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Transcript of Joseph William Novak, P.E., MSE, MBA, S.P.

Date: October 8, 2024

Case: Affordable Wire Management, LLC -v- CCABH, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

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Conducted on October 8, 2024

1 (1 to 4)

1 1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 ----- 3 BEFORE THE PATENT TRIAL AND APPEAL BOARD 4 ----- 5 AFFORDABLE WIRE MANAGEMENT, LLC, 6 Petitioner, 7 v. 8 CAMBRIA COUNTY ASSOCIATION FOR THE BLIND AND 9 HANDICAPPED, INC., 10 Patent Owner. 11 ----- 12 Case No. IPR2024-00139 13 U.S. Patent No. 10,177,551 B1 14 ----- 15 * CONFIDENTIAL UNDER PROTECTIVE ORDER * 16 DEPOSITION OF 17 JOSEPH WILLIAM NOVAK, P.E., MSE, MBA, S.P. 18 Conducted Virtually 19 Tuesday, October 8, 2024, 9:36 a.m. EDT 20 Job No.: 554257 21 Pages: 1 - 107 22 Reported by: Monique Vouthouris, CCR, RPR, CRR	3 A P P E A R A N C E S 1 ON BEHALF OF PETITIONER 2 AFFORDABLE WIRE MANAGEMENT, LLC: 3 WILLIAMS S. DIXON, ESQ. 4 MINTZ, LEVIN, COHN, FERRIS, GLOVSKY 5 AND POPEO, P.C. 6 1 Financial Center 7 Boston, Massachusetts 02111 8 617.542.6000 9 10 11 ON BEHALF OF PATENT OWNER CAMBRIA COUNTY 12 ASSOCIATION FOR THE BLIND AND HANDICAPPED, INC.: 13 TREVIN C. SCHMIDT, ESQ. 14 ECKERT SEAMANS CHERIN & MELLOTT LLC 15 2 International Place 16 16th Floor 17 Boston, Massachusetts 02110 18 617.342.6800 19 20 ALSO PRESENT: 21 PAUL KAMINSKI, Planet Depos Technician 22
2 1 DEPOSITION OF JOSEPH WILLIAM NOVAK, P.E., MSE, 2 MBA, S.P. pursuant to agreement, conducted virtually 3 via Zoom Videoconference, before Monique Vouthouris, 4 Certified Court Reporter, Registered Professional 5 Reporter, Certified Realtime Reporter, and Notary 6 Public in and for the States of New Jersey and New 7 York. 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	4 C O N T E N T S 1 EXAMINATION OF JOSEPH WILLIAM NOVAK, PAGE 2 P.E., MSE, MBA, S.P. 3 By Mr. Dixon 5 4 5 6 E X H I B I T S 7 (No exhibits were marked.) 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22

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2 (5 to 8)

5	1 PROCEEDINGS 2 3 JOSEPH WILLIAM NOVAK, P.E., MSE, MBA, S.P., 4 being first duly sworn or affirmed by the Notary, 5 testifies as follows: 6 EXAMINATION 7 BY MR. DIXON: 8 Q Good morning, Mr. Novak. Thank you for 9 taking the time to sit down with me. Hopefully we 10 can make this a pretty quick deposition and we can 11 all move on with our day. 12 Have you been deposed before? 13 A No. 14 Q I'll go over some ground rules just so 15 that we make this as efficient as possible and 16 create a nice clear record. 17 Do you understand that depositions are 18 taken in a question and answer format? 19 A Yes. 20 Q Do you understand that you're under oath 21 today as though you were giving this testimony 22 before a judge or a jury?	7	1 A Yes. 2 Q And because your testimony is being 3 recorded by the court reporter, it's important that 4 we each speak clearly and not interrupt each other. 5 So please allow time for me to complete my question. 6 Sometimes I might ask them in a disjointed way as 7 I'm thinking through how I want to phrase them, so 8 please allow sufficient time for that, and allow 9 sufficient time for your counsel. 10 Another important thing is please give 11 verbal answers, so no head nodding or other 12 non-verbal responses. Is that fair? 13 A Yes. 14 Q Did you prepare with your attorneys in 15 anticipation of this deposition? 16 A Yes. 17 Q About how much time did you spend 18 preparing for this deposition? 19 A In total, my time on this case has been I 20 would say less than one week. 21 Q Is that a full work week, as in 40 hours? 22 A Yeah, yeah, I'm assuming 40 hours.
6	1 A Yes. 2 Q It's important that you testify truthfully 3 and accurately to the best of your ability. Is 4 there any reason you cannot do so today, whether 5 that would be medication or otherwise? 6 A No. 7 Q If at any time during the deposition you 8 need to take a break, let me know and we can take a 9 break. I just ask that if there's a question 10 pending, you complete the answer of the question 11 before we take the break. Is that fair? 12 A Yes. 13 Q If you don't understand one of my 14 questions, please let me know and I'll try and 15 rephrase it for you. But if you do answer, I'll 16 assume that you understood my question. Is that 17 fair? 18 A Yes. 19 Q Your counsel may object from time to time. 20 But you do understand that unless your counsel 21 instructs you not to answer it, you're required to 22 answer my question.	8	1 Obviously, we started talking when this first came 2 up, this -- when we -- when I drafted my statement. 3 So that would have been -- you know, this is partial 4 hours over -- 40 hours over a couple months of time. 5 MR. DIXON: So at this time I would like 6 to introduce what have been previously marked as 7 Exhibit 25 -- 2059, and if we could introduce both 8 the Exhibit 2059 and the 139 IPR and the 178 IPR, 9 please. 10 MR. SCHMIDT: Just really quick, Will, as 11 I mentioned, we have clean copies of each of those 12 for Mr. Novak just for convenience purposes. 13 MR. DIXON: Appreciate it. Thank you. 14 THE TECHNICIAN: Just a quick question on 15 my end, do you want me to share those on the screen? 16 MR. DIXON: If you could just share the 17 178 exhibit, that would be great. 18 THE TECHNICIAN: So the 139, what do you 19 want that marked as? 20 MR. DIXON: Neither one of them need to be 21 marked. They both have preexisting markings. 22 THE TECHNICIAN: Okay. So just show the

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3 (9 to 12)

9	1 178 right now? 2 MR. DIXON: Yes. 3 BY MR. DIXON: 4 Q Mr. Novak, do you recognize these 5 exhibits? 6 A The three exhibits, yes. (Indiscernible) 7 when you say 178, all -- two of the documents say 8 case number - 178, and then the exhibits I guess is 9 EX and then they say 2059, so, and then the SolarPro 10 article says EX 2060. So when you say 178, I'm 11 going to be confused because it says both my 12 (indiscernible) -- 13 (Court Reporter clarification.) 14 (Recess 9:44 a.m. - 9:55 a.m.) 15 BY MR. SCHMIDT: 16 Q Mr. Novak, when I refer to these exhibits, 17 I was referring to both exhibits 2059. So you 18 submitted two exhibits in these IPRs. Is that 19 right? 20 A Yes, correct. 21 Q So you submitted one declaration in the 22 178 IPR. Is that right?	11
10	1 Q So if I refer to the Exhibit 2059 in the 2 178 IPR, is it fair that I can understand your 3 responses to be equally applicable to your 4 declaration in the 139 IPR? 5 A Yes. 6 Q So if you go to page 4 of Exhibit 2059, 7 specifically paragraph 8, do you see that? 8 A Paragraph 8, yes. 9 Q You say that your career in the solar 10 industry has spanned over 30 years, right? 11 A Correct. 12 Q Prior to 2010, what was your experience in 13 the solar industry? 14 A So I started in 1990, 1991 at Purdue 15 University, I took a class, a graduate level class 16 in solar energy. That would be the beginning. And 17 then I kept that reference manual and the 18 engineering book through -- throughout my career. 19 Now, directly I had done many other -- 20 many other experiences besides just solar. But in 21 this sentence, in total is my career experience has 22 spanned over 30 years, which would include the solar	12
10	1 industry. 2 Q In paragraph 10 on the same page of the 3 Exhibit 2059 you mention lean manufacturing. Is 4 that right? 5 A Yes. 6 Q What is lean manufacturing? 7 A Lean manufacturing would be a subset of 8 manufacturing. Lean would imply focused, focused 9 efforts, efficiency. And I think we do further in 10 the latter part of the sentence in section 10 where 11 we talk about manufacturing in a more cost efficient 12 and reliable manner, focusing on minimizing waste 13 while maximizing productivity. 14 Q Does lean manufacturing exclusively relate 15 to the manufacturing process itself? 16 MR. SCHMIDT: Object to form. 17 A Can you repeat the question? 18 Q Does lean manufacturing exclusively relate 19 to the manufacturing process itself? 20 MR. SCHMIDT: Same objection. 21 A No. 22 Q How else can lean manufacturing relate to	12

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4 (13 to 16)

13	1 other aspects of product development? 2 MR. SCHMIDT: Object to form. 3 A Lean manufacturing by definition and 4 practice is really encompassing and embracing a 5 collaborative effort, a systems approach, if you 6 will, to manufacturing. 7 And in order to maximize cost efficiency 8 and minimize waste, this collaborative process would 9 involve a range of discussions and involvement from 10 operations with operators, with people who would 11 install, who would also be involved working with 12 production and purchasing managers, finance 13 managers, managers in general. It would also 14 involve working with product development. 15 Essentially, it's all-encompassing in 16 order to eliminate all waste in the manufacturing 17 process, which is quite broad. 18 Q In your experience, have you ever taken a 19 product from one industry and applied it to a new 20 problem in a different industry? 21 MR. SCHMIDT: Object to form. 22 A Yes. So, specifically, much of my	15	1 implement utility scale solar projects, again, using 2 lean manufacturing in a general sense, specifically, 3 lessons I learned at Ford Motor Company and applied 4 directly to solar. 5 Q Is it a general principle of lean 6 manufacturing to take prior lessons learned and 7 apply them directly to a new problem? 8 MR. SCHMIDT: Object to form. 9 A Can you repeat the question? 10 Q Is it a lean manufacturing principle to 11 take prior lessons learned and apply them directly 12 to a new problem? 13 MR. SCHMIDT: Same objection. 14 A I don't know 100 percent if that would be 15 true. I think there are aspects of the question 16 that are true. 17 Q What aspects of the question are true? 18 A Can you repeat the question and I'll try 19 and specify? 20 Q Is it a lean manufacturing principle to 21 take prior lessons learned and apply them directly 22 to a new problem?
14	1 training at Ford Motor Company did involve lean 2 manufacturing product design. So one of the methods 3 that we used in lean manufacturing at Ford was to 4 develop more manual -- manual production systems in 5 order to make automotive parts. 6 So specifically in solar industry, I have 7 taken those same lessons and I developed a lean 8 manufacturing facility to assemble of solar PV, 9 which stands for photovoltaic, which is synonymous, 10 essentially, in layman's terms of solar, right, for 11 layman's terms solar would be sufficient. 12 So we developed -- I developed solar 13 process, lean manufacturing process to assemble 14 structural racking in an assembly form, a system, a 15 mini system, if you will, that contained solar 16 modules, integrated structural supports and wire 17 management, and that was in a lay manufacturing 18 facility, which would include the production 19 equipment, it would include operations, operator 20 training, as well as working with the finance 21 officers in the company, the marketing people in the 22 company, to develop a system of basic approach to	16	1 MR. SCHMIDT: Note the same objection. 2 A That would not be typical. Typical lean 3 manufacturing we're working on a specific problem, 4 not a new problem. We're trying to improve a 5 process. 6 So this would be lean manufacturing is 7 kind of what they call Kaizen, which was a 8 terminology used for improvements. So we're 9 continually making a process better. That's one of 10 the main critical elements of lean manufacturing. 11 So I'm not saying it couldn't be used for 12 a new process, but it is most traditionally used to 13 optimize an existing process. 14 Q So in paragraph 20, which is on page 6 of 15 Exhibit 2059 -- 16 (Simultaneous speaking.) 17 A Paragraph what? 18 Q Paragraph 20. Do you see where you say 19 you've maintained your passion for the solar 20 industry and continued to remain up to date on 21 developments and innovations in solar technologies? 22 A Yes.

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5 (17 to 20)

17	1 Q What did you do to continue to remain up 2 to date on development and innovations in solar 3 technologies? 4 A Just give me one second to orient my time 5 frame. 6 Okay. So this is in regards to the 2008 7 -- what I'll call, I guess, 2000, you know, early 8 2000s, if you will, to 2008 time frame. 9 So the work that I did at that time at 10 Ford Motor Company, I kept continuously on my desk 11 Solar Engineering textbook. It was entitled Solar 12 Engineering. This is a textbook that I was trained 13 on in undergraduate that we referred to previously. 14 And in my spare time at work at Ford, 15 which was, you know, as an engineer you have -- 16 often you have available time to research your own 17 interests. What I chose to do was to go through 18 work practice problems. I would do that almost as a 19 trainer would keep his muscles trained doing regular 20 workouts. I would do calculations for solar energy. 21 I would work example problems in the book. 22 For me, while I worked at Ford as an	19	1 And the glass plant that I worked at had a 2 furnace and we burned \$1 million of natural gas a 3 month. So in terms of cost savings to the plant, we 4 could implement solar technology based on my 5 readings, not only in my textbook, but just from 6 reading other -- reading very widely. 7 So I'm constantly trying to learn, whether 8 it's on the internet of the time, or other 9 publications, newspapers, any article that would 10 have solar energy, I would always find interest in 11 that. 12 And so combining all these, this is the 13 way that I would stay up to date and implement and 14 do a preliminary feasibility study for this and take 15 it to management for their review. 16 So that would be primarily how I 17 maintained, you know, updated on the solar industry 18 at that point. 19 Q What other publications and/or newspapers 20 did you read to stay up to date on the solar 21 industry at this time? 22 A So there are articles, obviously, in the
18	1 engineer, my passion was really solar. And, 2 unfortunately, there was not a huge career 3 opportunity at the time compared to the employment 4 and economics of, you know, being a Ford Motor 5 Company engineer. So basically what I would do is 6 keep fresh. 7 And I also would try to apply solar energy 8 to my work product at Ford where I could. So, for 9 example, in 2006 I was working at the Nashville 10 glass plant, which is a Ford Motor Company 11 manufacturing facility, and in my spare time that we 12 were allowed to do other activities, I performed an 13 assessment to take solar energy using photovoltaic 14 cells to produce electricity and to study its 15 potential impact to perform electrolysis, which is a 16 technical process to extract oxygen hydrogen from 17 water, and then look at the potential to combine 18 that hydrogen with carbon dioxide, which would also 19 be captured, combine those two processes utilizing 20 solar energy, electrical energy to make synthetic 21 methane, and synthetic methane or exit methane was 22 what we were using, it's a form of natural gas.	20	1 major newspapers, and they would, you know, they 2 would be from time to time available. 3 I read daily the Investor's Business 4 Daily, which would have a range of all industries. 5 It would include developments in solar, as well as, 6 obviously, many other. It was not a solar specific 7 documentation. But every day -- I subscribed to 8 Investor's Business Daily which has little articles 9 on, you know, technology and other -- other things. 10 So there were definitely articles in there. 11 But just, in general, on the internet 12 basically searching. So it would be a variety of 13 electrical contractor-type of publications, as well 14 as just your typical I'm going to say non-specific 15 publications on the internet. 16 Q And this is how you stayed up to date with 17 the solar industry through approximately 2008. Is 18 that right? 19 MR. SCHMIDT: Object to form. 20 A Correct. Correct. 21 Q At any point up through 2008 did you gain 22 any field experience in the solar industry?

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6 (21 to 24)

21	1 A I would say yes. Yes. 2 Q Prior to 2008, what was your field 3 experience in the solar industry? 4 A During 1991, in my class we had hands-on 5 experience with solar energy as part of the class. 6 Q What was that hands-on experience with 7 solar energy as part of your class in 1991? 8 A So in addition to working on book 9 problems, if you will, right, we would -- we would 10 simulate shading profiles, geometries impact, solar 11 path models, if you will. You know, sort of 12 hands-on knowledge, pass around equipment that was 13 used, you know, whether it's a mini wafer or 14 electronic piece of equipment that was used to sort 15 of get -- to take more than book learning in a what 16 we would call a hands-on student environment. 17 Q Did you have any other field experience 18 prior to 2008 in the solar industry? 19 A Not that I recall. 20 Q And you left Ford in 2008, right? 21 A Yes. 22 Q And in paragraph 24 of Exhibit 2059, you	23	1 think I'm thankful to have started that because I 2 have been very effective in my career. 3 So as part of that, obviously, I needed 4 funding, so I did consulting with some of my key 5 contacts. I would do contract work on a consulting 6 basis for engineering and/or turn around and 7 restructuring. 8 And as part of that, I was aware that the 9 Tennessee Solar Institute was starting, and I called 10 -- I called every day -- I'm sorry, every week or 11 every two weeks I called to ask if there was 12 available funding. And on one of those calls I was 13 indicated that there was an opportunity at the 14 Tennessee Solar Institute and I should pursue that 15 training. 16 So I did that, and as part of that we had 17 hands-on experience. We learned in a room of -- 18 from a senior electrical engineer, and I asked his 19 advice, because I was fascinated, and with that he 20 -- he was a professional engineer -- he encouraged 21 me to resume this full-time. 22 So from that class, the output of that
22	1 say that in 2010 you enrolled in training funded by 2 the Tennessee Solar Institute. Is that right? 3 A Yes. 4 Q What did you do between 2008 and 2010? 5 A 2009, in the beginning of 2009 I founded 6 Tropenas Company. And so as part of that work I was 7 transitioning with a career plan to start on my own, 8 like my great grandfather had started Tropenas 9 Company, its predecessor, if you will, which was 10 focused on improvements on the steel process, he was 11 an engineering consultant for that. 12 And so in 2009 with discussion with my 13 father, who was in the energy industry, I asked his 14 counsel and he encouraged me to follow my passion. 15 And I had the chance to go out on my own, and, so, 16 forgive me, because I'm a family man and I take a 17 lot of pride in being the fourth generation 18 engineer, and I'm blessed to have that opportunity. 19 So with that, the encouragement of my 20 family, I was able to come up with a plan in funding 21 on my own to start what I hoped would be a 22 successful solar career, which, in hindsight, I	24	1 class was I passed the entry level NABCEP test after 2 one week of training, including hands-on experience 3 and that was my introduction to the intricacies of 4 the National Electrical Code. 5 So a lot of the exam was related to the 6 National Electrical Code, and so having put in extra 7 time through the years helped me pass that test the 8 first time. 9 Also, in 2010, you know, having completed 10 that, then I went for -- pretty much two weeks after 11 I met some contacts in the solar industry and I went 12 to their sites where they had active solar 13 installations. 14 So I think that describes what I was doing 15 between Ford Motor Company and the start of my 16 company in 2009. 17 Q Sounds like you really had an opportunity 18 of a lifetime after maybe 15 or so years of doing 19 something that was interesting, but not exactly what 20 you wanted to do, so I really respect that. 21 You mentioned the NEC. What is the NEC? 22 A The NEC stands for the National Electrical

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7 (25 to 28)

25	1 Code, which is the United States primary code 2 related to electrical processes and implementation. 3 Q Why is a lot of the NABCEP exam related to 4 the NEC? 5 A So NABCEP stands for the National -- or 6 North American Board of Certified Energy 7 Practitioners. So by definition, energy 8 practitioners, energy in this form is primarily 9 related to the solar, and solar electric in 10 particular. And electric solar and the NEC handbook 11 go hand-in-hand. That's you cannot do solar with -- 12 in safe practices without embracing the National 13 Electrical Code. 14 Q How would an engineer in designing a solar 15 installation use the NEC? 16 A Based on all requirements as an engineer, 17 professional engineer, we're ethically obligated and 18 legally obligated to protect the public, and the way 19 to do that in engineering is to follow discipline 20 processes when we design our systems. And so as 21 part of that there are many standards that govern 22 and guide an engineer in how to do electrical	27	1 engineers in how to design the so-called balance of 2 systems of a solar array? 3 MR. SCHMIDT: Objection. Foundation. 4 A Is there a specific reference to that in 5 my document that you want a clarification on? 6 Q No. I'm just asking the question. I 7 don't think there's a specific reference in your 8 declaration. 9 A So, I guess, can you ask the question 10 again? 11 Q Does the NEC govern and guide solar 12 engineers in how to design the so-called balance of 13 systems in a solar array? 14 A I would say the word "govern" is not 15 correct, so in that regard the NEC does not govern, 16 okay. And then can you repeat the latter part of 17 the question? 18 Q So I guess for a clear record, I'm going 19 to rephrase the question without using the word 20 "govern" then. 21 Does the NEC guide solar engineers in how 22 to design the so-called balance of systems in a
26	1 drawings and how to do electrical calculations, and 2 many of those specifically reference the techniques 3 in the National Electric Code. 4 Additionally, the National Electrical Code 5 specifically has sections where they refer to 6 engineering calculations are acceptable within the 7 National Electric Code or various sections, as well 8 as standardized look-up tables or other mechanisms. 9 So the two are very closely aligned. 10 Q Is the NEC an example of the standard that 11 governs and guides solar engineers in how to do 12 their electrical drawings and calculations, is that 13 right? 14 MR. SCHMIDT: Object to form. 15 A Can you repeat that? 16 Q Is the NEC an example of a standard that 17 governs and guides solar engineers in how to do 18 their electrical drawings and calculations? 19 MR. SCHMIDT: Same objection. 20 A In layman's terms that would be one 21 definition. 22 Q Does the NEC govern and guide solar	28	1 solar array? 2 MR. SCHMIDT: Objection. Foundation. 3 A I would say that is not the major purpose 4 of the NEC code. NEC code is generic in terms of 5 not with reference to balance a system, which is a 6 solar term. Electrical -- the electrical code is 7 more specific to all electric. 8 Q Would an engineer looking to design a 9 solar array look to the NEC for guidance? 10 A Okay. Can you repeat the question, 11 please? 12 Q Would an engineer looking to design a 13 solar array look to the NEC for guidance? 14 A Yes. 15 Q In paragraph 27, which is on page 8 of 16 Exhibit 2059, you refer to being a sole proprietor. 17 Is that right? 18 A Yes. 19 Q Does that mean you were no longer working 20 for Tropenas Company? 21 A No. 22 Q What do you mean by you were consulting as

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8 (29 to 32)

29 1 a sole proprietor? 2 A So, specifically, I literally mean I was 3 consulting beyond Tennessee as a sole proprietor in 4 Georgia, Mississippi, and Kentucky. And this is a 5 sole proprietorship, as you know, is a legal 6 structure to operate as a business. And since I was 7 registered as a business, an engineering firm in 8 Tennessee as Tropenas Company, my work in Tennessee 9 was under the legal structure of a corporation, an 10 engineering firm in Tennessee. 11 And so when I would work outside of the 12 state, I would work and operate under a sole 13 proprietorship, essentially doing the same type of 14 work, but just for out of state non-Tropenas Company 15 Tennessee projects. 16 Q Okay. I think I understand. Thank you. 17 So turning to page 9 of Exhibit 2059, in 18 paragraph 28 you refer to a company called 19 Soltility. Is that accurate? 20 A If you can point me to the paragraph. 21 Q Paragraph 28 you refer to Soltility. 22 A Yes.	31 1 A Again, all, I could not say all would 2 require that. 3 Q In paragraph 30 you discuss cable 4 management. Is that accurate? 5 A Yes. 6 Q In paragraph 30 are you referring to cable 7 management in the racking systems developed by 8 Soltility? 9 MR. SCHMIDT: Object to form. 10 A Okay. So can you repeat the question? I 11 just reread the context. 12 Q In paragraph 30 are you referring to cable 13 management in the racking systems developed by 14 Soltility? 15 MR. SCHMIDT: Same objection, please. 16 A So I think the intent of the paragraph is 17 broader than just specifically related to these on 18 Soltility. That is an example that I was using to 19 discuss, it would be one of -- one of the -- one of 20 the instances of cable management. 21 Q Can you give me a picture of what the 22 wiring looks like in one of these solar assemblies?
30 1 Q What are solar module racking systems? 2 A First, the solar module would be commonly 3 termed a panel for the solar frame and the solar 4 photovoltaic wafers that produce energy, and the 5 racking system, in layman's terms, would be the 6 structural support for the system. 7 Q Do all solar arrays have a racking system? 8 A The technical answer would be no. But in 9 practice, the vast majority certainly would. 10 Q Why is the technical answer no, not all 11 solar arrays have a racking system? 12 A Just by the definition of all would 13 include every possible, and there are examples of 14 solar arrays that would just be without the 15 structural support. So for space, I mean, you said 16 all, so that's why I did try to qualify. But 17 certainly most solar arrays will need structural 18 support. 19 Q So rooftop solar and utility scale solar, 20 those are all going to need a racking system. Is 21 that right? 22 MR. SCHMIDT: Object to form. Foundation.	32 1 So I guess that wasn't really a question. 2 What are the solar module DC wires? 3 A Solar module DC wires, in reference to 4 paragraph 30, would be the manufactured cables that 5 come with the manufactured assembly, termed a solar 6 module. So these would be electric wires, the 7 pigtail leads, if you will, in layman's terms, that 8 are attached to the solar module. 9 Q What are DC home run wires? 10 A A DC home run wire would be the extension 11 cord, if you will -- that's, again, not a technical 12 term -- but the home run would be the extension 13 cable to give the PV DC energy from the solar panel 14 location to a required connector device. 15 Q What is a required connector device? 16 A That would be specifically there would be 17 several options. We would call that a DC combiner 18 box would be one iteration. There would be others. 19 Q What are the other iterations of a 20 required connector device? 21 A So any junction box. There's also like an 22 inverter, if you can connect to an inverter or

33	1 another electrical piece of equipment. 2 Q Do the solar module DC wires referenced in 3 paragraph 30 connect to the DC home run wires 4 referenced in paragraph 30? 5 A Yes. 6 Q How do the solar module DC wires connect 7 to the DC home run wires? 8 A The primary method would be to use a 9 listed connector device that's manufactured 10 specifically for that purpose. 11 Q So in physical mechanistic terms, how does 12 the connector device connect the solar module DC 13 wires to the home run wires? 14 MR. SCHMIDT: Object to form. 15 A The most common method, the solar module 16 manufacturer attaches, during the construction 17 process, attaches a connector, which, say, would be 18 the positive end or negative end. And the home run 19 would be accomplished -- the connection to the home 20 run would be accomplished via the same type of 21 plastic, if you will, connector. And so a positive 22 connector will mate to a negative connector to make	35	1 the long axis. 2 Q So to ask my question more specifically, 3 because I completely see your point, does the 4 Z-shaped purlin steel structure run parallel to the 5 direction of the group of solar panels? 6 MR. SCHMIDT: Object to form. 7 Q Let me re-ask the question. 8 PV modules are molded in a string, right? 9 A You broke up there. Can you clarify your 10 question? 11 Q PV modules are assembled in a string of 12 modules, right? 13 A They can be. They do not have to be. But 14 largely, yes, they are, especially on utility scale 15 projects. 16 Q That string of PV modules will run in a 17 single direction, right? 18 A I would say that's incorrect. The 19 orientation on utility scale projects, or any even 20 residential projects, is subject to a geometry 21 puzzle, if you will, so they can be oriented in any 22 direction. Again, this is what I was saying there
34	1 the male-female connection. 2 Q Is there a (indiscernible) when you say 3 that cable management was accomplished by laying 4 these wires in a Z-shaped purlin steel structure 5 running the length of the panelized system? Is that 6 right? 7 A Yes. 8 Q What does it mean to run the length of the 9 panelized system? 10 A So, specifically, this references the 11 steel structural support, which is a part of the 12 racking system. And to support the entire structure 13 -- I'm sorry. To support the entire PV module 14 assembly, the steel structure will have to run the 15 entire length of that structure. 16 Q Does the Z-shaped purlin steel structure 17 run parallel to the panels? 18 A Well, the panels are square, so it will 19 both run parallel and perpendicular, depending on 20 your orientation. 21 But I think, if I understand your question 22 correctly, it would run parallel, if you will, to	36	1 is no way to do it. 2 We call this 2V, which is 2 vertical, or 3 2H, which would be 2 horizontal, so you can rotate 4 them 90 degrees, they will be in a grid, and so you 5 have both directions that you really have to handle. 6 So the Z purlin would only be in one 7 direction. But it really makes no technical 8 difference whether you're running in an X or a Y 9 direction. I really don't think it's too relevant, 10 honestly, to your question either way. But I'm 11 happy to clarify. 12 Q Did you ever run a Z-shaped purlin steel 13 structure along the perimeter of a solar array? 14 MR. SCHMIDT: Objection. Foundation. 15 A I would say no, that would not be the most 16 appropriate way to mount. And from memory, I do not 17 recollect ever running on the edge. 18 Q So once the wires leave the length of the 19 panelized system, if we look at paragraph 31, which 20 is on page 10 of your declaration, was the normal 21 method to bury and trench those wires? 22 MR. SCHMIDT: Object to form.

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10 (37 to 40)

37	1 A Okay. So I refreshed in the entire 2 context of 31. Can you repeat your question? 3 Q Once the DC wires we were just discussing 4 leave the length of the panelized system, would the 5 normal method be to bury and trench those wires? 6 MR. SCHMIDT: Same objection. 7 A That would be one normal method. 8 Q What was another normal method for those 9 wires? 10 A This would be subject to what your goal 11 is, so where are we trying to connect to. So I 12 would have to have a specific example of where we're 13 trying to accomplish. 14 So in layman's terms, if you're trying to 15 go far, okay, which far could be feet, right, it 16 could be 10 feet or a hundred feet or any distance 17 really. If you're trying to go far, the common 18 method at that time was to put things in conduit and 19 to trench to get over there so it's not on 20 obstruction. 21 On the other hand, if you were targeting 22 something close by, say, within a couple feet, that	39	1 potentially cause movement or damage as of 2012? 2 A The primary approved method would be 3 placing them in conduit. 4 Q What is a conduit? 5 A A conduit would be a listed product, a 6 manufactured product designed specifically under 7 various standards, for example, a UL standard, and 8 this would be a product that would contain 9 electrical conductors. That's the definition of 10 conduit that we would be referring to. 11 Q Were there any other methods that were 12 used to accomplish securing and supporting the 13 conductors away from sharp objects or any obstacle 14 that could potentially cause damage or movement as 15 of 2012? 16 A Can you repeat the question? 17 Q Were there any other methods that were 18 used to accomplish securing and supporting the 19 conductors away from sharp objects or any obstacle 20 that could potentially cause damage or movement as 21 of 2012? 22 A There were other methods, but you would
38	1 you could get to without trenching. You would go 2 directly to that electrical box or connector. So, 3 again, another method would be to just go directly. 4 Q As of 2012, how would you go directly to 5 that electrical box for connector? 6 A The cables would be routed per the NEC in 7 a safe and workmanlike manner, and they would be 8 routed not exposed to physical damage, which is an 9 NEC requirement, and they could be routed 10 appropriately to a connector for the recommended 11 installation manuals instructions. 12 Q How would you route cables per the NEC in 13 a safe and workmanlike manner so that they would not 14 be exposed to physical damage? 15 A There would be a number of methods that 16 you could use to accomplish this. Typically, you're 17 going to secure and support the conductors away from 18 sharp objects or any obstacle that could potentially 19 cause movement or damage. 20 Q What are the methods that you would use to 21 accomplish securing and supporting the conductors 22 away from sharp objects or any obstacle that could	40	1 probably have to clarify a code compliant method, 2 and the codes are very complicated, even for 3 interpretation of experts. And so there are 4 certainly other methods that could be done. 5 Q What were those other methods? 6 A The methods that I would be aware of that 7 I would enact at that time would be the most code 8 compliant manner that we were aware of, which would 9 be to use conduit. 10 So, largely, I would say to exit safely in 11 a code compliant manner, a conduit was the preferred 12 method by far. 13 I'm trying to think of another example and 14 I cannot think of another example that would be a 15 hundred percent code compliant at that time. 16 Q An example -- sorry. 17 A I was going to say like this is 18 specifically trying to target, you know, an 19 obstruction, like coming around with a sharp object 20 or something along those lines, right, to secure and 21 support around an object that could potentially 22 cause harm or violate the code.

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11 (41 to 44)

41	1 Q You mentioned that there are other methods 2 that may not be 100 percent code compliant, right? 3 A Correct. 4 Q What were those other methods? 5 A Basically, code compliant really requires 6 in a workmanlike manner. And so if you were to do 7 things not orderly, that would be one method. If 8 you had wires that were exposed to damage, whether 9 it's movement, wind, environmental factors that 10 could cause, you know, those would be non-code 11 compliant methods. 12 If you attempted to secure and support 13 conductors in devices that were not listed and 14 tested and approved for the wire sizing or other 15 case that the listing required, and you tried to 16 implement those methods for a different class of 17 wire size or different application that it was 18 intended, that would be a code violation. 19 So there are many examples of incorrect 20 installations, especially in the earlier days of 21 solar. 22 Q Were there any drawbacks to using conduit?	43	1 MR. SCHMIDT: Same objection, form and 2 foundation. 3 A Yeah, I would say I don't quite understand 4 the other, other than or other systems, because 5 you're comparing two things that I'm just not making 6 a connection. 7 Q In paragraph 31 you mention that you 8 researched aboveground alternatives to trenching. 9 Is that right? 10 A Yes. 11 Q Other than the Snake Tray, did you find 12 any aboveground alternatives to trenching? 13 A So your question was did we find any other 14 alternatives besides Snake Tray? 15 Q Yes, that's right. 16 A So, yes, there are other alternatives. We 17 did not find one that we thought was code compliant 18 and an acceptable solution. 19 Q Setting aside the code compliance, what 20 were those other alternatives? 21 A That would be -- what's the term? -- a 22 cable tray, like a cable ladder. And I'm not saying
42	1 A As with any system, there are positives 2 and negatives. So yes. 3 Q What were the drawbacks to using conduit? 4 MR. SCHMIDT: Objection to form. 5 A Cost, time, labor to install, extra 6 purchasing, overhead, logistics, material handling. 7 You know, obviously, there would be a whole list, I 8 could probably take all your time. But those would 9 be the primary drawbacks. 10 Q Cost, time, labor to install, extra 11 purchasing, overhead and logistics would be 12 drawbacks common with using any system other than 13 directly routing cables, right? 14 MR. SCHMIDT: Objection. Form. 15 Foundation. 16 A Can you repeat the whole question? I 17 don't know if I understood the last part where 18 you're talking about other than. 19 Q Cost, time, labor to install, extra 20 purchasing, overhead, logistics would be drawbacks 21 common with using any system rather than directly 22 routing the cables, right?	44	1 that the cable ladder would be sufficient. I'm just 2 saying that there were other -- there are other 3 mechanisms in the industry to secure and support 4 conductors that may or may not be appropriate for 5 solar. 6 Q Other than the cable ladder, did you find 7 any other aboveground alternatives to trenching? 8 A Not that I recollect. Nothing that would 9 be significant in our mind. 10 Q What do you mean "significant in our 11 mind"? 12 A So the team that was designing this was, 13 of course, led by me, a professional engineer. Also 14 involved the owner of Soltility, who was a very 15 enthusiastic participant in the solar industry; 16 their CEO, so he was researching, you know, from a 17 cost perspective getting quotes, talking to 18 different vendors. 19 We attended the Solar Power International 20 Conference in, you know, the 2012 time frame. So 21 this would be, you know, during the year of 2012, 22 right. This is just not a February project. I was

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12 (45 to 48)

45	1 looking for methods to secure and support 2 conductors, and so those would be the, you know, the 3 type of analysis that we would be doing. 4 Did that answer your question? Or can you 5 repeat the question to make sure I got it all? 6 Q I'm looking more for what you meant by 7 significant, what -- what do you mean that you 8 didn't find any other aboveground alternatives to 9 trenching that was not significant? 10 A That would be a useful mechanism or 11 solution to implement. 12 Q Why do you specifically mention Snake Tray 13 in paragraph 31? 14 A At that time it was not only advertised in 15 features and popular solar articles, such as the 16 SolarPro Magazine, and it was I'm going to say 17 known, I don't want to say widely known, but it was 18 known to be a possible solution for wire management 19 within the industry and sort of a solarized version 20 of an industrial cable tray. 21 Q Do you know if the Snake Tray cable tray 22 was, in fact, used in solar in 2012?	47	1 A So we're a family-run company, and, of 2 course, it's changed over the years, so not only 3 family members, family engineers involved, but other 4 professionals, other consultants. So I'll manage 5 pretty much all aspects of the company from a 6 management perspective in collaboration with my 7 other colleagues that have come and gone over time. 8 Presently, my brother is a civil engineer, 9 so he works with me. So we will both do drawings. 10 We specialize -- we break up and specialize, I'll do 11 the more electrical and he'll do more civil-related 12 or layout or other basic elements. So pretty much 13 all aspects of the company. We're a small 14 engineering firm, so... 15 Q Other than engineering drawings, what 16 services does Tropenas offer in connection with 17 renewal energy projects? 18 MR. SCHMIDT: Object to form. 19 A So I serve many functions besides just 20 drawings. Drawings would just be one element of an 21 engineering study. So I could break it up into what 22 we will call feasibility studies, which would be
46	1 A Yes. 2 Q How was the Snake Tray cable tray used in 3 solar in 2012? 4 A In the other exhibit there's actually 5 pictures from their advertisement, which would be 6 one method, one instance of where it was used. 7 MR. DIXON: Okay. We have been going for 8 about an hour, and it's been about an hour and a 9 half since the start, so why don't we take a quick 10 break. 11 MR. SCHMIDT: Great. Do you want to say 12 five minutes? 10 minutes? 13 MR. DIXON: That works for me. 14 MR. SCHMIDT: We'll do 10 minutes. 15 (Recess 10:59 a.m. - 11:11 a.m.) 16 BY MR. DIXON: 17 Q So in your role at Tropenas, do you create 18 the actual engineering drawings for renewal energy 19 projects? 20 MR. SCHMIDT: Object to form. 21 A That is one of my roles, yes. 22 Q What are your other roles at Tropenas?	48	1 upfront assessments prior to a full construction 2 drawing set. 3 In terms of feasibility studies, I have 4 been a subject matter expert for -- 5 (Court Reporter clarification.) 6 A -- Oak Ridge National Laboratories, not 7 the laboratory itself, but that is the area that 8 developed the nuclear bomb in Tennessee outside of 9 Knoxville. 10 So there are subcontractors that 11 coordinate with the government to help implement 12 renewable energy policies. One of those policies, 13 to be specific, while I was a subject matter expert, 14 they asked me to submit a proposal for a site visit 15 to do a ballasted landfill solar array assessment to 16 see if the site was feasible for the Oak Ridge 17 National Laboratories. 18 I had also done other consulting work 19 implementing projects, solar projects nearby. So 20 subject matter expert would be one area. 21 We also do O&M advisory services, so this 22 is operations and maintenance, where I would go into

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13 (49 to 52)

49	1 a site, specifically one example of many would be 28 2 megawatt project in Georgia where I was hired by 3 Silicon Ranch, which is one of the largest in 4 utility scale solar developer/owner, project 5 developer/owner and operator of systems. So here 6 was a site they were developing. I was involved, I 7 was the engineer of record on the project, as well 8 as follow-up to the project. 9 While it was being constructed, through 10 construction, I went on site and made observations 11 in the field as it was installed, taking 12 photographic evidence of minute details during the 13 operations, writing daily reports of the operations 14 to get back to senior management at the company to 15 let them know what was going on hands-on as an 16 independent assessor, independent of the contractor. 17 So that would be another type of work that we did. 18 We also write procedures for companies 19 related to solar, for example, witness testing. So 20 witness testing would be on site during 21 commissioning process of the electrical facility 22 where you witness test, you witness, so I would be	51	1 So I have a master's in business 2 administration from the University of Michigan where 3 I graduated with highest distinction. As part of 4 that work I specialized in valuation models. So 5 I'll do valuation models for solar clients and solar 6 projects to evaluate the potential return of 7 investment on projects. 8 Also, as part of my master's in business 9 administration, I took a series of accounting 10 classes that are the equivalent requirements that 11 are required for a CPA, although I do not have a 12 CPA, but for training purposes I would be eligible 13 to take the test based on my accounting classes that 14 I have taken. 15 So with that, we do -- in the valuation 16 models we do are familiar with the relevant overhead 17 costs, accounting-type metrics, depreciation 18 schedules. So we will do kind of a full -- 19 full-blown assessment to help blend the business 20 side and the technical side to make sure our 21 valuation models are accurate, as accurate as can 22 be.
50	1 an observer either through data analysis, not 2 typically on site. We will collect the data, the 3 data would be collected, say, by an electrician, and 4 then we would go through our procedures to verify 5 that the data that they're collecting met the 6 standards. So, again, we would write procedures 7 upfront for the electrician to operate and collect 8 the data, fill in tables, if you will, of all the 9 data. So that witness testing and commissioning 10 observation would be one, another area. 11 Interconnection applications would be 12 another upfront area where we support the technical 13 standards awareness of the business development 14 process, pricing, we -- you know, value engineering 15 of the potential systems that go in place, as well 16 as the technical requirements that would be 17 involved. 18 So I would really say we're involved in 19 virtually every aspect that an engineer could be 20 involved in. We are involved in utility scale solar 21 and energy storage now. Also leveraging value 22 engineering.	52	1 Feasibility studies, again, those 2 assessments in terms of if I had to split, most of 3 my work is truly on engineering, so the vast 4 majority of my time, though it does vary over the 5 years, the vast majority of my time is dedicated 6 towards engineering by far. 7 And these other ancillary services, while 8 very important and valuable to my clients, they 9 generally don't take up much time because I'm pretty 10 fast and efficient through these other means. But I 11 do incorporate that, when I do an analysis for 12 engineering design, I incorporate these lessons 13 learned from the field. I incorporate the lessons I 14 learned on a site visit. I implement those back if 15 there was problems or what was good, what was bad 16 when we interview the operators and the installers, 17 and we take those lessons learned back and we 18 implement those in our designs. So in our 19 engineering calculations and our output, if you 20 will, the drawings, we try to implement those 21 practices. 22 Additionally, we do interviews, somewhat

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14 (53 to 56)

53	1 informal interviews and follow-up at the end of our 2 projects, we interview, like, in the team, I'll call 3 it a triangle team, if you will, of the owner, the 4 owner/operators, the purchasing managers, we 5 interview them for lessons learned. 6 We also ask the operators if the methods 7 that we used on our design were helpful or if they 8 have positive or negative feedback. And so it's our 9 way to extend our scope beyond just the projects 10 that we work on, to get input from the industry and 11 to make our designs better for the end user. 12 Q What is a ballasted landfill solar array? 13 A So ballasted would indicate that it is a 14 non-ground penetrating solution for the foundation. 15 So ballasted, again, that would be -- typically, a 16 concrete type of ballast would be the primary 17 mechanism to hold a structure down to the earth. 18 And then landfill, of course, this would 19 be a traditional definition of a landfill, so this 20 would be something that has been filled in. Usually 21 it's somewhat unknown material that is in the 22 landfill. But in solar terminology this would be an	55	1 it. So this would be a hundred percent buildable 2 site code compliant design. So in the form of a 3 recommendation, it really it might be -- I don't 4 know if "recommendation" is the right word, but we 5 do suggest potential products that we know have -- 6 are proven solutions in the industry. But, again, 7 they may be recommended to us, we would assess, and 8 then we would make the determination whether this is 9 a proper product to implement. 10 Q Have you ever been compensated for 11 recommending a certain product for inclusion in a 12 solar array project? 13 MR. SCHMIDT: Object to form. 14 A No. So as a professional engineer, I'm 15 licensed in now 24 states, that would be an update 16 from my last two months, I've picked up another two 17 sites -- or states, I'm sorry, that would be 18 Illinois and Wisconsin. 19 So as part of that, I am very, very aware 20 of all the requirements in the various states. One 21 of those requirements in many of the states, if not 22 all the states, is ethics. And there is a code of
54	1 area where you would not want to penetrate the 2 ground. You would want to use above methods to 3 support to not penetrate potential contaminants. 4 So we have done a number of sites, such as 5 the feasibility study, we have done a number of 6 construction sites, including Guantanamo Bay in 7 Cuba, which is a -- it's the U.S. Navy's facility at 8 Guantanamo Bay, which is a U.S. state occupied area 9 on Cuba, and there is a landfill on that site. We 10 have done the design. I was the engineer of record 11 for the utility scale solar project on that, as well 12 as many other landfill-type applications. 13 So that's what a ballasted landfill solar 14 array would be. 15 Q As the engineer of record, do you 16 recommend the specific products your clients use 17 within their solar array? 18 MR. SCHMIDT: Object to form. 19 A We can offer that service if the client 20 doesn't know what to use. Our recommendations 21 really would be in the form of a documented, stamped 22 drawing, which would have detailed specifications on	56	1 ethics that we comply with that if you were to 2 somehow get fined in one state, they have a 3 clearinghouse that I would be fined in, say if I get 4 a \$5,000 fine, which would be a typical fine in 5 engineering, if I were to be fined in one state, I 6 could very easily be fined in every state. 7 So with 24 states times \$5,000, I have no 8 economic incentive whatsoever to do other than the 9 utmost design, and that would -- say commissions or 10 kickbacks or anything along those lines would not be 11 allowed. 12 And so the only compensation I get is 13 either a direct compensation, say a reimbursement 14 for travel. If I'm traveling to a conference or 15 something like that, I might be reimbursed by a 16 client, a developer who would like me to go to the 17 show to either meet with him. So that would be 18 direct reimbursement compensation for my expenses 19 without any markup. 20 Or I get compensation for my drawing 21 package, which would be the output of my work. Or 22 in the case of like the feasibility studies, this

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15 (57 to 60)

57	1 would be an hourly subject matter expert witness -- 2 not witness -- subject matter expert hourly 3 compensation based on the very high tier rate which 4 would be reflective of my competence. 5 Q So on page 13 of Exhibit 2059 you mention 6 your first introduction to CAB. Is that right? 7 A Yes. 8 Q Did you take any photos of the display 9 that you mention in paragraph 40? 10 A Not to my recollection. I would have 11 taken photos at that time -- this is a three-day 12 conference directly on the trade show floor, and, of 13 course, there is training before the show, the 14 exhibit. But, largely, my time was spent at the 15 trade show floor over a three-day period. So 16 certainly I would have taken photos of displays. 17 My target objective at the show was to 18 visit pretty much every single booth, because this 19 was not my first trade show, so I had learned really 20 how to operate, I learned the most I could over 21 those three days. 22 So I try to be very efficient, so I would	59	1 wouldn't want you to take a photo. So I would 2 definitely take photos with my cell phone. 3 Sometimes I never look at these again and sometimes 4 I would. But I would go through thoroughly and look 5 at things. 6 And on this, this would be the third day, 7 from memory, because my memory is that they tended 8 to be towards the farther side, which is not 9 uncommon for, say, first time vendors of a large 10 trade show, they don't get, you know, as good of 11 locations as others. So from memory, this was on 12 the third day, which tends to be a little quieter 13 day. At that point, largely, people are spent 14 having spent three days. I do not recall taking any 15 pictures of this. You know, while my first intent 16 was just to learn, observe, and those were my 17 observations, I don't recall having any photos. 18 Q You mentioned that there's a display of 19 single carrier hangers suspended from a strand of 20 wire that appeared to be intended to depict a 21 messenger wire. Is that right? 22 A Okay. Can you point me to the paragraph?
58	1 start in one corner of the trade show during the -- 2 now, this is not exactly my process. But my 3 original process as a thorough engineer, I would 4 start in one corner and I would go pretty much to 5 every single booth was my goal over the three-day 6 period. 7 And, of course, I quickly learned after 8 the first, you know, half hour of the trade show 9 that I could not talk to everyone, but I would try 10 to. I would try to at least observe, to find out is 11 this something that passes my smell test, if you 12 will, like my sanity check, is this something worth 13 talking to or not worth talking to. 14 So I would go through the booths, if I saw 15 something that, I was, like, well, I need a picture 16 of this because I'm going to either draw up a 17 combiner box, maybe I'm drawing up a combiner box 18 detail and I haven't used, for example, SMA, which 19 is the industry leader, and I hadn't used that 20 before, I would take a photo, asking permission, of 21 course. This is a public trade show, usually there 22 is no problem, but sometimes, you know, they	60	1 Q Paragraph 40, first sentence. 2 A Right. Yes. 3 Q What did those single carrier hangers look 4 like? 5 A So, again, this would be a visual that 6 pretty much did stick in my mind, so I do have 7 pretty good recall of what this looked like. 8 So you asked specifically about the 9 hangers. Now, at that time I would not have known 10 what they were called, but now I do know what 11 they're called, which basically would be a saddle, 12 right, a coated single section saddle, and in this 13 case it was black for the coating. 14 And does that describe accurately what 15 you're looking for? 16 Q I think I understand. Yeah, I think I 17 understand. 18 Prior to seeing CAB's display, in your 19 experience, regardless of industry, had you been 20 aware of messenger wires before? 21 MR. SCHMIDT: Objection to form. 22 A Yes, as an engineer I'm familiar with the

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16 (61 to 64)

61	1 term "messenger wire." I could not tell you when I 2 first became aware of that term, but that is a 3 fairly standard term, "messenger wire." 4 Q As an engineer, are you aware of how 5 messenger wires are typically used? 6 A A messenger wire, by definition, messenger 7 is a carrier, if you will, so it would support -- it 8 would support something, right. And it's a wire so 9 it would be tensionally strong, so strong in 10 tension. So if you had to span an area, it would be 11 a means of support. 12 Q Do you know if messenger wires are used in 13 the electric utility industry? 14 MR. SCHMIDT: Objection to form. 15 Foundation. 16 A Yes. 17 Q How are messenger wires used in the 18 electric utility industry? 19 A The most common would be for a tension 20 wire. So this would be a support wire for like a 21 guy wire, if you will, so you're going to support a 22 utility pole.	63	1 suspended from a strand of wire? 2 MR. SCHMIDT: Objection. Form. 3 Foundation. 4 A So can you be more specific? Or repeat 5 the question? Because I don't know if I understood 6 what you said, what they were -- what your question 7 was what were they trying to sell, and I guess I 8 missed the first part. 9 Q At the 2013 SPI trade show, do you recall 10 if CAB was attempting to sell its system of hangers 11 suspended from a strand of wire? 12 MR. SCHMIDT: Same objection. 13 A So I guess I wouldn't know what they were 14 attempting to do. But my observations were that I 15 saw the mock-up. I was not sure what they were 16 selling. I didn't know their services, their 17 product. 18 At the trade show there's all sorts of 19 vendors; some sell products, some sell services, 20 some sell advisory services. You know, you name it, 21 it's at the trade show if it's at all related to 22 solar would be my assessment, because it takes three
62	1 Q Are you aware of any other uses of 2 messenger wires in the electric utility industry? 3 MR. SCHMIDT: Objection to form. 4 A For residential application you'll use a 5 messenger wire to span for a telecom support cable 6 or an electrical cable. 7 Q In residential applications, how does the 8 messenger wire support the telecom cable or 9 electrical cable? 10 A Simply, you would be fastened at two 11 different ends the span, that would be the span and 12 the utility, who is not necessarily governed by the 13 electric code, right. These are non-NEC code type 14 of standards. Utilities have their own 15 requirements. And I'm not a utility expert, so I 16 don't do utility exclusive designs. But my 17 understanding, as an engineer, based on purely 18 observations, would be that they take the AC cable 19 and they would spiral it, if you will, around the 20 messenger wire for support. 21 Q At the 2013 SPI trade show, do you recall 22 if CAB was attempting to sell its system of hangers	64	1 days to walk the show. 2 So with that, I was not specifically aware 3 what they said. But I, obviously, did have 4 conversation with the CAB representative, and I 5 don't recall specifically him saying, like, they're 6 trying to do this or that. 7 But I do know that they were a new entrant 8 into the market, and I wouldn't say what they were 9 trying to sell was a system or a specific product. 10 Q But CAB did attend the trade show to sell 11 something, right? 12 MR. SCHMIDT: Objection. Form. 13 Foundation. 14 A I guess I can't answer their motivation. 15 But, I mean, obviously, I would say I would expect 16 it was a service for a product, right. And so 17 having talked to him, I would assume they were 18 trying to sell some sort of product in some form, or 19 at least I should say market. I don't know 20 "selling" would be the right term. 21 Q So in paragraph 50 on page 16 of Exhibit 22 2059, you mention Bill Brooks, right?

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17 (65 to 68)

65	1 A Yes. 2 Q Who is Bill Brooks? 3 A So Bill Brooks, I'm going to reference 4 this from at the time my knowledge of Bill Brooks, 5 Bill Brooks is a professional engineer. I would 6 have first found his name in the literature, 7 particularly SolarPro Magazine, which my company and 8 my colleagues in the industry would refer to it as 9 we call it the Bible of solar energy. And in that, 10 jokingly as we would say, of the disciples that 11 wrote the Bible, various chapters, in our mind, Bill 12 Brooks, he was the top. 13 And for me, as a professional engineer, 14 he -- he's highly inspirational. And so when I 15 would read his articles, it made me know that I was 16 on the right track. If he said something, it was -- 17 it was something that was worth rereading. And we 18 would read that magazine religiously when it would 19 come into the office. 20 I managed four engineers typically at a 21 time, younger Bachelor engineers, Bachelor in 22 Science engineers, with, you know, a handful of	67	1 learn about updates in the industry, but also to 2 hear lessons from the experts like Bill Brooks. 3 Q Did you ever work with Bill Brooks on a 4 white paper? 5 A No. 6 Q Has Bill Brooks authored a white paper for 7 you? 8 A No. 9 Q How often does Bill Brooks author white 10 papers for industry participants? 11 A I couldn't answer -- 12 MR. SCHMIDT: Objection. Beyond the 13 scope. 14 A Yeah, I don't have any knowledge of Bill 15 Brooks, I really don't know him personally. I have 16 met him once after for a training course that he was 17 offering at the Anaheim Convention Center at 18 Renewable Energy. Now the name is Renewable Energy 19 Plus, but the name at that time was Solar Power 20 International. 21 Q In paragraph 53 on page 17 of your 22 declaration --
66	1 years of experience. That's why I was hired in as 2 chief engineer, to oversee their work. And when the 3 magazine would come in, pretty much all work in 4 engineering would stop. This is a publication that 5 would come in the mail, a physical copy, and we each 6 had our own copy because no one wanted to share, and 7 we would read these articles. 8 And SolarPro, my hardhat would have a 9 SolarPro label on it that we got from the magazine 10 because it was that inspirational. And Bill Brooks 11 was often a featured editorial writer, or he would 12 be interviewed and questioned and he would give very 13 good guidance and instruction, as well as the entire 14 magazine, right, there was very high quality, very 15 high quality. 16 And it's just not a commercial literature 17 pitch piece. When we say it's the Bible, like, why 18 do we say that? It's really because it's written by 19 multiple people, there are multiple viewpoints in 20 the article, and Bill Brooks would have been one for 21 those quality viewpoints. So that's why it was so 22 valuable to us; one, to learn about the industry,	68	1 A Can you give me the paragraph? 2 Q 53. 3 A Okay. 4 Q You state, "I began advocating for the use 5 of CAB's system on solar projects for which Tropenas 6 was consulting." Is that right? 7 A Correct. 8 Q What do you mean by advocating? 9 A Advocating in this definition would be 10 incorporating and convincing clients that this would 11 be a proven solution for their project, and so 12 suggesting its use in implementation for an 13 efficient design. And this would be a strong 14 emphasis, right, because we have much feedback. 15 I had mentioned before that we solicit 16 feedback from the installers. And on our very first 17 project that we implemented CAB, we implemented that 18 question session follow-up after the project. In 19 fact, we didn't even have to wait to the end. We 20 were getting positive feedback on its use, so much 21 positive feedback, that we were told in engineering 22 how come we haven't been using this before because

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18 (69 to 72)

69	1 this was such an improvement. 2 And so with that advice from the 3 installation teams, we would advocate, which was 4 basically communicating to their bosses, their 5 superintendents, to their -- as an engineer, we 6 would interface frequently with the senior 7 management of companies, and we would tell them the 8 stories that we got from the field. And we would 9 then recommend that on the next project we would 10 implement the same system based on its technical 11 results. 12 Q When did you first use a CAB system in a 13 solar project? 14 A The first implementation I believe is 15 referenced -- yes, this would be paragraph 54, at 16 the Oak Ridge National Laboratories in Oak Ridge, 17 Tennessee. Again, to clarify, this was not the same 18 Oak Ridge National Laboratory project that I 19 mentioned that later, many years later I was a 20 subject matter expert; a totally different client. 21 But on the Oak Ridge National Laboratories 22 there is a site that the, for lack of a better word,	71	1 So with that approach, because we analyzed 2 our different possible methods to for conductor 3 management, and our knowledge of CAB at that time -- 4 of course, we had not had positive feedback from the 5 installers, but we analyzed it, we looked through 6 code-type questions, and we decided that we should 7 implement this. 8 And so we thoroughly investigated it. We 9 learned through the installation manual. We read 10 the codes, we tried to apply the relevant codes, 11 which was hard to do, because, you know, it's not -- 12 it's what I'll call a new system. So as a new 13 system, there was not a lot of guidance for us, so 14 we had to use our best guess. 15 But that was the first site that we 16 implemented CAB on. 17 Q In 2015, the Oak Ridge National 18 Laboratories installation, what types of cables was 19 the CAB system supporting? 20 A Largely, these would have been the DC home 21 runs, and I'm thinking there was probably a 22 communication cable and an equipment ground
70	1 business development team at Oak Ridge had turned 2 this land, they wanted to turn it back over for 3 commercial and industrial use back to the public, 4 because it was reclaimed land from the World War II 5 era of nuclear bomb development. 6 And so as part of that, since this was 7 what I'll call a highly uncertain time frame of what 8 they were doing at that facility, we could not take 9 any risks, and we were not allowed to take any risks 10 of what was below the surface. 11 So this would be, as we described, a 12 landfill situation, in fact, a very extreme landfill 13 situation for sure. And so as part of that, there 14 were probably six, six- to twelve-foot diameter 15 concrete entombed I'm going to call them duct banks, 16 because it would just be a large open container that 17 they were using for whatever purpose in the nuclear 18 World War II era when they were developing the bomb. 19 So the seal that they had permanently entombed it in 20 concrete, so not only could you not penetrate the 21 area due to potential hazards, physically you 22 probably couldn't penetrate the area anyway.	72	1 conductor. 2 Q Was the CAB system supporting -- bear with 3 me one moment. 4 Was the CAB system in this installation 5 supporting solar module DC wires? 6 MR. SCHMIDT: Objection to form. 7 A In the terminology that we used earlier 8 where we were making a distinction between layman 9 terms, DC cables and home runs, I think the answer 10 would be no. The CAB system was utilized for home 11 runs, which are DC cables, but it's a specific -- 12 it's a specific form. 13 Q Was the CAB system supporting an equipment 14 ground conductor in addition to the DC cables? 15 A Yes. 16 Q How was the CAB system supporting an 17 equipment ground conductor in addition to the DC 18 cables? 19 A It would be no different than supporting 20 the PV cable. These would have been -- by code we 21 have to include an equipment ground conductor with 22 the PV cables or the home runs, I'll just call them

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19 (73 to 76)

73	1 PV cables for short. So as we exit the array and go 2 into the inverters that we were connecting to, it is 3 required by code to include an equipment ground 4 conductor at that time. 5 Q Would the equipment ground conductor be 6 touching the DC cables in the -- 7 (Simultaneous speaking.) 8 MR. SCHMIDT: Objection to form. 9 A Yes, I believe -- I believe it would, 10 yeah. Yeah, we would not separate it. 11 Q From the time of purchasing of the CAB 12 cable management system to the time this 2015 Oak 13 Ridge National Laboratories installation was 14 operational, about how long did that take? 15 MR. SCHMIDT: Objection. Foundation. 16 A Can you repeat the question? 17 Q So I'm wondering how long was it between 18 the time the CAB management -- cable management 19 system was purchased and the time that the Oak Ridge 20 National Laboratories installation was operational 21 and generating power? 22 A So I couldn't comment because my job is	75	1 A Yes. 2 Q In your experience, does it take longer 3 than one year for projects that are larger than one 4 megawatt from the start of your involvement and your 5 engineering completion letter? 6 MR. SCHMIDT: Objection. Beyond the 7 scope. 8 A It's possible that it could take less or 9 longer. I probably have been involved on projects 10 that take less and I have been involved on projects 11 that are larger that take longer. 12 Q You mentioned the Guantanamo Bay 13 installation earlier, right? 14 A Correct. 15 Q What size was that installation? 16 A I believe that one is probably referenced 17 in my declaration on page 12, and if you look at the 18 fifth bullet point, it says 12 megawatts for the 19 U.S. Navy Guantanamo Bay, Cuba project, that would 20 be a 12 megawatt project. 21 Q Do you recall how long it was between when 22 you started your involvement with the Guantanamo Bay
74	1 not procurement, so I wouldn't have been aware 2 specifically when it was procured or starting 3 procurement or when it arrived. 4 However, you know, generally these 5 projects are approximately one year. 6 Q These projects are generally approximately 7 one year between procurement and bringing them 8 online, or between bringing them online and some 9 other point in time? 10 MR. SCHMIDT: Objection. Form. 11 A I can comment on my involvement with the 12 project. And in general, the one megawatt project, 13 which this was my involvement, would be 14 approximately one year. This would be, say, from 15 start of design until my -- what I'll call it my 16 engineering completion letter, right, which we would 17 sign off and say that we are complete with our work. 18 And we won't sign off until a project has been 19 electrically inspected, so theoretically it's 20 operational at that point. 21 Q Have you worked on projects that are 22 larger than one megawatt?	76	1 project and your engineering completion letter? 2 A So Guantanamo Bay project would probably 3 be somewhat of an anomaly compared to a traditional 4 utility scale project. So I will caveat this answer 5 for that. I don't want to say that working on U.S. 6 Navy projects on a remote island would be 7 representative. 8 And my involvement in the Guantanamo Bay 9 project probably was larger than my typical role as 10 an engineer of record. So with that, I started the 11 Guantanamo Bay project earlier on, before it was 12 even a commercially viable project, right. This was 13 in a bid, a bid process to the government by higher 14 tier subcontractors, and so I was a lower tier 15 subcontractor giving advice on early drawings. 16 So with that, our rule of thumb is 17 military projects take four times as long as a 18 typical project, and in this case it was not four 19 times. So I would say my total involvement in that 20 project probably was three years. Most of that time 21 was not directly involved in construction and 22 construction support.

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20 (77 to 80)

77	1 Q The Guantanamo Bay project, what types of 2 wires did the CAB cable management system support? 3 A Let me refer to my document because I 4 think I discuss the timing. 5 Okay. So I'm going to reference page 19, 6 paragraph 62 where I start in 2020, we recommended 7 CAB's aboveground cable management system and the 8 integrated grounding system for installation on a 9 project used at Guantanamo Bay. 10 So with that, that's the kind of the 11 primary reference point. 12 Can you repeat the question so I make sure 13 I answer specifically what you asked? 14 Q For the Guantanamo Bay project, what types 15 of wires did the CAB cable management system 16 support? 17 A So we used the CAB management system on 18 three different locations of the 12 megawatts. So 19 this would be somewhat known as three different 20 sites all within -- contained within Guantanamo Bay. 21 So specifically on the first site, not 22 that there's any particular order to the site, but I	79	1 this case, unlike the earlier project, which did not 2 have integrated grounding, where we had to use a 3 separate equipment ground conductor, this new 4 method, this new improved system, if you will, 5 followed the proper installation procedures and the 6 guidance from white papers and the installation 7 manual and interpretation of the code allowed -- and 8 the listing document that CAB had tested the UL or 9 equivalent -- I'm going to call it UL because it's a 10 laboratory document -- that they test the procedures 11 of its implementation, test their system. 12 So all that said, that does not require an 13 equipment ground conductor because the system serves 14 that function. So with that, we would just install 15 DC conductors. 16 Q I think you mentioned that there were 17 three different sites. Would this -- was the last 18 part of your explanation in reference just to that 19 first ballasted landfill site or was that in 20 reference to all three sites? 21 A Largely, that would be all three sites. 22 Site 2 would be a similar size. This site 2, it's
78	1 will just describe them as site 1, site 1 was a 2 ballasted landfill, which would have been part of 3 the Guantanamo Bay that had been filled in as a 4 landfill waste area to make room. So this is a very 5 shallow fill-in of the ocean in the bay. 6 So as such, it was inadvisable to have any 7 sort of underground conduit in low lying areas. So 8 we supported the entire wire structure from the 9 array area. So this array area would have been on 10 the landfill cap. We needed to get the electricity 11 off of the cap so that we could enter the electrical 12 equipment, which in this case would have been an 13 inverter. 14 So what we did was we put the cables in 15 the CAB messenger hanger system and the system -- 16 well, I would say a couple components of the system, 17 to help clarify what wires were in there, we would 18 use multiple section hangers and we would put in DC 19 cables in those. 20 And fortunately, this project, they had 21 their new system in place which implemented the 22 grounding system, the integrated grounding. So in	80	1 different characteristics. It was not a landfill. 2 However, it was a, for lack of a better description, 3 an impenetrable, very solid coral deposit, if you 4 will, almost a rock-type structure. This was 5 approximately 50 to 100 feet cliff, if you will, off 6 of the ocean. Protected ground, pretty much not 7 impenetrable, but expensive to penetrate. 8 So a traditional method in the industry is 9 to trench with conduit. That was cost prohibitive 10 at that time considering -- considering kind of the 11 extreme nature of this project. It's a remote 12 island, everything you purchase has to go through 13 the government and shipment, so, you know, your 14 costs are higher than, say, a normal project. 15 So with that said, it is slightly 16 different characteristics. But the solution was 17 actually the same, which is one of the benefits of 18 the CAB system is its more universal implementation 19 ability. So the solution was no different in terms 20 of implementing that between the first site and the 21 second site. 22 The third site was a larger site. It was

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21 (81 to 84)

81	1 -- again, no site is the same. This was larger, it 2 had more rolling terrain, as well as unknown 3 underground obstructions. This had been used as a 4 military encampment. And so, again, penetrations 5 were not prohibited, but the solution determined 6 that CAB also was the proper solution for this as 7 well, the CAB system. 8 So in this case, from memory, I'm trying 9 to visualize the hangers' design that we used. I 10 believe it was identical other than maybe the 11 quantity in the path, if you will, that the 12 conductors would take. 13 But at a high level, the three sites from 14 a CAB system perspective are similar. 15 Q So across all three sites, it allowed you 16 to have a consistent aboveground cable management 17 system that didn't require penetrating the ground? 18 A Correct, in addition to probably other 19 benefits. 20 Q You mentioned an Exhibit 2060 in your 21 declarations. 22 A Yes.
82	1 Q Is that right? 2 A Yes. 3 MR. DIXON: Can we please bring up 4 Exhibits 2060. I believe they were filed using the 5 same exhibit number in the 178 and the 139 IPRs. 6 Q Do you have them in front of you, 7 Mr. Novak? 8 A Yes. 9 Q Are the Exhibits 2060 identical in both 10 IPRs? 11 A To my knowledge, yes. 12 Q And this is a copy of the February-March 13 2013 edition of SolarPro Magazine? 14 A Yes. 15 Q Did you have a copy of this magazine in 16 your possession in 2013? 17 A Yes. 18 Q And this is that copy? 19 A This is a duplicate copy. So I would have 20 had the published version that came in the mail. 21 And this specific PDF version would have come from I 22 have a personal account with SolarPro Magazine at
83	1 the time and also today, even though it's no longer 2 a publication for whatever reason. As early as 3 maybe earlier this year I still had an account, I 4 used my old email and access and I could download 5 archives for convenience. But it is basically the 6 same document, and I would maintain PDF copies on my 7 hard drive, as well as physical copies in my file 8 cabinets. 9 Q Paragraph 46 you cite to page 33 of the 10 Exhibit 2060. Is that right? 11 A Okay. So I'm on page 33. And then I 12 assume you're correct. I don't know what paragraph 13 were you referencing in the other exhibit. 14 Q Paragraph 46 of your declaration. 15 A 46. Okay. Yes, so this references page 16 33. 17 Q And throughout your declaration you 18 reference this article pages 32 -- that starts on 19 pages 32 and 33 of Exhibit 2060, right? 20 A Correct. 21 Q The second sentence in the body of this 22 article on page 33, do you see where it says, "PV
84	1 module leads can be sometimes too long or too short, 2 requiring site specific solutions for supporting and 3 interconnecting cables"? 4 A Yes, the second sentence, yes. 5 Q What does that mean, for the PV module 6 leads to be too long or too short and requiring site 7 specific solutions? 8 A So a PV module, again, is a manufactured 9 component, essentially, for layman's terms, a small 10 sheet of plywood, say approximately 3 feet by 6 11 feet, again, nominally. 12 So with that, there is a positive and a 13 negative lead and that would be called a PV module 14 lead. So this sentence references those leads. And 15 why they have plural is there's a positive and a 16 negative on each module, and the manufacturer 17 assembles that product and they include a 18 manufacturer PV module lead, they make those in 19 bulk. So they don't customize the lead length for 20 the project in order for cost, you know, reasons, 21 properly. And so sometimes, by the project, they're 22 going to be smaller or shorter or longer than you

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22 (85 to 88)

85	1 need. 2 And so due to code compliance, all cables 3 have to be supported and secured. I say all in the 4 terms of almost certainly all cables. A very short 5 cable may not need that. But in practical purposes 6 for a solar project, all these cables in some form 7 will need both supporting and securing. 8 Q Have you ever used CAB systems to support 9 PV module leads? 10 MR. SCHMIDT: Objection. Foundation. 11 A Not to my knowledge the module leads. 12 (Simultaneous speaking.) 13 A Let me -- so in different iterations, the 14 CAB system is pretty universal, and so I wouldn't 15 want to prohibit that as an exclusion. And I'm 16 specifically thinking of a tracker system. Again, 17 at this time, at this time the answer would be no. 18 But I have had a long career in solar. So if you 19 want to rephrase the question to a specific time. 20 If it's open to all time, I would say it's possible 21 that a PV module lead could be supported in the CAB 22 system.	87	1 To date, have you ever used a CAB 2 messenger wire-based system to support PV module 3 leads? 4 MR. SCHMIDT: Objection. Form. 5 A So I'll try and be specific again. I 6 think this will repeat and reiterate what I said. 7 But the PV module leads in the definition, 8 my understanding of the definition of this sentence 9 is specifically referring to those that are too long 10 or too short. So that, to me, implies fundamentally 11 that this is a manufactured part, and by definition, 12 that would be the PV module lead. And for your 13 clarity, these would be lengths of less than three 14 feet. They could be -- in modern days, a PV module 15 lead might be as small as three inches, very short. 16 At the time of reference from this article, they 17 would be equivalently a little over the length of a 18 module either in the X or the Y-axis. So, again, 19 I'm going to say nominally three feet. 20 So these PV module leads, by definition, 21 are intended for the purpose of string connections 22 module to module to module. So they're intended to
86	1 Q To date, have you ever used a CAB 2 messenger wire-based system to support PV module 3 leads? 4 A To the best of my recollection, 5 specifically the PV module leads, I cannot think of 6 a specific example where the PV module lead by its 7 exact definition has been installed in a project 8 that I have designed as an engineer of record. 9 Q So I think you just testified "To the best 10 of my recollection, specifically the PV module 11 leads, I cannot think of a specific example where 12 the PV module lead by its exact definition has been 13 installed in a project that I've designed as 14 engineer of record." 15 MR. SCHMIDT: Objection. Form. 16 Q Would you like to clarify the answer to 17 explain how that relates to the CAB messenger 18 wire-based system? 19 MR. SCHMIDT: Objection to form. Asked 20 and answered. 21 Q So maybe I'll just re-ask my question to 22 make it a little bit clearer.	88	1 just make those connections. It would not be 2 intended to leave the vicinity of the array. 3 And so, therefore, my answer is there is 4 really no need to put them in a product such as CAB 5 system, which is really intended, although it is a 6 very flexible system as we've experienced -- I'm not 7 saying you couldn't put it in there -- but I'm 8 specifically saying the PV module lead in this form, 9 considering that I'm a very thorough engineer, is 10 not commonly used in such a system because the CAB 11 system is really designed for what the PV module 12 lead interconnects to, which would be a DC home run, 13 or other longer type device. 14 Q Okay. So on page 34 of Exhibit 2060, do 15 you see a section in the lower left-hand part of 16 this page that says "The Consequences of Poor Wire 17 Management"? 18 A Okay. So can you direct me again to which 19 paragraph? 20 Q So it's on the lower left-hand side of 21 page 32 of the original SolarPro Magazine, page 34 22 of Exhibit 2060.

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23 (89 to 92)

89	1 A Okay. 2 Q And that's titled "The Consequences of 3 Poor Wire Management." 4 A Yes. Okay. I'm with you. 5 Q This is authored by Bill Brooks, right? 6 A At the bottom of this section, which is an 7 insert, if you will, into the standard article, 8 there is a quote by Bill Brooks where he says, "New 9 mistakes are invented every day." My understanding 10 would be the quote would be by Bill Brooks. I could 11 not attest that the surrounding text would be by 12 him. I wouldn't say it is or isn't, but it's not 13 clear to me. 14 Q This running text is written in the first 15 person, right? 16 A This running text defined as the first 17 sentence under "The Consequences of Poor Wire 18 Management" where it starts "I have done quite a few 19 fire investigations," and so certainly the words "I 20 have" is first person. 21 Q None of the other parts of the article are 22 written in the first person, right?	91	1 author, Tommy Jacoby, wrote this inset section "The 2 Consequences of Poor Wire Management"? 3 A I personally don't know her, I don't know 4 her full background other than what is written in 5 this article. So I really do not have an opinion or 6 know a proper way to assess that. 7 Q So in this inset, the last sentence of 8 that introductory paragraph says "All of the 9 following practices have caused fires in the field." 10 Is that accurate? 11 A Okay. So you're back to "The Consequences 12 of Poor Wire Management"? 13 Q Yes. 14 A Yes, so it says "All the following 15 practices have caused fires in the field," yes. 16 Q So these are examples of poor wire 17 management practices in the field. Is that 18 accurate? 19 A I could spend the time to read all the 20 inserts if you wish. Would you like me to do that? 21 Q Yes, please. 22 A Okay.
90	1 MR. SCHMIDT: Form. 2 A I could not answer that because I have not 3 reviewed the quotes. There are quotes from people 4 that says "I have witnessed." So I am not claiming 5 to be a grammar expert. 6 Q Those other first person statements are in 7 quotation marks, right? 8 A Of the ones that I see quickly. I would 9 be happy to spend more time to read this and inspect 10 it. But I also do see non-quoted "I's" for example, 11 on page 36 of -- not of the -- I'll give the numbers 12 of the exhibit, not the article itself. 13 So if you look at page 36 of 84, on the 14 left-hand column where it says "Industry Input and 15 Best Practices." And then if you look at the second 16 line, which is in the first sentence, it says, "I 17 asked several industry colleagues to share their 18 experience and expertise in PV wire management." So 19 I assume that is by the author and that is in first 20 person, as I would interpret it. And I think my 21 English teacher would be proud. 22 Q Do you have any reason to believe that the	92	1 Okay. So I've completed reading that. 2 And your question, if you could just remind me, 3 since it's been some time since your question. I 4 want to make sure I answer it properly. 5 Q Does this section of page 34 of Exhibit 6 2060 list examples of poor wire management practices 7 in the field? 8 A Those -- that is a listing, in my 9 interpretation of the first person article, article 10 being defined as this one small subsection where it 11 lists these bullet points, I would interpret this 12 as, according to the author of this section, which I 13 cannot determine who that was, that that would be 14 their description of the following practices that 15 would have caused fires in the field. 16 Q Do you agree that this section lists 17 examples of poor wire management practices? 18 A I would agree that the listing is -- 19 definitely includes poor wire management practices 20 for sure. 21 Q That first bullet point, it references 22 USE-2 string conductors.

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24 (93 to 96)

93	1 (Court Reporter clarification.) 2 Q So let me restart my question. 3 In the first bullet point it references 4 USE-2 string conductors. Is that right? 5 A Correct. 6 Q Are USE-2 string conductors the same as 7 solar module DC wires? 8 A No, they would not be the same. I would 9 say similar and could be one representation of a 10 system, but it's clearly not the same or it would be 11 called -- it would be called -- it would not be 12 called USE-2, it would be called PV home run or PV 13 wire. There's a different technical definition of 14 these wires. 15 Q What is a USE-2 string conductor? 16 A Okay. So, first of all, let me separate 17 it. In terms of string conductor, string conductor 18 is definitely, in PV terminology, since this is a PV 19 article, I could make the leap that this is 20 referring to PV conductors, okay, in the general 21 sense. Specifically, this is I'm going to call 22 USE-2 as an adjective to string conductors. So it's	95	1 perspective, although clearly would have a different 2 use in the generic sense, not the capital USE sense. 3 Q When you reference PV cable in your 4 answer, are you referring to all different types of 5 PV cables including feeder cables, or are you 6 specifically referring to module cables? I'm just 7 trying to get a sense of what you're referring to in 8 your response. 9 MR. SCHMIDT: Objection. Form. 10 A So PV -- I'm sorry, did you say PV feeders 11 or PV conductors? I missed that part. 12 Q Maybe a cleaner way to ask is: Are USE-2 13 string conductors used as home run cables? 14 MR. SCHMIDT: Objection. Foundation. 15 A I would say they probably could be used 16 under certain circumstances. 17 Q Are USE-2 string conductors typically used 18 as home run cables? 19 MR. SCHMIDT: Objection. Form. 20 A I would say not typical. This -- this 21 terminology is kind of a carryover from older 22 versions of the code where -- a USE-2 is a good
94	1 a specific descriptor of a type of wire of a type of 2 string conductor. 3 So USE-2 is a very specific type of cable, 4 and so it would be a conductor surrounded by a 5 particular type of insulation, electrical 6 insulation. 7 Q Where are USE-2 string conductors used in 8 a PV array? 9 A In certain classifications of projects at 10 certain times throughout the code you can use USE-2 11 string conductor. So it would be used in this case 12 -- again, they are not defining all examples. 13 They're just coming up with one case. 14 In layman's terms, assuming the code 15 allows, which would be a certain series of 16 conditions of voltage and current and whatever 17 classifications of the site, you would be able to 18 use either a USE-2 or PV cable. In layman's terms, 19 they are eerily similar. 20 But, obviously, since you asked the 21 question, they are different. But I'm going to say 22 they are pretty much the same from a layman's	96	1 quality cable. UV cables now are better. And so 2 this is kind of a legacy-type word in order to allow 3 systems to interconnect. Nowadays I don't really 4 see the significance. A lot of this is still 5 carried over. PV cable can be listed as USE-2, but 6 PV cables are tested to a higher standard. 7 So I don't want to say it's irrelevant, 8 but, largely, these I think from the perspective of 9 time, that this is simply really trying to forget 10 the descriptor. It's really just trying to say in 11 this note it's a string conductor for the purpose of 12 wire management. It makes no difference whether 13 it's a USE-2 or a PV cable, in my opinion. I think 14 it's just they are trying to indicate a specific -- 15 a specific type of cable. And no matter what word 16 you put in there as a descriptor, anything that 17 comes in -- I'm trying to do the larger context 18 versus just the one phrase that is in the sentence. 19 Any conductor you put in contact with 20 sharp edges is going to be electrical or wire 21 management practice. So I don't think this USE-2 is 22 of significance.

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25 (97 to 100)

97	1 Q What is a string conductor more generally, 2 not limited to USE-2? 3 A The string conductor would be string in 4 being the PV module system, a string by definition 5 is multiple PV modules connected in series. 6 So, for example, just to give you a 7 physical example, on a resident's house there might 8 be, say, five of these modules connected in series 9 with a string conductor. On a utility scale project 10 there might be 20 of these string conductors because 11 you're allowed different voltages. 12 So simply put, it is the conductor that 13 takes the energy from the PV module either through 14 the PV module lead or and/or the home run. Anywhere 15 that there's conduction, which is energy transfer, 16 electrical energy transfer in a wire typically, 17 that's what they're using as this term. 18 Q Okay. I think I understand. 19 MR. SCHMIDT: Will, I'm sorry, I was just 20 going to flag you for a break for lunch soon if 21 that's -- 22 MR. DIXON: I'm actually hoping to wrap up	99	1 A As I read this, the sentence verbatim, it 2 says, "Not properly identifying conductors and 3 incorrectly polarizing combiner boxes, creating 4 array short circuits and combiner box fires." 5 Q What does it mean to incorrectly polarize 6 a combiner box? 7 A Polarizing is positive and negative. So 8 with the DC conductor, if you have a positive and a 9 negative, so you switch the two, that would be 10 incorrectly polarizing. 11 Q So this bullet is discussing a situation 12 where someone has inadvertently switched the 13 positive and negative -- 14 (Simultaneous speaking.) 15 (Court Reporter clarification.) 16 Q -- positive and negative of the DC 17 conductor. 18 MR. SCHMIDT: Form, and the document 19 speaks for itself. Sorry about that. Sorry, I cut 20 you off there, Will. 21 A Okay. So can you read the question so I'm 22 up to speed on it?
98	1 before lunch. I'm very close, so I was pushing to 2 try and finish. 3 MR. SCHMIDT: Do you have just a general 4 estimate? 5 MR. DIXON: Probably 20 minutes at most. 6 MR. SCHMIDT: Could we do like a 7 five-minute bio break? 8 MR. DIXON: Sure. We can go off the 9 record. 10 (Recess 12:31 p.m. - 12:41 p.m.) 11 BY MR. DIXON: 12 Q So before the break we were talking about 13 this section on page 34 of Exhibit 2060 titled "The 14 Consequences of Poor Wire Management." 15 Do you remember that? 16 A Yes. 17 Q In the second bullet it states, "Not 18 properly identifying conductors and incorrectly 19 polarizing combiner boxes, creating array short 20 boxes and combiner box fires." Is that accurate? 21 MR. SCHMIDT: I'm just going to object. 22 The document speaks for itself.	100	1 Q Is this bullet discussing a situation 2 where someone has inadvertently switched the 3 positive and negative of the DC conductor? 4 MR. SCHMIDT: Same objection. 5 A So in my opinion, this was written to 6 convey -- the not properly identifying conductors, I 7 believe that would be a reference to the incorrect 8 polarity. 9 So, typically, a conductor is going to be 10 labeled positive and negative. So should the 11 operator mis-identify and call the negative a 12 positive, and then the operator thinking that he is 13 connecting the positive labeled one when he thinks 14 it's the positive and he connects it to the positive 15 input. 16 So, again, this would purely be related to 17 incorrectly connecting a positive and a negative. 18 And I think that's fully descriptive of the full 19 phrase in its entirety at the bullet point. 20 Q In the third bullet point it references 21 thermal expansion fittings. What are those? 22 A Thermal expansion fitting is going to be a

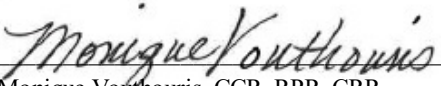
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26 (101 to 104)

101	1 manufactured part specifically designed for conduit 2 that, in my opinion, because they say in runs, 3 right, so when they say a run, that intellectual 4 contracting language of run is a run of conduit. 5 So improperly installing the thermal 6 expansion fitting is related to the expansion and 7 contraction due to temperature of conduit. And so 8 then they say "especially in runs that require 9 multiple fittings," so they're saying you might -- 10 someone might install something incorrectly, 11 especially in a run where they should do multiple. 12 So they would be referring to electrical conduit, 13 which is the primary means in the solar industry at 14 this time of running conductors. 15 Q So what role does a thermal expansion 16 fitting play in a conduit? 17 MR. SCHMIDT: Objection. Form. 18 A Thermal expansion for conduit fitting 19 would allow for movement without theoretical 20 breakage, right. So there's a specific product that 21 would allow proper thermal expansion. And this 22 device is designed, if properly designed, to take up	103	1 Okay. So can you repeat your question? 2 Q What are torque procedures for combiner 3 box terminals? 4 A So torque procedures for combiner box 5 would be the instructions to the electrical 6 installer to tighten, if you will, to tighten the 7 connection for a terminal, right. The technical 8 term would be a terminal. So in order to properly 9 connect the terminal to its implied conductor, you 10 need to have the proper torque procedure. 11 So a torque is a mechanical term which is 12 essentially, in layman's term, force, how tight are 13 you going to have this connection. And so in the 14 electrical code it requires certain ranges for 15 different sizes of connections. And so there are 16 proper torque procedures defined in the National 17 Electrical Code, as well as other standards, and/or 18 installation manuals for electrical equipment, the 19 equipment will specifically list the torque 20 procedures that a manufacturer has tested. 21 Q And if you turn to page 36 of Exhibit 22 2060, do you see the image with the caption "C'mon
102	1 and eliminate or reduce -- I should say reduce that 2 risk. 3 Q And then the third bullet from the bottom, 4 what does it mean to not fully seat a plug 5 connector? 6 A Okay. So a plug connector would be a 7 generic term for an electrical connector, right. So 8 you're trying to make a connection. So, again, you 9 have a wire, essentially a conductor, and it would 10 have a connector on it. And many of these 11 connectors, again, have to be fully seated or fully 12 engaged. If it's not fully seated, that would not 13 be complying with the installation manual, most 14 likely, for that product. And so by not fully 15 seating a plug-in connector or a plug connector, it 16 would not be properly installed. And so it's really 17 referring to improper installation of a conductor 18 connector. 19 Q And the last bullet of this section, what 20 are torque procedures for combiner box terminals? 21 A Okay. Let me read the entire sentence or 22 phrase and/or combination thereof.	104	1 man"? 2 A Yes. 3 Q According to the caption, this image 4 depicts a rooftop solar installation. Is that 5 right? 6 MR. SCHMIDT: Objection. The document 7 speaks for itself. 8 A Yeah, the image appears to depict a 9 portion of what appears to be a roof with solar 10 modules on top. 11 Q In your experience, are you aware of any 12 instance of a CAB system being employed on a rooftop 13 solar installation? 14 MR. SCHMIDT: Objection. Form. 15 Foundation. 16 A So, again, repeat the question for me. 17 Q In your experience, are you aware of any 18 instance of a CAB system being employed on a rooftop 19 solar installation? 20 MR. SCHMIDT: Same objection. 21 A No. 22 MR. DIXON: Okay. I have no further

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27 (105 to 108)

105	1 questions. 2 MR. SCHMIDT: Can we take 10? 3 MR. DIXON: No problem. 4 (Recess 12:51 p.m. - 1:15 p.m.) 5 MR. SCHMIDT: We have no questions. 6 MR. DIXON: Thank you for your time today, 7 Mr. Novak. Enjoy the rest of your day. 8 (Time noted: 1:15 p.m.) 9 10 ***** 11 12 13 14 15 16 17 18 19 20 21 22
107	1 I am not employed by or an attorney to any of the 2 parties to this action, and that I am in no way 3 interested, financially or otherwise, in the outcome 4 of this matter. 5 IN WITNESS WHEREOF, I have hereunto set my hand 6 this 15th day of October 2024. 7 8  9 10 Monique Vouthouris, CCR, RPR, CRR 11 Notary Public of the State of New Jersey 12 My commission expires: April 8, 2029 13 14 15 16 17 18 19 20 21 22
106	1 CERTIFICATE OF CERTIFIED SHORTHAND REPORTER 2 NOTARY PUBLIC 3 I, MONIQUE VOUTHOURIS, Certified Court Reporter 4 and Notary Public within and for the States of New 5 Jersey and New York, do hereby certify: 6 That JOSEPH WILLIAM NOVAK, P.E., MSE, MBA, 7 S.P., the witness whose remote deposition is 8 hereinbefore set forth, was duly sworn by me before 9 the commencement of such deposition, and that such 10 deposition was taken before me remotely and is a 11 true record of the testimony given by such witness. 12 I further certify that the adverse party, 13 Cambria County Association for the Blind and 14 Handicapped, was represented by counsel at the 15 deposition. 16 I further certify that the deposition of JOSEPH 17 WILLIAM NOVAK, P.E., MSE, MBA, S.P., occurred 18 remotely via Zoom Teleconference, on Tuesday, 19 October 8, 2024, commencing at 9:36 a.m. EDT to 20 1:15 p.m. EDT. 21 I further certify that I am not related to any 22 of the parties to this action by blood or marriage,

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