# **Dundee Sustainable Technologies Inc.**

Management's Discussion and Analysis

Years ended December 31, 2018 and 2017

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# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### **BACKGROUND**

This Management's Discussion and Analysis ("MD&A") of Dundee Sustainable Technologies Inc. ("DST" or the "Corporation") constitutes management's review of the factors that affected the Corporation's financial and operating performance for the years ended December 31, 2018 and 2017. This MD&A should be read in conjunction with the Corporation's audited consolidated financial statements for the years ended December 2018 and 2017, prepared in accordance with the International Financial Reporting Standards ("IFRS"). Unless otherwise noted, all figures are in Canadian dollars, the presentation and functional currency.

This MD&A takes into account all material events that took place up until March 26, 2019, the date on which the Corporation's Board of Directors approved this MD&A. Unless otherwise noted, all figures are in Canadian dollars, the presentation and functional currency.

Additional information regarding the Corporation is available on Sedar (<a href="www.sedar.com">www.sedar.com</a>) and on the Corporation's website at <a href="www.dundeetechnologies.com">www.dundeetechnologies.com</a>.

# **INCORPORATION AND NATURE OF OPERATIONS**

# Incorporation

The Corporation was incorporated under the Canada Business Corporations Act on July 22, 1997. The Corporation's head office is located at 1002 Sherbrooke West, Suite 2060, Montréal, Quebec, Canada, H3A 3L6.

The authorized capital of the Corporation consists of an unlimited number of subordinate voting shares and multiple voting shares, each multiple voting share having 10 votes.

Dundee Corporation ("Dundee") retains multiple voting shares of the Corporation, which are convertible, at the option of Dundee, into subordinate voting shares of the Corporation for no additional consideration. The multiple voting shares of the Corporation are not listed on a stock exchange.

At December 31, 2018, Dundee owned 178.1 million subordinate voting shares and all of the 50.0 million multiple voting shares of the Corporation giving Dundee a 63% equity interest and an 83% voting interest in the Corporation. In addition, Dundee is owed \$15.7 million in short term debt, including accrued interest.

#### Overview

The Corporation is a leader in the development and commercialization of innovative environmentally responsible technologies for the treatment of complex materials in the mining industry. Through the development of patented, proprietary processes, DST extracts precious and base metals from ores, concentrates and tailings, while permanently stabilizing contaminants such as arsenic, antimony and bismuth. These minerals resources could not otherwise be extracted or stabilized with conventional processes because of metallurgical issues, cost or environmental considerations. The Corporation's main focus is on the commercialization of its two innovative and patented processes (the "Technologies").

# Arsenic Stabilization by Vitrification

DST has designed, built and patented a method for the permanent stabilization of arsenic from numerous sources, including, but not limited to, arsenopyrite, cobaltite, enargite, flue dusts and environmental remediation. This process is an attractive technique to permanently stabilize arsenic and does so at a significantly lower cost than current alternatives, such as ferric arsenate or scorodite. This presents the Corporation with numerous opportunities to process materials considered too toxic or uneconomic to be exploited or stabilized using conventional mining and processing methods.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

# Gold Extraction by Chlorination

DST has also developed an advanced proprietary process associated with the extraction of precious and base metals using sodium hypochlorite to provide a cyanide-free alternative for the exploitation of gold deposits. The primary benefit of this innovative technology is a significantly shorter processing time (1-2 hours) as compared to the carbon in leach ("CIL") process (24-48 hours) and operates in a closed-loop operation. A key benefit of the closed loop operation is the elimination of the need for a costly and risky tailing pond. It also provides a reduction of the environmental footprint and produces inert and stable cyanide-free tailings.

The chlorination process developed by DST is a recognized "green technology" for which it was awarded a \$5 million grant by the Government of Canada, through its Sustainable Development Technology Fund ("SDTC"), for the construction and operation of a demonstration plant. The plant serves as a demonstration platform for the chlorination process on an industrial scale and under continuous operating conditions.

The environmentally responsible nature of the gold extraction technology has been confirmed by Environment Canada through the Canadian Environmental Technology Verification Program ("ETV"). The ETV is an independent certification of the performance of its cyanide-free gold extraction process.

The Corporation has protected its intellectual property by filing patents during the development of its technologies. To date, the Corporation has patents granted or published on 13 different processes, and it has 57 patents granted, published, pending or filed in 16 different countries. These patents expire between 2022 and 2034. The Corporation is in the process of expanding its patent portfolio for both processes and jurisdictions.

The Corporation recently applied for patents for its gold extraction technology in Kazakhstan and China, which are jurisdictions that management sees as key to the future. The Corporation continues to develop it's gold extraction technology and recently added key enhancements for the filing in China. This will allow us to update the patent filing in other countries and extending the life of the current patent portfolio.

Inherent in the commercialization of these processes is significant technology development risk. Each of these processes may require significant additional development, testing and investment prior to final commercialization. There can be no assurance that such technologies will be successfully developed, or that output from any use of the Corporation's processes could be produced at a commercial level at reasonable costs or successfully marketed.

# **Technical Services**

The Corporation also uses its state-of-the-art laboratory and processing facility in Thetford Mines, Quebec to assist other companies with services designed to help them with minerology for their deposits.

# **OPERATIONS DURING 2018**

### Arsenic Stabilization Technology

The small industrial scale vitrification plant (the "Plant") has been delivered to our development partner and DST personal have completed construction and have produced the first pour of a tonne of glass containing 5% arsenic. The Plant is financed through a collaboration arrangement with a related party and will provide proof of the arsenic technology in an operating industrial environment. The Corporation also announced that SDTC has awarded a grant of \$1.25 million to offset some of the costs associated with this plant.

#### Gold Chlorination Technology

In 2017, the Corporation completed the second of two demonstration programs to prove the efficacy of the chlorination technology with the assistance of Sustainable Technology Development Canada. The current intention of the Corporation is to initiate an independent technical-economic study, designed with the objective of building the first commercial plant in partnership with a strategic partner. DST is experiencing an increased interest in using this technology and has recently been engaged to do some high-level testing for several customers for the application of the chlorination technology on deposits under development. Testing of these samples is on-going.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### **Cobaltite Process**

In December 2017, DST entered into a lab scale technical services contract with eCobalt Solutions Inc. (TSX: ECS) ("eCobalt") to assist in conducting detailed metallurgical testing and flow sheet design for the creation of a clean cobalt concentrate using pyrolysis plus DST' vitrification on arsenic contaminated cobaltite concentrates. The lab scale testing reduced the arsenic in the concentrate from 18% to 0.15%. In early 2018, DST began a pilot scale program with eCobalt on an eight-tonne bulk sample, the purpose of which is to confirm the successful removal of arsenic as demonstrated in the lab scale testing. eCobalt has made significant progress in removing the arsenic using a kiln and has reported that it is reviewing its feasibility study to consider all options for starting operations given the weak cobalt prices. DST is working with eCobalt to assess how the arsenic by-product can be vitrified using DST arsenic vitrification process.

#### **Technical Services**

DST continues to build its technical services business and under the terms of these contracts, the Corporation will provide technical services in markets such as lithium, cobalt, nickel, magnesium, graphite, gold and fertilizer. Proceeds from these contracts will help to offset developmental and operating costs related to its primary technologies.

### **BUSINESS STRATEGY**

The growing pressure from communities and government authorities over the use of cyanide in various jurisdictions around the world is forcing developing gold projects to seek alternative processes that can extract the gold without the environmental liabilities associated with cyanide, while maintaining control over the deleterious elements such as arsenic, mercury and antimony.

DST offers a competitive alternative to the cyanidation process. The technology is at the forefront of the mining industry's innovative extraction processes and caters to the worldwide growing need for extractive technologies capable of processing refractory and arsenic bearing material. This alternative provides DST leverage to access quality material including material from metallurgical or environmentally constrained deposits.

DST's business plan is focused on controlling both of its technologies and leveraging them to become a major player in the industry. The Corporation has a unique opportunity to emerge as a major stakeholder in multiple mining projects. In the immediate term, DST is focused on advancing its discussions with major gold and copper producing companies on building alternative processing and stabilization processes. The Corporation is currently processing test material for a number of customers. Assuming successful results, the next step is to negotiate the business terms with those customers for commercializing its technologies.

The technology that the Corporation has developed with respect to complex deposits will allow for the development and or advancement of mining projects that would not be viable without its patented technology. DST has identified over 100 gold projects that could face significant concerns due to cyanide use, environmental and/or metallurgical constraints. These include some of the largest gold projects on the planet. The commercialization of the Corporation's technology would enable mining companies to advance those projects which are currently constrained because of the toxic nature of their deposits and discussions have commenced with a number of mining companies to help advance these otherwise stranded deposits.

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### INFORMATION ON EQUITY

The authorized capital of the Corporation consists of an unlimited number of subordinate voting shares and multiple voting shares, without nominal or par value. The holders of subordinate voting shares are entitled to one vote for each subordinate voting share and the holders of multiple voting shares are entitled to ten votes for each multiple voting share. The holders of subordinate voting shares and multiple voting shares shall be entitled to receive and to participate equally as to dividends, share for share, in an equal amount on all the subordinate voting shares and multiple voting shares at the time outstanding. The holder of multiple voting shares shall be entitled at any time and from time-to-time to have any or all of the multiple voting shares converted into subordinate voting shares based on one subordinate voting share for each multiple voting share. In all other respects, the holders of subordinate voting shares and multiple voting shares shall rank equally and the same rights and restrictions.

	March 26, 2019
Subordinate voting shares issued	314,942,521
Options	20,952,500
Warrants	14,285,714
Total – fully diluted subordinate voting shares	350,180,735
Multiple voting shares issued (each multiple voting share has 10 votes)	50,000,000

At March 26, 2019, Dundee owned 178,068,497 subordinate voting shares of the Corporation (63%) and all of the outstanding multiple voting shares.

### STOCK OPTION PLAN

The Board of Directors of the Corporation has full and final discretion to designate the persons who are to be granted options and to determine such number of options as well as their exercise price and vesting period. The exercise price shall not be less than that permitted under the rules of any stock exchange on which the subordinate voting shares are listed. The purpose of the stock option plan is to serve as an incentive for the directors, officers, employees and service providers who will be motivated by the Corporation's success as well as to promote ownership of common shares of the Corporation by these people. There is no performance indicator relating to profitability or risk attached to the plan.

On April 18, 2018, the Corporation granted a total of 7,250,000 stock options to its directors, officers, employees and one consultant. These options are exercisable at \$0.10 per share, vested at the grant date and expire on the fifth anniversary of their date of issuance. The fair value of options awarded is \$0.077 per share for a total share-based payment expense of \$558,250.

On April 26, 2018, the Corporation granted a total of 500,000 stock options to a director. These options are exercisable at \$0.10 per share, vested at the grant date and expire on the fifth anniversary of their date of issuance. The fair value of options awarded is \$0.064 per share for a total share-based payment expense of \$32,000.

On June 18, 2018, the Corporation granted a total of 500,000 stock options to an employee. These options are exercisable at \$0.10 per share, vested at the grant date and expire on the fifth anniversary of their date of issuance. The fair value of options awarded is \$0.046 per share for a total share-based payment expense of \$23,000.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### FINANCING ACTIVITIES

#### Year ended December 31, 2018

#### Issuance of shares

In December 2018, the Corporation issued 2,015,991 shares at \$0.032 per share for total consideration of \$64,512 pursuant to a non-brokered private placement.

# Options Exercise

During the year ended December 31, 2018, 1,550,000 options were exercised for an equal number of subordinate voting shares at an average price of \$0.05 per option, for aggregate proceeds to the Corporation of \$77.500.

## Promissory note from a Related Party

In February 2018, the Corporation signed a promissory note in the principal amount of \$400,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

In May 2018, the Corporation signed a promissory note in the principal amount of \$500,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

In August 2018, the Corporation signed a promissory note in the principal amount of \$650,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

In November 2018, the Corporation signed a promissory note in the principal amount of \$625,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

As at December 31, 2018, the aggregate principal amount of the promissory notes totalled \$2,675,000 and the finance cost accrued during the year amounted to \$262,097.

### Year ended December 31, 2017

#### Issuance of shares

In November 2017, the Corporation issued 14,285,714 units at \$0.035 per unit for total consideration of \$500,000 pursuant to a non-brokered private placement. A unit consists of one common share and one common share purchase warrant, with each warrant entitling its holder to purchase a common share at \$0.06 until November 23, 2022.

# Promissory note from a Related Party

On November 6, 2017, the Corporation signed a promissory note in the principal amount of \$500,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

As at December 31, 2017, the principal amount of the promissory note totalled \$500,000 and the finance cost accrued amounted to \$13,808.

#### Short-term Loans from a Related Party

In 2014, Dundee Resources Limited, a wholly owned subsidiary of Dundee, agreed to loan (the "Short-term Loans") up to \$6,000,000 to the Corporation. During 2015 and 2016, the aggregate amount of the loans was increased by \$1,650,000 and \$500,000 respectively for a total of \$8,150,000.

During 2017, an amount of \$360,000 was advanced bringing the total loan to \$8,310,000 as at December 31, 2017.

The secured loans bear interest at the rate of 12.68% per annum and mature on the earlier of November 30, 2019 and the date at which the Corporation raises the sum of \$10 million or greater by way of debt or equity.

# Contribution Agreement

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

Under an amended agreement dated October 12, 2016, the Corporation received from Canada Economic Development for Quebec Regions (CED) a \$397,000 repayable contribution (the "CED Contribution"). The CED Contribution was used by the Corporation for the acquisition of equipment for its demonstration plant (the "Project") in Thetford Mines. The CED Contribution is non-interest bearing, secured and repayable in equal monthly installments over seven years starting three years after the end of the Project. CED advanced \$324,575 in December 2016, and the balance of \$72,425 in May 2017.

The CED Contribution is secured by a hypothec, pari passu with Dundee's and IQ's loans, over all of the Corporation's property other than its intellectual property.

# Bridge Loan

In August 2017, an unsecured bridge loan, payable on demand, of \$250,000 was advanced to the Corporation. The loan was reimbursed in October 2017 for a total amount of \$250,000 including interest of \$7,500.

In October 2016, an unsecured bridge loan, payable on demand, of \$300,000 was advanced to the Corporation. The loan was partially reimbursed in December 2016 for a total amount of \$160,000 including interest of \$3,360. The outstanding bridge loan of \$140,000 and accrued interest of \$6,580 was reimbursed in January 2017.

### **INVESTING ACTIVITIES**

# Shining Tree properties

The Shining Tree properties consist of 14 mining leases and 37 mining claims. In early 2017, the Corporation agreed to sell the mining claims for an amount of \$400,000. In March 2017, the Corporation received \$200,000 and the remaining \$200,000 on the closing of the sale of the mining leases in the second quarter of 2017.

### LIQUIDITY AND WORKING CAPITAL

On December 31, 2018, the working capital position of the Corporation was negative \$16,100,133 (negative \$12,680,020 as at December 31, 2017). This working capital deficiency includes a \$15,711,770 (\$12,220,965 as at December 31, 2017) short-term loan (principal and accrued interest) from Dundee Corp. Management estimates that the Corporation will not have sufficient funds to meet its obligations and budgeted expenditures through the twelve months ended December 31, 2019. The Corporation will periodically have to raise additional funds to continue operations. The Corporation is pursuing financing alternatives to fund its operations and working towards developing its activities to operate as a going concern. Although there is no assurance that the Corporation will be successful in these actions, management believes, based on previous fund-raising experience and commercial activities, that it will be able to secure the necessary financing. Financings could be completed through the issuance of debt or new equity in public or privately negotiated equity offering. While it has been successful in doing so in the past, there can be no assurance that it will be able to do so in the future.

### **DISCUSSION AND ANALYSIS OF OPERATIONS**

#### Revenues

During the year ended December 31, 2018, the Corporation processed material for a number of customers, including major gold producers, for testing of ores and concentrates using the Corporation's technologies. As well, exploration and development companies in other commodities including cobalt, nickel, graphite and lithium utilized the Corporation's facilities and highly skilled personnel for the advancement of their projects.

DST provided its technical expertise and its facilities to these companies to evaluate the development of their projects using the Corporation's Thetford Mines facility including its chlorination process for precious metal extraction and/or its arsenic stabilization process. The technical services may serve to demonstrate the efficiency of the Corporation's facilities and technical staff at the laboratory and/or pilot scales on specific projects in need of viable processing alternative and initiate engineering studies required for an industrial implementation.

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

Revenues totalled \$1,881,442 during the year ended December 31, 2018 with related cost of \$1,507,674 recorded under operating expenses related to services. The Corporation reported revenues of \$2,423,586, with related cost of \$2,404,756 in the same period of the prior year. Revenues by line of business were as below:

	2018	2017
	\$	\$
Arsenic stabilization process	693,255	322,420
Chlorination process	130,986	77,284
Service revenues	1,057,201	2,023,882
	1,881,442	2,423,586

# Operating expenses

The major components of the operating expenses are as follows:

	2018	2017
	\$	\$
Labour	695,037	829,616
Consultants	296,954	338,673
Consumables	35,969	197,644
Plant overhead	479,714	1,038,823
	1,507,674	2,404,756

Lower service revenues in 2018 compared to 2017, prompted a reduction of the plant overhead associated to this type of projects.

#### Technology development

During 2018, the Corporation incurred net technology development costs of \$4,694,716 (\$1,039,428 in 2017) primarily on its arsenic stabilization process. These costs relate to the construction of the arsenic demonstration plant, research activities conducted in the arsenic technology pilot plant and the laboratory. The remaining expenses relate to the operation of the demonstration plant, other technology development, patent maintenance and plant overhead.

The Corporation periodically receives reimbursement of project expenses generated under collaboration agreement with a third party and financial assistance under government incentive programs. These compensate DST for expenses incurred are normally recognized as a reduction to research and development expense on a systematic basis in the same periods in which the expenses are incurred. On a net-of-assistance basis, research and development costs amounted to \$1,292,324 (\$1,039,428 in 2017).

	2018	2017
	\$	\$
Arsenic plant	3,186,284	399,457
Plant expenses	1,387,355	1,280,369
Patent maintenance	121,077	97,049
Technology development	4,694,716	1,776,875
Net contribution	(2,668,237)	(480,517)
Government grants	(734,155)	(256,930)
Technology development expenses, net	1,292,324	1,039,428

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

# Professional and consulting fees

	2018	2017
	\$	\$
Legal	31,510	43,364
Audit, audit related work and tax compliance	108,540	142,708
Accounting	17,583	53,883
	157,633	239,255

The audit related work of 2017 includes \$25,000 fees for work on the SDTC file review for the chlorination project completed that year which netted the Corporation \$5 million in funding.

Accounting includes the remuneration of the former Chief Financial Officer that was recorded as an accounting expense and beginning in June 2017, the Controller of the Corporation took the position as Chief Financial Officer and his remuneration is now recorded under Wages and Compensation.

# Administrative expenses

	2018	2017
	\$	\$
Insurance	175,646	225,780
Rent	132,642	127,831
Website and technical support	28,944	72,178
Travel and accommodations	66,282	59,779
Telecommunications and others	57,836	75,326
	461,350	560,894

The decrease in insurance expense was due to a review of our policy limits to match the current level of operations during this period. The decrease in website and technical support is mainly due to improvements on information technology processes implemented by the Corporation.

# Wages and compensation

	2018	2017
	\$	\$
Employees	444,888	398,149
Officer compensation	186,038	179,705
Director fees	31,000	34,000
	661,926	611,854

Officer compensation relates to the President and Chief Executive Officer's (CEO) compensation. The remuneration of the President and CEO is based on a monthly rate of \$15,833.

# Other Gains and Losses

	2018	2017
	\$	\$
Interest expenses on Dundee short-term loans and Dundee promissory notes	1,315,805	1,061,280
IQ loan	364,097	336,323
IQ loan accretion expense	165,984	107,513
CED Contribution accretion expense	25,316	20,570
Other interest expense	9,993	15,733
Gain on disposal of assets	(8,000)	(36,895)
Gain on investment with a related party	(51,350)	-
	1,821,845	1,504,524

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### SELECTED QUARTERLY INFORMATION

The following table sets forth selected historical financial information for the Corporation from the last eight quarters. Such information is derived from the Corporation's interim unaudited financial statements prepared in accordance with IFRS.

	Q4-18	Q3-18	Q2-18	Q1-18
		\$	\$	\$
Total revenue	484,906	297,631	579,980	518,925
Operating loss	685,791	641,940	963,635	697,594
Net loss and comprehensive loss	1,203,538	1,086,284	1,389,127	1,125,218
Basic and diluted net loss per share	0.003	0.003	0.004	0.003

	Q4-17	Q3-17	Q2-17	Q1-17
	\$	\$	\$	\$
Total revenue	869,034	681,161	662,196	211,195
Operating loss	328,063	792,372	518,258	1,303,359
Net loss and comprehensive loss	742,163	1,142,908	884,541	1,678,010
Basic and diluted net loss per share	0.002	0.003	0.003	0.005

#### **FOURTH QUARTER**

# Operating Activities

The Corporation reported a loss of \$1,203,538 for the fourth quarter of 2018 ("Q4-2018") compared to a loss of \$742,163 the same period last year ("Q4-2017"). The main reasons for the variance are:

- a) Revenues of \$484,906 during Q4-2018 from service contracts compared to \$869,034 in Q4-2017. The decrease was due to a non-recurrent tolling contract performed during Q4-2017;
- b) During Q4-2018, research and development expenses totalled \$348,042 (\$272,042 in Q4-2017) mainly for the operation of the technical facilities.

# Financing Activities

The financing activities of the Corporation during Q4-2018 were as follow:

- a) Promissory note from a Related Party During Q4-2018, an amount of \$625,000 was advanced to the Corporation payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.
- b) In December 2018, the Corporation issued 2,015,991 shares at \$0.032 per share for total consideration of \$64,512 pursuant to a non-brokered private placement.;

The financing activities of the Corporation during Q4-2017 were as follow:

- a) Promissory note from a Related Party During Q4-2017, an amount of \$500,000 was advanced to the Corporation payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.
- b) In November 2017, the Corporation issued 14,285,714 units at \$0.035 per unit for total consideration of \$500,000 pursuant to a non-brokered private placement. A unit consists of one common share and one common share purchase warrant, with each warrant entitling its holder to purchase a common share at \$0.06 until November 23, 2022.;

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### **OUTLOOK FOR 2019**

The Company continues to move towards the commercialization of its Technologies and seeking to maximize the value of all of its assets to accelerate this growth. The Corporation has numerous initiatives that it will execute to ensure success.

### Arsenic Stabilization Process

The Corporation completed the delivery to the mineral processing facility of our development partner. Assembly was completed by the end of 2018 and hot commissioning was completed in March 2019. Initial operation of the plant has begun with the first production of arsenical glass. The Corporation will use data from this program to position the technology for adoption by customers around the world.

#### **Chlorination Process**

The Corporation completed the second of two gold chlorination campaigns through the processing of a complex concentrate from Chile in December 2016 and the Corporation finalized the Demonstration Campaign Report during the first quarter of 2017. The processing of these materials continued to establish the proof of concept of the Corporation's chlorination process for different ore and concentrate streams. The intention is to initiate an independent technical-economic study, designed with the objective of building DST's first commercial plant in partnership with a strategic partner. The Company is working with several properties in Asia, Africa and Canada to test their ores and concentrates using the chlorination technology.

#### Cobaltite

The Corporation completed processing of an eight (8) tonne sample of concentrate from eCobalt Solutions Inc. eCobalt is currently reviewing its feasibility study to reflect the reduced pricing in the cobalt market. Management of DST is with eCobalt to ensure that is can make a significant improvement to the economics of the processing of the concentrate. The Corporation continues to work with other cobalt companies to test the amenability of its technologies to solving the metallurgical problems associated with these ores.

### **Technical Services:**

With the completion of the two gold chlorination demonstration campaigns, the Corporation owns a state-of-the-art crushing, grinding, mineral processing (hydrometallurgy and pyrometallurgy) facility which is being made available for test programs from the lab scale up to the thousands of tonnes scale. Management is in discussions with numerous parties with respect to specific projects that will maximize the value of our Thetford facility.

Management estimates that the Corporation will have to raise funds for its operations and to continue its activities. Although there is no assurance that the Corporation will be successful in these actions, management believes, based on previous fund-raising experience, that it will be able to secure the necessary financing through the issuance of debt or new equity in public or privately negotiated equity offering. While it has been successful in doing so in the past, there can be no assurance that it will be able to do so in the future.

### **OFF BALANCE SHEET ARRANGEMENTS**

The Corporation did not enter into any off-balance sheet arrangements in 2018 and 2017

#### CONTRACTUAL OBLIGATIONS AND COMMITMENTS

The contractual obligations of the Corporation include lease payments for the Thetford Mines facilities and the head office in Montreal (Refer to Note 17 to the financial statements for the years ended December 31, 2018 and 2017).

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### RELATED PARTY TRANSACTIONS

In addition to the transactions discussed in the financing and investing sections, details of related party transactions with the officers and directors of the Corporation and companies they control are as follows:

	2018	2017
	\$	\$
Professional and consulting fees		
Administration <sup>(1)</sup>	186,038	179,705
Legal <sup>(2)</sup>	14,578	22,405
Accounting <sup>(3)</sup>	· -	53,883
Directors' fees <sup>(4)</sup>	31,000	34,000
	231,616	289,993

- (1) Fees paid to a private company controlled by Brian Howlett, President and CEO for a total amount of \$186,038 (\$179,705 in 2017).
- (2) Fees paid to a private company controlled by Luce Saint-Pierre, Corporate Secretary for a total amount of \$14,578 (\$21,886 in 2017).
- (3) Remuneration of Vatche Tchakmakian, former Chief Financial Officer, from January to June 2017 in the amount of \$41,913 from a private company controlled by him. In addition, his company charged fees during the same period of \$11,970 for support staff in respect of accounting, bookkeeping and administrative services.
- (4) Directors' fees.

### SUBSEQUENT EVENTS

#### Promissory note

On February 13, 2019, the Corporation signed a promissory note in the principal amount of \$764,000 payable on demand to a wholly-owned subsidiary of Dundee along with interest at a rate of 18% per annum.

#### Stock options

On March 16, 2019, 400,000 employee stock options with an exercise price of \$0.05 expired.

### ACCOUNTING POLICY CHANGES, CRITICAL ESTIMATES, JUDGMENTS AND ASSUMPTIONS

The preparation of financial statements in conformity with IFRS requires management to make estimates and assumptions that affect amounts reported in the financial statements and accompanying notes. There is a full disclosure and description of the Corporation's critical accounting policies, estimates, judgments, assumptions in the financial statements as at December 31, 2018 in notes 1, 2 and 3.

# Changes in accounting policies

Effective January 1, 2018, the following new standards have been applied when preparing the Consolidated Financial Statements. The Corporation adopted IFRS 9, Financial Instruments, and IFRS 15, Revenue from Contracts with Customers. The Corporation adopted these new standards retrospectively without restating comparatives. The impact of applying the standards is described below.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

## a) IFRS 9, "Financial Instruments"

In July 2014, the IASB issued final amendments to IFRS 9, replacing IAS 39, Financial Instruments: Recognition and Measurement, of which the Corporation had early adopted the first aspects of classification, measurement and derecognition of financial assets and the classification and measurement of financial liabilities. The remaining aspects of IFRS 9 introduce new requirements impairment of financial assets and hedge accounting. The new model for the impairment of financial assets introduces a single, forward-looking "expected loss" impairment model for financial assets, which will require more timely recognition of expected credit losses. The new hedge accounting model requires an economic relationship between the hedged item and hedging instrument.

Adoption of the remaining aspects of IFRS 9 did not have a material impact on the Corporation's consolidated financial statements.

### b) IFRS 15, "Revenue from Contracts with Customers"

On January 1, 2018, the Corporation adopted IFRS 15, which supersedes IAS 18, Revenue, IAS 11, Construction Contracts, and other interpretive guidance associated with revenue recognition. IFRS 15 establishes the principles that an entity shall apply to report the nature, amount, timing, and uncertainty of revenue and cash flows arising from a contract with a customer.

IFRS 15 is based on the general principle that revenue is recognized when control of a good or service transfers to a customer rather than when the significant risks and rewards of ownership are transferred as is the case under IAS 18.

The implementation of IFRS 15 did not have a material impact on the Corporation's revenue recognition policy.

#### **ACCOUNTING STANDARDS ISSUED BUT NOT YET APPLIED**

The following new standard have not been applied when preparing the consolidated financial statements for the year ended December 31, 2018. The Corporation will adopt this new standard retrospectively as of January 1, 2019 without restating comparatives. The impact of applying the standard will be reflected in the opening balances as at January 1, 2019. The assessment of the impact of this new standard is set out below.

# IFRS 16, "Leases"

IFRS 16, issued in January 2016, replaces IAS 17, *Leases*. IFRS 16 results in most leases being reported on the balance sheet for lessees, eliminating the distinction between a finance lease and an operating lease. The Corporation has reviewed all existing operating leases to determine and document expected changes in lease accounting. The Corporation has completed its evaluation of the accounting implications on its consolidated financial statements and disclosures and accounting policies. Upon adoption of IFRS 16, the Corporation expects to recognize right-of use assets and the associated obligation of approximately \$1.3 million each as at January 1, 2019, with no impact on the total shareholders' deficiency.

# FINANCIAL INSTRUMENTS AND OTHER INSTRUMENTS

The Corporation is exposed to various financial risks resulting from both its operations and its investments activities. The Corporation does not enter into financial instrument agreements including derivative financial instruments for speculative purposes. The Corporation's main financial risk exposure and its financial risk management policies are disclosed in Note 21 to the annual consolidated financial statements for the years ended December 31, 2018 and 2017.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

#### **RISKS AND UNCERTAINTIES**

The technology is relatively new, and the Corporation has limited history of operations that, to date has consisted primarily of research and development. The Corporation has generated limited revenue from its core technologies and has limited experience in selling or marketing these technologies. The technology has not gained significant market exposure but is beginning to demonstrate market acceptance. Whether the Corporation can successfully manage the transition to a commercial enterprise will depend upon a number of factors, including expanding the sales and marketing capabilities, as well as establishing relationships with strategic partners. Given the limited market acceptance with respect to the Corporation's technologies, there can be no assurance as to the achievability of projected market penetration rates and associated sales revenues.

No Independent Evaluation of the Process.

While the Corporation's research with respect to the technology has, in the opinion of management, been validated in various applications and while various third parties (without limitation, Dundee Precious Metals Inc. and eCobalt Solutions Inc.) have carried out due diligence procedures to their satisfaction, there has been no independent evaluation of the Technologies. There can be no assurance that we will be able to achieve our growth strategy and bring the Technologies to commercialization. The inability to bring the Technologies to commercialization could have a material adverse effect on operations.

#### Intellectual Property

The Corporation relies on patents, trade secrets, trademarks and copyright laws to protect its intellectual property. The patents to which the Corporation currently has rights expire between 2022 and 2034. The Corporation's present or future-issued patents may not protect the Corporation's technological leadership, and the Corporation's patent portfolio may not continue to grow at the same rate as it has in the past. Moreover, the Corporation's patent position is subject to complex factual and legal issues that may give rise to uncertainty as to the validity, scope and enforceability of a particular patent. Accordingly, there is no assurance that: (a) any of the patents owned by the Corporation will not be invalidated, circumvented, challenged, rendered unenforceable; or (b) any of the Corporation's pending or future patent applications will be issued with the breadth of claim coverage sought by the Corporation, if issued at all. In addition, effective patent, trade secret, trademark and copyright protection may be unavailable, limited or not applied for in certain countries.

The Corporation also seeks to protect its proprietary intellectual property, including intellectual property that may not be patented or patentable, in part by confidentiality agreements and, if applicable, inventors' rights agreements with strategic partners and employees. The Corporation can provide no assurance that these agreements will not be breached, that the Corporation will have adequate remedies for any breach, or that such persons or institutions will not assert rights to intellectual property arising out of these relationships.

Management believes that the Technologies do not infringe on the proprietary rights of third parties. There can be no assurance, however, that third parties will not claim such infringement by the Corporation with respect to current or future products or processes. Dealing with any such claims, with or without merit, could be time consuming, result in costly litigation, or require the Corporation to enter into further royalty or licensing agreements, which may or may not be available on terms acceptable to the Corporation. The failure to do any of the foregoing may have a material adverse effect on the Corporation.

# Competition

The Corporation competes with other companies to develop products and services designed to extract precious and base metals. Many of these other companies have substantially greater technical and financial resources than the Corporation. There can be no assurance that developments by others will not materially adversely affect the competitiveness of the Corporation.

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

The mining industry is characterized by extensive research and development efforts and is going through a period of rapid technological change. Competition can be expected to increase as technological advances are made and commercial applications for extraction of products and services increase. Competitors of the Corporation may use different technologies or approaches to develop products and services similar to products and services which the Corporation is seeking to develop or may develop new or enhanced products and services that may be more effective, less expensive, safer or more readily available before the Companies obtain approval of their products and services. There can be no assurance that the Corporation's products and services will compete successfully or that research and development will not render the Companies' products and services obsolete or uneconomical.

Impact of Unfavourable Economic and Political Conditions and Other Developments and Risks.

Unfavourable global, domestic or regional economic or political conditions and other developments and risks could negatively affect the Corporation's business. For example, unfavourable changes related to interest rates, rates of economic growth, fiscal and monetary policies of governments, inflation, deflation, consumer credit availability, consumer debt levels, tax rates and policy, unemployment trends, commodity prices, oil prices, and other matters that influence, confidence and spending could adversely impact our business and results of operations. In addition, unstable political conditions or civil unrest, including terrorist activities and worldwide military and domestic disturbances and conflicts, may disrupt commerce and could have a material adverse effect on our business and results of operations.

#### Key Personnel

The Corporation's management team of seasoned and committed industry veterans has achieved success in developing the Corporation's business. The Corporation's continued success and the execution of its growth strategy will depend, in part, on the continued services of this management team.

The Corporation's management team is composed of a relatively small group of senior executive officers. The loss of the technical knowledge, management expertise and knowledge of the Corporation's operations of one or more members of the team could result in a diversion of management resources, as the remaining members of management would need to cover the duties of any senior executive who leaves the Corporation and would need to spend time usually reserved for managing the Corporation's business to search for, hire and train new members of management. The loss of some or all of the Corporation's management team could negatively affect the Corporation's ability to develop and pursue its growth strategy, which could adversely affect its business and financial condition.

In addition, the market for key personnel in the industry in which the Corporation competes is highly competitive, and the Corporation may not be able to attract and retain key personnel with the skills and expertise necessary to manage its business.

## Ability to Attract and Retain Quality Employees

The Corporation's business is dependent upon attracting and retaining quality employees. If the Corporation were unable to hire, train and retain employees capable of developing the technology, the Corporation may not be able to maintain its competitive strength and realize on its growth strategy. The Corporation may be unable to commercialize its technology.

The Corporation's ability to meet its labour needs while controlling the costs associated with hiring and training new employees is subject to external factors such as unemployment levels, prevailing wage rates, minimum wage legislation and changing demographics. Changes that adversely impact the Corporation's ability to attract and retain quality employees could adversely affect its business.

# **MANAGEMENT'S DISCUSSION AND ANALYSIS**

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

## Material Disruption in Computer Systems

The Corporation relies extensively on its computer systems to process transactions, collect and summarize data and manage its business. Computer systems are subject to damage or interruption from power outages, computer and telecommunications failures, computer viruses, security breaches, catastrophic events such as fires, floods, earthquakes, tornadoes, hurricanes, acts of war or terrorism, and usage errors by our employees. If the Corporation's computer systems are damaged or cease to function properly, the Corporation may have to make a significant investment to fix or replace these systems and may suffer loss of critical data and interruptions or delays in operations in the interim. Any material interruption in the computer systems could adversely affect the Corporation's business or results of operations and reputation.

## Regulations

The Corporation is subject to customs, environmental and other laws. Although the Corporation undertakes to monitor changes in these laws, if these laws change without the Corporation's knowledge, it could be subject to fines or other penalties under the controlling regulations, any of which could adversely affect its business.

#### Insurance Related Risks

The Corporation maintains Directors and Officers Insurance, Liability Insurance, Pollution and Property and Liability Insurance. However, there is no guarantee that the insurance coverage will be sufficient, or that insurance proceeds will be paid to the Corporation in a timely manner. In addition, there are types of losses we may incur but against which the Corporation cannot be insured, or which management believes are not economically reasonable to insure, such as losses due to acts of war and certain natural disasters. If the Corporation incurs these losses and they are material, the Corporation's business, operating results and financial condition may be adversely affected. In addition, certain material events may result in sizable losses for the insurance industry and materially adversely affect the availability of adequate insurance coverage or result in significant premium increases. Accordingly, the Corporation may elect to self-insure, accept higher deductibles or reduce the coverage.

### Environment

The Corporation could be liable for environmental damages resulting from its research, development operations.

The Corporation's business is exposed to the risk of harmful substances escaping into the environment, resulting in personal injury or loss of life, damage to or destruction of property, and natural resource damage. Depending on the nature of the claim, the Corporation's current insurance policies may not adequately reimburse us for costs incurred in settling environmental damage claims, and in some instances, we may not be reimbursed at all.

# Commodity Risk

Commodity price risk is the potential adverse impact on earnings and economic value due to commodity price movements and volatilities. The price of gold and precious metals may affect the profitability of the Corporation. Historically, such prices have fluctuated and are affected by numerous factors outside of the Corporation's control, including, but not limited to: industrial and retail demand, central bank lending, forward sales by producers and speculators, levels of worldwide production, short-term changes in supply and demand because of speculative hedging activities and other factors such as significant mine closures.

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

# Going Concern

Management estimates that the Corporation will not have sufficient funds to meet its obligations and budgeted expenditures through to December 31, 2018. The Corporation will therefore periodically have to raise additional funds to continue operations. The Corporation is pursuing financing alternatives to fund its operations and to continue its activities as a going concern. Although there is no assurance that the Corporation will be successful in these actions, management believes that it will be able to secure the necessary financing through the issuance of debt or new equity in a public or private equity offering. While it has been successful in doing so in the past, there can be no assurance that it will be able to do so in the future.

Although the referenced consolidated financial statements have been prepared using IFRS applicable to a going concern, the above-noted facts and circumstances cast significant doubt on the Corporation's ability to continue as a going concern.

The referenced consolidated financial statements do not reflect the adjustments to the carrying values of assets and liabilities, to the reported expenses and to the financial position classifications that would be necessary if the going concern assumption was inappropriate. These adjustments could be material.

### FORWARD LOOKING STATEMENTS

DST's public communications may include written or oral forward-looking statements. Statements of this type are included in this MD&A and may be included in other filings with the Canadian regulators, stock exchanges or in other communications. All such statements constitute forward looking information within the meaning of securities law and are made pursuant to the "safe harbour" provisions of applicable securities laws. Forward looking statements may include, but are not limited to, statements about anticipated future events or results including comments with respect to the Corporation's objectives and priorities for 2018 and beyond, and strategies or further actions with respect to the Corporation, its products and services, business operations, financial performance and condition. Forward looking statements are statements that are predictive in nature, depend upon or refer to future events or conditions or include words such as "expects", "anticipates", "intends", "plans", "believes", "estimates" or similar expressions concerning matters that are not historical facts. Such statements are based on current expectations of the Corporation's management and inherently involve numerous risks and uncertainties, known and unknown, including economic factors and those affecting the technology and resources industries generally. The forward-looking information contained in this MD&A is presented for the purpose of assisting shareholders in understanding business and strategic priorities and objectives as at the periods indicated and may not be appropriate for other purposes.

A number of risks, uncertainties and other factors may cause actual results to differ materially from the forward-looking statements contained in this MD&A, including, among other factors and without limitation, those referenced in the section above entitled "Risks and Uncertainties". The preceding list is not exhaustive of all possible risk factors that may influence actual results and is compiled based upon information available as of the issuance date of this MDA.

Forward looking statements contained in this MD&A are not guarantees of future performance and, while forward looking statements are based on certain assumptions that the Corporation considers reasonable, actual events and results could differ materially from those expressed or implied by forward looking statements made by the Corporation. Prospective investors are cautioned to consider these and other factors carefully when making decisions with respect to the Corporation and not place undue reliance on forward looking statements. Circumstances affecting the Corporation may change rapidly. Except as may be required by applicable law, the Corporation does not undertake any obligation to update publicly or revise any such forward looking statements, whether as a result of new information, future events or otherwise.

# MANAGEMENT'S DISCUSSION AND ANALYSIS

FOR THE YEARS ENDED DECEMBER 31, 2018 AND 2017

# ADDITIONAL INFORMATION CONCERNING DST

Additional information relating to Dundee Sustainable Technologies may be found on SEDAR at <a href="https://www.sedar.com">www.sedar.com</a> and the Corporation's website at <a href="https://www.dundeetechnologies.com">www.dundeetechnologies.com</a>.

March 26, 2019		
(s) Brian Howlett	(s) Arved Marin	
Brian Howlett President and CEO	Arved Marin CFO	