



## Pacific American Coal

24 August 2016

ASX Market Announcements  
Australian Securities Exchange  
20 Bridge Street  
Sydney NSW 2000

### ASX Market Announcement – For immediate release

#### Successful Field Trial for Imagine IM's Graphene Conducting Geotextile Highlights

- Imagine X3 coating tested by independent testing authority, NATA (National Association of Testing Authorities)
- Field trials were based on 2mm thick HDPE geomembrane in 2m wide, 25m long samples
- Successful detection of holes down to 1mm in size using the conductive properties of the X3 masterbatch coating
- No special installation techniques were required and there were no welding or specialized joining techniques needed
- Confirmation that the X3 coated membrane offers an environmentally compelling outcome at reduced cost to industry

The Directors of Pacific American Coal Limited (“the Company”) are pleased to report that the first independent field trials of Imagine IM’s X3 conductive geotextiles have been successfully completed. These trials, conducted by ExcelPlas, a NATA accredited testing facility, have shown that the commercially produced Imagine X3 coated conductive geotextile is suitable for commercial application.

Imagine believes that it is now well positioned to benefit from the commercialisation of an environmentally compelling product that will provide a significantly enhanced ability to detect leaks in liners used in tailings dams and landfills. Integrity of liners is essential in preventing toxins and contaminants from leaking into groundwater. Existing conductive products in the market place are difficult to install, involving high labour costs and expensive techniques. The product being developed by Imagine IM is expected to overcome these issues, making it the go-to-product of choice once it is available in commercial quantities.

The next step for Imagine IM is to conduct similar field tests with geotextile producing companies to tailor the X3 masterbatch to their products and their product chemistries and production methodologies, with commercial outcomes anticipated in the coming months that may lead to revenues in 2017.

Having successfully proven that the graphene enhanced non-woven textile is fit for purpose, Imagine IM will undertake a series of optimisation steps as part of a continuing research and development process that seeks to provide

ASX Codes PAK, PAKO

Ordinary shares listed 24 August 2016	119m
Options listed	39m
Market Cap (undiluted at 13.5 cps)	\$16m

#### About

Pacific American Coal Limited is focused on the production, development and exploration of metallurgical coal assets in North America. The Company’s strategic focus is on the 100% owned Elko coking coal project in British Columbia and its investments in technological advanced opportunities.

#### Board

Non-Executive Chairman – Geoff Hill  
 Non-Executive Director – Simon Bird  
 Non-Executive Director – Paul Chappell

#### Company Secretary

Ian Morgan

#### Management

Chief Executive Officer – Mark Sykes  
 Business Development – Dom Hill

Project	Stage	Location
Elko	Exploration	Canada
Hazell	Exploration	Canada

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generational improvements in the functionality and the economics of the X3 product over time.

Imagine IM is targeting the geotextile market, which is expected to account for \$480m of Australian sales by 2018, which is 3% of the global market, as an industry that is ideally suited for graphene-based applications. Beyond geotextiles, research and development will continue to investigate extensions of the applications to other synthetic materials that will benefit from the outstanding characteristics of graphene. See the attached press release from Imagine IM.

**About Imagine Intelligent Materials Pty Ltd (Imagine IM)**

*Imagine IM is a 40% owned associate of Pacific American Coal Limited [PAK]. It is developing graphene-based coatings for industrial textiles and fibres as well as other graphene related commercial applications. It is the first company in the world to develop conductive geosynthetic materials using functionalised graphene.*

*The PAK investment in Imagine IM is integral to Pacific American's strategy to seek exposure to high growth carbon technologies that are compatible with ownership and development of its quality coking coal assets in British Columbia, Canada.*

*Please see our website at [www.pamcoal.com](http://www.pamcoal.com) for further information*

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## Field Trial Success For Imagine IM's imgne® X3 Conducting Geotextile

Sydney, 21<sup>st</sup> August 2016

Imagine IM is pleased to announce the successful completion of the first independent field trials of its imgne® X3 coating for geotextiles, conducted on August 18<sup>th</sup> 2016 in Melbourne, Australia

Following on from successful laboratory testing of samples of imgne X3, Imagine IM commissioned ExcelPlas, a NATA (National Association of Testing Authorities) accredited testing facility, to conduct field trials of commercially-produced imgne X3 coated conductive geotextile to show suitability for commercial application.

The global Geosynthetics market is predicted to be worth \$16 Billion by 2018 according to analysts, Markets and Markets. The strategy of developing robust leak detection solutions as an entry point into this market was developed after detailed business discussions between Imagine IM and its initial commercial partner, Geofabrics Australia. Imagine IM's goal is to maximize market presence and credibility in the global geosynthetics market as a precursor to entering other large industrial market verticals. The first revenues from sales and licensing of imgne X3 masterbatch are anticipated to begin in Q1 2017. Imagine IM's plant based in Geelong has sufficient graphene output capacity to meet current Australian forecast demand and to enable initial orders from foreign markets to be fulfilled.

The field trials were conducted using standard commercial 2mm thick HDPE geomembrane in a two-layer configuration, ensuring maximum electrical insulation of the tested geomembrane from the earth. This is the most difficult condition for electrical leak detection. Testing was to ASTM standards D6747-04 and D7852-13 using 2m wide, 25m long samples of imgne X3 conductive geotextile, coated on one side only. Deliberate, controlled holes were drilled in the geomembrane from 5mm diameter down to 1mm diameter.

The field trials confirmed that leaks down to 1 mm hole size, the minimum size tested, were able to be detected in the imgne X3 coated geotextiles using normal testing methodologies and equipment for trials of this kind.

Notably, no special installation of the geotextiles was required and no welding or other specialized joining of the geotextile was required. Instead electrical joins between adjacent treated geotextile were achieved with a simple 100mm overlap of the geotextile. It was also proven that continuing conductivity could be achieved with overlaps down to only 10mm.

Testing sensitivity was proven to be constant at earth-lead distances from 1m to 20m and holes were successfully detected at 15kV test voltage, in each test, even when there were deformations in the geomembrane. Using standard brush pressure to ensure good geomembrane to conductive geotextile contact during testing, reliable results were registered even at 5kV test voltage. There were no false positives in any of the test results.

In all tests standard installation techniques were used with no special handling or preparation of the imgne X3 coated X3 conductive geotextile nor the geomembrane nor the ground itself.

Phillip Aitchison, COO of Imagine IM said, "We developed imgne® X3 as a graphene-based coating that enables delivery of conductivity in textiles and on other materials without impacting the strength and other characteristics of the materials themselves. The development of a conductive geotextile as

Imagine IM's first commercial application of imgne X3 is a major milestone for us. We have now proven our ability to both manufacture graphene at scale, and also to be able to produce masterbatch solutions that will enable large-scale industrial applications using graphene to make smart materials."

Chris Gilbey, CEO of Imagine IM said, "These results are extremely gratifying. The intent of using imgne® X3 is to provide a methodology for making geotextiles conductive that will lead to substantial economies for end users and to make leak detection more affordable and more accurate. The next step will be to undertake larger-scale field trials in conjunction with our initial customer, Geofabrics Australasia. We are now confident that our product is manufacturable at scale, and will perform according to the needs of end users, and equally importantly, that it will be able to deliver substantial economies from requiring less complex installation procedures"

For further information please contact:

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**About graphene**

*Graphene's discoverers were awarded the Nobel Prize in 2010. Graphene is the first two dimensional material and is classed as a "super-material" offering extremely high electrical and thermal conductivity, hydrophobicity, strength, and impermeability to all gases.*

**About Imagine Intelligent Materials:**

*Imagine IM is the leading Australian developer of graphene-based coatings for industrial textiles and fibres. It was founded in 2014 by a group of scientists led by Chris Gilbey and Phil Aitchison, with a vision to create disruptive products and solutions that use graphene. Imagine IM has developed a licensing and certification model to ensure that participants in the supply chain are required to meet a set of standards of materials quality. Imagine IM is the first company in the world to develop conductive geosynthetic materials using functionalised graphene.*