MGX Minerals and Engineering Partner Highbury Energy Announce R&D for Petroleum Coke to Synthetic Crude Oil Gasification with Vanadium, Nickel, Cobalt Extraction

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VANCOUVER, British Columbia, July 12, 2018 -- MGX Minerals Inc. (“MGX” or the “Company”) (CSE:XMG) (FKT:1MG) (OTCQB:MGXMF) and Highbury Energy Inc. (“Highbury”) are pleased to report additional work has commenced on gasification of petroleum coke (“petcoke”), an oilsands and refinery by-product, into a synthetic liquid equivalent to refinery crude oil feedstock. The expanded research and development is focused on the re-processing of petcoke waste product to a synthetic crude oil. The target specification is being designed to allow for reuse of petcoke into a primary input equivalent to crude oil that can be upgraded into petro-chemical products in a traditional refinery without any modification to existing equipment. The goal is to produce a fuel which can seamlessly integrate into existing refinery operations. This represents a potential long-term use for the large existing stockpiles of petcoke as well as ongoing output of petcoke and other waste products without significant changes to the existing refinery infrastructure. To date work has been focused on petcoke to hydrogen gas output and the extraction of metals from the gasification of the residual ash, in particular vanadium, nickel, and cobalt.

Petroleum Coke in Alberta
Petcoke is a carbon material by-product of the oil and gas industry that forms during the oil refining process. As refineries have become more efficient at processing extra heavy crude oils (bitumen) over the last two decades, output of Petcoke globally has risen significantly. Because Petcoke originates from heavier petroleum fractions, its denser impurities such as metals and sulphur compounds are concentrated in it.

The majority of Canadian Petcoke output occurs in close proximity to oil sand producing regions, where bitumen is upgraded into synthetic crude oil. Specifically, the Province of Alberta is known to host vast stockpiles of Petcoke. According to the Alberta Energy Regulator, petcoke inventories are estimated to have reached 106 million tonnes in 2016(1).

(1) Source: Alberta Energy Industry, Alberta Mineable Oil Sands Plant Statistics

Metals
While concentrations of individual metals are low in raw petcoke, Highbury is utilizing its advanced knowledge of the thermochemical gasification process and existing large-scale pilot plant experience to assist MGX in designing a process to generate hydrogen gas and concentrate metals in the form of ash byproduct. Technology partner Highbury has completed a Phase I report on potential processes and markets for primary and secondary byproducts. A Phase II study has commenced including analyses of locations, laboratory bench top feedstock results, advanced process design and initial plant design parameters.

Previously released assay results of petroleum coke (“petcoke”) samples collected from stockpiles produced from the Fort McMurray area mining and upgrading operation as well as an Edmonton refinery are summarized below. Both samples originated from Delayed Coking operations. Samples were obtained and prepared by Highbury Energy Inc. (“Highbury”) and metal contents analyzed by Acme Labs of Vancouver, British Columbia using standard ICP analyses.

Ash Content
Ash content was determined by weighing residues after burning coke samples of about 200 g in air in a muffle oven over extended periods at 815°C. Table A indicates the average ash content of 6 to 7 samples of each coke.

Table A. Ash Content of Coke Samples

Sample name	Ash content (% wt.)	No. of samples tested
Upgrader Coke A	2.73 ±0.09	6
Refinery Coke B	0.32 ±0.04	7

Upgrader Coke A had about nine times as much ash as was in Refinery Coke B.

Proximate Analyses
The cokes contain over 95 % organic (non-mineral) matter. Thermogravimetric analyses on 10 mg quantities are shown below.

Table B. Proximate Analyses of Coke by the Thermo-gravimetric Analyser Method

Quantity (wt. %)	Upgrader Coke A	Refinery Coke B
Volatile Matter	8.9	10.0
Fixed Carbon	86.9	86.3
Residues	4.3	1.7

Residue refers to residual mineral matter left after the thermo-gravimetric test. Except for the % Residue, the two cokes have similar combustion properties.

Metals Analysis in the Coke Samples
Lithium borate fusion ICP-MS method measures 45 trace metal concentrations in the coke. Results are expressed as (mg/kg) or ppmwt. Table C lists concentrations of selected metals.

Table C. Selected Metal Concentrations in Coke (mg Metal/kg Coke)

Sample	V	Ni	Cu	Zr	Co	Au	Ag
Upgrader Coke A	421	76.8	86.2	40.5	4.8	0.0011	< 0.1
Refinery Coke B	458	53.4	35.9	1.3	1.3	<0.0005	<0.1

Vanadium is the highest concentration of the 45 trace metals detected in the coke samples.

Ash Analyses
Ash analysis was completed by Bureau Veritas Commodities Canada Ltd. (“BV”) of Vancouver, British Columbia using XRF method (XF701). Results are expressed as % wt. in the ash as oxide. Sixteen elements as oxides, and LOI (loss on ignition) are determined. The ash samples were prepared in Highbury’s laboratory and sent to BV for analysis. The maximum % the analysis method could accommodate was 10.0 % for V_2O_5; therefore ash samples were diluted by mixing with other solids. In the Highbury laboratory both Al_2O_3 and Fe_2O_3 were used.

Table D. Selected Species in the Ash of Each Coke Type

Species (wt. %)	Upgrader Coke Ash A	Refinery Coke Ash B
Al_2O_3	27.7	9.8
SiO_2	42.6	23.6
V_2O_5	6.6	45.1
Fe_2O_3	8.0	2.7
TiO_2	5.7	0.7
K_2O+MgO+CaO	4.0	6.4
LOI	0.0	4.3
SubTotal (wt.%)	90.8	92.5

For Upgrader Coke A, the sum of Al_2O_3 + SiO_2 is about 70 %. V_2O_5 is about 6.6%, according to the ash analyses. For Refinery Coke B, the average % V_2O_5 in the ash is 45 %.

Table E. Trace Metals Concentration in Ash (mg Metal/kg Ash) for Selected Species [Two Determinations Average]

Sample	V	Ni	Cu	Zr	Co	Au	Ag	Mo
Upgrader Coke Ash A	34600	740	130	1840	230	0.02	2.5	1405
Refinery Coke Ash B	193000	177000	340	405	620	0.02	0.175	5000

Vanadium metal concentrations are 3.5 % wt. in Upgrader Coke Ash A, and 19.3 % wt. in Refinery Coke Ash B, which is also enriched in Nickel.

Calculated ash compositions from ICP and XRF methods can show discrepancies due to differences in analytical methods and to the dilution step as used in the present work.

Qualified Person
Andris Kikauka (P. Geo.), Vice President of Exploration for MGX Minerals, has prepared, reviewed and approved the scientific and technical information in this press release. Mr. Kikauka is a non-independent Qualified Person within the meaning of National Instrument 43-101 Standards.

About Highbury Energy
Highbury Energy Inc. is an innovative energy company dedicated to the development and utilization of renewable energy resources through the procurement and conversion of biomass. Highbury has developed a proprietary dual-bed steam gasification technology and patented gas cleanup system that converts biomass into high-grade synthesis or fuel gas. This robust process produces a medium calorific value gas from most types of organic matter, such as wood or agricultural wastes, without need of tonnage oxygen. The cleaned synthesis gas can readily replace natural gas in industrial kilns and furnaces in the mineral, pulp & paper, glass, and cement industries. Alternately, the syngas can fuel an internal combustion engine to make electricity, with waste heat used for refrigeration, or district heating. Syngas can also be converted to high value low carbon liquid fuels such as diesel or jet fuel, or into chemicals such as methanol or ethanol.

About MGX Minerals
MGX Minerals is a diversified Canadian resource company with interests in advanced material and energy assets throughout North America. Learn more at www.mgxminerals.com.

Forward-Looking Statements
This press release contains forward-looking information or forward-looking statements (collectively "forward-looking information") within the meaning of applicable securities laws. Forward-looking information is typically identified by words such as: "believe", "expect", "anticipate", "intend", "estimate", "potentially" and similar expressions, or are those, which, by their nature, refer to future events. The Company cautions investors that any forward-looking information provided by the Company is not a guarantee of future results or performance, and that actual results may differ materially from those in forward-looking information as a result of various factors. The reader is referred to the Company's public filings for a more complete discussion of such risk factors and their potential effects which may be accessed through the Company's profile on SEDAR at www.sedar.com.

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