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UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIBERTY ENERGY, INC. AND	)	
LIBERTY OILFIELD SERVICES,	)	
LLC,	)	
Petitioners,	)	Case No. IPR2025-00031
vs.	)	Patent 10,655,435
U.S. WELL SERVICES, LLC	)	
Patent Owner.	)	

REMOTE ORAL DEPOSITION
MICHAEL NIKOLAOU, PH.D
October 31, 2025

ORAL DEPOSITION OF PETITIONER, produced as a witness at the instance of the Petitioners and duly sworn, was taken in the above-styled and numbered cause on the 31st day of October, 2025, from 9:34 a.m. to 12:54 p.m., before Laurie Carlisle, Certified Shorthand Reporter certified in Texas, California and Louisiana, reported by computerized machine shorthand, via videoconference.

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1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

INDEX

MICHAEL NIKOLAOU

Examination by Mr. Walters 4

EXHIBITS

(None marked)

1 MICHAEL NIKOLAOU,
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.

8 Q. Where are you physically located today?

9 A. I am in my house in Houston, Texas.

10 Q. You've been deposed before?

11 A. I have.

12 Q. How many times?

13 A. About ten.

14 Q. And you understand you've been sworn to
15 testify truthfully to the best of your ability?

16 A. Yes.

17 Q. Is there any reason you cannot testify
18 truthfully today?

19 A. No.

20 Q. What did you do to prepare for today's
21 deposition?

22 A. I reviewed material that is related to

1 the subject of this deposition; namely, my
2 declaration and references in that. I had a
3 session with Mr. Quarles yesterday, where we
4 reviewed that material as well.

5 Q. Did you review any material that is not
6 referenced in your declaration?

7 A. Not referenced, no.

8 Q. You met with Mr. Quarles yesterday?

9 A. Online, yes.

10 Q. Was there anyone else at that meeting?

11 A. No, there was no other person in that
12 meeting.

13 Q. About how long did the meeting last?

14 A. About five, six hours.

15 Q. At what rate are you being compensated
16 for your time in this matter?

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

18 Q. And you submitted a declaration in this
19 proceeding, which is --

20 A. Yes.

21 Q. -- Exhibit 2010?

22 A. Exhibit 2010, yes, sir.

1 Q. And that declaration accurately states
2 your opinions?

3 A. Yes.

4 Q. The patent at issue in this proceeding is
5 US Patent No. 10,655,435, correct?

6 A. Correct.

7 Q. What's your understanding of the novelty
8 of the '435 patent?

9 A. My understanding of the novelty of this
10 patent is that it offers a way to monitor a system
11 that is used for hydraulic fracturing in oil and
12 gas wells.

13 Q. What is that way?

14 A. The way of monitoring?

15 Q. Yes.

16 A. It is described in the patent in text and
17 figures, and I can give you details depending on
18 what we want to focus on.

19 Q. Sure.

20 Can you provide a summary of the way
21 of monitoring that you have stated is the alleged
22 novelty of the '435 patent?

1 A. Yes. In fact, is it okay if I read from
2 the abstract of the patent, which is a pretty good
3 description of what they claim the novelty to be?

4 Q. Sure.

5 A. So the hydraulic fracturing system
6 further includes a control system which controls
7 the plurality of sensor devices configured to
8 measure one or more parameters of the plurality of
9 pumps. Those are the pumps that will provide
10 pressurized water for the fractures to open up.

11 And continuing from the abstract,
12 and the distribution system, one or more
13 processing devices configured to receive and
14 analyze the one or more parameters measured by the
15 plurality of sensing devices and generate control
16 instructions based at least in part on the one or
17 more parameters in one or more control devices
18 configured to receive the control instructions and
19 control one or more aspects of the plurality of
20 pumps or the distribution system based on the
21 control instructions.

22 So this is an overview that says,

1 basically, there are measurements. Measurements
2 are processed, and action is taken. Details are
3 provided in the text that follows this abstract.

4 Q. I'd like to -- let me ask a couple of
5 questions.

6 Do you have any materials in front
7 of you today?

8 A. I have the exhibits, but -- those are
9 clean files of the exhibits that are listed in the
10 declaration. That list includes the declaration
11 itself as well as the patent and several other
12 documents included in that list. Those are
13 exhibits from 1001 to 2017.

14 Q. Anything else?

15 A. My computer screen. Nothing else.

16 Let me close this, by the way.
17 Apologies. Let me see my email. I can close that
18 so I won't be distracted. I closed everything,
19 and I have the list of exhibits associated with my
20 declaration.

21 Q. I'd like to turn to Exhibit 1006, which
22 is the Borgstad reference.

1 A. I'm looking at this right now.

2 Q. Can you turn to Figure 1?

3 A. Figure 1. One second, please.

4 Figure 1. Yes, I'm looking at that.

5 Q. Figure 1 shows a master controller 106?

6 A. Yes.

7 Q. And a pump modulator 107?

8 A. Yes.

9 Q. And multiple pump controllers 108 that
10 are labeled 1 to N?

11 A. Yes.

12 Q. As shown in Figure 1, master controller
13 106 controls the pump modulator 107?

14 A. Yeah, it sends a command through line
15 120. That's what you are referring to, right?

16 Q. Yes.

17 A. Very good.

18 Q. And the pump modulator 107 controls the
19 pump controllers 108?

20 A. Yes, the pump modulator sends commands
21 through lines 124.

22 Q. And each of the pump controllers 108

1 controls a respective pump unit 110 labeled 1 to
2 N?

3 MR. QUARLES: Objection, form.

4 A. The pump controller sends a command
5 through line 116 to the corresponding pump unit.

6 Q. And that's to control the pump unit?

7 MR. QUARLES: Objection, form.

8 A. This is to perform the function for which
9 the pump controller has been put in place.

10 Q. Is that a control function?

11 MR. QUARLES: Objection, form.

12 A. I can look up the text to see what
13 exactly is the verbiage used here. Do we have a
14 minute?

15 Q. Sure.

16 A. So basically I'm going to do a search to
17 see what exactly is the verbiage for 108, 116 and
18 110, if I can take a minute.

19 Yes. It's stated that in column --
20 in page 2 -- page 8 of the Liberty Exhibit 1006.
21 The pump controller 108 may drive the pump further
22 down. The pump controller 108 controls the

1 operation of the pump unit 110 by sending signals
2 116 to the pump unit 110.

3 Q. I'd like to look at paragraph 23, which I
4 think is just below the portion that you just
5 read.

6 A. Yes.

7 Q. The third sentence of that paragraph
8 states "The measured performance of a pump at 118
9 may include, but is not limited to, the output
10 flow rate 130, the output pressure 132 or the
11 output efficiency 134."

12 You see that?

13 A. Yes.

14 Q. Do you agree that output flow rate 130,
15 output pressure 132, and output efficiency 134 are
16 each measured parameters of the pump?

17 MR. QUARLES: Objection, form.

18 A. We have an analysis of that in my
19 deposition, and I can refer to that.

20 The quick summary of that is that
21 performance is inferred from essentially
22 information on the pump operating characteristics.

1 So that is something that is
2 calculated, as I explain in the deposition.

3 Q. So I don't know -- I don't know if the
4 answer --

5 A. In the declaration, I'm sorry, not
6 deposition. My declaration. Apologies for using
7 the wrong term.

8 Q. I'm not sure if the answer to my question
9 was yes or no, so I'll ask it again.

10 Do you agree that the output flow
11 rate 130, output pressure 132, and output
12 efficiency 134 are each measured parameters of the
13 pump?

14 MR. QUARLES: Objection, form.

15 A. On efficiency, I would say no, this is
16 not a measured parameter of the pump.

17 Q. Is output flow rate 130 and output
18 pressure 132, are those measured parameters of the
19 pump?

20 A. I'll -- can I look at my declaration?
21 Because I didn't focus on these very much. I
22 focused more on efficiency for which there was a

1 clear indication of a calculation. Do I have a
2 minute again?

3 Q. Sure.

4 A. So with your permission, I'll open my
5 declaration.

6 So testing and flow rate, yes,
7 parameters, according to Borgstadt.

8 Q. But you do not agree that output
9 efficiency is a measured parameter of the pump?

10 MR. QUARLES: Objection, form.

11 A. Again, let me look at the specific way in
12 which Borgstadt actually talks about efficiency so
13 I can point you to that particular section in
14 this -- in this exhibit. I'm looking at Borgstadt
15 at this time with your permission again to find
16 the corresponding place.

17 Q. Sure.

18 A. Okay. So Borgstadt, page -- it's page 12
19 of the exhibit, right at the very top has in item
20 14 the pumping apparatus of claim 13 wherein the
21 model includes the pump curve. And that pump
22 curve is associated -- a model associated with the

1 pump so that efficiency can be calculated as
2 discussed, for example, in page 3, paragraph 0029,
3 about eight lines down that says, for example, the
4 model of operation of the pump units 110 may
5 comprise a pump curve. And at another location,
6 Borgstadt says what they do with this pump curve.
7 Let me retrieve that as well.

8 So page 2 of -- which is
9 paragraph 23, in one embodiment the pump
10 controller may determine -- at the bottom -- may
11 determine the efficiency of the pump using the
12 performance curve of the pump unit and taking into
13 account the pressure or flow rate at the output of
14 the pump.

15 Q. So Borgstadt in the sentence above that
16 states, "In certain embodiments the pump
17 controller 108 has the capability to determine
18 efficiency 134 of the pump unit 110."

19 You see that?

20 A. That is correct.

21 Q. So is it your opinion that the output
22 efficiency 134 is or is not a measured parameter

1 of the pump?

2 MR. QUARLES: Objection, form.

3 A. It is not.

4 Q. And why not?

5 A. Because the patent says it is determined,
6 and it explains how it is determined by using a
7 model and other measurements.

8 Q. So because it's determined, then it's not
9 measured? Is that --

10 MR. QUARLES: Objection, form.

11 Q. -- your opinion?

12 A. Again, the language that the patent is
13 using is clear. It says, as you pointed out in
14 paragraph 23, five lines before the bottom on the
15 left, "has the capability to determine efficiency
16 of the pump," and it explains how, determine the
17 efficiency of the pump using the performance
18 curve, which is a model, as I already pointed out,
19 and it is explained actually what kind of model it
20 is for the pump and so on.

21 Q. In paragraph 23, the third sentence
22 states, "The measured performance of a pump at 118

1 may include," and listed there is output
2 efficiency 134.

3 You see that?

4 A. Yes.

5 Q. So do you agree that output efficiency
6 134 is measured?

7 MR. QUARLES: Objection, form.

8 A. It says measured performance. And
9 measured performance, it says, may include the
10 things that you mentioned. The flow rate, the
11 pressure or output efficiency. But output
12 efficiency is explained that it is determined from
13 measurements, of course, but using a model.

14 Q. So it's your opinion that output
15 efficiency 134 is not a measured parameter of the
16 pump in Borgstadt?

17 MR. QUARLES: Objection, form.

18 A. That is my opinion.

19 Q. Let's look at Figure 1 of Borgstadt.

20 A. I'm sorry, figure what again?

21 Q. Figure 1.

22 A. Figure 1, yes. Let me go over there.

1 I'm in Figure 1, yes, sir.

2 Q. In Figure 1 of Borgstadt there's an
3 output 118 identified from the various pump units.
4 Do you see that?

5 A. Yes.

6 Q. And the output includes Q, P and a Greek
7 letter. How would you pronounce that Greek
8 letter?

9 A. Eta is good. E-T-A.

10 Q. Q is flow rate?

11 A. Yes.

12 Q. And P is pressure?

13 A. Correct.

14 Q. Eta is efficiency?

15 A. Eta is efficiency -- let me confirm that
16 this is, indeed, what the patent says. So that
17 would be 118. And just to be 100 percent sure --
18 again, doing...

19 Yes, eta. Yeah, that's efficiency.

20 Q. ~~Borgstad~~^{Borgstadt} describes here flow rate,
21 pressure and efficiency as pump parameters at the
22 pump output 118, correct?

1 MR. QUARLES: Objection, form.

2 A. What part in Borgstadt are you --
3 Borgstadt, sorry, are you referring to?

4 Q. Figure 1 that we were looking at.

5 A. Right. And then you mentioned something
6 about what Borgstadt claims. Is this from text or
7 a summary of what you assess to be the gist of
8 this?

9 Q. Sure. I'm not asking about what
10 Borgstadt claims. I'm asking that -- I'm stating
11 that Borgstadt here in Figure 1 describes flow
12 rate, pressure and efficiency as pump parameters
13 at pump output 118, correct?

14 MR. QUARLES: Objection, form.

15 A. He shows in 118 that those parameters are
16 output signals that he considers in that system,
17 yes.

18 Q. I'd like to go back to your opinion that
19 pump efficiency is not a measured parameter in
20 Borgstadt. Just so I understand, that's your
21 opinion because Borgstadt describes that pump
22 efficiency is determined?

1 A. Correct. This is determined from actual
2 measurements of what would be Q and P in Figure 1,
3 flow rate and pressure.

4 Q. And because it's determined from actual
5 measurements, then it's your opinion that it's not
6 measured, correct?

7 MR. QUARLES: Objection, form.

8 A. My opinion is that it's not measured
9 because, as Borgstadt explains, there is a model
10 involved here. So the model is fed with the
11 actual measurements of Q and P, and it then
12 produces a value for the efficiency, eta.

13 Q. I'd like to turn to paragraph 25 of
14 Borgstadt.

15 A. Yes, sir, I'm right there at
16 paragraph 25.

17 Q. Can you read the first sentence? You
18 don't have to read it aloud.

19 A. "The output 118 parameters of each pump
20 unit 110 are also fed into the pump modulator."

21 Q. The next sentence as well.

22 A. Oh, the next sentence. "These output

1 parameters may include, but are not limited to,
2 the output pressure, output flow rate, and output
3 efficiency of the pump unit 110."

4 Q. In this paragraph 25, Borgstadt describes
5 output flow rate, output pressure, and output
6 efficiency as output parameters of the pump,
7 correct?

8 MR. QUARLES: Objection, form.

9 A. He says clearly that output parameters
10 may include these three.

11 Q. Can we turn to paragraph 33?

12 A. Paragraph 33. Yes, sir, I'm there.

13 Q. Paragraph 33 relates to Figure 3 of
14 Borgstadt?

15 A. Yes.

16 Q. And a couple of sentences down there's a
17 sentence that starts with "although." You see
18 that?

19 A. Yes.

20 Q. And this states, "Although the pump
21 unit's efficiency is used as a parameter in this
22 example..." and then it says, "other parameters

1 may be used during the diagnosing process."

2 Do you see that?

3 A. Yes.

4 Q. So based on this description, a POSITA
5 would have known that Figure 3 could be applied to
6 other pump parameters such as output flow rate or
7 output pressure. Is that fair?

8 MR. QUARLES: Objection, form.

9 A. Let me see what procedure is meant here.

10 So the statement is general here in
11 paragraph 32 that other pump parameters may be
12 used during the diagnosing process. It doesn't
13 specifically say here what those parameters would
14 be.

15 Q. Given Borgstadt's earlier disclosure that
16 output flow rates and output pressure are pump
17 parameters, would you understand that this
18 sentence in paragraph 33 could also be referring
19 to those other parameters in addition to pump
20 efficiency?

21 MR. QUARLES: Objection, form.

22 A. This is an implicit statement. So do I

1 have some time to read the text that preceded that
2 to see what is the context in which this is
3 mentioned?

4 Q. Sure.

5 A. Okay. Thank you very much. Let me read
6 from that in my head, and I'll get right back.

7 So, again, with your permission,
8 I'll open a second window which has the exact same
9 patent by Borgstadt so I can see simultaneously
10 the text and figure. Is that okay?

11 Q. Sure.

12 A. Thank you.

13 Okay. So yes, so I went back to
14 Figure 2.

15 Let me start in a different way. So
16 shown in Figure 3 is a flow diagram of the pump
17 modulator, and the pump modulator is introduced in
18 Figure 2. And in Figure 2, information regarding
19 the performance of each pump unit is shown as an
20 input to the pump modulator.

21 And then performance -- information
22 regarding the performance of each pump unit can be

1 whatever the patent -- Borgstadt's patent
2 describes to us parameters or variables that
3 describe performance of flow rate, pressure,
4 efficiency. Those would be associated with
5 performance.

6 So your question was in Figure 3
7 there's a flow diagram. Could you rephrase it
8 once more to make sure I answer it accurately?

9 Q. Sure.

10 Based on the disclosure in
11 paragraph 33, a person of skill in the art would
12 have known that Figure 3 could be applied to other
13 pump parameters such as output flow rate and
14 output pressure?

15 MR. QUARLES: Objection, form.

16 A. Well, Figure 3 says specifically "Receive
17 the pump unit's current efficiency" value.

18 Q. And the sentence that we discussed a few
19 minutes ago states although the pump unit's
20 efficiency is used as a parameter in this example,
21 as would be appreciated by those of ordinary skill
22 in the art with the benefit of this disclosure,

1 other pump parameters may be used during the
2 diagnosing process?

3 A. Yes.

4 Q. My question is those other pump
5 parameters that could be used in the diagnosing
6 process could include output flow rate or output
7 pressure?

8 MR. QUARLES: Objection, form.

9 A. Yeah, other pump parameters, if those
10 parameters are associated with information
11 regarding the performance of each pump unit, as
12 stated in Figure 2, that would apply.

13 Here it says parameters in general,
14 as a parameter in this example. So I'm going to
15 leave it at that.

16 Q. And Borgstadt states that with respect to
17 Figure 3, the pump unit's efficiency may be used
18 for diagnosing a pump failure, correct?

19 MR. QUARLES: Objection, form.

20 A. In the text, right. As shown in Figure 3
21 is a flow diagram of the pump modulator process
22 for diagnosing a pump unit failure. Yes, sir.

1 Q. And so, based on this disclosure, a
2 POSITA would have known that other pump parameters
3 such as output flow rate or output pressure could
4 also be used for diagnosing a pump failure?

5 A. Other pump parameters, indeed, it is
6 stated that they could be used during the
7 diagnosing process, yes, sir.

8 Q. And those other pump parameters could
9 include pressure and flow rate?

10 A. To the extent those are pump parameters
11 of relevance, yes.

12 Q. I'd like to turn to the Norris reference,
13 which is Exhibit 1004.

14 A. Norris 1004, give me one second to open
15 it. Norris Exhibit 1004?

16 Q. Yes.

17 A. Yes, I'm right there.

18 Q. And I'd like to look at paragraph 32.

19 A. Paragraph 32. Okay. I'm right there.

20 Q. In the second sentence of that paragraph
21 it states, "Each engine of drive train 276
22 includes an associated electronic control module

1 ECM 415 suitable for monitoring and managing
2 engine operations."

3 Do you see that?

4 A. Yeah.

5 Q. The electronic control module is a device
6 that provides control to engine operations,
7 correct?

8 MR. QUARLES: Objection, form.

9 A. Are you referring to ECM?

10 Q. Yes.

11 A. It's what the term states, electronic
12 control module, and it's stated what kind of
13 electronic control module should be used, and it
14 should be one suitable for monitoring and managing
15 engine operations.

16 Q. You agree that the ECM provides control
17 to engine operations based on that sentence?

18 MR. QUARLES: Objection, form.

19 A. Well, it provides monitoring and managing
20 of engine operations.

21 Q. Is that different than control?

22 A. Well, it's a matter of what one

1 understands to mean by control or monitoring and
2 managing. So control may be part of it. But it
3 says monitoring and managing engine operations, so
4 that's the jargon that they preferred to use
5 there.

6 Q. Would you expect control to be part of
7 it, given the device is called an electronic
8 control module?

9 A. It depends by what you mean by control.
10 People may mean drive this to a desired value or
11 just make sure that the operation is as expected
12 without any other issues.

13 So given that the term "control" is
14 in the electronic control module, I would accept
15 in this sense the term "control" to mean, yes,
16 control of that, of that unit that has the
17 electronic control module.

18 Q. You would expect that to mean control of
19 engine operations?

20 MR. QUARLES: Objection to form.

21 A. Control in the sense of monitoring and
22 managing engine operations, yes, sir.

1 Q. I'd like to turn to the Omont reference,
2 Exhibit 1005.

3 A. Okay, I have Omont open.

4 Q. I'd like to start at paragraph 65.

5 A. 65. One second. 65, yes, sir.

6 Q. Paragraph 65 relates to each instance of
7 control hardware 400. Do you see that?

8 A. Yes.

9 Q. And at the bottom of exhibit page 19 in
10 that paragraph, Omont states, "Various instances
11 of the control hardware 400 may receive
12 information generated by the sensors 204, 214, and
13 222."

14 Do you see that?

15 A. Yes.

16 Q. Another sentence down, there's a sentence
17 that starts with "each instance."

18 Do you see that?

19 A. Yes.

20 Q. It states that "Each instance of the
21 control hardware 400 may execute programs,
22 routines, and/or other coded instructions."

1 Do you see that?

2 A. Yes.

3 Q. The next sentence states, "For example,
4 the executed instructions and/or generated output
5 information may be for controlling the
6 controllable devices 216, 224, and/or for
7 monitoring the sensors 204, 214, 222."

8 Do you see that?

9 A. Yes.

10 Q. Is it fair to say that control hardware
11 400 receives information from sensors 204, 214,
12 222?

13 MR. QUARLES: Objection, form.

14 A. It's as stated at the top of this page,
15 may receive information generated by sensors 204,
16 214, 222.

17 That's what you are referring to,
18 correct?

19 Q. Yes.

20 A. Yes, sir.

21 Q. And because this paragraph states that
22 the control hardware may execute coded

1 instructions and that the executed instructions
2 may be for monitoring the sensors, that's
3 additional support that the control hardware 400
4 receives information from the sensors. Is that
5 fair?

6 MR. QUARLES: Objection, form.

7 A. I'm not sure I'm following the logic. I
8 thought that it is fairly explicit that, indeed,
9 the system may -- 400, the control hardware 400
10 may receive information generated by sensors 204,
11 214, and 222.

12 Q. So my question is specifically around the
13 language "monitoring the sensors."

14 In order to monitor the sensors, it
15 would need to receive information from the
16 sensors. Is that fair?

17 MR. QUARLES: Objection, form.

18 A. That information may be received, indeed,
19 as stated at the very top.

20 And how monitoring of the sensors
21 would be done, I don't see details here at first
22 pass, but it says the executed instructions or

1 generated output may be for controlling or for
2 monitoring the sensors. So I would take this as
3 stated in the sentence.

4 Q. As one of skill in the art, would you
5 expect that in order to monitor the sensors, that
6 the control hardware would receive information
7 from the sensors?

8 MR. QUARLES: Objection, form.

9 A. Monitoring of the sensors could be done
10 in any way. For example, it could be that just
11 because a line is broken and you're not receiving
12 actually any input from the sensors, you can infer
13 that something is wrong with the sensors. Or you
14 may receive a flat line, for example, from the
15 sensors or -- it could be a number of things,
16 including not getting anything from the sensors.

17 Q. Could it include receiving information
18 from the sensors?

19 MR. QUARLES: Object to form.

20 A. It could, yes. It could.

21 Q. I'd like to turn to paragraph 61.

22 A. 61. Yes, sir.

1 Q. Can you read that first sentence -- it's
2 a long sentence. You can read it to yourself.

3 A. The very first sentence?

4 Q. Yes.

5 A. Okay. Give me one second, please.

6 Okay. I've read it. And do I have
7 permission to open a second window so I can look
8 at both Figure 2 and Figure 3 in the text at the
9 same time?

10 Q. Sure.

11 A. Thank you.

12 Okay. So I have the figures handy
13 in front of me, and I have read the first sentence
14 in paragraph 61.

15 Q. This first sentence states that
16 components of various elements of Figure 2 may be
17 implemented as an instance of control hardware 400
18 shown in Figure 4. Is that right?

19 MR. QUARLES: Objection, form.

20 A. Shown in Figure 4. So, yeah, it shows in
21 detail what exactly they refer to.

22 Q. Included are components of each subsystem

1 202, 212, and 220.

2 Do you see that?

3 A. 202, 212, 220, yes, I see that in the
4 second line.

5 Q. So this sentence is stating that
6 components of subsystems 212 and 220 may be
7 implemented as control hardware 400, correct?

8 MR. QUARLES: Objection, form.

9 A. Let me read in detail one more time,
10 please.

11 Yes, it's fairly explicit that
12 components of each subsystem 202, 212, 220 may
13 each be implemented as an instance of control
14 hardware 400 shown in Figure 4.

15 Q. And subsystem 212 includes sensors 214,
16 if you see that on Figure 2?

17 A. Subsystem 212 has sensors 214, yes.

18 Q. And we discussed earlier that instances
19 of control hardware 400 could receive information
20 from sensors, correct, including sensors 204, 214,
21 and 222?

22 MR. QUARLES: Objection, form.

1 A. Well, what is stated that Figure 2 is an
2 instance -- I'll read it again. Figure 2,
3 implementation in Figure 2 is an instance of the
4 control hardware 400 shown in Figure 4.

5 So maybe I didn't understand your
6 question exactly, and I may have given the wrong
7 answer.

8 Q. Sure.

9 Paragraph 61 states that components
10 of each subsystem may each be implemented as an
11 instance of control hardware 400, correct?

12 A. Yes.

13 Q. And control hardware 400 can receive
14 information from sensors -- sensor 214, correct?

15 MR. QUARLES: Objection, form.

16 A. 400 is shown in figure 5 -- 4, I'm sorry.
17 Figure 4. And there is no input from 214. Are
18 you referring to something implicit here that --

19 Q. Sure.

20 I'm referring to our discussion
21 about five minutes ago where we said that control
22 hardware 400 may receive information generated by

1 the sensors. And that's in paragraph 65.

2 A. Okay. But 400 shows it has volatile
3 memory, mass storage device, nonvolatile memory,
4 input device, processor, local memory, circuit
5 output device, and external storage medium.

6 Are you referring specifically to
7 any one of these so we can perhaps converge more
8 quickly?

9 Q. Sure. I'm referring to -- why don't we
10 go back to paragraph 65.

11 A. 65. Yes.

12 Q. At the bottom of that sentence it states,
13 "Various instances of the control hardware 400 may
14 receive information generated by the sensors."

15 Do you see that?

16 A. 65 again, you said?

17 Q. Yes.

18 A. So, for example, various instances of the
19 control hardware... and then it goes to the next
20 page. Information generated by the -- et cetera,
21 et cetera, et cetera.

22 Okay. So which one of these blocks

1 would be the one that would -- in Figure 4, which
2 one of these blocks would be the one that would be
3 204, 214 and 222?

4 So are you waiting for me to respond
5 to something, or am I expecting your response?

6 Q. Is that a question for me?

7 A. Yes, sir. So let me repeat it so I can
8 make sure I understood what you asked.

9 Q. I'm not the expert here. Okay?

10 A. Correct, correct, correct. I'm not
11 asking you for an explanation. I want to make
12 sure I understand your question.

13 So your question is -- if we go back
14 to 65, you're saying at the bottom it reads
15 various instances of the control hardware 400 may
16 receive information generated by the sensors 204,
17 214, 222, information by human operator via one or
18 more of the HMI...

19 So in Figure 4 where the system 400
20 is shown, what part in particular are you
21 referring to for which there could be instances of
22 204, 214, 222, 228, 310, 316, et cetera?

1 Q. I'm not looking at Figure 4. Let's go
2 back to paragraph --

3 A. Well, that's --

4 Q. Let's go back to paragraph 61.

5 A. Paragraph 61.

6 Q. Paragraph 61 states that "Components of
7 each subsystem 202, 212, and 220 may each be
8 implemented as an instance of control hardware
9 400."

10 Do you agree with that?

11 A. Yeah, it's stated explicitly.

12 Q. And in paragraph 65, it states that
13 various instances of control hardware 400 may
14 receive information generated by sensors 204, 214,
15 and 222.

16 Do you agree with that?

17 A. Same paragraph, a little further down?

18 Q. Paragraph 65.

19 A. Oh, 65.

20 Yes.

21 Q. And paragraph 65 also states that "Each
22 instance of the control hardware 400 may execute

1 instructions" and that "the executed instructions
2 may be for monitoring sensors 204, 214, and 222."

3 Correct?

4 A. Yes.

5 MR. QUARLES: Objection, form.

6 A. You're reading from paragraph 65,
7 correct?

8 Q. Yeah.

9 A. Yes, sir. I'm following that. Go ahead,
10 please.

11 Q. And you testified earlier that executed
12 instructions at control hardware 400 for
13 monitoring the sensors may include receiving
14 information from the sensors, correct?

15 MR. QUARLES: Objection, form.

16 A. Correct.

17 Q. Sensors 214 are part of subsystem 212,
18 correct?

19 A. We are back in Figure 2, right?

20 Q. Yes.

21 A. So sensors 214, part of 212, yes.

22 Q. So would you expect that the control

1 hardware 400 of subsystem 212 would receive
2 information from sensors 214 of subsystem 212?

3 MR. QUARLES: Objection, form.

4 A. So what is shown in Figure 2 is, as
5 stated there -- forgive me for a second. Let me
6 read that one more time to make sure.

7 So what is stated is that, again,
8 various instances of the control hardware 400 may
9 receive information generated by these sensors
10 204, 214, 222, which are shown in Figure 2.
11 That's the level of detail shown in that
12 paragraph.

13 Q. So as one of skill in the art reading
14 paragraphs 61 and 65, would you expect that the
15 control hardware 400 of subsystem 212 would
16 receive information from sensors 214 of subsystem
17 212?

18 MR. QUARLES: Objection, form.

19 A. Let me see the description. Give me just
20 one second to see, again, the description of
21 system 400.

22 Okay. I think I have enough

1 information to answer your question, so if you
2 could be kind enough to rephrase it, if you don't
3 mind.

4 Q. Sure.

5 So as one of skill in the art
6 reading paragraphs 61 and 65, would you expect
7 that the control hardware 400 of subsystem 212
8 would receive information from sensors 214 of
9 subsystem 212?

10 MR. QUARLES: Objection, form.

11 A. So it is stated in paragraph 65 that the
12 sensors 204, 214, 222 and/or other operational
13 aspects of the additive system 200, whether by
14 another instance of the control hardware 400,
15 could be used for purposes of control.

16 So also at the top of the same
17 paragraph, "May receive information generated by
18 the sensors 204, 214, 222, information input by a
19 human operator." Continuing on, "and/or
20 information retrieved from internal or external
21 memory of that instance of the control hardware
22 400."

1 So these are all instances of the
2 general figure 400 that is shown in Figure 4.

3 Q. So I don't think you answered what I
4 asked, so I'll just ask it again.

5 A. Okay, please.

6 Q. As one of skill in the art reading
7 paragraphs 61 and 65, would you expect that the
8 control hardware 400 of subsystem 212 would
9 receive information from sensors 214 of subsystem
10 212?

11 MR. QUARLES: Objection, form.

12 A. Yes, system 400 could receive information
13 generated by the sensors 204, 214, 222.

14 Q. And, similarly, would you expect that
15 control hardware 400 of subsystem 220 would
16 receive information from sensors 222 of subsystem
17 220?

18 MR. QUARLES: Objection, form.

19 A. So the general idea, again, is that 400
20 is at the different resolution and shows various
21 components, of which 204, 214, or 222 be part. So
22 in that sense, yes, 400 could receive information

1 from 222.

2 Q. And the control hardware 400 of subsystem
3 220 could receive information from sensors 222,
4 correct?

5 A. Well, again, 400 -- you see that 400 is
6 this dashed ^{line}one, right? That includes the entire
7 system.

8 Now, in that system there is
9 something that says input device. Everything
10 else --

11 Q. Yeah.

12 A. -- would not qualify as an input device
13 here because this says processor volatile memory,
14 output device, et cetera, et cetera. It's 426.

15 The role of the input device would
16 be played by 204, 214, 222, any input device that
17 would be there.

18 So it's not that there is a separate
19 system 400 and a separate 204, 214, 222. And
20 instantiation of the input device in that overall
21 system is 204, 214, 222 or any other sensors.
22 Like HMI is 228, 310, 316, and so forth.

1 Q. And each -- the components of each
2 subsystem 212 and 220 may each be implemented as
3 control hardware 400, correct, based on what's in
4 paragraph 61?

5 A. Well, let me one more time return to 61
6 for the umpteenth time.

7 Yeah, paragraph 61 says, for
8 example, various instances of the control hardware
9 400 may be operable to facilitate communication
10 between the additive system 200 and the cam system
11 300, including communication between one or more
12 components of various instances of the subsystems
13 202, 212, 220 and the SCM device 306.

14 Q. So would you expect that control hardware
15 400 of subsystem 220 would receive information
16 from sensors 222 of subsystem 220?

17 A. Again, 400 is a collective designation of
18 all of these systems that are shown, the memory
19 processor, et cetera, et cetera.

20 I identified the input device 426 as
21 something that one would expect to refer to an
22 input to whether -- where this arrow points,

1 interface circuit, et cetera, based on a
2 reasonable interpretation, the standard
3 interpretation of this diagram.

4 400 is again -- you see the dashed
5 line--is a number that refers to the collection of
6 all of these.

7 An input device could be a sensor or
8 other -- there could be input from a sensor. They
9 leave it at that, and they explain that these
10 sensors could be from systems 202, 212, 222, all
11 of these numbers.

12 Q. So --

13 A. Yeah, go ahead, please.

14 Q. -- control hardware 400 could receive
15 input from the sensors?

16 MR. QUARLES: Objection, form.

17 A. Well, this is part of control hardware
18 400. You see it's inside that block. For 400 to
19 receive input from something, there would have to
20 be an external arrow that points to 400. But the
21 only external arrow that points to 400 is external
22 storage medium.

1 Q. Is now a good time for a break? We've
2 been going more than an hour.

3 A. Sure.

4 MR. WALTERS: Okay. Ten minutes
5 okay?

6 (Recess taken)

7 BY MR. WALTERS:

8 Q. Welcome back, Dr. Nikolaou.

9 A. Thank you.

10 Q. I'd like to look at the claims of the
11 '435 patent.

12 A. Claims of -- give me just a second to
13 open it, please.

14 Q. Sure. And you may also want to open
15 Exhibit 1014, which is the claim listing. Feel
16 free to refer to either one.

17 A. Yeah, I'll open both. '435.

18 Okay. I'm there.

19 Q. I'd like to look at claim limitation
20 1[e][i].

21 A. So go to the end. What claim limitation
22 again?

1 Q. 1[e][i]. It's identified in
2 Exhibit 1014.

3 A. Oh, it's in that exhibit. I'm sorry.
4 Let me go to that.

5 Okay. Claim element, and there is
6 1[e][i], yes.

7 Q. Yes.

8 A. Uh-huh.

9 Q. This limitation recites "One or more
10 processing devices configured to receive a first
11 parameter from a first device of the plurality of
12 pumps, the distribution system, or the wellhead,
13 and transmit the first parameter to a second
14 device of the plurality of pumps, the distribution
15 system, or the wellhead."

16 Correct?

17 A. Correct.

18 Q. So this limitation recites one or more
19 processing devices, a first device and a second
20 device. You see that?

21 A. Yes.

22 Q. And the limitation requires that the

1 first parameter go from a first device to the one
2 or more processing devices, correct?

3 MR. QUARLES: Objection, form.

4 A. First parameter from a first device of
5 the plurality of pumps, distribution system, or
6 the wellhead, and transmit the first parameter to
7 a second device of the plurality of pumps, the
8 distribution system, or the wellhead.

9 Correct.

10 Q. The first aspect of this limitation
11 requires the first parameter to go from the first
12 device to the one or more processing devices. Is
13 that fair?

14 MR. QUARLES: Objection, form.

15 A. Well, it's explicitly stated, but yeah,
16 there is a first device of the plurality of pumps,
17 the distribution system or the wellhead, and
18 transmits the first parameter to a second device
19 of the plurality of pumps, the distribution system
20 or the wellhead.

21 Q. Yeah, so that's not my question. Okay?
22 I'd like you to listen specifically to my

1 question.

2 The first aspect of this limitation
3 states one or more processing devices configured
4 to receive a first parameter from a first device.

5 Do you see that?

6 A. Yes.

7 Q. So the limitation requires that the first
8 parameter go from the first device to the one or
9 more processing devices, right?

10 MR. QUARLES: Objection, form.

11 A. So we are reading up to the point that
12 says one or more processing devices configured to
13 receive a first parameter from a first device,
14 correct?

15 Q. Yes.

16 A. Yes.

17 Q. So the first parameter is going from the
18 first device to the one or more processing
19 devices, right?

20 MR. QUARLES: Objection, form.

21 A. Well, that's further down.

22 So the first part says one or more

1 processing devices configured to receive a first
2 parameter from a first device.

3 Q. Which way is the first parameter going in
4 that aspect? From which device to which device?

5 A. So a first device is receiving a first
6 parameter from one or more processing devices.

7 Q. Is that what it says?

8 A. It says one or more processing devices
9 configured to receive a first parameter from a
10 first device.

11 Oh, you're asking for a direction,
12 what is -- what initiates the transfer and what
13 receives the transfer?

14 Q. Yeah. What I asked is that the first
15 parameter goes from the first device to the one or
16 more processing devices.

17 A. Let me read it one more time, make sure I
18 don't misstate it.

19 So one or more processing devices
20 are configured to receive from a first device.

21 So the first device sends to one or
22 more processing devices that are configured to

1 receive that.

2 Q. So the first parameter goes from the
3 first device to the one or more processing
4 devices, correct?

5 MR. QUARLES: Objection, form.

6 A. First device, yes, sends a first
7 parameter to one or more processing devices.

8 Q. Okay. And then the limitation requires
9 that that first parameter go from the one or more
10 processing devices to a second device, correct?

11 A. Correct, this is stated, and transmit to
12 the first parameter, et cetera.

13 Q. Right. So we have a first device that
14 sends the first parameter to one or more
15 processing devices, and the one or more processing
16 devices sends the first parameter to a second
17 device, correct?

18 A. Correct.

19 MR. QUARLES: Objection, form.

20 Q. And it could be a plural number of
21 processing devices that receive the first
22 parameter from the first device and transmit the

1 first parameter to the second device, correct?

2 MR. QUARLES: Objection, form.

3 A. Are you trying to distinguish between
4 plural and singular, or are you, in general,
5 asking about the flow of information here?

6 Q. Sure. So because the limitation says one
7 or more processing devices --

8 A. Yes.

9 Q. -- it could read on a plural number of
10 processing devices that receive the first
11 parameter from the first device and transmit the
12 first parameter to the second device, correct?

13 MR. QUARLES: Objection, form.

14 A. To a second device of the plurality of
15 pumps, distribution system, or wellhead, yeah.

16 Q. So I'm asking you as one of skill in the
17 art, how could two devices -- how could you
18 envision two devices performing this
19 functionality?

20 Let me ask a different question, to
21 be clear.

22 How would you envision two

1 processing devices performing the functionality of
2 the processing devices here, specifically
3 receiving the first parameter from the first
4 device and transmitting that first parameter to a
5 second device?

6 MR. QUARLES: Objection, form.

7 A. I can check in the patent to see how
8 exactly they propose to do that because I don't
9 have it handy in my head, but it would be in any
10 reasonable way. And if there is any specific way
11 mentioned, I would have to look it up to refresh
12 my memory on this detail.

13 Q. I don't know if there is. You're welcome
14 to look. I don't know if there is or not.

15 A. Okay. Let me -- I can do a very quick
16 check, and I promise not to take too long.

17 So there is general description of
18 how communication between components, sensors and
19 control devices may take effect. For example, on
20 column 6 of the patent it says "the communication
21 between" -- I'm reading on line 14.

22 "The communication between

1 components, sensors and control devices may be
2 wired, wireless, or a combination of both.
3 Communication means may include fiberoptics,
4 electrical cables, wifi, Bluetooth,
5 radiofrequency, and other cellular near field
6 internet base or other network communication
7 means."

8 So that's one passage I could find
9 easily from a quick search.

10 Q. And it's your opinion that column 6,
11 lines 10 to 19 relates to claim limitation
12 1[e][i]?

13 MR. QUARLES: Objection, form.

14 A. Let me continue a little bit more. I
15 promise not to take too long. Apologies for
16 taking so long.

17 So this is -- yeah, throughout the
18 patent these options there are for communication.

19 And there is another one in column 7
20 that, for example, the fracturing pump components
21 may also include various types of communication
22 devices such as transmitters, receivers or

1 transceivers using various communication
2 protocols.

3 So communication is discussed in the
4 patent, but it's not a key. So they don't focus
5 on any particular type of communication, at least
6 for the purposes of what claim 1 is concerned
7 with. And they leave it in general as to the
8 options that would be available for this type of
9 communication.

10 Q. Let me ask a different question.

11 So we've established that limitation
12 1[e][i] requires that the first parameter go from
13 the first device to one or more processing
14 devices, and then the one or more processing
15 devices sends the first parameter to a second
16 device, correct?

17 MR. QUARLES: Objection, form.

18 A. You are reading from the text, right,
19 directly? Correct?

20 Q. The --

21 A. The text in Exhibit 1014, Claim
22 No. 1[e][i].

1 Q. That's the limitation I'm referring to.

2 A. Yes.

3 Q. So -- and the one or more processing
4 devices could be two processing devices, correct?

5 MR. QUARLES: Objection, form.

6 A. You are referring to one or more
7 processing devices? Yeah. One or more means one
8 or more, literally two, three, however many.

9 Q. Okay. So let me ask you this particular
10 question.

11 If you had processing devices A and
12 B -- so two processing devices --

13 A. Yes.

14 Q. -- and the first device in the claim sent
15 the first -- sent the first parameter to
16 processing device A, processing device A sent that
17 parameter to processing device B, and processing
18 device B sent the first parameter to the second
19 device, would that be encompassed by that claim
20 limitation?

21 MR. QUARLES: Objection, form.

22 A. So first device is one or two devices?

1 Just one device. That sends the same signal to
2 processing devices A and B. Is that what you
3 said?

4 Q. Let me -- I'll say it again. Okay?

5 A. Okay. Is it okay if I jot it down?

6 Q. Absolutely.

7 A. So we have a first device. Go ahead,
8 please.

9 Q. We have a first device -- I'll outline
10 all the devices we're going to talk about. Okay?

11 A. Okay.

12 Q. We have first device, we have second
13 device, and then we have two processing devices A
14 and B.

15 A. So processing A and processing B.

16 Q. The first device sends the first
17 parameter to processing device A --

18 A. Yes.

19 Q. -- which sends the parameter to
20 processing device B, which sends the first
21 parameter to the second device.

22 A. Wait. We are running out of devices.

1 There is a first device, which is A, and there is
2 a second device, which is B, correct?

3 Q. No.

4 A. No?

5 Q. No.

6 A. Both A and B are first?

7 Q. No.

8 A. Okay. Let's go one more --

9 Q. Let's start over. Let's start over with
10 what we just said one minute ago.

11 We have a first device.

12 A. Right.

13 Q. We have a second device.

14 A. Either A or B.

15 Q. No.

16 A. No, okay. Sorry again.

17 Q. So let's look at the claim limitation.

18 A. Yeah.

19 Q. Claim limitation recites one or more
20 processing devices. You see that?

21 A. It starts with one or more processing
22 devices, correct.

1 Q. So for that we're going to have
2 processing device A and processing device B.

3 A. Okay. So we have processing A and
4 processing B.

5 Q. The claim also recites a first device.
6 You see that?

7 A. Yes. First device, yes.

8 Q. And it also recites a second device. Do
9 you see that?

10 A. The second device, yes. Yes, sir, I see.

11 Q. So irrespective of these that we just
12 listed, we talked earlier and established that the
13 first device sends the first parameter to one or
14 more processing devices.

15 A. Correct.

16 Q. Which send the first parameter to the
17 second device, correct?

18 A. Correct. Correct.

19 Q. So for this example, the one or more
20 processing devices are going to be A and B. Okay?

21 A. A and B. I'm with you.

22 Q. Okay. So here's the scenario. The first

1 device sends the first parameter to processing
2 device A.

3 A. Yes.

4 Q. Which sends the parameter to processing
5 device B. Okay?

6 A. No, no, no. Hold on. We have one or
7 more processing devices, and then we have device
8 and then device. Processing devices appears once.
9 Device and device appears twice, correct?

10 There is a first device and a second
11 device, and they're also...

12 Q. Should I start over?

13 A. Well, I am with you up to the point with
14 the first device which sends signals to processing
15 device A and processing device B. And then --

16 Q. No, that's not my -- okay. I'll start
17 over. Okay?

18 A. Okay.

19 Q. Processing device -- excuse me. First
20 device --

21 A. Right. First device, yes.

22 Q. First device sends first parameter to

1 processing device A.

2 A. Correct. And --

3 Q. Which sends the parameter to processing
4 device B, which sends the first parameter to the
5 second device. That's the scenario I've outlined.
6 Okay?

7 A. So you have the two processing devices
8 talking to each other?

9 Q. Yes.

10 A. Okay. So it's not from the first device
11 going to A and B. It's from first device going to
12 processing device A, and then A sends something to
13 processing device B and --

14 Q. Sends the same parameter to B.

15 A. That's not what it says here.

16 Q. I'm not talking about the claim language.
17 I'm giving you a hypothetical. Okay?

18 A. Oh, okay.

19 Q. And then I'm going to ask you if the
20 hypothetical is covered by the claim.

21 A. Okay.

22 Q. Okay.

1 A. So first device sends to processing
2 device A. Processing device A sends to processing
3 device B, and then B sends to second device?

4 Q. Yes.

5 A. Okay. So I think it's all in series.

6 Q. Yes.

7 A. First device to processing device A to
8 processing device B to second device. That's the
9 configuration you want to look at, right?

10 Q. Correct.

11 A. Very good.

12 Q. My question is does that scenario read on
13 limitation 1[e][i]?

14 MR. QUARLES: Objection, form.

15 A. Well, 1[e][i], as phrased, says that
16 processing A and processing B should receive
17 something from the first device, from the -- a
18 first parameter from the first device. And then
19 each one is going to do something.

20 Q. So is it your opinion that that scenario
21 does not read on the claim?

22 MR. QUARLES: Objection, form.

1 A. So the claim has it differently, so it
2 doesn't exactly have that scenario as I read it.

3 Q. And is that because processing device B
4 is not receiving the first parameter directly from
5 the first device?

6 MR. QUARLES: Objection, form.

7 A. Let me read one more time.

8 So, as stated again, the claim shows
9 a clear sequence of a first device, then
10 processing device, and then a second device.

11 Q. So I don't think you answered my
12 question, so I'll ask it again.

13 A. Please.

14 Q. Is it your opinion that that scenario
15 does not read on limitation 1[e][i] because
16 processing device B is not receiving the first
17 parameter directly from the first device?

18 MR. QUARLES: Objection, form.

19 A. So directly is not stated there in the
20 claim. If processing device A is used essentially
21 as a means of transmitting the first parameter to
22 device B -- to processing device B, I think -- I

1 believe that that would not be precluded.

2 Q. So is it your opinion that the scenario
3 outlined does read or is covered by 1[e][i]?

4 MR. QUARLES: Objection, form.

5 A. It's not precluded by 1[e][i] because it
6 doesn't say directly, to directly receive a first
7 parameter from a first device.

8 Q. I'm not sure what you mean by not
9 precluded.

10 My question is whether the
11 scenario --

12 A. It can be included. It is included.

13 MR. WALTERS: Can we take like a
14 ten-minute break?

15 MR. QUARLES: Sure.

16 (Recess taken)

17 BY MR. WALTERS:

18 Q. I just sent you an exhibit in the Chat.

19 A. Oh, yes. It's what we discussed. Yes.

20 Q. Yes. I labeled this Exhibit 1030.

21 A. Very good.

22 Q. So, Dr. Nikolaou, this is my effort at

1 drawing the scenario we were just discussing with
2 respect to limitation 1[e][i].

3 A. Yes.

4 Q. Which requires a first parameter to go
5 from a first device to one or more processing
6 devices and then to a second device. And the
7 scenario we were discussing was having two
8 processing devices, processing device A and
9 processing device B.

10 And specifically what I've tried to
11 show in Exhibit 1030 is the first parameter A
12 going from the first device to processing device A
13 and then to processing device B and then to the
14 second device.

15 And I think you testified earlier
16 that this scenario outlined in Exhibit 1030 would
17 be covered by limitation 1[e][i]. Is that
18 correct?

19 MR. QUARLES: Objection, form.

20 A. In the following sense, that the claim is
21 clear that there has to be a signal sent from the
22 first device to a processing device.

1 Now, if the target here is
2 processing device B, as the patent explains and we
3 discussed that, there may be all kinds of
4 communication capabilities that could be taken
5 advantage of for that first measurement to go from
6 the first device to the target processing device,
7 in this case B.

8 Now, what you're presenting is
9 something that says, well, what if a processing
10 device A is used as a means of communication
11 between the first device and the processing device
12 B, which is the target of the signal from the
13 first device. Would that be okay?

14 Well, it would be okay in the sense
15 that there is a communication and a signal is sent
16 from the first device to the processing -- to
17 processing device B.

18 On that, the patent is explicit. In
19 fact, it specifies that those devices have to be
20 of the pump or the distribution system or the
21 wellhead to make it specific about what devices
22 and sensors we are talking about.

1 So to the extent that the processing
2 device A is used as a means of communication, it
3 would be okay, as would be any other means of
4 communication.

5 But the target here would be clear,
6 it would be processing device B. Processing device A
7 would be an intermediate station, would be used as
8 a wired or a wireless or any other means of
9 communication.

10 Q. And does Exhibit 1030 accurately
11 illustrate your understanding of the scenario we
12 were discussing before the break that you said was
13 included -- would be included within limitation
14 1[e][i]?

15 MR. QUARLES: Object to form.

16 A. In the context I just explained; namely,
17 that the processing device A would merely be used
18 as a means of communication, that would be
19 included as a means, again, for the first device
20 to communicate with the target processing device,
21 B in this case.

22 Q. I'd like to look at limitation 1[e][ii].

1 A. Let me go there. We are -- what document
2 again? I'm sorry, I lost it here. I may have
3 closed it inadvertently.

4 Q. Maybe Exhibit 1014.

5 A. Exhibit 1014, you are right. And we are
6 1[e][iii], you said, sir?

7 Q. I said 1[e][ii].

8 A. 1[e][ii]. Okay.

9 Q. Limitation 1[e][ii] recites "Detect that
10 the first parameter is outside of an acceptable
11 threshold," correct?

12 A. Yes. It says, "Detect that the first
13 parameter is outside of an acceptable threshold."

14 Q. What is an acceptable threshold in the
15 context of the '435 patent?

16 MR. QUARLES: Objection, form.

17 A. It's whatever the operator assesses to be
18 an acceptable threshold for the operation to
19 proceed as expected.

20 Q. Who is the operator?

21 A. The operator of the fracturing system,
22 the very system in question for the patent.

1 Q. And what is the operation?

2 MR. QUARLES: Objection, form.

3 A. The operation is hydraulic fracturing.

4 Q. So the threshold must be acceptable to
5 the operator of the hydraulic fracturing system?

6 MR. QUARLES: Objection, form.

7 A. I can check the patent for the specific
8 language that they use, but it's something that
9 one would understand as I described to you.

10 Let me take a minute to check the
11 patent and see if they use any specific language
12 to define what they mean, acceptable in the
13 context of pumping for hydraulic fracturing.

14 Q. Take your time.

15 A. Thank you.

16 So acceptable, well, it's referred
17 to indirectly by -- in the patent in terms of what
18 problems might arise when variables that are --
19 **monitored** go outside the threshold constraints, the
20 bounds.

21 And we actually discuss this quite a
22 lot in my declaration. We refer to definitions

1 from standard dictionaries such as Collins and
2 Cambridge.

3 We also refer to Dr. Durham's
4 opinion on the subject about acceptable referring
5 to without problems, not acceptable referring to
6 problems for the integrity of the equipment, the
7 safety of the operation, and things like that.

8 Q. Let me ask my question again.

9 The threshold must be acceptable to
10 the operator of the hydraulic fracturing system?

11 MR. QUARLES: Objection, form.

12 A. It's -- the operator would be one of the
13 constituencies, let's say, that would be
14 interested in that for the obvious reason that if
15 the operation would be at the risk of creating
16 problems for the equipment, problems for humans,
17 or any other safety concern, then that would be
18 unacceptable.

19 So it's not that the operator
20 subjectively defines on a whim what would be
21 acceptable. It's acceptable in the context I just
22 described.

1 Q. Do you agree that the term "acceptable
2 threshold" suggests that the thresholds must be
3 acceptable to some person?

4 MR. QUARLES: Objection, form.

5 A. It's not the personal opinion here. I
6 mean, if the -- if a variable that is monitored
7 exceeds a threshold and that creates a risk for,
8 say, equipment damage or human injury or things of
9 that kind, well, that's fairly objective.

10 Q. And that threshold must be acceptable to
11 something or someone, correct?

12 MR. QUARLES: Objection, form.

13 A. Acceptable in the sense I just described,
14 that it is not creating any problems or indicative
15 of any current or impending problems.

16 Q. To who?

17 A. Problems for the equipment or for humans.

18 Q. You understand the claim does not require
19 detecting that the parameter is outside of a
20 threshold, but it requires detecting that the
21 parameter is outside of an acceptable threshold,
22 correct?

1 MR. QUARLES: Objection, form.

2 A. Yes, that's exactly the meaning of the
3 term "threshold," that if you are below the
4 threshold, you accept it; if you are above it, you
5 do not. And that's why they call it the
6 acceptable threshold. Or vice versa, if you go
7 high-low or low-high.

8 Q. So are you suggesting that this
9 limitation means -- would mean the exact same
10 thing if it didn't use the word "acceptable"?

11 MR. QUARLES: Objection, form.

12 A. Acceptable basically explains what the
13 threshold is about. For example, it's not a
14 threshold about optimality. It's not a threshold
15 about -- that is arbitrarily set there. It's
16 acceptable threshold.

17 And the patent explains how to
18 actually do something about it to avoid -- I can
19 look it up if you give me one minute. I can look
20 at the patent that says what you do in case you
21 exceed the threshold to mitigate the risk.

22 Can I get a minute?

1 Q. I'm familiar with that, but that's not my
2 question.

3 A. Okay. Let's go back then.

4 Q. Sure.

5 So earlier you testified that the
6 threshold must be acceptable to an operator of the
7 system. Could it be anyone else that the
8 threshold needs to be acceptable to?

9 MR. QUARLES: Objection, form.

10 A. It should be objectively acceptable for
11 safe operation, safe for the equipment and for
12 humans. I mentioned the operator because the
13 operator is, of course, in charge of all this. So
14 they would be an authority that one would consult
15 with.

16 Q. Who selects the acceptable threshold?

17 A. The people that are responsible for the
18 operation.

19 Q. No one else?

20 MR. QUARLES: Objection, form.

21 A. Who else do you have in mind?

22 Q. Could it be anyone else? Could it be a

1 manufacturer of the pump?

2 A. The manufacturer of the pump would
3 contribute, indeed, to explaining what conditions
4 for the pump would be safe and what would not be
5 safe, and that would be communicated to the
6 operator.

7 So the bottom line is that whoever
8 is responsible for ensuring safe operation would
9 actually set these values so that they would not
10 be exceeded. The thresholds would not be
11 exceeded.

12 Q. Could it be a user at the fracking site?

13 MR. QUARLES: Objection, form.

14 A. Well, we are getting into who has
15 authority, and then it's a matter of policy and
16 reliability issues and things that go beyond that.
17 But as an engineering decision, whoever does the
18 engineering analysis would set this threshold.

19 Q. I'm sorry, did you say they would select
20 the threshold?

21 A. Whoever does this engineering analysis
22 would set the threshold, yes, sir.

1 Q. Is the threshold something that's
2 selected?

3 MR. QUARLES: Objection, form.

4 A. If you're asking whether it's random, no,
5 it's not random. It's set at a value.

6 Q. Would you consider the acceptable
7 threshold to be something that's required to be
8 met?

9 MR. QUARLES: Objection, form.

10 A. Required by who, when, where? The claims
11 in the patent are clear that they're looking at
12 that threshold in the precise way that they
13 specify.

14 Q. Is it based on the fracking operation?

15 A. The threshold is related to the fracking
16 operation because if there is damage to equipment
17 that is associated with the fracking operation,
18 there would be problems.

19 Q. And is the purpose of the acceptable
20 threshold to avoid damage to the equipment?

21 A. One purpose is that, yes.

22 Q. And would it be a required threshold for

1 operation of the fracking operation?

2 MR. QUARLES: Objection, form.

3 A. Required by whom?

4 Q. Whoever selects it.

5 A. Well, whoever selects it sets it there to
6 ensure safe operation. And the patent explains
7 that if the threshold is exceeded, action will be
8 taken to fix the problem. Or mitigate the
9 problem.

10 Q. I'd like to look at limitation 1[f].

11 A. 1[f].

12 Q. And my questions about this limitation,
13 it may be best to look at the limitation as it
14 appears in the '435 patent.

15 A. So shall I open the '435 patent?

16 Q. Sure.

17 A. I'm going to put both side to side just
18 in case.

19 Okay. I'm on the '435 patent.

20 Q. You have it up?

21 A. Yes. Go ahead, please. I have it up,
22 yes.

1 Q. I'm referring to -- so 1[f] in
2 Exhibit 1014 refers to the last limitation of
3 Claim 1 in the '435 patent that starts "One or
4 more control devices"?

5 A. Yes.

6 Q. So this limitation states, "One or more
7 control devices configured to receive the
8 automated control instructions and automatically
9 adjust one or more aspects of the second device
10 based on the control instructions."

11 A. Yes.

12 Q. So this limitation recites one or more
13 control devices that receive automated control
14 instructions, correct?

15 A. Yes.

16 Q. And the one or more control devices also
17 automatically adjust one or more aspects of the
18 second device based on the control instructions,
19 correct?

20 A. Correct.

21 Q. And you see in the patent well above that
22 limitation it recites "a control system

1 comprising"?

2 A. A few lines above?

3 Q. Yes.

4 A. Yes. Line 4, yes.

5 Q. The one or more control devices recited
6 in limitation 1[f] are part of the claimed control
7 system, correct?

8 MR. QUARLES: Objection, form.

9 A. As stated there in claim 1, yes, it says,
10 "a control system comprising" and has element --
11 paragraph 1, a second paragraph, and the third
12 element is one or more control devices, et cetera.
13 That's what you are referring to, correct?

14 Q. Yes.

15 A. Yes.

16 Q. That essentially the claim requires the
17 control system to include a plurality of sensing
18 devices, one or more processing devices, and one
19 or more control devices, correct?

20 A. Correct. Correct.

21 Q. The claim does not require that the one
22 or more control devices be part of the second

1 device?

2 MR. QUARLES: Objection, form.

3 A. Let me read that a bit more carefully.

4 Yeah, the language is in the last --
5 the third paragraph of the control system
6 comprising the third element says one or more
7 control devices, et cetera, et cetera, adjust one
8 or more aspects of the second device. So they
9 could be separate.

10 Q. The one or more control devices are not
11 required to be part of the second device, correct?

12 MR. QUARLES: Objection, form.

13 A. So a couple of lines above, the language
14 is "generate automated control instructions at the
15 second device based at least in part of the first
16 parameter and one or more control devices
17 configured to receive the automated control
18 instructions and automatically adjust one or more
19 aspects of the second device."

20 So it leaves it at that because it
21 says "generate automated control instructions at
22 the second device."

1 Q. And it's the one or more processing
2 devices that generate the automated control
3 instructions at the second device, correct?

4 A. It's, yes, described in the second
5 paragraph. Is that what you're referring to?

6 Q. Yes.

7 A. Yeah, it says generate automated control
8 instructions at the second device.

9 Q. I'd like to look at column 10 of the
10 patent.

11 A. Column 10, yes, sir.

12 Q. Specifically the paragraph from lines 4
13 to 26.

14 A. 4 to 26, yes.

15 Q. The beginning of this paragraph the
16 patent states that "In some embodiments the method
17 160 also includes detecting that a first parameter
18 of the one or more parameters is outside of an
19 acceptable threshold."

20 See that?

21 A. Yes.

22 Q. Then it says, "in which the first

1 parameter is associated with a first pump of the
2 plurality of pumps and automatically adjusting or
3 turning off the first pump."

4 Do you see that?

5 A. Yes.

6 Q. What might automatic adjustments entail?

7 A. Any adjustment that would alleviate the
8 problem of being outside the threshold.

9 Q. Can you think of examples?

10 A. I can think of -- there may be -- I may
11 have to read the patent again. I think they
12 mention such examples. But obvious ideas that
13 might come to mind is, say, change, adjust the
14 RPM.

15 But the statement is that it's
16 general. It's make whatever adjustment is needed
17 so that you mitigate or cancel the problems of
18 being outside the threshold.

19 Q. And what could trigger the adjustments?

20 A. What can trigger the adjustments?

21 Q. Yes.

22 A. Having a parameter outside of an

1 acceptable threshold.

2 Q. Could that be if the parameter was a
3 large deviation from a desired setting?

4 MR. QUARLES: Objection, form.

5 A. There is no desired setting here.

6 Q. Could that trigger the parameter being
7 outside the acceptable threshold?

8 MR. QUARLES: Objection, form.

9 A. You're asking whether the trigger could
10 be a parameter being outside an acceptable
11 threshold?

12 Q. I'm asking if the trigger could be the
13 parameter being a large deviation from a desired
14 setting.

15 MR. QUARLES: Objection, form.

16 A. No, there is no desired setting here.
17 There is an acceptable threshold, and if you're
18 outside, this is indication of a problem, in which
19 case you do something.

20 Q. Sure.

21 And could "outside the acceptable
22 threshold" be triggered if the parameter was a

1 large deviation from a desired setting?

2 MR. QUARLES: Objection, form.

3 A. Well, again, there is no desired setting
4 here.

5 Q. In practice, there could be, correct?

6 MR. QUARLES: Objection, form.

7 A. In practice, you could have a number of
8 things, but this is not mentioned here. They
9 basically -- they are concerned with whether you
10 are outside or inside an acceptable area. If
11 you're outside that acceptable area, if you cross
12 the threshold, then this is problematic, in which
13 case you do something as specified here.

14 Q. Let me ask a different way.

15 So if the parameter was deemed to be
16 a large deviation from a desired setting, that
17 would not be outside of an acceptable threshold?

18 MR. QUARLES: Objection, form.

19 A. One cannot tell. The safety thresholds
20 are set to be whatever they are, and they only
21 look at whether the parameter, the variable being
22 monitored, is outside or inside. That's the thing

1 that they focus on.

2 Q. So the acceptable threshold could not be
3 a large deviation from a particular setting?

4 MR. QUARLES: Objection, form.

5 A. Well, the threshold is a fixed value. So
6 it's whatever value has been deemed to be a good
7 value so that you can have acceptable operation
8 without any problems if you are in this range
9 between the thresholds.

10 Q. Could the threshold be selected based on
11 deviation from a setting?

12 MR. QUARLES: Objection, form.

13 A. Well, they specify clearly that the
14 threshold is for operation to proceed without
15 problems. There is no notion of desired setting
16 here.

17 Q. I understand that. And I'm wondering, in
18 practice, if an implementer could select the
19 acceptable threshold to be based on deviation from
20 a setting?

21 MR. QUARLES: Objection, form.

22 A. I cannot answer that. There is no way to

1 know. It depends on the situation, objectives,
2 many, many things. So this is hypothetical.

3 Q. In practice, if the operator of the
4 system selected the threshold to be based on
5 deviation from a desired setting, that would not
6 read on this limitation, correct?

7 MR. QUARLES: Objection, form.

8 A. I cannot agree with that.

9 Q. It could read on the limitation?

10 A. No, no.

11 MR. QUARLES: Objection, form.

12 A. You said could -- could somebody set the
13 threshold based on deviation from a desired level.
14 That's what you said, correct?

15 Q. No.

16 What I said was, in practice, if the
17 operator of the system selected the threshold to
18 be based on deviation from a desired setting, that
19 would not read on this limitation, right?

20 MR. QUARLES: Objection, form.

21 A. This limitation neither agrees with that
22 nor disagrees with that. It simply states there

1 is a threshold that is set so that I can have
2 operation that is acceptable, and if I'm outside
3 it, I'll do something.

4 Q. And so if the operator of the system in
5 operation selected the threshold to be based on
6 deviation from a desired setting, could that or
7 could it not read on this limitation?

8 MR. QUARLES: Objection, form.

9 A. When you say "read," what do you mean,
10 whether that limitation actually encompasses that
11 or --

12 Q. Yes.

13 A. So how one sets the threshold, again, is
14 not based on deviation from any particular setting
15 because there is no discussion about that. There
16 is no notion of desired setting and far from the
17 desired setting and all that.

18 There is an area of good, safe,
19 acceptable operation and an area outside that.
20 That's all this limitation is concerned with.

21 Q. So if the threshold were based on
22 deviation from a desired setting, then it would

1 not be an acceptable threshold as that term is
2 used in limitation 1[e][ii]?

3 MR. QUARLES: Objection, form.

4 A. It might or might not. You cannot just
5 tell by a simple look at this and say yes/no.
6 There has to be proper analysis, and the target of
7 the analysis is, as the patent states, that there
8 has to be an acceptable area that is delineated by
9 a threshold. If the threshold is exceeded --

10 Q. So if the threshold --

11 A. (Inaudible)

12 Q. -- were based on deviation from a desired
13 setting, then it might be an acceptable threshold
14 as that term is used in limitation 1[e][ii],
15 correct?

16 MR. QUARLES: Objection, form.

17 A. There is no indication whether that might
18 or might not be accepted. There is no
19 prescription for how to set the threshold or
20 whether the specific scenario would be acceptable
21 or not.

22 Q. You said it might or might not be, so I'm

1 just trying to understand your testimony.

2 A. There is no answer to that. Namely, this
3 is -- the threshold is not set based on this
4 **criterion** criteria. One would use a proper engineering
5 analysis to ensure that the threshold is set in a
6 way that would not create problems, let's say, to
7 the equipment -- safety to the equipment, safety
8 to humans, **and** if something is problematic because
9 a variable is outside the threshold, a corrective
10 action will be taken. That's all it says. It
11 doesn't discuss about how to set the threshold.

12 Q. So you said the --

13 A. The specific recipe you mention.

14 Q. I'm sorry. I didn't mean to interrupt
15 you.

16 A. Yeah, I apologize as well.

17 Q. You said the threshold is not set based
18 on this criteria, and the criteria you're
19 referring to is deviation from a desired setting.
20 Is that fair?

21 A. No. There is no desired setting and no
22 deviation from desired setting.

1 How can I put it? There is a zone,
2 an envelope of operation set by the threshold.
3 That's what is set there. As long as you are in
4 there, you can do anything you want. If you're
5 outside, you have to correct something.

6 Q. What criteria were you referring to when
7 you testified that the acceptable threshold is not
8 based -- is not set based on this criteria?

9 MR. QUARLES: Objection, form.

10 A. No, no. You mean the answer I gave just
11 a moment ago?

12 Q. Yes.

13 A. Yeah, I meant there is no single ^{crit}criteria
14 like this that can be used to say this is a
15 threshold or not. There has to be proper
16 engineering analysis that says if I'm in this
17 domain, I am okay. If I'm outside this domain, if
18 I have crossed the threshold, I have to do
19 something.

20 Inside the domain that is
21 acceptable, I can proceed with my operation as I
22 see fit.

1 Q. In identifying or determining the domain,
2 could the operator use deviation from a desired
3 setting?

4 MR. QUARLES: Objection, form.

5 A. They could use a number of things, and
6 that would be a subject of proper engineering
7 analysis.

8 Q. I'd like to look at line 15 of that
9 paragraph.

10 A. Line 15. Yes, sir. In column 10?

11 Q. Yes.

12 A. Yeah, very good.

13 Q. There's a sentence that starts there in
14 that line that states, "In one or more
15 embodiments, the method 160 also includes
16 determining that the one or more parameters are
17 indicative of a potential failure condition and
18 determining a source of the potential failure
19 condition."

20 Do you see that?

21 A. Yes.

22 Q. So at the beginning of that paragraph,

1 the patent states that the method includes
2 detecting that the first parameter is outside of
3 an acceptable threshold and automatically
4 adjusting or turning off the first pump, right?

5 A. Yeah, it has that in lines 5 and 6, yes.

6 Q. And in that sentence that we just
7 discussed at line 15, the patent states that "In
8 one or more embodiments the method also includes
9 determining that the one or more parameters are
10 indicative of a potential failure condition."

11 You see that?

12 A. Yes.

13 Q. So is it fair to say that the paragraph
14 contemplates at least three events in response to
15 detecting that the first parameter is outside the
16 acceptable threshold, namely, automatically
17 adjusting the pump, turning off the pump, or
18 determining there is a potential failure
19 condition?

20 MR. QUARLES: Objection, form.

21 A. Well, I would separate these in the sense
22 that determining that this is indicative of a

1 potential failure condition is an assessment, it's
2 a detection, and then adjusting the pump or taking
3 it offline altogether is a response to that.

4 Q. So are you saying that the patent is
5 stating that when you determine that the first
6 parameter is outside the acceptable threshold,
7 then you are necessarily determining a potential
8 failure condition?

9 A. Well, it says "in one or more
10 embodiments."

11 Q. Does that mean in all embodiments?

12 A. It means that -- it says -- I'll read it
13 again. It says in one or more embodiments the
14 method 160 also includes determining that the one
15 or more parameters are indicative of a potential
16 failure condition -- a determining source of the
17 potential failure condition.

18 So the detection of this and perhaps
19 the diagnosis, referring to the source of the
20 potential failure condition, is included in one or
21 more embodiments of the method 160.

22 Q. So my question is is the patent stating

1 that in all cases when you determine that the
2 parameter is outside of the acceptable threshold,
3 that you have a potential failure condition?

4 MR. QUARLES: Objection, form.

5 A. No. It says that you may include
6 capability for -- and I'm reading. I'm quoting,
7 "determining that the one or more parameters are
8 indicative of a potential failure condition."

9 So that is certainly one of the
10 things that you can look at based on the
11 measurement that you have.

12 Q. Is it possible that the detection that
13 the first parameter is outside the acceptable
14 threshold does not mean that you have a potential
15 failure condition?

16 MR. QUARLES: Objection, form.

17 A. In general, it may be, yes. It may be
18 another kind of problem. So they go here to that
19 specific case, which is obviously severe, and
20 that's --

21 Q. And if you have the other kind of
22 problem, you might just automatically adjust the

1 pump, correct?

2 MR. QUARLES: Objection, form.

3 A. No, they don't say that. You would
4 automatically -- the controller, that is, would
5 automatically take action based on whatever the
6 specific algorithm says.

7 Q. Okay. I'd like to look at your
8 declaration, Exhibit 2010.

9 A. Yes, I have it in front of me.

10 Q. Specifically at exhibit page 43.

11 A. Okay. Figure 3 -- 42, I'm sorry.
12 Exhibit page -- yeah, page 43. That's 42 of the
13 pdf or whatever that document is, right?

14 Q. Correct.

15 A. Okay. And it's Figure 3, that's what
16 you're looking at?

17 Q. No. I'm looking at the beginning of
18 section 8 at the bottom.

19 A. Okay. I'm sorry, yeah. Go ahead. I see
20 that, yes.

21 Q. So section 8 of your declaration,
22 starting on exhibit page 43, addresses the Norris

1 reference. Is that fair?

2 A. Yes.

3 Q. And I'd like to turn to page 72, exhibit
4 page 72. That's the beginning of section 9 of
5 your declaration.

6 A. Yes, I'm there.

7 Q. So section 9 of your declaration,
8 starting on exhibit page 72, addresses Omont,
9 correct?

10 A. Correct.

11 Q. I'd like to turn to exhibit page 93.

12 A. Yes, sir.

13 Q. This is where your section 10 starts.
14 You see that?

15 A. Yes, that's correct.

16 Q. And section 10 of your declaration,
17 starting on exhibit page 93, addresses Borgstadt,
18 correct?

19 A. Correct.

20 Q. So I'd like to go back to section 8 on
21 exhibit page 43.

22 A. Yes.

1 Q. In this section 8, you address Norris
2 where your opinion is that Norris does not
3 disclose the acceptable threshold term of Claim 1.
4 Is that right?

5 A. Correct.

6 Q. And the acceptable threshold is in claim
7 limitation 1[e][ii]?

8 A. 1 -- which one did you say? One more
9 time.

10 Q. 1[e][ii].

11 A. 1[e][ii]. Yes.

12 Q. So I'd like to look at limitation
13 1[e][i].

14 A. Yes.

15 Q. You do not offer an opinion regarding
16 whether Norris discloses, or renders obvious,
17 limitation 1[e][i], correct?

18 A. I'm not offering --

19 MR. QUARLES: Objection, form.

20 A. I'm not offering an opinion in my
21 declaration, you mean?

22 Q. Correct.

1 A. Well, in good faith, I'll take that. I
2 would have to look at my declaration, but I trust
3 that you have not found anything there, so let's
4 continue.

5 Q. Well, you agree that -- I mean -- strike
6 that.

7 Your opinion in your declaration,
8 based on Norris, is solely based on the acceptable
9 threshold limitation, which is in 1[e][ii],
10 correct?

11 MR. QUARLES: Objection, form.

12 A. Let me check really quickly.

13 Before I check, let me mention this.
14 1[e][iii], indeed, is the strongest one because the
15 patent '435 is about threshold, maintaining a
16 variable in the threshold. Norris is about
17 maintaining a variable around a set point, and
18 that's why I focused on that.

19 But let me check really quickly
20 through the document, through the declaration,
21 just to see what else I may have included there.
22 Give me just one second, and I'm not going to take

1 long because this is very standard.

2 Yes, this is -- I mean, you -- your
3 statement was that the argument regarding Norris
4 is about the difference between control around the
5 desired value and control within bounds and
6 through a threshold. And, indeed, that's how we
7 have framed -- that's how the argument is framed
8 in my declaration.

9 Q. And you do not offer an opinion regarding
10 whether Norris discloses or renders obvious
11 limitation 1[e][i], correct?

12 MR. QUARLES: Objection, form.

13 A. 1[e][i], let me -- apologies. Limitation
14 1[e][i], I didn't focus on that because I believe
15 there was a much stronger argument for 1[e][ii],
16 and that's why I placed all the argument there.

17 Q. Okay. Let's go back to section 9 of your
18 declaration at exhibit page 72.

19 A. So declaration section 9, page -- what
20 page again?

21 Q. Exhibit page 72.

22 A. 72. 9, yes, I'm there.

1 Q. And, again, this is a section where you
2 address Omont?

3 A. Yes.

4 Q. In this section you state that Omont does
5 not disclose or render obvious aspects of
6 limitation 1[e][i], correct?

7 MR. QUARLES: Objection, form.

8 A. What part of the text are you referring
9 to one more time?

10 Q. Section 9.

11 A. Section 9. And you're reading about --
12 what lines again?

13 Q. 1[e][i].

14 A. So section 9 starts with a POSITA would
15 agree, et cetera, and there is text after that.
16 Are you referring to that or --

17 Q. I'm referring to the entire section.

18 A. Okay, the entire section. Okay.

19 So, yeah, the argument, then, is as
20 stated in the introduction of section 9; namely,
21 there is a difference -- there is no disclosure of
22 transmitting the first parameter for the first

1 device to the second device where both the first
2 device and the second device are of the plurality
3 of pumps, the distribution system, or the
4 wellhead.

5 And that's why this is in italics,
6 actually.

7 Q. And that language is in limitation
8 1[e][i], correct?

9 A. Limitation 1[e][i], yes, it is.

10 Q. You do not offer an opinion that
11 addresses the motivations to combine Norris and
12 Omont, correct?

13 MR. QUARLES: Objection, form.

14 A. To combine those in what way?

15 Q. The way proposed in the petition.

16 A. Oh. I do not remember whether there is
17 any -- well, let me put it this way. There is no
18 section that has those looked at in combination.

19 Beyond that, I would have to go back
20 to my declaration to see whatever -- in what
21 details I may have referred to combining these
22 two.

1 Q. To that point, you don't offer an opinion
2 on whether the combination of Norris and Omont
3 discloses or renders obvious any of the
4 limitations, correct?

5 MR. QUARLES: Objection, form.

6 A. So Norris clearly does not render obvious
7 the corresponding limitation that we mentioned,
8 which was 1[e][ii], and Omont is 1[e][i]. So each
9 one fails to disclose or render obvious either one
10 of those two limitations.

11 Combination of the two, I don't see
12 how they would actually render those obvious --
13 these two limitations obvious or whether they
14 would disclose these two limitations.

15 Q. Let's look at section 10 of your
16 declaration, starting on exhibit page 93.

17 A. 93. Okay, I'm there.

18 Q. This is the section where you address
19 Borgstadt, correct?

20 A. Yes.

21 Q. And in this section you state your
22 opinion that Borgstadt does not disclose or render

1 obvious the claimed first parameter and the second
2 device of the claims?

3 A. Yes.

4 Q. You do not offer an opinion that
5 addresses the motivations to combine Norris and
6 Borgstadt, correct?

7 MR. QUARLES: Objection, form.

8 A. Well, if there is a specific way you
9 think that those can be combined, I could discuss
10 that. But I don't believe we have this in the
11 declaration, to the best of my recollection.

12 Q. And you do not offer an opinion on
13 whether the combination of Norris and Borgstadt
14 renders any claim limitations obvious, correct?

15 MR. QUARLES: Objection, form.

16 A. Well, it would not in the sense that
17 Norris is not about threshold control. So where
18 would that come from?

19 Q. Can you point me to the portion of your
20 declaration where you offer an opinion on the
21 combination of Norris and Borgstadt?

22 A. Combination, no, I don't believe we

1 considered that.

2 But what I'm saying is you asked me
3 could the combination of the two be considered,
4 you asked me something to that effect, or did I
5 misunderstand?

6 So if that was what you asked me, my
7 response is Norris doesn't have anything about
8 threshold control, so where would that come if we
9 tried to combine the two? How would this be
10 addressed?

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

13 MR. QUARLES: Yeah, just if I
14 could -- maybe ten minutes or so, if that's okay?

15 MR. WALTERS: Sure.

16 (Discussion off the record)

17 MR. QUARLES: No further questions.

18 MR. WALTERS: Thank you for your
19 time, Dr. Nikolaou.

20 THE WITNESS: Thank you.

21 MR. QUARLES: No rush from us.

22 THE REPORTER: What about rough

1 draft, Mr. Quarles?

2 MR. QUARLES: Sure, we'll take a
3 rough draft.

4 MR. WALTERS: So, Rick, I assume
5 that Dr. Nikolaou would like to review it?

6 MR. QUARLES: Yes.

7 MR. WALTERS: And we would like his
8 signature. So if we got it on the 7th, could he
9 turn it around -- that's a Friday. Could he turn
10 it around by the 11th? 10th or 11th?

11 THE WITNESS: Of November?

12 MR. WALTERS: Yes. Our brief is due
13 on the 13th. So if we could have the transcript
14 in a week, that would be good.

15 THE WITNESS: If I can have it by
16 the 6th, I'm traveling, so I could review it.

17 THE REPORTER: That's fine.

18 (Proceedings concluded at
19 12:54 a.m.)
20
21
22

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5 I declare under penalty of perjury that the
6 foregoing is true and correct.

7

8

9

10

MICHAEL NIKOLAOU

11

12

13 SUBSCRIBED AND SWORN TO BEFORE ME, the
14 undersigned authority, by the witness, MICHAEL
15 NIKOLAOU, on this the _____ day of _____,
16 2025.

17

18

19

NOTARY PUBLIC IN AND FOR

20

THE STATE OF _____

21

22 My Commission Expires: _____

1 CERTIFICATE OF SHORTHAND REPORTER

2 I, Laurie Carlisle, Certified Shorthand
3 Reporter within and for the State of California
4 do hereby certify:

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

10 I further certify that the adverse party,
11 U.S. WELL SERVICES, LLC,, was represented by counsel
12 at the deposition.

13 I further certify that the deposition of
14 MICHAEL NIKOLAOU, PH.D, occurred virtually via Zoom
15 on Friday, October 31, 2025, commencing at 9:34 a.m.
16 to 12:54 p.m.

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

1 IN WITNESS WHEREOF, I have hereunto set my
2 hand this 6th day of November, 2025.

3
4
5
6 
7 _____

8 Laurie Carlisle, CSR, CM, CRR

9 California CSR #13234

10 PLANET DEPOS

11 451 Hungerford Drive, Ste 400

12 Rockville, Maryland 20850
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ability 4:15 about 4:13, 5:13, 5:14, 13:12, 14:3, 18:6, 18:9, 34:21, 51:5, 56:10, 60:16, 65:21, 65:22, 69:4, 71:13, 71:14, 71:15, 71:18, 75:12, 85:15, 87:11, 96:15, 96:16, 97:4, 98:11, 101:17, 102:7, 102:22 above 14:15, 71:4, 76:21, 77:2, 78:13 above-styled 1:21 absolutely 56:6 abstract 7:2, 7:11, 8:3 accept 27:14, 71:4 acceptable 67:10, 67:13, 67:14, 67:18, 68:4, 68:12, 68:16, 69:4, 69:5, 69:9, 69:21, 70:1, 70:3, 70:10, 70:13, 70:21, 71:6, 71:10, 71:12, 71:16, 72:6, 72:8, 72:10, 72:16, 74:6, 74:19, 79:19, 81:1, 81:7, 81:10, 81:17, 81:21,	82:10, 82:11, 82:17, 83:2, 83:7, 83:19, 85:2, 85:19, 86:1, 86:8, 86:13, 86:20, 88:7, 88:21, 90:3, 90:16, 91:6, 92:2, 92:13, 95:3, 95:6, 96:8 accepted 86:18 according 13:7 account 14:13 accurately 6:1, 23:8, 66:10 action 8:2, 75:7, 87:10, 93:5, 105:18, 105:20 actual 19:1, 19:4, 19:11 actually 13:12, 15:19, 31:12, 68:21, 71:18, 73:9, 85:10, 99:6, 100:12 addition 21:19 additional 30:3 additive 40:13, 43:10 address 95:1, 98:2, 100:18 addressed 102:10 addresses 93:22, 94:8, 94:17, 99:11, 101:5	adjust 76:9, 76:17, 78:7, 78:18, 80:13, 92:22 adjusting 80:2, 90:4, 90:17, 91:2 adjustment 80:7, 80:16 adjustments 80:6, 80:19, 80:20 advantage 65:5 adverse 105:10 after 98:15 again 12:9, 13:2, 13:11, 13:15, 15:12, 16:20, 17:18, 22:7, 34:2, 35:16, 39:7, 39:20, 41:4, 41:19, 42:5, 43:17, 44:4, 45:22, 56:4, 57:16, 62:8, 62:12, 66:19, 67:2, 69:8, 80:11, 82:3, 85:13, 91:13, 97:20, 98:1, 98:12 ago 23:19, 34:21, 57:10, 88:11 agree 11:14, 12:10, 13:8, 16:5, 26:16, 37:10, 37:16, 70:1, 84:8, 96:5, 98:15 agrees 84:21 ahead 38:9, 44:13,	56:7, 75:21, 93:19 algorithm 93:6 all 41:1, 43:18, 44:6, 44:10, 56:10, 61:5, 65:3, 72:13, 85:17, 85:20, 87:10, 91:11, 92:1, 97:16 alleged 6:21 alleviate 80:7 aloud 19:18 already 15:18 also 19:20, 21:18, 25:4, 37:21, 40:16, 45:14, 53:21, 58:5, 58:8, 59:11, 69:3, 76:16, 79:17, 89:15, 90:8, 91:14 although 20:17, 20:20, 23:19 altogether 91:3 analysis 11:18, 73:18, 73:21, 86:6, 86:7, 87:5, 88:16, 89:7 analyze 7:14 another 14:5, 28:16, 40:14, 53:19, 92:18 answer 12:4, 12:8, 23:8, 34:7,

40:1, 83:22, 87:2, 88:10 answered 41:3, 62:11 any 4:17, 5:5, 8:6, 27:12, 31:10, 31:12, 35:7, 42:16, 42:21, 52:9, 52:10, 54:5, 66:3, 66:8, 68:11, 69:17, 70:14, 70:15, 80:7, 83:8, 85:14, 99:17, 100:3, 101:14, 102:11, 105:18, 105:19 anyone 5:10, 72:7, 72:22 anything 8:14, 31:16, 88:4, 96:3, 102:7 apologies 8:17, 12:6, 53:15, 97:13 apologize 87:16 apparatus 13:20 appeal 1:2 appearances 2:1 appears 59:8, 59:9, 75:14 applied 21:5, 23:12 apply 24:12 appreciated 23:21 arbitrarily 71:15 area 82:10, 82:11,	85:18, 85:19, 86:8 argument 97:3, 97:7, 97:15, 97:16, 98:19 arise 68:18 around 30:12, 96:17, 97:4, 103:9, 103:10 arrow 43:22, 44:20, 44:21 art 23:11, 23:22, 31:4, 39:13, 40:5, 41:6, 51:17 asked 36:8, 41:4, 49:14, 102:2, 102:4, 102:6 asking 18:9, 18:10, 36:11, 49:11, 51:5, 51:16, 74:4, 81:9, 81:12 aspect 47:10, 48:2, 49:4 aspects 7:19, 40:13, 76:9, 76:17, 78:8, 78:19, 98:5 assess 18:7 assesses 67:17 assessment 91:1 associated 8:19, 13:22, 23:4, 24:10, 25:22, 74:17,	80:1 assume 103:4 attorney 105:19 authority 72:14, 73:15, 104:14 automated 76:8, 76:13, 78:14, 78:17, 78:21, 79:2, 79:7 automatic 80:6 automatically 76:8, 76:17, 78:18, 80:2, 90:3, 90:16, 92:22, 93:4, 93:5 available 54:8 avenue 2:6 avoid 71:18, 74:20 B back 18:18, 22:6, 22:13, 35:10, 36:13, 37:2, 37:4, 38:19, 45:8, 72:3, 94:20, 97:17, 99:19 baker 2:5 base 53:6 based 7:16, 7:20, 21:4, 23:10, 25:1, 26:17, 43:3, 44:1, 74:14, 76:10, 76:18, 78:15,	83:10, 83:19, 84:4, 84:13, 84:18, 85:5, 85:14, 85:21, 86:12, 87:3, 87:17, 88:8, 92:10, 93:5, 96:8 basically 8:1, 10:16, 71:12, 82:9 because 12:21, 15:5, 15:8, 18:21, 19:4, 19:9, 29:21, 31:11, 42:13, 51:6, 52:8, 62:3, 62:15, 63:5, 72:12, 74:16, 78:20, 85:15, 87:8, 96:14, 97:1, 97:14 been 4:2, 4:10, 4:14, 10:9, 45:2, 83:6 before 1:2, 1:23, 4:10, 15:14, 66:12, 96:13, 104:13, 105:7, 105:8 beginning 79:15, 89:22, 93:17, 94:4 being 5:15, 80:8, 80:18, 81:6, 81:10, 81:13, 82:21 believe 63:1, 97:14, 101:10, 101:22 below 11:4, 71:3 benefit 23:22
--	--	---	---

best 4:15, 75:13, 101:11	28:9, 35:12, 36:14, 73:7, 93:18	106:8	circuit 35:4, 44:1
between 43:10, 43:11, 51:3, 52:18, 52:21, 52:22, 65:11, 83:9, 97:4	botts 2:5	carolina 2:14	claim 7:3, 13:20, 45:15, 45:19, 45:21, 46:5, 53:11, 54:6, 54:21, 55:14, 55:19, 57:17, 57:19, 58:5, 60:16, 60:20, 61:21, 62:1, 62:8, 62:20, 64:20, 70:18, 76:3, 77:9, 77:16, 77:21, 95:3, 95:6, 101:14
beyond 73:16, 99:19	bounds 68:20, 97:5	case 1:7, 65:7, 66:21, 71:20, 75:18, 81:19, 82:13, 92:19	claimed 77:6, 101:1
bit 53:14, 78:3	break 45:1, 63:14, 66:12	cases 92:1	claims 18:6, 18:10, 45:10, 45:12, 74:10, 101:2
block 44:18	brief 103:12	cause 1:22	clean 8:9
blocks 35:22, 36:2	broken 31:11	cellular 53:5	clear 13:1, 15:13, 51:21, 62:9, 64:21, 66:5, 74:11
blood 105:18	C	certain 14:16	clearly 20:9, 83:13, 100:6
bluetooth 53:4	cables 53:4	certainly 92:9	close 8:16, 8:17
board 1:2	calculated 12:2, 14:1	certificate 105:1	closed 8:18, 67:3
borgstad borgstadt 8:22, 13:7, 17:20	calculation 13:1	certified 1:24, 105:2	cm 106:8
borgstadt 13:12, 13:14, 13:18, 14:6, 14:15, 16:16, 16:19, 17:2, 18:2, 18:3, 18:6, 18:10, 18:11, 18:20, 18:21, 19:9, 19:14, 20:4, 20:14, 22:9, 24:16, 94:17, 100:19, 100:22, 101:6, 101:13, 101:21	california 1:25, 105:3, 106:9	certify 105:4, 105:10, 105:13, 105:17	coded 28:22, 29:22
borgstadt's 21:15, 23:1	call 71:5	cetera 35:20, 35:21, 36:22, 42:14, 43:19, 44:1, 50:12, 77:12, 78:7, 98:15	collection 44:5
both 32:8, 45:17, 53:2, 57:6, 75:17, 99:1	called 27:7	chad 2:4, 2:8	collective 43:17
bottom 14:10, 15:14,	cam 43:10	change 80:13	collins 69:1
	cambridge 69:2	characteristics 11:22	
	cancel 80:17	charge 72:13	
	cannot 4:17, 82:19, 83:22, 84:8, 86:4	charlotte 2:14	
	capabilities 65:4	chat 63:18	
	capability 14:17, 15:15, 92:6	check 52:7, 52:16, 68:7, 68:10, 96:12, 96:13, 96:19	
	carefully 78:3		
	carlisle 1:24, 105:2,		

column 10:19, 52:20, 53:10, 53:19, 79:9, 79:11, 89:10 com 2:8, 2:15 combination 53:2, 99:18, 100:2, 100:11, 101:13, 101:21, 101:22, 102:3 combine 99:11, 99:14, 101:5, 102:9 combined 101:9 combining 99:21 come 80:13, 101:18, 102:8 command 9:14, 10:4 commands 9:20 commencement 105:7 commencing 105:15 commission 104:22 communicate 66:20 communicated 73:5 communication 43:9, 43:11, 52:18, 52:20, 52:22, 53:3, 53:6, 53:18, 53:21, 54:1, 54:3, 54:5, 54:9, 65:4, 65:10, 65:15, 66:2, 66:4, 66:9, 66:18 compensated 5:15, 5:17	components 32:16, 32:22, 33:6, 33:12, 34:9, 37:6, 41:21, 43:1, 43:12, 52:18, 53:1, 53:20 comprise 14:5 comprising 77:1, 77:10, 78:6 computer 8:15 computerized 1:26 concern 69:17 concerned 54:6, 82:9, 85:20 concluded 103:18 condition 89:17, 89:19, 90:10, 90:19, 91:1, 91:8, 91:16, 91:17, 91:20, 92:3, 92:8, 92:15 conditions 73:3 configuration 61:9 configured 7:7, 7:13, 7:18, 46:10, 48:3, 48:12, 49:1, 49:9, 49:20, 49:22, 76:7, 78:17 confirm 17:15 consider 74:6 considered 102:1, 102:3 considers 18:16	constituencies 69:13 constraints 68:19 consult 72:14 contemplates 90:14 context 22:2, 66:16, 67:15, 68:13, 69:21 continue 53:14, 96:4 continuing 7:11, 40:19 contribute 73:3 control 7:6, 7:15, 7:17, 7:18, 7:19, 7:21, 10:6, 10:10, 25:22, 26:5, 26:6, 26:12, 26:13, 26:16, 26:21, 27:1, 27:2, 27:6, 27:8, 27:9, 27:13, 27:14, 27:15, 27:16, 27:17, 27:18, 27:21, 28:7, 28:11, 28:21, 29:10, 29:22, 30:3, 30:9, 31:6, 32:17, 33:7, 33:13, 33:19, 34:4, 34:11, 34:13, 34:21, 35:13, 35:19, 36:15, 37:8, 37:13, 37:22, 38:12, 38:22, 39:8, 39:15, 40:7, 40:14, 40:15, 40:21, 41:8,	41:15, 42:2, 43:3, 43:8, 43:14, 44:14, 44:17, 52:19, 53:1, 76:4, 76:7, 76:8, 76:10, 76:13, 76:16, 76:18, 76:22, 77:5, 77:6, 77:10, 77:12, 77:17, 77:19, 77:22, 78:5, 78:7, 78:10, 78:14, 78:16, 78:17, 78:21, 79:2, 79:7, 97:4, 97:5, 101:17, 102:8 controllable 29:6 controller 9:5, 9:12, 10:4, 10:9, 10:21, 10:22, 14:10, 14:17, 93:4 controllers 9:9, 9:19, 9:22 controlling 29:5, 31:1 controls 7:6, 9:13, 9:18, 10:1, 10:22 converge 35:7 correct 6:5, 6:6, 14:20, 17:13, 17:22, 18:13, 19:1, 19:6, 20:7, 24:18, 26:7, 29:18, 33:7, 33:20, 34:11, 34:14, 36:10, 38:3, 38:7, 38:14,
--	--	---	--

38:16, 38:18, 42:4, 43:3, 46:16, 46:17, 47:2, 47:9, 48:14, 50:4, 50:10, 50:11, 50:17, 50:18, 51:1, 51:12, 54:16, 54:19, 55:4, 57:2, 57:22, 58:15, 58:17, 58:18, 59:9, 60:2, 61:10, 64:18, 67:11, 70:11, 70:22, 76:14, 76:19, 76:20, 77:7, 77:13, 77:19, 77:20, 78:11, 79:3, 82:5, 84:6, 84:14, 86:15, 88:5, 93:1, 93:14, 94:9, 94:10, 94:15, 94:18, 94:19, 95:5, 95:17, 95:22, 96:10, 97:11, 98:6, 99:8, 99:12, 100:4, 100:19, 101:6, 101:14, 104:6 corrective 87:9 corresponding 10:5, 13:16, 100:7 could 21:5, 21:18, 23:7, 23:12, 24:5, 24:6, 25:3, 25:6, 25:8, 31:9, 31:10, 31:15, 31:17, 31:20, 33:19, 36:21, 40:2, 40:15,	41:12, 41:22, 42:3, 44:7, 44:8, 44:10, 44:14, 50:20, 51:9, 51:17, 53:8, 55:4, 65:4, 72:7, 72:22, 73:12, 78:9, 80:19, 81:2, 81:6, 81:9, 81:12, 81:21, 82:5, 82:7, 83:2, 83:10, 83:18, 84:9, 84:12, 85:6, 85:7, 89:2, 89:5, 101:9, 102:3, 102:14, 103:8, 103:9, 103:13, 103:16 counsel 105:11 couple 8:4, 20:16, 78:13 course 16:13, 72:13 covered 60:20, 63:3, 64:17 create 87:6 creates 70:7 creating 69:15, 70:14 criteria 87:4, 87:18, 88:6, 88:8, 88:13 cross 82:11 crossed 88:18 crr 106:8 csr 106:8, 106:9	current 23:17, 70:15 curve 13:21, 13:22, 14:5, 14:6, 14:12, 15:18 D dallas 2:7 damage 70:8, 74:16, 74:20 dashed 42:6, 44:4 day 1:22, 104:15, 106:2 decision 73:17 declaration 5:2, 5:6, 5:18, 6:1, 8:10, 8:20, 12:5, 12:6, 12:20, 13:5, 68:22, 93:8, 93:21, 94:5, 94:7, 94:16, 95:21, 96:2, 96:7, 96:20, 97:8, 97:18, 97:19, 99:20, 100:16, 101:11, 101:20 declare 104:5 deemed 82:15, 83:6 define 68:12 defines 69:20 definitions 68:22 delineated 86:8 depending 6:17	depends 27:9, 84:1 depos 106:10 deposed 4:10 deposition 1:15, 1:19, 4:21, 5:1, 11:19, 12:2, 12:6, 105:6, 105:7, 105:8, 105:12, 105:13 describe 23:3 described 6:16, 68:9, 69:22, 70:13, 79:4 describes 17:20, 18:11, 18:21, 20:4, 23:2 description 7:3, 21:4, 39:19, 39:20, 52:17 designation 43:17 desired 27:10, 81:3, 81:5, 81:13, 81:16, 82:1, 82:3, 82:16, 83:15, 84:5, 84:13, 84:18, 85:6, 85:16, 85:17, 85:22, 86:12, 87:19, 87:21, 87:22, 89:2, 97:5 detail 32:21, 33:9, 39:11, 52:12 details 6:17, 8:2, 30:21, 99:21 detect 67:9, 67:12
---	---	--	---

detecting 70:19, 70:20, 79:17, 90:2, 90:15 detection 91:2, 91:18, 92:12 determine 14:10, 14:11, 14:17, 15:15, 15:16, 91:5, 92:1 determined 15:5, 15:6, 15:8, 16:12, 18:22, 19:1, 19:4 determining 89:1, 89:16, 89:18, 90:9, 90:18, 90:22, 91:7, 91:14, 91:16, 92:7 deviation 81:3, 81:13, 82:1, 82:16, 83:3, 83:11, 83:19, 84:5, 84:13, 84:18, 85:6, 85:14, 85:22, 86:12, 87:19, 87:22, 89:2 devices 7:7, 7:13, 7:15, 7:17, 29:6, 46:10, 46:19, 47:2, 47:12, 48:3, 48:9, 48:12, 48:19, 49:1, 49:6, 49:8, 49:16, 49:19, 49:22, 50:4, 50:7, 50:10, 50:15, 50:16, 50:21, 51:7, 51:10, 51:17,	51:18, 52:1, 52:2, 52:19, 53:1, 53:22, 54:14, 54:15, 55:4, 55:7, 55:11, 55:12, 55:22, 56:2, 56:10, 56:13, 56:22, 57:20, 57:22, 58:14, 58:20, 59:7, 59:8, 60:7, 64:6, 64:8, 65:19, 65:21, 76:4, 76:7, 76:13, 76:16, 77:5, 77:12, 77:18, 77:19, 77:22, 78:7, 78:10, 78:16, 79:2 diagnosing 21:1, 21:12, 24:2, 24:5, 24:18, 24:22, 25:4, 25:7 diagnosis 91:19 diagram 22:16, 23:7, 24:21, 44:3 dictionaries 69:1 difference 97:4, 98:21 different 22:15, 26:21, 41:20, 51:20, 54:10, 82:14 differently 62:1 direction 49:11 directly 54:19, 62:4, 62:17, 62:19, 63:6 disagrees 84:22	disclose 95:3, 98:5, 100:9, 100:14, 100:22 discloses 95:16, 97:10, 100:3 disclosure 21:15, 23:10, 23:22, 25:1, 98:21 discuss 68:21, 87:11, 101:9 discussed 14:2, 23:18, 33:18, 54:3, 63:19, 65:3, 90:7 discussing 64:1, 64:7, 66:12 discussion 34:20, 85:15, 102:16 distinguish 51:3 distracted 8:18 distribution 7:12, 7:20, 46:12, 46:14, 47:5, 47:8, 47:17, 47:19, 51:15, 65:20, 99:3 document 67:1, 93:13, 96:20 documents 8:12 doing 17:18 domain 88:17, 88:20, 89:1 done 30:21, 31:9	down 10:22, 14:3, 20:16, 28:16, 37:17, 48:21, 56:5 dr 4:6, 45:8, 63:22, 69:3, 102:19, 103:5 draft 103:1, 103:3 drawing 64:1 drive 10:21, 25:21, 27:10, 106:11 due 103:12 duly 1:21, 4:2, 105:6 durham's 69:3 during 21:1, 21:12, 24:1, 25:6 E e-mail 2:8, 2:15 e-t-a 17:9 each 9:22, 11:16, 12:12, 19:19, 22:19, 22:22, 24:11, 25:21, 28:6, 28:17, 28:20, 32:22, 33:12, 33:13, 34:10, 37:7, 37:21, 43:1, 43:2, 60:8, 61:19, 100:8 earlier 21:15, 33:18, 38:11, 58:12, 64:15, 72:5
---	---	--	---

easily 53:9 ecm 26:1, 26:9, 26:16 effect 52:19, 102:4 efficiency 11:11, 11:15, 12:12, 12:15, 12:22, 13:9, 13:12, 14:1, 14:11, 14:18, 14:22, 15:15, 15:17, 16:2, 16:5, 16:11, 16:12, 16:15, 17:14, 17:15, 17:19, 17:21, 18:12, 18:19, 18:22, 19:12, 20:3, 20:6, 20:21, 21:20, 23:4, 23:17, 23:20, 24:17 effort 63:22 eight 14:3 either 45:16, 57:14, 100:9 electrical 53:4 electronic 25:22, 26:5, 26:11, 26:13, 27:7, 27:14, 27:17 element 46:5, 77:10, 77:12, 78:6 elements 32:16 else 5:10, 8:14, 8:15, 42:10, 72:7, 72:19,	72:21, 72:22, 96:21 email 8:17 embodiment 14:9 embodiments 14:16, 79:16, 89:15, 90:8, 91:10, 91:11, 91:13, 91:21 employed 105:19 encompassed 55:19 encompasses 85:10 end 45:21 energy 1:4 engine 25:21, 26:2, 26:6, 26:15, 26:17, 26:20, 27:3, 27:19, 27:22 engineering 73:17, 73:18, 73:21, 87:4, 88:16, 89:6 enough 39:22, 40:2 ensure 75:6, 87:5 ensuring 73:8 entail 80:6 entire 42:6, 98:17, 98:18 envelope 88:2 envision 51:18, 51:22 equipment 69:6, 69:16,	70:8, 70:17, 72:11, 74:16, 74:20, 87:7 esq 2:4, 2:11 essentially 11:21, 62:20, 77:16 established 54:11, 58:12 et 35:20, 35:21, 36:22, 42:14, 43:19, 44:1, 50:12, 77:12, 78:7, 98:15 eta 17:9, 17:14, 17:15, 17:19, 19:12 events 90:14 everything 8:18, 42:9 exact 22:8, 71:9 exactly 10:13, 10:17, 32:21, 34:6, 52:8, 62:2, 71:2 examination 3:5, 4:4 example 14:2, 14:3, 20:22, 23:20, 24:14, 29:3, 31:10, 31:14, 35:18, 43:8, 52:19, 53:20, 58:19, 71:13 examples 80:9, 80:12 exceed 71:21 exceeded 73:10, 73:11, 75:7, 86:9 exceeds 70:7	excuse 59:19 execute 28:21, 29:22, 37:22 executed 29:4, 30:1, 30:22, 38:1, 38:11 exhibit 5:21, 5:22, 8:21, 10:20, 13:14, 13:19, 25:13, 25:15, 28:2, 28:9, 45:15, 46:2, 46:3, 54:21, 63:18, 63:20, 64:11, 64:16, 66:10, 67:4, 67:5, 76:2, 93:8, 93:10, 93:12, 93:22, 94:3, 94:8, 94:11, 94:17, 94:21, 97:18, 97:21, 100:16 exhibits 3:8, 8:8, 8:9, 8:13, 8:19 expect 27:6, 27:18, 31:5, 38:22, 39:14, 40:6, 41:7, 41:14, 43:14, 43:21 expected 27:11, 67:19 expecting 36:5 expert 36:9 expires 104:22 explain 12:2, 44:9 explained 15:19, 16:12,
--	---	--	--

66:16 explaining 73:3 explains 15:6, 15:16, 19:9, 65:2, 71:12, 71:17, 75:6 explanation 36:11 explicit 30:8, 33:11, 65:18 explicitly 37:11, 47:15 extent 25:10, 66:1 external 35:5, 40:20, 44:20, 44:21	far 85:16 fed 19:10, 19:20 feel 45:15 few 23:18, 77:2 fiberoptics 53:3 field 53:5 figure 9:2, 9:3, 9:4, 9:5, 9:12, 16:19, 16:20, 16:21, 16:22, 17:1, 17:2, 18:4, 18:11, 19:2, 20:13, 21:5, 22:10, 22:14, 22:16, 22:18, 23:6, 23:12, 23:16, 24:12, 24:17, 24:20, 32:8, 32:16, 32:18, 32:20, 33:14, 33:16, 34:1, 34:2, 34:3, 34:4, 34:16, 34:17, 36:1, 36:19, 37:1, 38:19, 39:4, 39:10, 41:2, 93:11, 93:15 figures 6:17, 32:12 files 8:9 financially 105:21 find 13:15, 53:8 fine 103:17 fit 88:22	five 5:14, 15:14, 34:21 fix 75:8 fixed 83:5 flat 31:14 floor 2:13 flow 11:10, 11:14, 12:10, 12:17, 13:6, 14:13, 16:10, 17:10, 17:20, 18:11, 19:3, 20:2, 20:5, 21:6, 21:16, 22:16, 23:3, 23:7, 23:13, 24:6, 24:21, 25:3, 25:9, 51:5 focus 6:18, 12:21, 54:4, 83:1, 97:14 focused 12:22, 96:18 following 30:7, 38:9, 64:20 follows 4:3, 8:3 foregoing 104:6 forgive 39:5 forth 42:22, 105:6 found 96:3 fracking 73:12, 74:14, 74:15, 74:17, 75:1 fractures 7:10	fracturing 6:11, 7:5, 53:20, 67:21, 68:3, 68:5, 68:13, 69:10 framed 97:7 free 45:16 friday 103:9, 105:15 front 8:6, 32:13, 93:9 function 10:8, 10:10 functionality 51:19, 52:1 further 7:6, 10:21, 37:17, 48:21, 102:12, 102:17, 105:10, 105:13, 105:17
F			G
facilitate 43:9 fact 7:1, 65:19 fails 100:9 failure 24:18, 24:22, 25:4, 89:17, 89:18, 90:10, 90:18, 91:1, 91:8, 91:16, 91:17, 91:20, 92:3, 92:8, 92:15 fair 21:7, 29:10, 30:5, 30:16, 47:13, 87:20, 90:13, 94:1 fairly 30:8, 33:11, 70:9 faith 96:1 familiar 72:1			gas 6:12 gave 88:10 general 21:10, 24:13, 41:2, 41:19, 51:4, 52:17, 54:7, 80:16, 92:17 generate 7:15, 78:14, 78:21, 79:2, 79:7 generated 28:12, 29:4, 29:15, 30:10, 31:1, 34:22, 35:14, 35:20, 36:16, 37:14, 39:9, 40:17, 41:13

getting 31:16, 73:14	96:1, 103:14	hereinbefore 105:6	67:8, 67:9,
gist 18:7	greek 17:6, 17:7	hereunto 106:1	86:2, 86:14,
give 6:17, 25:14,	hand 106:2	high-low 71:7	95:7, 95:10,
32:5, 39:19,	handy 32:12, 52:9	hmi 36:18, 42:22	95:11, 96:9,
45:12, 71:19,	hardware 28:7, 28:11,	hold 59:6	96:14, 97:15,
96:22	28:21, 29:10,	hour 5:17, 45:2	100:8
given 27:13, 34:6,	29:22, 30:3,	hours 5:14	iii 67:6
105:9	30:9, 31:6,	house 4:9	illustrate 66:11
giving 60:17	32:17, 33:7,	houston 4:9	impending 70:15
go 16:22, 18:18,	33:14, 33:19,	however 55:8	implementation 34:3
35:10, 36:13,	34:4, 34:11,	human 36:17, 40:19,	implemented 32:17, 33:7,
37:1, 37:4,	34:13, 34:22,	70:8	33:13, 34:10,
38:9, 44:13,	35:13, 35:19,	humans 69:16, 70:17,	37:8, 43:2
45:21, 46:4,	36:15, 37:8,	72:12, 87:8	implementer 83:18
47:1, 47:11,	37:13, 37:22,	hungerford 106:11	implicit 21:22, 34:18
48:8, 50:9,	38:12, 39:1,	hydraulic 6:11, 7:5,	inadvertently 67:3
54:12, 56:7,	39:8, 39:15,	68:3, 68:5,	inc 1:4
57:8, 64:4,	40:7, 40:14,	68:13, 69:10	include 11:9, 16:1,
65:5, 67:1,	40:21, 41:8,	hypothetical 60:17, 60:20,	16:9, 20:1,
68:19, 71:6,	41:15, 42:2,	84:2	20:10, 24:6,
72:3, 73:16,	43:3, 43:8,		25:9, 31:17,
75:21, 92:18,	43:14, 44:14,		38:13, 53:3,
93:19, 94:20,	44:17		53:21, 77:17,
97:17, 99:19	head 22:6, 52:9		92:5
goes 35:19, 49:15,	here 10:13, 17:20,		included 8:12, 32:22,
50:2	18:11, 19:10,		63:12, 66:13,
going 10:16, 24:14,	21:9, 21:10,		66:19, 91:20,
45:2, 48:17,	21:13, 24:13,		96:21
49:3, 56:10,	30:21, 34:18,		includes 7:6, 8:10,
58:1, 58:20,	36:9, 42:13,		13:21, 17:6,
60:11, 60:19,	51:5, 52:2,		25:22, 33:15,
61:19, 64:12,	60:15, 65:1,		42:6, 79:17,
75:17, 96:22	66:5, 67:2,		89:15, 90:1,
good 4:6, 4:7, 7:2,	70:5, 81:5,		90:8, 91:14
9:17, 17:9,	81:16, 82:4,		including 31:16, 33:20,
45:1, 61:11,	82:8, 82:13,		
63:21, 83:6,	83:16, 92:18		
85:18, 89:12,	here's 58:22		
	hereby 105:4		
		I	
		idea 41:19	
		ideas 80:12	
		identified 17:3, 43:20,	
		46:1	
		identifying 89:1	
		ii 66:22, 67:7,	

43:11 indeed 17:16, 25:5, 30:8, 30:18, 73:3, 96:14, 97:6 index 3:2 indication 13:1, 81:18, 86:17 indicative 70:14, 89:17, 90:10, 90:22, 91:15, 92:8 indirectly 68:17 infer 31:12 inferred 11:21 information 11:22, 22:18, 22:21, 24:10, 28:12, 29:5, 29:11, 29:15, 30:4, 30:10, 30:15, 30:18, 31:6, 31:17, 33:19, 34:14, 34:22, 35:14, 35:20, 36:16, 36:17, 37:14, 38:14, 39:2, 39:9, 39:16, 40:1, 40:8, 40:17, 40:18, 40:20, 41:9, 41:12, 41:16, 41:22, 42:3, 43:15, 51:5 initiates 49:12 injury 70:8 input 22:20, 31:12, 34:17, 35:4,	40:18, 42:9, 42:12, 42:15, 42:16, 42:20, 43:20, 43:22, 44:7, 44:8, 44:15, 44:19 inside 44:18, 82:10, 82:22, 88:20 instance 1:20, 28:6, 28:17, 28:20, 32:17, 33:13, 34:2, 34:3, 34:11, 37:8, 37:22, 40:14, 40:21 instances 28:10, 33:18, 35:13, 35:18, 36:15, 36:21, 37:13, 39:8, 41:1, 43:8, 43:12 instantiation 42:20 instructions 7:16, 7:18, 7:21, 28:22, 29:4, 30:1, 30:22, 38:1, 38:12, 76:8, 76:10, 76:14, 76:18, 78:14, 78:18, 78:21, 79:3, 79:8 integrity 69:6 interested 69:14, 105:21 interface 44:1 intermediate 66:7 internal 40:20 internet 53:6	interpretation 44:2, 44:3 interrupt 87:14 introduced 22:17 introduction 98:20 involved 19:10 ipr 1:7 irrespective 58:11 issue 6:4 issues 27:12, 73:16 italics 99:5 item 13:19 itself 8:11 J jargon 27:4 jot 56:5 K key 54:4 kind 15:19, 26:12, 40:2, 70:9, 92:18, 92:21 kinds 65:3 know 12:3, 52:13, 52:14, 84:1 known 21:5, 23:12, 25:2 L labeled 9:10, 10:1,	63:20 language 15:12, 30:13, 60:16, 68:8, 68:11, 78:4, 78:13, 99:7 large 81:3, 81:13, 82:1, 82:16, 83:3 last 5:13, 76:2, 78:4 laurie 1:23, 105:2, 106:8 least 7:16, 54:5, 78:15, 90:14 leave 24:15, 44:9, 54:7 leaves 78:20 left 15:15 let's 16:19, 37:1, 37:4, 57:8, 57:9, 57:17, 69:13, 72:3, 87:6, 96:3, 97:17, 100:15 letter 17:7, 17:8 level 39:11, 84:13 liberty 1:4, 1:5, 10:20 limitation 45:19, 45:21, 46:9, 46:18, 46:22, 47:10, 48:2, 48:7, 50:8, 51:6, 53:11, 54:11, 55:1, 55:20, 57:17, 57:19,
---	---	--	---

61:13, 62:15, 64:2, 64:17, 66:13, 66:22, 67:9, 71:9, 75:10, 75:12, 75:13, 76:2, 76:6, 76:12, 76:22, 77:6, 84:6, 84:9, 84:19, 84:21, 85:7, 85:10, 85:20, 86:2, 86:14, 95:7, 95:12, 95:17, 96:9, 97:11, 97:13, 98:6, 99:7, 99:9, 100:7 limitations 100:4, 100:10, 100:13, 100:14, 101:14 limited 11:9, 20:1 line 9:14, 10:5, 31:11, 31:14, 33:4, 44:5, 52:21, 73:7, 77:4, 89:8, 89:10, 89:14, 90:7 lines 9:21, 14:3, 15:14, 53:11, 77:2, 78:13, 79:12, 90:5, 98:12 list 8:10, 8:12, 8:19 listed 8:9, 16:1, 58:12 listen 47:22 listing 45:15	literally 55:8 little 37:17, 53:14 llc 1:6, 1:11, 105:11 llp 2:5 local 35:4 located 4:8 location 14:5 logic 30:7 long 5:13, 32:2, 52:16, 53:15, 53:16, 88:3, 97:1 look 10:12, 11:3, 12:20, 13:11, 16:19, 25:18, 32:7, 45:10, 45:19, 52:11, 52:14, 57:17, 61:9, 66:22, 71:19, 75:10, 75:13, 79:9, 82:21, 86:5, 89:8, 92:10, 93:7, 95:12, 96:2, 100:15 looked 99:18 looking 9:1, 9:4, 13:14, 18:4, 37:1, 74:11, 93:16, 93:17 lost 67:2 lot 68:22 louisiana 1:25	low-high 71:7 M machine 1:26 maintaining 96:15, 96:17 make 23:8, 27:11, 36:8, 36:11, 39:6, 49:17, 65:21, 80:16 managing 26:1, 26:14, 26:19, 27:2, 27:3, 27:22 manufacturer 73:1, 73:2 many 4:12, 55:8, 84:2 marked 3:9 marriage 105:19 maryland 106:12 mass 35:3 master 9:5, 9:12 material 4:22, 5:4, 5:5 materials 8:6 matter 5:16, 26:22, 73:15, 105:22 maybe 34:5, 67:4, 102:14 mean 27:1, 27:9, 27:10, 27:15, 27:18, 63:8, 68:12, 70:6, 71:9, 85:9,	87:14, 88:10, 91:11, 92:14, 95:21, 96:5, 97:2 meaning 71:2 means 53:3, 53:7, 55:7, 62:21, 65:10, 66:2, 66:3, 66:8, 66:18, 66:19, 71:9, 91:12 meant 21:9, 88:13 measure 7:8 measured 7:14, 11:8, 11:16, 12:12, 12:16, 12:18, 13:9, 14:22, 15:9, 15:22, 16:6, 16:8, 16:9, 16:15, 18:19, 19:6, 19:8 measurement 65:5, 92:11 measurements 8:1, 15:7, 16:13, 19:2, 19:5, 19:11 medium 35:5, 44:22 meeting 5:10, 5:12, 5:13 memory 35:3, 35:4, 40:21, 42:13, 43:18, 52:12 mention 80:12, 87:13, 96:13 mentioned 16:10, 18:5, 22:3, 52:11,
--	--	--	--

72:12, 82:8, 100:7 merely 66:17 met 5:8, 74:8 method 79:16, 89:15, 90:1, 90:8, 91:14, 91:21 michael 1:16, 3:4, 4:1, 104:10, 104:14, 105:5, 105:14 might 68:18, 80:6, 80:13, 86:4, 86:13, 86:17, 86:18, 86:22, 92:22 mind 40:3, 72:21, 80:13 minute 10:14, 10:18, 13:2, 57:10, 68:10, 71:19, 71:22 minutes 23:19, 34:21, 45:4, 102:14 misstate 49:18 misunderstand 102:5 mitigate 71:21, 75:8, 80:17 model 13:21, 13:22, 14:4, 15:7, 15:18, 15:19, 16:13, 19:9, 19:10 modulator 9:7, 9:13, 9:18, 9:20, 19:20, 22:17,	22:20, 24:21 module 25:22, 26:5, 26:12, 26:13, 27:8, 27:14, 27:17 moment 88:11 monitor 6:10, 30:14, 31:5, 68:19 monitored 70:6, 82:22 monitoring 6:14, 6:21, 26:1, 26:14, 26:19, 27:1, 27:3, 27:21, 29:7, 30:2, 30:13, 30:20, 31:2, 31:9, 38:2, 38:13 more 7:8, 7:12, 7:14, 7:17, 7:19, 12:22, 23:8, 33:9, 35:7, 36:18, 39:6, 43:5, 43:11, 45:2, 46:9, 46:18, 47:2, 47:12, 48:3, 48:9, 48:12, 48:18, 48:22, 49:6, 49:8, 49:16, 49:17, 49:19, 49:22, 50:3, 50:7, 50:9, 50:14, 50:15, 51:7, 53:14, 54:13, 54:14, 55:3, 55:6, 55:7, 55:8, 57:8, 57:19, 57:21, 58:14, 58:19, 59:7, 62:7, 64:5,	76:4, 76:6, 76:9, 76:12, 76:16, 76:17, 77:5, 77:12, 77:18, 77:19, 77:22, 78:3, 78:6, 78:8, 78:10, 78:16, 78:18, 79:1, 79:18, 89:14, 89:16, 90:8, 90:9, 91:9, 91:13, 91:15, 91:21, 92:7, 95:8, 98:9 morning 4:6, 4:7 motivations 99:11, 101:5 much 12:21, 22:5, 97:15 multiple 9:9 must 68:4, 69:9, 70:2, 70:10, 72:6 N namely 5:1, 66:16, 87:2, 90:16, 98:20 near 53:5 necessarily 91:7 need 30:15 needed 80:16 needs 72:8 neither 84:21 network 53:6	next 19:21, 19:22, 29:3, 35:19 nikolaou 1:16, 3:4, 4:1, 4:6, 45:8, 63:22, 102:19, 103:5, 104:10, 104:15, 105:5, 105:14 none 3:9 nonvolatile 35:3 norris 25:12, 25:14, 25:15, 93:22, 95:1, 95:2, 95:16, 96:8, 96:16, 97:3, 97:10, 99:11, 100:2, 100:6, 101:5, 101:13, 101:17, 101:21, 102:7 north 2:14 notary 104:19 nothing 8:15 notion 83:15, 85:16 novelty 6:7, 6:9, 6:22, 7:3 november 103:11, 106:2 number 31:15, 44:5, 50:20, 51:9, 82:7, 89:5 numbered 1:22 numbers 44:11 O object 31:19, 66:15
---	---	--	--

objection 10:3, 10:7, 10:11, 11:17, 12:14, 13:10, 15:2, 15:10, 16:7, 16:17, 18:1, 18:14, 19:7, 20:8, 21:8, 21:21, 23:15, 24:8, 24:19, 26:8, 26:18, 27:20, 29:13, 30:6, 30:17, 31:8, 32:19, 33:8, 33:22, 34:15, 38:5, 38:15, 39:3, 39:18, 40:10, 41:11, 41:18, 44:16, 47:3, 47:14, 48:10, 48:20, 50:5, 50:19, 51:2, 51:13, 52:6, 53:13, 54:17, 55:5, 55:21, 61:14, 61:22, 62:6, 62:18, 63:4, 64:19, 67:16, 68:2, 68:6, 69:11, 70:4, 70:12, 71:1, 71:11, 72:9, 72:20, 73:13, 74:3, 74:9, 75:2, 77:8, 78:2, 78:12, 81:4, 81:8, 81:15, 82:2, 82:6, 82:18, 83:4, 83:12, 83:21, 84:7, 84:11, 84:20, 85:8, 86:3, 86:16, 88:9, 89:4, 90:20, 92:4, 92:16,	93:2, 95:19, 96:11, 97:12, 98:7, 99:13, 100:5, 101:7, 101:15 objective 70:9 objectively 72:10 objectives 84:1 obvious 69:14, 80:12, 95:16, 97:10, 98:5, 100:3, 100:6, 100:9, 100:12, 100:13, 101:1, 101:14 obviously 92:19 occurred 105:14 october 1:17, 1:22, 105:15 offer 95:15, 97:9, 99:10, 100:1, 101:4, 101:12, 101:20 offering 95:18, 95:20 offers 6:10 office 1:1 offline 91:3 oh 19:22, 37:19, 46:3, 49:11, 60:18, 63:19, 99:16 oil 6:11 oilfield 1:5 okay 7:1, 13:18,	22:5, 22:10, 22:13, 25:19, 28:3, 32:5, 32:6, 32:12, 35:2, 35:22, 36:9, 39:22, 41:5, 45:4, 45:5, 45:18, 46:5, 47:21, 50:8, 52:15, 55:9, 56:4, 56:5, 56:10, 56:11, 57:8, 57:16, 58:3, 58:20, 58:22, 59:5, 59:16, 59:17, 59:18, 60:6, 60:10, 60:17, 60:18, 60:21, 60:22, 61:5, 65:13, 65:14, 66:3, 67:8, 72:3, 75:19, 88:17, 93:7, 93:11, 93:15, 93:19, 97:17, 98:18, 100:17, 102:14 omont 28:1, 28:3, 28:10, 94:8, 98:2, 98:4, 99:12, 100:2, 100:8 once 23:8, 59:8 online 5:9 only 44:21, 82:20 open 7:10, 13:4, 22:8, 25:14, 28:3, 32:7, 45:13, 45:14, 45:17, 75:15 operable 43:9	operating 11:22 operation 11:1, 14:4, 27:11, 67:18, 68:1, 68:3, 69:7, 69:15, 72:11, 72:18, 73:8, 74:14, 74:16, 74:17, 75:1, 75:6, 83:7, 83:14, 85:2, 85:5, 85:19, 88:2, 88:21 operational 40:12 operations 26:2, 26:6, 26:15, 26:17, 26:20, 27:3, 27:19, 27:22 operator 36:17, 40:19, 67:17, 67:20, 67:21, 68:5, 69:10, 69:12, 69:19, 72:6, 72:12, 72:13, 73:6, 84:3, 84:17, 85:4, 89:2 opinion 14:21, 15:11, 16:14, 16:18, 18:18, 18:21, 19:5, 19:8, 53:10, 61:20, 62:14, 63:2, 69:4, 70:5, 95:2, 95:15, 95:20, 96:7, 97:9, 99:10, 100:1, 100:22, 101:4, 101:12, 101:20 opinions 6:2
--	---	---	---

optimality 71:14	20:2, 20:5, 20:6, 20:9, 21:6, 21:7,	14:2, 14:9, 15:14, 15:21, 19:13, 19:16,	55:18, 56:17, 56:19, 56:21, 58:13, 58:16,
options 53:18, 54:8	21:16, 23:13, 23:14, 24:6, 25:3, 29:4,	20:4, 20:11, 20:12, 20:13, 21:11, 21:18,	59:1, 59:4, 59:22, 60:3, 60:4, 60:14,
oral 1:15, 1:19	31:1, 35:5, 42:14	23:11, 25:18, 25:19, 25:20, 28:4, 28:6,	61:18, 62:4, 62:17, 62:21, 63:7, 64:4,
order 30:14, 31:5	outside 67:10, 67:13, 68:19, 70:19,	28:10, 29:21, 31:21, 32:14, 34:9, 35:1,	64:11, 67:10, 67:13, 70:19, 70:21, 78:16,
ordinary 23:21	70:21, 79:18, 80:8, 80:18, 80:22, 81:7,	35:10, 37:2, 37:4, 37:5, 37:6, 37:12,	79:17, 80:1, 80:22, 81:2, 81:6, 81:10,
other 5:11, 8:11,	81:10, 81:18, 81:21, 82:10, 82:11, 82:17,	37:17, 37:18, 37:21, 38:6, 39:12, 40:11,	81:13, 81:22, 82:15, 82:21, 90:2, 90:15,
15:7, 20:22, 21:6, 21:11, 21:19, 23:12,	82:22, 85:2, 85:19, 87:9, 88:5, 88:17,	40:17, 43:4, 43:7, 77:11, 78:5, 79:5,	91:6, 92:2, 92:13, 98:22, 101:1
24:1, 24:4, 24:9, 25:2, 25:5, 25:8, 27:12, 28:22, 40:12, 42:21, 44:8, 53:5, 53:6, 60:8, 66:3, 66:8, 69:17, 92:21	90:2, 90:15, 91:6, 92:2, 92:13 over 16:22, 57:9, 59:12, 59:17	79:12, 79:15, 89:9, 89:22, 90:13 paragraphs 39:14, 40:6, 41:7	parameters 7:8, 7:14, 7:17, 11:16, 12:12, 12:18, 13:7, 17:21, 18:12, 18:15, 19:19, 20:1,
otherwise 105:21	overall 42:20 overview 7:22	parameter 12:16, 13:9, 14:22, 16:15, 18:19, 20:21, 23:20, 24:14, 46:11, 46:13,	20:6, 20:9, 20:22, 21:6, 21:11, 21:13, 21:17, 21:19, 23:2, 23:13, 24:1, 24:5,
out 15:13, 15:18, 56:22	owner 1:12, 2:10	47:1, 47:4, 47:6, 47:11, 47:18, 48:4, 48:8, 48:13, 48:17, 49:2, 49:3, 49:6, 49:9, 49:15, 50:2, 50:7,	24:9, 24:10, 24:13, 25:2, 25:5, 25:8, 25:10, 79:18, 89:16, 90:9, 91:15, 92:7
outcome 105:21	P	50:9, 50:12, 50:14, 50:16, 50:22, 51:1, 51:11, 51:12, 52:3, 52:4, 54:12, 54:15, 55:15, 55:17,	part 7:16, 18:2, 27:2, 27:6, 36:20, 38:17, 38:21, 41:21, 44:17, 48:22, 77:6, 77:22, 78:11, 78:15,
outline 56:9	page 10:20, 13:18, 14:2, 14:8, 28:9, 29:14, 35:20, 93:10, 93:12, 93:22, 94:3, 94:4, 94:8, 94:11, 94:17, 94:21, 97:18, 97:19, 97:20, 97:21, 100:16		
outlined 60:5, 63:3, 64:16	paragraph 11:3, 11:7,		
output 11:9, 11:10, 11:11, 11:14, 11:15, 12:10, 12:11, 12:17, 13:8, 14:13, 14:21, 16:1, 16:5, 16:11, 16:14, 17:3, 17:6, 17:22, 18:13, 18:16, 19:19, 19:22,			

98:8 particular 13:13, 36:20, 54:5, 55:9, 83:3, 85:14 parties 105:18, 105:20 party 105:10 pass 30:22, 102:12 passage 53:8 patent 1:1, 1:2, 1:9, 1:12, 2:10, 6:4, 6:5, 6:8, 6:10, 6:16, 6:22, 7:2, 8:11, 15:5, 15:12, 17:16, 22:9, 23:1, 45:11, 52:7, 52:20, 53:18, 54:4, 65:2, 65:18, 67:15, 67:22, 68:7, 68:11, 68:17, 71:17, 71:20, 74:11, 75:6, 75:14, 75:15, 75:19, 76:3, 76:21, 79:10, 79:16, 80:11, 86:7, 90:1, 90:7, 91:4, 91:22, 96:15 pdf 93:13 penalty 104:5 people 27:10, 72:17 percent 17:17 perform 10:8 performance 11:8, 11:21,	14:12, 15:17, 15:22, 16:8, 16:9, 22:19, 22:21, 22:22, 23:3, 23:5, 24:11 performing 51:18, 52:1 perhaps 35:7, 91:18 perjury 104:5 permission 13:4, 13:15, 22:7, 32:7 person 5:11, 23:11, 70:3 personal 70:5 petition 99:15 petitioner 1:19, 2:3 petitioners 1:7, 1:20 ph 1:16, 105:5, 105:14 phrased 61:15 physically 4:8 place 10:9, 13:16 placed 97:16 planet 106:10 played 42:16 please 9:3, 32:5, 33:10, 38:10, 41:5, 44:13, 45:13, 56:8, 62:13, 75:21 plural 50:20, 51:4,	51:9 plurality 7:7, 7:8, 7:15, 7:19, 46:11, 46:14, 47:5, 47:7, 47:16, 47:19, 51:14, 77:17, 80:2, 99:2 point 13:13, 48:11, 59:13, 96:17, 100:1, 101:19 pointed 15:13, 15:18 points 43:22, 44:20, 44:21 policy 73:15 portion 11:4, 101:19 posita 21:4, 25:2, 98:14 possible 92:12 potential 89:17, 89:18, 90:10, 90:18, 91:1, 91:7, 91:15, 91:17, 91:20, 92:3, 92:8, 92:14 practice 82:5, 82:7, 83:18, 84:3, 84:16 preceded 22:1 precise 74:12 precluded 63:1, 63:5, 63:9 preferred 27:4 prepare 4:20	prescription 86:19 presenting 65:8 pressure 11:10, 11:15, 12:11, 12:18, 14:13, 16:11, 17:12, 17:21, 18:12, 19:3, 20:2, 20:5, 21:7, 21:16, 23:3, 23:14, 24:7, 25:3, 25:9 pressurized 7:10 pretty 7:2 problem 75:8, 75:9, 80:8, 81:18, 92:18, 92:22 problematic 82:12, 87:8 problems 68:18, 69:5, 69:6, 69:16, 70:14, 70:15, 70:17, 74:18, 80:17, 83:8, 83:15, 87:6 procedure 21:9 proceed 67:19, 83:14, 88:21 proceeding 5:19, 6:4 proceedings 103:18 process 21:1, 21:12, 24:2, 24:6, 24:21, 25:7 processed 8:2 processing 7:13, 46:10,
--	--	---	--

46:19, 47:2, 47:12, 48:3, 48:9, 48:12, 48:18, 49:1, 49:6, 49:8, 49:16, 49:19, 49:22, 50:3, 50:7, 50:10, 50:15, 50:21, 51:7, 51:10, 52:1, 52:2, 54:13, 54:14, 55:3, 55:4, 55:7, 55:11, 55:12, 55:16, 55:17, 56:2, 56:13, 56:15, 56:17, 56:20, 57:20, 57:21, 58:2, 58:3, 58:4, 58:14, 58:20, 59:1, 59:4, 59:7, 59:8, 59:14, 59:15, 59:19, 60:1, 60:3, 60:7, 60:12, 60:13, 61:1, 61:2, 61:7, 61:8, 61:16, 62:3, 62:10, 62:16, 62:20, 62:22, 64:5, 64:8, 64:9, 64:12, 64:13, 64:22, 65:2, 65:6, 65:9, 65:11, 65:16, 65:17, 66:1, 66:6, 66:17, 66:20, 77:18, 79:1 processor 35:4, 42:13, 43:19 produced 1:19 produces 19:12	programs 28:21 promise 52:16, 53:15 pronounce 17:7 proper 86:6, 87:4, 88:15, 89:6 propose 52:8 proposed 99:15 protocols 54:2 provide 6:20, 7:9 provided 8:3 provides 26:6, 26:16, 26:19 public 104:19 pump 9:7, 9:9, 9:13, 9:18, 9:19, 9:20, 9:22, 10:1, 10:4, 10:5, 10:6, 10:9, 10:21, 10:22, 11:1, 11:2, 11:8, 11:16, 11:22, 12:13, 12:16, 12:19, 13:9, 13:21, 14:1, 14:4, 14:5, 14:6, 14:9, 14:11, 14:12, 14:14, 14:16, 14:18, 15:1, 15:16, 15:17, 15:20, 15:22, 16:16, 17:3, 17:21, 17:22, 18:12, 18:13, 18:19, 18:21,	19:19, 19:20, 20:3, 20:6, 20:20, 21:6, 21:11, 21:16, 21:19, 22:16, 22:17, 22:19, 22:20, 22:22, 23:13, 23:17, 23:19, 24:1, 24:4, 24:9, 24:11, 24:17, 24:18, 24:21, 24:22, 25:2, 25:4, 25:5, 25:8, 25:10, 53:20, 65:20, 73:1, 73:2, 73:4, 80:1, 80:3, 90:4, 90:17, 91:2, 93:1 pumping 13:20, 68:13 pumps 7:9, 7:20, 46:12, 46:14, 47:5, 47:7, 47:16, 47:19, 51:15, 80:2, 99:3 purpose 74:19, 74:21 purposes 40:15, 54:6 put 10:9, 75:17, 88:1, 99:17 Q qualify 42:12 question 12:8, 23:6, 24:4, 30:12, 34:6, 36:6, 36:12, 36:13, 40:1, 47:21, 48:1, 51:20,	54:10, 55:10, 61:12, 62:12, 63:10, 67:22, 69:8, 72:2, 91:22 questions 8:5, 75:12, 102:12, 102:17 quick 11:20, 52:15, 53:9 quickly 35:8, 96:12, 96:19 quite 68:21 quoting 92:6 R radiofrequency 53:5 random 74:4, 74:5 range 83:8 rate 5:15, 11:10, 11:14, 12:11, 12:17, 13:6, 14:13, 16:10, 17:10, 17:20, 18:12, 19:3, 20:2, 20:5, 21:6, 23:3, 23:13, 24:6, 25:3, 25:9 rates 21:16 read 7:1, 11:5, 19:17, 19:18, 22:1, 22:5, 32:1, 32:2, 32:6, 32:13, 33:9, 34:2, 39:6, 49:17, 51:9, 61:12,
---	---	---	--

61:21, 62:2, 62:7, 62:15, 63:3, 78:3, 80:11, 84:6, 84:9, 84:19, 85:7, 85:9, 91:12 reading 38:6, 39:13, 40:6, 41:6, 48:11, 52:21, 54:18, 92:6, 98:11 reads 36:14 really 96:12, 96:19 reason 4:17, 69:14 reasonable 44:2, 52:10 receive 7:13, 7:18, 23:16, 28:11, 29:15, 30:10, 30:15, 31:6, 31:14, 33:19, 34:13, 34:22, 35:14, 36:16, 37:14, 39:1, 39:9, 39:16, 40:8, 40:17, 41:9, 41:12, 41:16, 41:22, 42:3, 43:15, 44:14, 44:19, 46:10, 48:4, 48:13, 49:1, 49:9, 49:20, 50:1, 50:21, 51:10, 61:16, 63:6, 76:7, 76:13, 78:17 received 30:18 receivers 53:22 receives 29:11, 30:4,	49:13 receiving 31:11, 31:17, 38:13, 49:5, 52:3, 62:4, 62:16 recess 45:6, 63:16 recipe 87:13 recited 77:5 recites 46:9, 46:18, 57:19, 58:5, 58:8, 67:9, 76:12, 76:22 recollection 101:11 record 102:16, 105:9 refer 11:19, 32:21, 43:21, 45:16, 68:22, 69:3 reference 8:22, 25:12, 28:1, 94:1 referenced 5:6, 5:7 references 5:2 referred 68:16, 99:21 referring 9:15, 18:3, 21:18, 26:9, 29:17, 34:18, 34:20, 35:6, 35:9, 36:21, 55:1, 55:6, 69:4, 69:5, 76:1, 77:13, 79:5, 87:19, 88:6, 91:19, 98:8, 98:16, 98:17 refers 44:5, 76:2	refresh 52:11 regarding 22:18, 22:22, 24:11, 95:15, 97:3, 97:9 related 4:22, 74:15, 105:17 relates 20:13, 28:6, 53:11 relevance 25:11 reliability 73:16 remember 99:16 remote 1:15, 2:1 render 98:5, 100:6, 100:9, 100:12, 100:22 renders 95:16, 97:10, 100:3, 101:14 repeat 36:7 rephrase 23:7, 40:2 reported 1:25 reporter 1:24, 102:22, 103:17, 105:1, 105:3 represented 105:11 require 70:18, 77:21 required 74:7, 74:10, 74:22, 75:3, 78:11 requires 46:22, 47:11, 48:7, 50:8,	54:12, 64:4, 70:20, 77:16 resolution 41:20 respect 24:16, 64:2 respective 10:1 respond 36:4 response 36:5, 90:14, 91:3, 102:7 responsible 72:17, 73:8 retrieve 14:7 retrieved 40:20 return 43:5 review 5:5, 103:5, 103:16 reviewed 4:22, 5:4 rick 2:11, 103:4 right 9:1, 9:15, 13:19, 18:5, 19:15, 22:6, 24:20, 25:17, 25:19, 32:18, 38:19, 42:6, 48:9, 48:19, 50:13, 54:18, 57:12, 59:21, 61:9, 67:5, 84:19, 90:4, 93:13, 95:4 risk 69:15, 70:7, 71:21 rockville 106:12 role 42:15
--	---	--	--

ross 2:6 rough 102:22, 103:3 routines 28:22 rpm 80:14 rquarles@winston 2:15 running 56:22 rush 102:21	says 7:22, 14:3, 14:6, 15:5, 15:13, 16:8, 16:9, 17:16, 20:9, 20:22, 23:16, 24:13, 27:3, 30:22, 42:9, 42:13, 43:7, 48:12, 48:22, 49:7, 49:8, 51:6, 52:20, 60:15, 61:15, 65:9, 67:12, 71:20, 77:9, 78:6, 78:21, 79:7, 79:22, 87:10, 88:16, 91:9, 91:12, 91:13, 92:5, 93:6 scenario 58:22, 60:5, 61:12, 61:20, 62:2, 62:14, 63:2, 63:11, 64:1, 64:7, 64:16, 66:11, 86:20 scm 43:13 screen 8:15 search 10:16, 53:9 second 9:3, 22:8, 25:14, 25:20, 28:5, 32:5, 32:7, 33:4, 39:5, 39:20, 45:12, 46:13, 46:19, 47:7, 47:18, 50:10, 50:16, 51:1, 51:12, 51:14, 52:5, 54:15, 55:18, 56:12, 56:21, 57:2, 57:13, 58:8, 58:10, 58:17, 59:10, 60:5, 61:3, 61:8, 62:10, 64:6, 64:14, 76:9, 76:18, 77:11, 77:22, 78:8, 78:11, 78:15, 78:19, 78:22, 79:3, 79:4, 79:8, 96:22, 99:1, 99:2, 101:1 section 13:13, 93:18, 93:21, 94:4, 94:7, 94:13, 94:16, 94:20, 95:1, 97:17, 97:19, 98:1, 98:4, 98:10, 98:11, 98:14, 98:17, 98:18, 98:20, 99:18, 100:15, 100:18, 100:21 see 8:17, 10:12, 10:17, 11:12, 14:19, 16:3, 17:4, 20:17, 21:2, 21:9, 22:2, 22:9, 26:3, 28:7, 28:14, 28:18, 29:1, 29:8, 30:21, 33:2, 33:3, 33:16, 35:15, 39:19, 39:20, 42:5, 44:4, 44:18, 46:20, 48:5, 52:7, 57:20, 58:6, 58:9, 58:10, 68:11, 76:21, 79:20, 80:4, 88:22, 89:20, 90:11, 93:19, 94:14, 96:21, 99:20, 100:11 select 73:19, 83:18 selected 74:2, 83:10, 84:4, 84:17, 85:5 selects 72:16, 75:4, 75:5 send 58:16 sending 11:1 sends 9:14, 9:20, 10:4, 49:21, 50:6, 50:14, 50:16, 54:15, 56:1, 56:16, 56:19, 56:20, 58:13, 59:1, 59:4, 59:14, 59:22, 60:3, 60:4, 60:12, 60:14, 61:1, 61:2, 61:3 sense 27:15, 27:21, 41:22, 64:20, 65:14, 70:13, 90:21, 101:16 sensing 7:15, 77:17 sensor 7:7, 34:14, 44:7, 44:8 sensors 28:12, 29:7, 29:11, 29:15, 30:2, 30:4, 30:10, 30:13, 30:14, 30:16, 30:20, 31:2,
S	
safe 72:11, 73:4, 73:5, 73:8, 75:6, 85:18 safety 69:7, 69:17, 82:19, 87:7 said 34:21, 35:16, 56:3, 57:10, 66:12, 67:6, 67:7, 84:12, 84:14, 84:16, 86:22, 87:12, 87:17 same 22:8, 32:9, 37:17, 40:16, 56:1, 60:14, 71:9 say 12:15, 21:13, 29:10, 56:4, 63:6, 69:13, 70:8, 73:19, 80:13, 85:9, 86:5, 87:6, 88:14, 90:13, 93:3, 95:8 saying 36:14, 91:4, 102:2	

31:5, 31:7, 31:9, 31:12, 31:13, 31:15, 31:16, 31:18, 33:15, 33:17, 33:20, 34:14, 35:1, 35:14, 36:16, 37:14, 38:2, 38:13, 38:14, 38:17, 38:21, 39:2, 39:9, 39:16, 40:8, 40:12, 40:18, 41:9, 41:13, 41:16, 42:3, 42:21, 43:16, 44:10, 44:15, 52:18, 53:1, 65:22 sent 55:14, 55:15, 55:16, 55:18, 63:18, 64:21, 65:15 sentence 11:7, 14:15, 15:21, 19:17, 19:21, 19:22, 20:17, 21:18, 23:18, 25:20, 26:17, 28:16, 29:3, 31:3, 32:1, 32:2, 32:3, 32:13, 32:15, 33:5, 35:12, 89:13, 90:6 sentences 20:16 separate 42:18, 42:19, 78:9, 90:21 sequence 62:9 series 61:5 services 1:5, 1:11,	105:11 session 5:3 set 71:15, 73:9, 73:18, 73:22, 74:5, 82:20, 84:12, 85:1, 86:19, 87:3, 87:5, 87:11, 87:17, 88:2, 88:3, 88:8, 96:17, 105:6, 106:1 sets 75:5, 85:13 setting 81:3, 81:5, 81:14, 81:16, 82:1, 82:3, 82:16, 83:3, 83:11, 83:15, 83:20, 84:5, 84:18, 85:6, 85:14, 85:16, 85:17, 85:22, 86:13, 87:19, 87:21, 87:22, 89:3 several 8:11 severe 92:19 shall 75:15 shorthand 1:24, 1:26, 105:1, 105:2 should 26:13, 26:14, 59:12, 61:16, 72:10 show 64:11 shown 9:12, 22:16, 22:19, 24:20, 32:18, 32:20,	33:14, 34:4, 34:16, 36:20, 39:4, 39:10, 39:11, 41:2, 43:18 shows 9:5, 18:15, 32:20, 35:2, 41:20, 62:8 side 75:17 signal 56:1, 64:21, 65:12, 65:15 signals 11:1, 18:16, 59:14 signature 103:8 signature-b7fzp 106:6 similarly 41:14 simple 86:5 simply 84:22 simultaneously 22:9 single 88:13 singular 51:4 sir 5:22, 17:1, 19:15, 20:12, 24:22, 25:7, 27:22, 28:5, 29:20, 31:22, 36:7, 38:9, 58:10, 67:6, 73:22, 79:11, 89:10, 94:12 site 73:12 situation 84:1 six 5:14	skill 23:11, 23:21, 31:4, 39:13, 40:5, 41:6, 51:16 solely 96:8 some 22:1, 70:3, 79:16 somebody 84:12 someone 70:11 something 12:1, 18:5, 31:13, 34:18, 36:5, 42:9, 43:21, 44:19, 60:12, 61:17, 61:19, 65:9, 68:8, 70:11, 71:18, 74:1, 74:7, 81:19, 82:13, 85:3, 87:8, 88:5, 88:19, 102:4 sorry 12:5, 16:20, 18:3, 34:16, 46:3, 57:16, 67:2, 73:19, 87:14, 93:11, 93:19 source 89:18, 91:16, 91:19 south 2:13 specific 13:11, 52:10, 65:21, 68:7, 68:11, 86:20, 87:13, 92:19, 93:6, 101:8 specifically 21:13, 23:16, 30:12, 35:6,
--	---	---	--

47:22, 52:2, 64:10, 79:12, 93:10 specified 82:13 specifies 65:19 specify 74:13, 83:13 st 1:22 standard 44:2, 69:1, 97:1 start 22:15, 28:4, 57:9, 59:12, 59:16 starting 93:22, 94:8, 94:17, 100:16 starts 20:17, 28:17, 57:21, 76:3, 89:13, 94:13, 98:14 state 98:4, 100:21, 104:20, 105:3 stated 6:21, 10:19, 24:12, 25:6, 26:12, 29:14, 30:19, 31:3, 34:1, 37:11, 39:5, 39:7, 40:11, 47:15, 50:11, 62:8, 62:19, 77:9, 98:20 statement 21:10, 21:22, 80:15, 97:3 states 1:1, 6:1, 11:8, 14:16, 15:22, 20:20, 23:19, 24:16, 25:21,	26:11, 28:10, 28:20, 29:3, 29:21, 32:15, 34:9, 35:12, 37:6, 37:12, 37:21, 48:3, 76:6, 79:16, 84:22, 86:7, 89:14, 90:1, 90:7 stating 18:10, 33:5, 91:5, 91:22 station 66:7 ste 106:11 storage 35:3, 35:5, 44:22 strawn 2:12 street 2:13 strike 96:5 stronger 97:15 strongest 96:14 subject 5:1, 69:4, 89:6 subjectively 69:20 submitted 5:18 subscribed 104:13 subsystem 32:22, 33:12, 33:15, 33:17, 34:10, 37:7, 38:17, 39:1, 39:2, 39:15, 39:16, 40:7, 40:9, 41:8, 41:9, 41:15, 41:16, 42:2,	43:2, 43:15, 43:16 subsystems 33:6, 43:12 suggesting 71:8 suggests 70:2 suitable 26:1, 26:14 suite 2:6 summary 6:20, 11:20, 18:7 support 30:3 sure 6:19, 7:4, 10:15, 12:8, 13:3, 13:17, 17:17, 18:9, 22:4, 22:11, 23:8, 23:9, 27:11, 30:7, 32:10, 34:8, 34:19, 35:9, 36:8, 36:12, 39:6, 40:4, 45:3, 45:14, 49:17, 51:6, 63:8, 63:15, 72:4, 75:16, 81:20, 102:15, 103:2 sworn 1:21, 4:2, 4:14, 104:13, 105:6 system 6:10, 7:5, 7:6, 7:12, 7:20, 18:16, 30:9, 36:19, 39:21, 40:13, 41:12, 42:7, 42:8, 42:19, 42:21, 43:10, 46:12,	46:15, 47:5, 47:8, 47:17, 47:19, 51:15, 65:20, 67:21, 67:22, 68:5, 69:10, 72:7, 76:22, 77:7, 77:10, 77:17, 78:5, 84:4, 84:17, 85:4, 99:3 systems 43:18, 44:10 T take 10:18, 31:2, 52:16, 52:19, 53:15, 63:13, 68:10, 68:14, 93:5, 96:1, 96:22, 103:2 taken 1:21, 8:2, 45:6, 63:16, 65:4, 75:8, 87:10, 105:8 taking 14:12, 53:16, 91:2 talk 56:10 talked 58:12 talking 60:8, 60:16, 65:22 talks 13:12 target 65:1, 65:6, 65:12, 66:5, 66:20, 86:6 tell 82:19, 86:5 ten 4:13, 45:4, 102:14
--	--	--	---

ten-minute 63:14	62:11, 62:22, 64:15, 80:9, 80:10, 80:11, 101:9	90:3, 90:16, 91:6, 92:2, 92:14, 95:3, 95:6, 96:9, 96:15, 96:16, 97:6, 101:17, 102:8	transmits 47:18
term 12:7, 26:11, 27:13, 27:15, 70:1, 71:3, 86:1, 86:14, 95:3	third 11:7, 15:21, 77:11, 78:5, 78:6	thresholds 70:2, 73:10, 82:19, 83:9	transmitters 53:22
terms 68:17	thought 30:8	through 9:14, 9:21, 10:5, 96:20, 97:6	transmitting 52:4, 62:21, 98:22
testified 4:2, 38:11, 64:15, 72:5, 88:7	three 20:10, 55:8, 90:14	throughout 53:17	traveling 103:16
testify 4:15, 4:17	threshold 67:11, 67:13, 67:14, 67:18, 68:4, 68:19, 69:9, 70:2, 70:7, 70:10, 70:20, 70:21, 71:3, 71:4, 71:6, 71:13, 71:14, 71:16, 71:21, 72:6, 72:8, 72:16, 73:18, 73:20, 73:22, 74:1, 74:7, 74:12, 74:15, 74:20, 74:22, 75:7, 79:19, 80:8, 80:18, 81:1, 81:7, 81:11, 81:17, 81:22, 82:12, 82:17, 83:2, 83:5, 83:10, 83:14, 83:19, 84:4, 84:13, 84:17, 85:1, 85:5, 85:13, 85:21, 86:1, 86:9, 86:10, 86:13, 86:19, 87:3, 87:5, 87:9, 87:11, 87:17, 88:2, 88:7, 88:15, 88:18,	time 5:16, 13:15, 22:1, 32:9, 33:9, 39:6, 43:5, 43:6, 45:1, 49:17, 62:7, 68:14, 95:9, 98:9, 102:19	trial 1:2
testimony 87:1, 105:9		today 4:12	tried 64:10, 102:9
testing 13:6		today's 4:8, 4:18, 8:7	trigger 80:19, 80:20, 81:6, 81:9, 81:12
texas 1:25, 2:7, 4:9		top 13:19, 29:14, 30:19, 40:16	triggered 81:22
text 6:16, 8:3, 10:12, 18:6, 22:1, 22:10, 24:20, 32:8, 54:18, 54:21, 98:8, 98:15		trademark 1:1	true 104:6, 105:9
th 2:13, 103:10, 103:13		train 25:21	trust 96:2
thank 22:5, 22:12, 32:11, 45:9, 68:15, 102:18, 102:20		transceivers 54:1	truthfully 4:15, 4:18
thing 71:10, 82:22		transcript 103:13	trying 51:3, 87:1
things 16:10, 31:15, 69:7, 70:8, 73:16, 82:8, 84:2, 89:5, 92:10		transfer 49:12, 49:13	tryon 2:13
think 11:4, 39:22, 41:3, 61:5,		transmit 46:13, 47:6, 50:11, 50:22, 51:11	turn 8:21, 9:2, 19:13, 20:11, 25:12, 28:1, 31:21, 94:3, 94:11, 103:9
			turning 80:3, 90:4, 90:17
			twice 59:9
			two 51:17, 51:18, 51:22, 55:4, 55:8, 55:12, 55:22, 56:13, 60:7, 64:7, 99:22, 100:10, 100:11, 100:13,

100:14, 102:3, 102:9 type 54:5, 54:8 types 53:21	87:4, 89:2, 89:5 user 73:12 using 12:6, 14:11, 15:6, 15:13, 15:17, 16:13, 54:1	W	99:4 wells 6:12 went 22:13 whatever 23:1, 67:17, 80:16, 82:20, 83:6, 93:5, 93:13, 99:20 wherein 13:20 whereof 106:1 whether 40:13, 43:22, 63:10, 74:4, 81:9, 82:9, 82:21, 85:10, 86:17, 86:20, 95:16, 97:10, 99:16, 100:2, 100:13, 101:13 whim 69:20 whoever 73:7, 73:17, 73:21, 75:4, 75:5 wifi 53:4 window 22:8, 32:7 winston 2:12 wired 53:2, 66:8 wireless 53:2, 66:8 within 66:13, 97:5, 105:3 without 27:12, 69:5, 83:8, 83:14 witness 1:20, 102:12, 102:20, 103:11,
U	V		
uh-huh 46:8 umpteenth 43:6 unacceptable 69:18 under 104:5 undersigned 104:14 understand 4:14, 18:20, 21:17, 34:5, 36:12, 68:9, 70:18, 83:17, 87:1 understanding 6:7, 6:9, 66:11 understands 27:1 understood 36:8 unit 10:1, 10:5, 10:6, 11:1, 11:2, 14:12, 14:18, 19:20, 20:3, 22:19, 22:22, 24:11, 24:22, 27:16 unit's 20:21, 23:17, 23:19, 24:17 united 1:1 units 14:4, 17:3 use 27:4, 68:8, 68:11, 71:10,	value 19:12, 23:17, 27:10, 74:5, 83:5, 83:6, 83:7, 97:5 values 73:9 variable 70:6, 82:21, 87:9, 96:16, 96:17 variables 23:2, 68:18 various 17:3, 28:10, 32:16, 35:13, 35:18, 36:15, 37:13, 39:8, 41:20, 43:8, 43:12, 53:21, 54:1 verbiage 10:13, 10:17 versa 71:6 via 1:26, 36:17, 105:14 vice 71:6 videoconference 1:27 virtually 105:14 volatile 35:2, 42:13 vs 1:9	wait 56:22 waiting 36:4 walters 2:4, 3:5, 4:5, 45:4, 45:7, 63:13, 63:17, 102:11, 102:15, 102:18, 103:4, 103:7, 103:12 walters@bakerbot- ts 2:8 want 6:18, 36:11, 45:14, 61:9, 88:4 water 7:10 way 6:10, 6:13, 6:14, 6:20, 8:16, 13:11, 22:15, 31:10, 49:3, 52:10, 74:12, 82:14, 83:22, 87:6, 99:14, 99:15, 99:17, 101:8, 105:20 we'll 103:2 we're 56:10, 58:1 we've 45:1, 54:11 week 103:14 welcome 45:8, 52:13 wellhead 46:12, 46:15, 47:6, 47:8, 47:17, 47:20, 51:15, 65:21,	

103:15, 104:14, 105:5, 105:9, 106:1 wondering 83:17 word 71:10 wrong 12:7, 31:13, 34:6	0029 14:2 1 10 53:11, 79:9, 79:11, 89:10, 94:13, 94:16, 100:15, 103:10 10,655,435 1:9, 6:5 100 17:17 1001 8:13 1004 25:13, 25:14, 25:15 1005 28:2 1006 8:21, 10:20 1014 45:15, 46:2, 54:21, 67:4, 67:5, 76:2 1030 63:20, 64:11, 64:16, 66:10 106 9:5, 9:13 107 9:7, 9:13, 9:18 108 9:9, 9:19, 9:22, 10:17, 10:21, 10:22, 14:17 11 103:10 110 10:1, 10:18, 11:1, 11:2, 14:4, 14:18, 19:20, 20:3 1100 2:6 116 10:5, 10:17,	11:2 118 11:8, 15:22, 17:3, 17:17, 17:22, 18:13, 18:15, 19:19 12 1:23, 13:18, 103:19, 105:16 120 9:15 124 9:21 13 13:20, 103:13 130 11:10, 11:14, 12:11, 12:17 132 11:10, 11:15, 12:11, 12:18 13234 106:9 134 11:11, 11:15, 12:12, 14:18, 14:22, 16:2, 16:6, 16:15 14 13:20, 52:21 15 89:8, 89:10, 90:7 16 2:13 160 79:17, 89:15, 91:14, 91:21 19 28:9, 53:11 2 200 40:13, 43:10 2001 2:6 2010 5:21, 5:22,	93:8 2017 8:13 202 33:1, 33:3, 33:12, 37:7, 43:13, 44:10 2025 1:7, 1:17, 1:22, 104:16, 105:15, 106:2 204 28:12, 29:7, 29:11, 29:15, 30:10, 33:20, 36:3, 36:16, 36:22, 37:14, 38:2, 39:10, 40:12, 40:18, 41:13, 41:21, 42:16, 42:19, 42:21 20850 106:12 212 33:1, 33:3, 33:6, 33:12, 33:15, 33:17, 37:7, 38:17, 38:21, 39:1, 39:2, 39:15, 39:17, 40:7, 40:9, 41:8, 41:10, 43:2, 43:13, 44:10 214 28:12, 29:7, 29:11, 29:16, 30:11, 33:15, 33:17, 33:20, 34:14, 34:17, 36:3, 36:17, 36:22, 37:14, 38:2, 38:17, 38:21, 39:2, 39:10, 39:16, 40:8, 40:12, 40:18, 41:9,
Y yeah 9:14, 17:19, 24:9, 26:4, 32:20, 37:11, 38:8, 42:11, 43:7, 44:13, 45:17, 47:15, 47:21, 49:14, 51:15, 53:17, 55:7, 57:18, 78:4, 79:7, 87:16, 88:13, 89:12, 90:5, 93:12, 93:19, 98:19, 102:13 yesterday 5:3, 5:8 yourself 32:2	Y yeah 9:14, 17:19, 24:9, 26:4, 32:20, 37:11, 38:8, 42:11, 43:7, 44:13, 45:17, 47:15, 47:21, 49:14, 51:15, 53:17, 55:7, 57:18, 78:4, 79:7, 87:16, 88:13, 89:12, 90:5, 93:12, 93:19, 98:19, 102:13 yesterday 5:3, 5:8 yourself 32:2		
Z zone 88:1 zoom 105:14	Z zone 88:1 zoom 105:14		
\$ \$700 5:17	\$ \$700 5:17		
. .4 3:5	. .4 3:5		
0 00031 1:7	0 00031 1:7		

41:13, 41:21, 42:16, 42:19, 42:21 216 29:6 220 33:1, 33:3, 33:6, 33:12, 37:7, 41:15, 41:17, 42:3, 43:2, 43:13, 43:15, 43:16 222 28:13, 29:7, 29:12, 29:16, 30:11, 33:21, 36:3, 36:17, 36:22, 37:15, 38:2, 39:10, 40:12, 40:18, 41:13, 41:16, 41:21, 42:1, 42:3, 42:16, 42:19, 42:21, 43:16, 44:10 224 29:6 228 36:22, 42:22 23 11:3, 14:9, 15:14, 15:21 25 19:13, 19:16, 20:4 26 79:13, 79:14 276 25:21 28202 2:14 3 300 2:13, 43:11 306 43:13 31 1:17, 1:22,	105:15 310 36:22, 42:22 316 36:22, 42:22 32 21:11, 25:18, 25:19 33 20:11, 20:12, 20:13, 21:18, 23:11 34 1:23, 105:15 4 400 28:7, 28:11, 28:21, 29:11, 30:3, 30:9, 32:17, 33:7, 33:14, 33:19, 34:4, 34:11, 34:13, 34:16, 34:22, 35:2, 35:13, 36:15, 36:19, 37:9, 37:13, 37:22, 38:12, 39:1, 39:8, 39:15, 39:21, 40:7, 40:14, 40:22, 41:2, 41:8, 41:12, 41:15, 41:19, 41:22, 42:2, 42:5, 42:19, 43:3, 43:9, 43:15, 43:17, 44:4, 44:14, 44:18, 44:20, 44:21, 106:11 415 26:1 42 93:11, 93:12 426 42:14, 43:20	43 93:10, 93:12, 93:22, 94:21 435 6:8, 6:22, 45:11, 45:17, 67:15, 75:14, 75:15, 75:19, 76:3, 96:15 451 106:11 5 54 1:23, 103:19, 105:16 6 61 31:21, 31:22, 32:14, 34:9, 37:4, 37:5, 37:6, 39:14, 40:6, 41:7, 43:4, 43:5, 43:7 65 28:4, 28:5, 28:6, 35:1, 35:10, 35:11, 35:16, 36:14, 37:12, 37:18, 37:19, 37:21, 38:6, 39:14, 40:6, 40:11, 41:7 6th 103:16, 106:2 7 72 94:3, 94:4, 94:8, 97:18, 97:21, 97:22 75201 2:7 7th 103:8 9 1:23, 98:20,	105:15 93 94:11, 94:17, 100:16, 100:17
--	--	--	--

Re: Deposition of **Michael Nikolaou, Ph.D.**

Date: 10/31/2025

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Page	Line	Correction/Change and Reason
13	7	Borgstad --> Borgstadt
17	20	Borgstad --> Borgstadt
42	6	dashed one --> dashed line
44	5	line is --> line -- is
53	5-7	radiofrequency, and other cellular near field internet base or other network co
54	7	in general --> general
66	6	would --> it would
68	19	monitor --> monitored
87	4	criteria --> criterion
87	8	or --> and
88	13	criteria --> criterion
109		borgstad --> borgstadt

(Date)_____
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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.

11/10/2025

(Date)



(Signature)