UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AFFORDABLE WIRE MANAGEMENT, LLC,
Petitioner,

v.

CAMBRIA COUNTY ASSOCIATION FOR THE BLIND AND HANDICAPPED, INC.,
Patent Owner.

IPR2024-00139
Patent 10,177,551

DECLARATION OF MITCHEL F. BOWMAN
IN SUPPORT OF PATENT OWNER'S RESPONSE

I, Mitchel F. Bowman, declare as follows:

I. Introduction

1. I am providing this declaration in support of the Patent Owner Response of Cambria County Association for the Blind and Handicapped, Inc. ("CAB") in connection with IPR2024-00178, concerning U.S. Patent No. 11,349,291 (the "'291 Patent"), pending before the U.S. Patent and Trademark Office, Patent Trial and Appeal Board (the "Board"). I am also submitting the substance of this declaration in a separate declaration in support of the Patent Owner Response of CAB in connection with IPR2024-00139, concerning U.S. Patent No. 10,177,551 (the "'551 Patent").

2. I understand that CAB obtained a patent from the United States Patent and Trademark Office (USPTO) for its above-ground cable management system. I understand that the '291 Patent relates to CAB's above-ground cable management system.

3. I further understand that CAB obtained a patent from the USPTO for its integrated grounding system. I understand that the '551 Patent relates to CAB's integrated grounding system.

4. I understand that Petitioner Affordable Wire Management, LLC ("AWM") filed two petitions for *inter partes* review (the "Petition") to challenge the claims of the '291 Patent and the '551 Patent.

5. I am personally knowledgeable about the matters stated herein and am competent to make this declaration. The information presented herein is based on my personal knowledge, background, and experience in the solar industry, including specifically my experience in the design, development, and installation of utility-scale solar power plants, components of solar power plants, and the development and improvements of technology in the solar industry.

6. The following is my written declaration concerning my knowledge of CAB's above-ground cable management system in utility-scale solar installations that it introduced in the 2014 timeframe. Specifically, CAB's above-ground cable management system used above-ground messenger wire from which cable hangers are suspended to support and separate the various kinds of electrical cables within a solar installation array. CAB's system was the first of its kind in the solar industry. As I will explain further below, cable management in solar installations had always presented significant challenges to the industry. CAB's system only presented additional and more difficult challenges.

7. I am also knowledgeable about CAB's integrated grounding system. Specifically, CAB's integrated grounding system, for the first time, used a messenger wire as an equipment grounding conductor as well as a support structure for supporting cable hangers. Prior to CAB's integrated grounding system, separate grounding conductors and grounding jumpers were used as

grounding conductors for grounding the system, including the various system equipment components.

8. I have no financial interest in CAB or in the outcome of these IPR proceedings or any other legal proceeding involving CAB, the '291 Patent, or the '551 Patent. I am being compensated solely for my time in preparing this declaration and providing any follow-up information as necessary in these proceedings. I am being compensated at the rate of $200/hour for these services.

II. My Background and Experience in the Solar Industry

9. A summary of my relevant experience follows. More details of my background and experience in the solar industry, including my relevant work and projects, are included in my resume. A true and accurate copy of my resume is being submitted as **EX2029** in this proceeding.

10. In 2005, I earned a Bachelor of Science (B.S.) with a major in physics from California Polytechnic University. In 2007, I earned a Master of Science in Industrial Engineering and a Master of Business Administration from California Polytechnic University.

11. From 2008 through December 2012, I worked as a Program Manager for SolFocus, Inc. located in San Jose, California. SolFocus was a leading supplier of Concentrator Photovolatic (CPV) systems. As Program Manager, I worked in

three primary areas: Project Management, Product Management & Development, and Market & Business Development.

12. In Project Management at SolFocus, I worked extensively in the field with customers to build out solar energy power plants.

13. In Product Management & Development at SolFocus, I led the development of the second-generation SolFocus tracker product.[1] The development process focused on minimizing the costs to create the tracker and the cost of installing the tracker at solar energy power plants. My team and I created a larger module of solar panels that were pre-installed and pre-aligned. Thus, less modules needed to be installed and aligned at a given solar energy power plant, which reduced production costs by 20% and installation costs by 35%.

14. In Market & Business Development, I was responsible for overseeing two international markets located in Chile and Spain (large markets for solar at the time), which represented 80% of SolFocus' revenue in 2012. In this capacity, I developed a deep understanding and working knowledge of the solar market,

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[1] A "tracker" in the solar industry is a mechanical device that positions photovoltaic panels (i.e., solar panels) to face the sun in an optimal position throughout the day to maximize the amount of solar radiation that the solar panels can collect.

including the products in the market, the key players in the market, the issues or deficiencies in the existing technologies, and what technological innovations were being researched and developed, or were imminently coming to market.

15. From April 2013 to 2016, I worked for SunEdison, Inc. located in Belmont, California. At the time, SunEdison was the world's largest renewable energy company headquartered in the United States. SunEdison developed, engineered, built, owned, and operated solar power plants and wind energy plants, while also manufacturing various solar energy modules, components, and systems. I held the position of Manager within Global Design & Engineering. The Global Design and Engineering team that I managed included over 100 engineers.

16. From 2013 to 2015, I initiated and managed an organic innovation program that delivered over $100 million in realized utility-scale project savings. I also developed and managed SunEdison's global standard design program, which established the technical specifications around product selection and design standards for the global utility-scale solar team. Essentially, my job was to create the most cost-effective, efficient, and reliable solar power plant possible through technology selection and design standards. In this role, I developed an idea to combine two innovative systems for application in utility-scale solar power plants. Specifically, I combined CAB's innovative above-ground management system,

which was quickly becoming the industry standard for cable management, with the innovative tracker, NEXTracker.

17. In 2016, I was awarded a Lean Black Belt Certification, for cross-functional work in driving shared savings contracts with key engineering, procurement and construction ("EPC") partners. Essentially, this program applied lean manufacturing concepts (i.e., manufacturing in a cost-efficient and reliable manner, focusing on minimizing waste and inefficiencies while maximizing productivity and effectiveness) to the design, engineering, and installation of utility-scale solar power plants. To obtain my Lean Black Belt Certification, I had to complete an educational classroom component and then work on an in-field utility-scale solar power plant, develop an improvement in the field, and present that improvement to the board for approval.

18. In or about April 2016, SunEdison filed for bankruptcy. Due to a number of geopolitical and economic circumstances, including a drop in oil prices, there was a significant decline in growth of new solar energy at that time.

19. I left SunEdison and worked with former SunEdison colleagues to create a new company, FTC Solar, Inc., located in San Francisco, California. I worked for FTC Solar from February 2017 through December 2023.

20. The primary focus of FTC Solar was the development of trackers for solar energy plants. This included the design and development of the Voyager single-axis tracker.

21. From February 2017 through March 2021, I was the Senior Director for Product Management at FTC Solar. As one of the founding members of FTC Solar, I proposed the initial concept and formalized the market requirements document ("MRD") and product requirements document ("PRD") for the development of the Voyager single-axis tracker. The Voyager was developed to be the next-generation of single-axis tracker to provide industry-leading ease of installation, performance, and reliability. The Voyager was designed to minimize installation costs, minimize costs of maintenance over time, and maximize energy yield.

22. I also managed the initial market release of the Voyager product. In this role, I oversaw and coordinated our commercial product release of the Voyager, including coordinating the first purchase orders for the Voyager, onsite material delivery, and "golden row" installation training (i.e., construction of the first row of the solar array with the customer). The Voyager was an extremely commercially successful product.

23. During the two years post-commercial launch, I oversaw the delivery of 2.5 gigawatts of power of Voyager tracker projects, and was a key team member

in the marketing, advertising, and roadshows, and worked in due diligence leading to a successful initial public offering (IPO) in March of 2021.

24. After the IPO in March of 2021, I served as the Vice President of Business Operations, and remained in this position until the end of my tenure at FTC Solar in December 2023. In this leadership position, I led a department of more than thirty (30) people consisting of sales engineers, project engineers, structural engineers, and a pile testing business, with personnel located in the United States, India, Dubai, China, and Australia. I also created and managed an engineering services business that generated over $2 million in revenue in its first year and was on track to cover 100% of the department's operating expenses in its second year. In this role, I fostered an engineering culture around the concept of value engineering (providing the necessary functions of a project at the lowest cost), which eventually became one of FTC Solar's greatest selling strengths for the Voyager and Pioneer tracker products.

25. In December of 2023, I stopped working for FTC Solar, and am working on my transition to the next phase of my career.

III. <u>CAB's Above-Ground Cable Management System</u>

26. In 2014, while working as a Manager for SunEdison, I led the innovation department within the Global Design & Engineering team. As part of this job, I was required to be educated about and aware of the latest innovations,

inventions, and discoveries in the solar industry. To be effective, I had to keep my finger on the pulse of the solar industry, with particular attention to utility-scale solar energy.

27. Prior to 2014, the industry standard for cable management for utility-scale solar energy plants was to bury the electrical cables underground in trenches (commonly known as "trenching"). Trenching involves digging trenches, burying conductors, with or without conduit, and then covering the cables with soil.[2]

28. Trenching is expensive and inefficient. The problems with trenching include the significant labor involved in digging the trenches and burying the cables, and possibly including the need to excavate or blast through rocky subsurface conditions. While direct bury was the most cost-effective method at the time (because of the high cost of conduit), both methods of trenching were expensive over time because the cables were not easily accessible when repairs or maintenance was required.

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[2] Both conduit and direct bury refer to underground cable management systems. "Conduit" refers to enclosing the electrical conductors in PVC pipes that are buried in the ground. "Direct bury" refers to placing the conductors in a trench and directly covering the cables with some type of earth, sand, or soil.

29. Due to the cost and labor inefficiencies with trenching, I led our innovation department in investigating alternative cable management systems. As part of that investigation, we evaluated the use of metal cable trays to support the electrical cables in a utility-scale solar installation, such as the cable trays sold by SnakeTray at the time. Cable trays were primarily useful for applications where they could rest on rooftops, but cable trays were not as effective or efficient for utility-scale solar energy plants. Cable trays were also very expensive and provided for less flexibility in managing the various kinds of cables from the solar panels to the inverter.

30. Dissatisfied with the usual methods of cable management, my team and I looked for other solutions for cable management.

31. In approximately January 2014, I learned about CAB's above-ground cable management system. In October 2013, while I was at SunEdison, the Director of Engineering at SunEdison attended the Solar Power International ("SPI")[3] trade show in Chicago, Illinois, where he met Tim Wedding and Allen

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[3] SPI is the solar industry's most well-renowned trade show, hosted annually in different cities in the United States, where solar companies showcase their products and systems. Solar professionals also attend SPI to learn from industry experts about the latest innovations and developments in the solar industry.

Smith of CAB, and learned about CAB's idea for an above-ground cable management system for solar applications. At that time, CAB was the only company in the solar industry proposing an above-ground cable management system using messenger wire supported cable hangers to support and separate the various kinds of electrical cables within a solar installation array.

32. Prior to 2014, bids for solar projects primarily used direct bury trenching for cable management, with cable trays being used in very limited circumstances. No solar project bids at this time proposed using above-ground cable management systems as proposed by CAB.

33. I subsequently contacted CAB and we agreed to work together in the summer of 2014 to prototype CAB's above-ground cable management system on a single-axis tracker called the AP90.

34. At this time, members of my team, as well as engineers within SunEdison, were skeptical about the installability, practicality, reliability, and cost of using CAB's above-ground cable management system in a utility-scale solar power plant. There were serious concerns about ultraviolet ray and radiation resistance, how to structure the hanger support system, wind causing the hangers to sway and fray the jacket of power cables, compliance with various code requirements, and the long-term reliability of the system.

35. In June 2014, we tested and evaluated a prototype of the CAB system at SolarTAC in Denver, Colorado. SolarTAC is an outdoor solar testing and demonstration facility. The prototype was used to test and assess the following: the installability and practicality in a utility-scale power plant, the physical support of the system, cost (including labor) for installation and maintenance, cost of the components, corrosion in various environments, reliability in the short- and long-term, and compliance with various safety code requirements, such as the National Electrical Code ("NEC").

36. The prototype and related testing revealed that CAB's above-ground cable management system was not only a practical application for cable management in a utility-scale solar power plant, but the system addressed the problems presented by already-existing cable management options in the solar industry. It was determined that the CAB system was cheaper to install in terms of labor costs, cheaper to maintain over time, required fewer component parts (reducing cost of components and long-term maintenance of those components), and provided easy-access to the power cables for installation and maintenance. Moreover, it was determined that CAB's system complied with all safety requirements, including the NEC.

37. Submitted in this proceeding as **EX2030** is a true and accurate copy of a PowerPoint presentation that sets forth the results and conclusions from the

prototyping. As noted on page 2 of **EX2030**, CAB's above-ground cable management system reduced balance of system (BOS) costs[4], had faster installation and cycle times, simplified maintenance, and simplified project planning. CAB's above-ground cable management system was cheaper than the alternative cable management systems.

38. **EX2030** contains various photographs of CAB's above-ground cable management system, including, as shown below, a comparison of CAB's above-ground cable management system to trenching.

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[4] BOS refers to the components and equipment that move DC energy produced by solar panels through the conversion system which in turn produces AC electricity. Essentially, BOS refers to all components of a solar installation array other than the solar panels themselves.

Trenching **CAB's system**

EX2030, at 13.

39. Furthermore, at page 14 of **EX2030** is provided a detailed cost comparison, which shows how CAB's above-ground messenger wire supported cable management system is far more cost-effective than conduit and direct bury methods of cable management, primarily due to the drastically lower labor costs.

40. The prototyping convinced SunEdison to begin building CAB's above-ground cable management system into its templates and to incorporate CAB's system in future solar power plant projects. **EX2031** is a true and accurate copy of a series of email communications between myself and others at SunEdison, and CAB, regarding SunEdison's evaluation of the CAB system.

41. After the prototype in the summer of 2014, SunEdison went so far as manufacturing its piles with pre-drilled holes to make the piles compatible with CAB's system for installation of CAB's system on the piles. **EX2031**, at 1-2.

42. Even after the prototyping demonstrated the cost-savings of using CAB's system, there was still significant skepticism within SunEdison regarding long-term reliability, and whether CAB's system could comply with applicable electrical codes. To address these concerns, SunEdison performed an additional six (6) months of work to vet all the code issues, reliability concerns, and contingency plans if the reliability concerns manifested in field applications. SunEdison's engineers assessed CAB's system for compliance with the NEC. SunEdison's structural engineers assessed wind, snow, and ice loading, UV tolerance of cable jackets and plastics, and galvanic corrosion concerns. These efforts included additional testing of CAB's cable management solution, including additional [redacted] tests of its hangers [redacted].

43. As to safety and code requirements, in addition to assessments made by SunEdison's own engineers, SunEdison further relied on a white paper prepared by Bill Brooks of Brooks Engineering. Bill Brooks is a renowned guru in the solar industry and is widely considered to be a pioneer and a legend in solar. Accordingly, his analysis and conclusions on various subjects in solar, including

compliance with electrical codes, are widely-accepted. As a result, his analysis concluding that CAB's system could comply with the NEC and other industry installation standards, provided great comfort to SunEdison that CAB's above-ground cable management system would meet safety and code requirements for utility-scale solar plants.

44. In July 2015, SunEdison decided that it would use CAB's above-ground cable management system for all of SunEdison's projects involving its NT tracker system. **EX2012**. At that time, SunEdison anticipated implementing CAB's system on approximately ten projects in development. **EX2012**.

45. In further effort to assess CAB's system, SunEdison hired DNV, a world-renowned company that provides, among many other services, testing, certification, and technical advisory services in solar energy. SunEdison went through nine (9) months of back-and-forth discussions with DNV, with DNV continuing to express concerns with the level of [redacted]. Finally, in August 2015, DNV approved the use of CAB's system. **EX2032** is a true and accurate copy of an email in which I was informed by SunEdison's Director of Engineering of DNV's approval of CAB's system.

46. Shortly after final approval of CAB's above-ground messenger supported cable management system in August 2015, SunEdison moved forward

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with its first installation of CAB's system in a power plant located in Pueblo, Colorado.

47. Thereafter, SunEdison specified and/or recommended CAB's above-ground cable management system in any utility-scale solar power plant for which it submitted bids, or that it designed, evaluated, or installed.

48. By the time I started FTC Solar in 2017, CAB's above-ground cable management system was considered the industry standard for cable management designs and specifications for utility-scale solar energy plants.

49. As described above, FTC Solar developed, manufactured, and sold the Voyager tracker. Because CAB had become the industry standard for quality and reliability, the Voyager tracker system, as sold out of the box, was specifically designed to be compatible with CAB's above-ground cable management system. In fact, FTC Solar's standard electrical detail template that it shared with customers specified the CAB-ready aspect of the Voyager tracker.

IV. CAB's Integrated Grounding System

50. I first learned of CAB's integrated grounding system at an SPI show in the 2019 timeframe. Prior to seeing CAB's integrated grounding system, I had never seen, and was not aware of, any instance where a messenger wire was used as an equipment grounding conductor and as a support structure for cable hangers.

51. Any utility-scale solar installation requires grounding conductors to ground the system and its system components. Even systems that used trenching for its cable management system would require grounding conductors and jumpers connected to grounding electrodes. The grounding conductors used in trenching systems are typically underground as well. The implementation of CAB's above-ground messenger supported cable management system did not eliminate the need for grounding. With CAB's kind of system, however, grounding was typically achieved by using a separate copper grounding conductor that ran along with the messenger wire and electrical cables, to a grounding electrode at the inverter, and copper jumpers from the separate conductor to each metal pile.

52. Copper is very expensive, and installing jumpers from the copper grounding conductor to each pile requires extensive labor and associated cost. Installing these jumpers at each pile was difficult and time-consuming. The additional copper jumpers resulted in significantly increased material costs, and the need to install these jumpers at each pile resulted in significantly increased labor costs. Moreover, the additional copper jumpers further increased maintenance costs of all these additional components.

53. CAB's integrated grounding system addresses these problems by removing the need to use separate grounding conductors and grounding jumpers. As a result, CAB's integrated grounding system greatly reduces the amount of

expensive copper that is required, as well as the cost of labor required to install copper jumpers at each pile. The use of a messenger wire as the grounding conductor also facilitates the required maintenance. Essentially, it was a no-brainer to use the CAB integrated grounding system when using above-ground cable management system in a utility-scale solar application as it adequately grounded the system and did so in a significantly more cost-efficient manner.

54. At the time that CAB's integrated grounding system became available to the market, I was working at FTC Solar. From that point forward, FTC Solar always recommended that CAB's integrated grounding system be used for any above-ground cable management system in a utility-scale solar power plant for which it submitted bids, or that it designed, evaluated, or installed.[5]

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[5] FTC Solar recommended CAB's integrated grounding system, rather than requiring it, because FTC Solar deferred to the owner of the solar power plant to ultimately select which grounding method, or even cable management method, to use at a particular site. The Voyager was designed to be grounded using any of the UL-compliant grounding methods, including CAB's integrated grounding system, that met this requirement.

55. Just like CAB's above-ground cable management system, CAB's integrated grounding system became the new industry standard for solar power plants using an above-ground messenger wire supported cable hanger system.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Mitchel Bowman

Mitchel F. Bowman

Dated: 8-5-2024