# Prophecy Technology Partner NWME Produces 98.6% Pure V2O5 (Vanadium Pentoxide) from Gibellini Samples, Aims for 99.5% V2O5 Next Run

written by Raj Shah | August 14, 2018

August 14, 2018 (Source) – **Prophecy Development Corp.** ("**Prophecy**" or the "**Company**") (**TSX:PCY**, **OTCQX:PRPCF, Frankfurt:1P2N)** is pleased to announce the results from the metallurgical tests conducted by Northwest Nonferrous Metals Mining Group Co., Ltd. ("**NWME**") on samples collected from the Company's Gibellini Vanadium Project (the "**Project**"). Samples were collected by NWME's technical team during their visit to the Project's site in February 2018, with tests performed at NWME's facility in Xian, China.

98.6% V2O5 Produced on the 1st Run with Simple Conventional Flowsheet

NWME used solvent extraction ("**SX**") processing method to recover vanadium from sulfuric acid pregnant leach solution ("**PLS**") generated by bottle roll and column test acid leaching on Gibellini samples. The solution was reduced and then precipitated using ammonia to make ammonium metavanadate ("**AMV**"). The AMV was calcined and heated then cooled and pulverized. A vanadium pentoxide with 98.56 % purity content was produced. The assay for this work is shown below:

| Gibellini vanadium pentoxide assay |
|---|

| V2O5 % | SI % | Fe % | P % | S % | As % | Na2O % | K2O % | Al % | U % |
|---|---|---|---|---|---|---|---|---|---|
| 98.56 | 0.0078 | 0.88 | 0.058 | 0.47 | 0.0026 | 0.43 | 0.052 | 0.22 | 0.0001 |

Uranium content is less than 0.0001% which does not affect the marketability of the product.

The PLS was produced with very low deleterious elements which enabled using an efficient SX process. The PLS V2O5 concentration was 1.15 gram per liter and the Pregnant Strip Solution V2O5 concentration was 39.61 grams per liter.

Overall Vanadium Recovery of Over 60% and Low Acid Consumption

PLS was produced from both bottle roll and column tests. Sulfuric acid was added to the feed material with the bottle rolling for 1 hour, then the open bottle was allowed to cure for 24 hours and water was added to the bottle to attain the desired density (40%). Initial samples were taken at 6 hours, 12 hours, 24 hours, 36 hours, 48 hours and then once a day until the bottle roll was completed.

In column tests, sulfuric acid was added to the feed material and the material was allowed to cure for 24 hours before initiating the leaching. Leaching was conducted by applying 108 grams per liter acid solution over the material. PLS was collected every 24 hours and samples were taken for vanadium analysis. All the tests were performed at room temperature and at atmospheric pressure.

The results of the tests are given below:

| Test | Leach Time | Vanadium Recovery % | Sulfuric Acid Consumed kg/t |
|---|---|---|---|
| Column Test | 21 days | 70.74 | 100 |
| Bottle Roll Test – investigate the effect of the curing method and increase of sulfuric acid addition on the vanadium recovery | 50 hours | 62.8 | 150 |
| Bottle Roll Test – investigate addition of NWME prepared leaching agent on the vanadium recovery | 144 hours | 66.5 | 100 |
| Bottle Roll Test – investigate the leaching of coarse feed (2mm) on the vanadium recovery | 216 hours | 63.7 | 100 |

The results of the bottle roll and column leach tests performed by NWME largely validate the results of previous tests performed by McClelland Laboratories on Gibellini bulk sample in 2013 (18 tons of material).

The NWME test samples were not agglomerated and were on short leach time of 21 days for column tests and 5 days for bottle roll tests. Prophecy studied both the NWME test and McClelland test in detail and believe the results were consistent, whereby 70% recovery can be achieved with longer leach cycle (over 100 days McClelland Laboratories vs 21 days NWME) and less acid consumption (50 kg of acid per tonne of material McClelland Laboratories vs 100 kg of acid per tonne of material NWME)

A summary of acid heap leach tests of a Gibellini bulk sample, completed at McClelland Laboratories, September 4, 2013 is

tabulated below:

| Size | Test Type | Time (Days) | Vanadium Recovery % | Head Grade % V2O5 | Sulfuric Acid Consumed kg/t |
|---|---|---|---|---|---|
| 50 mm (2”) | Column, open circuit | 123 | 76.6 | 0.53 | 39.9 |
| 12.5 mm (1/2”) | Column, open circuit | 123 | 80.2 | 0.56 | 32.7 |
| 12.5 mm (1/2”) | Column, closed circuit | 230 | 68.3 | 0.51 | 38.1 |
| 12.5 mm (1/2”) | Column, closed circuit | 198 | 74.0 | 0.56 | 43.5 |
| 12.5 mm (1/2”) | Bottle Roll | 4 | 67.1 | 0.51 | 33.6 |
| 1.7 mm (-10m) | Bottle Roll | 4 | 66.3 | 0.51 | 29.9 |
| -75µ | Bottle Roll | 4 | 67.6 | 0.50 | 28.1 |
| -75µ | Bottle Roll | 30 | 74.2 | 0.53 | 24.5 |

Representative Feed Grade with Benign Test Conditions that Can be Replicated in Commercial Setting

The leaching bottle roll and column tests were performed at room temperature and at atmospheric pressure based on Gibellini’s representative grade from grab sampling method across the width of the mineralization at various locations of the Project. These samples are characterized in the following table:

| Sample Number | Sample ID | Weight kg | Head Grade V2O5 (%) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | 18-L6-28 | 17.0 | 0.665 |
| 2 | 18-L6-29 | 17.0 | 0.885 |
| 3 | 18-L6-30 | 12.5 | 0.370 |
| 4 | 18-L6-31 | 18.0 | 0.210 |
| 5 | 18-L6-32 | 13.5 | 0.420 |
| 6 | 18-L6-33 | 22.5 | 0.280 |
| 7 | 18-L6-34 | 19.0 | 0.315 |
| 8 | 18-L6-35 | 20.0 | 0.185 |
| 9 | 18-L6-36 | 18.0 | 0.165 |
| 10 | 18-L6-37 | 20.0 | 0.195 |
| Total | | 177.5 | |

For the purpose of metallurgical testing, the samples were mixed to produce a composite material with the average grade of 0.30% V2O5 which is representative of Gibellini resource grade. The composite material was ground to -75 µm feed. Prophecy believes the test conditions can easily be replicated in a commercial heap leach setting with low technical and implementation risk.

Unique Vanadium Mineralogy in Achieving Remarkable Recovery at Room Temperature and Atmospheric Pressure

NWME performed detailed mineralogical analysis which included microscope identification using Carl Zeiss Axioskop, XRD analysis on Bruker D8-A25 XRD, multi-element analysis, electron probe X-ray microanalysis on JEOL JXA 8230, scanning electron microscopy/energy dispersive X-ray spectroscopy analysis on Mineral Liberation Analyzer 650 and V element phase analysis. This mineralogical analysis confirmed that the Gibellini resource has a high percentage of independent vanadium minerals ("**IVM**") such as kazakhstanite, shubnelite, sherwoodite, bokite, which can be leached easily at room temperature and atmospheric pressure within a short time frame.

NWME noted the unique nature of the Gibellini samples with over 45% IVM versus numerous other typical black shale deposits which they have encountered containing less than 10% IVM.

All of the testwork carried out on the material from the Project indicate that there is a two-stage leaching phenomenon in Gibellini ore – about 50% of the vanadium leaches in the first 96 hours (independent vanadium minerals), and the remaining leaching approximately 15 to 20% occurs over a longer time horizon.

Heap leaching is the lowest-cost recovery method compared to roasting, and pressured container VAC leaching, whereby capital costs can compound to multiple times greater for the same throughput.  Gibellini's high IVM content is a key competitive differentiator which places the deposit in the top tier of black shale deposits in terms of pre-production capital cost required based on NWME's research.

The mineralogical results of the Gibellini ore as characterized by NWME's testwork is shown in the following table:

| Mineral composition | | Mineral content % | V content in minerals % | V distribution % |
|---|---|---|---|---|
| Independent vanadium minerals 45.2% of vanadium content | Kazakhstanite | 0.15 | 40.91 | 19.77 |
| | Shubnelite | 0.13 | 27.86 | 11.67 |
| | Sherwoodite | 0.08 | 34.54 | 8.90 |
| | Bokite | 0.03 | 36.51 | 3.53 |
| | Melanovanadite | 0.01 | 41.27 | 1.33 |

| | | | | |
|---|---|---|---|---|
| Vanadium-bearing layered aluminosilicate minerals 20.8% of vanadium content | Sericite | 8.59 | 0.57 | 14.63 |
| | Illite | 5.58 | 0.28 | 5.03 |
| | Chlorite | 0.81 | 0.44 | 1.14 |
| | Nacrite-palygorskite | 0.70 | – | – |
| Vanadium-bearing layered iron oxide, sulfate 34% of vanadium content | Limonite | 1.76 | 5.48 | 31.07 |
| | Strengite | 0.64 | 0.49 | 1.01 |
| | Jarosite | 0.48 | 1.24 | 1.92 |
| Gangue | Quartz | 75.88 | – | – |
| | Apatite | 2.83 | – | – |
| | Potassium feldspar | 0.73 | – | – |
| | Dolomite | 0.66 | – | – |
| | Carbonaceous | 0.45 | – | – |
| | Rutile | 0.25 | – | – |
| | Barite | 0.04 | – | – |
| | Pyrite | 0.20 | – | – |
| Total | | 100.00 | | 100.00 |

Low Carbon Content Results in Exceptional Low Acid Consumption

NWME detailed mineralogical analysis which included microscope identification using Carl Zeiss Axioskop, XRD analysis on Bruker D8-A25 XRD, multi-element analysis, electron probe X-ray microanalysis on JEOL JXA 8230, scanning electron microscopy/energy dispersive X-ray spectroscopy analysis on Mineral Liberation Analyzer 650 and V element phase analysis, confirmed the extremely low carbonaceous content of Gibellini's oxide and transition samples. This explains the low acid consumption (less than 50 kg per tonne) compared to other average black shale deposits of 200 kg to 300 kg per tonne based on extensive NWME data compilation. Given acid cost accounts for

approximately 50% of the Project's operating expenses, Gibellini's low carbon content is a key competitive differentiator which places it in the top tier of black shale deposits in terms of processing cost based on NWME's findings.

The following table is a generalized comparison of Gibellini's deposit to a composite of typical black shale vanadium deposits:

| | Gibellini Vanadium Deposit | Black Shale Series Vanadium Deposits |
|---|---|---|
| Host Rock | Silica State | Carbon Siliceous Rocks with Mudstone |
| The Mineral Composition | High Silica, Low Aluminium and Low Carbonaceous. SiO2-78.40%; Al2O3 – 4.13%; **T(C) – 0.47%** | High Silica, High Aluminum and High Carbonaceous. SiO2-62-93%; Al2O3 > 7%; **T(C) > 10%** |

The next step for NWME will be to investigate the application of NWME's proprietary technology to Gibellini mineral to produce a high purity vanadium pentoxide product with 99.5% V2O5 content. During the Prophecy's team visit to NWME's processing facilities in China in June 2018, NWME commented that its own black-shale vanadium mine produces exclusively 99.5% V2O5 which commands a 15 to 25% pricing premium (compared to benchmark 98% purity) to supply to the vanadium battery, chemical, and aerospace industries. Prophecy has prepared the representative samples from the Project with a total weight of 1.6 tonnes and is ready to ship the samples to China. Prophecy expects to receive the results from the second phase of metallurgical testing by NWME by the end of 2018.

Management Discussion and Summary

Michael Drozd, V-P, Operations, states: "NWME's comprehensive Gibellini mineral analysis demonstrates a high concentration of independent vanadium oxide minerals comprising 45% of the contained vanadium with very low carbon content (0.5%). This phenomenon is rare and possibly one-of-a-kind when it comes to black shale vanadium deposits, and enables Gibellini to adopt a heap leach process at ambient temperature and atmospheric pressure with high recovery and low acid consumption. Those

important metallurgical attributes are key in establishing a high confidence level in Gibellini's projected low capital cost, low operating cost, and simple flow sheet with minimal technical and implementation risks."

With NWME's new findings and confirmation of prior metallurgical tests done by McClelland Laboratories and basic engineering studies carried out by Scotia International, Prophecy has finalized the process flow sheet and is preparing to tender Engineering, Procurement, Construction and Management (EPCM) proposals shortly, in August 2018.

**Qualified Person**

The technical contents of this news release 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 Prophecy**

Prophecy Development Corp. is a Canadian public company listed on the Toronto Stock Exchange. Prophecy's main objective is to develop the Gibellini primary vanadium mining project in the Battle Mountain region in northeastern Nevada to production. Further information on Prophecy can be found at www.prophecydev.com.

PROPHECY DEVELOPMENT CORP.

ON BEHALF OF THE BOARD

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Executive Chairman

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