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## PYROGENESIS CANADA INC.

### MANAGEMENT'S DISCUSSION AND ANALYSIS

This management's discussion and analysis ("MD&A") is intended to assist readers in understanding the business environment, strategies, performance and risk factors of PyroGenesis Canada Inc. ("PyroGenesis", or the "Company"). The MD&A provides the reader with a view and analysis, from the perspective of management, of the Company's financial results for the three months ended March 31, 2017. The MD&A has been prepared in accordance with National Instrument 51-102, Continuous Disclosure Requirements, and should be read in conjunction with the audited financial statements and related notes thereto of the Company for the year ended December 31, 2016.

The condensed financial statements and MD&A have been reviewed by PyroGenesis' Audit Committee and were approved by its Board of Directors on May 30, 2017. The Board of Directors is responsible for ensuring that the Company fulfills its responsibilities for financial reporting and is ultimately responsible for reviewing and approving the MD&A. The Board of Directors carries out this responsibility principally through its Audit Committee. The Audit Committee is appointed by the Board of Directors and is comprised of independent and financially literate directors. The Audit Committee reports its findings to the Board of Directors for its consideration when it approves the MD&A and financial statements for issuance to shareholders.

The following information takes into account all material events that took place up until May 30, 2017, the date on which the Company's Board of Directors approved this MD&A. Unless otherwise indicated, all amounts are presented in Canadian dollars. The Company's functional and reporting currency is the Canadian dollar.

Additional information regarding PyroGenesis is available on SEDAR ([www.sedar.com](http://www.sedar.com)), OTC Markets ([www.otcmarkets.com](http://www.otcmarkets.com)) and on the Company's website at [www.pyrogenesis.com](http://www.pyrogenesis.com).

### FORWARD-LOOKING STATEMENTS

This MD&A contains forward-looking statements. All statements other than statements of historical fact contained in this MD&A are forward-looking statements, including, without limitation, the Company's statements regarding its products and services; relations with suppliers and clients; future financial position; business strategies; potential acquisitions; potential business partnering; litigation; and plans and objectives. In certain cases, forward-looking statements can be identified by the use of words such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes", or variations of such words and phrases or state that certain actions, events or results "may", "could", "would", "might" or "will be taken", "occur" or "be achieved" and similar words or the negative thereof. Although management of the Company believes that the expectations represented in such forward-looking statements are reasonable, there can be no assurance that such expectations will prove to be correct.

In particular, this MD&A contains forward-looking statements that relate, but are not limited, to:

- the Company's business strategies, strategic objectives and growth strategy;
- the Company's current and future capital resources and the need for additional financing;
- the Company's ability to increase sales, including the results of the successful completion of the Company's current projects;
- management's expectation that the Company will achieve sustained annual growth and profitability, and that gross margins will increase resulting in a decrease in cost of sales as a percentage of revenue; and



- the Company's overall financial performance.

By their nature, forward-looking statements require assumptions and are subject to inherent risks and uncertainties including those discussed herein. In particular, forward-looking statements relating to future sales, growth and profitability are based on the assumption that current projects will be completed and the Company will be awarded certain anticipated contracts pursuant to recent negotiations with, and statements made by, third parties. There is significant risk that predictions and other forward-looking statements will not prove to be accurate. Readers are cautioned to not place undue reliance on forward-looking statements made herein because a number of factors could cause actual future results, conditions, actions or events to differ materially from the targets, expectations, estimates or intentions expressed in the forward-looking statements.

The future outcomes that relate to forward-looking statements may be influenced by many factors, including, but not limited to, the strength of the Canadian, US and Asian economies; operational, funding, and liquidity risks; unforeseen engineering and environmental problems; delays or inability to obtain required financing and/or anticipated contracts; risks associated with licenses, permits and regulatory approvals; supply interruptions or labour disputes; foreign exchange fluctuations and collection risk; competition from other suppliers, or alternative, less capital intensive, energy solutions; and risk factors described elsewhere in this document under the heading "Risk Factors". We caution that the foregoing list of factors is not exhaustive, and that, when relying on forward-looking statements to make decisions with respect to the Company, investors and others should carefully consider these factors, as well as other uncertainties and potential events, and the inherent uncertainty of forward-looking statements.

Although the Company has attempted to identify significant factors that could cause actions, events or results to differ materially from those described in forward-looking statements, there may be other factors that cause actions, events or results not to be as anticipated, estimated or intended. There can be no assurance that forward-looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. Accordingly, readers should not place undue reliance on forward-looking statements. Forward-looking statements are provided as of the date of this MD&A, and the Company assumes no obligation to update or revise such forward-looking statements to reflect new events or circumstances except as required under applicable securities laws.

The forward-looking statements contained herein are expressly qualified in their entirety by this cautionary statement. The forward-looking statements included in this MD&A are made as of the date of this MD&A or such other date specified herein.

## **OVERVIEW**

PyroGenesis Canada Inc. is the world leader in the design, development, manufacturing and commercialization of advanced plasma processes. The Company provides engineering and manufacturing expertise, cutting-edge contract research, as well as turnkey process equipment packages to the defense, metallurgical, mining, advanced materials (including 3D printing), oil & gas, and environmental industries. With a team of experienced engineers, scientists and technicians working from its Montreal office and its 3,800m<sup>2</sup> production facility, PyroGenesis maintains its competitive advantage by remaining at the forefront of technology development and commercialization. PyroGenesis' core competencies allows the Company to be a leader in providing innovative plasma torches, plasma waste processes, plasma atomisation processes, high-temperature metallurgical processes, and engineering services to the global marketplace. PyroGenesis' operations are ISO 9001:2008 certified, and have been ISO certified since 1997. PyroGenesis is a publicly-traded Canadian company on the TSX Venture Exchange (Ticker symbol: PYR.V) and on the OTCQB in the United States (Ticker symbol: PYRNF).



## **SELECTED FINANCIAL INFORMATION**

	Three months ended Mar 31,		% Change
	2017	2016	2017vs2016
<b>Revenue</b>	\$ 1,696,138	\$ 1,016,853	\$ 67%
Cost of sales and services before amortization of intangible assets	820,264	723,255	
Gross margin before amortization of intangible assets	875,874	293,598	
Amortization of intangible assets	-	349,268	
Gross profit (loss)	875,874	(55,670)	
<b>Expenses</b>			
Selling, general and administrative	1,148,916	1,048,914	
Research and development	68,064	42,877	
Finance income and finance costs	157,847	151,200	
	1,374,827	1,242,991	
<b>Net loss and comprehensive loss</b>	<b>(498,953)</b>	(1,298,661)	-62%
Other income	200,343	50,000	
Impairment loss on property and equipment	-	-	
<b>Comprehensive loss</b>	<b>\$ (298,610)</b>	\$ (1,248,661)	\$ -76%
Basic and diluted loss per share	\$ (0.00)	\$ (0.01)	
<b>Adjusted EBITDA (loss)</b>	<b>\$ 22,586</b>	\$ (649,506)	-103%

Adjusted EBITDA (loss) is not a performance measure defined under IFRS and it is not considered an alternative to Income (Loss) from operations or Comprehensive Earnings (Loss) in the context of measuring a Company's performance. Management believes that providing certain non-GAAP performance measures, in addition to IFRS measures, provides users of the Company's financial statements with an enhanced understanding of their results and related trends, and as such increases transparency and clarity. Adjusted EBITDA is an important measure of operating performance because it allows management, investors and others to evaluate and compare the Company's core operating results, including our return on capital and operating efficiencies, from period to period, by removing the impact of its capital structure (interest expense to service outstanding debt), asset base (depreciation and amortization), tax consequences, and other non-operating items not requiring cash outlays including share-based compensation. Securities regulations require that companies caution readers that earnings and other measures adjusted to a basis other than IFRS do not have standardized meanings and are unlikely to be comparable to similar measures used by other companies. Accordingly, they should not be considered in isolation.

### **Extract from Statement of Financial Position at:**

	Mar 31, 2017	Dec 31, 2016
Current assets	3,208,459	1,968,964
Non-current assets	1,873,148	1,279,968
<b>Total assets</b>	<b>\$ 5,081,607</b>	\$ 3,248,932
Current liabilities	9,212,835	4,048,316
Non-current liabilities	16,656	3,605,897
<b>Total liabilities</b>	<b>\$ 9,229,491</b>	\$ 7,654,213
Shareholders' equity (deficiency)	\$ (4,147,884)	\$ (4,405,282)



## **RESULTS OF OPERATIONS**

### **Revenue**

PyroGenesis recorded revenue of \$1,696,138 in the first quarter of 2017 ("Q1, 2017"), representing an increase of 67% compared with \$1,016,853 recorded in the first quarter of 2016 ("Q1, 2016").

Revenues recorded in the first quarter of 2017 were generated primarily from:

- (i) the development of a vacuum arc reducing process to convert Silica into high purity Silicon metal,
- (ii) the manufacture and further field testing of Tactical PACWADS, the first mobile plasma system for destruction of chemical warfare agents under contract with an international military consortium,
- (iii) the demonstration of the viability of PyroGenesis' existing plasma chemical warfare agent destruction platform with locally available materials, for the complete eradication of chemical warfare agents without creating hazardous by-products,
- (iv) support services related to PAWDS-Marine systems supplied to the US Navy,

### **Cost of Sales and Services and Gross Margin**

#### **Cost of Sales and Services**

	<b>Three months ended Mar 31,</b>		<b>% Change</b>
	<b>2017</b>	<b>2016</b>	<b>2017vs2016</b>
Employee compensation	\$ 483,051	\$ 497,190	-3%
Subcontracting	23,391	75,718	-69%
Direct materials	315,721	113,775	177%
Manufacturing overhead & other	127,312	136,137	-6%
Foreign exchange loss	3,035	9,250	-67%
Investment tax credits	(132,246)	(108,815)	22%
<b>Sub-total before amortization of intangible assets</b>	<b>820,264</b>	<b>723,256</b>	<b>13%</b>
Amortization of intangible assets		349,268	-100%
<b>Total Cost of Sales and Services</b>	<b>\$ 820,264</b>	<b>\$ 1,072,524</b>	<b>-24%</b>

#### **Gross Margin**

	<b>Three months ended Mar 31,</b>	
	<b>2017</b>	<b>2016</b>
Revenue	\$ 1,696,138	\$ 1,016,853
Cost of Sales and Services before amortization of intangible assets	820,264	723,256
Gross Margin before amortization of intangible assets	875,874	293,597
Gross Margin % before amortization of intangible assets	51.6%	28.9%
Amortization of intangible assets	-	349,268
Gross Margin after amortization of intangible assets	\$ 875,874	\$ (55,671)
Gross Margin % after amortization of intangible assets	51.6%	-5.5%



Gross margin before amortization of intangible assets is not a performance measure defined under IFRS and it is not considered an alternative to gross margin in the context of measuring the Company's performance. Management believes that providing certain non-GAAP performance measures, in addition to IFRS measures, provides users of the Company's financial statements with an enhanced understanding of its results and related trends, and increases transparency and clarity. Gross margin before amortization of intangible assets is an important measure of operating performance because it allows management, investors and others to evaluate and compare the Company's core operating results, including its return on capital and operating efficiencies, from period to period, by removing the impact of non-operating items not requiring cash outlays. Securities regulations require that companies caution readers that earnings and other measures adjusted to a basis other than IFRS do not have standardized meanings and are unlikely to be comparable to similar measures used by other companies. Accordingly, they should not be considered in isolation.

Cost of sales and services before amortization of intangible assets was \$820,264 in Q1, 2017, representing an increase of 13% compared with \$723,256 in Q1, 2016.

In Q1, 2017 cost of direct materials increased to \$315,721 (Q1, 2016: \$113,775), while employee compensation, subcontracting and manufacturing overhead and other decreased to, \$483,051 (Q1, 2017 - \$497,190), \$23,391 (Q1, 2017 - \$75,718), \$127,312 (Q1, 2017 - 136,137), respectively.

The type of contracts being executed and the nature of the project activity during any given quarter has a significant impact on both the overall level of cost of sales and services reported in a period, as well as the composition of the cost of sales and services, as the mix between labour, materials and subcontracts may be significantly different.

Investment tax credits recorded against cost of sales are primarily related to client funded projects that qualify for tax credits from the provincial government of Quebec. Qualifying tax credits increased to \$132,246 in Q1, 2017, compared with \$108,815 in Q1, 2016. This represents an increase of 22%. The Company continues to make investments in research and development projects involving strategic partners and government bodies.

The gross margin for Q1, 2017, before amortization of intangible assets was \$875,874, or 51.6% of revenue. This compares with a gross margin before amortization of intangible assets of \$293,597 (28.9% of revenue) for Q1, 2016.

The amortization of intangible assets of \$Nil in Q1, 2017 and \$349,268 for Q1, 2017 relates to the licenses and know-how purchased in 2011 from a company under common control. Of note, this expense is a non-cash item and the underlying asset was fully amortized in Fiscal 2016.

### ***Selling, General and Administrative Expenses***

	<b>Three months ended Mar 31,</b>		<b>% Change</b>
	<b>2017</b>	<b>2016</b>	<b>2017vs2016</b>
Employee compensation	\$ 524,397	\$ 535,473	-2%
Professional fees	247,909	224,387	10%
Office and general	113,447	114,338	-1%
Travel	42,502	40,008	6%
Depreciation on property and equipment	25,198	32,256	-22%
Government grants	-	(20,848)	-100%
Other expenses	57,312	56,870	1%
<b>Sub-total before Share-based payments</b>	<b>1,010,765</b>	982,484	3%
Share-based payments	138,151	66,431	108%
<b>Total selling, general and administrative</b>	<b>\$ 1,148,916</b>	\$ 1,048,915	10%



Included within Selling, General and Administrative expenses (“SG&A”) are costs associated with corporate administration, business development, project proposals, operations administration, investor relations and employee training.

SG&A expenses for Q1,2017 excluding the costs associated with share-based compensation (a non-cash item in which options vest over a four year period), were \$1,010,765, representing an increase of 3% compared with \$982,484 reported for Q1, 2016.

The increase in SG&A expenses in Q1, 2017 over the same period in 2016 is attributable to the net effect of:

- a decrease of 2% in employee compensation,
- an increase of 10% for professional fees, primarily due to increase in investor relations,
- a decrease of 1% in office and general expenses, due to a decrease in courses and seminars,
- travel costs increased by 6%, due to an increase in travel abroad,
- depreciation on property and equipment decreased by 22%, asset under development in Q1, 2017 totaling \$848,617 will begin to be depreciated when the asset is available or ready for use,
- government grants decreased by 100% due to lower level of activities supported by such grants and,
- other expenses increased by 1%, primarily due to the reduced cost of freight and shipping.

Separately, share based payments increased by 108% in Q1, 2017 over the same period in 2016 as a result of the vesting structure of the stock option plan including the stock options offered on September 25, 2016.

### **Research and Development (“R&D”) Costs**

	<b>Three months ended Mar 31,</b>		<b>% Change</b>
	<b>2017</b>	<b>2016</b>	<b>2017vs2016</b>
Employee compensation	\$ 59,994	\$ 23,971	150%
Subcontracting	3,364	-	100%
Materials and equipment	4,492	17,539	-74%
Other expenses	214	1,367	-84%
<b>Total net R&amp;D costs</b>	<b>\$ 68,064</b>	<b>\$ 42,877</b>	<b>59%</b>

The Company incurred \$68,064 of R&D costs in Q1, 2017, compared with \$42,877 in Q1, 2016, representing an increase of 59%.

In addition to internally funded R&D projects, the Company also incurred R&D expenditures during the execution of client funded projects. These expenses are eligible for Scientific Research and Experimental Development (“SR&ED”) tax credits. SR&ED tax credits on client funded projects are applied against cost of sales and services (see “Cost of Sales” above).



### **Finance Income and Finance Costs**

	Three months ended Mar 31,		% Change
	2017	2016	2017vs2016
Finance income	\$ 200,343	\$ 50,000	
Finance expenses	\$ 157,847	\$ 151,200	4%
Net finance expenses	\$ (42,496)	\$ 101,200	-142%

Finance income in Q1, 2017 resulted from the adjustment to the fair market value of other investments in Q1, 2017 and Q1, 2016.

Finance costs for Q1, 2017 totaled \$157,847 as compared with \$151,200 for Q1, 2016, representing an increase of 4%. The increase in Finance costs in Q1, 2017, is attributable to an increase in accretion costs on convertible debentures.

### **Depreciation on Property and Equipment**

	Three months ended Mar 31,		% Change
	2017	2016	2017vs2016
Depreciation on property and equipment	\$ 25,198	\$ 32,256	-22%

The depreciation on property and equipment decreased to \$25,198 in Q1, 2017, compared with \$32,256 in Q1, 2016. The 22% decrease reflects a reduced level of investments in machinery and equipment from 2010 to 2015. The asset under development in Q1, 2017 totaling \$848,617 will begin to be depreciated when the asset is available or ready for use,

### **Net loss and comprehensive loss**

	Three months ended Mar 31,		% Change
	2017	2016	2017vs2016
Loss from operations	\$ (498,953)	\$ (1,298,661)	-62%
Comprehensive loss	\$ (298,610)	\$ (1,248,661)	-76%

The loss from operations for Q1, 2017 of \$498,953 compared to \$1,298,661, in Q1, 2016, represents a decrease in loss of 62%. The net comprehensive loss in Q1, 2016 includes amortization of intangible assets in the amount of \$349,269. The net comprehensive loss from operations includes finance income in the amount of \$200,343 for Q1, 2017.

The net comprehensive loss for Q1, 2017 of \$298,610 compared to a loss of \$1,248,661, in Q1, 2016, representing a decrease in loss of \$950,051 (76%) primarily attributable to the factors described above, which have been summarized as follows:

- (i) an increase in product and service related revenue of \$679,285 arising in Q1, 2017,
- (ii) an increase in cost of sales and services totaling \$97,009 in Q1, 2017,
- (iii) an increase in SG&A expenses of \$100,002 arising in Q1, 2017 as explained above,





- (iv) an increase in R&D expenses of \$25,187 primarily due to the fact that many of the Company's engineering and R&D resources were concentrated on activities within projects under construction for clients, with such costs being recorded within cost of sales.
- (v) an increase in net finance costs of \$6,647,
- (vi) an increase in finance income of \$150,343 in Q1, 2017.

### **EBITDA and Adjusted EBITDA**

	<b>Three months ended Mar 31,</b>		<b>% Change</b>
	<b>2017</b>	<b>2016</b>	<b>2017vs2016</b>
Comprehensive loss	<b>\$ (298,610)</b>	\$ (1,248,661)	-76%
Depreciation on property and equipment	<b>25,198</b>	32,256	
Amortization of intangible assets	-	349,268	
Financing charges	<b>157,847</b>	\$ 151,200	
<b>EBITDA (loss)</b>	<b>\$ (115,565)</b>	\$ (715,937)	-84%
<b>Other non-cash items:</b>			
Share-based payments	<b>138,151</b>	66,431	
<b>Adjusted EBITDA (loss)</b>	<b>\$ 22,586</b>	\$ (649,506)	-103%

EBITDA is defined as Earnings (from operations) before Net Financing Charges, Taxes, Depreciation and Amortization and Adjusted EBITDA is defined as Earnings (from operations) before Net Financing Charges, Taxes, Depreciation, Amortization and other non-cash items including share-based payment costs.

EBITDA and Adjusted EBITDA are not performance measures defined under IFRS and they are not considered an alternative to income or loss from operations, or to comprehensive earnings or loss, in the context of measuring a company's performance. Management believes that providing certain non-GAAP performance measures, in addition to IFRS measures, provides users of the Company's financial statements with an enhanced understanding of its results and related trends and increases transparency and clarity. Management believes that EBITDA and Adjusted EBITDA are important measures of operating performance because it allows management, investors and others to evaluate and compare the Company's operating results, including its return on capital and operating efficiencies, from period-to-period by removing the impact of the Company's capital structure (interest expense to service outstanding debt), asset base (depreciation and amortization), tax consequences, and other non-operating items not requiring cash outlays including share-based compensation. Securities regulations require that companies caution readers that earnings and other measures adjusted to a basis other than IFRS do not have standardized meanings and are unlikely to be comparable to similar measures used by other companies. Accordingly, they should not be considered in isolation.

The EBITDA loss in Q1, 2017 was \$115,565 compared with an EBITDA loss of \$715,937 for Q1, 2016, representing a decrease of 84%. The decrease in the EBITDA loss in Q1, 2017 compared with Q1, 2016 is primarily attributable to higher level of revenues in Q1, 2017.

Adjusted EBITDA in Q1, 2017 was \$22,586 compared with an Adjusted EBITDA loss of \$649,506 for Q1, 2016. The increase of \$672,092 in the Adjusted EBITDA in Q1, 2017 is mainly attributable to the decreased comprehensive loss of \$950,051, a decrease in depreciation on property and equipment of \$7,058, a decrease of \$349,268 in amortization of intangible assets, offset by an increase in share-based payments of \$71,720.





## **SUMMARY OF QUARTERLY RESULTS**

	2017		2016		
	Q1	Q4	Q3	Q2	Q1
Revenues	\$ 1,696,138	\$ 1,483,543	\$ 1,902,748	\$ 818,990	\$ 1,016,853
Gross margin before amortization of intangible assets	875,874	582,475	1,220,643	74,063	293,597
Gross margin %	51.6%	39.3%	64.2%	9.0%	28.9%
Loss from operations	(298,610)	(3,641,515)	(717,041)	(1,345,000)	(1,298,663)
Comprehensive loss	(298,610)	(3,641,515)	(717,041)	(1,345,000)	(1,248,663)
Net loss per share - basic and diluted	(0.00)	(0.04)	(0.01)	(0.01)	(0.01)

The majority of PyroGenesis' revenue is recognised using the percentage of completion basis, and is dependent on the timing of project initiation and execution, including project engineering, manufacturing, and testing.

## **LIQUIDITY AND CAPITAL RESOURCES**

The following table summarizes the contractual maturities of financial liabilities as at March 31, 2017.

	Total	6 months or less	6 to 12 months	1-2 year	2-3 year
	\$	\$	\$		\$
Accounts payable and accrued liabilities	1,528,032	1,528,032	-	-	-
Capital lease obligations	26,372	4,521	4,521	9,042	8,288
Loans	607,060	607,060	-	-	-
Convertible debentures	4,300,000	-	4,300,000	-	-
	6,461,464	2,139,613	4,304,521	9,042	8,288

The Company has incurred, in the last several years, operating losses and negative cash flows from operations, resulting in an accumulated deficit of \$37,325,015 as at March 31, 2017. Furthermore, as at March 31, 2017, the Company's current liabilities and expected level of expenses for the next twelve months exceed cash on hand of \$1,278,447. The Company has relied upon external financings to fund its operations in the past, primarily through the issuance of equity, debt, and convertible debentures, as well as from investment tax credits.

As at March 31, 2017, the Company had cash on hand of \$1,278,447 and negative working capital of \$6,004,376 compared with a cash balance of \$385,257 and negative working capital of \$2,079,353 as at December 31, 2016.

Revenue generated from active projects does not yet produce sufficient positive cash flow to fund operations. However, based on current backlog of \$9.4MM at May 30, 2017 (over 180% of 2016



revenues), together with the pipeline of prospective new projects, cash flow from operations are expected to become positive in the very near future.

### **OFF-BALANCE SHEET ARRANGEMENTS**

The Company had no off-balance sheet arrangements as at March 31, 2017.

### **SUMMARY OF CASH FLOWS**

	<b>Three months ended Mar 31,</b>	
	<b>2017</b>	<b>2016</b>
Cash provided by (used in) operating activities	<b>\$ 908,600</b>	<b>\$ (1,098,405)</b>
Cash provided by (used in) investing activities	<b>(392,514)</b>	<b>-</b>
Cash provided by (used in) financing activities	<b>377,104</b>	<b>556,600</b>
Increase (decrease) in cash	<b>893,190</b>	<b>(541,805)</b>
Cash - end of period	<b>1,278,477</b>	<b>225,563</b>

For the three months ended Q1, 2017, cash flow from operating activities generated cash of \$908,600 compared to a net use of \$1,098,405 for the same period in the prior year.

The use of cash during Q1, 2017 consists of the comprehensive loss of \$298,610 (Q1, 2017 - \$1,248,663) plus adjustment for non-cash items totalling \$120,853 (Q1, 2017 - \$599,155) less a net change in non-cash operating working capital items of \$1,169,774 (Q1, 2017 - negative net change in non-cash operating working capital items of \$364,095) plus interest paid of \$83,417 (Q1, 2016 - interest paid of \$84,802).

The net change in non-cash operating working capital items was driven by:

- a) an increase in accounts receivable of \$574,035 in Q1, 2016, compared to a decrease of \$171,698 in Q1, 2016;
- b) an increase in sales tax receivable of \$43,454 in Q1, 2017, compared to a decrease of \$167,360 in Q1, 2016;
- c) a decrease in costs and profits in excess of billings on uncompleted contracts of \$467,255 in Q1, 2017, compared to an increase of \$280,117 in Q1, 2016;
- d) an increase in investment tax credits receivable of \$132,246 in Q1, 2017, compared to an increase of \$108,815 in Q1, 2016;
- e) an increase in prepaid expenses of \$63,826 in Q1, 2017, compared to a decrease of \$25,229 in Q1, 2016;
- f) an increase in accounts payable and accrued liabilities of \$81,304 in Q1, 2017, compared to an increase of \$6,010 in Q1, 2016;
- g) an increase in billings in excess of costs and profits on uncompleted contracts of \$1,434,776 in Q1, 2017, compared with a decrease of \$345,460 in Q1, 2016.

Investing activities resulted in a use of cash of \$392,514 in Q1, 2017, compared to a use of cash of \$Nil in Q1, 2016 resulting from the purchase of property and equipment.

Financing activities in Q1, 2017 resulted in a net source of funds of \$377,104, compared with a net source of funds of \$556,600 in Q1, 2016. In Q1, 2017, the Company issued common shares



upon exercise of warrants for a cash proceeds of \$417,857 raised for general working capital purposes, and repaid of \$40,753 in loans and capital lease obligations. In Q1, 2016, the Company completed loans for a net cash proceeds of \$556,600.

For Q1, 2017, the net cash position of the Company increased by \$893,190, compared to a net decrease of \$541,805 for the same period in the prior year.

### **CAPITAL STOCK INFORMATION**

The authorized share capital of the Company consists of an unlimited number of Class A common shares (the "Common Shares"). As at May 30, 2017, PyroGenesis had 104,501,291 Class A Common Shares, 7,070,790 warrants, 9,751,000 outstanding options issued and 7,748,000 exercisable options issued.

### **GOING CONCERN**

Cash generated from contracts and from providing engineering services to clients has historically been insufficient to meet the overall cash requirements of the Company to cover operating costs. For the Company to generate sufficient positive cash flows from operations and meet current cash requirements, the level of business must exceed that recorded to date. Management expects that the investments currently being made in accelerating projects under development for various clients, together with executing on the \$9.4MM backlog at May 30, 2017, (over 180% of 2016 revenues) which is primarily related to the Company's successful diversification into niche markets of the additive manufacturing (including 3D printing), and metals & mining industries, will continue to improve the Company's cash position.

To date, the Company has raised financing primarily through successive issuances of equity and convertible debentures. There is no certainty that the Company will continue to be able to raise additional financing or expand its sales to fund its operations, although management is confident that it will be able to do so. These conditions indicate the existence of a material uncertainty that may cast significant doubt on the Company's ability to continue as a going concern.

The March 31, 2017 condensed financial statements have been prepared using International Financial Reporting Standards ("IFRS") applicable to a going concern, which contemplates the realization of assets and settlement of liabilities in the normal course of business as they become due. If the going concern assumption were not appropriate for these financial statements then adjustments would be necessary to the carrying value of assets and liabilities, the reported expenses and the statements of financial position classifications used. The impact on the financial statements could be material.

### **RELATED PARTY TRANSACTIONS**

During the three months ended March 31, 2017, the company concluded the following transactions with related parties:

Rent was charged by a trust beneficially owned by a shareholder of the Company in the amount of \$43,452 (2016 - \$47,560). A balance due of \$43,173 (December 31, 2016 - \$40,688) is included in accounts payable and accrued liabilities.

The balance of interest on balance of sale charged by a company under common control that has not been paid of \$317,319 (December 31, 2016 - \$317,319) is included in loans.

Interest on the convertible debentures was charged by a shareholder of the Company in the amount of \$14,171 (2016 - \$14,156)



Fees of \$23,000 were charged for services rendered by the independent directors who are members of the Company's Board of Directors (2016 - \$31,000). A balance of \$50,000 (December 31, 2016 – \$Nil) is included in accounts payable and accrued liabilities.

Fees of Nil were charged for professional services rendered by a company controlled by a director of the Company (2016 – 30,000).

During the period ended March 31, 2017, the total compensation to key management amounted to \$134,283 (Q1, 2016 - \$187,804).

As part of a stock option incentive plan, on September 25, 2016, 4,350,000 common shares at a price of \$0.18 in the capital of the company were granted to the Directors of the Company. The options will be exercisable for a period of five (5) years commencing on the date of the grant. During the year ended December 31, 2016, the total compensation to key management amounted to \$654,939 (2015 - \$670,533).

### **SUBSEQUENT EVENTS**

In April 2017, PyroGenesis received an aggregate amount of \$175,000 from the exercise of a series of warrants which were previously issued by the Company in connection with a private placement offering completed on July 26, 2016. As a result of such exercise, the Company issued 500,000 Common Shares in its share capital.

### **CRITICAL ACCOUNTING ESTIMATES, NEW AND FUTURE ACCOUNTING POLICIES AND FINANCIAL INSTRUMENTS**

For a discussion of critical accounting estimates, new and future accounting policies and financial instruments, please refer to notes 4, 5 and 19 of the 2016 Consolidated Financial Statements.

### **RISK FACTORS**

PyroGenesis is subject to a number of risks and uncertainties that could significantly affect the Company's financial condition and performance. This list of risk factors may not be exhaustive as the Company operates in a rapidly changing business environment and new risk factors emerge from time to time. The Company cannot predict such risk factors, nor can the Company assess the impact, if any, of such risk factors or uncertainties on its business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those projected in any forward-looking statements. Accordingly, neither shareholders of the Company nor purchasers of securities of the Company should rely on forward-looking statements as a prediction of actual results. If any of these risks actually occur, the Company's business, results of operations, financial position and cash flows could be adversely affected. In any such case, the market price of the Company's common shares could decline and investors may lose all or part of their investment.

#### ***Revenue Risks***

PyroGenesis may experience delays in achieving revenues, particularly with plasma gasification projects which have a long sales cycle. Revenues may be delayed or negatively impacted by issues encountered by the Company or its clients including:

- (a) unforeseen engineering and/or environmental problems;
- (b) delays or inability to obtain required financing, licenses, permits and/or regulatory approvals;
- (c) supply interruptions and/or labour disputes;
- (d) foreign exchange fluctuations and/or collection risk; and



- (e) competition from other suppliers and/or alternative energy solutions that are less capital intensive.

There is no assurance that the business will perform as expected or that returns from the business will support the expenditures needed to develop it.

In addition, the Company has experienced and has been dealing with technical issues under an existing contract with a customer based in Asia since December 31, 2015. At the date of this MD&A, these differences have not yet been resolved and the timing of the resolution remains uncertain. Management believes that the Company has respected the terms of the contract and expect to recover the full amounts owing under the contract from the customer. As such, the timing of the delivery of the remaining nine units, which was initially expected in 2016 for an amount of \$9.6 million, is also dependent on the resolution of the differences between the Company and the customer. There is no assurance that the Company will be able to resolve these differences with the customer in its favour either through settlement or litigation. If the Company is unable to resolve these differences with the customer, this will adversely affect the Company's financial position, financial performance and cash flows.

#### ***Technology Development and Manufacturing Capability Risks***

PyroGenesis recently expanded into new areas of business and, as a result, many of the Company's products are at various stages of the development cycle. The Company may be unable to commercialise such products or it may be unable to manufacture such products in a commercially viable manner. Whilst management is confident in both its technology and in its team of experienced engineers, scientists and technicians, it cannot know with certainty, which of its products will be commercialised, when such products will be commercialised, or whether such products will be able to be manufactured and distributed profitably.

#### ***Lack of Product Revenues/History of Losses***

PyroGenesis has incurred losses in the majority of years since its inception. The Company's operations have not generated sufficient earnings and cash flows to date to result in consistent profitability or positive cash flow. Consequently, the Company's continued existence is dependent upon its ability to generate profitable operations by establishing and expanding its client base and/or raising adequate long term financing. PyroGenesis has relied primarily on equity financing, debt financing, partner funding and government funding to carry on its business to date. The ability of the Company to achieve profitable sustainable operations in the future is uncertain. PyroGenesis has not yet demonstrated its ability to consistently achieve positive gross margins and its ongoing efforts to improve product gross margins may be insufficient to result in profitability.

#### ***Additional financing and dilution***

PyroGenesis will require additional financing to support ongoing operations and to undertake capital expenditures. There can be no assurance that additional financing will be available to the Company when needed, or on terms acceptable to the Company. PyroGenesis' inability to raise financing to support ongoing operations or to fund capital expenditures could limit the Company's growth and may have a material adverse effect upon the Company.

The Company does not exclude raising additional funds by equity financing. In addition, at May 30, 2017, 9,751,000 stock options are currently issued and outstanding, together with 7,070,790 warrants and 5,000,000 convertible debentures. The exercise of stock options and/or warrants, together with the conversion of debentures, as well as any new equity financings, represents dilution factors for present and future shareholders.



### ***Sales Cycle and Fixed Price Contracts***

PyroGenesis sales cycle is long and the signing of new contracts is subject to delay, over which the Company has little control. The Company also enters into sales contracts with fixed pricing, which may be impacted by changes over the period of implementation. There is no assurance that delays or problems in fulfilling contracts with clients will not adversely affect the Company's activities, operating results or financial position.

### ***Reliance on Technology***

PyroGenesis will depend upon continuous improvements in technology to meet client demands in respect of performance and cost, and to explore additional business opportunities. There can be no assurance that the Company will be successful in its efforts in this regard or that it will have the resources available to meet this demand. Whilst management anticipates that the research and development will allow the Company to explore additional business opportunities, there is no guarantee that such business opportunities will be presented or realised. The commercial advantage of the Company will depend to a significant extent on the intellectual property and proprietary technology of PyroGenesis and the ability of the Company to prevent others from copying such proprietary technologies. PyroGenesis currently relies on intellectual property rights and other contractual or proprietary rights, including (without limitation) copyright, trade secrets, confidential procedures, contractual provisions, licenses and patents, to protect its proprietary technology. PyroGenesis may have to engage in litigation in order to protect its patents or other intellectual property rights, or to determine the validity or scope of the proprietary rights of others. This type of litigation can be expensive and time consuming, regardless of whether or not the Company is successful. PyroGenesis may seek patents or other similar protections in respect of particular technology; however, there can be no assurance that any future patent applications will actually result in issued patents, or that, even if patents are issued, they will be of sufficient scope or strength to provide meaningful protection or any commercial advantage to the Company. Moreover, the process of seeking patent protection can itself be long and expensive. In the meantime, competitors may develop technologies that are similar or superior to PyroGenesis' technology or design around the patents owned by the Company, thereby adversely affecting the Company's competitive advantage in one or more of its areas of business. Despite the efforts of the Company, its intellectual property rights may be invalidated, circumvented, challenged, infringed or required to be licensed to others. It cannot be assured that any steps the Company may take to protect its intellectual property rights and other rights to such proprietary technologies that are central to the Company's operations will prevent misappropriation or infringement of its technology.

### ***Changes to Contracts***

PyroGenesis is dependent upon its ability to establish and develop new relationships and to build on existing relationships with current clients. The Company cannot provide assurance that it will be successful in maintaining or advancing its relationships with current clients or procure additional clients. In addition, PyroGenesis cannot provide assurance that the U.S. Military and/or other military clients will continue to provide the Company with business. Sales to governments and governmental entities are subject to specific additional risks, such as delays in funding, termination of contracts or sub-contracts at the convenience of the government, termination, reduction or modification of contracts or sub-contracts in the event of changes in the government's policies or as a result of budgetary constraints, and increased or unexpected costs resulting in losses or reduced profits under fixed price contracts.

### ***Foreign Exchange Exposure***

PyroGenesis' products and services are increasingly being sold in markets outside of Canada, whilst most of its operating expenses and capital expenditures are denominated in Canadian dollars. As a result, the Company is exposed to fluctuations in the foreign exchange rates





between Canadian dollar and the currency in which a particular sale is transacted, which may result in foreign exchange losses that could affect earnings.

### ***Competition***

The industry is competitive and PyroGenesis competes with a substantial number of companies which have greater technical and financial resources. There can be no assurance that such competitors will not substantially increase the resources devoted to the development and marketing of products and services that compete with those of the Company or that new or existing competitors will not enter the various markets in which PyroGenesis is active. There can be no assurance that competitors will not develop new and unknown technologies with which the Company may have difficulty competing. Furthermore, failure to remain cost competitive may result in PyroGenesis losing business to its competitors.

### ***Management and Key Personnel***

PyroGenesis depends on the skills and experience of its management team and other key employees. The Company relies heavily on its ability to attract and retain highly-skilled personnel in a competitive environment. PyroGenesis may be unable to recruit, retain, and motivate highly-skilled employees in order to assist the Company's business, especially activities that are essential to the success of the Company. Failure to recruit and retain highly-skilled employees may adversely affect PyroGenesis' business, financial condition and results of operations.

### ***Implementation of a strategic plan***

PyroGenesis' commercial strategy aims to leverage its products, consumables, and services whilst focusing on the resolution of problems within niche markets within the industries served by the Company. There can be no assurances as to the success of the Company's strategic plan, which should be considered under the risks perspective and difficulties frequently encountered by a developing business.

### ***Adverse Decisions of Sovereign Governments***

PyroGenesis conducts an increasing portion of its business internationally. There is no assurance that any sovereign government, including Canada's, will not establish laws or regulations that will not be detrimental to the Company's interests or that, as a foreign corporation, it will continue to have access to the regulatory agencies in other countries. Governments have, from time to time, established foreign exchange controls, which could have a material adverse effect on the Company's business, financial condition and results of operations.

### ***Governmental Regulation***

PyroGenesis is subject to a variety of federal, provincial, state, local and international laws and regulations relating namely to the environment, health and safety, export controls, currency exchange, labour and employment and taxation. These laws and regulations are complex, change frequently and have tended to become more stringent over time. Failure to comply with these laws and regulations may result in a variety of administrative, civil and criminal enforcement measures, including assessment of monetary penalties, imposition of remedial requirements and issuance of injunctions as to future compliance. The Company may be subject to compliance audits by regulatory authorities in the various countries in which it operates.

### ***Environmental Liability***

PyroGenesis is subject to various environmental laws and regulations enacted in the jurisdictions in which it operates, which govern the manufacturing, processing, importation, transportation, handling and disposal of certain materials used in the Company's operations. Management





believes that it has adequate procedures in place to address compliance with current environmental laws and regulations. Furthermore, management monitors the Company's practices concerning the handling of environmentally hazardous materials. However, there can be no assurance that the Company's procedures will prevent environmental damage occurring from spills of materials handled by the Company or that such damage has not already occurred. On occasion, substantial liabilities to third parties may be incurred. The Company may have the benefit of insurance maintained by it or the operator, however, the Company may become liable for damages against which it cannot adequately insure or against which it may elect not to insure because of high costs or other reasons. The Company's clients are subject to similar environmental laws and regulations, as well as limits on emissions to the air and discharges into surface and sub-surface waters. While regulatory developments that may follow in subsequent years could have the effect of reducing industry activity, the Company cannot predict the nature of the restrictions that may be imposed. The Company may be required to increase operating expenses or capital expenditures in order to comply with any new restrictions or regulations.

### ***Product Liability and Other Lawsuits***

PyroGenesis is subject to a variety of potential product liabilities claims and other lawsuits related with its operations, including liabilities and expenses associated with product defects. The Company maintains product liability and other insurance coverage that management believes is generally in accordance with the market practice in its industry, but there can be no assurance that the Company will always be adequately insured against all such potential liabilities.

### ***Market Liquidity***

The market price for the common shares of the Company could be subject to wide fluctuations. Factors such as the announcement of significant contracts, technological innovations, new commercial products, patents, a change in regulations, quarterly financial results, future sales of common shares by the Company or current shareholders, and many other factors could have considerable repercussions on the price of the Company's common shares. In addition, the financial markets may experience significant price and value fluctuations that affect the market prices of equity securities of companies that sometimes are unrelated to the operating performance of these companies. Broad market fluctuations, as well as economic conditions generally may adversely affect the market price of the Company's common shares.

### ***Information systems disruptions***

The Company's business depends on the efficient and uninterrupted operation of its computer and communications software, hardware systems, and its other information technology. If such systems were to fail, or the Company was unable to successfully expand the capacity of these systems or integrate new technologies into its existing systems, its operations and financial results could be adversely affected. The Company, under these circumstances, is constantly reviewing the adequacy of its cyber security procedures in order to establish and maintain the necessary preventive measures and controls to prevent such information system incidents.

## **OUTLOOK**

At year end 2016, we described the preceding twelve months as being a pivotal year for PyroGenesis as the Company shifted its focus away from being a fabricator of plasma-based systems that produced unique titanium powders, in favour of becoming a producer of metal powders for the Additive Manufacturing Industry (the "Industry"). Given their unique properties (pure, small, spherical, and uniform; which make them flow like water), these powders are greatly sought after in the Industry, particularly 3D printing. Given this strategic shift, together with the backlog of signed contracts from our non-additive manufacturing business ("Core/Traditional Lines



of Business”) of over \$13MM since June 30, 2016, we projected that 2017 was shaping up to be a break out year for PyroGenesis, and Q1 2017 has not disappointed.

Q1 2017 results reflected the following:

- Revenues increased 67% to \$1.7MM in Q1 2017 from \$1.0 MM posted in Q1 2016;
- Gross profit *after* amortization of intangible assets increased to 52% in Q1 2017, from - 5.5% over the same period in 2016. (Gross profit *before* amortization of intangible assets increased to 52% in Q1 2017, from 29% over the same period in 2016);
- Most importantly, Q1 2017 was profitable on an EBITDA (adjusted) basis. Q1 2017 posted an EBITDA (adj.) of \$22.6K versus a EBITA (adj.) loss of \$649.5K;
- Over \$13.5MM in contracts were signed, and work begun on, since June 30, 2016 which, taken in context of historic revenues (2016: \$5.2MM; 2015: \$6.2MM; 2014: \$5.8MM) is quite significant. Backlog of signed contracts as of the date of this writing is \$9.4MM;
- Cash on hand at March 31<sup>st</sup> 2017 was \$1.3 MM (December 31<sup>st</sup> 2016: \$385K).

What is key to note is that these results reflect revenues from what we call our Core/Traditional Lines of Business (ie no revenues from powder sales at all), however expenses reflect certain costs of building our first powder production system which came on stream in Q1 2017 and is, as previously announced, currently ramping up to full production.

We are more convinced than ever before that 2017 is the breakout year we have been positioning the Company for, for a number of reasons:

- The healthy gross margins established in 2016 (before consideration of the 2016 write-offs), have improved, and are expected to continue to improve once powder production is in full swing.
- Established backlog of signed contracts, the majority of which are expected to be completed in 2017.
- Our Core/Traditional Lines of Business are poised to contribute significantly to the bottom line and be both profitable and significant in their own right.

The following is a non-exhaustive review of PyroGenesis’ main commercial activities:

A) Powder Production: The Company has met every milestone announced on the road to making metal powders for the Industry. It was recently announced that the assembly of the first powder production system was completed and that the first powder run exceeded expectations. The ramp up is under way and is expected to take place linearly over the ensuing months. As announced in recent press releases interest has far exceeded Managements’ expectations and an initial contract was signed for a sample amount of powder. Also recently announced was the fact that the Company has signed a number of agreements with significant and potential players in the Industry reflecting various discussions regarding the possibility of concluding certain business relationships or transactions geared to the production of powders. The current system is the first of many PyroGenesis expects to make to address an increasing need for metal powders in the Industry<sup>1</sup>.

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<sup>1</sup> Wohlers Report 2016 (ISBN 978-0-9913332-2-6)



B) DROSRITE™: The DROSRITE™ Furnace System was proven out at a North American customer's Mexican facility during the first half of 2016. Soon thereafter, a successful demonstration of the DROSRITE™ System in the Middle East took place, following which an unsolicited request to exclusively market the process in the region was received and is currently being discussed. Management's belief that the supply and installation of the first commercial sale in North America would enable the Company to leverage this success to generate a continued flow of orders for additional DROSRITE™ systems is being borne out. This recent flurry of activity and interest for the DROSRITE™ system bodes well for 2017 where we now expect to have at least 3 orders placed. We continue to expect the first follow on contracts to be signed in the 2<sup>nd</sup> half of 2017. The market potential for PyroGenesis' DROSRITE™ system, from Aluminium dross alone, exceeds \$400MM.

C) HPQ: On August 2, 2016 PyroGenesis announced that it had signed contracts totalling CDN \$8,260,000 with HPQ Silicon Resources Inc., formally Uragold Bay Resources Inc. for the sale of IP and to provide a 200 metric tonne (MT) per year PUREVAP™ pilot system to produce silicon metal directly from quartz. This system will for the most part be constructed in 2017, with advancement of the contract accelerating in the second half of the year. According to percent completion accounting standards for revenue recognition the majority of these revenues will be recognized in the 2<sup>nd</sup> half of 2017. Of note, if successful, PyroGenesis benefits from a 10% royalty on all revenues derived from the use of this system by HPQ, subject to annual minimums.

D) Chemical Warfare Destruction System: The Company recently announced that PyroGenesis has, in coordination with the US-based Southwest Research Institute (SwRI), successfully completed long-duration performance tests using the Company's tactical Plasma Arc Chemical Warfare Agents Destruction System ("PACWADS") using surrogate chemical warfare agent material. These tests supported the Defense Advanced Research Projects Agency (DARPA) Agnostic Compact Demilitarization of Chemical Agents (ACDC) program and far exceeded minimum requirements with over 99.9999% destruction efficiency. The PACWADS has, as of this writing, been delivered to the testing site and is currently going through final testing using real chemical warfare agents. These tests should be completed by the end of Q3 2017 (this timeline however is out of the Company's control). Again this bodes well for 2017 as we would expect additional contracts resulting from a successful completion of the final testing. However, no indication has been given as to the size, if any, such procurement would entail.

E) Other Contracts: There are other contracts being discussed (such as a third order for a PAWDS for a New US Aircraft Carrier which is expected to be ordered sometime towards the end of 2017/beginning of 2018 with an estimated value of approximately \$6MM; SPARC system sales, amongst others) which give us confidence that 2017 will be the break out year.

Given the above, we expect a strong performance in the coming year, and based on existing contracts, the Company expects to be profitable in 2017 (excluding any contribution from powder sales) as noted above. Our projections for 2017 are only heightened by the reception we have received so far, particularly how well received our entrance as a powder producer in the Additive Manufacturing community has been.

Management remains focused on reducing PyroGenesis' dependency on long-cycle projects by developing a strategic portfolio of volume driven, high margin/low risk products that resolve specific problems within niche markets, and doing so by introducing these plasma-based technologies to industries that have yet to consider such solutions.

Management is also actively targeting recurring revenue opportunities that will generate a growing, and profitable, regular cash flow to the Company.



PyroGenesis has one of the largest concentrations of plasma expertise in the world, with over 250 years of accumulated technical experience and 59 patents, combined with unique relationships with major Universities performing cutting edge plasma research and development, which positions the Company well to execute upon its various strategies.

The Company will be issuing an in depth update on the progress of its Powder Production business line within the next two weeks where a review will take place on all aspects of that sector. Suffice it to say at this point that there have been no disappointments and we are very happy with the progress and developments to date.

Additional information regarding the Company can be found on SEDAR at [www.sedar.com](http://www.sedar.com) OTC Markets ([www.otcmarkets.com](http://www.otcmarkets.com)) and on the Company's website at [www.pyrogenesis.com](http://www.pyrogenesis.com)