

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APEAL BOARD

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TENNANT COMPANY,  
Petitioner,

v.

OXYGENATOR WATER TECHNOLOGIES, INC.,  
Patent Owner

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Case IPR2021-00602

Patent No. RE45,415

Reissued: March 17, 2015

Filed September 28, 2011

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**DECLARATION OF DR. RALPH E. WHITE**

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## DECLARATION OF DR. RALPH E. WHITE

### **I. Introduction**

1. I, Ralph E. White, provide the following declaration identifying my opinions and bases therefore concerning certain issues in the Petition for Inter Partes Review of U.S. Patent No. RE45,415 (“the ‘415 patent,” Ex. 1001). I am over the age of twenty one (21) and am competent to provide this report. I am a citizen of the United States. I reside in the State of South Carolina and maintain an office located at the University of South Carolina, Columbia, South Carolina, 29208.

2. I am a Professor of Chemical Engineering in the Department of Chemical Engineering at the University of South Carolina.

3. I have been retained by Carlson Caspers on behalf of Oxygenator Water Technologies, Inc (OWT) in the above-captioned matter as an independent technical expert.

4. I have been asked by counsel for OWT to review U.S. Patent Nos. RE45,415 (“the ‘415 patent”).

### **II. Qualifications, Experience, Publications**

5. I have almost fifty years of experience in the field of chemical engineering with research interests targeted to electrochemical systems, mathematical modeling, electrolysis, batteries, corrosion, and electrodeposition.

6. In 1971, I graduated with a B.S. in Engineering from the University of South Carolina. In 1973, I obtained my M.S. in Chemical Engineering from the University of California at Berkeley. In 1977, I obtained my Ph.D. in Chemical Engineering from the University of California at Berkeley.

7. I worked as a Chemical Engineer for Ethyl Corporation in the summer of 1970, as a Nuclear Engineer for Mare Island Naval Shipyard in the summer of 1971, and as a Research Engineer for Chevron in the summer of 1972. Since obtaining my Ph.D., I have worked as a consultant for over 15 companies including Dow Chemical, Boeing, Celgard, and Energizer.

8. I worked at Texas A&M University from 1977 through 1993, during which I held the positions of Assistant Professor, Associate Professor, and Professor, before serving as the Associate Head of the Department of Chemical Engineering. I then moved to the University of South Carolina, where I have been since 1993. I have held the roles of Chair of the Department of Chemical Engineering, Director of the Center for Electrochemical Engineering, and Dean of the College of Engineering and Computing. I am currently a Professor and Distinguished Scientist at the University of South Carolina.

9. I have received numerous honors and awards throughout my career, including the Battery Division Research Award from The Electrochemical Society,

Inc. in 1991, the Best Paper of the Conference at the Fifth Annual Battery Conference on Applications and Advances in 1990, the E. H. Brockett Professor of Chemical Engineering honor in 1990, the Scientific Achievement Award by the American Electroplaters and Surface Finishers Society in 1999, and several major awards from The Electrochemical Society (Olin Palladium, Vittorio de Nora, and Linford).

10. I am a member of several societies, such as the American Institute of Chemical Engineers, the National Society of Professional Engineers, The Electrochemical Society, and the National Association for the Advancement of Science.

11. I worked for Dow Chemical as a consultant from 1979 to 1993 on the electrolysis of brine to produce chlorine gas, hydrogen gas, and aqueous sodium hydroxide. This work resulted in several publications on this subject. I also served as a consultant to other companies for the electrolysis of water to produce hydrogen and oxygen gases.

12. A detailed description of my professional qualifications, including publications and a listing of my specialties/expertise and professional activities, is contained in my *curriculum vitae* which is attached to the end of this declaration as Exhibit A.

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