

We have no reported mineral reserves as defined by SEC rules, and our current projects and assets or any projects we may acquire are not likely to offer the opportunity for near term revenues or sale proceeds. If we are unsuccessful in identifying mineral reserves in the future, we may not be able to realize any profit from our property interests.

None of our current projects have reported mineral reserves as those terms are used in SEC rules. 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 have mineral resources reported on our Florida Canyon and Lik projects upon which we do not exercise 100% control. The potential for reported mineral reserves on these projects is dependent on additional geologic work and economic evaluation which our joint venture partners may or may not conduct, and there can be no assurance that if such activities are performed that these will result in a positive feasibility or other study to allow the mineral resources to be upgraded to mineral reserves as defined by SEC rules, and as a result we may not be able to sell or otherwise realize any profit from our property interests in the Florida Canyon or Lik projects.

Our Florida Canyon and Lik projects have reported mineral resources in accordance with SEC rules. However, these resources may never be upgraded to mineral reserves without significant additional geologic work, including additional drilling, economic and environmental analysis, and the completion of a feasibility or other study to demonstrate the mineral potential and economic viability of these projects. To a significant degree, the completion of this work and a feasibility or other appropriate study is dependent on our joint venture partners desire to do so, over which we have limited influence. In addition, there is no assurance that if such work and studies are undertaken and completed, that either or both of these projects will be determined to be economically viable. The lack of reserves on these mineral properties could prohibit us from any near-term sale or joint venture of such 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.

Our Golden Crest project is an early-stage exploration project with no mineral resources or mineral reserves as defined by SEC rules. There can be no assurance that additional geologic work will result in reported mineral resources or mineral reserves in the future. If we are unsuccessful in identifying mineral reserves in the future, we may not be able to sell or otherwise realize any profit from our property interests.

Our Golden Crest project, which was acquired during 2021, has no reported mineral resources or mineral reserves as defined by SEC rules. We have conducted limited geologic activities at the Golden Crest project consisting primarily of soil

and rock sampling. Additional geologic, environmental, and economic work would be required to allow us to report mineral resources at the Golden Crest project, including drilling and completion of a preliminary economic study. Furthermore, significant additional work would be required to prepare a feasibility or other study to allow us to report mineral reserves at the Golden Crest project. There can be no assurance that if such work is completed that the results would allow us to report either mineral resources or mineral reserves in the future. The lack of mineral resources or mineral reserves at the Golden Crest project could prohibit us from any near-term sale or joint venture of our interest in the Golden Crest project and we may not be able to realize any proceeds and or profit from our interests in the Golden Crest project, which could materially adversely affect our financial position or results of operations.

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, but not limited to 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 the hazards of mineral exploration could result in damage to life or property, and 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.

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 Peru 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. Currently a portion of our mineral properties are located in Peru and we have previously held mineral properties and royalties on non-producing exploration properties in Peru, Mexico, Argentina, Bolivia and Brazil. Our current exploration activities and mineral properties located outside of the United States are subject to the laws of Peru (and any other countries in which we may conduct business). Exploration and potential development activities in other countries where we may conduct exploration 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 U.S. laws and regulations, including the U.S. Foreign Corrupt Practices Act (“FCPA”);
- 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 a change in the U.S. dollar compared to local currencies);
- foreign exchange controls;
- restrictions on the ability for us to hold U.S. 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.

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 results of operations and growth potential.

The capital required for exploration and development of mineral properties is substantial. In the past we have financed operations through public and private sales of our common stock, the sale of interests in mineral properties (including the sale

of our interest in the former Mt. Hamilton project 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 including short-term investments, the sale of marketable equity securities we hold, and funds from the issuance of long-term debt. We expect to need to raise additional capital, or enter into new joint venture arrangements, in order to fund our obligations with respect to our properties and our 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 exploration or development of our existing mineral properties or any new mineral property assets we may acquire. 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 or 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 which could have a material adverse effect on our financial position, prospects, 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 mineral property assets and mining projects. Our competitors with greater financial resources than us are 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 personnel with technical skills and experience in the mineral exploration business. There can be no assurance that we will continue to 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 with various government agencies on all of our mineral properties. If we, or our joint venture partners, 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.

Occurrence of events for which we are not insured or have limited insurance coverage 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 or have limited insurance coverage could have a material adverse effect on our financial position or results of operations.

Normal weather variations as well as severe or violent storms could materially affect our operations due to damage or delays caused by such weather.

Our exploration activities (and those of our joint venture partners) 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 our projects are located and we or our joint venture partners conduct these activities. Delays or damage caused by severe weather could materially affect our operations or our financial position.

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 they are located 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.

In the United States and the other countries in which we operate or own assets, 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. The expenditures to obtain exploration permits to conduct our exploration activities may be material to our total exploration cost.

The laws and regulations in all the countries in which we operate, or own assets 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.

Our operations are subject to permitting requirements which could require us to delay, suspend or terminate our operations on our mining properties.

Our exploration operations, including any exploration drilling programs and other exploration activities, require permits from various state and federal governments, including permits for the use of water and for drilling exploration holes. We may be unable to obtain these permits in a timely manner, on reasonable terms or on terms that provide us sufficient resources to explore or develop our properties in any way. Even if we are able to obtain such permits, the time required by the permitting process can be significant. If we cannot obtain or maintain the necessary permits, or if there is a delay in receiving these permits, our timetable and business plan for exploration of our properties will be adversely affected, which may in turn adversely affect our results of operations, financial condition, cash flows and market price of our securities.

Due to increased activity levels of non-governmental environmental groups, native American, aboriginal, and local groups targeting the mining industry, the potential for the government or process instituted by these local groups, to delay the issuance of permits or impose new requirements or conditions upon mining operations may be increased. Any changes in government policies may be costly to comply with and may delay mining operations. Future changes in such laws and regulations, if any, may adversely affect our operations, make them prohibitively expensive, or prohibit them altogether. If our interests are materially adversely affected as a result of a violation of applicable laws, regulations, permitting requirements or a change in applicable law or regulations, it would have a significant negative impact on the value of our company and could have a significant impact on our stock price.

Our business could be negatively affected by changing climate and climate change laws.

A number of governments, including the United States, have introduced or are moving to introduce climate change legislation and treaties at the international, national, state/provincial and local levels. Regulations relating to emission levels (such as carbon taxes) and energy efficiency are becoming more stringent. If the current regulatory trend continues, this may result in increased costs at some or all of our project locations. In addition, the physical risks of climate change may also have an adverse effect on our operations and properties. Some of the countries in which we own or have owned mineral property assets have implemented, and are developing, laws and regulations related to climate change and greenhouse gas emissions.

Legislation and increased regulation and requirements regarding climate change could impose increased costs or limit our ability, or our joint venture partners' ability, to effectively advance our projects, including impacting our suppliers through increased energy, capital equipment, environmental monitoring and reporting and other costs to comply with such regulations.

Our business is dependent on the market price of certain commodities, particularly gold and zinc, 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. Because our core assets are currently in zinc and gold related projects, the spot price of zinc and gold is particularly important to the value of our assets and future prospects. 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 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.

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.

The success of projects held under joint ventures that are not operated by us are substantially dependent on the joint venture partner, over which we have limited or no control. Our Florida Canyon project and our Lik project are joint ventured with other mining companies that manage the exploration activities on the projects. We are the minority-interest party at Florida Canyon and a 50% partner at the Lik project. Although our joint venture agreements provide certain voting rights and other minority-interest safeguards, the majority partner and/or operator not only manages operations, but controls most decisions, including budgets and scope and pace of exploration and other activities. Consequently, we are highly dependent on the operational expertise and financial condition of our joint venture partners, as well as their 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 not to 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 requires unanimous consent by the joint venture partners for annual budgets in excess of \$1.0 million. Consequently, exploration of the Lik project could be delayed without the unanimous consent of both parties to certain proposed actions or transactions.

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

Neither we, nor our joint venture partners are currently involved in mining development or mining operations at any of our properties. In order to realize a profit from our mineral interests we have to: (1) sell our properties or interests 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; (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 a future project, not currently under joint venture, we may either look to form a joint venture with another mining company to develop and/or operate the project 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 attempt to acquire a new property, or another company and the acquisition may require a substantial amount of capital or the issuance of our capital stock 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 require a substantial amount of capital or the issuance of our capital stock 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.

Failure to comply with the 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 us, are not subject to U.S. laws and regulations, including the FCPA, and therefore our exploration, and potential future 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. Certain of 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 the FCPA and other 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.

Risks Related to Our Common Stock

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 2022 was approximately 148,000 shares. The market price of our shares of common stock 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.

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 26 of our 29 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; (i) during 2015, as a result of the sale of our former Mt. Hamilton project; (ii) during 2003, as a result of a \$5,438,000 gain on a derivative instrument related to our investment in certain Crown warrants and (iii) 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.

We have never paid, and do not intend to pay cash dividends and, consequently, the ability to achieve a return on any

investment in our common stock will depend on appreciation in the price of our common stock.

We have never paid cash dividends on any of our capital stock, and we currently intend to retain future earnings, if any, to fund the development and growth of our business. Therefore, a holder of our stock is not likely to receive any dividends on our common stock for the foreseeable future. Since we do not intend to pay dividends, the ability to receive a return on an investment in our common stock will depend on any future appreciation in the market value of our common stock. There is no guarantee that our common stock will appreciate or even maintain the price at which it was purchased.

Issuances of our stock in the future could dilute existing shareholders and adversely affect the market price of our common stock.

We have the authority to issue up to 100,000,000 shares of common stock and 10,000,000 shares of preferred stock, and to issue options and warrants to purchase shares of our common stock without shareholder approval. In addition, during 2021 we put an ATM (“At the Market”) program in place and expect to sell shares of our common stock under that program from time to time. Future issuances of our securities could be at prices substantially below the price paid for our common stock by our current shareholders. In addition, we can issue blocks of our common stock in amounts up to 20% of the then-outstanding shares without further shareholder approval. Sales of a substantial number of shares by the Company in the public market (or otherwise), or the perception that those sales may occur, could cause the market price of our common stock to decline.

General Risk Factors

The outbreak of pandemics, including the coronavirus (COVID-19) may affect our assets, operations and development plans at our projects.

We face risks related to health epidemics and other outbreaks of communicable diseases, which could significantly disrupt our operations and may materially and adversely affect our business and financial conditions.

Our business still could be adversely impacted by the effects of the COVID-19 or other epidemics or pandemics. How these epidemics or pandemics may ultimately impact our business, including our future exploration and other activities and the market for our securities, will depend on future developments, which are highly uncertain and cannot be predicted at this time, and include the duration, severity, and any recurrence of various strains of the outbreak and the actions taken to contain or treat the coronavirus outbreak. In particular travel and other restrictions established to curb the spread of COVID-19, or other pandemic diseases could materially and adversely impact our business including without limitation, planned exploration programs at our Florida Canyon, Lik and Golden Crest projects during 2023 and beyond, employee health, workforce productivity, increased insurance premiums, limitations on travel, labor shortages and the availability of industry experts and personnel, the timing to process drilling and other metallurgical testing, supply chain constraints that impede exploration operations, and other factors that will depend on future developments beyond our control, which may have a material and adverse effect on our business, financial condition and results of operations. There can be no assurance that we will not be impacted by COVID-19 or other pandemic diseases and that we could ultimately see our workforce productivity reduced or incur increased medical costs or insurance premiums as a result of these health risks. The outbreak of additional strains of COVID-19 or other pandemic diseases could create a widespread global health crisis that contributes to volatility in the economy and financial markets that could have an adverse effect on the future demand for precious and base metals and, in turn, our prospects.

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

At December 31, 2022, we have invested \$3,951,000 in United States Treasury securities (“USTS”) held in a brokerage account, with maturities of between 15 days and 12 months and we have approximately \$293,000 of our cash in uninsured deposit accounts and brokerage accounts which are not covered by Federal Deposit Insurance Company insurance. The failure of a financial institution holding these funds and assets could have a material impact on the market price of our common stock and our liquidity and capital resources.

Increased costs could impede our ability to explore sell or develop our current projects.

Capital and operating costs at mining operations are subject to variation due to a number of factors, such as changing ore grade, changing metallurgy, and revisions to mine plans in response to changing commodity prices, additional drilling results and updated geologic interpretations. In addition, costs are affected by the cost of capital, tax and royalty regimes, trade tariffs, the global cost of mining and processing equipment, commodity prices, and foreign exchange rates, as well as the costs

of fuel, electricity, operating supplies, and appropriately skilled labor. These costs are at times subject to volatile price movements, including increases that could negatively affect our ongoing exploration efforts and negatively impact our potential for future development or sale of our exploration projects as well as our estimates of mineral resources. This could have a material adverse effect on our business prospects, results of operations, cash flows and financial condition.

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, theft of assets, 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, loss of assets, including our cash, short-term investments, or marketable equity securities, 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.

Item 1B. Unresolved Staff Comments

None

Item 2. Properties

CAUTIONARY NOTE REGARDING DISCLOSURE OF MINERAL PROPERTIES

Mineral Reserves and Resources

We are subject to the reporting requirements of the Exchange Act and applicable Canadian securities laws, and as a result we report our mineral resources according to two different standards. U.S. reporting requirements, are governed by Item 1300 of Regulation S-K (“S-K 1300”), as issued by the SEC. Canadian reporting requirements for disclosure of mineral properties are governed by National Instrument 43-101 Standards of Disclosure for Mineral Projects, as adopted from the definitions provided by the Canadian Institute of Mining, Metallurgy and Petroleum. Both sets of reporting standards have similar goals in terms of conveying an appropriate level of confidence in the disclosures being reported, but the standards generally embody slightly different approaches and definitions.

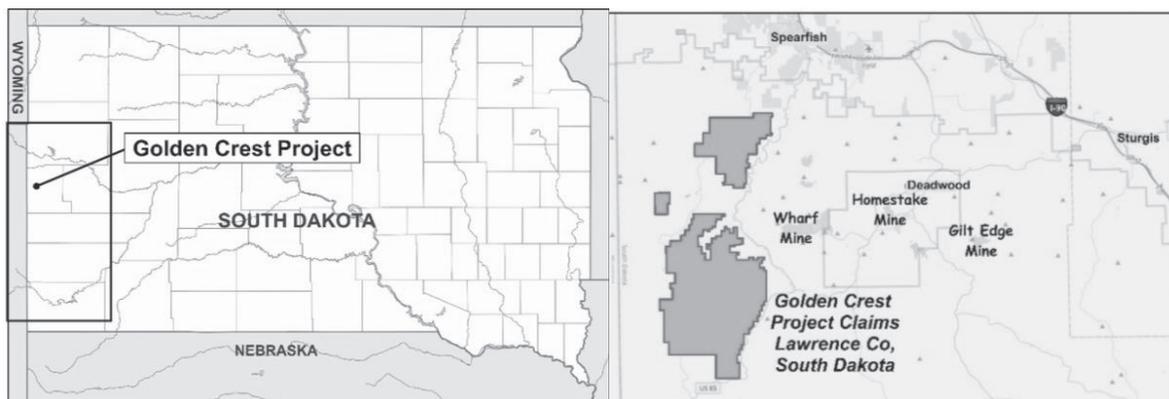
In our public filings in the U.S. and Canada and in certain other announcements not filed with the SEC, we disclose measured, indicated and inferred resources, each as defined in S-K 1300. The estimation of measured resources and indicated resources involve greater uncertainty as to their existence and economic feasibility than the estimation of proven and probable reserves, and therefore investors are cautioned not to assume that all or any part of measured or indicated resources will ever be converted into S-K 1300-compliant reserves. The estimation of inferred resources involves far greater uncertainty as to their existence and economic viability than the estimation of other categories of resources, and therefore it cannot be assumed that all or any part of inferred resources will ever be upgraded to a higher category. Therefore, investors are cautioned not to assume that all or any part of inferred resources exist, or that they can be mined legally or economically.

Technical Report Summaries and Qualified Persons

The scientific and technical information concerning our mineral projects in this Annual Report on Form 10-K have been reviewed and approved by “qualified persons” under S-K 1300, including our Chief Operating Officer, Walter Hunt. For a description of the key assumptions, parameters and methods used to estimate mineral reserves and mineral resources included in this Annual Report on Form 10-K, as well as data verification procedures and a general discussion of the extent to which the estimates may be affected by any known environmental, permitting, legal, title, taxation, sociopolitical, marketing or other relevant factors, please review the Technical Report Summaries for each of the Company’s material properties which are incorporated by reference into, this Annual Report on Form 10-K.

Golden Crest Project (United States)

1. Property Description and Location



(map of Golden Crest project)

The Golden Crest project is in the northern Black Hills of western South Dakota in Lawrence County. A map of the project location is shown above. The Golden Crest project is comprised of 1,707 unpatented lode claims, with an associated area of approximately 33,000 acres. Two hundred forty-one of the claims are leased from Golden Crest II, LLC, a Wyoming limited liability company (“GC LLC”) and 27 unpatented claims (“Easter Claims”) are leased from the Easter Project, LLC, a Wyoming limited liability company. All the remaining claims are owned by Solitario and were staked throughout 2021 and 2022.

Solitario acquired its interest in the GC Claims in May 2021 by entering into the Golden Crest Agreement with GC LLC. Terms of the Golden Crest Agreement include scheduled payments to the underlying owner of \$65,000 paid upon signing and an obligation to pay the underlying owner \$60,000 at the first anniversary date. To continue the lease, Solitario has agreed to pay, at its option, the underlying owner escalating annual payments over a five-year period that total \$340,000 and annual payments of \$150,000 thereafter. Solitario has agreed to pay the underlying owner an additional success fee of \$1.00 per ounce of gold in the event Solitario files a 43-101 qualified resource of up to 1.5 million ounces of gold or a maximum of \$1,500,000. Solitario has agreed to perform escalating work commitments, at Solitario’s option, on the GC Claims totaling \$3,000,000 in work expenditures during the first five years of the lease. Solitario has fulfilled its \$600,000 work commitment for the first two years. The term of the Golden Crest Agreement is for twenty years and is automatically extended as long as Solitario is performing any exploration, development or mining activities on the GC Claims. The underlying owner will retain a 2.0% Net Smelter Return royalty. Solitario has the option, but not the obligation, to reduce the Net Smelter Return royalty to 1.0% by paying the underlying owner \$1,000,000. GC LLC reserves a three-mile area of interest to its original claim position.

In February of 2022, Solitario entered into a lease agreement (the “Easter Agreement”) whereby Solitario acquired exclusive exploration rights to the Easter Claims in the Black Hills region of South Dakota. The Easter Claims are part of Solitario’s Golden Crest project. Terms of the Easter Agreement include \$10,000 paid upon signing, scheduled annual payments to the underlying owner totaling \$180,000 through the tenth anniversary, and \$30,000 per year thereafter. Solitario has agreed to escalating work commitments, at Solitario’s option, on the Easter Claims totaling \$660,000 during the first five years of the lease, with the first year totaling \$20,000. All other terms of the Easter Agreement are substantially the same as the Golden Crest Agreement, except there is no area of interest.

Federal maintenance fees and county registration due in 2022 will be approximately \$333,000 for all Golden Crest claims currently held by Solitario.

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

Access to the Golden Crest project by road is by traveling south of the city of Spearfish, SD along several paved and/or gravel roads. US Highway 14A, and US Highway 85 are near the eastern and southern boundaries of the Golden Crest project. Maintained gravel roads extending westward and northward from Highways 14A and 85 as well as numerous unmaintained, numbered secondary United States Forest Service (“USFS”) roads provide additional ingress to the Golden Crest Project.

The Golden Crest Project is in forested highlands with subdued relief separated by steep-sided canyons. Elevations in the immediate area range from approximately 1,500 m to 2000 m. Spearfish Creek, a stream with a perennial flow, is situated

east of the property while most other creeks on the property are generally dry in the summer months. Vegetation consists of mixed forest composed of deciduous hardwoods and conifers with sporadic meadows and locally dense underbrush. Stands of timber of commercial value cover the property at higher elevations and are managed by the USFS. Logging activities have been widespread on large portions of the property in the past five to twenty years and are ongoing.

Climate at the Golden Crest project area is temperate, characterized by hot summers, cold winters and pronounced seasonal variation in precipitation and temperatures. Average annual temperature, as measured at the Spearfish weather station, is 55°F with seasonal variation averages highs of 32°F and 80°F in winter and summer respectively. The average amount of annual rainfall is approximately 26 inches along with 44 inches of snowfall (as measured at the Spearfish recording station). Average precipitation is greater at the higher elevations of the property itself. The mineral exploration season is generally from early April to late November.

The closest population center is Spearfish, South Dakota (population 11,500), which represents the largest city in Lawrence County (population: 25,800). Spearfish is located along Interstate Highway 90, linking Rapid City, South Dakota to Gillette, Wyoming. Spearfish supports light industry, ranching and tourism and hosts a small university, Black Hills State University. The nearest towns to the project area are Lead (population 3,000) and the nearby town of Deadwood (population 1,500), which is the county seat of Lawrence County and a major tourism and gaming center for the area. Mining related employment continues to be an important segment of Lawrence County's economy. The closest regional airport servicing the area is at Rapid City, situated approximately 80 km southeast along Interstate Highway 90. All major commercial and industrial services are available in Rapid City. Other mining services are available in Lead, South Dakota due to the legacy of the Homestake Mining Company ("Homestake") operations and the currently producing Wharf mine operated by Coeur Mining. Solitario maintains an office in Spearfish, South Dakota.

3. History

The state of South Dakota ranks third among US states for historic gold production, totaling approximately 51 million ounces produced through 2020, most of which came from the world class Homestake Mine in Lead. The first documented gold discovery in the Black Hills was made by prospectors attached to the Custer Expedition of 1874, who discovered placer gold in gravel bars along French Creek near the present site of Custer, South Dakota. The first known lode claims in the Black Hills were located in the spring of 1876 at the head of Gold Run and Deadwood Gulches. Beginning in the 1890's, hundreds of mines and mining companies sprang to life in the northern Black Hills, clustered within a relatively small area measuring 20 km long by 16 km wide, and centered around the cities of Lead and Deadwood. Collectively this area, known as the Lead Gold District, is one of the richest gold districts in the world. Gold mining has occurred continuously in the district for 145 years, a record unmatched by any other US gold mining district.

Despite the importance of the Lead Gold District among American mining camps, during the last 140 years very little regional exploration has been conducted on the property which comprises the Golden Crest project. Although the Golden Crest project is adjacent to the Lead Gold District, the lack of regional exploration is apparently due to the widespread cover of the gold bearing Precambrian rocks by younger sedimentary formations. The Golden Crest project is within several kilometers of district mines with significant historical production, yet only a handful of prospect pits occur on the property. It is also thought that the subdued topography, soil cover and absence of outcrops of the distinctive Precambrian rocks that host the ore in the main Lead Gold District resulted in the project area being largely overlooked for such a long time. There is no prior documented work on the property with the exception of three exploration core holes drilled by Homestake in 1993-1994, a small cluster of small prospect pits and a very limited stream sediment survey.

GC LLC staked the 241 GC Claims in 2021. Solitario acquired these claims in May of 2021. Prior to Solitario's acquisition of the GC Claims, GC LLC completed a minimal amount of work comprised mainly of rock sampling throughout the area. GC LLC discovered gold bearing rocks, mainly along recently disturbed logging roads, in the area where Homestake collected and documented gold anomalies in dry stream sediments. The Easter Claims property, previously known as the 11th Hour Mine, had a longer history with minor production in the early 1900's where by 1906 nearly 4000 feet of underground workings had been developed. However, an attempt to mill the mined ore was a technological failure and no further work was known to have been completed after 1909.

4. Geological Setting

Geologically, the Black Hills consists of Archean and Proterozoic crystalline rocks that are overlain by Paleozoic rocks ranging in age from Cambrian to Pennsylvanian. Precambrian rocks in the Lead window consist primarily of Precambrian metasedimentary rocks and minor extrusive metabasalts and intrusive gabbros. The Paleozoic sequence of marine sedimentary rocks (mainly carbonates and calcareous sediments) contains five formations, dominated by the Cambro-Ordovician Deadwood Formation at its base and the Mississippian-aged Pahasapa Group (regionally known as the Madison Group) at its top. Thin stratigraphic units including the Ordovician Winnipeg and Whitewood Formations and Devonian

Englewood Formation are present. The Deadwood Formation is the most important Paleozoic host for Tertiary replacement gold mineralization and paleoplacer gold deposits. The Mississippian Pahasapa Group contains three recognizable members that correlate to the Lodgepole Limestone, Mission Canyon Limestone and Charles Formation of the regional Madison Group. The Pahasapa Group is overlain in stratigraphic unconformity by the Minnelusa Formation, a package of Pennsylvanian-aged shallow marine and continental red beds and evaporite successions up to 180 m thick. The upper Pahasapa was strongly karsted in the Black Hills prior to deposition of the Minnelusa, producing the world's largest known paleo-cave systems.

This karsted carbonate package is an important lithologic host for alteration and mineralization across the Golden Crest project. The thickness of the Paleozoic sedimentary package varies from east to west across the Lead District from less than 240 m thick east of Deadwood to over 365 m thick at Tinton in the west. Tertiary igneous rocks preferentially invade several shale horizons in the Deadwood Formation and have locally inflated the thickness of the Cambro-Ordovician section by up to 300 m. Igneous rocks rarely intrude higher stratigraphic units except for a few pre-mineralization laccolithic stocks and plugs.

The Golden Crest project area is centered on a broad synform separating the Lead and Tinton domes in the west-central part of the Lead Gold District. Geographically the synform constitutes a broad plateau 40 km long and up to 20 km across with little structural or topographic relief. The surface of the plateau is dominated by Upper Paleozoic rock units, the Mississippian Pahasapa Group and the Pennsylvanian Minnelusa Formation. No Precambrian is exposed on the Golden Crest project property and only three diamond drill holes have been drilled into these Precambrian rocks.

5. Prior Exploration and Recent Work

The first known mineral exploration work on the property was a limited dry stream sediment survey conducted by Homestake from 1988 to 1993 over a 250 square kilometer area. The results of this survey pointed to a seven square kilometer area of anomalous gold values that was subsequently staked by the GC LLC and leased by Solitario. Homestake drilled three deep exploration core holes in 1993-1994 on Solitario's current property, but not in the area of the anomalous gold values in dry stream sediments. The objective of these holes was to test for the presence of the Precambrian Homestake Formation that hosts the prolific past-producing 42 million-ounce Homestake gold deposit. Two of the three holes intersected the Homestake Formation.

From approximately 2017 to 2020, GC LLC conducted surface exploration consisting of collecting 251 rock float samples mainly exposed in and near recently constructed logging roads. Of these, 103 samples contained gold values greater than 20 parts per billion ("ppb") gold, with 12 samples containing greater than 1,000 ppb gold. Many of the collected rock samples were siliceous hydrothermal breccias (jasperoids) that occurred as narrow veinlets cutting the limestone formation at surface.

In March 2021 Solitario started exploration activities in the area. Exploration largely consisted of widespread sampling of suspected mineralized and hydrothermally altered rock float, primarily from the Pahasapa and Minnelusa Formations and systematic soil sampling on a grid. Outcrop or subcrop is rare so rock sampling is often limited to float which is resistant to weathering. The topography of most of the property is flat to very gently rolling so the lateral transport of the surficial rocks is minimal.

Apart from the float rock which is highly resistant to weathering, the inference of the subcropping geology is limited to areas where the topography is less flat and those areas where road cuts or road beds expose "C" horizon soils. The inability to observe outcrop limits the ability to detect and interpret the geometry and thickness of zones of alteration, so a soil sampling program was initiated property-wide to assist in the identification of new target areas for mapping and more detailed rock sampling. Exploration work during the past two years has consisted of grid soil sampling, select grab rock sampling of float and less commonly bedrock, hand-dug trenching, geologic mapping and Induced Polarization ground geophysics.

6. Mineralization

The Black Hills are unique for the remarkable spatial superposition of several genetic styles of gold mineralization formed over >2 billion years of geologic history. In excess of 90 million ounces of gold (recorded past production + unmined resources reported from published sources believed to be accurate, but not verified) are contained within five distinct styles of gold deposits in roughly a 300 square kilometer area. This is thought to represent the greatest endowment per square kilometer of any gold district in the United States. The repeated formation of large gold deposits over time in the same small geographic area argues for a fundamentally gold-enriched area of the earth's crust that has persisted since the Archean time. Solitario's property does not contain any historic producing mines nor resources and the presence of nearby gold deposits does not indicate that economic gold deposits are present on the Golden Crest project.

A Laramide-aged igneous belt of alkalic magmatic intrusive centers occurs along a linear WNW-trending belt for

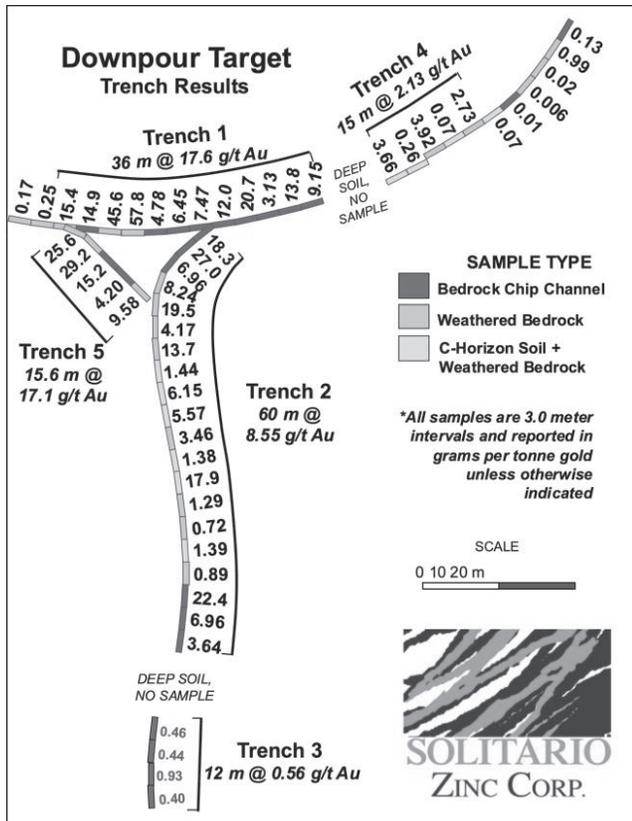
approximately 150 km across the northern Black Hills and includes dozens of intrusive stocks and laccoliths and innumerable dikes and sills concentrated in five magmatic centers. These Tertiary-aged intrusive rocks have remobilized important orogenic gold mineralization in the Precambrian basement into overlying Paleozoic rocks. In the Ruby Basin camp at the Wharf Mine Complex, thick pre-mineral igneous sills acted as permeability barriers within the Deadwood Formation that resulted in the deposition of gold mineralization.

Alteration, gold and trace element enrichment in the Pahasapa formation at the Golden Crest project is viewed as a possible indication of replacement-style epithermal mineralization in stratigraphic units lower in the sedimentary sequence (e.g. Upper and Lower Deadwood Formation). Ore-forming magmatic hydrothermal fluids ascended from mineralizing centers may have passed through overlying Paleozoic carbonate sections along subvertical faults and fractures, becoming progressively cooler and diluted by ground water, and depositing trace elements and gold. This extensive hydrothermal fluid interaction is interpreted to have resulted in widespread low-temperature alteration of limestones, silicification and geochemical anomalism +/- gold mineralization in the Pahasapa Formation.

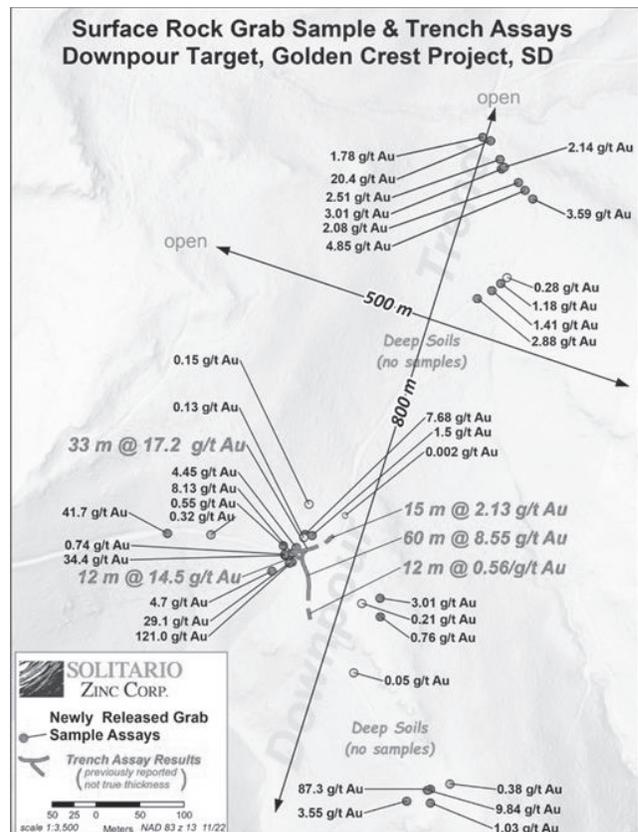
Over twenty gold-enriched target areas have been identified by Solitario by select rock grab sampling. All of these prospects have returned anomalous gold assays, with fourteen containing multi-gram gold per tonne and the remaining prospects returned values between 0.1 and one-gram gold. with fourteen containing multi-gram gold per tonne and the remaining prospects returned values between 0.1 and one-gram gold.

Late in the 2021 field season, Solitario received very high-grade gold values from select surface grab rock samples at the Downpour target area. Additional surface sampling was conducted in the immediate area of the high-grade samples and eight continuous three-meter (total 24 meters) rock-chip channel samples were also collected. In 2022, Solitario sampled an additional 127.5 meters of trenching at Downpour, where significant high-grade intervals were found as shown in the lefthand Downpour Target map below.

Solitario also expanded its exploration search area at the Downpour Prospect in 2022 and successfully enlarged the potential target area for high-grade gold mineralization. As shown on the Rock Grab Sample Assay Map on the righthand side below, mineralization at Downpour has now been identified over an 800-meter-long strike length, with a width of up to 500 meters wide. This prospect remains open in three directions.

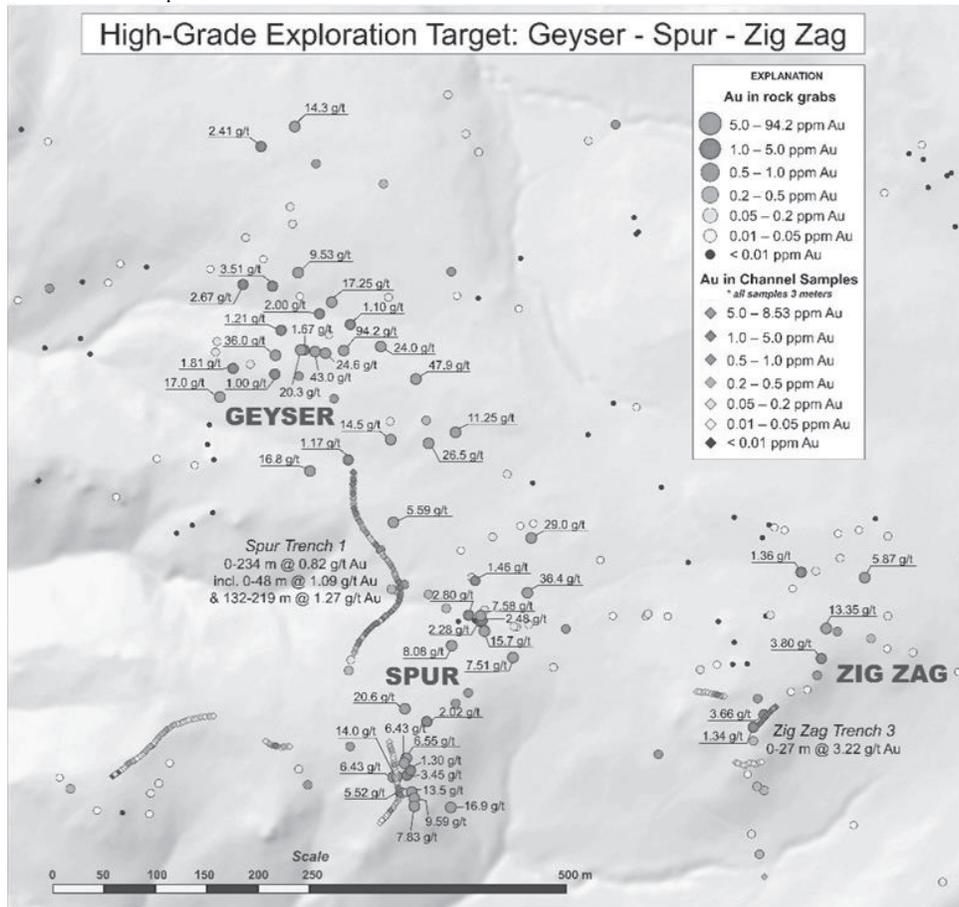


Downpour trenching results with assay values in gpt gold.



Greater Downpour area with rock grab sample assay results.

In 2022, Solitario discovered a new area of significant mineralization within a generalized area called Ponderosa. Select grab sampling of float, weathered bedrock and bedrock yielded both low- and high-grade gold mineralization. Three centers of mineralization were initially identified by select grab samples: Geyser, Spur and Zig Zag. Based on these very favorable results, a trenching program was initiated in all three areas. Assay results for both the select rock grab samples and trenching samples are presented on the map below:



Geyser-Spur-Zig Zag prospect area with gold (gpt) assays for rock grab samples and trench samples.

All areas of trenching on the Golden Crest properties are manually completed using hand tools and are reclaimed as soon as sampling is complete. Revegetation is accomplished utilizing a seed mixture approved by the USFS.

7. Drilling:

No drilling has been conducted at the Golden Crest project by Solitario but is scheduled to begin before the end of the second quarter of 2023, pending permit approvals (see Exploration and Development section below).

8. Sampling, Analysis and Security of Samples

The collection of all select surface grab rock samples was supervised by project geologists, including chain of custody. Rock grab samples were reconnaissance select composite samples that usually displayed alteration, typically silicification, and hydrothermal brecciation. Many of the select grab samples were rock float. These samples were derived from the underlying bedrock in the immediate area, with little transport due to the subdued relief. In all cases the samples are composites within a small area of less than one-square meter or composites of sub-crop or outcrop. The significance of these samples is limited to determining whether gold, or trace elements usually associated with gold, are present within rocks affected by hydrothermal alteration fluids and assay results may not be representative of, nor verify economically mineable mineralization at depth.

Chip-channel and trenching and composite samples were more systematically collected as a measured continuous sample of bedrock, Bedrock + weathered bedrock and weathered bedrock. The chip channel assays are thought to be the most representative of bedrock mineralization in comparison to trench samples that contained weathered bedrock and/or soil. In all cases, chip channel and trenching samples are considered more representative than select grab samples. Samples were

analyzed by ALS Laboratories in Reno, NV, a laboratory accredited in accordance with the standards of ISO 17025:2017. The samples were crushed and pulverized, and sample pulps were analyzed using industry standard fire assay methods. A certified reference sample or duplicate was inserted at least every 20th sample.

9. Prefeasibility Studies: No prefeasibility studies have been conducted on the Golden Crest project.

10. Reserves and Resources: There are no reported mineral reserves or mineral resources on the Golden Crest Project.

11. Drill Hole Permitting, General Reclamation and ESG

Solitario submitted a Plan of Operations (“POO”) to the USFS in late-2021 for 25 widely spaced drill hole locations throughout our property position. After USFS comments, and Solitario responses to those comments, the POO was deemed complete in May of 2022. Respec Company LLC (“Respec”) was engaged by the USFS to complete an Environmental Assessment (“EA”) on Solitario’s proposed POO activities. A draft EA is nearing completion. After a comment period the USFS, in coordination with Respec, will analyze and prepare responses to the public comments, make any required changes to the analysis, prepare a final EA and determine if a Finding of No Significant Impact (FONSI) is appropriate. A USFS decision and an administrative record is anticipated to be filed by the end of the second quarter 2023.

Solitario is committed to a “best practices” policy for all of its exploration activities, whether on private or public lands. For example, all proposed drill hole locations will be located adjacent to or on logging roads or other logging related surface disturbances. In this way drill hole sites will minimize or eliminate new surface disturbance on public land. All rock and soil sampling, as well as hand-tool trenching, conducted to date has been reclaimed as soon as practical after taking of surface samples. We have monitored the impacts of these activities, and in all instances, virtually no visual impacts exist after completion of reclamation. Drilling proposed under the POO and analyzed in the EA will be conducted in accordance with the provisions of the decision document issued by the USFS and any state permits granted for proposed actions.

12. Planned Exploration and Development

For 2023, Solitario is planning to conduct a 4,000-5,000-meter drilling program consisting of approximately eight to twelve exploration core holes. The initiation of this program is dependent upon receiving permit approvals, which are expected before the end of the second quarter of 2023 (see Section 11 above for drill hole permitting process and status). Solitario will also continue its surface exploration program at the Golden Crest project consisting of prospecting for new areas of mineralization through the collection of select rock grab samples, systematic soil sampling, trenching and geophysics.

Florida Canyon Zinc Project (Peru)

Gustavson & Associates completed the S-K 1300 Florida Canyon TRS which is entitled *S-K 1300 Technical Report Summary Florida Canyon Zinc Project, Amazonas Department, Peru; Effective Date: February 1, 2022, Report Date: March 15, 2022.*

The following summary descriptions of the Florida Canyon project does not purport to be a complete description and is qualified in its entirety by reference to the full text of the S-K 1300 Florida Canyon TRS, which is incorporated by reference as Exhibit 96.1 to this Annual Report on Form 10-K. There has not been material change in the mineral reserves or mineral resources for the Florida Canyon Zinc project since the date of the last technical report summary for the property.

1. Property Description and Location



(Map of Florida Canyon Property, formerly Bongará)

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 (the "Framework Agreement"), pursuant to, and replacing, the 2006 Letter Agreement. In 2015 Votorantim transferred its interest in the Florida Canyon project to Milpo, an 80%-owned affiliate of Votorantim. In October of 2017, Milpo and Votorantim merged to form Nexa. Nexa is listed on the NYSE under the trading symbol "NEXA." For the remainder of this Florida Canyon property section, all references to Votorantim, Milpo or Nexa are 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 a 39% interest in the Florida Canyon project.

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. Solitario completed the funding of \$1,580,000 of a drilling program during 2019. Solitario was not obligated to fund under the terms of the Framework Agreement. The paid funding of the drilling program will be treated as an advance on Solitario's commitment to fund 30% of any future construction development costs of Florida Canyon under the original joint venture agreement. Accordingly, in the event the Florida Canyon project is developed, which cannot be assured at this time, the funds paid to Nexa under this arrangement will reduce the amount of Solitario's obligation to fund 30% of future development costs, and/or repay loans from Nexa for future development costs at the Florida Canyon project.

According to Peruvian law, concessions may be held indefinitely, subject only to payment of annual fees to the government. In June 2023, payments of approximately \$360,000 to the Peruvian government will be due in order to maintain all the Florida Canyon mineral rights of Minera Bongará S.A. Nexa is responsible for paying these costs as part of its earn-in expenditure. 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 to provide access for exploration work at the Florida Canyon project. Generally, these are short-term agreements. Nexa has an agreement with the local community which specifies certain obligations and payments that Nexa is required to provide in exchange for community permissions to perform work.

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. Nexa received a permit in 2021 to allow for drilling immediately south and east of the current Florida Canyon drilling area and is currently working on an additional permit for an expanded drilling program. Although we believe that new 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 40 kilometers of access road and is planning to complete the road access to local communities and the mineralized area of the project in 2023. Nexa maintains project field offices in Pedro Ruiz and a drill core processing facility and operations office in the nearby community of Shipasbamba.

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 permanent 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). Cominco drilled 80 core holes from 1997-2000. Cominco withdrew from the joint venture in February 2001, and at that time Solitario retained its 100% interest in the project. We maintained the claims from 2001 to 2006, until the 2006 letter agreement was signed. Nexa conducted surface drilling on an annual basis from 2006 to 2013 and from 2018 to 2019, 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 and Recent Work.”

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 1,000 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-silver 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-silver 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 and Recent Work

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, to determine 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, and in 2018-2019. Underground exploration operations were conducted from 2011-2013. Nexa has more recently continued surface exploration work consisting of geologic mapping and sampling that has identified new surface zinc mineralization to the south and east of Florida Canyon and also 15 kilometers to the north and northwest in areas called San Jose and Naranjitos (see Chambara Project below). Nexa's expenditures for 2022 were approximately \$3.2 million. The two major work activities for 2022 were: 1) advancement and upgrading of the access road to the project area and adjacent communities as part of their community outreach program; and 2) a significant metallurgical testing program (see section 9 below: "Prefeasibility Studies").

6. Mineralization

Two important styles of mineralization occur at Florida Canyon: Manto-style with mineralization usually localized in favorable carbonate strata in a near horizontal orientation; and a second style with mineralization in a near-vertical orientation occurring within high-angle structural zones. Manto mineralization occurs as both massive to semi-massive replacements and disseminations of sphalerite and galena localized by specific sedimentary facies (rock strata) within the limestone stratigraphy. Often manto-style mineralization is laterally associated with near-vertical structural feeders and karst breccias that cut the carbonate stratigraphy. 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. It is believed that mineralizing fluids passed through structurally controlled vertical feeder zones and into adjacent near-horizontal rock formations to produce mineralized vertical replacement bodies and 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.

Zinc mineralization was originally deposited in the form of sulfide minerals. However, some near-surface mineralization has been oxidized to varying degrees. Approximately 80% of mineralization defined at Florida Canyon is sulfide-dominant with the remainder being mixed sulfide-oxide, or oxide-dominant. Processing sulfide mineralization is commercially more profitable.

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 900 meters vertically, and up to 1,000 meters along strike.

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

Breakout Zone Name	Drill Hole Number	Intercepts (meters)	Zinc %	Lead %	Zinc+Lead %
Sam	GC-17	58.8	12.0	2.8	14.8
	FC-23	81.5	4.8	0.8	5.6
Karen	A-1	36.2	12.8	2.7	15.5
	V-1021	V-21	92.0	5.5	7.2
South Zone	V-44	28.3	15.2	0.8	16.0
	V-169	51.6	7.1	0.7	7.8
San Jorge	V-297	56.6	22.69	1.15	23.84

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 two largest high-angle zones identified to date are the San Jorge and 1021 zones. These zones represent well-defined north-northeast structural feeder zones. Less important mineralization occurs along 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 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.

From November 2018 to October 2019, Nexa completed a 39-hole, 17,033-meter core drilling program. The majority of holes were drilled in 2019. The program had three major objectives: 1) extend the San Jorge near-vertical replacement body to the south and the adjacent near-horizontal manto bodies to the east; 2) offset previously drilled hole V-21 in the northern part of Florida Canyon to determine if it represented a significant near-vertical replacement body with horizontal mantos similar to the San Jorge Zone; and 3) extend horizontal mantos in the central and northern parts of the Florida Canyon drilling footprint. All three objectives were successfully achieved.

All past 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 three zones with the largest amount of drilling are the San Jorge, the Karen-Milagros and the 1021 zones. Drilling indicates that, for the most part, the entire Florida Canyon district remains open to expansion and the identified zones are interconnected. Better 2018-2019 drill-hole intercepts are provided in the table below:

2018-2019 Mineralized Intersections					
Drill Hole	Intercept	Zinc	Lead	Silver	ZnEq*
Number	Meters	(%)	(%)	(grams/t)	(%)
PEBGD-03	1.3	42.7	15.0	83.0	56.9
PEBGD-04	1.3	40.5	0.0	4.8	40.6
PEBGD-08	4.4	16.8	1.1	32.1	18.3
PEBGD-10	48.9	5.2	1.0	11.5	6.2
including	17.5	11.3	2.2	25.4	13.7
PEBGD-15	12.4	14.9	0.0	8.9	15.1
PEBGD-24	4.1	18.6	0.9	5.7	19.5
PEBGD-25	6.3	7.7	0.5	3.2	8.2
And	8.8	5.2	1.5	18.1	6.9
PEBGD-30	6.7	18.4	0.0	10.6	18.7
PEBGD-31	7.4	11.3	1.7	14.5	13.1
PEBGD-32	9.3	23.5	2.8	18.1	26.5
PEBGD-33	9.9	5.9	1.6	12.9	7.7
PEBGD-36	6.1	20.1	5.6	42.4	25.6
And	1.8	35.2	0.5	69.7	37.1
PEBGD-38	9.7	22.8	0.2	11.8	23.2
PEBGD-39	3.3	37.7	9.6	65.5	47.1

*Zn-Eq was calculated using the following price assumptions: Zn=\$1.10/lb., Pb=\$0.91lb., Ag=\$16.50/oz.

Reported intervals are estimated to be at least 80% of the true thickness

Numbers in this table may not add exactly as numbers have been rounded to the nearest decimal

8. Sampling, Analysis and Security of Samples

Core recoveries were typically high within mineralized zones, but occasionally karst caves were encountered, and no core was recovered for intervals generally less than two meters. Core samples were transported from the drill by helicopter in sealed boxes to the processing facility in Shipasbamba. The entire core obtained from each drill hole, usually NQ and HQ size, was logged on site at a core storage facility. All of the core containing sulfide mineralization was cut using diamond saws and half of the core was sent for assay. Intervals of the half-core taken for assay were selected according to geologic criteria under the supervision of the geologist in charge and shipped in sealed bags by land. Cominco used SGS Laboratories (“SGS”) and Nexa used ALS-Chemex, both in Lima, Peru, where all samples were analyzed by ICP (inductively coupled plasma). 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 periodically been assisted by SRK Consulting (USA) Inc. (“SRK) and Gustavson Associates, both independent international mining engineering firms, 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 prefeasibility levels.

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. 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. These tests on composited samples indicate zinc recoveries above 90% and lead recoveries above 80% were generally achieved for sulfide dominant ores. Increasingly lower recoveries of zinc and lead resulted in direct proportion to the percentage of oxides present in the ore tested. In 2022, Nexa initiated a much more rigorous metallurgical testing program that mainly focused on sulfide mineralization, which is the dominant ore type (78%). This work indicated higher Zn and Pb recoveries as well as higher concentrate grades than was estimated previously. Zn recovery for sulfide mineralization was estimated at 91.7% with a concentrate grade of 56.6% and lead recovery of 88.5% with a concentrate grade of 52.1%.

Solitario and Nexa jointly funded a PEA prepared by SRK 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.

Although sulfide recoveries reported in the 2017 PEA were very good, SRK suggested that optimization of processing and metallurgical parameters may result in improved recoveries and concentrate grade. In consideration of this recommendation, in 2022, Nexa initiated a much more rigorous metallurgical testing program that mainly focused on sulfide mineralization, which is the dominant ore type (78%). This work indicated higher Zn and Pb recoveries as well as higher concentrate grades than was estimated previously. Zn recovery for sulfide mineralization was estimated at 91.7% with a concentrate grade of 56.6% and lead recovery of 88.5% with a concentrate grade of 52.1%. The impact of these recent metallurgical testing results combined with the increase in sulfide resources reported in 2021 is expected to have a positive impact on project economics.

Prior to the 2022 S-K 1300 Florida Canyon TRS filing, Solitario filed on SEDAR in Canada a technical report entitled: *Amended NI 43-101 Technical Report on Resources, Florida Canyon Zinc Project, Amazonas Department, Peru; Effective Date: February 1, 2021; Report Date: April 5, 2021; and Amended Date: May 27, 2021.*

10. Reserves and Resources

There are no reported mineral reserves at the Florida Canyon project. Estimated Mineral Resources for the Florida Canyon deposit are shown in the table below (for greater detail, see “S-K 1300 Technical Report Summary Florida Canyon Zinc Project, Amazonas Department, Peru; Effective Date: February 1, 2022, Report Date: March 15, 2021, which is Exhibit 96.1 to this Annual Report on Form 10-K. Gustavson & Associates, an international independent mining engineering firm, completed the S-K 1300 Florida Canyon TRS).

Florida Canyon Total Mineral Resources (100% basis)

Classification	Sum of Tonnes	Zn %	Ag g/t	Pb %	Fe %
Measured	806,945	11.32	15.42	1.39	2.44
Indicated	1,634,702	10.28	14.87	1.31	2.23
Measured + Indicated	2,441,647	10.62	15.05	1.33	2.3
Inferred	14,858,733	9.63	11.28	1.26	2

Mineral resources are not mineral reserves and have not been demonstrated to have economic viability. There is no certainty that the mineral resource will be converted to mineral reserves. The quantity and grade or quality is an estimate and is rounded to reflect the fact that it is an approximation. Quantities may not sum due to rounding.

- CIM (2014) standards for mineral resources were followed.
- The effective date of the Mineral Resource Estimate is February 1st, 2021.
- The mineral resources are reported using a cutoff of US \$41.40/t NSR for sub-level mining areas, US \$42.93/t for cut and fill, and US \$40.61/t for room and pillar areas of the mine.
- The minimum mining thickness was 3 m for sub-levels in cut and fill, and 4 m for room and pillars method.
- Mineral resources are reported exclusive of mineral reserves.
- Mineral resources are not mineral reserves and have not demonstrated economic feasibility.
- Numbers may not sum correctly due to rounding.

Estimates for mineral resources are based on drill results received up to 30 October 2020, with 545 holes and a total length of 136,758.15 m stope shapes for support of economic potential were developed using the stope optimizer tool of Deswik (DSO).

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, 2022, 700 meters of tunneling were completed.

12. Planned Exploration and Development

Nexa plans to conduct a 4,000-to-5,000-meter core drilling program on the Florida Canyon project during 2023. The program is focused on testing for southern extensions to the very well mineralized San Jorge and Sam structure and associated mantos bodies. Drilling is also being considered in the Karen-Milagros and Sam areas to the north of the current resources.

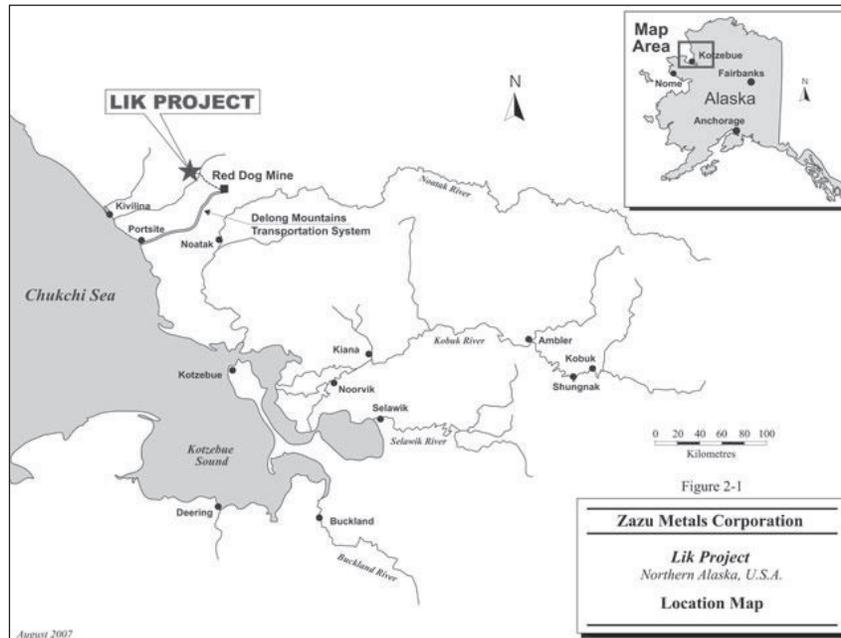
Lik Zinc Project (Alaska)

Gustavson & Associates completed the S-K 1300 Lik TRS which is entitled *S-K 1300 Technical Report Summary Lik Zinc Project, Northwest Arctic Borough, Alaska, USA: Effective Date: December 31, 2021, Report Date: March 11, 2022.*

The following summary descriptions of the Lik Zinc project does not purport to be a complete description and is qualified in its entirety by reference to the full text of the S-K 1300 Lik TRS, which is Exhibit 96.2 to this Annual Report on Form 10-K and is incorporated by reference herein. There has not been material change in the mineral reserves or mineral resources for the Lik project since the date of the last technical report summary for the property.

1. Property Description and Location

(Map of Lik property) Lik.jpg



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.

To retain the state claims, the Company is required to make annual rental payments to the State of Alaska. The estimated rental payments for 2022 are \$9,000. 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 Metals Corp (“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. 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. HOMEX assigned its interest in the Lik Block Agreement to Echo Bay Mines Ltd., which, in turn, assigned such interest to Teck. The Lik Block Agreement terminated on January 27, 2018 and the joint venture is now governed under the Joint Operating Agreement (“JOA”) that was attached to the Lik Block Agreement. Since 2018, Teck and Solitario have agreed to annual exploration funding to advance the Lik project. The JOA requires unanimous approval by the parties for annual expenditures in excess of \$1 million. Solitario is the operator of the joint venture. Solitario and Teck each retain a 50% interest in the Lik property.

In July 2018, the Company and Teck signed a Joint Exploration Agreement (“JEA”) whereby both parties agreed to fund a surface exploration program on a 50%/50% basis for 2018. Addendums extending the JEA and providing funding for continued exploration were signed in 2019, 2020, 2021, 2022 and a fifth Addendum to the JEA is expected to be signed in 2023. Teck has acted as manager of the exploration programs for the past four years.

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, Alaska, which is located about 90 miles from the deposit, is a seaport with commercial air service from Anchorage, Alaska. Kotzebue is the center for access to the nearby Red Dog mine operated by Teck.

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 nine inches of rain and 47 inches of snowfall per year. Snow falls are not extreme but blowing snow may form significant drifts. Strong winds are common in most parts of Alaska. Diamond drilling is possible at the Lik property between June and October.

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.

There is a camp located on the Lik property. The camp has been used periodically over the last fifteen years. 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, 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. Construction of a road would be required to connect the Lik deposit to the haul road from Red Dog to the port. The port has a shipping season in excess of 100 days.

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. ("WGM"), 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 diamond drilling programs during the 2007, 2008 and 2011 summer field seasons. From 2009 through 2014, Zazu conducted a suite of economic, engineering, environmental and metallurgical studies on the Lik property, culminating with the completion of a PEA in 2014.

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 deep-water facies of the Lisburne Group, the Kuna Formation, are exposed chiefly in the Endicott Mountains.

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 known 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 Siksikpak 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.

Low angle thrust faults also cut the rocks at Lik and regionally. These faults are known to cut and displace massive sulfide mineralization at the Red Dog deposits and others in the district.

6. Prior Exploration and Recent Work

The Lik deposit was discovered by GCO in the mid-1970's by following up on soil color and stream geochemical anomalies. From the late 1970's to 2011, various geochemical, geophysical, and geologic activities were intermittently conducted to define drill targets. The Lik property was drill tested from the late-1970's to 2011 by seven different companies. Details of these historical drilling campaigns are discussed above under the heading "History" and below under the heading "Drilling."

Teck conducted a soil sampling survey, an Induced Polarization ("IP") geophysical survey and geologic mapping in 2021. The majority of this work was conducted northeast of the Lik deposit exploring for indications of potential new zinc deposits on trend with the Lik deposit in favorable stratigraphy. A total of 381 soil samples were collected. The IP geophysical survey consisted of six survey lines totaling eight kilometers. The results of the IP survey suggested that the rock formation that hosts the Lik deposit may flatten out to the west and be at drillable depths, opening up a whole new area for potential drill testing.

Teck completed a three-hole, 737-meter (2,415 feet) drilling program in 2022. This was the first drilling program conducted since 2011. Drill hole Lik-231 intersected 3.5 meters (11.5 feet) grading 9% zinc and 3% lead. Holes Lik-230 and 232 did not intersect significant mineralization. In addition to the drilling, Teck also conducted traverse geologic mapping to the northwest of the Lik deposit and a ground gravity geophysics with survey data points at 400-meter (1,300-foot) centers. The geophysical survey was also conducted to the northwest of the Lik deposit and was successful in defining a low-amplitude gravity anomaly that requires further follow-up work.

In December 2022, Teck submitted a drilling permit application to the Alaska Department of Natural Resources for 70 core holes, including water sources for drilling. Drill hole location includes step-out drilling surrounding the currently defined deposit as well as location along strike to the northeast and theoretical targets more distant to the deposit. This robust permitting submission allows for significant flexibility in the choice of drill sites for the next five years.

7. Mineralization

The Lik deposit is a black shale-hosted stratiform zinc-lead-silver sedimentary-exhalative (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 portion of the ore body near the surface is oxidized. The deposit is continuous outside the Lik property onto the adjacent 100%-owned Teck property to the south. The southern continuation of the Lik deposit is referred to as the Su deposit, lying on Teck'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. 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:

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	7.01	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	2.08	28.8
43	35.66	40.69	5.03	17.66	3.62	8.6
43	60.96	80.28	19.32	9.07	2.49	47.7
43	84.73	91.04	6.31	21.07	5.95	111.4
68	32.31	53.43	21.12	13.34	2.85	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 thick. 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 are summarized in the following table.

Historical Diamond Drilling Campaigns

Year	Number of Holes	Aggregate Depth (m)	Company
1977	10	1,603.3	Managed by WGM
1978	79	10,680.2	Managed by WGM
1979	14	4,931.1	Managed by GCO
1980	3	202.1	Managed by GCO
1983	1	835.2	Managed by GCO
1984	6	1,643.5	Managed by GCO
1985	16	4,883.1	Managed by Noranda
1987	1	696.5	Managed by GCO
1990	3	263.4	Managed by Moneta
1992	2	283.5	Managed by GCO
2007	11	1,393.5	Managed by Zazu
2008	58	6,827.5	Managed by Zazu
2011	25	3,871.0	Managed by Zazu
2022	3	737.0	Managed by Teck
Totals	232	39,065.6	

Zazu completed two diamond drilling programs during 2007 and 2008 to further test the Lik South deposit and to obtain samples for metallurgical testing. 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 drilling program 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 approximately 38,328 meters (125,700 feet) of drilling in 229 holes had been completed on the Lik property by the Company (Zazu) and the previous owners.

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 cut 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 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 British Columbia. 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 Gold Inc.) 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 and selecting sample intervals.

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.

10. Prefeasibility Studies

Zazu completed a PEA 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 flotation mill for processing resulting in a nine-year mine life. Concentrates would be handled through the DeLong Mountain Regional Transportation System road and port system that currently handles all concentrate produced by the nearby Red Dog zinc mine of Teck. A summary of metallurgical testing and mineral processing is provided below. The PEA analyzed the Lik project as a stand-alone operation and assumes construction of its own independent processing, tailings and port facilities. Alternate development scenarios might be developed utilizing infrastructure under the control of the nearby Red Dog operation. However, no agreements are in place to develop such plans and are therefore hypothetical.

Prior to the S-K 1300 Lik TRS report, Solitario filed on SEDAR in Canada: 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”).

11. 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 may also be recovered and payable at times in the zinc concentrate and, more significantly, in the lead concentrate.

12. Reserves and Resources

There are no reported mineral reserves at the Lik project. Estimated mineral resources for the Lik deposit are shown in the table below (for greater detail, see “S-K 1300 Technical Report Summary Lik Zinc Project, Northwest Arctic Borough, Alaska, USA: Effective Date: December 31, 2021, Report Date: March 11, 2022, included as Exhibit 96.2 to this Annual Report on Form 10-K. Gustavson & Associates, an international independent mining engineering firm, completed the S-K 1300 Lik TRS).

Lik Mineral Resource Estimate (100% basis)

Location	Indicated Resources				Inferred Resources			
	Mt	% Zn	% Pb	g/t Ag	Mt	% Zn	% Pb	g/t Ag
Lik South	17.1	8.04	2.69	50	0.71	7.78	1.97	14.3
Lik North	0.51	8.95	2.46	52.9	2.09	8.93	2.98	47.2
Total	17.6	8.07	2.68	50.1	2.8	8.64	2.73	38.9

- (1) Price assumptions for Lik: Zn: \$0.92/lb.; Pb: \$1.01/lb.; Ag: \$19.43/oz
- (2) Mineral resource recoveries for Lik: Zn: 85.0%; Pb: 69.7%; Ag:26.87%
- (3) Mineral resource for Lik is reported at a cutoff grade of 5% Pb%+Zn%
- (4) The preliminary pit optimization was prepared using Datamine Software. The drillhole database, mineralized domain solids and block model were imported into Leapfrog Geo/Edge 2021.2.3 for review.
- (5) For the current resource estimate only surface mining methods were considered. While there may be potential to exploit mineralization via underground mining methods, this was not considered in the current resource statement.

13. Mining Operations

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

14. Planned Exploration and Development

Solitario and Teck are in final discussions to potentially fund a 2023 exploration program, with Teck acting as project manager. The program, if approved, consists of drilling two core holes totaling approximately 716 meters (2,350 feet) to test for extensions to the currently defined Lik deposit. An airborne ZTEM survey to measure for resistivity features at depth is also being considered. The drilling and geophysical programs, if approved, would begin in June of 2023.

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. In October of 2017, Milpo and Votorantim merged to form Nexa. For the remainder of this Chambara property section, all references to Votorantim, Milpo or Nexa are 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. The current claim holdings of Minera Chambara are 48 concessions totaling 36,080 hectares of valid concessions that completely surround the Florida Canyon project area held by Minera Bongará. As of December 31, 2022, 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 construction financing for Solitario's interest. Nexa has not met the cumulative spending total as of December 31, 2022. If Nexa provides such construction financing, we would repay that financing, including interest, from 80% of Solitario's portion of the project cash flow.

Significant geochemical anomalies and outcropping mineralization have been identified at several locations on the Chambara property. During 2021 Nexa conducted geologic mapping and geochemical sampling at the San Jose and Naranjitos prospects which were initially discovered by Solitario in the 1990's. Significant new geologic information collected reveal that at least some of the San Jose mineralization is found in the same stratigraphic location as the Florida Canyon deposit which indicates that the target for future drilling is closer to the surface than previously thought. It is known that the size and strength of the geochemical signature at San Jose is similar to that at Florida Canyon even though surface exploration is still at a very early stage. Even less work has been done at Naranjitos but that project also appears to be very prospective.

There are no reported mineral reserves or mineral resources at the Chambara project.

Discontinued Projects

We had no mineral property impairments in 2022. During 2021 we recorded \$17,000 of mineral property impairment related to our decision to abandon our Gold Coin project in Arizona.

Mineral Resources

The following mineral resources summary represents resources attributable to Solitario's interest in the mineral resources as provided in the S-K 1300 Florida Canyon TRS at Solitario's current 39% interest at the Florida Canyon project in Peru and Solitario's interest in the mineral resources provided in the S-K 1300 Lik TRS at Solitario's current 50% interest at the Lik project in Alaska, in each case as of the end of the fiscal year ended December 31, 2022.

Lik (1)(3)(5)	Tonnes (000)	Zinc %	Zinc lbs (000)	Silver (g/t)	Oz (000)	Lead %	Lead lbs (000)
Measured Mineral Resources	-	-	-	-	-	-	-
Indicated Mineral Resources	8,800	8.07	1,565,903	50.10	14,175	2.68	520,027
Measured+Indicated Resources	8,800	8.07	1,565,903	50.10	14,175	2.68	520,027
Inferred Mineral Resources.	1,400	8.64	266,717	38.90	1,751	2.73	84,275
Florida Canyon (2)(4)							
Measured Mineral Resources	315	11.32	78,553	15.42	156	1.39	9,646
Indicated Mineral Resources	638	10.28	144,512	14.87	305	1.31	18,415
Measured+Indicated Resources	952	10.62	222,988	15.05	461	1.33	27,926
Inferred Mineral Resources.	5,795	9.63	1,230,499	11.28	2,102	1.26	161,000
Total							
Measured Mineral Resources	315	11.32	78,553	15.42	156	1.39	9,646
Indicated Mineral Resources	9,438	8.22	1,710,415	47.72	14,480	2.59	538,443
Measured+Indicated Resources	9,752	8.32	1,788,890	46.68	14,636	2.55	547,953
Inferred Mineral Resources.	7,195	9.44	1,497,216	16.65	3,853	1.55	245,275

(1) Price assumptions for Lik: Zn: \$0.92/lb.; Pb: \$1.01/lb.; Ag: \$19.43/oz

(2) Price assumptions for Florida Canyon: Zn: \$1.20/lb.; Pb: \$1.00/lb.; Ag: \$16.50/oz

(3) Mineral resource recoveries for Lik: Zn: 85.0%; Pb: 69.7%; Ag: 26.87%

(4) Mineral resource recoveries for Florida Canyon: Zn: 79.8%; Pb: 74.3%; Ag: 51.7%

(5) Mineral resource for Lik is reported at a cutoff grade of 5% Pb%+Zn%.

(6) Mineral resource cut-offs for Florida Canyon are NSR \$41.40/t for sub-level stoping, \$42.93/t for cut and fill stoping and \$40.61/t for room and pillar.

Internal controls

Solitario's internal controls are designed to provide reasonable assurance that information and processes utilized in assessing its exploration results as well as mineral resource estimation are reasonable and in line with industry best practices. These internal controls include quality assurance and quality control ("QA/QC") programs in the collection, analysis, verification, storage, reporting and use of drillhole, assay, metallurgical and other technical and scientific information, including the following:

- Review of joint venture analysis/data/and programs by Solitario qualified personnel, including approval of budgets

and annual review of geologic and financial results of programs;

- All mineral resource calculations are prepared by independent third-party engineering firms and reviewed by Solitario's qualified person prior to final publication;
- Maintenance of a complete chain-of-custody, ensuring the traceability and integrity of the samples at all handling stages from collection, transportation, sample preparation and analysis to long-term sample storage;
- Third-party fully certified labs are used for assays used in public disclosure or resource models; and
- QA/QC data are regularly verified to ensure that outliers sample mix-ups, contamination, or laboratory biases during the sample preparation and analysis steps are correctly identified, mitigated or remediated.

Mineral resources and mineral reserves are estimates that contain inherent risk and depend upon geologic interpretation and statistical inferences drawn from drilling and sampling analysis, which may prove to be unreliable. See Risk Factors in Item 1A for additional information.

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.

“Amphibole” means any of a class of rock-forming silicate or aluminosilicate minerals typically occurring as fibrous or columnar crystals.

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

“Biotite” means a black, dark brown, or greenish black variety of mica, occurring in many igneous and metamorphic rocks.

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

“Carbonaceous” means a compound relating to or containing carbon.

“Chert” means a sedimentary rock of microcrystalline quartz (the mineral form Silicon dioxide - SiO₂).

“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, CaMg (CO₃)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.

“Float” means pieces of rock that have been broken off and moved from their original location by natural forces such as frost or glacial action.

“Galena” means a bluish gray or black mineral of metallic appearance, generally the chief ore of lead sulfide.

“Gabbros” means a granular igneous rock composed essentially of calcic plagioclase, a ferromagnesian mineral, and accessory minerals.

“gpt” means grams per tonne.

“Indicated Mineral Resource” means that part of a mineral resource for which quantity and grade or quality are estimated on the basis of adequate geological evidence and sampling.

“Inferred Mineral Resource” means that part of a mineral resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling.

“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.

“Limestone” means a bedded, sedimentary deposit consisting chiefly of calcium carbonate.

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

“Metabasalts” means generally fine to medium grained basalts, dominated by plagioclase, quartz, amphibole, and biotite rock.

“Measured Mineral Resource” means that part of a mineral resource for which quantity and grade or quality are estimated on the basis of conclusive geological evidence and sampling.

“Mineral Resource” means as a concentration or occurrence of material of economic interest in or on the earth’s crust in such form, grade or quality, and quantity that there are reasonable prospects for its economic extraction.

“Minnelusa” means a formation as a geologic unit of primarily limestone and dolomite found in the Black hills of South Dakota of the Permian to Pennsylvanian aged limestones and dolomites.

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

“NSR” means net smelter return royalty.

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

“Ounce” means a troy ounce.

“Oxide” means a mineral class in which the chemical compound typically contains an 0 -2 oxygen atom in its chemical formula.

“Pahasapa” means a formation as a geologic unit of primarily limestone and dolomite that is exposed in the Black hills of South Dakota of Mississippian aged limestones and dolomites.

”Plagioclase” means a group of feldspar minerals that form a solid solution series ranging from pure albite, $\text{Na}(\text{AlSi}_3\text{O}_8)$, to pure anorthite, $\text{Ca}(\text{Al}_2\text{Si}_2\text{O}_8)$.

“Pyrite” means a compound of iron sulfide (FeSO_2) commonly found in mineral rich areas.

“Reserves” or **“Mineral Reserve”** 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.

“Shale” means a fine-grained sedimentary rock that forms from the compaction of silt and clay commonly referred to as mud.

“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 planes 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.

“Subcrop” means an occurrence of strata beneath the subsurface of an inclusive stratigraphic unit that succeeds an unconformity on which there is marked overstep.

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

“Synform” means A topographic feature which is composed of sedimentary layers in a concave formation.

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

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

“Tonne” means a metric measure 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

From time to time, we may become a party to various legal proceedings arising in the ordinary course of business. There can be no assurance that we will prevail in any such litigation. We believe that the amount of any reasonably possible or probable loss for known matters would not be material to our financial statements; however, the outcome of these actions is inherently difficult to predict. In the event of an adverse outcome, the ultimate potential loss could have a material adverse effect on our financial condition, results of operations or cash flows in a particular period.

Item 4. Mine Safety Disclosures

Not applicable

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 the NYSE American exchange has exceeded the trading volume of our stock on the TSX by a substantial margin.

Holders of our common stock

As of March 15, 2023, we have approximately 246 holders of record of 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.

Item 6. [Reserved]

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). Effects of COVID-19

As of December 31, 2022, the effects of COVID-19 have not had a material adverse effect on Solitario's administrative activities as we have three full-time employees, all of whom can work remotely, and are not required to meet in person on a regular basis. We use part-time employees and contract geologists at our Golden Crest project in South Dakota and to date, the effects of COVID-19 have not had a material impact on our operations at the Golden Crest project. However, as a result of the pandemic our joint-venture partners, Teck at our Lik project and Nexa at our Florida Canyon project, reduced, with our concurrence, the planned exploration activities on these projects for 2021 and during 2022 implemented safety and operational protocols for COVID-19 and are reviewing their 2023 exploration plans on our projects to comply with these protocols. These protocols include, but are not limited, to; (i) our partners' limited exploration staffing; (ii) certain safety and operational guidelines for COVID-19 and other potential pandemics related to their exploration activities; (iii) the reallocation of exploration resources to non-site specific tasks, such as data and resource review, and planning for future drilling; and (iv) the ability to modify and or postpone 2023 exploration activities if necessary. Solitario has discussed these operational and safety measures with our joint venture partners and currently does not believe these measures are expected to have a major impact on planned 2023 exploration activities and does not believe these measures negatively reflect on the long-term economic potential of either its Lik or Florida Canyon projects.

The extent to which the COVID-19 pandemic impacts our business, including our exploration and other activities and the market for our securities, will depend on future developments, which are highly uncertain and cannot be predicted at this time. Please see Item 1A, "Risk Factors," in this Annual Report on Form 10-K for the year ended December 31, 2022.

Solitario believes its current cash and short-term assets together with potential access to capital under its ATM Program (defined below) or otherwise, provide Solitario with the flexibility to continue its short and mid-term operations.

(b). Business Overview and Summary

We are an exploration stage company as defined by rules issued by the SEC. We were incorporated in the state of Colorado on November 15, 1984 as a wholly owned subsidiary of Crown. In July 1994, we became a publicly traded company on the TSX through our initial public offering. We have been actively involved in mineral exploration since 1993. Our primary focus is the acquisition and exploration of precious metals and zinc-related exploration mineral properties. We have historically held a portfolio of mineral exploration properties and assets for future sale, for joint venture or to create a royalty up to the development stage of the project (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. Although our mineral properties may be developed in the future by us, through a joint venture or by a third party, we have never developed a mineral property. In addition to focusing on our current mineral exploration properties, we also from time to time evaluate potential strategic transactions for the acquisition of new precious and base metal properties and assets with exploration potential.

Our current geographic focus for the evaluation of potential mineral properties is in North and South America; however, we have conducted property evaluations for potential acquisition in other parts of the world. At December 31, 2022, we consider our Golden Crest project in South Dakota, our carried interest in our Florida Canyon project in Peru, and our interest in the Lik project in Alaska to be our core mineral property assets. 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 North and South America.

As of December 31, 2022, we have balances of cash and short-term investments that we anticipate using, in part, to fund planned 2023 exploration, to further the exploration of our Lik and Golden Crest projects, conduct reconnaissance exploration and to potentially acquire additional mineral properties. The fluctuations in commodity prices of base and precious metals have 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 the 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 potential development activities, including drilling, sampling and geologic testing, indicate a project may not be economically feasible 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 zinc or gold is down, the value of zinc, gold or other precious metal-bearing mineral properties decreases; however, when the price of zinc or gold is up it may become more difficult and expensive to locate and acquire new zinc, gold or other precious metal-bearing mineral properties with potential to have economic deposits.

The potential sale, joint venture or development of our mineral properties will occur, if at all, on an infrequent basis. Historically, we have recorded revenues and met our need for capital in the past through (i) the issuance of common stock, (ii) the sale of properties and assets; (iii) a royalty sale on our former Mt. Hamilton property; (iv) the sale of shares of marketable equity securities we hold; (v) long-term debt secured by our mineral properties; (vi) short-term borrowing; and (vii) joint venture payments, including delay rental payments. During 2022 we issued a total of 2,650,724 shares of common stock pursuant to our ATM Program for net proceeds of \$2,023,000. We did not record any mineral property income from the sale of mineral properties during 2022 or 2021. Proceeds from the sale or joint venture of properties, although potentially 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, 2022 to the year ended December 31, 2021

We had a net loss of \$3,928,000 or \$0.06 per basic and diluted share for the year ended December 31, 2022 compared to a net loss of \$2,367,000 or \$0.04 per basic and diluted share for the year ended December 31, 2021. As explained in more detail below, the primary reasons for the increase in net loss during 2022 compared to 2021 was (i) an increase in exploration expense to \$2,283,000 during 2022 compared to exploration expense of \$1,198,000 during 2021; (ii) an increase in general and administrative expense to \$1,360,000 during 2022 compared to general and administrative expense of \$952,000 during 2021; and (iii) the recording of an unrealized loss on marketable equity securities during 2022 of \$94,000 compared to an unrealized gain on marketable equity securities of \$82,000 during 2021. Partially offsetting these factors that contributed to the increase in our net loss in 2022 were the following (i) a decrease in the loss on sale of marketable equity securities to \$201,000 during 2022 compared to a loss on the sale of marketable equity securities of \$248,000 during 2021; (ii) an increase in interest and dividend income to \$131,000 during 2022 compared to interest and dividend income of \$123,000 during 2021; (iii) an increase in other income to \$20,000 during 2022 compared to other income of \$10,000 during 2021; and (iv) a decrease in the loss on derivative instruments to \$4,000 during 2022 compared to a loss on derivative instruments of \$38,000 during 2021. Each of these items is discussed in greater detail below.

Our primary exploration activities during 2022 were related to our Golden Crest project in South Dakota and our Lik project in Alaska. We recorded \$1,505,000 of exploration costs at Golden Crest during 2022 compared to \$420,000 during 2021. The Golden Crest expenditures during 2022 and 2021 consisted primarily of geologic evaluation of claims for staking, mapping and soil and rock sampling with related assay costs. In addition to these exploration costs, we also capitalized \$340,000 and 695,000 of mineral acquisition costs at Golden Crest for our initial acquisition costs related to leasing, staking and filings on claims acquired during 2022 and 2021, respectively. All future exploration and filing costs related to these claims will be expensed as incurred. Solitario's share of exploration expenses at our Lik project in Alaska was \$668,000 during 2022 compared to \$362,000 of exploration expense at the Lik project 2021. Teck completed a three-hole drilling program during 2022 which accounted for the increase in expenses during 2022 compared to 2021. This was the first drilling program conducted since 2011. Drill hole Lik-231 intersected 3.5 meters (11.5 feet) grading 9% zinc and 3% lead. Holes Lik-230 and 232 did not intersect significant mineralization. In addition, Teck performed on-going geologic evaluation of the Lik project during both 2022 and 2021, which included on-site geophysics, mapping and analysis of prior drilling and permitting as part of a 50/50 exploration program managed by Teck. The geophysical survey was successful in defining a low-amplitude gravity anomaly that requires further follow-up work. We are evaluating, along with Teck, the completed 2022 drilling program for planned exploration including potential drilling in 2023. The decision to drill at Lik during 2023 is expected to be made prior to the end of the second quarter of 2023. Given that the exploration program at our Florida Canyon project in Peru is fully funded by our joint venture partner, Nexa, we had relatively small exploration expenses at Florida Canyon of \$16,000 during 2022 compared to \$85,000 in 2021. During 2021 we made the decision to abandon our Gold Coin project in Arizona after initial exploration efforts did not provide sufficient encouragement to move the project forward. The remaining exploration expenditures during 2022 and 2021 were reconnaissance work, including the evaluation of potential mineral properties for acquisition, including work during 2021 at Golden Crest, prior to its acquisition. Our 2023 total exploration and development budget, excluding any new projects, in which we may acquire an interest, is approximately \$2,000,000, which

reflects planned work at the Golden Crest project as well as the Lik project. Our planned exploration activities in 2023 may be modified, as necessary for any drilling programs we may undertake at Golden Crest or projects we may acquire, changes related to any number of factors including COVID-19 adjustments and delays, potential acquisition of new properties, joint venture funding, commodity prices and changes in the deployment of our capital.

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

(in thousands of dollars) Property Name	Year ended December 31,	
	2022	2021
Golden Crest	\$1,505	\$420
Florida Canyon	16	85
Lik project	668	362
Gold Coin	-	25
Reconnaissance exploration activity	94	306
Total exploration expense	\$2,283	\$1,198

We believe a discussion of our general and administrative costs should be viewed without the non-cash stock option compensation expense (discussed below). Excluding these costs, general and administrative costs were \$1,022,000 during 2022 compared to \$828,000 during 2021. The major components of our general and administrative costs were (i) salary and benefits expense which increased to \$411,000 during 2022 compared to \$301,000 during 2021; (ii) legal and accounting costs which increased to \$287,000 during 2022 compared to \$199,000 during 2021 primarily due to increased exploration activity, as well as initial costs to comply with initial SK-1300 disclosure requirements during 2022; (iii) travel and investor relation costs which decreased to \$205,000 during 2022 compared to \$234,000 during 2021 as a result of less travel and fewer investor conferences attended during 2022 compared to 2021, despite some increased investor relations costs related to the Golden Crest project during 2022; and (iv) other costs related to office, insurance and miscellaneous costs which increased to \$119,000 during 2022 compared to \$94,000 during 2021 as a result of additional activity and general cost increases. We anticipate general and administrative costs for 2023 to be \$1,085,000 which will be somewhat higher than the costs incurred during 2022; however, this amount may vary significantly during 2023 depending on the outcome of our exploration activity at Golden Crest and Lik and any strategic transactions we may attempt to execute upon.

We account for our employee stock options under the provisions of Accounting Standards Codification No. 718 (“ASC No. 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 our outstanding options. During the year ended December 31, 2022, we recorded \$338,000 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 \$124,000 of non-cash stock option compensation expense during 2021. The amount was higher during 2022 primarily due the grant of 2,360,000 options with a total grant date fair value of \$876,000, of which Solitario recognized 25% on the grant date or \$218,000 compared to expense of \$23,000 for the amortization of 25% of the grant date fair value of the 140,000 new options granted during 2021. The remaining compensation expense was related to the straight-line amortization of our outstanding options in 2022 and 2021. See Note 10, “Employee Stock Compensation Plans,” to our consolidated financial statements in Item 8, “Financial Statements and Supplementary Data to this Annual Report on Form 10-K” 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.

We recorded an unrealized loss on marketable equity securities of \$94,000 during 2022 compared to a gain on marketable equity securities of \$82,000 during 2021. The net loss on marketable equity securities during 2022 was primarily related to a \$172,000 unrealized loss related to a decrease in the value of our holdings of Kinross common stock and a decrease of \$59,000 in the value of our holdings of Vox common stock, which was partially offset by an unrealized gain related to the increase of \$137,000 in the value of our holdings of Vendetta stock. The net gain during 2021 was primarily related to an unrealized gain on marketable equity securities of \$193,000 due to an increase in the value of our holdings of shares of Vendetta common stock, and an unrealized gain on marketable equity securities of \$53,000 on our holdings of Vox common stock offset by an unrealized loss on marketable equity securities of \$153,000 in the value of our holdings of Kinross common stock and an unrealized loss on the value of our holdings of TNR Gold Corp. (“TNR”) of \$11,000 during 2021. Changes in the unrealized value of our holdings of marketable equity securities are related to the changes in the fair values of those holdings which are dependent on the market prices of the individual securities.

During 2022 we sold 1,250,000 shares of Vendetta common stock for proceeds of \$63,000 and recorded a realized loss on the sales of \$201,000. During 2021 we sold (i) 2,550,000 shares of Vendetta common stock for proceeds of \$112,000 and recorded a realized loss on the sales of \$269,000; (ii) 430,000 shares of TNR common stock for proceeds of \$27,000 and recorded a gain on the sale of \$19,000 and (iii) 3,200 shares of Vox for proceeds of \$8,000 and recorded a gain on the sale of \$2,000. See Note 3, “Marketable Equity Securities” to our

consolidated financial statements in Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K for additional discussion of our marketable equity securities. We may sell some of our marketable equity securities from time to time during 2023 for working capital needs; however, we do not expect to sell all of our holdings of marketable equity securities during 2023. Any proceeds we may receive from sales of marketable equity securities during 2023 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, 2022. See “Liquidity and Capital Resources” below.

We recorded a loss on derivative instruments of \$4,000 during 2022 compared to a loss on derivative instruments of \$38,000 during 2021. During 2022, our warrants to acquire Vendetta common stock (“Vendetta Warrants”) expired unexercised, which resulted in the \$4,000 loss on derivative instruments. The loss during 2021 was primarily related to a \$46,000 loss on our Vendetta Warrants offset by a gain on certain Kinross calls we sold for \$8,000, which expired unexercised. See Note 7, “Derivative Instruments” to our consolidated financial statements in Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K for additional discussion of our derivative instruments. We anticipate we may write calls against our holdings of Kinross common stock in 2023 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.

We recorded \$29,000 of depreciation and amortization during 2022 compared to \$27,000 of depreciation and amortization during 2021. We added approximately \$50,000 of equipment for use at our Golden Crest project which accounted for the majority of the increase in our depreciation between 2022 and 2021. We amortize our equipment over a five-year period. We anticipate our 2023 depreciation and amortization expense will be similar to our 2022 depreciation expense.

We recorded interest income of \$131,000 during 2022 compared to interest income of \$123,000 during 2021. The increase during 2022 was primarily related to an increase in the outstanding balances of our investments in United States Treasury securities during the majority of the year as a result of the \$2,036,000 received from sales of our common stock under our ATM Program effected in the first quarter of 2022. In addition, during 2022 we recorded an unrealized loss of \$108,000 related to the value of our mark-to-market short term investments in United States Treasury securities compared to an unrealized loss of \$102,000 during 2021 as a result of changing interest rates. We anticipate our interest income will decrease in 2023 compared to 2022 as a result of the use of our short-term investments and our cash balances for ordinary overhead, operational costs, and 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.

Our other income of \$20,000 during 2022 was from the sale of certain exploration data on a non-owned mineral property upon which Solitario had previously done exploration activities. Our other income of \$10,000 during 2021 related to the forgiveness of \$10,000 remaining balance on our Paycheck Protection Program loan (the “PPP Loan”) that originated in 2019 with an original balance of \$70,000. We do not anticipate other income will be a significant source of cash in 2023, if at all.

We recorded no deferred tax expense or benefit in either 2022 or 2021 as we provide a valuation allowance for the tax benefit arising out of our net operating losses for all periods presented. See Note 6, “Income Taxes” to our consolidated financial statements in Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K for additional discussion of our income tax valuation allowance, deferred tax assets and our net operating losses for 2022 and 2021. 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 2022 we recorded no mineral property impairments. During 2021 we recorded \$17,000 of mineral property impairment related to our decision to abandon our Gold Coin project in Arizona.

(d). Liquidity and Capital Resources

Cash

As of December 31, 2022, we had \$316,000 in cash. We intend to utilize a portion of this cash and a portion of our short-term investments, discussed below, to fund our ordinary overhead, operational costs, exploration activities and for the potential acquisition of additional mineral properties and other assets over the next several years.

Short-term Investments

As of December 31, 2022, we have USTS with maturities of 15 days to one year, recorded at their fair value of \$3,951,000. Solitario has also held CD's during 2021 and 2022 which matured during 2022 and Solitario has no outstanding CD's at December 31, 2022. The USTS and CD's are recorded at their fair value based upon quoted market prices. Our short-term investments in USTS and CD's 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 short-term investments not used for operating costs or mineral property acquisitions as they mature during 2023.

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 as of December 31, 2022, which are recorded at their fair value of \$409,000. As of December 31, 2022, we own 7,750,000 shares of Vendetta common stock recorded at their fair market value of \$229,000 and we own 134,055 shares of Vox common stock recorded at their fair market value of \$311,000. Changes in the fair value of marketable equity securities are recorded as gains and losses in the statements of operations. Solitario also holds 200,000 shares of Highlander Silver Corp. stock at December 31, 2022, which has a restrictive legend and has been recorded with a zero fair value until the restrictive legend is removed.

Working Capital

We had working capital of \$4,991,000 at December 31, 2022 compared to working capital of \$6,883,000 as of December 31, 2021. Our working capital at December 31, 2022 consists primarily of our cash and cash equivalents, our investment in short-term investments and our marketable equity securities, less our current liabilities of \$263,000. As of December 31, 2022, 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 anticipate using our working capital and any additional funds we might acquire to carry out our 2023 planned expenditures. Our existing resources are adequate to fund these expenditures. These expenditures include planned exploration for Golden Crest, including potential drilling, pending the receipt of required permits, as well as planned exploration at our Lik project where we are in discussions with our joint venture partner, Teck regarding planned 2023 expenditures. We do not expect any significant exploration expenditures at our Florida Canyon project where Nexa is responsible for all 2023 planned expenditures. 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

As of December 31, 2022, options to acquire 5,390,000 shares of our common stock were outstanding. There are 3,227,500 options that are vested and exercisable at December 31, 2022. As of December 31, 2022, our outstanding options include 5,250,000 options that are in the money with a weighted average exercise price of \$0.41 per share, which is below the market price of a share of Solitario common stock at December 31, 2022 of \$0.62 per share as quoted on the NYSE American exchange. See Note 10, "Employee Stock Compensation Plans" to our consolidated financial statements in Item 8, "Financial Statements and Supplementary Data of this Annual Report on Form 10-K for a discussion of the activity in our 2013 Plan during 2022 and 2021. We anticipate that a portion of stock options for 1,561,500 shares of our common stock, which expire in October 2023 with an exercise price of \$0.31 per share may be exercised during 2023 if our stock price as quoted on the NYSE American exchange exceeds the exercise price prior to the expiration date.

December 2021 Equity Offering

On December 6, 2021 we completed the sale of 3,100,000 shares of common stock (the "Shares"), at a price of \$0.50 per share (the "Offering") for net proceeds after expenses of \$1,542,000. We did not engage an underwriter or placement agent for the Offering, and therefore there were no underwriter discounts or commissions or placement agent fees. The sale of the Shares was made through a subscription agreement between Solitario and each respective investor. The Shares were offered and sold pursuant to our existing shelf registration statement on Form S-3 (File No. 333-249129). We filed a prospectus supplement, dated December 1, 2021, with the SEC in connection with the sale of the Shares in the Offering. Three of our executive officers participated in the Offering, purchasing 50,000 Shares each, on the same terms as the other investors. The Offering was unanimously approved by our Board of Directors and the participation by our executive officers was also unanimously approved by the Audit Committee of our Board of Directors.

At the Market Offering

On February 2, 2021, we entered into an at-the-market offering agreement (the “ATM Agreement”) with H. C. Wainwright & Co., LLC (“Wainwright”), under which we may, from time to time, issue and sell shares of our common stock through Wainwright as sales manager in an at-the-market offering under a prospectus supplement for aggregate sales proceeds of up to \$9.0 million (the “ATM Program”). The common stock is distributed at the market prices prevailing at the time of sale. As a result, prices of the common stock sold under the ATM Program may vary as between purchasers and during the period of distribution. The ATM Agreement provides that Wainwright is entitled to compensation for its services at a commission rate of 3.0% of the gross sales price per share of common stock sold. In March 2022, we sold 2,650,724 shares of our common stock under the ATM Program at a price of \$0.79 per share for net proceeds of \$2,023,000 after commissions and sale expenses. During 2021, we recorded \$144,000 as a charge to additional paid-in-capital for one-time expenses related to entering into the ATM Agreement. During 2021, we sold an aggregate of 643,033 shares of our common stock under the ATM Program at an average price of \$0.68 per share for net proceeds of \$299,000 after commissions, sale expenses, and one-time expenses.

Off-balance sheet arrangements

As of December 31, 2022 and 2021, we have no off-balance sheet arrangements.

(e). Cash Flows

Net cash used in operations during the year ended December 31, 2022 increased to \$2,900,000 compared to \$2,157,000 for the year ended December 31, 2021 primarily as a result of (i) the increase in exploration expense at our Golden Crest project to \$1,505,000 during 2022 compared to \$420,000 of exploration expense incurred at our Golden Crest project during 2021, and the increase in exploration expense at our Lik project to \$668,000 during 2022 compared to \$362,000 expense incurred at Lik during 2021; and (ii) an increase in the use of cash from the net change in accounts payable and other current liabilities to \$51,000 during 2022 compared to a net use of cash of \$17,000 from the net change in accounts payable and other current liabilities during 2021. Partially offsetting this increased use of cash in operations was (i) a net source of cash from changes in prepaid expenses and other current assets of \$265,000 during 2022 compared to a net use of cash from changes in prepaid expenses and other current assets of \$277,000 during 2021; (ii) a reduction in reconnaissance exploration expense to \$94,000 during 2022 compared to reconnaissance exploration of \$306,000 during 2021; and (iii) an increase in interest income to \$131,000 during 2022 compared to interest income of \$123,000 during 2021. These items are discussed in further detail above under “Results of Operations.”

Net cash provided by investing activities increased to \$701,000 during 2022 compared to net cash provided of \$90,000 during 2021. The primary reasons for the increase in cash provided by investing activities are (i) an increase in the cash provided from the sale of short-term investments to \$1,028,000 during 2022 compared to \$609,000 during 2021; and (ii) a reduction in capitalized initial costs for new Golden Crest claims to \$340,000 compared to the capitalization of initial costs on claims and lease acquisition costs at Golden Crest of \$695,000 during 2021. Partially offsetting these net increases in cash provided by investing activities were (i) an increase in acquired exploration related equipment classified as other assets related to the Golden Crest project to \$50,000 during 2022 compared to additions to other assets of \$39,000 during 2021, and (ii) a decrease in the cash from the sale of marketable equity securities to \$63,000 during 2022 compared to cash from the sale of marketable equity securities of \$147,000 during 2021. We anticipate we will continue to utilize proceeds from the sale of our short-term investments and any proceeds we may derive from potential sales of marketable equity securities to fund our operations during 2023.

Our net cash provided by financing activities during 2022 was from (i) the sale of 2,650,724 shares of our common stock under the ATM Program at a price of \$0.79 per share for net proceeds of \$2,023,000, and (ii) the exercise of options for 114,250 shares of our common stock for net proceeds of \$30,000. Our net cash provided by financing activities during 2021 was from (i) the sale of 3,100,000 shares in December 2021 of our common stock for net proceeds of \$1,542,000; (ii) the issuance of 643,033 shares of our common stock under the ATM Program for net proceeds of \$299,000 and (iii) the exercise of options for 185,000 shares of our common stock for net proceeds of \$83,000. We may utilize the ATM Program during 2023 to supplement our existing cash resources, however we will only use the ATM Program when we believe the market conditions based upon the quoted price of a share of our common stock are appropriate.

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

Development Activities

We do not have any ongoing mineral development activities, which are activities for the development of mineral properties with reserves for potential mining.

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 2022 mineral and surface property filing rental and option payments, included in exploration expense, were \$107,000. Our 2023 total exploration property rentals and option payments for properties we own, have under joint venture, or operate are estimated to be approximately \$1,273,000. 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 \$854,000 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.

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, 2022 and 2021, 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, 2022				
	Payments due by period				
	Total	Less than 1 year	1–3 years	4–5 years	More than 5 years
Operating Lease Obligations (1)	\$ 35	\$ 35	\$ -	\$ -	\$ -
Mineral property option and lease payments (2)	\$ 419	\$ 419	\$ -	\$ -	\$ -

(1) Lease obligation on our Wheat Ridge, Colorado office.

(2) Mineral property payments under lease and property claim and concession payments for the next year, net of joint venture payments.

(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, 2022. 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.

Golden Crest

The Golden Crest project is 100%-owned early-stage exploration project located in the northern Black Hills of western South Dakota in Lawrence County. The Golden Crest project is comprised of 1707 unpatented lode claims, with an associated area of approximately 33,000 acres. Solitario acquired its initial interest in the Golden Crest project during 2021.

During 2022 Solitario conducted exploration activities on the Golden Crest project including grid soil and grab rock

sampling, hand trenching, mapping, induced polarization ground geophysics, permitting and geotechnical work. Over twenty gold-enriched target areas have been identified, with fourteen of these areas containing multi-gram gold per tonne assays.

A Plan of Operations for drilling has been submitted to the USFS and is currently under review. If permits to drill are received during 2023 field season, Solitario will conduct a 4,000-5,000 meter drilling program. In addition, we will be continuing a surface exploration program during 2023 consisting of prospecting for new areas of mineralization through the collection of select rock grab samples, systematic soil sampling and geophysics.

Florida Canyon

The Florida Canyon 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 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 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 terrain at Florida Canyon is steep and 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. During 2022 and 2021 limited work was undertaken on road access to the project, and Nexa expects to continue to work on completing the road access during 2023.

Nexa's expenditures during 2022 were for the advancement of the access road, community outreach, and a metallurgical testing program. During 2021, Nexa worked on two separate drilling permits. The first of these permits (4MEIAsd) was approved and allows additional drilling immediately to the south and east of the current Florida Canyon drilling footprint. The second permit (5MEIAsd) greatly expands the area in which drilling is permitted to the south and east. The metallurgical testing program was undertaken to better quantify recoveries of zinc, lead and silver and to more accurately determine the quality of concentrate that the Florida Canyon ores can produce. The results of the program were encouraging by increasing the estimated recoveries and concentration grades at Florida Canyon. Nexa has indicated during 2023 they will undertake a 4,000 to 5,000 meter drilling program to focus on the extension of the current resource, Nexa is also continuing to extend road construction to local communities that currently do not have vehicle access as part of their ESG commitment.

Lik project

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

During 2022 Teck completed a three-hole, 737-meter (2,415 feet) drilling program in 2022. Drill hole Lik-231 intersected 3.5 meters (11.5 feet) grading 9% zinc and 3% lead. In addition to the drilling, Teck also conducted traverse geologic mapping and a ground gravity geophysics survey, which was successful in defining a low-amplitude gravity anomaly that requires further follow-up work.

For 2023, Teck has submitted a drilling permit application to the Alaskan Department of Natural Resources for 70 core holes, including water sources for drilling. Drill hole location include step-out drilling surrounding the currently defined deposit as well as location along strike to the northeast and theoretical targets more distant to the deposit. This robust permitting submission allows for significant flexibility for the next five years.

Solitario and Teck are in discussions to jointly fund a 2023 exploration program, with Teck acting as project manager. The program will include core analysis, mapping and other surface work, project maintenance and, if approved, a limited drilling program to follow-up on the results of the three core holes drilled during 2022. No specific drill targets have been approved, which is expected to be decided prior to the end of the second quarter of 2023.

Other Properties

Chambara

The current claim holdings of Minera Chambara are 48 concessions totaling 36,080 hectares of valid concessions that surround the Florida Canyon project area held by Minera Bongará. The project has been on care and maintenance in recent years. Significant geochemical anomalies and outcropping mineralization have been identified at several locations on the Chambara property. Nexa is responsible for maintaining the property in good standing and making all concession payments to the Peruvian government.

2023 Planned Expenditures

Our 2023 total exploration and development budget is approximately \$2,000,000 for our planned exploration expenditures. This amount does not include any significant expenditures for our Florida Canyon project where our joint venture partner, Nexa, is responsible for 100% of exploration costs. It includes \$1,852,000 planned exploration expense at our Golden Crest project, excluding drilling, pending permitting. We will continue the evaluation of potential new acquisitions of properties primarily in the United States around the Golden Crest project as well as other regions of North and South America. We expect to carry out our exploration activities during 2023 utilizing Teck at Lik, Nexa at Florida Canyon, and our own employees and contract geologists at Golden Crest and other projects.

(h). Discontinued Projects

We recorded no mineral property impairments during 2022. During 2021 we recorded \$17,000 of mineral property impairment related to our decision to abandon the Gold Coin project in Arizona.

(i). Significant Accounting Policies and Critical Accounting Estimates

See Note 1, “Business and Summary of Significant Accounting Policies,” in Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K for a discussion of our significant accounting policies.

Solitario’s valuation of mineral properties is a critical accounting estimate. We review and evaluate our mineral properties for impairment when events or changes in circumstances indicate that the related carrying amounts may not be recoverable. Significant negative industry or economic trends, adverse social or political developments, geologic results, geo-technical difficulties, or other disruptions to our business are a few examples of events that we monitor, as they could indicate that the carrying value of the mineral properties may not be recoverable. In such cases, a recoverability test may be necessary to determine if an impairment charge is required. There has been no change to our assumptions, estimates or calculations during the year ended December 31, 2022.

(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” of this Annual Report on Form 10-K for a discussion of recent accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

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

Item 8. Financial Statements and Supplementary Data

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Consolidated Financial Statements	
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Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Solitario Zinc Corp.

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Solitario Zinc Corp. (the “Company”) as of December 31, 2022 and 2021, the related statements of operations, shareholders' equity, and cash flows for each of the years in the two-year period ended December 31, 2022, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the years in the two-year period ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion

The Company's management is responsible for these financial statements. 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.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved especially challenging, subjective, or complex judgments. We determined that there are no critical audit matters.

/s/ Plante & Moran, PLLC

We have served as the Company's auditor since 2004.

Denver, Colorado
March 15, 2023

SOLITARIO ZINC CORP.
CONSOLIDATED BALANCE SHEETS

(in thousands of U.S. dollars, except share and per share amounts)

	December 31, 2022	December 31, 2021
Assets		
Current assets:		
Cash and cash equivalents	\$ 316	\$ 462
Short-term investments, at fair value	3,951	5,087
Investments in marketable equity securities, at fair value	949	1,307
Prepaid expenses and other	38	303
Total current assets	5,254	7,159
Mineral properties	16,646	16,306
Other assets	134	154
Total assets	\$22,034	\$23,619
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	\$228	\$239
Operating lease liability	35	37
Total current liabilities	263	276
Long-term liabilities		
Asset retirement obligation – Lik	125	125
Operating lease liability	-	35
Total long-term liabilities	125	160
Commitments and contingencies (Note 9)		
Shareholders' equity:		
Preferred stock, \$0.01 par value, authorized 10,000,000 shares (none issued and outstanding at December 31, 2022 and 2021)	-	-
Common stock, \$0.01 par value, authorized, 100,000,000 shares (64,801,373 and 62,036,399, respectively, shares issued and outstanding at December 31, 2022 and 2021)	648	620
Additional paid-in capital	74,886	72,523
Accumulated deficit	(53,888)	(49,960)
Total shareholders' equity	21,646	23,183
Total liabilities and shareholders' equity	\$22,034	\$23,619

See Notes to Consolidated Financial Statements.

SOLITARIO ZINC CORP.
CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share amounts)

	For the years ended December 31,	
	2022	2021
Costs, expenses and other		
Exploration expense	\$ 2,283	\$ 1,198
Depreciation and amortization	29	27
Mineral property impairment	-	17
General and administrative	1,360	952
Total costs, expenses and other	3,672	2,194
Other (expense) income		
Interest and dividend income (net)	131	123
Other income	20	10
Loss on derivative instruments	(4)	(38)
Loss on sale of marketable equity securities	(201)	(248)
Unrealized loss on short-term investments	(108)	(102)
Unrealized (loss) gain on marketable equity securities	(94)	82
Total other income (expense)	(256)	(173)
Net loss	\$(3,928)	\$(2,367)
Loss per common share		
basic and diluted	\$(0.06)	\$(0.04)
Weighted average shares outstanding		
Basic and diluted	64,263	58,709

See Notes to Consolidated Financial Statements.

SOLITARIO ZINC CORP.
CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 2022 AND 2021

(in thousands, of U.S. Dollars
except share amounts)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Total Shareholders' Equity
	Shares	Amount			
Balance at December 31, 2020	58,108,366	\$581	\$70,514	\$(47,593)	\$23,502
Stock option expense	-	-	124	-	124
Issuance of shares – option exercises	185,000	2	81		83
Issuance of shares – ATM, net	643,033	6	293		299
Issuance of shares – private placement	3,100,000	31	1,511		1,542
Net loss	-	-	-	(2,367)	(2,367)
Balance at December 31, 2021	62,036,399	\$620	\$72,523	\$(49,960)	\$23,183
Stock option expense			338		338
Issuance of shares – option exercises	114,250	1	29		30
Issuance of shares – ATM, net	2,650,724	27	1,996		2,023
Net loss	-	-	-	(3,928)	(3,928)
Balance at December 31, 2021	64,801,373	\$648	\$74,886	\$(53,888)	\$21,646

See Notes to Consolidated Financial Statements.

SOLITARIO ZINC CORP.
CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands of U.S. Dollars)

	For the year ended December 31,	
	2022	2021
Operating activities:		
Net loss	\$ (3,928)	\$ (2,367)
Adjustments to reconcile net loss to net cash used in operating activities:		
Unrealized loss (gain) on marketable equity securities	94	(82)
Unrealized loss on short-term investments	108	102
Loss on sale of marketable equity securities	201	248
Loss on derivative instruments	4	38
Other income – Paycheck Protection Program loan forgiveness	-	(10)
Mineral property impairment	-	17
Employee stock option expense	338	124
Depreciation	29	27
Amortization of right of use lease asset	40	40
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	265	(277)
Accounts payable and other current liabilities	(51)	(17)
Net cash used in operating activities	(2,900)	(2,157)
Investing activities:		
Sale of short-term investments – net	1,028	609
Additions to mineral property	(340)	(635)
Sale of marketable equity securities	63	147
Sale of derivative instruments – net	-	8
Additions to other assets	(50)	(39)
Net cash provided by investing activities	701	90
Financing activities:		
Issuance of common stock – net of issuance costs	2,023	1,841
Stock options exercised for cash	30	83
Net cash provided by financing activities	2,053	1,924
Net decrease in cash and cash equivalents	(146)	(143)
Cash and cash equivalents, beginning of year	462	605
Cash and cash equivalents, end of year	\$ 316	\$ 462
Supplemental Cash Flow information:		
Accrued mineral property acquisition costs included in accounts payable	\$ -	\$60
Acquisition of right to use asset	\$ -	\$99

See Notes to Consolidated Financial Statements.

SOLITARIO ZINC CORP.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
For the years ended December 31, 2022 and 2021

1. Business and Summary of Significant Accounting Policies

Business and company formation

Solitario Zinc Corp. (“Solitario,” or the “Company”) is an exploration stage company as defined by rules issued by the United States Securities and Exchange Commission (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. 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. Solitario is primarily focused on the acquisition and exploration of precious metal, zinc and other base metal exploration mineral properties. In addition to focusing on its mineral exploration properties and the evaluation of mineral properties for acquisition, Solitario also evaluates potential strategic transactions for the 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 properties. Revenues and / or proceeds from the sale or joint venture of properties or assets have not been a consistent annual source of cash 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 in Peru, its interest in the Lik project in Alaska and its interest in the Golden Crest project in South Dakota to be its core mineral property assets. Nexa Resources, Ltd. (“Nexa”), Solitario’s joint venture partner, is continuing the exploration and furtherance of the Florida Canyon project and Solitario is monitoring progress at Florida Canyon. Solitario is working with its 50% joint venture partner, Teck American Incorporated, a wholly owned subsidiary of Teck Resources Limited (both companies are referred to as “Teck”), in the Lik deposit to further the exploration of the Lik project, and to evaluate potential development plans for the Lik project. Solitario is conducting mineral exploration of its Golden Crest project on its own.

As of December 31, 2022 and 2021, Solitario has balances of cash and short-term investments that Solitario anticipates using, in part, to further the development of the Florida Canyon project, the Lik project and the Golden Crest project and to potentially acquire additional mineral property assets. The fluctuations in precious metal and other commodity prices have 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.

Revenue recognition

Solitario has recorded revenue from the sale of exploration mineral properties and joint venture property payments. Solitario’s policy is to recognize revenue from the sale of its exploration mineral properties (those without reserves) on a property-by-property basis, computed as the cash received and / or collectable receivables less any capitalized cost. Payments received for the sale of exploration property interests that are less than the properties cost are recorded as a reduction of the related property’s capitalized cost. In addition, Solitario’s policy is to recognize revenue on any receipts of joint venture property payments in excess of its capitalized costs on a property that Solitario may lease to another mining company.

Solitario has not recognized any revenue during 2022 or 2021. Solitario expects any property sales in the future to be

on an infrequent basis. Solitario last recognized revenue in 2019 from the sale of certain royalties and in 2018 from the sale of its royalty in the Yanacocha property. Solitario does not expect to record joint venture property payments on any of its currently held properties for the foreseeable future. Historically, Solitario's revenues have been infrequent and significant individual transactions have only been from sales to well known or vetted mining companies. Solitario has never had a return on any of its sales recorded as revenue in its history and does not anticipate it will recognize any estimated returns on any potential future recorded revenues.

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) the recoverability of its investment in mineral properties related to its mineral exploration properties and their future exploration potential; (ii) the fair value of stock option grants to employees; (iii) the ability of Solitario to realize its deferred tax assets; and (iv) 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 mineral 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. At December 31, 2022, approximately \$293,000 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

At December 31, 2022, Solitario has United States Treasury securities ("USTS") with maturities of 15 days to one year, recorded at their fair value of \$3,951,000 compared to USTS recorded at their fair value of \$4,236,000 at December 31, 2021. At December 31, 2021, Solitario also held FDIC insured bank certificates of deposit ("CD's") with face values between \$100,000 and \$250,000 and maturities of three months to one year, which are recorded at their fair value of \$851,000. Solitario's short-term investments are recorded at their fair value based upon quoted market prices. During the year ended December 31, 2022 and 2021 the non-cash decrease in the fair value of its short-term investments, due primarily to changes in interest rates on held securities, was \$108,000 and \$102,000, respectively. 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"). During 2019, Solitario acquired certain Vendetta Mining Corp. ("Vendetta") units, which included Vendetta Warrants (defined below). Changes in fair value of the Vendetta Warrants are recognized in the statements 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 Gold Corporation ("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 are recognized in the statements of operations in the period of the change as gain or loss on derivative instruments.

Fair value

Financial Accounting Standards Board 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. Solitario's short-term investments in USTS and CD's, 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. See Note 8, "Fair Value of Financial Instruments," below.

Marketable equity securities

Solitario's investments in marketable equity securities are carried at fair value, which is based upon quoted prices of the securities owned. Solitario records investments in marketable equity securities 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 and realized gain or loss on marketable equity securities sold is determined by the specific identification method. Changes in fair value on Solitario's holdings of marketable equity securities are recorded as unrealized gain or loss in the consolidated statement 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 2022 and 2021 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. Inter-company funding is transacted 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 6, "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, 2022 and 2021. Potentially dilutive shares, consisting of outstanding common stock options of 5,390,000 and 5,513,000, respectively, exercisable for Solitario common shares were excluded from the calculation of diluted loss per share for the year ended December 31, 2022 and 2021 because the effects were anti-dilutive.

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 10, “Employee Stock Compensation Plans,” below.

Risks and Uncertainties

Solitario faces risks related to health epidemics and other outbreaks of communicable diseases, which could significantly disrupt its operations and may materially and adversely affect its business and financial conditions.

Solitario’s business still could be adversely impacted by the effects of the coronavirus (“COVID-19”) or other epidemics or pandemics. Solitario continues to evaluate the effects of COVID-19 on its operations and at times during the pandemic has taken pro-active steps to address the impacts on its operations, including at times reducing costs, in response to the economic uncertainty associated with potential risks from COVID-19. These prior cost reductions included implementing salary reductions and evaluating and reducing certain planned 2021 exploration programs through its joint venture partners at the Florida Canyon and Lik exploration projects. Certain of Solitario’s joint venture partners have, from time to time, modified plans with respect to the projects in which Solitario holds an interest in response to the COVID-19 pandemic. Also, Solitario has evaluated the potential impacts on its ability to access future traditional funding sources on the same or reasonably similar terms as in past periods. Solitario will continue to monitor the effects of COVID-19 on its operations, financial condition, and liquidity. However, the extent to which COVID-19 ultimately impacts Solitario’s business, including its exploration and other activities and the market for its securities, will depend on future developments, which are highly uncertain and cannot be predicted at this time, and include the duration, severity and scope of any new outbreak and the actions taken to contain or treat the COVID-19 pandemic.

2. Mineral Properties:

The following table details Solitario’s capitalized investment in exploration mineral property:
(in thousands)

	December 31,	
	2022	2021
Exploration		
Lik project (Alaska – US)	\$15,611	\$15,611
Golden Crest (South Dakota – US)	1,035	695
Total exploration mineral property	<u>\$16,646</u>	<u>\$16,306</u>

Exploration property

Solitario's exploration mineral properties at December 31, 2022 and 2021 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 or the cost to acquire the property, as appropriate. At December 31, 2022, 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.

Golden Crest

On May 27, 2021, Solitario entered into a lease agreement (the “Golden Crest Agreement”) whereby Solitario acquired exclusive exploration rights in certain claims (the “GC Claims”) in the Black Hills region of South Dakota. The GC Claims are part of Solitario’s Golden Crest project. Terms of the Golden Crest Agreement include scheduled payments to the underlying owner of \$65,000 paid upon signing and the payment to the underlying owner of \$60,000 at the first anniversary date during 2022. Solitario recorded an initial acquisition cost of \$125,000 during 2021 related to these required payments. In addition, to continue the lease, Solitario has agreed to pay, at its option, the underlying owner escalating annual payments over five years that total \$340,000 and annual payments of \$150,000 thereafter, which will be expensed as paid. Solitario has agreed to pay the underlying owner an additional success fee of \$1.00 per ounce of gold in the event Solitario files a 43-101 qualified resource of up to 1.5 million ounces of gold or a maximum of \$1,500,000. Solitario has agreed to escalating work

commitments, at Solitario’s option, on the GC Claims and an area of interest around the GC claims totaling \$3,000,000 during the first five years of the lease, with the first-year minimum exploration expenditures of \$200,000, which Solitario exceeded during 2022. The term of the Golden Crest Agreement is for twenty years and is automatically extended as long as Solitario is performing any exploration, development or mining activities on the GC Claims. The underlying owner retained a 2.0% Net Smelter Return royalty. Solitario will have the option, but not the obligation, to reduce the Net Smelter Return royalty to 1.0% by paying the owner \$1,000,000.

In addition, through December 31, 2022, Solitario has staked additional mineral claims, including some claims included in an area of interest of the GC Claims and claims not related to the GC Claims, as part of the Golden Crest project. As of December 31, 2022 and 2021 Solitario has capitalized costs for staking, initial filing fees, legal and other costs of \$1,035,000 and \$695,000 as initial acquisition costs related to the Golden Crest project.

Lik Property

Solitario holds a 50% operating interest in the Lik zinc-lead sliver property in northwest Alaska, which we acquired as part of the acquisition of Zazu Metals Corporation (“Zazu”) in July 2017. Solitario recorded its acquisition cost of \$15,611,000 as mineral property at the date of acquisition. Teck is Solitario’s 50% partner on the Lik Project and acted as the project manager during 2022 and 2021.

Florida Canyon

In addition to its capitalized exploration properties, Solitario has an interest in its Florida Canyon exploration concessions, which are 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 previously recorded joint venture property payment revenue received in excess of capitalized costs. Per the joint venture agreement, as of December 31, 2022, no further standby joint-venture payments are due to Solitario on the Florida Canyon project. At December 31, 2022 and 2021, Solitario has no remaining capitalized costs related to its Florida Canyon joint venture. Per the joint venture agreement with Nexa covering the Florida Canyon project, Solitario currently holds a 39% interest in the Florida Canyon zinc project. Nexa is required to fund 100% of exploration expenditures at Florida Canyon, until Nexa commits to put the project into production based upon a positive feasibility study, at which time Nexa’s interest will increase from its current 61% interest to a 70% interest.

Discontinued projects

During 2021 Solitario recorded \$17,000 of mineral property impairment related to its decision to abandon its Gold Coin project in Arizona. Solitario did not record any mineral property impairments during 2022.

Exploration Expense

The following items comprised exploration expense:

(in thousands)	For the year ended	
	December 31,	
	2022	2021
Geologic and field expenses	\$2,121	\$1,092
Administrative	162	106
Total exploration expense	\$2,283	\$1,198

Asset Retirement Obligation

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 Solitario and its joint venture partner Teck and is supported by a permitting bond required by the State of Alaska, for which Solitario has retained 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.

As of December 31, 2022, Solitario has no reclamation liability at its Florida Canyon project as Nexa is responsible for the costs at Florida Canyon, including reclamation, if any. In addition, the activities to date at Solitario's Golden Crest project of staking claims and mapping, soil and rock sampling, and assaying have not created any material environmental or other disturbances. Historically Solitario's exploration activities have not resulted in any long-term environmental disturbances or liabilities and where there have been required restoration of disturbances, these have been completed contemporaneously with the completion of our mineral exploration activities.

3. Marketable Equity Securities

During 2022 Solitario sold 1,250,000 shares of Vendetta common stock for proceeds of \$63,000 and recorded a realized loss on sale of \$201,000. During 2021, Solitario sold (i) 2,550,000 shares of Vendetta common stock for proceeds of \$112,000 and recorded a realized loss on the sale of \$269,000; (ii) 430,000 shares of TNR Gold Corp. ("TNR") common stock for proceeds of \$27,000 and recorded a realized gain on the sale of \$19,000; and (iii) 3,200 shares of Vox Royalty Corp. ("Vox") common stock for proceeds of \$8,000 and recorded a realized gain on the sale of \$2,000.

On July 31, 2019, Solitario purchased 3,450,000 Vendetta units for aggregate consideration of \$233,000. Each unit consisted of one share of Vendetta common stock and one warrant which allows the holder to purchase one additional share of Vendetta common stock at a purchase price of Cdn\$0.13 per share for a period of three years (the "Vendetta Warrants"). The Vendetta Warrants expired unexercised during 2022. During 2022 and 2021, Solitario recorded a loss on derivative instruments of \$4,000 and \$46,000, respectively, for the change in the value of the Vendetta Warrants.

At December 31, 2022 Solitario owns the following marketable equity securities:

	Year ended December 31, 2022		Year ended December 31, 2021	
	shares	Fair value (000's)	shares	Fair value (000's)
Kinross Gold Corp	100,000	\$409	100,000	\$581
Vendetta Mining Corp.	7,750,000	229	9,000,000	356
Vox Royalty Corp.	134,055	311	134,055	370
Highland Silver Corp.	200,000	-	-	-
Total		\$949		\$1,307

The following tables summarize Solitario's marketable equity securities and adjustments to fair value:

(in thousands)	Year ended December 31,	
	2022	2021
Marketable equity securities at cost	\$1,440	\$1,704
Cumulative unrealized loss on marketable equity securities	(491)	(397)
Marketable equity securities at fair value	\$949	\$1,307

The following table represents changes in marketable equity securities:

(in thousands)	Year ended December 31,	
	2022	2021
Cost of marketable equity securities sold	\$ 264	\$ 395
Realized loss on marketable equity securities sold	(201)	(248)
Proceeds from the sale of marketable equity securities sold	(63)	(147)
Net loss on marketable equity securities	(295)	(166)
Additions to marketable equity securities	-	-
Change in marketable equity securities at fair value	\$(358)	\$(313)

The following table represents the realized and unrealized gain (loss) on marketable equity securities:

(in thousands)	Year ended December 31,	
	2022	2021

Unrealized (loss) gain on marketable equity securities	\$ (94)	\$ 82
Realized loss on marketable equity securities sold	(201)	(248)
Net loss on marketable equity securities	<u>\$(295)</u>	<u>\$(166)</u>

Other Income

During 2022, Solitario sold rights to certain exploration data on a non-owned mineral property upon which Solitario had previously done exploration activities. The data was sold to Highland Silver Corp., a Canadian exploration company (“Highland”) for \$20,000 cash and 200,000 shares of Highland common stock. On the date of sale, the Highland common stock carried a restrictive legend. The shares were not available for trade on the date of sale and at December 31, 2022 and no value has been assigned to the common stock. Solitario recorded \$20,000 of other income on the date of the sale. Any future changes to the value of the Highland common stock owned by Solitario will be recorded as changes in value of marketable equity securities.

4. Operating Lease

Solitario accounts for its leases in accordance with ASC 842. Solitario leases one facility, its Wheat Ridge, Colorado administrative office (the “WR Lease”), that has a term of more than one year. Solitario has no other significant operating lease costs. The WR Lease was extended to October 2023 during 2021 and Solitario recorded a net increase in right of use assets of \$99,000 during 2021 upon the extension of the WR Lease. The WR Lease is classified as an operating lease and has a remaining term of 10 months at December 31, 2022. The right-of-use office lease asset for the WR Lease is classified as other assets and the related liability as a current office lease liability in the consolidated balance sheet. Lease expense is recognized on a straight-line basis over the lease term, with variable lease payments recognized in the period those payments are incurred.

During 2022 and 2021, Solitario recognized \$40,000 and \$40,000, respectively, of non-cash lease expense for the WR Lease included in general and administrative expense. Cash lease payments of \$39,000 and \$39,000, respectively, were made on the WR Lease during 2022 and 2021 and this amount, less \$3,000 and \$4,000, respectively, of imputed interest during 2022 and 2021, reduced the related liability on the WR Lease. The discount rate within the WR Lease is not determinable and Solitario applied a discount rate of 5% based upon Solitario’s estimate of its cost of capital in recording the WR Lease. Solitario has \$36,000 remaining cash payments as of December 31, 2022.

The following is supplemental cash flow information related to our operating lease for 2022 and 2021:

(in thousands)	Year ended December 31, 2022	Year ended December 31, 2021
Cash paid for amounts included in the measurement of lease liabilities		
Operating cash outflows from WR Lease payments	\$39	\$39
Non-cash amounts related to the WR lease		
Right of use assets recorded in exchange for new operating lease liabilities	\$ -	\$99

5. Other Assets

The following items comprised other assets:

(in thousands)	December 31, 2022	December 31, 2021
Furniture and fixtures, net of accumulated depreciation	\$ 97	\$ 65
Lik project equipment, net of accumulated depreciation	-	10
Office lease asset	33	72
Vendetta warrants	-	3
Exploration bonds and other assets	4	4
Total other assets	<u>\$134</u>	<u>\$154</u>

6. Income Taxes:

Consolidated loss before income taxes includes losses from foreign operations of \$37,000 and \$136,000 in 2022 and 2021, respectively.

The net deferred tax assets/liabilities in the December 31, 2022 and 2021 consolidated balance sheets include the following components:

(in thousands)	2022	2021
Deferred tax assets:		
Loss carryovers	\$11,652	\$12,148
Investment in Mineral Property	1,669	1,669
Capitalized Exploration Costs	778	418
Stock option compensation expense	152	309
Unrealized loss on derivative securities	121	98
Other	65	91
Unrealized loss on short-term investments	20	-
Lease Liability	9	18
Valuation allowance	(14,309)	(14,561)
Total deferred tax assets	157	190
Deferred tax liabilities:		
Unrealized gains on marketable equity securities	149	173
Lease Asset	8	17
Total deferred tax liabilities	157	190
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)	2022	2021
Expected income tax benefit	\$(825)	\$(497)
Equity based compensation	238	4
Foreign tax rate differences	(3)	(12)
State income tax	(166)	(98)
Expiration of Capital Loss and Foreign Tax Credit Carryovers	18	1,385
Adjustment to Deferred Taxes	11	(82)
Foreign currency exchange	968	(32)
Change in valuation allowance	(251)	(489)
Change in Tax Rates	13	(194)
Permanent differences and other	(3)	15
Income tax (benefit) expense	\$ -	\$ -

During 2022, the valuation allowance increased primarily due to the addition of deferred tax assets related to current year net operating losses. During 2021, the valuation allowance decreased primarily due to the expiration of capital loss carryovers.

At December 31, 2022, Solitario has unused US Federal net operating loss carryovers of \$22,905,000 and unused US State net operating loss carryovers of \$24,811,000 which begin expiring in 2027. As a result of the ownership change of Zazu Metals (Alaska) Corp, utilization of some of these federal and state losses will be limited due to the annual limitation provided by Section 382 of the Internal Revenue Code. Solitario has unused capital loss carryovers of \$380,000 for US Federal and US State purposes which begin expiring in 2025. Solitario has Canadian loss carryforwards of \$9,294,000 which begin expiring in 2027. 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, 2022 or December 31, 2021, or for the years then ended as Solitario had no unrecognized tax benefits.

Solitario and its subsidiaries are subject to the following material taxing jurisdictions: United States Federal, State of Colorado, State of Alaska, State of South Dakota, Canada and Peru. Solitario’s United States federal, Canada and State of Alaska returns for years 2019 and forward and Solitario’s Peru and State of Colorado returns for tax years 2018 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, 2022, or December 31, 2021 or for the years then ended.

7. Derivative Instruments:

Covered call options

From time-to-time Solitario has sold covered call options against its holdings of shares of common stock of Kinross included in Marketable Equity Securities. 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 and any changes in the fair value of its covered calls are recognized in the statement of operations in the period of the change. During 2021, Solitario sold covered calls against its holdings of Kinross for cash proceeds of \$8,000 all of which expired unexercised. As of December 31, 2022 and 2021, Solitario has no remaining liability related to Kinross call options.

8. 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, Vox common stock and TNR common stock are carried at their estimated fair value based on publicly available quoted market prices.

Solitario applies ASC 820 that 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.

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, 2022 and 2021, 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, 2022:

(in thousands)	Level 1	Level 2	Level 3	Total
Assets				
Short-term investments	\$3,951	\$ -	\$ -	\$3,951
Marketable equity securities	\$ 949	\$ -	\$ -	\$ 949

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, 2021:

(in thousands)	Level 1	Level 2	Level 3	Total
Assets				
Short-term investments	\$5,087	\$ -	\$ -	\$5,087
Marketable equity securities	\$1,307	\$ -	\$ -	\$1,307
Vendetta Warrants	\$ -	\$ 3	\$ -	\$ 3

Items measured at fair value on a recurring basis:

Short-term investments: At December 31, 2022 and 2021, Solitario's holdings of short-term investments consist of USTS and CD's at December 31, 2021, both recorded at their fair value based upon quoted market prices.

Marketable equity securities: At December 31, 2022 and 2021, the fair value of Solitario's holdings in shares of Vendetta, Kinross, and Vox marketable equity securities are based upon quoted market prices.

Vendetta Warrants: At December 31, 2021 the fair value of Solitario's Vendetta Warrants is based upon a Black Scholes model, using market inputs.

During the year ended December 31, 2022, Solitario did not change any of the valuation techniques used to measure its financial assets and liabilities at fair value.

9. 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 2023 property claim, lease and option payments for properties Solitario owns, has under joint venture or Solitario operates to be approximately \$1,274,000. 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 \$419,000 of these estimated 2023 property claim, lease and rental payments are paid or are reimbursable to us by Solitario's joint venture partners. Solitario may be required to make further payments in the future if it acquires new properties or enters into new agreements.

10. Employee Stock Compensation Plans:

On June 18, 2013, Solitario's shareholders approved the Solitario Exploration & Royalty Corp. Omnibus Stock Incentive Plan (the "2013 Plan"). Under the terms of the 2013 Plan, as amended, a total of 5,750,000 shares of Solitario common stock are reserved for awards to directors, officers, employees and consultants. 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.

a.) 2013 Plan stock option grants

The following table shows the grant date fair value of Solitario's awards during 2022 and 2021 pursuant to the 2013 Plan:

Grant Date	9/8/22 (1)	5/5/21 (1)	6/10/21 (1)
Option – grant date price	\$0.60	\$0.67	\$0.69
Options granted	2,360,000	90,000	50,000
Expected life years	5.0	5.0	5.0
Expected volatility	73%	76%	76%
Risk free interest rate	3.4%	0.9%	0.9%
Weighted average fair value	\$0.37	\$0.41	\$0.41
Grant date fair value	\$876,000	\$37,000	\$20,000

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

b.) Stock option activity

During 2022 and 2021, options for 114,250 and 185,000, respectively, shares of common stock were exercised for proceeds of \$30,000 and \$83,000 respectively. The following table summarizes the activity for stock options outstanding under the 2013 Plan for the years ended December 31, 2022 and 2021:

	2022			2021		
	RSUs/ Options	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)	RSUs/ Options	Weighted Average Exercise Price	Aggregate Intrinsic Value (1)
Outstanding, beginning of year	5,513,000	\$0.49		5,558,000	\$0.58	
Granted	2,360,000	\$0.60		140,000	\$0.67	
Exercised	(114,250)	\$0.26		(185,000)	\$0.45	
Expired	(2,360,000)	\$0.77		-	-	
Forfeited	(8,750)	\$0.20		-	-	
Outstanding, end of year	<u>5,390,000</u>	\$0.42	<u>\$1,034,000</u>	<u>5,513,000</u>	\$0.49	<u>\$718,000</u>
Exercisable, end of year	<u>3,227,500</u>	\$0.34	<u>\$899,000</u>	<u>4,718,000</u>	\$0.53	<u>\$506,000</u>

(1) Intrinsic value based upon December 31, 2022 and 2021 price of a share of Solitario common stock as quoted on the NYSE American exchange of \$0.62 and \$0.50, respectively, per share.

During the years ended December 31, 2022 and 2021, Solitario recorded \$338,000 and \$124,000, respectively, of stock option expense under the 2013 Plan for the amortization of the grant date fair value of each of its outstanding options with a credit to additional paid-in-capital. At December 31, 2022, the total unrecognized stock option compensation cost related to non-vested options is \$618,000 and is expected to be recognized over a weighted average period of 31 months.

11. Shareholders' Equity

At the Market Offering Agreement

On February 2, 2021, Solitario entered into an at-the-market offering agreement (the "ATM Agreement") with H. C. Wainwright & Co., LLC ("Wainwright"), under which Solitario may, from time to time, issue and sell shares of Solitario's common stock through Wainwright as sales manager in an at-the-market offering under a prospectus supplement for aggregate sales proceeds of up to \$9.0 million (the "ATM Program"). The common stock is distributed at the market prices prevailing at the time of sale. As a result, prices of the common stock sold under the ATM Program may vary as between purchasers and during the period of distribution. The ATM Agreement provides that Wainwright is entitled to compensation for its services at a commission rate of 3.0% of the gross sales price per share of common stock sold. During 2021, Solitario recorded \$144,000 as a charge to additional paid-in-capital for one-time expenses related to entering into the ATM Agreement.

During 2022, Solitario sold 2,650,724 shares of its common stock under the ATM Program at a price of \$0.79 per share for net proceeds of \$2,023,000 after commissions and sale expenses. During 2021, Solitario sold an aggregate of 643,033 shares of its common stock under the ATM Program at an average price of \$0.68 per share for net proceeds of \$299,000 after commissions, sale, and one-time expenses.

2021 Equity Offering

In December 2021 Solitario completed the sale of 3,100,000 shares of common stock (the "Shares"), at a price of \$0.50 per share (the "Offering") for net proceeds after expenses of \$1,542,000. Solitario did not engage an underwriter or placement agent for the Offering, and therefore there were no underwriter discounts or commissions or placement agent fees. The sale of the Shares was made through a subscription agreement between Solitario and each respective investor. The Shares were offered and sold pursuant to the Company's existing shelf registration statement on Form S-3 (File No. 333-249129). Solitario filed a prospectus supplement, dated December 1, 2021, with the SEC in connection with the sale of the securities in the Offering. Three of Solitario's executive officers participated in the Offering, purchasing 50,000 Shares each, on the same terms as the other investors. The Offering was unanimously approved by Solitario's Board of Directors and the participation

by our executive officers was also unanimously approved by the Audit Committee of the Board of Directors.

Share Repurchase Program

On October 28, 2015, Solitario's Board of Directors approved a share repurchase program that authorized Solitario to purchase up to two million shares of its outstanding common stock. During 2021, Solitario did not purchase any shares pursuant to the share repurchase program. As of December 31, 2021, Solitario had purchased a total of 994,000 shares for an aggregate purchase price of \$467,000 under the share repurchase program since its inception. The share repurchase plan expired on December 31, 2021 and no additional shares will be purchased under the plan in the future.

13. Subsequent Events

Solitario has evaluated events subsequent to December 31, 2022 to assess the need for potential recognition or disclosure in this report. Such events were evaluated through the date these financial statements were available to be issued. No events have occurred requiring recognition or disclosure through the date of this report.

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 Securities Exchange Act of 1934, as amended (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, 2022, 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, 2022.

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

Item 9B. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not Applicable

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, 2022 pursuant to Section 14(a) of the Exchange Act (the "2023 Proxy").

Item 11. Executive Compensation

The information required under Item 11 is incorporated herein by reference to the information set forth in the 2023 Proxy.

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

Except for the information with respect to our equity compensation plan included below, the information with respect to Item 12 is incorporated herein by reference to the information set forth in the 2023 Proxy.

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 of common stock available 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 awards are granted by the Board of Directors or a committee appointed by the Board of Directors.

On September 8, 2022, the Board of Directors granted options to acquire 2,360,000 shares of Solitario common stock under the 2013 Plan. The options have an exercise price of \$0.60 per share, a five-year term, vested 25% on the date of grant, vest 25% on each of the next three anniversary dates and have a grant date fair value of \$876,000 based upon a Black-Scholes model, with a 73% volatility and a 3.4% risk-free interest rate.

On May 5, 2021, the Board of Directors granted options to acquire 90,000 shares of Solitario common stock under the 2013 Plan. These 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, have an exercise price of \$0.67 per share, and a grant date fair value of \$37,000, based upon a Black-Scholes model with an expected volatility of 76%, and a risk-free interest rate of 0.9%. On June 10, 2021, the Board of Directors granted options to acquire 50,000 shares of Solitario common stock under the 2013 Plan. These 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, have an exercise price of \$0.69 per share, and a grant date fair value of \$20,000, based upon a Black-Scholes model with an expected volatility of 76%, and a risk-free interest rate of 0.9%.

Equity Compensation Plan Information as of December 31, 2022:

Plan category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights (2013 Plan – US\$)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a))
2013 Plan	(a)	(b)	(c)
Equity compensation plans approved by security holders	5,390,000	0.42	10,180
Equity compensation plans not approved by security holders	-	N/A	-

Total 2013 Plan	5,390,000	0.42	10,180
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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 2023 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 2023 Proxy.

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 (Plante Moran, PLLC, Denver, Colorado, PCAOB ID 166)

Consolidated Balance Sheets as of December 31, 2022 and 2021

Consolidated Statements of Operations for the years ended December 31, 2022 and 2021

Consolidated Statements of Shareholders' Equity for the years ended December 31, 2022 and 2021

Consolidated Statements of Cash Flows for the years ended December 31, 2022 and 2021

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.

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
James R. Maronick
Chief Financial Officer

Date: March 15, 2023

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.

Signature	Title	Date
<u>/s/ Christopher E. Herald</u> Christopher E. Herald, Chief Executive Officer	Principal Executive Officer and Director	March 15, 2023
<u>/s/ James R. Maronick</u> James R. Maronick, Chief Financial Officer	Principal Financial and Accounting Officer	March 15, 2023
<u>/s/ John Labate</u> John Labate	A majority of the Board of Directors	March 15, 2023
<u>/s/ Brian Labadie</u> Brian Labadie		
<u>/s/ James Hesketh</u> James Hesketh		
<u>/s/ Gil Atzmon</u> Gil Atzmon		
<u>/s/ Debbie Austin</u> Debbie Austin		
<u>/s/ Joshua D. Crumb</u> Joshua D. Crumb		
<u>By: /s/ James R. Maronick</u> James R. Maronick, Attorney-in-fact		

INDEX TO EXHIBITS

Description

- 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 Zinc Corp., as amended (incorporated by reference to Exhibit 3.1 to Solitario's Form 8-K filed on April 23, 2021)
- 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)
- 4.2 Description of Common Stock (incorporated by reference to Exhibit 4.2 to Solitario's Form 10-K filed on March 2, 2020)
- 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# 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)
- 10.3# 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)
- 10.4# 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)
- 10.5 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)
- 10.6# 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)
- 10.7 At The Market Offering Agreement between Solitario Zinc Corp. and H.C. Wainwright & Co., LLC, dated February 2, 2021 (incorporated by reference to Solitario's Form 8-K filed on February 2, 2021)
- 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 Plante & Moran, PLLC
- 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
- 96.1 Technical Report Summary for the Florida Canyon Project (incorporated by reference to Exhibit 96.1 to Solitario's Form 10-K filed on March 30, 2022)
- 96.2 Technical Report Summary for the Lik Project (incorporated by reference to Exhibit 96.1 to Solitario's Form 10-K filed on March 30, 2022)
- 101* The following materials from the Company's Annual Report on Form 10-K for the year ended December 31, 2021 formatted in Inline eXtensible Business Reporting Language (iXBRL): (i) Condensed Consolidated Balance Sheets as of December 31, 2022 and 2021, (ii) Condensed Consolidated Statements of Operations for the years ended December 31, 2022 and 2021, (iii) Condensed Consolidated Statements of Cash Flows for the years ended December 31, 2022 and 2021; and (iv) Notes to the Condensed Unaudited Consolidated Financial Statements.

* Filed herewith

Designates a management contract, or a compensatory plan or arrangement.

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