

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 LIBERTY ENERGY INC. AND LIBERTY ENERGY SERVICES
5 LLC
6 Petitioners,

7 v.

8 U.S. WELL SERVICES, LLC
9 Patent Owner.

10
11 Case No. IPR2025-00139
12 Patent 11,208,878

13
14 ORAL DEPOSITION OF MICHAEL NIKOLAOU, PH.D.

15 (VIA ZOOM VIDEOCONFERENCE)

16 Friday, December 5, 2025

17 9:31 a.m. CST

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21 Pages: 1 - 58

22 Reported By: Linda Russell

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2
3 Remote Deposition of MICHAEL NIKOLAOU, PH.D.
4 produced as a witness at the instance of the
5 Petitioners, and duly sworn, was taken in the
6 above-styled and numbered cause on December 5,
7 2025, from 9:31 a.m. to 11:23 a.m., before Linda
8 Russell, CSR in and for the State of Texas,
9 recorded by machine shorthand, held via Zoom
10 Videoconference pursuant to 37 C.F.R. § 42.53 and
11 any provisions stated on the record or attached
12 hereto.
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A P P E A R A N C E S

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I N D E X

	Page
MICHAEL NIKOLAOU, PH.D. BY MR. WALTERS	5

EXHIBITS REFERENCED

No.	Description	Page
Exhibit 1001	US11208878	7
Exhibit 1003	Declaration of Dr. Robert Durham	15
Exhibit 1004	US20200040705A1	51
Exhibit 1006	US20170222409A1	43
Exhibit 2013	Nikolaou Declaration ISO POR 878	24
IPR2025-00139 Petition	IPR2025-00139 Petition for Inter Partes Review of Patent No. 11,208,878	21

(Referenced exhibits were not provided to reporter by counsel.)

(REPORTER'S NOTE: All quotations from exhibits are reflected in the manner in which they were read into the record and do not necessarily denote an exact quote from the document.)

1 MICHAEL NIKOLAOU, PH.D.,
2 having been first duly sworn, testified as
3 follows:

4 EXAMINATION

5 BY MR. WALTERS:

6 Q Good morning, Dr. Nikolaou.

7 A Good morning, Mr. Walters.

8 Q Where are you physically located right
9 now?

10 A I am located in Houston, Texas. I am at
11 home.

12 Q No one else is in the room with you?

13 A Not in this room. My wife is in another
14 room and she underwent hip replacement surgery
15 couple weeks ago, so if there is an urgent need
16 for help, I may have to take a quick break,
17 although it's unlikely because she is recovering
18 well.

19 Q Okay. Just let me know if that's the
20 case.

21 A Very good. Thank you.

22 Q You've been deposed before?

1 A I have.

2 Q About how many times?

3 A About a dozen times.

4 Q And you understand you've been sworn to
5 testify truthfully to the best of your ability?

6 A Yes.

7 Q Is there any reason in particular that you
8 cannot testify truthfully today?

9 A No.

10 Q What did you do to prepare for today's
11 deposition?

12 A I reviewed material for this case, and I
13 had a session with Mr. Quarles yesterday to make
14 sure that I have access to all the material
15 pertaining to this deposition.

16 Q About how long did you meet with
17 Mr. Quarles?

18 A About four or five hours online.

19 Q And what materials did you review?

20 A I reviewed the declaration that I gave in
21 connection with today's deposition and several of
22 the exhibits that are mentioned in my declaration.

1 Q Any other materials outside those cited in
2 your declaration?

3 A Nothing specifically, no.

4 Q At what rate are you being compensated for
5 your time in this matter?

6 A I am compensated at \$700 an hour.

7 Q The patent at issue in this proceeding is
8 the '878 Patent; is that correct?

9 A That is correct.

10 Q Can you describe the novelty of the
11 '878 Patent?

12 A Certainly.

13 THE WITNESS: I understand that I can open
14 any of the exhibits associated with this case on
15 my computer screen?

16 MR. WALTERS: Sure.

17 THE WITNESS: It's the only thing I will
18 open. Very good. So let me open the '878 Patent.
19 Give me just one second.

20 (Exhibit 1001 marked for identification.)

21 A It's Exhibit 1001. And as explained in
22 the claims of the exhibit -- or the '878 Patent,

1 the invention is about hydraulic fracturing system
2 that includes an electric power pump, a variable
3 frequency drive, a transformer, and a switchgear
4 all on common support structure.

5 Q Any particular aspect of those items that
6 you listed that you think are particularly novel
7 here for this patent?

8 A Well, this is what I consider to be the
9 novelty of the patent. And, now, whether this is
10 particularly novel or not is a matter of degree.
11 So, I haven't thought much about to what degree
12 these are particularly novel. But everything
13 related to novelty of the patent is outlined in
14 the claims of the invention.

15 Q The priority date of this patent dates
16 back to 2018?

17 A Correct.

18 Q Fracturing systems were around in 2018,
19 correct?

20 A Certainly.

21 Q Electric powered pumps were around in
22 2018, correct?

1 A That is correct.

2 Q Variable frequency drives were around in
3 2018, correct?

4 A Definitely.

5 Q Transformers were around in 2018?

6 A Correct.

7 Q Switchgear was around in 2018?

8 A Yes.

9 Q Common support structures were around in
10 2018?

11 A Yes.

12 Q What about common support structures that
13 held electric powered pump, a VFD, switchgear, and
14 a transformer?

15 A Well, as this issue actually came up
16 during the prosecution of the patent, that is the
17 novelty of the patent. In fact, the examiner in
18 the history of the patent reveals that as to the
19 distinguishing characteristic, the feature that
20 made the patent possible, namely that all four of
21 these elements were on a common support structure.

22 Q The title of the patent -- can you look at

1 the title of the patent?

2 A Certainly. Give me just one second, go to
3 the top page.

4 Yes, "Modular Switchgear System and Power
5 Distribution for Electric Oilfield Equipment."

6 Q Is the modular aspect of the switchgear
7 part of the novelty here?

8 A Well, the title refers to switchgear
9 system and power distribution for electric
10 oilfield equipment, so it's modular in the sense
11 that there is an entire system in a modular form
12 that can accomplish that to deliver power and
13 accomplish -- electrical power, that is -- and
14 accomplish the fracturing as described in the
15 patent.

16 Q Does the modular nature of the switchgear
17 enable it to be put on the common support
18 structure with the other components that are
19 identified in the claim?

20 A The switchgear included in the
21 configuration described in the patent is regular
22 switchgear. As described in the patent, there are

1 schematics and there are descriptions of what this
2 switchgear might entail. In fact, there is even
3 more detailed description about what internal
4 functions the switchgear might entail in terms of
5 voltages, currents, powers, switches, things like
6 that.

7 Q What does a modular switchgear mean?

8 A Well, it's a modular switchgear system.

9 Q Okay. What does a modular switchgear
10 system mean?

11 A That -- it's interpreted in the standard
12 way that the authors of the patent intended, I
13 presume, namely that the four pieces of equipment
14 that I described are in one -- on one platform.
15 And that platform can move around -- so that's a
16 support system -- can move around as an entire
17 system. And the elements of the system are the
18 elements described in the patent, in particular
19 four elements are mainly mentioned in the claims,
20 and there may be others that are mentioned as well
21 in addition to the four that they mention.

22 Q Can you turn to column 15 of the patent.

1 A Certainly. Column 15.

2 THE WITNESS: Give me one second to close
3 the door to reduce some noise.

4 A Column 15. Yes, sir, I'm there.

5 BY MR. WALTERS:

6 Q At line 29 of column 15.

7 A Line 29.

8 Q There's a sentence that states, "For
9 example, modular architecture may be used for
10 scalable solutions, e.g., distributed
11 intelligence." Do you see that?

12 A Yes.

13 Q Is that part of the novelty?

14 A Well, this is what may be included in an
15 embodiment of the system and that's why it is
16 giving us an example.

17 Q And what does "modular architecture" mean
18 to you?

19 A Well, it means that it is -- well, I have
20 to go a little higher up to understand what this
21 means. It starts at the top of column 15. It
22 says, "Use of modular system architecture may

1 simplify installation and upgrades. In
2 embodiments," blah, blah, blah, it continues. And
3 then further down it goes on line 29 to have that
4 specific statement that you mentioned about
5 "modular architecture may be used for scalable
6 solutions."

7 So these modules -- the architecture of
8 these elements on the common support structure
9 contains these modules, of which four are
10 mentioned in the claims. And by being modular,
11 the configuration of the system is in such a way
12 that it can be put together in an efficient way or
13 in a way that is, in general, convenient. And I
14 don't want to use language that is not used in the
15 patent. I'll just stick to what they specify on
16 column 15, specifically on "modular system
17 architecture may simplify installation and
18 upgrades."

19 Q What is switchgear?

20 A Switchgear is what the term suggests,
21 namely it's a piece of equipment whose internal
22 gear, the elements that it contains, allows to

1 transfer power from one element to another by
2 using switches, relays, circuit breakers and all
3 that internal gear that allows the power to be --
4 electrical power in particular in this case -- to
5 be transferred from one element to another safely
6 or interrupted in case there is an issue and do
7 this kind of management in an -- in an acceptable
8 manner.

9 Q What are the various functions that
10 switchgear perform in a power distribution system?

11 A Those are fairly standard. And the
12 functions, again, have to do with -- that's where
13 the term "switch" is used. So those functions can
14 include turning on or off a line, doing that as
15 programmed or doing this automatically or doing
16 this in response to an event, for safety reasons,
17 or to implement a certain scenario, all of these.

18 Q What about isolation, is isolation a
19 function performed by a switchgear in a power
20 distribution system?

21 A What do you mean isolation? Isolation,
22 what -- I mean, I can understand it as described.

1 For example, mentioned in -- the word "isolating a
2 ground switch," for example, is used on column 15,
3 but do you mean something specific? What would be
4 isolated from what?

5 Q Isolation of power distribution equipment
6 from other equipment.

7 A Well, this can -- a switchgear can be used
8 to be -- to be in between elements that share
9 power sources and syncs of power, so in that way
10 it can be intermediary, if you are using the term
11 isolation in that sense.

12 Q Do power distribution systems commonly
13 have multiple switchgear?

14 A You mean multiple units? That is a unit,
15 right? Switchgear, again, refers to a unit that
16 has all these capabilities. So for a certain
17 function, for certain unit, the switchgear
18 involves a big box, so to speak, that accomplishes
19 these functions. Depending on what kind of system
20 you have physically, you use switchgear as
21 necessary by the design of the system.

22 (Exhibit 1003 was referenced.)

1 BY MR. WALTERS:

2 Q Can you look at Exhibit 1003.

3 A Exhibit 1003. One second, please.

4 Q This is Dr. Durham's declaration in this
5 proceeding.

6 A Yes, I opened it. Yeah, I'm looking at
7 Dr. Durham's document.

8 Q Specifically at the top of
9 exhibit page 49.

10 A 49. Exhibit page 49, yes.

11 Q There's a definition of "switchgear"
12 provided there. Do you see that?

13 A Yes.

14 Q Do you agree with that definition?

15 A Yes. Yes, that's a good way to put it.

16 Q Okay. Is it fair to say that one of the
17 functions of switchgear to isolate electrical
18 equipment from other components?

19 A Isolate, again, in the sense of what -- I
20 mean, equipment can be -- or from what other
21 components would you refer to? Components can be
22 anything.

1 Q What does "isolate" mean to you?

2 A "Isolate," I understand it as creating an
3 environment around something so that it cannot be
4 reached by something else.

5 Q Is that a function of switchgear?

6 A It depends what is the something in
7 "something else" that you are referring to.

8 Q Can switchgear isolate some components
9 from other components?

10 MR. QUARLES: Object to form.

11 A Components of what, for -- I mean, I --
12 the function of the switchgear is well described
13 in the summary that you present there. It's a
14 good summary. And beyond that, for example, if
15 you -- if you -- let me give you an example as I
16 understand it.

17 A switchgear has switches or a circuit
18 breaker, so if a switch is off or the circuit
19 breaker has been activated, obviously one -- these
20 are elements in the line and obviously there is no
21 electricity flowing in that line so one part of
22 the line is isolated from the other part of the

1 line.

2 But examples like that can be of various
3 kinds and I don't know exactly what you're
4 referring to when you say component and component.
5 That can be anything. And what "isolation" would
6 mean, again, could be anything that one can think
7 of in terms of what that term might entail.

8 BY MR. WALTERS:

9 Q Can the term switchgear refer to multiple
10 circuit breakers?

11 A A switchgear may have circuit breakers,
12 multiple circuit breakers, yes.

13 Q Can the term simply refer to multiple
14 circuit breakers?

15 MR. QUARLES: Objection. Form.

16 A The term switchgear may have more material
17 than that, more gears, so to speak, to stick to
18 that term.

19 BY MR. WALTERS:

20 Q Sure.

21 Can the term simply refer to multiple
22 circuit breakers?

1 MR. QUARLES: Objection. Form.

2 A It depends on what kind of a switchgear
3 you're using for a system. Again, the very
4 definition that you are using from Dr. Durham
5 says, and I agree, that switchgear is a general
6 term.

7 BY MR. WALTERS:

8 Q As used in the '878 Patent, can multiple
9 circuit breakers be considered switchgear?

10 MR. QUARLES: Objection. Form.

11 A The patent says switchgear in general,
12 so -- and in fact, it gives some description of
13 what this switchgear might entail. And I don't
14 remember off the top of my head all the different
15 elements that are there, but there is quite a
16 detailed description of things that the switchgear
17 might deliver.

18 BY MR. WALTERS:

19 Q So I don't -- I'm looking at your answer.
20 I don't think you answered my question, so just to
21 be clear I'll ask it again.

22 As used in the '878 Patent, can multiple

1 circuit breakers be considered switchgear?

2 MR. QUARLES: Objection. Form.

3 A The '878 Patent gives a description of
4 what a switchgear might be, but they don't confine
5 it to just several circuit breakers. It gives the
6 term "switchgear" in general, and I agree the
7 definition as shown in Dr. Durham's document that
8 "switchgear" is a general term covering everything
9 that follows that.

10 BY MR. WALTERS:

11 Q Can a single circuit breaker be considered
12 switchgear in the '878 Patent?

13 MR. QUARLES: Objection. Form.

14 A The '878 Patent does not specify anything
15 like that. It gives a general reference to
16 switchgear and it gives some examples of what this
17 switchgear might entail.

18 BY MR. WALTERS:

19 Q Can you turn to column 4 of the
20 '878 Patent.

21 A Yes.

22 Column 4, yes.

1 Q Specifically at line 7.

2 A Line 7, yes.

3 Q Where it states, "In embodiments, the
4 switchgear may refer to a single breaker." Do you
5 see that?

6 A Yes.

7 Q So in the '878 Patent can a single breaker
8 be considered switchgear?

9 A According to this statement, in some
10 embodiments, yeah. Yeah, that escaped my memory,
11 actually. So indeed it is specifically mentioned
12 that in embodiments the switchgear may refer to a
13 single breaker, that is correct.

14 Q Can multiple breakers be considered
15 switchgear?

16 MR. QUARLES: Objection. Form.

17 A In general, yes. Although I will have to
18 check again whether the patent specifically
19 mentions that or not, but if a single breaker can
20 be considered switchgear, multiple -- multiple
21 breakers would be considered switchgear as well.

22 (IPR2025-00139 Petition was referenced.)

1 BY MR. WALTERS:

2 Q Can you pull up the '878 Petition.

3 A What exhibit number is that, sir?

4 Q It's not an exhibit number, it's the
5 original brief.

6 A Oh, it's in the other list. Give me just
7 one second.

8 So which document again did you say?

9 Q The Petition.

10 A The IPR Petition '878 --

11 Q Correct.

12 A -- dated 2024-11-20?

13 Q Yes.

14 A Very good. Yeah. It's Case Number
15 IPR2025-00139, right?

16 Q Yes.

17 A Very good.

18 Q Do you understand what the IPR Petition
19 is?

20 A It's -- well, I understand it in layman's
21 terms. I don't have any legal training, but I
22 understand that there is a petition from the party

1 that is named here, Liberty Energy and Liberty
2 Energy Services versus U.S. Well Services, and
3 there's a Petition about the invalidity of this
4 patent, which has initiated this inter partes
5 review.

6 Q Can you turn to pages 16 and 17 of the
7 Petition?

8 A 16 and 17.

9 Page 16, yes.

10 Q On page 16 and 17, the grounds of
11 invalidity of the Petition are identified. Do you
12 see that?

13 A I do.

14 Q Okay. You understand that each of the
15 Petition's invalidity grounds relies on either the
16 Premset Catalog or the Premset Brochure in
17 combination with the Morris and Oehring IV
18 references?

19 A The Morris and Oehring references, yes,
20 sir.

21 Q And you understand that each ground relies
22 on the combination of the Premset Catalog or the

1 Premset Brochure with Morris and Oehring IV
2 references?

3 A Help me understand what is the Premset
4 Catalog or the Brochure that you mention.

5 Q They're identified in that table.

6 A How are those identified again?

7 Q Do you know what the Premset Catalog and
8 the Premset Brochure are?

9 A Help me understand this precisely, to make
10 sure I don't misinterpret the term.

11 Q I'm just asking you if you know what those
12 two references are.

13 A As a technical term, Premset is something
14 I'm not very familiar with. I did go over Morris
15 and Oehring and the arguments put forth regarding
16 how these were considered to anticipate claims in
17 the '878 and all that business, but the term
18 "Premset" I'm not familiar with.

19 (Exhibit 2013 marked for identification.)

20 BY MR. WALTERS:

21 Q Can we look at your declaration --

22 A Yes.

1 Q -- which is Exhibit 2013.

2 A Declaration, Exhibit -- yes, sir.

3 Yes, that's what I'm looking at.

4 Q Specifically in Section VIII, which is on
5 page 35.

6 A Page 35, yes.

7 Q Section VIII is where you state your
8 opinions as to whether the prior art anticipates
9 or renders obvious the claims of the '878 Patent.

10 A Correct.

11 Q In this analysis you do not offer an
12 opinion regarding the disclosure of the Premset
13 Catalog?

14 MR. QUARLES: Objection. Form.

15 A I'll have to -- to be honest with you, I
16 concentrated on technical arguments based on the
17 specific documents that I mention there one by
18 one. Whether the term "Premset" was used there or
19 whether I used it, I'll have to do a quick search.

20 (Document Review)

21 So in my declaration, for example, I see
22 that there is this term, but I concentrate on the

1 term "Exhibit 1007," for example, and from that
2 we -- I concentrated on the technical aspects of
3 this to have an opinion about how the portion of
4 the '878 specifications may correspond or may be
5 associated with disclosures in this.

6 The term "Premset Catalog," to be honest
7 with you, never registered in my mind. I always
8 used the term "Exhibit 1007," or Exhibit whatever
9 the exhibit number was.

10 BY MR. WALTERS:

11 Q You do not offer an opinion regarding the
12 motivation to combine the Premset Catalog with the
13 Morris and Oehring IV references, correct?

14 MR. QUARLES: Objection. Form.

15 A You mean my declaration?

16 BY MR. WALTERS:

17 Q Yes.

18 A In my declaration I offer an assessment,
19 an evaluation, and an opinion as to how
20 combination of these prior patents leads to
21 anticipating or rendering obvious the '878 Patent.

22 Q Where in your declaration do you offer an

1 opinion regarding the motivation to combine the
2 Premset Catalog with the Morris and Oehring IV
3 references?

4 A I'm not sure I am following this. There
5 is -- there is a section, "Motivation to Combine,"
6 and which is in the patent. And there is
7 discussion about whether a POSITA would have been
8 motivated. So they show motivation appears in my
9 declaration in various places. If that is what
10 you are asking, that has been mentioned in the
11 declaration and addressed in a number of places.

12 Q That's not what I'm asking.

13 A Uh-huh.

14 Q I'll go back to my prior question.

15 A Okay.

16 Q You do not offer an opinion regarding the
17 motivation to combine the Premset Catalog with the
18 Morris and Oehring IV references, correct?

19 MR. QUARLES: Objection. Form.

20 A I -- well, I analyze those in very detail,
21 so I'll have to go back and check my declaration
22 how I address this issue specifically. Do I have

1 some time --

2 BY MR. WALTERS:

3 Q Sure.

4 A -- to check that?

5 Okay. So, again, to make sure that I
6 don't look for the wrong thing, you're asking do I
7 address in my declaration whether -- the issue of
8 motivation for combining Morris and Oehring, for
9 example, correct?

10 Q With the Premset Catalog.

11 A With the Premset Catalog.

12 (Document Review)

13 Okay. So, as I mentioned, again, the
14 issue of motivation is addressed in several places
15 in the declaration. The very term "Premset," as I
16 also mentioned, I didn't pay much attention
17 because with Premset there was an
18 exhibit associated when I looked at the technical
19 details of issues of patents from like Morris, for
20 example, or Oehring, which is why I didn't pay
21 much attention at the term "Premset," which I
22 consider a technical term, referring to the

1 specific exhibits.

2 And as far as addressing Premset
3 specifically, for example, on page 38 of the
4 exhibit of my declaration there is a statement
5 that, "Petitioners also assert Premset Catalog
6 (Exhibit 1007) and Premset Brochure
7 (Exhibit 1008), both of which address only
8 switchgear and thus do not disclose or render
9 obvious the Common Support Structure limitation."

10 So I looked at the corresponding exhibits,
11 1007 and 1008, and I only found there things
12 whether there was any motivation suggested by any
13 of these.

14 I do have opinions in various places of
15 the -- of my declaration, as I mentioned, and I
16 can refer to any one of those specifically,
17 depending on what exactly you would like to find
18 out from this.

19 Q Sure. Can you point me to where you offer
20 an opinion regarding the motivation to combine the
21 Premset Catalog with the Morris and Oehring IV
22 references?

1 A So, let me see again. Give me just one
2 second to make sure I don't misstate or mis-assign
3 numbers.

4 So Morris and Oehring, these two, correct?
5 Let me write it down.

6 Q With the Premset Catalog.

7 (Document Review)

8 A So, first of all, the catalog, as I
9 mentioned, is -- it is referred to in that
10 footnote on page -- which one was this -- 38. Let
11 me go there.

12 So at page -- let me find -- page 38 of
13 the exhibit, "Petitioners also assert Premset
14 Catalog (Exhibit 1007) and Premset Brochure
15 (Exhibit 1008)." That's from Dr. Durham's
16 declaration.

17 And then further down in my declaration,
18 for example, on page 73 of the exhibit there is a
19 statement, "A POSITA would disagree that the
20 Petition provides any motivation to combine
21 Oehring" -- "Oehring's VFD with Morris's system."
22 Were those two the elements you were looking for

1 in terms of motivation? And further -- and the
2 text continues, but I don't want to take too much
3 time on the wrong thing.

4 It continues, for example, "I disagree
5 that a POSITA would be motivated to combine
6 Oehring IV and Morris," and it continues further
7 down.

8 Q This is starting at paragraph 88?

9 A Correct, yes.

10 Q So is it your opinion that that section
11 addresses the motivation to combine the Premset
12 Catalog with the Morris and Oehring IV references?

13 A Yes.

14 Q Where is the Premset Catalog mentioned in
15 that section?

16 A In that section it's not mentioned. It's
17 mentioned earlier on on page 38 of the exhibit.
18 And the general statement is that there is no
19 suggestion for a common platform. And those two
20 patents, Oehring IV and Morris, refer to elements
21 in those two exhibits for the corresponding
22 Premset Catalog and Brochure.

1 Q It's your opinion that Footnote 3
2 addresses the motivation to combine the Premset
3 Catalog with the Morris and Oehring IV references?

4 MR. QUARLES: Objection. Form.

5 A So, I'll read Footnote 3. So,
6 "Petitioners also assert Premset Catalog and
7 Premset Brochure, both of which address only
8 switchgear and thus do not disclose or render
9 obvious the Common Support Structure limitation."

10 The Oehring and Morris patents have to be
11 combined if we are to consider the claims of the
12 '878 Patent. So part of the combination is
13 elements included in 1007 -- the Premset Catalog
14 and the Premset Brochure, and page 878 -- no, I'm
15 sorry, page -- page 74 -- ah, again the wrong
16 one -- page 73 of my declaration at paragraph 88
17 makes the case that there was no motivation to
18 combine these two elements.

19 BY MR. WALTERS:

20 Q What two elements?

21 A Of the patents by Oehring and Morris.

22 Q So it's your opinion -- strike that.

1 It's your testimony for the Board that you
2 provide an opinion as to the motivation to combine
3 the Premset Catalog with other prior art
4 references in the analysis starting on page 73 of
5 your declaration and in the footnote on page 38 of
6 your declaration, correct?

7 MR. QUARLES: Objection. Form.

8 A Again, I may have missed the sequence here
9 with all the interruptions. Could you be kind
10 enough to repeat this?

11 BY MR. WALTERS:

12 Q Sure. It's your testimony for the Board
13 that you provide an opinion as to the motivation
14 to combine the Premset Catalog with other prior
15 art references in the analysis starting on page 73
16 of your declaration and in the footnote on page 38
17 of your declaration?

18 MR. QUARLES: Objection. Form.

19 A Let me try to answer that one more time by
20 checking these two elements, page 73 and page 38.
21 Give me just one second to make sure that I don't
22 miss any of the details there.

1 (Document Review)

2 So the Premset Catalog, as explained on
3 page 80 of Dr. Durham's declaration is a
4 switchgear catalog.

5 So I understand, then, the question refers
6 to whether there is motivation to combine
7 switchgear with other elements, and that would be
8 suggested by Oehring and Morris given that, again,
9 Premset is a switchgear catalog?

10 BY MR. WALTERS:

11 Q The question was where you address the
12 motivation to combine the Premset Catalog
13 reference with other prior art references in your
14 declaration.

15 A Okay. Give me, again -- I may have --
16 well, in combining Morris and Oehring, I may not
17 have addressed exactly the Premset part, because
18 it was -- I notice the combination I addressed a
19 moment ago combining Oehring and Morris was about
20 a VFD. But let me check one more time my
21 declaration to see where I address the switchgear
22 issue and how that could be combined with any

1 other components. Just one second.

2 (Document Review)

3 I apologize for a second. Acrobat
4 crashed, so I have to reopen all files. I'm
5 almost done, though.

6 Okay. I opened my declaration again.

7 So page 68 of my declaration states that,
8 "my opinion that Payne provides" -- at the very
9 top -- "Payne provides a POSITA no teaching,
10 suggestion, or motivation for combining its
11 fracturing pump units, transformers, and
12 switchgear onto a common support structure."

13 So switchgear is what the catalog, the
14 Premset, refers to as used in this context. And
15 in this sentence there's a claim that this prior
16 art does not provide any motivation for a POSITA
17 to combine switchgear with these other elements on
18 a common support structure.

19 Q When you say "this prior art," you're
20 referring to the Payne reference?

21 A Yeah, that's what this sentence says
22 specifically.

1 Q And this is in paragraph 78 of your
2 declaration?

3 A It's in paragraph 78, that is correct,
4 yes.

5 Q And so it's your testimony for the Board
6 that paragraph 78 of your declaration addresses
7 the motivation to combine the Premset Catalog
8 reference with the Morris and Oehring IV
9 references?

10 MR. QUARLES: Objection. Form.

11 A The Morris and Oehring IV references do
12 not just look at switchgear. We have addressed
13 these in the context of VFD in different context.
14 I can -- I can look at those again to see to what
15 extent they refer to switchgear.

16 BY MR. WALTERS:

17 Q Let me ask the question again --

18 A Yeah.

19 Q -- a different way.

20 A Yeah.

21 Q It's your testimony for the Board that
22 paragraph 78 of your declaration addresses the

1 motivation to combine the Premset Catalog
2 reference with other prior art references?

3 A Yes.

4 MR. QUARLES: Objection. Form.

5 BY MR. WALTERS:

6 Q Okay. Is it also your testimony for the
7 Board that paragraph 78 of your declaration
8 addresses the motivation to combine the Premset
9 Brochure reference with other prior references?

10 MR. QUARLES: Objection. Form.

11 A Let me make sure that I address that by
12 checking what exactly is the specific content of
13 the Premset Brochure. Give me just one second
14 again.

15 (Document Review)

16 Yeah, so the question was whether this --
17 the previous question you asked, it is the same
18 question for the latest round with "catalog"
19 replaced by "brochure" -- correct -- for Premset?

20 BY MR. WALTERS:

21 Q Yes.

22 A Yes, the answer is yes. The same answer

1 as previously for the catalog in the sense, again,
2 that this statement addresses motivation for
3 combining elements from the Premset Brochure with
4 other -- that means switchgear, actually -- from
5 the Premset Brochure with other elements.

6 Q It's your testimony for the Board that
7 paragraph 78 of your declaration addresses the
8 motivation to combine the Premset Brochure
9 reference with other prior art references?

10 A Yes.

11 MR. QUARLES: Objection. Form.

12 MR. WALTERS: Would now be a good time to
13 take a short break?

14 THE WITNESS: Sure.

15 THE COURT REPORTER: Off the record.

16 (A break was taken from 10:37 a.m. to
17 10:47 a.m.)

18 MR. WALTERS: Welcome back, Dr. Nikolaou.

19 THE WITNESS: Thank you, Mr. Walters.

20 BY MR. WALTERS:

21 Q What is a fixed frequency drive?

22 A A fixed frequency drive is an electric

1 drive that provides power at a single fixed
2 frequency.

3 Q What is a variable frequency drive?

4 A It's an electric drive that can provide
5 power over a range of frequencies.

6 Q What are the benefits of using a fixed
7 frequency drive?

8 A Compared to variable frequency drive?

9 Q Yes.

10 A It's simplicity. Obviously to achieve
11 variable frequencies in a VFD, a variable
12 frequency drive, you need more sophistication. So
13 that has certain advantages, because you provide
14 power at variable frequencies, over a range of
15 frequencies. That also includes disadvantages of
16 having more complex equipment both to build and to
17 maintain.

18 So a fixed frequency drive is simpler, if
19 that is what you need in terms of providing power
20 at a single frequency. It's good for the task if
21 you need to provide power at variable frequencies,
22 you may use a VFD.

1 Q What are the benefits of using a variable
2 frequency drive?

3 A That you may have applications where a
4 single frequency is not enough. Typical examples
5 may be when you want to turn a motor, for example,
6 at a rpm that varies, you can accomplish that by
7 varying the frequency of the drive.

8 Q Can both fixed frequency drives and
9 variable frequency drives, be used to control an
10 electrical motor?

11 A Yes, with different capabilities, as I
12 explained, that is correct.

13 Q When might one choose to use a variable
14 frequency drive over a fixed frequency drive to
15 control an electric motor?

16 A In general, when the motor does not have
17 to operate at a single rpm, revolutions per
18 minute. If you need the motor to operate at a
19 range of frequencies, it would likely be a VFD
20 that you would use to accomplish that. If the
21 motor can provide what you need at a single rpm, a
22 single frequency drive might be good.

1 Q Do fracking systems typically encounter
2 varying flow rates and pressures in a fracking
3 operation?

4 A Pressures you mean for pumping water into
5 the ground, correct? I mean, the motor would
6 drive a pump and the pump would pump water into
7 the well to accomplish the fracturing. That's
8 what you refer to by "pressure," as I understand
9 it, correct?

10 Q Yes.

11 A Yeah, so the -- yeah, the pressure --
12 there are specific profiles of pressure that need
13 to be followed so you can accomplish the
14 fracturing operation, yes.

15 Q Do you agree that varying flow rates and
16 pressures in a fracturing operation can cause the
17 electrical load to change?

18 A Yes, I agree.

19 Q Might one want to use a variable frequency
20 drive to account for the change in electrical load
21 in a fracturing operation?

22 MR. QUARLES: Objection. Form.

1 A Well, that -- it's probably in reverse.
2 Namely, if one uses a variable frequency drive the
3 corresponding electrical load would vary
4 accordingly.

5 BY MR. WALTERS:

6 Q Is that desirable in a fracking operation?

7 MR. QUARLES: Objection. Form.

8 A It's one -- you mean to have a -- whether
9 it is desirable to have a varying electrical load?

10 BY MR. WALTERS:

11 Q Yes.

12 A It's -- by itself, it's not the primary
13 concern whether you want it to vary or not.
14 The -- the main objective is to have the fluid
15 pumped into the well following a certain flow rate
16 and pressure profile. And you can accomplish that
17 by adjusting a number of parameters. That can be
18 by adjusting the pump or by having a pump that is
19 not necessarily adjusted but you can adjust flow
20 rate by a valve at the exit of the pump. And to
21 adjust the pump, you may use a variable frequency
22 drive, because that would adjust the motor of the

1 pump.

2 (Exhibit 1006 was referenced.)

3 BY MR. WALTERS:

4 Q Can you pull up Exhibit 1006, which is the
5 Oehring IV reference.

6 A Exhibit 1006, yes.

7 Q Specifically can you look at paragraph 9.

8 A Paragraph 9. Yes, I'm looking at -- oh,
9 paragraph 9. It has two columns, right? Or, no,
10 I'm sorry, I'm on the wrong -- paragraph 9.

11 Okay. Paragraph 9 that starts, "In
12 hydraulic fracturing," et cetera, et cetera,
13 right?

14 Q Yes.

15 A Yes.

16 Q Feel free to read that paragraph to
17 yourself.

18 (Document Review)

19 A Yes, it's -- it's an accurate statement.
20 It's factually correct.

21 Q And Oehring IV teaches here to use a
22 variable frequency drive to apply more or less

1 torque and throttle the pump motors up or down,
2 correct?

3 A In this paragraph it doesn't talk about
4 VFD, but it talks -- the patent talks about "pump
5 motors are required to 'throttle' up or 'throttle'
6 down (applying more or less torque from a variable
7 frequency drive)." That's what you are referring
8 to?

9 Q Yes.

10 A Yes.

11 Q The paragraph does talk about a variable
12 frequency drive, correct?

13 A Oh, yes. Yes. Yes.

14 Q Do you agree with Oehring that a variable
15 frequency drive operates as described in
16 paragraph 9?

17 A Yes.

18 Q Was it common in 2018 to use cables to
19 distribute electrical power in a hydraulic
20 fracturing facility?

21 A Yes.

22 Q Was it common to protect those cables that

1 were used for distributing electrical power?

2 A Yes.

3 Q Why would one want to protect the cables?

4 A To avoid accidents, to start with.

5 Q Safety reasons?

6 A Yes.

7 Q What methods were used to protect power
8 distribution cables at fracking facilities?

9 A Anything that would be standard from
10 putting a shield around cables for creating a
11 conduit that would be used to have the cables
12 inside. Anything standard.

13 Q Burying cables underground?

14 A If that is allowed by the configuration,
15 yes, yes.

16 Q Elevating the cables?

17 A Elevating? You mean so that they cannot
18 be reached, or...

19 Q Yes.

20 A Again, those are things on which I have a
21 general knowledge and I may not be able to offer
22 specific details beyond what I already mentioned.

1 But any -- those were methods that people were
2 using -- "those" meaning standard methods for
3 protecting cables were routinely used in
4 fracturing operations.

5 Q Using cable trays?

6 A Cable trays? If cable had to be run
7 underneath certain level, such as a ceiling or a
8 floor, yes.

9 Q Can you think of any other ways that were
10 used to protect power distribution cables in
11 fracking operations?

12 A What we mentioned comes to mind. The
13 general idea -- and this is -- again, this is not
14 confined to fracturing operations alone, it's the
15 standard practice for protecting power cables,
16 namely shield them so to reduce the possibility
17 that they may come in contact with anything else,
18 and if inadvertently they come in contact with
19 anything else protect them so that there is no
20 breaking of whatever shields the cable from its
21 environment.

22 Q Can you turn back to the '878 Patent.

1 A '878 Patent. Give me just one second.

2 '878 Patent, yes.

3 Q Can you look at the "Technical Field"
4 section, which is in column 1.

5 A The very first column of the cover page?

6 Q No, column 1.

7 A Oh, column 1, I'm sorry.

8 "Technical Field," yes, sir.

9 Q The "Technical Field" of the '878 Patent
10 includes "power distribution systems"?

11 A The "Technical Field," yeah, I can -- I
12 can read it: "This disclosure relates generally
13 to hydraulic fracturing and more particularly to
14 systems and methods for module switchgear and
15 power distribution systems."

16 Q Power distribution systems would include
17 power distribution equipment, correct?

18 A Yes.

19 Q And the power distribution equipment would
20 include switchgear?

21 A Typically, yes.

22 Q The power distribution equipment would

1 include generators?

2 A If power is generated on the spot, yes,
3 which is the case here, there is a gas turbine.

4 Q And the power distribution equipment would
5 include transformers?

6 A Again, yeah, it's in the context here of
7 AC power, so, yes.

8 Q And the power distribution equipment would
9 include cables?

10 A Certainly.

11 Q Can you look at column 2, line 15 of the
12 patent.

13 A Yes. Yes, I'm right there.

14 Q In this paragraph, the patent states that
15 during fracturing operations cables, hoses, and
16 the like may extend across various locations at
17 the well site. Do you see that?

18 A Yes.

19 Q And, "This may generate traffic or
20 congestion."

21 A Correct.

22 Q Later on in that paragraph, the patent

1 states that it is challenging to hook up hoses and
2 cables to desired locations?

3 A Yes, it's line 21-22.

4 Q And then another challenge is that
5 "operators may be confused when connecting or
6 disconnecting equipment"?

7 A Yes, lines 19-20.

8 Q And then the next paragraph, the patent
9 identifies that one of its goals is managing power
10 generation?

11 A There, the very last paragraph of this
12 section, "Therefore it may be desirable to devise
13 a means by which turbine power generation can be
14 managed at an output usable by fracturing
15 equipment," yes.

16 Q I'd like to go back to your declaration,
17 Exhibit 2013.

18 A Yes, I'm there.

19 Q Specifically at pages 67 to 68?

20 A Pages 67 to 68. Yes, I'm there.

21 Q Paragraph 78.

22 A Yes.

1 Q Here you state that Payne teaches that
2 switchgear are on a separate support structure
3 than the fracturing pump units?

4 A Yes.

5 Q And those separate support structures for
6 switchgear are switchgear trailers 80a to 80b?

7 A Switchgear trailer -- yeah, the very last
8 line of that page.

9 Q Is it your opinion that switchgear
10 trailers 80a to 80b are Payne's only teaching of
11 switchgear?

12 MR. QUARLES: Objection. Form.

13 A Are you asking whether he mentions
14 anything different -- any configuration different
15 from what is shown on 80a through 80b?

16 BY MR. WALTERS:

17 Q I'm asking whether Payne discloses
18 switchgear other than through switchgear
19 trailers 80a to 80b.

20 A That's what he shows in the schematics.
21 But I can do one quick check again to see if he
22 teaches anything in addition to that.

1 Q Okay.

2 A So, Payne and -- which number is this, if
3 you have it handy?

4 Q 1013.

5 A 1013. Thank you.

6 (Document Review)

7 Again, I don't find anything, again, from
8 a search on "Payne" other than what I have in my
9 declaration?

10 (Exhibit 1004 was referenced.)

11 BY MR. WALTERS:

12 Q I'd like to look at the Morris reference,
13 Exhibit 1004.

14 A Exhibit 1004. Let me open that.

15 Okay. I'm there.

16 Q Specifically at paragraph 37.

17 A Yes.

18 Q The first sentence of paragraph 37 states,
19 "The switchgear transport 108 could also be set up
20 to act as a hub." Do you see that?

21 A Yes.

22 Q What does that mean, "could also be"?

1 A "Could also be." In addition -- "also"
2 means in addition to what has already been
3 mentioned.

4 Q Does it mean that Morris's teaching that
5 the switchgear transport must be set up to act as
6 a hub?

7 MR. QUARLES: Objection. Form.

8 A It means what it says. My understanding
9 that's -- it is stated that it could also be set
10 up to act as a hub.

11 BY MR. WALTERS:

12 Q Does it mean --

13 A Or it -- I'm sorry, yeah, go ahead.

14 Q Does it mean that Morris's teaching that
15 the switchgear transport must be set up to act as
16 a hub?

17 MR. QUARLES: Objection. Form.

18 A It means, again, what it says, that it
19 "could also be set up to act as a hub for
20 receiving control and monitoring information for
21 fracturing fleet."

22 BY MR. WALTERS:

1 Q Does it mean that Morris's teaching that
2 the switchgear transport may be set up to act as a
3 hub?

4 A So you're asking whether "could" can be --
5 no pun intended -- can be replaced by "may"?

6 Q Yes.

7 A To the extent that one could interpret
8 "could" and "may" as the same thing, yes.

9 Q Do you interpret "could" and "may" as the
10 same thing?

11 A In this sentence: "The switchgear
12 transport may also be set up to act," this, yes, I
13 would understand as the same thing.

14 Q Does this mean that when implementing
15 Morris, in some cases the switchgear transport may
16 not be set up to act as a hub?

17 MR. QUARLES: Objection. Form.

18 A That, I haven't studied. I'll have to go
19 back to the patent and read again the details to
20 see what exactly are the limitations and whether
21 that is allowed or not. But I'm, again, confining
22 myself to what the patent itself states as to what

1 configurations are suggested.

2 BY MR. WALTERS:

3 Q Based on this sentence at paragraph 37, is
4 Morris teaching that in all instances the
5 switchgear transport will be set up to act as a
6 hub?

7 MR. QUARLES: Objection. Form.

8 A By this sentence alone there is no
9 suggestion that this would be the only
10 configuration, clearly, no, because it says,
11 "could also be" -- "could also be set up," so it's
12 another possibility.

13 MR. WALTERS: I don't have any further
14 questions, so I'll pass the witness.

15 MR. QUARLES: Let me -- let's take a
16 ten-minute break and I'll consult my notes.

17 THE COURT REPORTER: Off the record.

18 (A break was taken from 11:13 a.m. to
19 11:23 a.m.)

20 MR. QUARLES: No further questions.

21 (Time Noted: 11:23 a.m.)

22

1 CERTIFICATE OF SHORTHAND REPORTER

2

3 I, LINDA RUSSELL, Certified Reporter
4 within and for the State of Texas, do hereby
5 certify:

6 That MICHAEL NIKOLAOU, PH.D., the witness
7 whose deposition is hereinbefore set forth, was
8 duly sworn by me before the commencement of such
9 deposition and that such deposition was taken
10 before me and is a true record of the testimony
11 given by such witness.

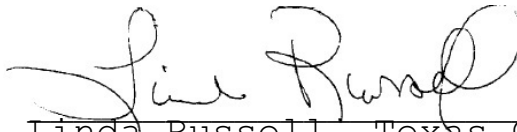
12 I further certify that the all parties
13 were represented by counsel at the deposition.

14 I further certify that the deposition of
15 MICHAEL NIKOLAOU, PH.D., occurred remotely via
16 Zoom videoconference on Friday, December 5, 2025,
17 commencing at 9:31 a.m. to 11:23 a.m. CST.

18 I further certify that I am not related
19 to any of the parties to this action by blood or
20 marriage, I am not employed by or an attorney to
21 any of the parties to this action, and that I am
22 in no way interested, financially or otherwise, in

1 the outcome of this matter.

2
3
4 IN WITNESS WHEREOF, I have hereunto set
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ACKNOWLEDGMENT OF DEPONENT

I, Michael Nikolaou, Ph.D., do hereby
acknowledge that I have read and examined the
foregoing testimony, and the same is a true, correct
and complete transcription of the testimony given by
me and any corrections appear on the attached Errata
sheet signed by me.

12/19/2025

(Date)



(Signature)

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