Prophecy Announces Positive Preliminary Economic Assessment Study for the Gibellini Vanadium Project

written by Raj Shah | May 29, 2018

May 29, 2018 (Source) – **Prophecy Development Corp.** ("**Prophecy**" or the "**Company**") (**TSX:PCY**, **OTCQX:PRPCF**, **Frankfurt:1P2N**) is pleased to announce results of a positive preliminary economic assessment study (the "**PEA**") for its Gibellini vanadium project, designed to be an open pit, heap leach operation in Nevada's Battle Mountain region, about 25 miles south of the town of Eureka. The PEA reported an after tax cumulative cash flow of $601.5 million, an internal rate of return of 50.8%, a net present value of $338.3 million at a 7% discount rate and a 1.72 years payback on investment from start-up assuming an average vanadium pentoxide price (V_2O_5) of $12.73 per pound. As of May 29, 2018, the price of vanadium pentoxide is $14.20 per pound according to www.asianmetal.com. The PEA was prepared by Amec Foster Wheeler E&C Services Inc. ("**AMEC**"), part of the Wood Group of companies. All dollar values are expressed in US dollars unless otherwise noted.

The PEA Highlights:

Highlights of the PEA (after tax):	
Internal rate of return	50.8%

Net present value (NPV)	$338.3 million at 7% discount rate
Payback period	1.72 years
Average annual production	9.65 million lbs V_2O_5
Average V_2O_5 selling price	$12.73 per lb
Operating cash cost	$4.77 per lb V_2O_5
All-in sustaining costs*	$6.28 per lb V_2O_5
Breakeven price**	$7.76 per lb V_2O_5
Initial capital cost including 25% contingency	$116.76 million
Average grade	0.26% V_2O_5
Strip ratio	0.17 waste to leach material
Mining operating rate	3.4 million tons (leach material and waste) per year
Average V_2O_5 recovery through Direct Heap Leaching	62%
Life of mine	13.5 years

*includes selling costs, royalties, operating cash cost, reclamation, exploration and sustaining capital costs.

**includes selling costs, royalties, operating cash costs, taxes (local, state, and federal), working capital, and sustaining & capital costs.

The PEA is preliminary in nature, and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is

no certainty that the PEA will be realized. Mineral resources are not mineral reserves and do not have demonstrated economic viability.

Sensitivity Analysis

The tables below show the sensitivity analysis to the vanadium pentoxide price, grade, and to the PEA capital cost and operating costs. This sensitivity analysis indicates strong project economics even in very challenging conditions, and that the project is well positioned to benefit from the current rising vanadium price environment. A 20% increase in the vanadium price relative to the base case translates to a $491.3 million after-tax NPV at a 7% discount rate.

V_2O_5 price change	V_2O_5 price $/lb	After-tax IRR	After-tax NPV $M @ 7%	After-tax cashflow $M
30%	16.55	69%	568.0	996.0
20%	15.28	63%	491.3	864.4
10%	14.00	57%	415.2	733.2
Base price	12.73	51%	338.3	600.4
-10%	11.46	44%	261.0	467.2
-20%	10.18	36%	183.1	333.2
-30%	8.91	26%	103.9	196.9

V_2O_5 grade change	V_2O_5 grade	After-tax IRR	After-tax NPV $M @ 7%	After-tax cashflow $M
30%	0.34%	68%	554.4	972.8
20%	0.31%	63%	482.4	849.0
10%	0.28%	57%	410.7	725.4
Base grade	0.26%	51%	338.3	600.4

-10%	0.23%	44%	265.6	475.0
-20%	0.21%	37%	192.2	348.9
-30%	0.18%	28%	118.3	221.6

Capex change	Capex $M	After-tax IRR	After-tax NPV $M @ 7%	After-tax cashflow $M
30%	151.8	40%	307.2	564.3
20%	140.1	43%	317.6	576.3
10%	128.4	47%	328.0	588.4
Base Capex	116.8	51%	338.3	600.4
-10%	105.1	55%	348.6	612.5
-20%	93.4	61%	358.9	624.6
-30%	81.7	67%	369.3	636.8

Opex change	Opex $/lb	After-tax IRR	After-tax NPV $M @ 7%	After-tax cashflow $M
30%	6.20	45%	257.9	450.2
20%	5.72	47%	284.8	500.3
10%	5.25	49%	311.6	550.4
Base Opex	4.77	51%	338.3	600.4
-10%	4.29	53%	364.8	650.0
-20%	3.82	55%	390.7	698.4
-30%	3.34	56%	416.0	745.4

Mineral Resources

The PEA was based on the Measured, Indicated and Inferred Mineral Resource estimates for the Gibellini deposit and the Inferred Mineral Resource estimate for the Louie Hill deposit.

Gibellini Deposit Mineral Resource Statement

Confidence Category	Domain	Cut-off V_2O_5 (%)	Tons (Mt)	Grade V_2O_5 (%)	Contained V_2O_5 (Mlb)
Measured	Oxide	0.101	3.96	0.251	19.87
	Transition	0.086	3.98	0.377	29.98
Indicated	Oxide	0.101	7.83	0.222	34.76
	Transition	0.086	7.19	0.325	46.73
Total Measured and Indicated			***22.95***	***0.286***	***131.34***
Inferred	Oxide	0.101	0.16	0.170	0.55
	Transition	0.086	0.01	0.180	0.03
	Reduced	0.116	14.80	0.175	51.72
Total Inferred			***14.97***	***0.175***	***52.30***

Louie Hill Deposit Mineral Resource Statement

Confidence Category	Cut-off V_2O_5 (%)	Tons (Mt)	Grade V_2O_5 (%)	Contained V_2O_5 (Mlb)
Inferred	0.101	7.52	0.276	41.49

Notes to accompany mineral resource tables for Gibellini and Louie Hill deposits:

1. The Qualified Person for the estimate is Mr. E.J.C. Orbock III, RM SME, a Wood Group employee. The Mineral Resources have an effective date of May 29, 2018.

2. The oxidation state for the Louie Hill deposit was not modeled.

3. Mineral Resources are reported within a conceptual pit shell that uses the following assumptions: Mineral Resource V_2O_5 price: $14.64/lb; mining cost: $2.21/ton mined; process cost: $13.62/ton processed; general and administrative (G&A) cost:

$0.99/ton processed; metallurgical recovery assumptions of 60% for mineralized material; tonnage factors of 16.86 ft^3/ton for mineralized material, royalty: 2.5% net smelter return (NSR); shipping and conversion costs: $0.37/lb V_2O_5. For the purposes of the resource estimate constraining pit shell, an overall 40º slope angle assumption was used.

4. Rounding as required by reporting guidelines may result in apparent summation differences between tons, grade and contained metal content. Tonnage and grade measurements are in US units. Grades are reported in percentages.

High Grade Mineral Resources

Gibellini Deposit Mineral Resource at higher cut-off grades

Cut-off grade V2O5	Measured and Indicated			Inferred		
	Tons (Mt)	Grade V_2O_5 (%)	Contained V_2O_5 (Mlb)	Tons (Mt)	Grade V_2O_5 (%)	Contained V_2O_5 (Mlb)
@0.25% cut-off	13.8	0.35	96.4	0.5	0.271	2.5
@0.35% cut-off	5.5	0.43	48.0	–	–	–

Louie Hill Deposit Mineral Resource at higher cut-off grades

Cut-off grade V2O5	Inferred		
	Tons (Mt)	Grade V_2O_5 (%)	Contained V_2O_5 (Mlb)
@0.25% cut-off	4.0	0.35	28.1
@0.35% cut-off	1.5	0.45	13.8

Mining & Processing

Mining at the Gibellini and Louie Hill projects is planned to be a conventional open pit mine utilizing a truck and shovel fleet comprised of 100-ton trucks and front end loaders. Average mine production during the 13.5 year mine life is 3.4 million tons of leach material (3 million tons) and waste (0.4 million tonnes) per year at a strip ratio of 0.17. Mining is to be completed through contract, with Prophecy's mining staff overseeing the contracted mining operation and performing the mine engineering and survey work.

	Oxide '000 tons	Transition '000 tons	Reduced '000 tons	Grade % V_2O_5	Metal contained V_2O_5 (Mlb)	Metal Produced V_2O_5 (Mlb)
YR 1	2,600	400	–	0.291	17.440	10.633
YR 2	2,400	600	–	0.278	16.690	10.480
YR 3	1,760	1,240	–	0.310	18.580	12.067
YR 4	650	2,350	–	0.372	22.320	15.217
YR 5	310	2,680	10	0.366	21.950	15.185
YR 6	2,240	750	10	0.315	18.920	11.928
YR 7	3,000	–	–	0.316	18.980	11.394
YR 8	1,910	700	380	0.189	11.310	7.085
YR 9	690	1,220	1,090	0.216	12.940	8.023
YR 10	110	370	2,520	0.208	12.480	6.898
YR 11	450	360	2,180	0.182	10.910	6.103
YR 12	50	140	2,820	0.166	9.980	5.349
YR 13	390	10	2,600	0.183	10.970	5.839
YR 14	1,710	–	–	0.195	6.670	4.096
Totals:	**18,290**	**10,830**	**11,590**	**0.258**	**210.15**	**130.297**

The processing method envisioned for the project will be to feed leach material from the mine via loader to a hopper that feeds the crushing plant. The leach material will then be fed to the

agglomerator where sulfuric acid, flocculent and water will be added to achieve adequate agglomeration. The agglomerated leach material will be transported to a stacker on the leach pad, which will stack the material to a height of 15 feet. Once the material is stacked, solution will be added to the leach heap at a rate of 0.0025 gallons per minute per square foot. The solution will be collected in a pond and this pregnant leach solution will be sent to the process building for metal recovery where it will go through solvent extraction and stripping processes to produce the vanadium pentoxide.

Vanadium Recoveries and Metallurgical Testing

Approximately 130.3 million pounds of V_2O_5 is expected to be produced from Gibellini and Louie Hill leaching operations at an average recovery of 62% (oxide: 60%, transition: 70% and reduced: 52%). The heap leaching is performed at ambient temperature and atmospheric pressure without pre-roasting or other beneficiation process. The pregnant leach solution is continuously collected with leach material undergoing, on average, a 150-day heap-leaching cycle. The table below summarizes the projected metallurgical recoveries used in the PEA for the three defined oxidation-type domains.

Mill Feed Material Type	Direct Leaching Recovery
Oxide	60%
Transition	70%
Reduced	52%

The direct heap leach vanadium recovery estimates used in the PEA were based on extensive metallurgical testing work performed by SGS Lakefield Research Laboratories, Dawson Minerals Laboratories, and McClelland Laboratories. Samples were selected from a range of depths within the deposit, representative of the various types and styles of mineralization. Samples were

obtained to ensure that tests were performed on sufficient sample mass. The end results demonstrated low acid consumption (less than 100 lb acid consumption per ton leached) and high recovery through direct leaching. Notable test results included the following:

Acid Heap Leach Testing of a Gibellini Bulk Sample, McClelland Laboratories, September 4, 2013 –

A series of trenches were excavated and approximately 18 tons of material were sent to McClelland Laboratories for pilot testing. The material was air dried and stage crushed to 2” where a column sample was cut for 12” columns and then the leach material was crushed to – ½”. A head sample was taken and material for bench marking columns, and a bottle roll test was also taken. The results of the pilot plant testing are shown in the table below:

Crush Size 100% Passing	Test Type	Time (Days)	Head Grade %V*	% Vanadium Recovery	Acid Consumption lbs/st
50 mm (2”)	Column, open circuit	123	0.299	76.6%	88
12.5 mm (1/2”)	Column, open circuit	123	0.313	80.2%	72
12.5 mm (1/2”)	Column, closed circuit	199	0.284	68.3%	84
12.5 mm (1/2”)	Column, closed circuit	198	0.313	74.0%	96

12.5 mm (1/2”)	Bottle Roll	4	0.286	67.1%	74
1.7 mm (-10m)	Bottle Roll	4	0.286	66.3%	66
-75µ	Bottle Roll	4	0.279	67.6%	62
-75µ	Bottle Roll	30	0.298	74.2%	54

*to convert V to V_2O_5, multiply V by 1.7852.

Solvent Extraction (SX) Test Work –

The design parameters from this test work are:

- SX Extraction pH Range 1.8 to 2.0
- Di-2-Ethyl Hexyl Phosphoric Acid Concentration 0.45 M (~17.3% by weight) Cytec
- 923 Concentration 0.13 M (~5.4% by weight)
- The Organic Diluent is Orform SX-12 (high purity kerosene)
- SO_2 addition of 1.0 to 1.5 g/l
- Strip Solution Sulfuric Acid Concentration 225 to 250 g/l SX
- Extraction Efficiency ~97%
- SX Strip Efficiency ~98%

Pilot Scale Solvent Extraction Testing on Vanadium Bearing Solutions from Two Gibellini Project Column Leach Tests, McClelland Laboratories, September 16, 2013 –

Solvent extraction (“**SX**”) processing was conducted to recover vanadium from sulfuric acid pregnant leach solution (PLS) generated during pilot column testing on bulk leach samples from the Gibellini project. Laboratory scale testing was conducted on select solutions generated during the pilot SX processing, to optimize the SX processing conditions. Additional laboratory

scale testing was conducted on the loaded strip solution generated during the pilot SX testing, to evaluate methods for upgrading and purifying it to levels that may be required for sale of a final vanadium bearing product.

The final pregnant strip solution was 6.1% vanadium, 250 g/l sulfuric acid with approximately 2% Fe and Al. The solution was suitable for oxidation using sodium chlorate to convert the V^{+4} to V^{+5} which was then precipitated using ammonia to make ammonium metavanadate (AMV). To make a vanadium product for the steel industry, this AMV is calcined (ammonia driven off) and heated to above 700°C (the fusion temperature of V_2O_5). This fused V_2O_5 would then be cooled on a casting wheel, pulverized and packaged. Additionally, using ion exchange resins in conjunction with solvent extraction, strip solution was produced which met or exceeded specifications of electrolyte for vanadium flow batteries.

Capital and Operating Costs

The projected capital costs for the Gibellini vanadium project over a 1 ½ year construction period and mine life average operating costs are summarized in the tables below. The capital cost includes 25% contingency or $23.4 million.

Pre-Production Capital Cost:

Cost Description	Total (US$000s)
Open Pit Mine	
Open pit mine development	1,412
Gibellini incremental WRSF	212
Mobile equipment	111
Infrastructure-On Site	

Site prep	2,431
Roads	1,391
Water supply	2,007
Sanitary system	61
Electrical – on site	2,052
Communications	165
Contact water ponds	174
Non-process facilities – buildings	7,583
Process Facilities	
Mill feed handling	15,380
Heap leach system	20,037
Process plant	14,441
Off-Site Infrastructure	
Water system	4,495
Electrical supply system	3,227
First fills	860
Subtotal Total Direct Cost	*76,039*
Construction indirect costs	4,254
Sales tax / OH&P	4,236
EPCM	8,879
Total Before Contingency	**93,409**
Contingency (25%)	23,352
Total Project Cost	**116,761**

Operating Costs:

Total Cash Operating Cost	$ per Ton Leached	$ per lb of V_2O_5 Produced

G&A	0.99	0.31
Mining Cost	2.72	0.85
Total Processing Cost	11.54	3.61
Total	**15.26**	**4.77**

The cash operating costs in the first half of the project covering years 1-7 is $3.59 per lb of V_2O_5 produced and for the years 8-14 is $7.12 per lb of V_2O_5 produced, resulting in the weighted average cash cost of $4.77 per lb of V_2O_5 produced. The cash operating cost is lower in the first half of the project due to processing higher grade material.

John Lee, Prophecy's Executive Chairman states:

"The PEA was prepared on schedule and on budget. This comprehensive 249-page PEA presents exceptional project economics and positions Gibellini as the most important vanadium mineral deposit in North America in terms of project viability and time to market.

Gibellini's annual vanadium production would represent roughly 3.5% of global vanadium production today. That share increases to 15% if one excludes vanadium production from China, Russia and South Africa. The timeline from receipt of permit and capital to build a new vanadium mine and mill, and first production, has historically been five years according to leading vanadium industry consultants, TTP Squared Inc. They also state that it is improbable that any potential new vanadium mines will add any significant amount of production to the supply base in the next few years.

Gibellini offers phenomenal leverage to rising vanadium prices in a politically-safe, mining-friendly jurisdiction. Every dollar (per pound) increase in vanadium pentoxide price lifts our project NPV by over $60 million. Prophecy has a total of

approximately 7.5 million shares outstanding.

With our Plan of Operations already filed in May 2018, and having Gibellini eligible for streamlined National Environmental Policy Act review, the Company is on firm footing to deliver the first primary vanadium producing mine in North America that offers the best quality vanadium pentoxide product that exceeds customer requirements for a variety of applications from traditional re-enforcement bars to high-tech grid-scale batteries and use in the aerospace industry."

Next steps:

Permitting

Further to our news release dated May 9, 2018, Prophecy achieved a major permitting milestone by submitting its Management's Plan of Operation ("**MPO**") and associated baseline studies with the local office of the federal Bureau of Land Management ("**BLM**"). Prophecy expects to receive feedback within 60 days and amend the reports as necessary. Upon acceptance of the baseline studies, MPO, and environmental report by the BLM, Prophecy expects to trigger a Notice of Intent ("**NOI**") in 2019 by the BLM, to prepare an environmental impact statement ("**EIS**") for the Gibellini project.

In December 2017, vanadium was listed by the U.S. Geological Survey as one of 23 metals critical to the US economy despite there being no active primary vanadium mines in North America. As a result of direction from Secretary of the Interior Order No. 3355 (Streamlining National Environmental Policy Reviews and Implementation of Executive Order 13807), Prophecy anticipates the Gibellini EIS will not be more than 150 pages (excluding appendices) and the BLM to complete the Gibellini final EIS within one year from the issuance of the NOI. Should that occur, it means that permitting for the Gibellini project may

potentially be concluded in 2020.

Engineering Procurement Construction Management ("**EPCM**"):

Prophecy is preparing to tender EPCM contracts with detailed engineering design and cost estimates in 2018. The Company expects to complete this task in 2019, as Prophecy has already received complete basic engineering design drawings for the Gibellini vanadium project prepared by Scotia International of Nevada Inc. which includes hundreds of drawings related to: process flow, crushing, heap leach pad, pregnant leach solution pond, solvent extraction plant, piping and infrastructure (i.e. power, water, and haul road).

To try to minimize technical and implementation risk, the Company is working closely with its chosen technology partner, Northwest Nonferrous Metals Mining Group Co., Ltd. ("**NWME**"), to fine tune metallurgy, process design and engineering, and ensure maximum vanadium recovery and high grade vanadium pentoxide commercial product on site. NWME owns and is currently operating the world's largest black-shale vanadium mine in China with an environmentally friendly, hydrometallurgical leach processing technology without the need of a pre-roasting step. Refer to news release dated March 12, 2018 for more details.

NWME conducted a Gibellini site visit in March 2018, and analyzed Gibellini samples in its laboratories. The Company expects to announce a progress update on its partnership with NWME in June, 2018.

Offtake and project financing:

Prophecy has received unsolicited expressions of interest from various potential investment sources, and is currently engaged in discussions with potential cornerstone investors, vanadium product off-takers and banks on potential equity, debt and

prepaid off-take financing possibilities. We expect to report material progress in due course.

The PEA will be filed under the Company's SEDAR profile and available within 45 days.

Qualified Persons

The following AMEC staff served as Qualified Persons (QPs) as defined in National Instrument 43-101, *Standards of Disclosure for Mineral Projects* ("**NI 43-101**"):

Mr. Kirk Hanson, P.E., Technical Director, Open Pit Mining;

Mr. Edward J.C. Orbock III, RM SME, Principal Geologist and US Manager, Consulting;

Mr. Edwin Peralta, P.E., Senior Mining Engineer; and

Mr. Lynton Gormely, P.Eng., Consultant Metallurgist.

The PEA was prepared under the direction of Kirk Hanson. Mr. Hanson is a "Qualified Person" for the purposes of NI 43-101, and he is independent of Prophecy. Mr. Hanson has approved the content of this news release that summarizes the results of the PEA.

Other technical contents of this news release not pertaining directly to the PEA have been prepared under the supervision of Danniel Oosterman, VP, Exploration. Mr. Oosterman is not independent of the Company in that he is employed as a consultant to the Company and most of his income is derived from the Company. Mr. Oosterman is a Qualified Person as defined in NI 43-101.

About AMEC

AMEC is a part of Wood Group, a global leader in the delivery of

project, engineering and technical services to energy and industrial markets. Wood Group operates in more than 60 countries, employing around 55,000 people, with revenues of over $10 billion. Wood Group provides performance-driven solutions throughout the asset life cycle, from concept to decommissioning across a broad range of industrial markets including upstream, midstream and downstream oil & gas, chemicals, environment and infrastructure, power & process, clean energy, mining, nuclear and general industrial sectors.

About Prophecy

Prophecy Development Corp. is a Canadian public company listed on the Toronto Stock Exchange. The Company aims to provide exposure and leverage to rising vanadium prices by defining and adding attributable vanadium resources in the ground in politically safe jurisdictions. Further information on Prophecy can be found at www.prophecydev.com.

PROPHECY DEVELOPMENT CORP.
ON BEHALF OF THE BOARD

“JOHN LEE”
Executive Chairman

Neither the Toronto Stock Exchange nor its Regulation Services Provider (as that term is defined in the policies of the Toronto Stock Exchange) accepts responsibility for the adequacy or accuracy of this release.

Cautionary Note Regarding Forward-Looking Statements

Forward-looking statements in this news release relate to future events or future performance and reflect current estimates, predictions, expectations or beliefs regarding future events and include, but are not limited to, statements with respect to: (i)

the PEA representing a viable development option for the project; (ii) construction of a mine at the project and related actions; (iii) estimates of the capital costs of constructing mine facilities and bringing a mine into production, of sustaining capital and the duration of financing payback periods; (iv) the estimated amount of future production, both produced and metal recovered; and (vi) life of mine estimates and estimates of operating costs and total costs, cash flow, net present value and economic returns including internal rate of return estimates from an operating mine constructed at the project. All forward-looking statements are based on Prophecy's or its consultants' current beliefs as well as various assumptions made by them and information currently available to them. The most significant assumptions are set forth above, but generally these assumptions include: (i) the presence of and continuity of vanadium mineralization at the project at estimated grades; (ii) the geotechnical and metallurgical characteristics of rock conforming to sampled results; (iii) infrastructure construction costs and schedule; (iv) the availability of personnel, machinery and equipment at estimated prices and within the estimated delivery times; (v) currency exchange rates; (vi) vanadium sale prices; (vii) appropriate discount rates applied to the cash flows in the economic analysis; (viii) tax rates applicable to the proposed mining operation; (ix) the availability of acceptable financing on reasonable terms; (x) projected recovery rates and use of a process method, that although well-known and proven on other commodity types like copper, has not been previously brought into production for a vanadium project; (xi) reasonable contingency requirements; (xii) success in realizing proposed operations; and (xiii) assumptions that project environmental approval and permitting will be forthcoming from county, state and federal authorities. The economic analysis is partly based on Inferred Mineral Resources that are considered too

speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA based on these Mineral Resources will be realized. Currently there are no Mineral Reserves on the Gibellini property. Although the Company's management and its consultants consider these assumptions to be reasonable based on information currently available to it, they may prove to be incorrect. Many forward-looking statements are made assuming the correctness of other forward-looking statements, such as statements of net present value and internal rates of return, which are based on most of the other forward-looking statements and assumptions herein. The cost information is also prepared using current values, but the time for incurring the costs will be in the future and it is assumed costs will remain stable over the relevant period.

These factors should be considered carefully, and readers should not place undue reliance on Prophecy's or its consultant's forward-looking statements. Prophecy or its consultants believe that the expectations reflected in the forward-looking statements contained in this news release and the documents incorporated by reference herein are reasonable, but no assurance can be given that these expectations will prove to be correct. In addition, although Prophecy and its consultants have attempted to identify important factors that could cause actual 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. Prophecy or its consultants undertake no obligation to release publicly any future revisions to forward-looking statements to reflect events or circumstances after the date of this news or to reflect the occurrence of unanticipated events, except as expressly required by law.