

UNITED STATES PATENT AND TRADEMARK OFFICE

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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TECHNICAL CONSUMER PRODUCTS, INC.,  
NICOR INC.,  
AMAX LIGHTING,  
Petitioners,

v.

LIGHTING SCIENCE GROUP CORPORATION,  
Patent Owner

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IPR Trial No.: Unassigned

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**DECLARATION OF DR. ZANE COLEMAN IN SUPPORT OF  
PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT NO. 8,672,518**

## LIST OF EXHIBITS

<b>Exhibit</b>	<b>Description</b>
Ex. 1001	U.S. Patent No. 8,672,518
Ex. 1002	Declaration of Dr. Zane Coleman in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 8,672,518 (“Coleman Decl.”)
Ex. 1003	Provisional Application 61/248665 (’968 Patent)
Ex. 1004	Original Application 12/775310(’968 Patent)
Ex. 1005	Original claims of Application 12/775310 (’968 Patent)
Ex. 1006	Office Action (’968 Patent)
Ex. 1007	Reply to Office Action (’968 Patent)
Ex. 1008	Notice of Allowance (’968 Patent)
Ex. 1009	Notice of Allowance (’518 Patent)
Ex. 1010	U.S. Patent No. 7,670,021 (“Chou”)
Ex. 1011	U.S. Patent No. 7,828,465 (“Roberge”)
Ex. 1012	Roberge Provisional Appl. No. 60/916,053
Ex. 1013	U.S. Patent No. 7,980,736 (“Soderman”)
Ex. 1014	U.S. Patent No. 7,722,227 (“Zhang”)
Ex. 1015	U.S. Patent No. 7,993,034 (“Wegner”)
Ex. 1016	Silescent S100LP2 <i>Installation Instructions and Cut Sheet</i> (“Silescent”)
Ex. 1017	Declaration of Daryl Soderman in Support of Petition for <i>Inter Partes</i> Review of U.S. Patent No. 8,201,968 (“Soderman Decl.”)
Ex. 1018	Reply to Office Action – November 13, 2014 (’844 Patent)
Ex. 1019	U.S. Patent Application Publication No. 2002/0113244 (“Barnett”)
Ex. 1020	International Patent Application No. WO 2010/004503A1 (“Van Elmpt”)
Ex. 1021	U.S. Application No. 13/476,388 (the “’388 application”)
Ex. 1022	U.S. Patent No. 8,201,968 (“’968 Patent)
Ex. 1023	Progress Lighting’s <i>Guide to Green Lighting</i> (“Progress Lighting Catalog”)
Ex. 1024	U.S. Provisional Patent Application Ser. No. 60/979,068 (“Zhang Provisional”)

I, Dr. Zane Coleman, declare as follows:

1. I am over the age of 18 and am competent to make this declaration in support of the Petition for *Inter Partes* Review of Technical Consumer Products, Inc., Nicor Inc., and Amax Lighting (collectively, “Petitioners”). The information set forth here is from my own personal knowledge. If called to testify, I could and would provide testimony regarding the substance, content, and reasons and bases for these statements.

2. I have been retained as an expert witness by Petitioners to address issues concerning the validity of U.S. Patent No. 8,672,518 (“the ’518 Patent”) (Ex. 1001) for the above captioned *inter partes* review. I am being compensated for my time at a rate of \$400 per hour.

3. I am familiar with the technology at issue (*i.e.* LED luminaires). I am also familiar with the level of skill of a person of ordinary skill in the art with respect to the technology at issue as of October 2009. In preparing this declaration, I reviewed the ’518 Patent and considered each of the documents cited below in light of my knowledge of the technology at issue. I have also reviewed Dr. Jonathan Leeper’s declaration in support of Generation Brands LLC’s *inter partes* review petition against the ’844 Patent, IPR No. IPR2016-01546, Paper No. 2 (Ex. 1002), and I agree with Dr. Leeper’s opinion about the validity of the ’844 Patent. When

forming my opinions, I considered the viewpoint of a person of ordinary skill in the art as of October 2009.

## QUALIFICATIONS

4. In 1992, I received a Bachelor of Science degree in Applied Physics, including a Certificate in Optics from the Georgia Institute of Technology. I received my doctorate in Physics at the Loughborough University in the United Kingdom in 1997, focusing on applied rigorous coupled wave diffraction theory to model and analyze recorded edge-lit holograms and their applications as illuminators. My analysis included modeling and measuring optical and thermal properties of illumination systems including Light Emitting Diode (LED) illumination systems.

5. From 1993-1997, I worked as an Optical Engineer at ImEdge Technology Inc. While at ImEdge Technology I conducted research for a start-up company developing holographic illumination technology which included analyzing optical and thermal performance of different recording systems and materials for illumination systems including LED based illumination systems. During this time, I also invented new methods directed to recording edge-lit holograms and edge-lit devices for display and biometric applications; responsible for seven issued patents.

6. From 1997 to 2002, I worked as a Senior Physicist for Motorola Labs. I helped optically design and construct the world's first personal micro-projector

(US Patent 6,637,896). I also designed optical films for LCDs as well as 3 new optical film products with suppliers, including an optical film with 3M, which was shipped in over 100 million cellular phones. I also analyzed thermal and optical properties of products including developing new measurement techniques. During my time at Motorola, I was also responsible for 4 issued patents and 26 patent disclosures.

7. From 2003-2005, I served as the President of Phostech, where my roles included the optical design, analysis, and invention of new diffusing films, refractive and total internal reflection (TIR) films, optical lenses, projection screens and systems, LCD backlights, lightguides, illuminated signs, head-up displays, and light fixtures.

8. From 2005-2006, I was the Manager of Optical Engineering at Fusion Optix Inc. where I helped to develop and prototype micro-replicated, multi-functional optical films, components and lenses for displays and light fixtures through optical modeling, prototyping, analysis, and specification. I designed, installed, and managed the optical film, LED backlight, and light fixture characterization lab including optical, thermal, and environmental characterization. I consulted with the product development group and contributed to the optical design, thermal design, packaging, and accessories for LED light fixtures and other products.

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