



August 2, 2017

**SOLITARIO ANNOUNCES ECONOMICS FROM ITS PRELIMINARY ECONOMIC ASSESSMENT FOR THE FLORIDA CANYON ZINC PROJECT, PERU**

Denver, Colorado: Solitario Zinc Corp. (“Solitario;” NYSE American: **XPL**; TSX: **SLR**) is pleased to announce results from its Preliminary Economic Assessment (“PEA”) for its high-grade Florida Canyon Zinc Project, formerly called the Bongará Zinc Project. The project is a joint venture between Solitario and Compañía Minera Milpo S.A.A. (“Milpo”) and is situated in northern Peru.

**PEA Economic Highlights – 100% of Project (US\$’s)**  
Metal Price Assumptions: Zn=\$1.20/lb; Pb=\$1.00/lb; Ag=\$16.50/oz

|   |  |
|---|--|
| <b>NPV @ 8%-discount rate (after-tax)</b>               | <b>\$198 million</b>                             |
| <b>Operating Margin (EBITDA)</b>                        | <b>\$958 million</b>                             |
| <b>Internal Rate of Return (after-tax)</b>              | <b>24.7%</b>                                     |
| <b>Payback</b>  | <b>2.6 years</b>                                 |
| <b>Initial Capital (incl. \$40 million contingency)</b> | <b>\$214 million</b>                             |
| <b>Sustaining Capital</b>                               | <b>\$83 million</b>                              |
| <b>Mine Life / Operating Rate</b>                       | <b>12.5 years / 2,500 tonnes/day</b>             |
| <b>Average Annual Payable Metal Production</b>          | <b>111.7 million lbs. payable zinc</b>           |
|   | <b>12.6 million lbs. payable lead</b>            |
|   | <b>160 thousand oz. payable silver</b>           |
| <b>Direct and Indirect Cash Costs</b>                   | <b>\$64.15/tonne or \$0.51/Zn-Eq payable lb.</b> |
| <b>All-in-Cost</b>                                      | <b>\$90.64/tonne or \$0.73/Zn-Eq payable lb.</b> |

Chris Herald, President and CEO of Solitario, stated, “We are extremely pleased with the outstanding economic results shown in the PEA for the Florida Canyon deposit. It clearly demonstrates that a high-grade deposit with clean metallurgy delivers superior economic results. For the first seven years of operations, payable zinc-equivalent production is forecast to average in excess of 140 million pounds per year. These project-level results become even more meaningful to Solitario as the terms of our joint venture agreement provides for Solitario’s portion of construction funding in the form of a loan from our joint venture partner, requiring no equity dilution to achieve production. The Florida Canyon deposit remains open in several directions and we are confident that additional drilling will add to the resource base with the strong possibility of higher annual throughput and longer mine life.”

“With our recent acquisition of Zazu Metals and its interest in the Lik zinc deposit in Alaska, Solitario now holds interests in two advanced stage high-grade zinc deposits that are located in safe and politically stable jurisdictions that are favorable to mining. Besides the benefits of asset diversity, both the Florida Canyon and Lik projects have solid operating partners, Milpo and Teck Resources Ltd., respectively, which lower project development risks and costs.

We want to acknowledge Milpo for their technical input to the Florida Canyon PEA, making it a stronger document.”

## Project and PEA Background Information

During the past eleven years, core drilling, both surface and underground, tunneling, metallurgy, and various other engineering studies were conducted and funded by Solitario's joint venture partners Votorantim Metais – Cajamarquilla S.A. ("Votorantim Metais") and its successor in interest, Milpo (a majority owned subsidiary of Votorantim). In 2014 Solitario completed a NI 43-101 compliant resource estimate for the Florida Canyon deposit (see Solitario news release dated June 23, 2014). The resource estimate was based on 486 core holes totaling approximately 117,280 meters of drilling.

In November 2016, Solitario announced it would initiate a PEA on the Florida Canyon deposit. In January 2017, SRK Consulting (U.S.), Inc. ("SRK"), an independent and internationally recognized mining engineering firm, was engaged to complete the PEA. In April 2017, Milpo elected to participate in funding and preparation of the PEA.

## Summary of Key Economic Inputs (100% basis of project)

| Mine and Mill Statistics             |  | Average Annual Production                       |  |                            |
|--------------------------------------|--|---|--|----------------------------|
| Total Life of Mine tonnes (millions) | 11.187                                     | <b>Commodity</b>                                | <b>Annual Metal Produced in Conc.</b>                  |                            |
| Mining/milling rate (tonnes per day) | 2,500                                      | Zinc  | 131.4 million pounds                                   |                            |
| Life of Mine (years)                 | 12.5                                       | Lead  | 13.2 million pounds                                    |                            |
| Cutoff: NSR                          | \$70.15                                    | Silver  | 168,203 Oz.  |                            |
| Cutoff Grade (average grade)         | 3.3% Zn-Eq                                 |   |  |                            |
| Avg. NSR Value of Movable Resource/t | \$145.16                                   |   |  |                            |
| <b>Life-of-Mine Statistics</b>       |  |   |  |                            |
| <b>Commodity</b>                     | <b>Mill head grade Zn/Pb (%); Ag (g/t)</b> | <b>Mill Recoveries</b>                          | <b>LOM Mine / Recovered Metal in concentrate</b>       | <b>Smelter Payability</b>  |
| Zinc (%)                             | 8.34                                       | 80%   | 1,643 million pounds                                   | 85%                        |
| Lead (%)                             | 0.90                                       | 74%   | 165 million pounds                                     | 95%                        |
| Silver (g/t)                         | 11.31                                      | 52% in Pb con                                   | 2.1 million ounces                                     | 95%                        |
| Zn-Equivalent                        | 9.32                                       |   |  |                            |
| <b>Metal Price Assumptions:</b>      |  | <b>Zinc: \$1.20/lb.</b>                         | <b>Lead: \$1.00/lb.</b>                                | <b>Silver: \$16.50/oz.</b> |
| <b>Operating and Capital Costs</b>   |  |   |  |                            |
| <b>Operating Costs</b>               | <b>Run-of-Mine \$/t</b>                    | <b>Smelter Related Costs</b>                    | <b>Capital Costs</b>                                   | <b>\$-Millions</b>         |
| Mining                               | 20.43                                      | Concentrate transportation: \$8.67/tonne milled | Initial capital (including \$40.1 million contingency) | \$213.7                    |
| Processing                           | 12.88                                      | Treatment charge: \$24.93/tonne milled          | Sustaining capital                                     | 82.7                       |
| G & A                                | 3.50                                       |   |  |                            |
| <b>Total</b>                         | <b>36.81</b>                               |   | <b>Total</b>   | <b>296.4</b>               |

| Florida Canyon Zinc Project (100% Basis, US\$)         |         |           |         |           |         |           |         |           |
|--|---------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Zinc Price Sensitivity (Pb: \$1.00/lb, Ag: \$16.50/oz) |         |           |         |           |         |           |         |           |
| Zn Price   | \$1.00  |           | \$1.10  |           | \$1.20  |           | \$1.30  |           |
|  | Pre-Tax | After-Tax | Pre-Tax | After-Tax | Pre-Tax | After-Tax | Pre-Tax | After-Tax |
| FCF (\$000,000)  | 408     | 267       | 535     | 352       | 662     | 437       | 788     | 521       |
| NPV8% (\$000,000)                                      | 187     | 96        | 263     | 147       | 339     | 198       | 414     | 248       |
| IRR  | 24.5%   | 17.0%     | 29.7%   | 21.0%     | 34.5%   | 24.7%     | 38.9%   | 28.1%     |

## Mine Plan Resource

The Florida Canyon deposit consists of high grade zinc and lead sulfide bodies with silver credits contained in both flat lying “mantos” and more steeply dipping breccia bodies. The resource has been estimated using 486 surface and underground core holes. Twenty individual domains have been constrained in the resource model by wireframed 3D solids.

The Mine Plan Resource takes into account metallurgical recoveries based on composition. It is neither a Mineral Resource or a Mineral Reserve as defined by CIM guidelines. It is presented to define the material used in the preparation of the mine plan for this PEA.

Although the modeled mineralization is primarily sulfide, oxidation of the ore is also present. Metallurgical testing shows that mixed ore can be economically processed with good recovery of metal. Blocks in each domain in the Mine Plan Resource model have been assigned a grade, density and metallurgical recovery in order to define their net smelter return value. Internal mining dilution of 34% has been applied. These block-by-block NSR values were used to design the mine plan. The average NSR value of the mineable resource is \$148.16 per tonne.

## Mine Plan Resource (100% basis)

| Category       | Mass<br>kt   | Zn<br>Grade<br>% | Pb<br>Grade<br>% | Ag<br>Grade<br>g/t | NSR*<br>Value<br>(\$/t) | ZnEq**<br>%  | Contained Metal |               |              |                 |
|----------------|--------------|------------------|------------------|--------------------|-------------------------|--------------|-----------------|---------------|--------------|-----------------|
|                |              |                  |                  |                    |                         |              | Zn<br>klbs      | Pb<br>klbs    | Ag<br>koz    | Zn-Eq**<br>klbs |
| Measured       | 1,293        | 10.64            | 1.33             | 15.60              | 197.12                  | 12.38        | 303,239         | 37,989        | 648          | 352,871         |
| Indicated      | 2,011        | 8.77             | 1.08             | 13.44              | 166.85                  | 10.22        | 389,019         | 48,064        | 869          | 453,137         |
| <b>M&amp;I</b> | <b>3,303</b> | <b>9.51</b>      | <b>1.18</b>      | <b>14.28</b>       | <b>178.69</b>           | <b>11.05</b> | <b>692,258</b>  | <b>86,053</b> | <b>1,517</b> | <b>806,008</b>  |
| Inferred       | 7,883        | 7.86             | 0.78             | 10.07              | 135.36                  | 9.03         | 1,365,542       | 136,322       | 2,551        | 1,570,067       |

\*Net Smelter Return is calculated using variable recoveries based on sulfide/oxide ratios (recovery ranging from 32%-93%), a Zn price of \$1.20/lb, a Pb price of \$1.00/lb, an Ag price of \$17.50/oz. The transportation charge is \$70.00/t conc, Zn treatment charge of \$115/t conc, Pb treatment charge of \$100/t conc, Zn refining charge of \$0.115/lb Zn, and Pb refining charge of \$0.1/lb Pb. These factors were used for mine planning and vary somewhat from the final economic model.

\*\*ZnEq estimate is based on a NSR value of \$19.62 per 1% ZnEq. The \$19.62 is calculated using a Zn price of \$1.20/lb, a Pb price of \$1.00/lb, an Ag price of \$17.50/oz. The ZnEq also includes TC/RC and transportation costs and assumes an average Zn recovery of 78.15% which differs somewhat from that presented in the economic model. An example of the NSR to ZnEq calculation is  $(148.16/19.62)/0.7815$ .

**Cautionary Note to U.S. Investors concerning estimates of Resources:** This news release uses the terms “Measured, Indicated and Inferred Resources.” The Company advises U.S. investors that while these terms are recognized and required by Canadian regulations, the SEC does not recognize the terms. U.S. investors are cautioned not to assume that any part or all of Measured or Indicated Mineral Resources will ever be converted into Reserves. Inferred Resources have a great amount of uncertainty as to their existence, and great uncertainty as to their economic and legal feasibility. It cannot be assumed that all or any part of an Inferred Mineral Resource will ever be upgraded to a higher category. Under Canadian rules, estimates of Inferred Mineral Resources may not form the basis of feasibility or pre-feasibility studies, except in rare cases. U.S. investors are cautioned not to assume that any part or all of a *measured, indicated or inferred* resource exists, or is economically or legally minable.

### **Conservative Pricing Alternative**

Included in the Florida Canyon PEA is an alternative economic analysis of the project using much lower metal pricing to gauge how the project would perform in a lower metal price environment. Prices used in this alternative case scenario were \$1.06/lb. zinc and \$0.88/lb. lead. The alternative case also used a higher discount rate of 9%. Cost inputs remained the same as in the base case scenario. Under this lower price scenario, the project is still attractive with an after-tax NPV<sup>9%</sup> of \$106 million and an after-tax IRR of 19.1%.

### **Mine Plan**

The PEA envisions the mine as an underground operation utilizing conventional mining methods with an average throughput rate of 2,500 tonnes per day, or approximately 912,000 tonnes per year. Depending upon the geometry of the ore zones, longhole stoping will be used in steeply dipping zones and mechanized drift-and-fill extraction methods in shallowly dipping mantos. Minimum mining heights of drift-and-fill stopes are 3m or 4m depending on the geometry of the ore. Longhole stopes will be developed on 16m sublevels. Stopes of 8m or less in width will be developed longitudinally whereas stopes with thickness of greater than 8m will be developed by transverse stoping.

Cemented paste backfill will be placed underground to increase mining recovery and to stabilize mined-out areas. Adits provide access from the surface to the ore zones in the currently defined mine plan. The mill head grades from the mine do not vary significantly during the first ten years, but the grade in the final three years of the current mine plan is moderately lower.

### **Processing and Metallurgy**

The PEA incorporates a conventional mill design flow sheet with three-stage crushing followed by single-stage grinding to 80% minus 44 microns, with two multi-stage flotation circuits. The first circuit will produce a lead concentrate and the second multi-stage flotation circuit, the zinc circuit, receives tails from the lead circuit to produce a zinc concentrate. Both final concentrates will be transferred to their respective thickeners and then filtered (10m<sup>2</sup> filtration area for lead concentrate, and 60 m<sup>2</sup> filtration area for zinc concentrate) to approximately 9% moisture before being trucked offsite to smelters. Under average conditions, it is expected that Florida Canyon will produce approximately 287 tonnes per day of zinc concentrate grading 50% zinc and 46 tonnes per day of lead concentrate grading 50% lead.

Tailings from the flotation plant will be thickened to approximately 50% solids by weight. A fraction of the tails representing approximately 60% of the solids will be piped to a filtration plant located by the tailings storage area and then dry stacked at a moisture of approximately 17% by weight. Water recovered in the tails filter will be recycled to the process plant. The remaining 40% of the solid's stream will be transfer to a backfill plant to be used in the underground operation.

Metallurgical testing has indicated that the ore does not contain penalty elements that would attract extra smelter charges.

### **Location, Infrastructure and Power**

The project is located approximately 8 km from a paved road that connects coastal northern Peru with the Amazon basin. Infrastructure required for mining includes expansion of a local access road network, a mill, new mine development and a dry stack tailings facility. Power will be provided by a hydroelectric facility owned by a third party.

## **Environmental and Social Considerations**

The small footprint of the underground mine design reduces surface disturbance and the use of tailings backfill minimizes the storage requirement for tailings on the surface. Waste rock will be used in tailings facility construction and for underground structural fill, thereby minimizing the need for waste storage on the surface. Low iron sulfide content in waste and ore combined with carbonate host rocks creates a net neutral geochemical environment which minimizes impacts to local water resources. The use of locally produced hydroelectric power will reduce air emissions compared to on-site power generation.

## **Opportunities**

Delineating additional resources is the most promising opportunity to significantly enhance project economics. The most prospective targets include:

1. Extension drilling south of the San Jorge zone and northeast of the Karen-Milagros zones are considered the highest priority to increase high-grade zinc sulfide resources. Both zones are open in the recommended areas of drill testing.
2. Infill drilling several large un-drill tested areas surrounded by mineralized zones within the mineralized footprint has the potential to significantly increase resources.
3. Extension drilling peripheral to the currently defined mineralized footprint.
4. Further development of drill targets over the 20 kilometer-long northern Florida Canyon mineralized corridor where large areas of strong zinc in soil and rock chip geochemistry indicate the potential for additional mineralized zones.

As the mineralization remains open in several directions, it is anticipated that the mine life could be extended with additional exploration drilling. More detailed mine scheduling could optimize revenues in the early part of the mine life and further enhance project economics.

Although metallurgical studies to date indicate excellent zinc recoveries in sulfides (+90%), it is likely that higher average recoveries and a higher concentrate grades can be achieved for the global resource base. More detailed metallurgical optimization tests are required to determine this.

Additional trade-off studies may develop more efficient tailings management to reduce construction and closure costs.

## **Qualified Persons and Technical Report**

This news release has been reviewed and approved by Walter H. Hunt, COO, who participated in the preparation of the PEA and is a Non-Independent QP for Solitario under National Instrument 43-101 (“NI 43-101”).

Jay Pennington, a Qualified Person from SRK, who led the preparation of the 2017 PEA, has reviewed and approved the content of this news release.

A Technical Report in support of the 2017 PEA prepared in accordance with National Instrument 43-101 Standards for Disclosure for Mineral Projects (“NI 43-101”) will be filed on SEDAR within 45 days of this news release. The summary results of the PEA reported in this news release are preliminary. For the full details and further information with respect to the key assumptions, parameters, and risks associated with the results of the PEA, the mineral resource estimates included therein, and other technical information, please refer to the complete Technical Report to be made available at SEDAR.

## Terms of the Florida Canyon Joint Venture with Milpo

Currently, Solitario owns 39% of the Florida Canyon Zinc Project and Milpo owns 61%. Since inception of the joint venture in 2006, Milpo and its parent, Votorantim Metais – Cajamarquilla S.A., have funded 100% of project expenditures. Milpo will earn a 70% interest in the project by continuing to fund all project expenditures and committing to place the project into production based upon a positive feasibility study. After earning 70%, Milpo has further agreed to finance Solitario's 30% participating interest for construction. Solitario will repay the loan facility through 50% of its net cash flow distributions.

### About Solitario

Solitario is an emerging zinc exploration and development company traded on the NYSE American (“XPL”) and on the Toronto Stock Exchange (“SLR”). Besides Solitario’s joint venture with Milpo on its high-grade Florida Canyon zinc project in Peru, Solitario also holds a 50% joint venture interest (Teck Resources Ltd. holds the other 50% interest) in the high-grade, open pitable Lik zinc deposit in Alaska, and a 7.6% equity interest in Vendetta Mining. Solitario’s Management and Directors hold approximately 9.2% (excluding options) of the Company’s 58.45 million shares outstanding. Solitario’s cash balance and marketable securities stand at approximately US\$15 million. Additional information about Solitario is available online at [www.solitariozinc.com](http://www.solitariozinc.com)

FOR MORE INFORMATION AT SOLITARIO, CONTACT:

|   |                |
|---|----------------|
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### Cautionary Statement Regarding Forward Looking Information

*This press release contains forward-looking statements within the meaning of the U.S. Securities Act of 1933 and the U.S. Securities Exchange Act of 1934, and as defined in the United States Private Securities Litigation Reform Act of 1995 (and the equivalent under Canadian securities laws), that are intended to be covered by the safe harbor created by such sections. Forward-looking statements are statements that are not historical fact. They are based on the beliefs, estimates and opinions of the Company's management on the date the statements are made and address activities, events or developments that Solitario expects or anticipates will or may occur in the future, and are based on current expectations and assumptions. The Company would like to specifically caution the reader that the preliminary economic assessments (“PEA(s)”) of the Florida Canyon and Lik projects that supports the technical feasibility or economic feasibility of the Florida Canyon and Lik zinc deposits, including the marketability of the concentrate, mining methods, cost, recoveries of metals and any other technical aspects related to the Florida Canyon or Lik deposit, are preliminary in nature and there is no certainty that the PEA will be realized. Forward-looking statements involve a number of risks and uncertainties. Consequently, there can be no assurances that such statements will prove to be accurate and actual results and future events could differ materially from those anticipated in such statements. Such forward-looking statements include, without limitation, statements regarding the Company's expectation of the projected timing and outcome of engineering studies; expectations regarding the receipt of all necessary permits and approvals to implement a mining plan, if any, at Florida Canyon and Lik; the potential for confirming, upgrading and expanding zinc, lead and silver mineralized material; future operating and capital cost estimates may indicate that the stated resources may not be economic; estimates of zinc, lead and silver grades of resources provided are predicted and actual mining grade could be substantially lower; estimates of recovery rates for could be lower than estimated for establishing the cutoff grade; and other statements that are not historical facts could vary significantly from assumptions made in the Preliminary Economic Assessments; risks associated with our partners' (Milpo and Teck Resources Ltd.) ability to finance continued development and potential construction of the Florida Canyon and Lik projects could have a materially negative impact on the timing of project development, and such project development may never occur. Although Solitario management believes that its expectations are based on reasonable assumptions, it can give no*

*assurance that these expectations will prove correct. Important factors that could cause actual results to differ materially from those in the forward-looking statements include, among others, risks relating to risks that Solitario's and its joint venture partners' exploration and property advancement efforts will not be successful; risks relating to fluctuations in the price of zinc, lead and silver; the inherently hazardous nature of mining-related activities; uncertainties concerning reserve and resource estimates; availability of outside contractors in connection with Florida Canyon and Lik, and other activities; uncertainties relating to obtaining approvals and permits from governmental regulatory authorities and country risks of operations, both inside and outside of the United States; the possibility that environmental laws and regulations will change over time and become even more restrictive; and availability and timing of capital for financing the Company's exploration and development activities, including uncertainty of being able to raise capital on favorable terms or at all; as well as those factors discussed in Solitario's filings with the U.S. Securities and Exchange Commission (the "SEC") including Solitario's latest Annual Report on Form 10-K and its other SEC filings (and Canadian filings) including, without limitation, its latest Quarterly Report on Form 10-Q. The Company does not intend to publicly update any forward-looking statements, whether as a result of new information, future events, or otherwise, except as may be required under applicable securities laws.*