

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MINNESOTA**

OXYGENATOR WATER  
TECHNOLOGIES, INC.

Plaintiff,

v.

TENNANT COMPANY

Defendant.

Civil Action No. 0:20-cv-00358

**Jury Trial Demanded**

**EXPERT DECLARATION OF RALPH E. WHITE**

I, Ralph E. White, declare as follows:

**I. INTRODUCTION**

1. The following report contains my opinions and bases concerning certain issues in the present Investigation. 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. I have been asked by counsel for OWT to review U.S. Patent Nos. RE45,415,

RE47,092, and RE47,665 (respectively “the ’415 patent”, “the ’092 patent”, and “the ’665 patent”, collectively, “the Patents”).

## II. QUALIFICATIONS, EXPERIENCE, AND PUBLICATIONS

4. 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.

5. 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.

6. 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.

7. I worked at Texas A&M University from 1977 through 1993, during which time 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.

8. 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).

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

10. 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. This consulting work was not related to any litigation.

11. 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 as Exhibit A.

### **III. COMPENSATION**

12. I am being compensated on an hourly basis at the rate of \$400/hour for my work performed in connection with this proceeding. I have received no additional compensation for my work in this case, and my compensation does not depend upon the

contents of this report, any testimony I may provide, or the ultimate outcome of this proceeding.

**IV. PRIOR TESTIMONY**

13. During September and December 2020, I served as a consultant and expert witness in the matter of: CERTAIN LITHIUM-ION BATTERY CELLS, BATTERY MODULES, BATTERY PACKS, COMPONENTS THEREOF, AND PRODUCTS CONTAINING THE SAME, Investigation No. 337-TA-1181, UNITED STATES INTERNATIONAL TRADE COMMISSION and provided testimony at a deposition and a hearing.

14. I served as an expert witness in connection with the following two *inter partes* review petitions filed on July 6, 2020 with the United States Patent and Trademark Office: *SKI Innovation Co., Ltd. v. LG Chem, Ltd.*, Case Nos. IPR2020-01239 and IPR2020-01240. I submitted a declaration in support of each of the two petitions.

15. From May 2018 to March 2019, I served as a consultant and expert witness in *Multi Service Technology Solutions Inc. v. Lifeshield LLC*, U.S. District Court for the Western District of Missouri, Case No. 17-cv-0696-HFS, which involved a dispute involving lithium-ion battery defects in a tablet computer. I submitted an expert report and provided testimony at a deposition.

**V. MATERIALS REVIEWED**

16. In connection with submitting this declaration, in addition to my general experience, I considered the following materials:

- U.S. Patent No. RE45,415

- U.S. Patent No. RE47,092
- U.S. Patent No. RE47,665
- U.S. Patent No. 6,689,262
- U.S. Patent No. 7,369,441
- U.S. Patent No. 7,670,495
- The file histories for the above identified patents
- Investigation of electrical conductivity of different water liquids and electrolyte solutions, H. Golnabi, M.R. Matloob, M. Bahar, M. Sharifan (OWT0018617)
- What is TDS in Water & Why Should You Measure It? John Woodard (OWT0081879)
- Analysis of Water Quality for Livestock, Clell Bagley, Janis Kotuby-Amacher, Kitt Farrell-Poe (OWT0081896)
- The New IEEE Standard Dictionary of Electrical and Electronics Terms, Page 995
- U.S. Patent No. 8,025,787
- Tennant's IPR Petitions and the supporting declarations of Dr. Mario Tremblay
- U.S. Patent No. 6,251,259
- An Experimental Study on the Effect of Electrolytic Concentration on the Rate of Hydrogen Production (OWT0017879)
- Electrical Conductivity Protocol (AWP\_OWT000001)
- Water Cell Functionality (ASP\_OWT000015)
- Flow Chart (TC00033231)

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