

**Form 51-102F3**  
**Material Change Report**

**Item 1      Name and Address of Company**

ZEN Graphene Solutions Ltd. (the “Company”)  
210 – 1205 Amber Drive  
Thunder Bay, ON P7B 6M4

**Item 2      Date of Material Change**

December 29, 2020

**Item 3      News Release**

The news release was disseminated on December 22, 2020.

**Item 4      Summary of Material Change**

**Item 5      Full Description of Material Change**

**Item 6      Reliance on subsection 7.1(2) of National Instrument 51-102**

Neither subsection 7.1(2) nor (3) of National Instrument 51-102 is being relied upon.

**Item 7      Omitted Information**

No information has been omitted on the basis that it is confidential information.

**Item 8      Executive Officer**

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Executive Chairman  
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DATED:      December 29, 2020

Schedule "A"

**ZEN Graphene Solutions Develops Novel Graphene-Based Potential Treatment for Bacterial and Viral Infections in Humans**

**Guelph, ON – December 22nd, 2020, ZEN Graphene Solutions Ltd.** ("ZEN" or the "Company") (TSXV:ZEN and OTC:ZENYF) is pleased to announce that it has developed a potential graphene-based antibiotic, antiviral and antifungal compound. Recently received testing results from the University Health Network/Mount Sinai Hospital Department of Microbiology in Toronto indicate that this patent pending formulation could be a medical breakthrough in the treatment of numerous human-contracted pathogens including, upper and lower respiratory tract infections – where COVID-19 is a major contributor – as well as drug resistant organisms. Testing was conducted by Dr. Tony Mazzulli, MD, FRCPC, FACP, Microbiologist-in-Chief & Infectious Disease Specialist at Mount Sinai Hospital. Dr. Mazzulli is also a Professor at the Departments of Laboratory Medicine & Pathobiology and Medicine at the University of Toronto.

Greg Fenton, CEO commented: "This broad-spectrum compound is a novel solution that could have an impact on infectious disease management. It has the potential to act as a targeted treatment for multi-drug resistant organisms (MDR) as well. As in previously released results on the effectiveness of a similar compound against COVID-19, this graphene-based treatment could be against viral infections. We will be exploring its use not only in the fight against the current global pandemic, but also against numerous other pathogens."

"Based on this breakthrough and an urgent need for such treatments, we will seek immediate collaborations with potential pharmaceutical partners to optimize the delivery mechanisms to target infections in general and especially those common in the respiratory tract."

Highlights:

- Graphene compound is 99.9% effective against both gram-positive and gram-negative aerobic bacteria
- Graphene compound is 99.9% effective against Candida Albicans (fungus/yeast)
- Extremely low Minimum Inhibitory Concentrations (MIC) leading to the potential use in humans
- ZEN has filed a provisional patent on these graphene compounds
- Additional testing required to determine full spectrum of activity against other pathogens
- Cytotoxicity studies are currently underway
- Potential use to treat infection of upper and lower respiratory tract

- Potential role in ear, eye, and fungal infections

Dr. Tony Mazzulli commented: "This Graphene Compound (GC) appears to be active against both gram positive (e.g. Streptococci and Staphylococci) and gram negative (e.g. *E. coli*, *H. influenzae*, *M. catarrhalis*) bacteria as well as common yeast (e.g. *Candida albicans*) at extremely low concentrations. These results are promising. Additional testing against a broader range of bacterial species is required to determine the full spectrum of activity of this GC".

Dr. Mazzulli added: "The relatively low concentrations of GC required to achieve an antimicrobial effect is also promising. Although one cannot directly compare the MICs of different compounds to determine their relative efficacy, the extremely low concentrations of this GC show an effect well below the concentration required of commonly used antibiotics to show a similar effect. These concentrations are also in keeping with concentrations that have been shown to have an antiviral effect of this GC as well".

Dr. Mazzulli concluded his report by stating: "In the clinical setting, if GC can be shown to be safe and effective, it could provide a breakthrough alternative therapy with potentially significant impact on the practice of family medicine (who initially see most of these common infections) but also in the fields of Otolaryngology, Ophthalmology, and even in the Intensive Care Unit where MDR organisms are a major challenge for treatment."

Delivery mechanisms like a dry powder inhaler or nasal spray would maximize local concentrations directly at the site of infection and avoid having to administer it systemically (orally or parenterally). Most antimicrobial agents currently used to treat common upper respiratory tract infections such as acute and chronic sinusitis achieve poor concentrations in the sinuses when administered systemically.

The company is currently conducting cytotoxicity studies to demonstrate the safety of the compound and will be releasing these results when available. Upon successful completion and outcome of these studies, the company will then seek to move immediately to human trials.

The company will be following up on recommendations from Dr. Mazzulli and further testing this provisional patent pending graphene compound for a full spectrum analysis of its biocidal activity. The company is also focused on building a team to support this new potential pharmaceutical agent.

**Disclaimer:** The Company is not making any express or implied claims that its product has the ability to eliminate, cure or contain the Covid-19 (or SARS-2 Coronavirus) at this time

The company must receive Health Canada or FDA approvals for any of the products or solutions discussed.

### **About ZEN Graphene Solutions Ltd.**

ZEN is a graphene technology solutions company with a focus on the development of graphene-based nanomaterial products and applications. The unique Albany Graphite Project provides the company with a potential competitive advantage in the graphene market as independent labs in Japan, UK, Israel, USA and Canada have independently demonstrated that ZEN's Albany Pure™ Graphite is an ideal precursor material which easily converts (exfoliates) to graphene, using a variety of mechanical, chemical and electrochemical methods. ZEN is focused on commercializing a patent pending graphene-based coating with 99% viricidal activity against COVID-19.

### **For further information:**

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To find out more about ZEN Graphene Solutions Ltd., please visit our website at [www.ZENGraphene.com](http://www.ZENGraphene.com). A copy of this news release and all material documents in respect of the Company may be obtained on ZEN's SEDAR profile at [www.sedar.ca](http://www.sedar.ca).

### **Forward-Looking Statements**

This news release contains forward-looking statements. Since forward-looking statements address future events and conditions, by their very nature they involve inherent risks and uncertainties. Although ZEN believes that the assumptions and factors used in preparing the forward-looking information in this news release are reasonable, undue reliance should not be placed on such information, which only applies as of the date of this news release, and no assurance can be given that such events will occur in the

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