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IN THE UNITED STATES TAX COURT

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In the Matter of: )  
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 PRESTON OLSEN & ELIZABETH OLSEN, ) Docket Nos. 26469-14,  
 ET AL, ) 21247-16  
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 ) Petitioners, )  
 )  
 )  
 v. )  
 )  
 )  
 )  
 ) COMMISSIONER OF INTERNAL REVENUE, )  
 )  
 )  
 ) Respondent. ) Consolidated

Volume: 3  
 Pages: 447 through 537  
 Place: Provo, Utah  
 Date: January 23, 2020



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2

3 In the Matter of:

4 PRESTON OLSEN & ELIZABETH OLSEN, ) Docket Nos. 26469-14,  
ET AL, ) 21247-16

5

Petitioners,

6

v.

7

8 COMMISSIONER OF INTERNAL REVENUE,

8

Respondent. ) Consolidated

9

10 4th District Juvenile Courthouse-Provo  
11 137 Freedom Boulevard 200 W  
12 Courtroom #5B-5th Floor  
13 Provo, Utah 84604

12

13

January 23, 2020

14

The above-entitled matter came on for trial, pursuant  
15 to notice at 10:04 a.m.

16

17 BEFORE: HONORABLE ALBERT G. LAUBER  
Judge

18

APPEARANCES:

19

For the Petitioners:  
20 PAUL W. JONES, ESQ.  
HALE & WOOD, PLLC  
4766 South Holladay Boulevard  
21 Salt Lake City, UT 84117

22

For the Respondent:  
23 SKYLER K. BRADBURY, ESQ.  
DAVID W. SORENSEN, ESQ.  
INTERNAL REVENUE SERVICE  
24 OFFICE OF CHIEF COUNSEL  
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Salt Lake City, UT 84101



1 APPEARANCES (Cont'd):

2 For the Respondent:  
3 MATTHEW A. HOUTSMA, ESQ.  
4 INTERNAL REVENUE SERVICE  
5 OFFICE OF CHIEF COUNSEL  
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7 Denver, CO 80202  
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C O N T E N T S

WITNESSES: DIRECT CROSS REDIRECT RECROSS VOIR DIRE

FOR THE PETITIONERS:

Bryan Bolander 451 457 459,460 460

FOR THE RESPONDENT:

Thomas Mancini 463,484 502 519 472

Thomas Mancini 522 524 526  
(Rebuttal)



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E X H I B I T S

EXHIBITS:	IDENTIFIED	RECEIVED
147-R	484	486
148-R	526	526



1 P R O C E E D I N G S

2 (10:04 a.m.)

3 THE CLERK: All rise.

4 THE COURT: Please be seated. Good morning.

5 Mr. Jones, you have one witness left, I believe?

6 MR. JONES: Yes. Good morning, Your Honor.

7 Petitioners call Bryan Bolander to the witness stand.

8 And Mr. Bolander, you're going to be sworn in.

9 So if you want to continue to use your -- yeah. Raise

10 your right hand if you're ready.

11 BRYAN BOLANDER

12 having been duly sworn, testified as follows:

13 THE CLERK: Please state your name and address

14 for the record.

15 THE WITNESS: Bryan Bolander. 852 W. Clover

16 Blossom Circle, Emery, Utah 84123.

17 THE CLERK: Please be seated.

18 DIRECT EXAMINATION

19 BY MR. JONES:

20 Q Good morning, Mr. Bolander.

21 A Good morning.

22 Q Would you mind just telling us a little bit

23 about your educational background?

24 A Yes. I graduated with a bachelor's degree from

25 the University of Utah more years ago than I would care to



1 remember, started practicing with the public accounting  
2 firm in 1977, became the CPA in 1979.

3 Q Great. And do you have any professional  
4 licenses?

5 A Yes.

6 Q What are they?

7 A A CPA license from the State of Utah through  
8 DOPL.

9 Q And DOPL is the State of Utah's licensing?

10 A Division of Occupational Licensure (sic), yeah.

11 Q Okay. Great. And what's your current  
12 profession?

13 A I am practicing as a CPA with a firm called VCB,  
14 PC, of which I'm an owner.

15 Q Great. And that profession also includes the  
16 preparation of tax returns?

17 A Yes.

18 Q About how many tax returns do you prepare in a  
19 year, typically, I should say?

20 A I would say it's just myself, personally,  
21 somewhere between 175 to 200. I looked at my log for last  
22 year, and it was 199.

23 Q Okay. Great. And do you know Preston Olsen?

24 A Yes.

25 Q And did you prepare tax returns for Preston



1 Olsen?

2 A I did.

3 Q Do you recall which tax years you prepared?

4 A There were three years; 2009, 2010, and 2011.

5 Q Okay, great. And were you aware that Mr.

6 Olsen's tax returns were selected for examination by the

7 IRS?

8 A Yes.

9 Q And how did you become aware of this?

10 A He informed that he had received notification

11 from the IRS. Since I had prepared the returns, I felt

12 obligated to represent him through that audit process and

13 the appeals process. And so there was a power of attorney

14 put in place so that I could do that.

15 Q Okay. Did you reach out to Mr. Olsen, or did he

16 reach out to you, or?

17 A There would not have been any notice come to me

18 until the power of attorney's in place. So I believe he

19 reached to me.

20 Q Okay. And can you maybe just to describe to the

21 Court and to me what your role was during that exam

22 process; like, what did you do?

23 A Obviously, as the IRS wants to look at returns

24 that are filed and so forth, particularly ones that I

25 prepared, I was to provide documentation, information,





1 contracts, other information that I had had available to  
2 me when I was preparing the return to show them why I put  
3 what where on the return, and all of that, so that I would  
4 take significant documents into the audit and provide them  
5 with everything that they needed.

6 Q Okay.

7 A Then I would be involved in face-to-face meeting  
8 with the original auditor.

9 Q Okay.

10 A And other conversations later with the appeals  
11 officer.

12 Q Okay, thank you. Did you receive requests for  
13 information of documents from the IRS?

14 A Yes.

15 Q Okay. And what did you do when you received  
16 those requests?

17 A Obviously, it was my responsibility to gather  
18 the information together and provide it to them. Some of  
19 those items, I personally took down there in a face-to-  
20 face meeting. Other items, I would either mail or email  
21 to them.

22 Q Okay. And would you communicate with Preston  
23 during this time?

24 A Yes.

25 Q Do you recall if Preston participated in the



1 exam process?

2 A He did not. One of the sayings that CPAs like  
3 to believe is that anybody that takes their client to talk  
4 to the IRS is a fool. So we normally do not do that  
5 unless there are special circumstances that justify that.  
6 So I was representing him.

7 Q And how would you communicate to Preston what  
8 was going on in the exam?

9 A Either through phone conversations or email.

10 Q Okay. And he was generally informed?

11 A Uh-huh.

12 Q Great. Are you aware of any requests or  
13 documents that were missing; in other words, was there  
14 anything the IRS felt was lacking that you could not  
15 provide?

16 A Well, it's really, really hard to bring  
17 everything into an audit circumstance and have you have  
18 absolutely everything. So I would take notes and say, in  
19 addition we need this and this and this this, and provide  
20 it later. So I'm sure there some of those requests. I  
21 can say without reservation that I provided them  
22 everything that they requested of me.

23 Q Okay. And was the exam process generally  
24 cooperative?

25 A Yes.



1 Q Were there any time where you refused to provide  
2 information to the IRS?

3 A No. No.

4 Q Anything that they accused you of not providing?

5 A No, not that I'm aware of.

6 Q Okay. I'm going to kind of transition to more  
7 of a general topic now about the type of advice you would  
8 provide to Preston Olsen. So did Preston Olsen ever ask  
9 you for any advice?

10 A Yes.

11 Q And what type of advice did he ask you for?

12 A It would be similar type of advice that I would  
13 offer to any client that I prepare tax returns for. I  
14 mean, they would come with specific questions about part  
15 of their circumstances, situations. And I would respond  
16 to that. Often, I would prepare a preliminary tax  
17 estimate to give them an idea of what their tax liability  
18 would be, those kinds of things.

19 He would have questions. He had specific  
20 questions in our three years we were dealing with each  
21 other about this specific purchase of the solar lenses.

22 Q Okay.

23 A And to the best of my ability, I would respond  
24 to those.

25 Q Okay. And what type of advice would that



1 include?

2 A It would be, like I say, part of the tax  
3 estimates, saying if you purchased a certain amount of  
4 units, what would that do for him, taxwise, those kinds of  
5 things. I would respond to questions that he had and to  
6 tell him that, based on his tax circumstance, the solar  
7 lenses may or may not benefit him.

8 Q Okay. Anything else, any other types of advice?

9 A Not that can I recall.

10 MR. JONES: Okay. Thank you. That's all I  
11 have.

12 THE COURT: Cross-examination?

13 CROSS-EXAMINATION

14 BY MR. HOUTSMA:

15 Q Mr. Bolander, you didn't claim to be, but I just  
16 want to be clear, you're not an expert in solar power  
17 generation, are you?

18 A No. When I was asked originally to prepare  
19 returns, I spent a lot of hours researching the solar  
20 credit and how that all worked and everything else before  
21 I agreed to do returns for these people. So I became much  
22 more of an expert than I was originally. But I do not  
23 classify myself an expert, per se.

24 Q And if you turn to Exhibit 12-J -- there's a  
25 binder in front of you; does it says Volume 1?



1 A Yes.

2 Q It says that the parties have stipulated this is  
3 Preston Olsen's equipment purchase agreement for the first  
4 purchase of 2009.

5 A Yes. Um-hum.

6 Q So you see there; it took place on July 23rd,  
7 2009. You didn't speak to Mr. Olsen before July 23rd,  
8 2009?

9 A No. The first contact I had with him was when  
10 we were preparing 2009 returns during the first part of  
11 2010. So he had already purchased these.

12 Q Just one more brief topic, Mr. Bolander. You  
13 didn't provide any emails that Preston Olsen either sent  
14 to or received from Greg Shepard or Neldon Johnson, or any  
15 of the people involved with RaPower3 to the IRS during the  
16 exam process, did you?

17 A There were some that I had received from Preston  
18 directly. There may have been a few that Greg Shepard or  
19 RaPower3 sent out that I provided him, but it would not  
20 have been a major number. I didn't have access to  
21 everything that he sent to his customers.

22 MR. HOUTSMA: All right. I have no further  
23 questions.

24 Thank you, Mr. Bolander.

25 MR. JONES: I just have one follow-up on



1 redirect.

2 THE WITNESS: Yes.

3 REDIRECT EXAMINATION

4 BY MR. JONES:

5 Q Were you asked by the IRS examiner to provide  
6 emails from Greg Shepard?

7 A That would've been something that probably  
8 would've come about in the meeting itself. So I don't  
9 recall exactly how many. But I would assume that it  
10 would've been a few. That would've been one of the things  
11 that they would've asked for if I had it available to me.

12 Q Okay. And so were there any follow-ups on that?  
13 Why haven't you provided this, can I get a copy; was there  
14 anything like that?

15 A There would be requests made and notes made.  
16 And then I would normally send it right back to them if I  
17 had it available to me.

18 Q Were you aware of anything else outstanding  
19 that --

20 A No, no.

21 Q -- that was not provided? Okay. Thank you.

22 THE COURT: Yeah, I have a few questions on  
23 that. So you're saying that at some point, the IRS agent  
24 did ask you to produce any emails between Mr. Olsen and  
25 the principals of the solar power?



1 THE WITNESS: They asked about certain aspects  
2 of solar power, and I did have available to me some emails  
3 from Greg Shepard that either Preston provided or Greg  
4 provided to me, because I'm acquainted with Greg, that  
5 might've supported whatever the IRS agent was looking for.

6 THE COURT: And did you ask Mr. Olsen if he had  
7 additional emails that you were in possession of?

8 THE WITNESS: I didn't specifically ask him  
9 about that, and they did not pursue that with me.

10 MR. HOUTSMA: Just a tiny bit or recross, Your  
11 Honor.

12 RECCROSS-EXAMINATION

13 BY MR. HOUTSMA:

14 Q You didn't ask Preston Olsen to go back and  
15 search his emails from starting in 2009 for any emails  
16 that might be relevant to this case, did you?

17 A No.

18 MR. HOUTSMA: Okay. No further questions.

19 FURTHER REDIRECT EXAMINATION

20 BY MR. JONES:

21 Q When you said, they never pursued that, so was  
22 that something where they said, hey, you're not providing  
23 this and why aren't you, and was there a follow-up, or was  
24 the issue dropped?

25 A Actually, I provided the limited amount that I



1 did have. There was never any question about them wanting  
2 anything else, that I can recall.

3 MR. JONES: Okay. Thank you.

4 MR. HOUTSMA: No more questions, Your Honor.

5 THE COURT: Okay. More?

6 MR. HOUTSMA: No, none at all. Thank you.

7 THE COURT: Okay. Mr. Bolander, thank you for  
8 your testimony; you are dismissed.

9 THE WITNESS: Thank you.

10 MR. JONES: Petitioners have no further  
11 witnesses and rest.

12 THE COURT: You rest. Very good.

13 MR. JONES: I guess, I just said I rest, and I  
14 apologize. I'm just going to do a housekeeping question.

15 THE COURT: Okay.

16 MR. JONES: So in terms of our Stip of Facts, I  
17 think there was only one exhibit that was excluded. We  
18 haven't gotten to Dr. Mancini. But other than that, it's  
19 all submitted, right? I mean, in other words, for our  
20 record, we've got our Stip of Facts, right?

21 THE COURT: Yeah, I mean, I made sort of a  
22 blanket ruling that all relevancy objections --

23 MR. JONES: Right.

24 THE COURT: -- to any exhibits that concern the  
25 email communications or promotion materials were



1 overruled. And I believe you confirmed it --

2 MR. JONES: Correct.

3 THE COURT: -- that covered all of those.

4 Everything in the binders is in. The report of Mr.

5 Gardner is in. The report of the four engineers is not

6 in. And 146-R, I think, was that the one that was marked

7 but not admitted.

8 MR. SORENSEN: The only question I would ask is

9 there were two or three videos that were unable to

10 accessed on the --

11 MR. JONES: Yes. And may I provide that to the

12 Court. There's no dispute about what it is. May I

13 provide the Court with, maybe I'll mail in a flash drive?

14 THE COURT: Yeah, sure.

15 MR. JONES: Is that okay?

16 THE COURT: That's fine. Just mail it to my

17 chambers.

18 MR. JONES: Okay. And we have no dispute that's

19 in as well, so.

20 MR. SORENSEN: No. We have access to them; we

21 just couldn't load them.

22 MR. JONES: Right, right, right.

23 THE COURT: Right.

24 MR. JONES: Okay. Thank you.

25 THE COURT: Okay. That sounds fine.



1 MR. JONES: Sorry for that.

2 MR. BRADBURY: Respondent calls Dr. Thomas  
3 Mancini.

4 THE CLERK: Please raise your right hand.

5 THOMAS MANCINI

6 having been duly sworn, testified as follows:

7 THE CLERK: Please state your name for the  
8 record.

9 THE WITNESS: Thomas R. Mancini, 9924 Lorelei  
10 Lane, Albuquerque, New Mexico.

11 THE CLERK: Please be seated.

12 THE WITNESS: 87111.

13 DIRECT EXAMINATION

14 BY MR. BRADBURY:

15 Q Dr. Mancini, please introduce yourself to the  
16 judge.

17 A My name is Tom Mancini. I'm a mechanical  
18 engineer.

19 Q Would you please give a brief overview of your  
20 formal education?

21 A I have a BS, MS, and PhD in mechanical  
22 engineering.

23 Q Where did you study?

24 A Colorado State University.

25 Q And you earned all three degrees from Colorado



1 State University?

2 A I did.

3 Q When did you earn your PhD?

4 A That would be 1975.

5 Q What did you do after earning your PhD?

6 A I took a job as an assistant professor in New  
7 Mexico State University in Las Cruces.

8 Q How long were you a professor?

9 A I was an assistant, associate, and then a  
10 tenured full professor at New Mexico State over a ten-year  
11 period.

12 Q When did you become a tenured professor?

13 A Oh, let's see. That would be 1980. I might be  
14 off on that, but I think that's right.

15 Q What courses did you teach?

16 A I taught in the thermal science area, heat  
17 transfer, fluid mechanics, applied mathematics,  
18 experimental methods. Because I was doing a lot of  
19 research work in solar energy, I taught solar energy  
20 courses, including one solar power course. And let's see.  
21 I taught undergraduate and graduate level courses. And I  
22 think that's about -- oh, I also taught a course in the  
23 honors curriculum.

24 Q What was solar power like back in 1980?

25 A You know, it wasn't all that different from what



1 it is today.

2 Q Really?

3 A Except you didn't have people actually trying to  
4 develop it. The systems that I'm going to talk about, we  
5 all understood them at that time. It's just a question of  
6 how do you bring things into the commercial domain.

7 Q In what year did you stop teaching?

8 A That would be about 1985.

9 Q What did you do after leaving New Mexico State?

10 A Actually, I took a year sabbatical and went to  
11 work at Sandia National Laboratories. I had been doing  
12 some consulting work with them on a solar power project.  
13 And there appeared to be an opportunity for me to go  
14 there, and I wasn't sure I wanted to leave academia  
15 because I enjoyed what I was doing, but. So I took a  
16 sabbatical for a year. And after a year, they made an  
17 offer to me, and I decided to take it.

18 Q What is Sandia?

19 A Sandia is one of the government laboratories,  
20 one of the 13 government laboratories that do specific  
21 work for the Department of Energy and also for Department  
22 of Defense and other agencies. It's referred to as a  
23 government contractor, GOCO. We aren't government  
24 employees. We work for the laboratory. But virtually all  
25 the work is somehow sanctioned by the government.



1 Q Well, what sort of projects did you work on?

2 A Well, I joined a solar-thermal power group which  
3 is a CSP group. And my initial charge was to develop  
4 solar concentrators. So I did a lot of research on solar  
5 concentrators and worked with industry people who were  
6 developing solar concentrators which is, really, that was  
7 one of the reasons that I left the university. I found  
8 the interaction with people who are actually trying to do  
9 something more interesting to me as an engineer than just  
10 teaching and doing research.

11 Q What were some of your roles at Sandia?

12 A Well, I came in as a project lead which was a  
13 senior position and continued in a project lead role over  
14 different areas, including dish engine development and  
15 some systems analysis work. My last role was as the  
16 program manager for the CSP program. And I did that from  
17 about -- that was about eight years I was the program  
18 manager.

19 Q How many employees did you manage?

20 A There were about 20 at that point.

21 Q When did you leave Sandia Laboratories?

22 A I retired from Sandia in 2011.

23 Q And what have you been doing since 2011?

24 A I formed a consulting company, because I  
25 couldn't sit still, and I think my wife was happy I did.



1 But I formed a consulting company, and I started doing  
2 some consulting work.

3 Q What type of work do you perform as a  
4 consultant?

5 A For the most part, it's technical evaluation.  
6 I've had about 25 clients over the last nine or so years.  
7 Some of them had been small where they might have a  
8 concept that they wanted to have a little bit of an  
9 evaluation of, but they didn't want to spend a lot of  
10 money and a lot of time. So I'd help them out with that.

11 I've advised people on solar trackers. I helped  
12 one large company develop a molten salt pump. They were a  
13 pump company that wanted to get involved in providing  
14 molten salt pumps to solar projects. And so I helped them  
15 understand some of the requirements and maybe some of the  
16 things that aren't obvious about pumping a molten salt  
17 material.

18 Q Is most of your consulting work with the private  
19 industry?

20 A The majority of it has been, yes.

21 Q Do you do any other consulting work?

22 A I have done a little bit extra, witness  
23 testimony.

24 Q Let's talk about that for a minute. Have you  
25 been hired as an expert witness in any other cases besides



1 this one?

2 A I have actually been an expert witness on four  
3 other cases than this one.

4 Q What are those cases?

5 A Three of them were similar cases having to do  
6 with suits against the Kingdom of Spain over a change in  
7 tariffs that they implemented on solar plants that were  
8 installed in Spain. And I was asked to testify on behalf  
9 of the owners of those plants at the International Court  
10 of Arbitration.

11 Q Were you qualified as an expert in those cases?

12 A Yes.

13 Q You mentioned four cases. That was three;  
14 what's the fourth case you've been an expert?

15 A The fourth case was the injunction case that's  
16 related to this one.

17 Q And in the injunction case against the promoters  
18 of the tax-avoidance scheme at issue here, did the  
19 District Court accept you as an expert witness?

20 A They did.

21 MR. JONES: I just object to the inflammatory  
22 nature of that statement.

23 THE COURT: I hear you.

24 MR. BRADBURY: Sorry. I forgot, the promotion.

25 BY MR. BRADBURY:



1 Q Have there been any negative consequences from  
2 testifying as an expert in the injunction case?

3 A I have received a summons.

4 Q From who?

5 A From Mr. Neldon Johnson.

6 Q Who else was part of that case?

7 A The summons actually had about 18 issues and  
8 included the Department of Justice and the judge.

9 Q And what's the status of that case?

10 A It stayed.

11 Q Do you know why it stayed?

12 A I think it stayed in order that the receiver  
13 could do his work, is what I was told.

14 Q Let's talk a little bit about the publications  
15 that you've written. What, if any, publications have you  
16 authored?

17 A There's a list of them in my CV. But I over the  
18 years authored reports on research work that I've done and  
19 projects I had been involved in. And there are probably  
20 70 or 75 that are relative to this CSP solar power area.

21 Q With which, if any, professional organizations  
22 are you affiliated?

23 A I've always been a member of the American  
24 Society of Mechanical Engineers. I've had some  
25 affiliations with solar organizations. But the two that





1 I've been most active in are the ASME Solar Energy and  
2 Heat Transfer Divisions. And the International Energy  
3 Agency's Solar Power and Chemical Energy Systems working  
4 group.

5 Q Is that called SolarPACES?

6 A Yeah, it's a mouthful.

7 Q What does SolarPACES do?

8 A SolarPACES is an interesting group. When it  
9 first started back in the early 1980s, it was just a loose  
10 association of people through the International Energy  
11 Agency who were interested in trying to transfer knowledge  
12 and help develop CSP solar power, not photovoltaics, but  
13 CSP solar power technologies to different countries that  
14 were interested in it. So there were half a dozen  
15 countries involved.

16 Over the years and, in fact, during the years  
17 that I was chairman, it grew to about 30 countries being  
18 members because of the growth in actual implementation and  
19 deployment of these systems. It's still minor in the  
20 scheme of producing power. But a lot of countries,  
21 particularly in the Middle East where they have a lot of  
22 solar energy, are interested in exploiting this resource.

23 Q You mentioned being a chair; what does that  
24 mean?

25 A Yeah, it's like herding cats. Well, we had an



1 annual conference. So the main activity is making sure  
2 that annual conferences are properly organized and held,  
3 but also making sure that there's some growth in the group  
4 and that we try to figure out how we can best work with  
5 industry to help and develop the technologies. And it's  
6 different in every country and even in every state in the  
7 U.S. So we have different outreach efforts in trying to  
8 develop new activities around that, so industry would come  
9 and ask for help in certain areas, and we try to figure  
10 out what the best way to help them would be and who would  
11 do it, those sorts of things.

12 Q How long were you a chair?

13 A I was a chair for eight years, until I retired.

14 Q You mentioned one other group, the American  
15 Society of Mechanical Engineers or ASME?

16 A Yes.

17 Q What, if any, designations do you hold with  
18 ASME?

19 A I am a fellow of ASME.

20 Q What is a fellow; what does that mean?

21 A It's recognition of your technical contributions  
22 to your area and your efforts on behalf of the society as  
23 well as society in general. And it represents about three  
24 percent of the membership.

25 Q In which area were you designated a fellow?





1 For example, the Western Governors' Association had an  
2 activity at one point where they were trying to enhance  
3 the deployment of different renewable technologies, and I  
4 did testify at these seminars at their meetings to try and  
5 explain what the technologies were, what the pros and cons  
6 were, what's involved in actually building a plant, that  
7 kind of thing.

8 Q Okay.

9 A So it's indirectly, but not directly in --

10 Q Do you have any direct experience --

11 A No, I have no direct experience.

12 Q -- in implementing a solar project, okay. In  
13 your report as I reviewed it, you talk a lot about phases  
14 of developing, so in other words, taking a project from, I  
15 believe you called it, the research phase to the market  
16 stage, 1 through 4; is that right? What type of expertise  
17 do you have in implementing something, a solar project  
18 through those stages?

19 A Well, first of all, what you're referring to is  
20 not unique to solar projects. Its' a general engineering  
21 approach to how you develop whatever it is your  
22 developing, whether it is a better nose-hair trimmer,  
23 whatever it is. The --

24 MR. BRADBURY: If you're qualified, I'm going to  
25 cross on nose-hair trimming, for sure. I'm just kidding,



1 so. But go ahead.

2 THE WITNESS: Yeah. I don't know why I picked  
3 that.

4 It's a standard engineering. And when you teach  
5 engineering courses often, you deploy some sort of a  
6 ladder like that. And most industries have their own  
7 version, and companies have their own version of that  
8 development ladder. But it starts out with a research  
9 phase, moves into what's often referred to as a  
10 development phase, where you're further developing  
11 whatever you narrow down in the research phase. Then you  
12 build a prototype and test it and evaluate it, and you  
13 probably iterate on that process. It's part of the  
14 engineering discipline that we teach in engineers. So it  
15 was taught by me and others in various forms in courses.

16 BY MR. JONES:

17 Q But it sounds like to me, you would admit that  
18 you don't have any expertise in this specific application.  
19 In other words, admittedly, you don't have any expertise  
20 in --

21 A No, that's not correct. Actually, in the work I  
22 was doing in Sandia, I was very involved in it. Companies  
23 would come to us at different stages in that process. And  
24 we'd help them either with their research, or if they had  
25 a development problem.



1 For example, a company came to us, and they had  
2 a problem. They were developing a complement, and it  
3 wasn't working properly. And part of the problem was the  
4 material selection for it. And so we looked at that and  
5 worked with them and called in some expert metallurgists  
6 from Sandia to help work with that. We identified another  
7 material that would work in that pump and make it work the  
8 way we wanted, so they didn't have to change the design or  
9 whatever. So that would've been at the development phase.

10 Furthermore, we had a company in Phoenix who was  
11 at, what I would call, at the final stage, the market-  
12 entry stage where you do sort of a demonstration project.  
13 And they built a plant with 40 systems in it, in Phoenix.  
14 And they wanted help in evaluating the performance of that  
15 plant. So we got involved with them at that stage. So  
16 actually we've worked in different phases, not necessarily  
17 develop a project of our own, but in helping them do that.

18 Q Just so I want to understand. So your testimony  
19 is that you're saying that you've worked in those areas in  
20 a piecemeal way, but you've never taken a project from  
21 start to finish?

22 A That's correct.

23 Q And would you agree that you don't have any  
24 expertise in doing that complete transition?

25 A I'll agree that I've never done that. I won't



1 agree that I don't have the expertise. I think I do.

2 Q Okay.

3 A I've worked in every level in different places.

4 Q Okay. But that work, you would agree, is in a  
5 piecemeal fashion?

6 A That's correct.

7 Q Okay. Do you have any other -- I mean, I guess  
8 I should put some background on this. When you're a  
9 mechanical engineer, what is that; what does a mechanical  
10 engineer do?

11 A That's a good question. There are two  
12 fundamental disciplines within mechanical engineering.  
13 One of them has to do with, what I'll call it, dynamics  
14 and structural analysis and moving structures, and the  
15 other is fundamentally thermal sciences. My  
16 concentration, even though I have some background in the  
17 other area, has always been in the thermal science area.

18 The thermal science area itself feeds directly  
19 into CSP solar energy because thermal processes are  
20 involved. And the whole process, for example, heat  
21 transfer is the study of radiation, convection, and  
22 conduction. Anybody that's had elementary physics  
23 remembers that. But radiation, sunlight is radiation.  
24 That conversion process to convert that, that's heat  
25 transfer. The power cycle, that's thermodynamics. I



1 mean, the application of the thermal sciences are all  
2 focused within the solar energy area, no pun intended.

3 Q Okay. And then you would agree you're not civil  
4 engineer?

5 A No, I'm not a civil engineer.

6 Q Right. And you're not an optical engineer?

7 A I have quite of bit a work in optics, but I  
8 don't have a degree in optics.

9 Q Okay. Can you explain what type of work have  
10 you done in the optic area?

11 A Well, a lot of the solar concentrators are  
12 reflective concentrators; the bulk of them are. And I've  
13 actually worked with refractive concentrators also. One  
14 of the clients, one of the industry people we worked with  
15 was developing a Fresnel lens solar concentrator for CSP  
16 applications back in the mid-1980s. So while I didn't  
17 understand a lot of the optics issues, as a PhD, we  
18 studied often other areas, and I studied that  
19 significantly and got to the point where I could deal with  
20 the issues and wrote computer programs and analyzed  
21 situations and worked with them on that.

22 Q Would you admit, though, that you're not an  
23 expert in optics?

24 A I'm not a degreed optical engineer.

25 Q Okay.





1 A Or physicist.

2 Q Okay. And what about a design engineer, would  
3 you call yourself a design engineer?

4 A All engineers at our level do design. It's just  
5 what happens. And the work I did was design-oriented,  
6 yes.

7 Q Okay. And so you would hold yourself as an  
8 expert?

9 A I would hold myself as designer and somewhat of  
10 an expert in design. I want to emphasize here; the design  
11 process often involves disciplines where you go to the  
12 specific discipline and ask for specific help. And I did  
13 a lot of that. A designing engineer does a lot of it.

14 Q Okay. And what expertise do you have in  
15 determining if something is commercial grade? You used  
16 that term. So what expertise do you have there, so?

17 A That's difficult to quantify, what you mean by  
18 commercial grade. The general consensus is that if you're  
19 out there selling it into the marketplace, regardless of  
20 the situation, whether it's subsidized or not subsidized,  
21 some people would say, if you're selling a subsidized  
22 product -- for example, if there's a tariff that allows  
23 you to sell solar energy within a certain country, like  
24 Spain -- they provided tariffs to increase the value of it  
25 to encourage people to build plants. But that's not really



1 commercial because it's a subsidized market. And maybe it  
2 is; maybe, it isn't.

3 In fact, the fact that they would get multiple  
4 bids on projects to build that, the fact they were being  
5 built using different processes, the fact that there were  
6 50 or 100 of them built seems to -- on a competitive  
7 basis, to me, would represent a commercial deployment. So  
8 I would feel that I understand that.

9 Q And is that your expertise, is your having given  
10 testimony about what commercial grade means in that  
11 Spanish case you were involved in?

12 A No, it is not. My responsibility in the Spanish  
13 case did not involve whether I thought it was commercial  
14 grade or not. In fact, I would say that both parties  
15 agreed to the fact that it was commercial grade. That  
16 wasn't the issue.

17 My particular responsibility there was to do a  
18 technical analysis of the plants. And there were multiple  
19 plants involved in each case, and there were three  
20 separate cases. So I had multiple plants to evaluate.  
21 And I evaluated their technical operation, their O&M  
22 costs, their actual O&M. I've reviewed any problems they  
23 had at the plants. Most of these plants have been  
24 operating for between five and ten years.

25 And the case was about the fact that the tariffs



1 were changed after the initial contracts were signed. And  
2 so the owners of the plants, which were typically pension  
3 funds and other consortia -- I'm sorry. Am I --

4 Q I'm actually going to stop you, if that's okay.

5 A Okay. No, that's --

6 Q I'm more interested in where you derive your --  
7 why you would hold yourself out as an expert to be able to  
8 say, this is a commercial-grade application.

9 THE COURT: Well, could I ask a question about  
10 that. It seems to me, commercial grade can be a lot of  
11 different things. On the one hand, an invention that has  
12 gone through all four stages of development and really  
13 works and is ready to be sold, you might say is  
14 commercial. When it's going to be highly profitable given  
15 the market and the competing products and the tariffs and  
16 the taxes, that's whole different question, right?

17 THE WITNESS: And that's why I said, I'm not  
18 aware of a good definition of commercial grade, what that  
19 means. And that's why I'm trying to qualify it a little  
20 bit here. But the work I did in those cases was technical  
21 work. It was not related to that.

22 Certainly, commercial grade has a lot to do with  
23 profitability and whether you can sell it in the open  
24 market. And you might try, and it doesn't work. And you  
25 don't make it.



1 BY MR. JONES:

2 Q So are you saying that aspect of it, whether  
3 this is commercially ready, that's not something that you  
4 feel like you could opine on because it's difficult?

5 A No. I'm saying I can opine on that because I've  
6 been through that process on multiple projects. And they  
7 might technically be at a commercial point, but the cost  
8 point isn't there. And so how you want to define that, I  
9 feel comfortable in saying that something will be  
10 commercial when it gets to that point and maybe make some  
11 sales even into a subsidized market.

12 Q Yeah.

13 A I feel comfortable doing it.

14 Now, the key metric here is not a technical  
15 metric. It's a combined metric. And we haven't discussed  
16 it in this case. It's the levelized energy cost. It's  
17 what the cost of producing electricity using your  
18 technology over the lifetime of the project. Most of  
19 these are big power plants. Their lifetimes are 25 or 30  
20 years.

21 Q Yeah. And --

22 A How much energy do you produce, and then the --

23 Q I appreciate that.

24 A Okay.

25 Q I apologize, because I'm asking it inartfully.



1 But I'm trying to figure out why is it that you can tell  
2 the Court, my opinion should count as an expert opinion as  
3 to the question about, is the technology commercially  
4 ready.

5 A Well, because I've done this dance multiple  
6 times with multiple companies and with given technology,  
7 in the CSP space.

8 Q And in those instances that you mentioned, you  
9 had to tell them your product's commercially ready?

10 A Sometimes, we had that discussion.

11 Q Okay. And give me what those are; give me the  
12 examples.

13 A Well, Stirling Energy Systems is an excellent  
14 example because it's pertinent to this particular case.  
15 they were developing a dish-Stirling system based on --

16 THE COURT: Is that Stirling engine?

17 THE WITNESS: We use as a Stirling engine.

18 THE COURT: Same thing, okay.

19 THE WITNESS: It doesn't use steam. It's  
20 different in that technology. That's correct.

21 And they had a large company of about 30, 40  
22 engineers and 50 technicians working on this project for  
23 about five years. And they didn't start from scratch.  
24 They bought an existing technology. And we worked with  
25 them the last four years of their project while they were



1 developing this commercial, what I call, a pre-commercial  
2 demonstration project in Phoenix. And they deployed 40 of  
3 these systems, which is about a megawatt worth of power,  
4 in Phoenix, and were operating them.

5 And we helped them monitor the operation, the  
6 O&M. We helped them evaluate the performance. And at one  
7 point during that process, there was a major meeting with  
8 them and their corporate leadership, which was a company  
9 out of Ireland, that we participated in, to discuss  
10 whether they should go to the next level or not and  
11 actually start building these things.

12 Now, I didn't make that decision, but I was  
13 asked for input on it, and provided input on it.

14 BY MR. JONES:

15 Q Any other examples?

16 THE COURT: Counsel, I think this has gone on  
17 long enough.

18 MR. JONES: Okay. Thank you.

19 I would say our objection specifically is we  
20 don't believe he has the expertise to select personnel in  
21 projects. He doesn't have that commercial application of  
22 that. He's testified that way. There is a portion of his  
23 opinion that goes to that. I would say he does not have  
24 that expertise.

25 THE COURT: Well, I'll overrule that objection



1 and recognize Dr. Mancini as an expert in concentrated  
2 solar power, or CSP.

3 MR. BRADBURY: Your Honor, may I approach to  
4 have Dr. Mancini's report marked as an exhibit?

5 THE COURT: You may.

6 THE CLERK: Exhibit 147-R marked for  
7 identification, titled IAS Solar Dish Technology  
8 Evaluation.

9 (Whereupon, the Document referred to as Exhibit  
10 147-R was marked for identification.)

11 MR. BRADBURY: Thank you.

12 RESUMED DIRECT EXAMINATION

13 BY MR. BRADBURY:

14 Q Dr. Mancini, what did the IRS Office of Chief  
15 Counsel hire you to do?

16 A Well, you hired us to essentially be a source of  
17 information on concentrating solar power technologies and  
18 to review the technology involved in this case in light of  
19 the expertise that I have, and to determine whether the  
20 system, as proposed by IAS and RaPower3, would have  
21 produced electricity and provided it to the grid, and  
22 whether that system had the potential to become a  
23 commercial system.

24 Q How have you been compensated for this case?

25 A I've been paid on an hourly basis for my



1 services.

2 Q What is your hourly rate? What was your hourly  
3 rate when we entered the contract?

4 A That's a little bit of a sore -- \$300 an hour.

5 Q If you did work for both this case and the  
6 District Court case, how did you bill for that?

7 A Well, actually, that was an interesting point  
8 because I think I brought it up with you, that if I was  
9 going to do, that it made sense at least for the first  
10 draft of the report to be shared equally between the two  
11 cases. And I had a separate contract for the injunction  
12 case. And you and the attorneys for the injunction case  
13 agreed that we could do that. So my first draft or two,  
14 we shared the cost. And then since the injunction case  
15 was proceeding sooner than this case, costs after that  
16 relative to what I did for the injunction case,  
17 specifically, were charged only to them.

18 Q And work you've done specifically to prepare for  
19 this case has only been billed to the IRS; is that  
20 correct?

21 A That's correct.

22 Q How, if at all, is your compensation in this  
23 case contingent on the outcome?

24 A Not at all.

25 Q How, if at all, is your compensation in this





1 case contingent on the substance of your testimony?

2 A Not at all.

3 MR. BRADBURY: Your Honor, the Respondent moves  
4 that the expert report prepared by Dr. Mancini be admitted  
5 into evidence.

6 THE COURT: We will admit his report as 147-R  
7 into evidence.

8 (Whereupon, the Document referred to as Exhibit  
9 147-R was received into evidence.)

10 THE COURT: Counsel, is the exactly the same  
11 document that you lodged with the Court?

12 MR. BRADBURY: Yes.

13 THE COURT: Maybe that's because it's single-  
14 sided rather than double-sided?

15 MR. BRADBURY: Right.

16 THE COURT: Okay, right. It seems longer than  
17 what I had read before.

18 MR. BRADBURY: It is, yes.

19 THE COURT: Okay.

20 MR. BRADBURY: Yes. We weren't sure if the  
21 Court wanted it that way or not. So we did it single  
22 sided this time.

23 BY MR. BRADBURY:

24 Q Dr. Mancini, Judge Lauber has asked expert  
25 witnesses in this case to provide a brief executive



1 summary of your report; will you please do that?

2 THE COURT: And one thing I'm interested in, and  
3 you were here yesterday, right --

4 THE WITNESS: Yes, I was.

5 THE COURT: -- during Mr. Gardner's testimony?  
6 He made a number of observations of what he saw at the  
7 site during his site visits in 2015, 2017. How many  
8 visits did you make?

9 THE WITNESS: I made two.

10 THE COURT: Were they with him?

11 THE WITNESS: No.

12 THE COURT: You went at different times?

13 THE WITNESS: They were at different times. I  
14 was there in January of 2017 and in April of 2017.

15 THE COURT: Oh, so you were not there in 2015?

16 THE WITNESS: I wasn't there in 2015.

17 THE COURT: Well, I'd be interested to know at  
18 some point, either now or through questions, to know  
19 whether your observation's different from his in any  
20 respect.

21 THE WITNESS: Would you like me to respond to  
22 that right now?

23 THE COURT: Sure.

24 THE WITNESS: I think you're referring to  
25 observing the system operating. I found no evidence that



1 a system had ever been assembled or operated. There is no  
2 data in support of that, no photographs, no film.

3 THE COURT: They didn't show you a 30-minute  
4 demonstration?

5 THE WITNESS: They did not. When I was there,  
6 the system was not operational as a system.

7 THE COURT: Okay. Well, you can proceed to --

8 MR. BRADBURY: Your Honor, may I actually ask  
9 Dr. Mancini a couple of rebuttal witness questions now and  
10 then do his expert summary, or do you want me to do that  
11 after?

12 THE COURT: Well, maybe I jumped the gun on  
13 this.

14 MR. BRADBURY: You stole my thunder a little  
15 bit, yeah.

16 THE COURT: Why don't we let him do that later?

17 MR. BRADBURY: All right.

18 THE COURT: Why don't we just proceed with his  
19 executive summary of his report and then do cross-  
20 examination. And then you can put him on as a rebuttal  
21 witness.

22 MR. BRADBURY: Great, thank you.

23 THE WITNESS: I'm sorry. I may have encouraged  
24 that.

25 THE COURT: No, I encouraged that.



1 THE WITNESS: Could I set the record straight on  
2 something we've been hearing for a couple of days and make  
3 sure we're all on the same page?

4 THE COURT: Certainly.

5 THE WITNESS: I think we all understand that  
6 solar power can be reduced to either using photovoltaics  
7 or concentrating solar power. And I'd like to describe  
8 just briefly, and very briefly -- and I'm not a PV expert,  
9 and I'm not here as a PV expert. And I'm sure Mr.  
10 Gardner, wherever he is, will feel a twinge when I say  
11 what I'm going to say.

12 But PV fundamentally --

13 THE COURT: Just one caveat, right? Okay. I am  
14 a classics guy. The only science course I took in my life  
15 was Physics for Poets at Yale College. So you have to  
16 really dumb it down for me.

17 THE WITNESS: But you know, Thoreau knew a lot  
18 about physics.

19 Photovoltaics is basically an atomic-level  
20 phenomenon wherein solar energy hits the cell. It hits an  
21 electron loose, grabs that electron, flows through a  
22 circuit. And you can generate electricity with it.

23 THE COURT: Are those the big panels we see out  
24 in the desert from the airplane, right?

25 THE WITNESS: They're the flat ones you see on



1 rooftops, and they're flat for the most part. There are  
2 concentrating PV panels, but they're not as widely  
3 applied. I think Mr. Gardner did say that. And that's  
4 how PV works.

5           Solar thermal is very different. And I'll use  
6 an example to show how it's different. A coal-fired power  
7 plant, you burn coal. You use the heat from that  
8 combustion process to generate steam in a power cycle.  
9 And that power cycle is called the Rankine cycle in the  
10 power plant. And the steam is expanded through a turbine,  
11 spins the turbine, drives the generator, produces  
12 electricity to stick it on the grid.

13           And that steam, it's part of the cycle. It has  
14 to go back through a condenser where it's condensed and  
15 goes to a pump as liquid water, pumped back into the  
16 boiler. All we do in solar thermal power, whether it's  
17 used in a Rankine cycle or Stirling cycle, is replace that  
18 combustion process with the solar heat. That's all we do.

19           THE COURT: The sun replaces the coal,  
20 basically?

21           THE WITNESS: Yes. And now, there's a subtle  
22 difference here in the markup. Mr. Sorensen just recently  
23 put solar panels on the roof of his house. I'm going to  
24 guess that he has somewhere between three and seven  
25 kilowatts' worth of panels on his house to power his



1 house. He uses that photovoltaic power -- see, I can't  
2 say it -- photovoltaic power to either power the  
3 appliances in his house through an inverter power  
4 conditioning system, or to put power back on the grid.  
5 And he does it right there. And he's got a simple  
6 agreement to do that with the power company.

7 CSP power is nothing like that at all. It's all  
8 utility scales. We're talking about three to five, seven  
9 kilowatts in the case of Mr. Sorensen's house. You might  
10 see more of them on the roof of a building. You might see  
11 10, 15, 100 kilowatts. You might see a bigger one out in  
12 the desert that's 10, 12, maybe even 20 megawatts. That's  
13 about as big as they get.

14 Concentrated solar power, the smallest one  
15 you'll ever see is about a 50 megawatt. And more  
16 commonly, they want to be 250-megawatt power plants.  
17 They're huge. A 100-megawatt power plant is enough to  
18 power about 15,000 houses. So we're talking about utility  
19 scale, utility-grade power that would be put on the grid,  
20 but not at your house. It would have to go through a  
21 substation and have quite a few requirements met as part  
22 of Federal regulatory conditions on power, local, state  
23 regulations, whatever company you're selling to, before it  
24 can go on the grid. You don't just stick on a power pole  
25 by your house. It can't be done that way.

1                   So there are some subtle differences there. And  
2 I was starting to refer before to the levelized energy  
3 cost relative to commercialization. The idea of whether  
4 you can compete in the marketplace depends greatly on what  
5 kind of a cost you can actually show the potential buyer;  
6 how much is it going to cost to build that plant, to  
7 operate it for 30 years? And that involves all the O&M,  
8 all the insurance, everything that you have to do.

9                   THE COURT: Mr. Gardner, I think, referred to  
10 some way, I think he said, of using a CSP in conjunction  
11 with photovoltaic.

12                   THE WITNESS: Yeah. There are photovoltaic  
13 devices. Again, I'm not an expert; I've been often saying  
14 that. Photovoltaic devices, if they heat up, their  
15 efficiency drops off. So they would have to cool --

16                   THE COURT: So if you had concentrated solar and  
17 you're trying to put in a photovoltaic, it would blow it  
18 up, right? It wouldn't work.

19                   THE WITNESS: If you what?

20                   THE COURT: If you concentrated solar image on a  
21 PV panel, it would like overheat and blow it up?

22                   THE WITNESS: Not necessarily.

23                   THE COURT: No? No?

24                   THE WITNESS: Not necessarily. It depends on  
25 the level of a concentration, and that's what he's talking



1 about. And that's why they like Fresnel lenses because  
2 they're not imaging concentrators. They give you a bigger  
3 area at a lower flux density.

4 But what he's referring to is that producing  
5 that electricity using maybe a concentrator, maybe a flat  
6 plane. But as that temperature goes up, they have to be  
7 cooled in order to operate more efficiently. And so you  
8 have to remove that heat. And so you have a cold  
9 application for that heat if you can. And so you're doing  
10 both heating and some sort of thermal process and the PV  
11 generation. And that's kind of clever. It's not  
12 necessarily easy to find an application that that applies  
13 to. But it's an interesting idea.

14 But what I was going to say, if you take this  
15 plant that costs so much to build and operate -- we're  
16 talking hundreds of millions of dollars here. And you  
17 divide how much it costs over its lifetime by the total  
18 power you produce, and you get a metric which is the true  
19 metric. And it's the cost per kilowatt hour of energy  
20 generated. And that you can do for any technology that's  
21 power generation. And the metric right now is for new  
22 coal plants is something like 12 to 15 cents per kilowatt  
23 hour. If you can show that your technology can produce  
24 100 megawatts and can meet that kind of cost point, you  
25 could potentially sell that technology, if you can



1 convince the people you're telling the truth.

2 So I just wanted to make sure we were on the  
3 same page because PV is not only different in how it  
4 works, it's different in sort of what the market segments  
5 look like. It has more value in the market segment it's  
6 in than a utility-scale power plant would have in this  
7 market. You could sell it for more because you're  
8 competing with the retail cost to the consumer of  
9 electricity, not the whole set of costs.

10 THE COURT: And what about the CSP technology  
11 dictates that you really have to have a big plant to  
12 implement?

13 THE WITNESS: Yeah, it's a scale issue.

14 THE COURT: Yeah.

15 THE WITNESS: If you don't, you can't get those  
16 costs down. That's fundamentally it.

17 THE COURT: Okay. I think that's enough for a  
18 beginning.

19 MR. BRADBURY: Yes, Your Honor.

20 THE COURT: Okay. Mr. Jones, you may cross-  
21 examine.

22 THE WITNESS: Well, did you want me to summarize  
23 what I did, or is that all --

24 THE COURT: Okay. Well, okay. If you do a  
25 little bit. Yeah, take a little bit more.



1 THE WITNESS: Okay.

2 THE COURT: Maybe it's --

3 THE WITNESS: Please? I practiced it last  
4 night. The --

5 THE COURT: I want to know, basically, what your  
6 basic conclusions were.

7 THE WITNESS: Yes. And I'm going to tell a  
8 little bit of a story here because I think it helps put a  
9 little more of a context for things. If I exceed my, what  
10 was it, 15 minutes, 10 minutes or whatever, let me know.

11 So I've already stated what the focus was. So  
12 what I was asked to determine was whether the system had  
13 ever actually produced power and put it on the grid.

14 When I got started, I, of course, went to the  
15 website, and downloaded all the papers, and read all that  
16 stuff. And we put together both with the injunction case  
17 and the tax case a list of information that I would like  
18 to seek to evaluate. That included things like power-  
19 purchase agreements. It included resumes for all the key  
20 players in IAS and RaPower3. It included a list of all  
21 the personnel that worked for them, what their job titles  
22 were. It included all the analysis and reports they've  
23 done.

24 In looking at the website, it seemed to me that  
25 this technology had been worked on for a number of years



1 and that it was pretty close to becoming something. And  
2 so I figured there was quite a body of engineering  
3 information available there. And I asked them to provide  
4 computer models, what different components did they  
5 consider for the different applications, what systems  
6 models did they have that helped them make the decision on  
7 the performance of the system was going to look like, what  
8 engineering drawings did they have for this package that I  
9 thought was fairly complete.

10 I'd expected to see -- and I was a little scared  
11 by this one -- 600 to 1,000 engineering drawings defining  
12 the concentrate of the receiver, the turbine, the power  
13 cycle, the controls, setup that would control the plant,  
14 all the detailed drawings.

15 I assumed that they probably had done a lot of  
16 tests, and they had a lot of discussion of tests, so I  
17 asked them for reports on all their test reports, on  
18 components, on the full system, and what it was doing, and  
19 all of that. So we requested all that information.

20 And I received over 26 -- I reviewed over 26,000  
21 documents, including photographs and other things, and did  
22 not see the level of detail that I expected to see. I saw  
23 no -- only a few engineering drawings, maybe 40, most of  
24 them partial drawings, not complete. I saw no test  
25 reports, and I saw no resumes for the people involved.



1           But as you mentioned, I did make two site  
2 visits, and I had about five hours of direct contact with  
3 Mr. Johnson to ask him a lot of questions. And I asked  
4 him some of those questions about that information and so  
5 forth, and was told relative to the drawings, he'd give me  
6 all the drawings. And I guess that's what I got.

7           And but he told me that he didn't keep test  
8 reports or make test reports; he didn't need to do that.  
9 And I asked him about the expertise he had involved, and  
10 he admitted he was not -- in deposition -- that he was not  
11 an engineer. He's not an educated engineer. He doesn't  
12 have a degree. And he couldn't point to anybody else.  
13 But he said I hire consultants, and that's an okay thing.  
14 But he never identified any of the consultants he hired.  
15 He did include some of the information into a couple of  
16 the documents I was able to use. But he never identified  
17 what was his or what was the consultant's work, and he  
18 never identified the consultants or their backgrounds. So  
19 I didn't have a lot to go on. And no tests, no test  
20 reports, no test documentation of any type.

21           So I took the path that, well, that he wanted  
22 the tables in his report, he showed what we call a  
23 waterfall chart. And it's a breakdown of how the system  
24 operates, starting with the solar energy hitting in the  
25 outside of the lens, going through its production of



1 electrical power.

2 And I said I can learn a lot by just modeling  
3 myself these individual components, since I don't have any  
4 data or any other information to tell me how they  
5 operated, and see what I can do, based on what little  
6 information I have.

7 So first I had to define what the system was.  
8 And I confirmed that with Mr. Johnson. At one point he  
9 told me that he was using a molten salt working fluid.  
10 Later he told me he had changed it back to using the hot  
11 oil. So I modeled the hot-oil system, and I modeled the  
12 system based on the diagram in his one report that was  
13 useful to me.

14 THE COURT: That was all to test the -- to  
15 analyze the potential --

16 THE WITNESS: Exactly.

17 THE COURT: -- commerciality of the process?

18 THE WITNESS: Trying to fold in as much  
19 information as I could gather from what I have. So I  
20 wasn't totally going from scratch, but -- and it wasn't an  
21 arduous process, and it was -- actually, I enjoyed doing  
22 it. But it pointed out four major shortcomings in the  
23 design that were what I would call fatal engineering  
24 errors. And one in particular, the turbine itself under  
25 the conditions of the hot oil wasn't going to operate, by



1 his own admission -- or his expert's admission in the  
2 report.

3 So after reviewing all of this, and I asked him,  
4 he said, yes, it did produce electricity, I could find no  
5 information that even indicated that all these components  
6 have been assembled into a system to produce electricity.  
7 There was nothing to support it.

8 I also took into consideration the fact that  
9 he'd been working on this for 17 years, and that the --  
10 from my understanding of the engineering process, he's  
11 still at the research phase. He's changing things all the  
12 time; I'm going to try this, I'm going to try that, oh, I  
13 can do this. And when I'd ask him a question about, well,  
14 wouldn't the receiver work better if you did this, and  
15 he'd say, well, I can do anything I want to do. They were  
16 still operating in this research phase. They hadn't  
17 even -- maybe ventured a little bit into trying to develop  
18 something, but they didn't know what they were developing  
19 because they hadn't defined it.

20 So based on that, and based on the fact of  
21 the -- I could find no evidence that a system had ever  
22 been assembled, that I concluded that they never produced  
23 electricity. And I think -- and provided to the grid, and  
24 I think that's been testified previously in this trial.

25 Now, the question on commercialization is much



1 harder, though, for me because you're trying to project  
2 that onto the future. And Mr. Jones' comments are  
3 defining what commercialization is is if there's no  
4 definition. My definition could be as good as your  
5 definition. The judge probably even has a poetic  
6 definition.

7 So that was all we're left. But I did -- I took  
8 one thing. I remember, actually, there was three issues  
9 that I had taken into consideration, and considered this.  
10 And that is the system, as defined, wasn't going to  
11 operate, and could it be made to operate? And I thought,  
12 yeah, it probably could be. I mean, there would have to  
13 be some changes to the turbine; the current turbine  
14 wouldn't work. But that could probably be done.

15 But I felt that the -- IAS and RaPower3 -- had a  
16 real -- they didn't have the intellectual capability.  
17 They didn't have the right people in the right training to  
18 take and define the concept and create and develop  
19 something that would work. I thought that there was -- I  
20 mean, there was no engineers working there. They weren't  
21 following an engineering process. Roughly -- with 12 or  
22 15 people with hired contractors to help.

23 THE COURT: But the lens itself, was that  
24 clever? Was that inventive?

25 THE WITNESS: I thought it was inventive. I



1 thought it was really clever. I had my concerns about it  
2 relative to some of my past experiences. And they were  
3 actually held out because the size of the image is way too  
4 large. And there is a trade-off between the optical and  
5 the -- you still have to worry about efficiency. High  
6 efficiency doesn't mean you're automatically a winner  
7 because the cost has to be played in, right? And you have  
8 to look at the LEC as the metric to levelize (sic) energy  
9 cost.

10 But considering what Mr. Johnson had, if he  
11 hired a whole bunch of people and really went to work for  
12 five years, he could probably produce a system that would  
13 generate electricity. Would it be a commercial system?  
14 The efficiency of the system we're talking about here is  
15 very low. It's probably four times lower than the dish  
16 Stirling system I was talking about earlier that Mr. Jones  
17 asked me about. And those people decided they couldn't  
18 compete on a commercial basis, so they weren't willing to  
19 take the risk. And after that meeting, they sold off the  
20 equipment and the technology.

21 There are no commercial dish systems operating  
22 today. The reason for that is fundamentally -- and I've  
23 always been a proponent of dish systems. I mean, I ran a  
24 dish program for a number of years at Sandia. And I  
25 always loved it. I was having too much fun. The





1 shortcoming is the operation and maintenance cost and the  
2 scalability aren't there. And based on all of those  
3 reasons, I reached the conclusion that it's certainly  
4 unlikely -- and I even allowed myself to say never would  
5 be a commercial system.

6 THE COURT: Okay. So thank you.

7 THE WITNESS: So that's my summary.

8 THE COURT: All right, thank you. Any cross-  
9 exam, Counsel?

10 MR. JONES: Thank you.

11 THE COURT: Do you want to take a break before  
12 we do that?

13 MR. JONES: If you'd like to, that would be  
14 fine. I can proceed either way. It's up to the Court.

15 THE COURT: Okay.

16 THE WITNESS: I'm fine.

17 THE COURT: Go ahead then. Let's take a five-  
18 minute break.

19 MR. JONES: Five-minute break?

20 THE CLERK: All rise.

21 (Whereupon, a recess was held from 11:13 a.m.  
22 until 11:21 a.m.)

23 THE CLERK: All rise.

24 THE COURT: Yeah. Please be seated.

25 CROSS-EXAMINATION



1 BY MR. JONES:

2 Q Thank you for the information you provided so  
3 far. I'm just going to ask you a few questions. And I  
4 did graduate with a degree in accounting, but I'm probably  
5 a little bit like the judge where -- definitely not an  
6 engineer. So I'm going to go over some concepts, just to  
7 make sure that I'm understanding what I think I  
8 understand, consistent with your understanding; is that  
9 okay? Yeah?

10 A Yes.

11 Q Okay. Thank you.

12 THE COURT: You have to answer his questions,  
13 right?

14 THE WITNESS: What I understand --

15 MR. JONES: Yeah.

16 THE WITNESS: -- consistent with your  
17 understanding.

18 MR. JONES: Yeah. Maybe, you see, that's how  
19 bad it is. I can't even ask a good question. So -- okay.

20 BY MR. JONES:

21 Q So in your report you speak a lot about the  
22 utilization of the Rankine cycle in this system; is that a  
23 fair statement?

24 A That's correct.

25 Q Okay. So I understand that a power cycle or a



1 thermodynamic cycle is basically the process of taking  
2 mechanical work, and that transfers into energy. And the  
3 way that's done is that there -- heat is created somehow,  
4 and that heat is transferred. So like in the Rankine  
5 cycle there's a use of a boiler, right, and it creates  
6 steam. And so vapor is what pushes the turbine blades.  
7 And that is the mechanical work that you can hook to a  
8 generator, and that will generate electricity. Is that --  
9 did I explain that correctly? Is that --

10 A I think it's not a bad explanation.

11 Q Not a bad explanation?

12 A Yes.

13 Q Okay. And --

14 A B-plus.

15 Q B-plus? Thank you. That's actually pretty  
16 good. B-plus. That's good. Okay. So I want to just  
17 talk about the lenses here. So you -- I think that we  
18 have, from what I've heard in your testimony, in what's  
19 said in your report, we really don't have a disagreement  
20 that those Fresnel lenses can be used to generate heat.

21 A I'll take just a little bit of a license with  
22 that. They're not really generating heat. They're  
23 concentrating existing -- the sunlight. Okay?

24 Q Okay. That's fair.

25 A That -- but yes, that's what they're doing.



1 Q That's fair. So they -- in other words, the sun  
2 shines, the light rays come down, they are -- the lenses  
3 are in the ring, and they refract light into a  
4 concentrated area. That concentrated area produces heat.

5 A It produces heat -- it becomes hot when  
6 something absorbs it. Yes.

7 Q Okay. Thank you. This is an example of --

8 A It's semantics a little bit, because what you're  
9 saying I would agree with, but it's not what the process  
10 is, right?

11 Q Okay.

12 A The air will absorb that heat, and it will be a  
13 little hotter there. You wouldn't stick your finger in  
14 there, not because the air is hot, but because the sun is  
15 hot, and when your finger absorbs it, it would disappear.

16 Q Okay. I think I understand. Well, can you  
17 clarify that? What do you -- so meaning that -- maybe I  
18 didn't understand. So you said that -- or maybe can you  
19 restate, because I'm not sure I understood what you just  
20 said. I apologize.

21 A I was just saying that the air does absorb the  
22 heat -- the sunlight, and make it hotter in that area.  
23 But it's not a lot hotter. So that if the sun were away,  
24 and you just put your hand in that air, that it would  
25 necessarily bother you.



1 Q Okay.

2 A But you would never stick your hand into the  
3 beam itself because your hand then would absorb --

4 Q Oh, I see.

5 A -- and convert --

6 Q I understand now what you're saying.

7 A -- convert that energy --

8 Q Yeah.

9 A -- into heat and cook you.

10 Q You would burn yourself, in other words.

11 A You'd burn yourself.

12 Q Okay. I'm sorry. I was --

13 A Yeah, I --

14 Q -- lost in translation. I'm sorry.

15 A I'm probably gaming semantics games here, and  
16 I'll try not to do that.

17 Q That's okay. Okay. So again, it sounds like we  
18 don't have a disagreement with the ring. The ring with  
19 the lenses on it comes to a focal point where there is  
20 heat absorption. And so from that point, do you believe  
21 that it's possible to implement any number of different  
22 systems that might generate or that would generate  
23 electricity?

24 A Yes. I mean, I think the discussion yesterday  
25 about maybe putting photocells at that location or



1 something like that, although there are other issues and  
2 so forth. Yes. The answer to that is yes.

3 Q Okay. Great. And so the statement about -- and  
4 I think -- I don't want to jump ahead either, but the --  
5 we're all kind of agreeing that these lenses can be used  
6 in a system. And I think you take exception to it being  
7 this system -- but in a system to generate electricity;  
8 that's a fair statement?

9 A You could potentially. Whether that would be a  
10 commercial system -- it wasn't the -- my discussion has  
11 been focused on the system that was proposed.

12 Q I understand.

13 A Okay.

14 Q And specifically I should say, you looked at a  
15 specific set of assumptions and variables that were  
16 provided to you. Were you also provided other materials?  
17 Like, I have an engineering drawing that has the solar  
18 towers connected to just one turbine. Did you --

19 A That was the system that I was modeling.

20 Q Okay. Isn't your -- we can look at your report  
21 real quick. It's on page -- I apologize. Let me look to  
22 it.

23 A 16? I'm guessing.

24 Q Yeah, you're right. Thank you. Page 16. So  
25 this has a diagram where there are multiple towers



1 connected to only one turbine, right?

2 A That's correct.

3 Q Would it be possible to have a standalone system  
4 so just one tower is operating on one turbine?

5 A I think that could be possible. I understand  
6 the reason they're not doing that in this picture, and why  
7 they arrived at that. And I would assume it's because  
8 then you would have to have 25 turbines, and 25 complete  
9 thermodynamic cycles -- thermodynamic Rankine cycles. And  
10 that really complicates -- then you're not using any  
11 scaling to help you reduce cost.

12 Q Um-hum.

13 A But from a technical perspective, that could be  
14 done.

15 Q Okay.

16 THE COURT: But see, is this -- paragraph 64,  
17 this schematic -- is this your diagram, or is it their  
18 diagram?

19 THE WITNESS: It came out of a document that --  
20 called a breakthrough solar to replace natural gas or  
21 something like that, that Mr. Johnson has admitted that he  
22 was the author of.

23 THE COURT: So Mr. Johnson or somebody on his  
24 team produced this schematic, and you just copied it into  
25 here? Or did you --



1 THE WITNESS: I think Mr. Johnson would tell you  
2 that he produced it, and there are sections in it that he  
3 did not produce but he admits that other technical experts  
4 did produce, but he won't identify --

5 THE COURT: Okay. What I'm trying to get at is  
6 whether this was your --

7 THE WITNESS: No, it's not my drawing.

8 THE COURT: -- attempt to model what was  
9 going --

10 THE WITNESS: This is his.

11 THE COURT: This is -- okay. Got it.

12 THE WITNESS: And this is a system that I tried  
13 to use --

14 THE COURT: I understand.

15 THE WITNESS: -- to build the model.

16 THE COURT: Right.

17 BY MR. JONES:

18 Q And we heard testimony yesterday from Randy  
19 Johnson, for example, where they had also intended just to  
20 use one tower alone. And so you're -- I just want to make  
21 sure I'm being clear. You're saying there's no reason why  
22 that couldn't be done. You could use this one tower or --

23 A That's correct. They could use just one tower  
24 and the power cycle there, yes.

25 Q Okay. Great. Did you perform any tests on your





1 own -- any independent tests?

2 A I didn't. There wasn't anything to test. And I  
3 wouldn't normally do that.

4 Q You wouldn't normally do that, okay.

5 A No. That's -- if somebody's got a piece of  
6 developmental equipment, they're not going to want you to  
7 mess around with it. And you're not going to want to mess  
8 around with it.

9 Q Okay.

10 A That's why when I worked at Sandia, what we did  
11 for the most part was worked with the contractors. If  
12 they wanted to run a specific test or we wanted to test-  
13 run, they would run it and we'd help them with the  
14 instrumentation and the evaluation of the results. It's  
15 not something that I would --

16 THE COURT: Did you ask Mr. Johnson or whoever  
17 was there during your visit if they would produce a little  
18 show-and-tell for you?

19 THE WITNESS: I didn't ask him to do that. They  
20 did do some show-and-tells. They did operate addition and  
21 azimuth only and burn a board (ph.).

22 THE COURT: Um-hum.

23 THE WITNESS: I asked them if they had any  
24 receivers, and they didn't have any receivers they could  
25 put on it. That's not something they could do anyway. It



1 takes time to do this. You can't just slap something on  
2 it. So I really didn't expect them -- I expected them to  
3 have a show-and-tell for us. I didn't ask -- I didn't  
4 know what to ask.

5 BY MR. JONES:

6 Q Okay. Thank you. And you're aware that this  
7 case is mostly about the lenses? Are you aware of that?

8 A I think I'm sitting here the last two days, so  
9 I --

10 Q You got it. You got it. Great.

11 A Yeah. I'm --

12 Q Yeah, I'm just --

13 A I'm not real quick on the uptake --

14 Q I'm asking here, so -- yeah, okay. I do have  
15 just a quick question for you -- and like I said, I'm  
16 going to be fairly brief with you here. So if you could  
17 turn to page 20 of your report? And it's paragraph 77  
18 there.

19 A Yes.

20 Q You refer to a report by Murray and French. Do  
21 you see that?

22 A I do.

23 Q That study talked about -- well, I shouldn't say  
24 relied upon, just a pure simulation, right? It wasn't a  
25 real-world test; is that correct?



1 A That was my understanding, yes.

2 Q Okay. And that showed that there was a 22-  
3 percent reduction in solar energy transmission after ten  
4 years in a simulated laboratory exposure; is that right?

5 A That's correct.

6 Q Okay. Why didn't you use another study? So  
7 for -- I'll give you a couple examples. So there was one  
8 that was conducted at Sandia, for example. It's titled,  
9 Operational, Reliability, and Maintenance Experience with  
10 Photovoltaic Concentrator Arrays. And unlike the Murray  
11 and French study, Burgess and Shafer, they rely on real-  
12 world data from the same acrylic lenses, except it's in  
13 the field. And according to that report -- I'll just read  
14 a quote.

15 It says, "Analysis of acrylic sheets exposed to  
16 22 years of sunlight and blowing sand revealed only a ten  
17 percent total degradation in specular transmittance. Thus  
18 very stable Fresnel lenses are predicted." So why not use  
19 that?

20 A Why didn't I use that report?

21 Q Yeah.

22 A Well, a couple of reasons. And probably the  
23 main one is that I'm familiar with -- I couldn't -- first  
24 of all, I couldn't drag up a copy of that report. That  
25 report was from 1980. It was actually done at the test



1 facility where I worked for 30 years, starting in 1985.

2 And the second piece here is the report I'm  
3 referencing, a lot of things changed over the years. And  
4 the acrylic -- so I couldn't really get the report to  
5 comment on that report. But the Murray and French report  
6 is 31 years newer than that, and involves a lot more of  
7 our understanding of how acrylic ages. And I felt that a  
8 more recent report had more viable and probably more  
9 correct results.

10 Q There is also a 2010 report from the United  
11 States Department of Energy called, Durability of  
12 Poly(Methyl Mecracyl -- I can't pronounce it. Meth --

13 A Methacrylate.

14 Q Thank you -- Lenses Used in Concentrating  
15 Photovoltaics. And are you familiar with that report by  
16 chance?

17 A No, I --

18 Q Okay.

19 A I would have liked to have read it.

20 Q Yeah, and this -- their report was also real-  
21 world instead of simulations. And they only reported a  
22 six-percent decrease. And so I -- so and it's -- again,  
23 do you think there's a difference between these -- having  
24 a simulation --

25 A I don't know.



1 Q -- and all that?

2 A I haven't read that report. I can't --

3 Q Don't know?

4 A -- really comment on it.

5 Q Okay. All right. I also want to just ask  
6 about -- you make a few comments about problems with  
7 cleaning and maintenance of the lenses. So can you talk  
8 to me about that for a minute?

9 A Sure. That issue came up because a number --  
10 within the white-paper document there were comments in a  
11 number of places that the lenses are better than mirrors  
12 because you don't have to clean them. And that's just  
13 simply not true. They get dirty, and it has a big effect  
14 on things.

15 And the issue has actually been twice as bad for  
16 a lens than it is for a mirror, because a mirror has only  
17 one surface that you're concerned about keeping clean.  
18 And it doesn't have ridges on it. And so I felt that that  
19 was an issue that was going to be an O&M issue. And  
20 getting up there to do it -- I think it can be done, I'm  
21 not -- but to say that it doesn't need to be done, it's  
22 just not correct.

23 Q And is that your only issue? So --

24 A Yes, that was my only issue.

25 Q So if you were to clean it, you'd be satisfied



1 that it would solve your issue?

2 A Yeah, but that's an additional cost, too, going  
3 up there --

4 Q Yeah.

5 A -- to do it. And how often do you have to clean  
6 it?

7 Q Um-hum.

8 A How do you monitor it so you know when to clean  
9 it? I mean, you have to do it probably -- during the  
10 summertime you have to do it more often. During the  
11 wintertime probably less often, but it's probably a  
12 different contaminant, so how do you it.

13 Q Do you think it matters that the lenses are  
14 facing toward the ground? Do you think they stay cleaner  
15 because the ridges are facing the ground?

16 A No, because both surfaces -- both the under  
17 surface and the upper surface will get dirty.

18 Q And so you'd need to clean -- your statement is  
19 you'd have to clean the whole thing?

20 A You have to clean the whole thing.

21 Q Yeah. Okay. But that's easily resolved by  
22 cleaning?

23 A It could be done, I'm not saying it can't --

24 Q Yeah.

25 A -- be done.



1 Q Okay.

2 A But to say that it doesn't need to be done  
3 simply isn't correct.

4 Q Yeah. So you testified in direct when Mr.  
5 Bradbury was asking you that you think it probably could  
6 be a viable system. And I got specific points here, but I  
7 think in your direct you said this so we can save some  
8 time here, but you kind of made the overarching statement  
9 that, yeah, get better personnel, I guess wash the lenses.  
10 I think you have an issue about sandblasting the towers  
11 and painting them, things like that. But get all this in  
12 place. You think the technology could probably work to  
13 generate electricity in five years, you said. Is that --

14 A Oh, I don't know. I don't know five years. But  
15 I think if you got the right team on it, and you really  
16 invested the money in it, you could probably make  
17 something that would generate electricity using the  
18 concept as it stands.

19 Now, could it -- what it compete in commercial  
20 marketplace was really the issue I was going after, and I  
21 don't think it would.

22 Q And is that entirely cost-driven?

23 A Without having gone through the process, I can't  
24 say for 100-percent sure that it could be made to work.  
25 But I'm relatively confident that if you put people who



1 know what they're doing and they're wanting to do this,  
2 and they felt that they -- that you could produce  
3 electricity with it. I'm not clear that if you did the  
4 upfront work that you needed to do that you would ever do  
5 that work, because you'd know right away this is not going  
6 to make the cost work.

7 Q Okay. Is that the case with most solar? It  
8 seems like there's got to always be a subsidy for it to  
9 work? I don't know.

10 A Yeah, that --

11 Q Or government subsidy or whatever?

12 A That's generally the case for emerging  
13 technologies in general, whether it's solar or something  
14 else; it's not unique to renewable energy. It's just that  
15 the kinds of things we're talking about here are more in  
16 the public domain for discussion than a lot of other  
17 things. And people say, we're going to pay the extra for  
18 solar. I mean, it's just -- most things have developed in  
19 emerging technology. There's not an opportunity to get  
20 tariffs. There's not a reason for tariffs. The reason is  
21 they think they can actually hit the price point they need  
22 to hit, and then put that new frying pan on the market,  
23 or --

24 Q Yeah.

25 A -- that new washing machine and by golly, it's





1 going to be -- even though it's new technology, I can get  
2 to that price point right away. If I could mass-produce  
3 it and I know I could do that price point.

4 Q Right.

5 A Or I'm going to make it a little more expensive  
6 at first to recover my development cost, and then we'll  
7 let the price drift down --

8 Q Okay.

9 A -- and get into the --

10 Q Let me ask you this. Do you think that there is  
11 value -- commercial value for research?

12 A I've always felt that way. And most big  
13 companies do have research labs.

14 Q Yeah. And so is research and development a  
15 commercial application?

16 A I don't know how to respond to that. I don't --

17 Q You don't know?

18 A I don't think that -- well, what do you mean by  
19 commercial -- I guess if you're investing in something  
20 with hopes that it will have future payoff -- the drug  
21 companies certainly do a lot of it, don't they?

22 Q Definitely.

23 A And they charge us a lot for it, don't they?

24 Q Definitely.

25 A So I guess it is.



1 MR. JONES: Okay. I have nothing further.

2 THE COURT: So I asked a question like that of  
3 Mr. Gardner -- I mean, and I said it seems to me that R&D  
4 can be a commercially income-producing activity, if you do  
5 it as a contract for somebody else. But if you're doing  
6 it for your own stuff, it's a capital absorber, not a  
7 income-generator until you've got a commercial product,  
8 right?

9 THE WITNESS: That's why you have to charge more  
10 for whatever product --

11 THE COURT: Right.

12 THE WITNESS: -- you are selling in order to be  
13 able to afford to do that research, like the drug  
14 companies do.

15 THE COURT: Right.

16 Any redirect, Counsel?

17 MR. BRADBURY: May I have just a moment, Your  
18 Honor?

19 THE COURT: Sure.

20 (Counsel confer.)

21 MR. BRADBURY: Just two questions, Your Honor.

22 REDIRECT EXAMINATION

23 BY MR. BRADBURY:

24 Q Mr. Jones asked you if it was possible to have  
25 just a system with one tower and I think it was one



1 generator; remember that?

2 A Yes.

3 Q What are the problems with that design?

4 A Well, there are a couple of problems. First of  
5 all, you'd have to have a complete Rankine cycle at that  
6 single tower. So you'd have to have your own boiler  
7 there. You're going to have to have the turbine there and  
8 a generator there. And based on the scale of this system,  
9 those would be about 25 kilowatt-units, because each of  
10 those dishes were supposed to produce enough power for  
11 about 20 or 25 kilowatts worth of electricity generation.

12 But you'd have to have then 25 of those  
13 duplicated around the field. And as opposed to having  
14 just one power block, and providing all the thermal energy  
15 to that power block, and driving just one cycle. The O&M  
16 on that and the cost of the initial equipment on having 25  
17 duplicative units versus one is significant.

18 You can do it, technically. It's not an issue  
19 technically. And I believe that was his question. But  
20 it's not probably which is when I -- I think that's one of  
21 the reasons they wanted to have a bigger field was try to  
22 reduce those costs.

23 Q So would it be a cost-effective way to design  
24 the system?

25 A No.



1 Q One other point to clarify. You mentioned a  
2 white paper. What is that?

3 A That's the solar breakthrough natural gas --  
4 it's the -- it's what -- it was the main document that  
5 came out of my -- look-through all the information  
6 provided by Mr. Johnson.

7 Q And those are attached to your report?

8 A Yes.

9 MR. BRADBURY: And for Your Honor's information,  
10 they're also part of our Stipulation of Facts, and  
11 attached as exhibits --

12 THE COURT: Okay.

13 MR. BRADBURY: -- to the stipulation. That's  
14 all the questions I have.

15 THE COURT: Any recross, Counsel?

16 MR. JONES: No, no recross.

17 THE COURT: Okay. Dr. Mancini, thank you for  
18 your testimony. It was very helpful to the Court. And  
19 you are free to go back to your pew.

20 MR. BRADBURY: Actually, may I ask --

21 MR. JONES: I was going to say he's --

22 MR. BRADBURY: -- a couple of rebuttal  
23 questions?

24 THE COURT: Oh, good. I'm sorry. I forgot.

25 MR. BRADBURY: To rebut Mr. Gardner?



1 THE COURT: We have to get the rebuttal phase  
2 now. Right. Thank you, Counsel.

3 DIRECT EXAMINATION (REBUTTAL)

4 BY MR. BRADBURY:

5 Q Sorry, Dr. Mancini.

6 A I didn't realize we were in church.

7 Q You were present for Mr. Gardner's testimony  
8 yesterday, correct?

9 A I was.

10 Q And you heard him say that he saw lenses used in  
11 a CSP system to run a generator for 30 minutes --

12 A I heard him say that.

13 Q -- in the fall of 2015?

14 A Yes. Yes, I did.

15 Q What was your reaction to that testimony?

16 A It's the first time I ever heard that. I saw no  
17 information to support that. In the information I  
18 reviewed, I don't recall Mr. Johnson ever telling me that  
19 he had done explicitly that. It's the first time I heard  
20 it. And certainly from another party.

21 Q Were you ever able to review test results from  
22 that day --

23 A Yeah.

24 Q -- that don't -- the fall of 2015 --

25 A Yeah.



1 Q -- test? Mr. Gardner also testified about one  
2 tower being erected with four arrays full of complete  
3 lenses. Do you remember that testimony?

4 A I do.

5 Q When you visited in January of 2017, what was  
6 the condition of the towers?

7 A There wasn't any with complete complementive  
8 facets. The towers -- in fact, there was a little bit of  
9 difference between the two visits, but only one of them  
10 was tracking at the time. And it had -- it would only  
11 track during the first visit, and as -- it would not track  
12 in the elevation mode.

13 And they showed me that, and it wasn't tracking  
14 automatically; it was being done manually. During that  
15 first visit at the manufacturing facility, Randale Johnson  
16 had showed me his tracking -- he was developing the  
17 tracking program, and he explained how it was going to  
18 work.

19 And I think during the second visit, I think  
20 they were tracking it automatically, but I don't know  
21 that. But Randale was operating it, so I assume that that  
22 same dish was tracking in both elevation and azimuth. But  
23 it was not fully populated with lenses at that point  
24 either.

25 Q Thank you.



1 MR. BRADBURY: I have no further questions.

2 THE COURT: Okay. Any cross?

3 MR. JONES: I actually just have one.

4 CROSS-EXAMINATION (REBUTTAL)

5 BY MR. JONES:

6 Q Mr. Gardner's testimony was that that test took  
7 place in 2015?

8 A Yes.

9 Q And did you ever visit the site in 2015?

10 A No.

11 MR. JONES: Okay. That's all I have.

12 THE COURT: Okay.

13 MR. BRADBURY: Nothing further, Your Honor.

14 THE COURT: Okay. Now you may step down in your  
15 second capacity as a rebuttal witness.

16 MR. JONES: Can I have just a moment?

17 THE COURT: Sure.

18 (Counsel confer.)

19 MR. BRADBURY: Mr. Jones asked about the  
20 rebuttal report that Dr. Mancini prepared. We would like  
21 to submit that as evidence into the case, Your Honor.

22 THE COURT: Oh, right. Right.

23 MR. BRADBURY: I didn't have any copies to mark,  
24 so I apologize.

25 MR. JONES: I am also submitting that flash

1 drive. We can handle that the same way.

2 THE COURT: Well, do you have his rebuttal  
3 report?

4 MR. BRADBURY: I submitted it to the Court  
5 before and Mr. Jones has a copy, but I didn't bring a copy  
6 to mark today.

7 THE COURT: Oh, I understand.

8 MR. BRADBURY: I'm sorry. I didn't think about  
9 that.

10 THE COURT: Well, I can go get it and we can  
11 mark it.

12 MR. BRADBURY: That would be great. Sure.

13 (Whereupon, a recess was held from 11:48 a.m.  
14 until 11:49 a.m.)

15 THE COURT: Okay. So I have Respondent's Notice  
16 of Submission of the Rebuttal Report of Dr. Mancini. So  
17 I'll just take off the cover letter, and then as I  
18 understand it, it's not lengthy. It's a six-page report.  
19 You put in a signature page?

20 MR. BRADBURY: Yes, Your Honor.

21 THE COURT: Okay. So I guess I'll have to get  
22 the doctor back to -- is he still here?

23 THE WITNESS: He's still here.

24 THE COURT: Yeah, to confirm this is his report  
25 and all that.





1 So could you come back to the stand very  
2 briefly?

3 THE CLERK: Exhibit 148-R marked for  
4 identification, titled Rebuttal Expert Report prepared in  
5 response to the expert witness report of Mr. Ken Gardner.

6 (Whereupon, the Document referred to as Exhibit  
7 148-R was marked for identification.)

8 REDIRECT EXAMINATION (REBUTTAL)

9 BY MR. BRADBURY:

10 Q Dr. Mancini, will you please look through that  
11 exhibit and tell us if it's the same one that you prepared  
12 as a rebuttal to Mr. Gardner's expert report?

13 A Yes, it is.

14 MR. BRADBURY: Respondent moves to admit Exhibit  
15 148-R.

16 MR. JONES: I assume that I have no objection.  
17 May I approach and just review it?

18 THE COURT: Sure.

19 MR. JONES: Thank you, sir.

20 THE WITNESS: You're welcome.

21 MR. JONES: No objection.

22 THE COURT: The report will be admitted. So  
23 148-R is into evidence.

24 (Whereupon, the Document referred to as Exhibit  
25 148-R was received into evidence.)



1 MR. BRADBURY: Thank you, Your Honor. The  
2 Respondent --

3 THE COURT: I think that completes your --

4 MR. BRADBURY: -- has no further witnesses.

5 THE COURT: What? Pardon?

6 MR. BRADBURY: Respondent has no further  
7 witnesses.

8 THE COURT: Okay. So I think now that completes  
9 your task. Thank you very much.

10 Okay. The next order of business, I guess, is  
11 post-trial briefing. So there was a little humor  
12 yesterday about the length of the briefs.

13 MR. SORESENSEN: It was bad humor.

14 THE COURT: Yes. I don't necessarily want  
15 gargantuan briefs, but I want comprehensive briefs in the  
16 sense that they address all the issues.

17 Now, normally a judge in a case tries to decide  
18 the fewest issues possible in order to resolve the case,  
19 judicial restraint and all the rest of it. But this is a  
20 test case. And I have 225 or so of these cases on my  
21 docket. And I think one point of the test case is to  
22 resolve as many issues as possible, even if they involve  
23 alternative holdings and so forth. To give the parties  
24 the greatest possible guidance to resolution of the other  
25 cases, and to reduce the need to try dozens of other



1 cases.

2 So I mean, none of these issues is technically  
3 complex, like I'm facing in some of my -- like in Amazon,  
4 you know what I mean? But there are a number of issues  
5 that I think -- like, they're all flagged in Respondent's  
6 pre-trial memorandum that I would like the post-trial  
7 briefs to address.

8 So just walking through it, I would suggest you  
9 start with whether Mr. Olsen was in a trade or business  
10 for profit. And I think the subset of that is could  
11 renting property of this sort ever be a trade of business.

12 Okay. And then the second point is, if it's not  
13 a trade or business, could he deduct depreciation and get  
14 credits under Section 212 for property held for production  
15 of income.

16 Then we have placed-in-service requirement for  
17 the lenses, and a subset of that is when is leased  
18 property placed in service.

19 We next have -- assuming that deductions and  
20 credits would be allowable, the at-risk limitation and the  
21 passive-loss limitation.

22 Now, are there any other issues that either  
23 party thinks are presented by the case that need to be  
24 addressed? The penalties are off the table.

25 MR. JONES: Your Honor, before we answer that



1 question, can I -- my wrist was going, but I just -- do  
2 you mind if I just review those to make sure I got  
3 everything?

4 THE COURT: Okay.

5 MR. JONES: Would that be okay? So the issues  
6 that we are to cover are the trade-or-business issue,  
7 whether renting can ever be a trade or business. If it's  
8 not a trade or business, does it qualify under 212 for the  
9 production of income as to the tax credit -- and I assume,  
10 also depreciation.

11 THE COURT: Right.

12 MR. JONES: The place --

13 THE COURT: And what, if anything -- if there  
14 are any different rules on what would be creditable or  
15 deductible depending on 162 or 212, I would need to have  
16 that --

17 MR. JONES: Right.

18 THE COURT: -- explored.

19 MR. JONES: Understood. Then the placed-in-  
20 service issue, and a subset of that being specifically  
21 when is an asset that is leased, when is that placed in  
22 service.

23 MR. SORENSEN: If ever.

24 MR. JONES: If ever, sure.

25 MR. SORENSEN: Yeah. That's our argument to



1 make.

2 MR. JONES: Well, that was a hint. Thank you.  
3 I think I knew that, though. So all right. An analysis  
4 of the at-risk rules, and then an analysis of the passive-  
5 loss limitations.

6 THE COURT: Right.

7 MR. SORENSEN: Yes.

8 MR. JONES: Okay.

9 THE COURT: Yeah.

10 MR. JONES: And I don't think there's anything  
11 so with that list.

12 MR. BRADBURY: No. I think that was all the  
13 issues as well.

14 THE COURT: Yeah. Okay. And that would seem to  
15 be, at least from a high level, a logical order in which  
16 to address them -- and I'm not sure where the 212 thing  
17 goes, but the other stuff I'm pretty clear about.

18 And I think I will try to address -- I will  
19 intend to address all of them, and that may involve making  
20 alternative holdings of some kind. And I think that would  
21 be appropriate in a case like this.

22 Okay. I have also rethought the order. I think  
23 it would be best to -- contrary to what I said yesterday,  
24 to have seriatim briefing with Respondent going first.  
25 And so I would expect Respondent to do a fairly



1 comprehensive proposed findings of fact, and then address  
2 the arguments.

3 And then Petitioner would go next and file the  
4 answering brief. And I wouldn't require Petitioner to set  
5 out his own proposed findings of fact, but just respond to  
6 Respondent's findings that you think that anything is  
7 important been omitted, you can kind of add those. But I  
8 mean, I don't want you to go through a whole soup to nuts  
9 findings of that. It's not worth the money and expense in  
10 doing that. Just respond to theirs. If you think there  
11 are any critical omissions in their findings, propose your  
12 own findings at the end, maybe.

13 MR. JONES: Okay.

14 THE COURT: And then address -- and then respond  
15 to Respondent's arguments on these various legal issues.

16 I don't normally impose pages limitations. It's  
17 just not my practice. I just assume that you lawyers will  
18 do your job and write the shortest brief you can that's  
19 comprehensive.

20 MR. SORENSEN: We will, Your Honor.

21 MR. BRADBURY: Would you like us to do a reply  
22 brief to Petitioner's answering brief?

23 THE COURT: I think what I would like is to  
24 have -- after Petitioner files their brief, his answering  
25 brief, Respondent may move to file a reply. And then if



1 you do that, Petitioner would, of course, get a -- I would  
2 give Petitioner a surreply. So we could have --

3 MR. SORENSEN: But if we do that, it would be --  
4 we will limit ours to reply to their arguments and nothing  
5 else.

6 THE COURT: Right. Right. Right. A reply  
7 brief should be short.

8 MR. SORENSEN: Very short.

9 THE COURT: Right, it should be very short.

10 MR. SORENSEN: I'm a firm believer in short  
11 briefs, Your Honor.

12 THE COURT: Okay. Well, we'll see.

13 MR. SORENSEN: Well, especially, since --

14 THE COURT: The proof of the pudding is in the  
15 eating.

16 MR. HOUTSMA: Mr. Sorensen will not be writing  
17 it for us, so --

18 MR. JONES: That's what I was going to say.  
19 That's because he's not writing.

20 MR. SORENSEN: I won't write it anyway.

21 MR. HOUTSMA: There's a relevance objection.

22 THE COURT: Okay. Now the timing.

23 MR. SORENSEN: Yeah, we -- just to maybe help  
24 the Court here, we get the benefit of Judge Goeke hearing  
25 about 65 days over two months, and probably the same

1 courtroom. So we would request at least 90 days, because  
2 Skyler unfortunately has I think 14 cases on that calendar  
3 still. So --

4 THE COURT: Judge Goeke gets an awful lot of  
5 cases that don't get resolved. He likes coming out West,  
6 though. He's from this part of the country. You're in  
7 Provo, not in Salt Lake City?

8 MR. HOUTSMA: Correct.

9 MR. SORENSEN: Provo. Apparently, we're being  
10 told that Tax Court is finding the rental of courtrooms  
11 far less in Provo than Salt Lake City.

12 THE COURT: Well, it's a much better facility.  
13 This is like state-of-the art, this building. It's  
14 amazing.

15 MR. JONES: It is a beautiful building, yeah.

16 MR. SORENSEN: Well, it is, except for the  
17 commute.

18 THE COURT: The travel. The commute, well.

19 MR. SORENSEN: And those archaic Government  
20 rules that they won't let us stay down here because we're  
21 within 50 miles of the courthouse.

22 THE COURT: I see. Right. The Marriott --

23 MR. SORENSEN: But we'll deal with those.

24 THE COURT: The Marriott's awfully convenient  
25 across the street.





1 MR. SORENSEN: We've been staying at the Hyatt.  
2 We made an exception for this one. And it's mighty  
3 convenient to walk across the street.

4 THE COURT: Right.

5 MR. SORENSEN: So we would be looking for at  
6 least 90 days, if we could, Your Honor.

7 THE COURT: Okay. The transcript will be likely  
8 30 days. That's the usual rule, right?

9 MR. SORENSEN: Yeah.

10 THE COURT: Okay. So 90 days from today would  
11 be when?

12 THE CLERK: April 22nd.

13 THE COURT: Okay. Mr. Jones, what would you  
14 like?

15 MR. JONES: I think the 45 days, it's normal.  
16 After that, is that okay with everybody?

17 THE COURT: Well, if you want more -- they're  
18 getting a little extra beyond the 75. So if you'd like a  
19 little bit more, that would be fine.

20 MR. JONES: Yeah, I guess, maybe 60 --

21 THE COURT: 60? Okay.

22 MR. JONES: -- is fine. Yeah.

23 THE COURT: That would be when?

24 THE CLERK: June 22nd.

25 THE COURT: Okay. And I said if Respondent



1 believes that he would like to file a reply within a  
2 reasonable time after getting Petitioner's answering  
3 brief, you may file a motion, and --

4 MR. SORENSEN: It's my practice, Your Honor,  
5 that if we decide not to, we'll file a quick one-page  
6 statement saying Respondent's --

7 THE COURT: Okay.

8 MR. SORENSEN: -- not going --

9 THE COURT: Okay. All right. All right.

10 MR. SORENSEN: -- to file one. Just to let the  
11 Court know where we stand.

12 THE COURT: Okay. Fine. But there will either  
13 be two briefs or four briefs. I would want to keep it  
14 even, all right?

15 MR. SORENSEN: All right.

16 THE COURT: Okay. Well, thank you.

17 MR. JONES: What was your due date?

18 THE COURT: The case is very well presented.

19 MR. SORENSEN: April 22nd.

20 THE COURT: And I got nice education of solar  
21 power, which is more than I knew -- a lot more than I knew  
22 a week ago. So I thank you for that. I look forward to  
23 getting your briefs.

24 MR. SORENSEN: Thank you, Your Honor.

25 THE CLERK: All rise.



1 MR. JONES: Thank you.

2 (Whereupon, at 12:00 p.m., the above-entitled  
3 matter was concluded.)

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1 CERTIFICATE OF TRANSCRIBER AND PROOFREADER

2 CASE NAME: Preston Olsen & Elizabeth Olsen, et al v.  
3 Commissioner

4 DOCKET NO.: 26469-14; 21247-16

5 We, the undersigned, do hereby certify that the  
6 foregoing pages, numbers 447 through 537 inclusive, are  
7 the true, accurate and complete transcript prepared from  
8 the verbal recording made by electronic recording by  
9 Deborah Gonzalez on January 23, 2020 before the United  
10 States Tax Court at its session in Provo, UT, in  
11 accordance with the applicable provisions of the current  
12 verbatim reporting contract of the Court and have verified  
13 the accuracy of the transcript by comparing the  
14 typewritten transcript against the verbal recording.

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16

17

18

*Cylia Israel*

19 Cylia Israel, CDLT-113 2/5/20

20 Transcriber Date

21

22

*Traci Fine*

23

24 Traci Fine, CDLT-169 2/5/20

25 Proofreader Date

