

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

INTELLIGENT WELLHEAD SYSTEMS, INC.,)
)
Petitioner,)
)
vs.)
)
DOWNING WELLHEAD EQUIPMENT, LLC,)
)
Patent Owner.)
_____)

CERTIFIED COPY

Case No.: IPR2024-00300
CM#57959.37US01
Patent No. 11,560,770

DEPOSITION OF
ROBERT A. DURHAM, PH.D, PE, CFEI
REMOTELY HELD VIA VIDEOCONFERENCE TECHNOLOGY
JANUARY 28, 2025

REPORTED BY:
LYNETTE MARIE NELSON,
CA CSR No. 11585, OR CSR No. 250121,
TN LCR No. 896, RPR, CRR, CCRR, CRG,
REALTIME SYSTEMS ADMIN.
JOB NO. 25-147042

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Petitioner,)
vs.) Case No.: IPR2024-00300
DOWNING WELLHEAD EQUIPMENT, LLC,) CM#57959.37US01
Patent No. 11,560,770
Patent Owner.)
_____)

DEPOSITION OF ROBERT A. DURHAM, PH.D, PE, CFEI,
taken by the Patent Owner, commencing at the hour of
10:04 a.m. Central Standard Time on Tuesday,
January 28, 2025, held remotely via videoconference,
before Lynette Marie Nelson, Certified Shorthand
Reporter in and for the State of California, Oregon, and
Tennessee.

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APPEARANCES:

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I N D E X

WITNESS: ROBERT DURHAM, PH.D, PE, CFEI PAGE
EXAMINATION
BY MR. JARRATT 6

NO EXHIBITS WERE OFFERED
FOR INCLUSION WITH THIS RECORD.

1 REMOTE DEPOSITION; TUESDAY, JANUARY 28, 2025, 10:04 A.M.

2 -000-

3 THE STENOGRAPHER: My name is Lynette Nelson,
4 Certified Shorthand Reporter, License No. 11585, and
5 Registered Professional Reporter with primary offices in
6 Knoxville, Tennessee, in cooperation with The Sullivan
7 Group of Court Reporters located in Los Angeles,
8 California.

9 Today's date is January 28, 2025, and the time
10 is 10:04 a.m. Today's proceedings are taking place via
11 Zoom Workplace with each participant in differing
12 locations.

13 The deponent today is Dr. Robert Durham
14 testifying in the matter of Intelligent Wellhead
15 Systems, Inc., versus Downing Wellhead Equipment, LLC,
16 regarding Patent No. 11,560,770 in the United States
17 Patent and Trademark Office before the Patent Trial and
18 Appeal Board.

19 Would counsel in the meeting state your
20 appearances, please.

21 MR. JARRATT: Scott Jarratt, counsel for patent
22 owner Downing Wellhead and also joining for patent owner
23 is Tiffany Cooke.

24 MS. MARGONIS: This is Lisa Margonis for
25 petitioner, and I have cocounsel Tammy Terry here and

1 also Califf Cooper, Kevin Szymczak, and Laura Witbeck
2 and Tracy Morris are just observing.
3 (Witness sworn.)
4 THE WITNESS: I do.
5 THE STENOGRAPHER: Thank you.
6
7 ROBERT DURHAM, Ph.D, PE, CFEI,
8 HAVING BEEN DULY SWORN BY THE CERTIFIED SHORTHAND
9 REPORTER, WAS EXAMINED AND TESTIFIED AS FOLLOWS:
10 EXAMINATION
11 BY MR. JARRATT:
12 Q. Good morning, Dr. Durham.
13 A. Good morning.
14 Q. Did you receive the link, the box link that
15 contained the complete record for this IPR?
16 A. I have the complete record on this computer.
17 MS. MARGONIS: Yeah, from the link you sent, we
18 opened it up.
19 THE WITNESS: Okay.
20 MS. MARGONIS: Yes.
21 BY MR. JARRATT:
22 Q. Dr. Durham, is there any reason you cannot
23 provide full and accurate testimony today?
24 A. Not that I'm aware of.
25 Q. Do you -- excuse me -- do you recall being

1 deposed in this IPR proceeding previously?

2 A. Yes, sir.

3 Q. How many depositions have you sat for since
4 that deposition in this IPR?

5 A. I can think of two. There may have been a
6 third. Two or three.

7 Q. Were those depositions on behalf of petitioner
8 IWS?

9 A. No.

10 Q. So is it fair to say that you generally know
11 how depositions work?

12 A. Generally.

13 Q. You understand that you must provide verbal
14 answer to my question so that the court reporter can
15 make an accurate transcript?

16 A. Yes, sir.

17 Q. And so because we are forming a record here,
18 it's important that we don't talk over each other. So
19 if you'll let me finish a question, I'll let you finish
20 your answers. Does that sound fair?

21 A. Best I can.

22 Q. Do you understand that your counsel might
23 object to a question, but you still must provide an
24 answer to that question unless instructed otherwise?

25 A. Yes.

1 Q. If you're confused about -- as to a question
2 that I ask, I'd appreciate it if you let me know so I
3 can perhaps ask it a different way. Can we agree on
4 that?

5 A. Yes, sir.

6 Q. Are you connecting to the deposition today on a
7 personal computer?

8 A. I'm not one -- not mine. This is a computer
9 provided by counsel.

10 Q. Aside from Zoom, are there any other
11 applications running on your personal computer today?

12 A. No, sir, not right now.

13 Q. Any web pages running?

14 A. No.

15 Q. Any PDF applications running?

16 A. Not open right now.

17 Q. Any messaging programs running?

18 A. No, no, sir. Other than Zoom.

19 Q. Do you have any other electronic devices in the
20 room with you?

21 A. My phone is in my jacket pocket across the
22 room.

23 Q. Are there any other people in the room with you
24 today?

25 A. Yes, counsel for IWS is in the room.

1 Q. Do you have any physical papers or documents
2 related to this case with you?

3 A. No.

4 Q. Do you have any handwritten notes with you
5 today?

6 A. No.

7 Q. And you understand that the testimony you're
8 providing today will be used in Inter Partes review
9 proceeding IPR2024-00300; correct?

10 A. Yes, sir.

11 Q. And if I refer to "this IPR," you'll understand
12 that that to mean Inter Partes review proceeding
13 IPR 2024-00300; correct?

14 A. Yes, sir.

15 Q. And do you understand that this IPR concerns
16 U.S. Patent 11,560,770?

17 A. Yes.

18 Q. If I say "the '770 patent," will you understand
19 that to be referring to U.S. Patent 11,560,770?

20 A. Yes, sir.

21 Q. And do you understand that your testimony will
22 be publicly available if filed in this proceeding?

23 A. Yes.

24 Q. And do you understand that if the transcript is
25 filed, any member of the public would be able to

1 download and read that transcript?

2 A. Yes.

3 Q. About how many IPRs have you worked on?

4 A. 15 or 20 probably. Somewhere in that range.

5 Q. Of those IPRs, how many were you working on

6 behalf of petitioner, Intelligent Wellhead Systems?

7 A. Two.

8 Q. How many declarations have you filed in this

9 IPR?

10 A. Two.

11 Q. When I say "your first declaration," will you

12 understand that I'm referring to Exhibit 1002 filed in

13 this IPR?

14 A. Well, I don't have the exhibit number on these

15 declara- -- oh, yes, I do. Yes, 1002. I agree.

16 Q. And if I say "your reply declaration," will you

17 understand that I'm referring to Exhibit 1044 filed in

18 this IPR?

19 A. Yes, sir.

20 Q. And if I use the acronym "POSITA," will you

21 understand that to mean a person of ordinary skill in

22 the art as of the priority date of the '770 patent?

23 A. Yes, sir.

24 Q. Who wrote your reply declaration?

25 A. I did.

1 Q. Were you provided with a first draft?
2 A. No.
3 Q. Who originally developed the position -- the
4 positions in your reply declaration?
5 A. I did.
6 Q. Does your declaration contain any opinions that
7 are not yours?
8 A. No, it does not.
9 Q. Did you physically type every word of your
10 reply declaration?
11 A. I physically typed the entire first draft and
12 I'm sure there's been edits that counsel has suggested
13 that I may have accepted.
14 Q. Approximately how long did you spend preparing
15 your reply declaration?
16 A. I wouldn't know how to answer that. It's been
17 too long. Several days.
18 Q. All right. What did you review in preparation
19 for your deposition today?
20 A. I reviewed my first declaration, my reply
21 declaration. I reviewed patent owner's reply and
22 Mr. Hughett's declaration both from the -- for the
23 patent owner's preliminary response -- I'm sorry --
24 patent owner's response -- I may get confused, I'm
25 sorry. Patent owner's response I reviewed. I may have

1 reviewed the reply brief as well.

2 I reviewed several pieces of the prior art,
3 Carr, Tolman, Beuterbaugh, Jackson in particular. There
4 may have been others.

5 I reviewed the institution decision, and I
6 reviewed several exhibits provided by patent owner with
7 their response brief.

8 I think that's a fair representation of what I
9 reviewed. So a large portion of the record.

10 Q. Did you meet with anybody to prepare?

11 A. Yes.

12 Q. Who did you meet with?

13 A. Counsel for IWS.

14 Q. Do you have a virtual copy of your reply
15 declaration in front of you?

16 A. I have the -- the items that you sent, yes.

17 Q. Do you have your own copy or you just have the
18 clean copy provided by patent owner counsel?

19 A. Just the clean copy provided by patent owner's
20 counsel.

21 Q. Let's go ahead and turn to exhibit previously
22 marked 1044, which is your reply declaration.

23 A. Okay.

24 Q. Do you have that open?

25 A. I do.

1 Q. Can you confirm that this is your reply
2 declaration you filed in this proceeding?
3 A. It appears to be in a quick review.
4 Q. Can you turn to the very last page of the PDF?
5 I believe it's PDF page 46.
6 A. Yes, sir.
7 Q. Can you confirm that's your signature on the
8 last page?
9 A. It is.
10 Q. So after you signed your declaration on
11 December 9, 2024, were any changes to Exhibit 1044 made
12 by you or anyone else?
13 A. I did not see any.
14 Q. Did you confirm that no changes were made after
15 filing -- or sorry, after signing?
16 A. Well, I've read the declaration several times
17 after I signed it and I don't see any changes. I didn't
18 ask anyone else. But that much I can say.
19 Q. In drafting your reply declaration, did you
20 choose your words carefully?
21 A. Tried to. I made some errors, but I tried to.
22 Q. On the point of errors, are there any
23 typographical errors that you would like to correct at
24 this point?
25 A. If I can find them on this copy, I would be

1 glad to.

2 Q. Are there any errors that you're aware of at
3 this point?

4 A. Yes, there are a couple.

5 Q. Can we go to those, please?

6 A. Yeah, if I can find them in this copy.

7 Wow. Apologize, I'm not familiar with this PC.
8 Paragraph 40, in the second sentence, I say:

9 "In an attempt to support this,
10 Mr. Hughett appears to quote the
11 petition."

12 I believe if we look at that reference, it's
13 actually Mr. Hughett appears to quote the patent owner's
14 response and not the petition. That's certainly the
15 most substantive error that I found.

16 If I see any more as we go through, I'll be
17 glad to point them out.

18 Q. So that sentence you just pointed to has a
19 footnote reference, footnote citation to Exhibit 2012,
20 paragraph 216.

21 A. Yes.

22 Q. Which I believe is Dr. Hughett's declaration;
23 is that correct?

24 A. Yes, sir.

25 Q. And it's your understanding that that quote is

1 actually from patent owner's response and not the
2 petition?

3 A. No, sir, I correct myself. That is from the
4 petition. I don't know how I got that in my mind. I
5 apologize, that sentence, as written, is correct.

6 Q. Are there any other substantive errors in your
7 reply declaration you would like to correct?

8 A. Not that I can recall right now.

9 Q. Any errors in your analysis?

10 A. No, sir, not that I found for sure.

11 Q. Did you -- before you signed your declaration,
12 did you review whether the other quotes in your reply
13 declaration were from the correct sources?

14 A. Yes, sir.

15 Q. So if something is quoted but does not appear
16 in the cited source, that would have been found in your
17 review; is that correct?

18 A. Certainly hope so.

19 Q. Can you turn to paragraph 6 in your reply
20 declaration.

21 A. Yes, sir.

22 Q. What is the purpose of this paragraph?

23 A. To introduce the list of exhibits. And to cite
24 the materials that I referenced and relied on.

25 Q. When you say the words "list of exhibits," are

1 you referring to the table below the sentence?

2 A. Yes, sir.

3 Q. So are you saying in forming your opinion, you
4 reviewed and relied upon this list of exhibits?

5 A. Yes, sir.

6 Q. How many documents are listed in this table?

7 A. I count 77.

8 Q. And you reviewed these 77 documents in forming
9 your opinions?

10 A. Yes, sir.

11 Q. Did you read and consider every word of each of
12 these documents in forming your opinions?

13 A. I would say the prosecution history, there's
14 some pages I can recognize almost instantly that I don't
15 need to look at, some of the -- the forms, I guess, that
16 the patent office fills out. So I did not look at every
17 word of those pages.

18 And in the Occidental earnings call and the
19 Chesapeake Corporation reports, which would be
20 Exhibits 2025 and 2028, there were some paragraphs I
21 could read the first couple lines of the paragraph and
22 realize that there were not relative to this analysis of
23 the nexus and was able to skip portions of those
24 paragraphs. But I reviewed every page and looked at
25 every paragraph to determine if it was relevant.

1 Other than those exceptions, I read every word
2 for most of the exhibits, multiple times.

3 Q. All right. Thank you.

4 MR. JARRATT: Can we go off the record for a
5 second, Lynette.

6 (Discussion held off record.)

7 MR. JARRATT: Let's go back on the record.

8 BY MR. JARRATT:

9 Q. All right. Dr. Durham, you had mentioned the
10 word "nexus" in a couple of your last answers. Can we
11 go to paragraph 43 of your reply declaration?

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

13 Q. Can you read the first two sentences of
14 paragraph 43?

15 A. Certainly.

16 "I have considered the
17 information supplied by patent owner
18 regarding secondary considerations of
19 nonobviousness. I have not seen any
20 evidence that would support a
21 conclusion of nexus between the broad
22 and previously known valve operations
23 claimed in the '770 patent and the
24 purported secondary considerations of
25 nonobviousness presented by patent

1 owner."

2 Q. What is nexus as used in this sentence?

3 A. A nexus means there is a direct connection
4 between the alleged secondary considerations and the
5 unique characteristics of a patent and that those
6 secondary considerations are the direct result of the
7 unique characteristics of the claimed invention.

8 Q. Do you understand that "nexus" is a legal term
9 with special meaning in patent law?

10 A. Yes, sir.

11 Q. Are you providing a legal opinion as to the
12 existence or nonexistence of nexus?

13 A. No, sir.

14 Q. Are you an attorney, Dr. Durham?

15 A. No, sir.

16 Q. So how exactly did you determine that there was
17 no nexus in this case?

18 A. I found that the -- was no evidence of the
19 evidence provided by patent owner the Freedom Series
20 practiced all each and every claim of the '770 patent or
21 any claim of the '770 patent for that matter. And I
22 found that there was no direct result of the unique
23 characteristics of a claimed invention that led to the
24 statements and the alleged considerations of
25 nonobviousness presented by patent owner.

1 Q. Is it your understanding that, quote, each and
2 every claim of the '770 patent must be practiced by the
3 Freedom Series?

4 A. No, sir. Each and every limitation of any
5 particular claim is what I intended to say.

6 Q. So -- okay. Is it your understanding that each
7 limitation of the '770 patent must be practiced by the
8 Freedom Series?

9 A. In order for the Freedom Series to practice the
10 '770 patent -- I'm sorry, '770 patent, yes. And that is
11 one of the considerations I look at as nexus.

12 Q. How did you come to that understanding that
13 each limitation must be practiced by the '770 patent --
14 or by the Freedom Series, excuse me?

15 A. That's just simply my understanding of whether
16 or not that Freedom Series practices the claim is that
17 there must be evidence that it practices each and every
18 limitation very similar to an infringement analysis.

19 Q. Did you review any case law to determine what
20 type of evidence can establish nexus?

21 A. No, sir. That's simply my understanding from
22 instructions of counsel.

23 Q. Is it possible that there's nexus in this case,
24 but you just didn't recognize it because you're not an
25 attorney?

1 A. I haven't seen any evidence that would lead me
2 to the conclusion of nexus as a POSITA.

3 Q. So you looked at it from the point of view of a
4 POSITA rather than an attorney; is that correct?

5 A. Yes, sir, that's correct.

6 Q. Let's turn to page 32 of your declaration --
7 reply declaration.

8 A. Okay. I'm there.

9 Q. Do you notice -- so there's an image on
10 page 32. What is this image of? What does it depict?

11 A. This was an image out of Mr. Hughett's
12 declaration, I believe this was his patent owner's
13 preliminary response declaration, to my recollection,
14 that he marked up during his deposition and it depicts a
15 frack tree at a frack site and the caption gives the
16 particular location, what formation it's in.

17 Q. Would you agree this is a typical frack tree?

18 A. It's representative of a frack tree, yeah,
19 there's different configurations, but it's certainly
20 representative and very common to have this particular
21 arrangement.

22 Q. When was this image captured?

23 A. Early 2013.

24 Q. Did frack trees change in any way between early
25 2013 and the priority date of the '770 patent?

1 A. As I've said, this is a -- this is a
2 representative configuration. There's different
3 configurations you can do. Couple of things stay the
4 same as there's always master valves closest to the
5 well. But the particular arrangement of where what wing
6 valves are used for what, where a frack valve may be,
7 where a goat's head may be changes.

8 Those master valve locations don't change and
9 the swab valves and the lubricator stack don't change.
10 Other than that, everything else can be moved around.

11 Q. So it's possible more modern frack trees may
12 have additional valves than the ones shown here?

13 A. Yes, sir, you can add to any frack tree. You
14 can add additional valves, sure.

15 Q. What is the "goat's head" as annotated in this
16 figure?

17 A. The goat's head is those fittings near the top
18 of the stack where multiple flow lines come and flow
19 together.

20 Q. Does the goat's head include any valves?

21 A. The goat's head itself, it can. Typically
22 controlled by other valves, but goat's heads can have
23 isolation valves, manual valves in particular on them.

24 Q. Typically how many valves would a goat's head
25 have?

1 A. It depends. Very often, there's zero. There
2 can be some. It just depends on the particular
3 configuration and size of the frack job.

4 Q. What is the "cross" as labeled in this
5 annotated figure?

6 A. The cross is that element that -- where the
7 flows from the four directions come together. In this
8 figure, it's top, bottom, left, and right, if you will.
9 Those flows all commingle at the cross.

10 Q. What is the purpose of the cross?

11 A. To allow the flows from the various directions
12 to commingle.

13 Q. How many valves does a typical cross have?

14 A. Crosses typically don't have valves. You add
15 valves to the cross.

16 Q. What do you mean by "you add valves to the
17 cross"?

18 A. Right. You add valves on the top for whatever
19 configuration you need, you add valves or plugs to the
20 left to seal it off and valves or plugs to the right and
21 you almost always -- it's very typical to have the
22 master valves below the cross if indeed there is a
23 cross.

24 Q. So it's possible there would be no cross in
25 some frack jobs?

1 A. Sure. Absolutely.

2 Q. And if there is a cross in a frack job, it
3 would be associated with several valves or have several
4 valves or be connected to several valves?

5 A. Yes, it would be connected to several valves
6 typically.

7 Q. Does the cross typically include valves
8 associated with flowback?

9 A. They can or cannot. Depends on the
10 configuration. Sometimes you remove this frack head
11 completely and put in a different flowback stack.

12 Q. So the configure -- so I guess -- excuse
13 me -- strike that.

14 So the configuration of the cross would
15 typically depend upon the specific frack job; is that
16 correct?

17 A. Yes, sir. The particular frack job and the
18 particular contractor, how they like to do things.

19 Q. So depending on the frack job, a frack tree may
20 have different number of valves in different instances;
21 is that correct?

22 A. Sure. One thing that always has is a valve or
23 valves to isolate it from a well. And if you're doing
24 plug-and-perf operations, what it would always have is
25 some way to attach the lubricator and do wire line

1 operations. But other than that, the configuration can
2 change.

3 Q. About how many total valves does this typical
4 frack tree include on this page of your reply
5 declaration?

6 A. Resolution is not great on this to answer that
7 question.

8 I count seven or eight large valves. But it
9 appears that there may be some smaller valves, isolation
10 valves, maybe ball valves in different locations. The
11 resolution is hard on -- it's kind of hard to say. But
12 at least seven or maybe eight of the large valves
13 typically associated with a frack tree.

14 Q. So this typical frack tree, as shown in this
15 image, includes an upper master and a lower master. Is
16 that a typical configuration?

17 A. Yeah, that's very common.

18 Q. Can the upper and lower master valves be
19 operated independently?

20 A. Yes.

21 Q. Is it possible for the upper master valve to be
22 opened and the lower master valve to be closed?

23 A. Yes. You can't do anything with the well in
24 that configuration, but it's possible.

25 Q. Is the opposite true as well?

1 A. Yes. Very commonly we have the upper master
2 closed and the lower master open.

3 Q. If we go to the next paragraph, paragraph 34,
4 can you read that second sentence?

5 A. Starting with "A POSITA"?

6 Q. Correct.

7 A. (Reading:)

8 "A POSITA would have been well
9 aware of the common use of 'tree
10 valves' as described in Tolman and
11 would have immediately envisioned a
12 setup similar to that in Figure 15
13 above, including hydraulically and
14 remotely operated valves and frack
15 valves."

16 Q. Why does a POSITA need to quote envision a
17 frack tree in Tolman?

18 A. Tolman simply says the word "tree valves,"
19 which a POSITA would immediately recognize as
20 configuration similar to that. In other words, Tolman
21 did not need to provide any additional description other
22 than he -- well, that's Tolman article.

23 Any additional description for a POSITA to be
24 well understood that he's talking about valves such as
25 those in Figure 15, Figure 15 is just one example.

1 Q. Could Tolman --

2 A. It goes to the understanding of what a POSITA
3 would understand reading Tolman.

4 Q. So it's your understanding that Tolman itself
5 does not provide any detail about what valves it
6 frack -- its frack trees contain?

7 A. It -- it says it has tree valves and a POSITA
8 would immediately recognize those as a configuration
9 similar to Figure 15. Doesn't provide any detail past
10 that. Doesn't need to.

11 Q. Could it be possible that Tolman's frack tree
12 has additional valves than the frack tree shown in
13 Figure 15?

14 A. Yes.

15 Q. Can we go to paragraph 41 in your reply
16 declaration.

17 A. Okay.

18 Q. Which valves does Tolman state are closed when
19 the first well, 104-A, has been shut in?

20 A. It doesn't describe particular valves. As I
21 said in my first declaration and again in this
22 declaration, it would be at least master valves to shut
23 in the well. Those are the valves that you would use to
24 shut in the well, as Mr. Huggett agreed during his
25 deposition as well.

1 Q. Are there any valves on Tolman's frack tree
2 that would be open during shut-in?
3 A. There may be.
4 Q. But can you be sure based on Tolman's
5 description?
6 A. No, it doesn't matter. If the well is shut in,
7 the master valves are closed and nothing is going into
8 or coming out of the well. That's what the term "shut
9 in" means.
10 Once you've done that, the configuration of any
11 of the other valves doesn't mean anything relative to
12 the well because the well is isolated, shut in.
13 Q. Are any of the valves on Tolman's cross,
14 provided that it includes a cross, be open during
15 shut-in?
16 A. Could be. Doesn't matter.
17 Q. Would Tolman's -- provided Tolman includes a
18 lower master valve, would that lower master valve be
19 open during shut-in?
20 A. It's possible. If an upper master valve is
21 holding, it would be a common configuration to have the
22 upper master closed and the lower master still opened.
23 Q. Could the lower master valve be closed as well?
24 A. Absolutely.
25 Q. All right. Can you please turn to paragraph 9

1 in your reply declaration.

2 A. Okay.

3 Q. At the bottom of this paragraph, there's a
4 figure from Carr, Figure 5, that I believe you had
5 previously annotated; is that correct?

6 A. Yes, sir, I recognize that figure.

7 Q. What do your annotations represent in this
8 figure?

9 A. As I testified in my deposition, my first
10 deposition, these two colors, orange and yellow,
11 represent the two flow paths for fluid going into the
12 various wells in the particular embodiment shown in
13 Figure 5 of Carr.

14 Q. Do you still agree with these annotations?

15 A. Yes.

16 Q. What is the valve that you annotated in hand as
17 valve 474?

18 A. In this particular configuration from Figure 5
19 or particular embodiment from Figure 5, that's a
20 proportioning valve.

21 Q. What is the purpose of the proportioning valve?

22 A. It's to help direct the fluid into the two
23 branches, 470 -- the four branches represented by
24 valves 470 and 472.

25 Q. Is it correct that there's three pipes attached

1 to the proportioning valve?

2 A. Well, there could be pipes or that that set of
3 valves could represent a manifold. Either way, it
4 provides the functions of the manifold so it could be
5 pipes or it could be manifold.

6 Q. Does Tolman state that those three valves are
7 part of a manifold?

8 A. No.

9 Q. For the ease of reference, can I refer to these
10 three lines as "the blender pipe," the valve 470 pipe
11 and the valve 472 pipe?

12 A. For ease, we can use that understanding as long
13 as it is on the record that it may not be pipes and it
14 may be a manifold. It would be very common to have a
15 manifold at this location, so for purposes of this
16 deposition, we can use those terms but they may not all
17 be pipes.

18 Q. Understood.

19 Can you describe how the proportioning valve
20 functions to do its job in this configuration?

21 A. Yeah. It adds flow impedance in one path or
22 the other to help direct the flow between those two
23 valves. You can add flow impedance either using
24 valve 470 or 472, or you can add flow impedance to one
25 of the paths by using valve 474. So it's a combination

1 of valves 470, 472, and 474 that direct or redirect the
2 flow.

3 Q. Does Tolman describe any other valve besides
4 the proportioning valve 474 as redirecting the flow?

5 A. Yes.

6 Q. Excuse me. Excuse me -- strike that.

7 Does Carr describe any other valve besides the
8 proportioning valve 474 as redirecting the flow?

9 A. Yes.

10 Q. Which valves?

11 A. Well, by including Figure 5, valves 470 and
12 472.

13 Q. Can you point me to the portion of Carr where
14 it states that valve 470 redirects the flow?

15 A. I can look -- well, I can certainly point to
16 Figure 5 and the additional figures of Carr as
17 containing that disclosure. It's basic simple fluid
18 dynamics. But let me pull up Carr and answer your
19 question more completely.

20 MS. MARGONIS: Sorry, can I just ask which
21 exhibit number is Carr since we're using the online?
22 Might make it easier for us to find it.

23 MR. JARRATT: Yes, Carr is Exhibit 1004.

24 MS. MARGONIS: Thank you.

25 THE WITNESS: As one example in paragraph 33

1 states:

2 "Further, in some embodiments,
3 the first valve 470 and the second
4 valve 472 can be used to control the
5 flow rates to the first well 140, the
6 second 142, or to both the first well
7 140 and second well 142
8 simultaneously."

9 That description and particularly in
10 combination with Figure 5, which is referencing that
11 paragraph, would allow a POSITA to understand that they
12 were -- those flows are directed between the wells using
13 470 and 472.

14 And then in paragraph 34, the embodiment adds
15 in the proportioning valve 474 to help direct that flow
16 from the first isolated man and the second isolated
17 manifold path.

18 And then it says at the end of that paragraph,
19 to make it clear:

20 "The proportioning valve 474 can
21 be used in conjunction with, or
22 separate from, the first valve 470
23 and the" first valve -- "second valve
24 472."

25 Taking the paragraph in total assist the

1 valve 474 in the directing of the flow to the various
2 paths.

3 Paragraph 35 has a similar description of first
4 valve 470, second valve 472, and/or the proportioning
5 valve 474 to control the position of the valves in light
6 of fluid flow targets which, again, is talking about
7 directing the flow between the various wells. It's the
8 relationship of the impedance in the 470 path and the
9 472 path that determines how much flow goes to each set
10 of wells.

11 BY MR. JARRATT:

12 Q. Anything else in Carr?

13 A. I'm still -- I'm still reading it. I think
14 that description is the best representation. I didn't
15 see anything else in a very brief review.

16 Q. In those portions of Carr that you just pointed
17 to, would well 140 and well 142 be stimulated
18 simultaneously?

19 A. Yes. As -- certainly could be.

20 Q. Going back to Figure 5, your annotation on
21 page 10 of your reply declaration.

22 A. Okay.

23 Q. So inside of the proportioning valve 474, are
24 the pipes 470 -- excuse me, the valve 470 pipe and the
25 valve 470 -- excuse me -- strike that.

1 So inside the proportioning valve, are the
2 valve 470 pipe and the blender pipe connected?

3 A. Yes. Assuming that 474 has not completely
4 closed off or shut in that path to 470. They are
5 connected.

6 Q. And similarly, inside of proportioning
7 valve 474, is the valve 472 pipe and the blender pipe
8 connected?

9 A. Yes, sir, with the same caveat.

10 Q. Inside the proportioning valve, are the
11 valve 470 pipe and the valve 472 pipe connected?

12 A. Yes. With the same caveat.

13 Q. What is that caveat again?

14 A. That the proportioning valve is not being
15 operated as though to completely shut in flow to one of
16 the -- those path pipes, one of those flow paths. And
17 again, with the pipes understanding they could be a
18 manifold.

19 Q. Can fluid flow directly from valve 470 pipe to
20 valve 472 pipe?

21 A. Yes.

22 Q. How does proportioning valve direct or redirect
23 fluid between each of those pipes if they are directly
24 connected and fluid freely flows between them?

25 A. Because it changes the impedance of the flow

1 paths.

2 Q. Does the proportioning valve split a common
3 fluid flow into separate flows?

4 A. It helps direct that common flow to the
5 separate flow paths. It doesn't always split the flow
6 depending on the configurations of 470 and 472. It's a
7 combination of 474 with 470 and 472 that splits the
8 flow. In this figure, in this particular embodiment,
9 they would operate in concert, not in isolation from
10 each other.

11 Q. So you stated that the proportioning valve
12 helps direct the common flow to the separate flow paths.

13 Is it your understanding that the fluid has
14 been split into those two flow paths prior to reaching
15 the valves 470 and 472?

16 A. No, sir. You can't -- in this particular
17 embodiment, it doesn't work that way. You have to take
18 into consideration the impedance provided by valve 470
19 and 472 in order to make that split.

20 Q. Well, my question wasn't about the impedance.

21 My question was: Is there separate fluid flow
22 in the valve 470 pipe and the valve 472 pipe?

23 A. Well, you can't not talk about the impedance.
24 Because it's the impedance in the flow paths that
25 determine that split. So as Carr states, 470 and 474

1 and 472 all work in concert to direct the flow. You
2 can't ignore one set of valves in the analysis.

3 Q. I'm not necessarily talking about the analysis
4 at this point.

5 I'm just asking you, when there's fluid in two
6 different pipes, pipe 470 and pipe 472, would you agree
7 that the fluid has been separated?

8 A. No, not in all cases, no, sir. Not without
9 taking into account the impedance of 470 and 472.

10 Q. Would you say fluid in one pipe is separated
11 from fluid in a second pipe?

12 A. No, sir. Not without taking into account those
13 other valves. You just can't do that. You can't say
14 that fluid that flows through the 470 pipe that you call
15 it never flows to the 472 pipe. No, sir.

16 Q. At what point is the fluid separated in the
17 system of Carr?

18 A. Downstream of valves 470 and 472, wherever they
19 may be.

20 Q. What is it about valve 470 that separates the
21 fluid?

22 A. Because there are no -- in Carr, there are no
23 other valves downstream of 470, for example, in Figure 5
24 that would change that impedance of that flow path and
25 direct the fluid. So once it leaves 470, there's no

1 valve that's going to stop the flow and back it up, if
2 you will, back into 472. At least according to the
3 description of Carr.

4 Q. So your definition of when fluid has been
5 separated is based upon whether its impedance has
6 changed; is that correct?

7 A. No. My definition of when fluid's separated is
8 when we can say that there will not be, in this
9 configuration, fluid flowback from a particular location
10 into another location.

11 So if I'm in a configuration where fluid enters
12 or gets to a particular location, it would never go back
13 to the other well valve, for example. Now they're
14 separated. But as long as there is fluid that would go
15 into those positions and flow back to it, they're not
16 separated.

17 Q. Why did you color -- if it's your -- strike
18 that.

19 If it's your testimony that the two fluid flows
20 are not separated until after they are past valve 470
21 and 472, why did you change, use two different colors
22 for pipe 470 and pipe 472 in your annotations?

23 A. I believe I described that in my declaration,
24 or my deposition, but that was simply to show the bulk
25 of the fluid flow. I don't think I used the term

1 "bulk," but anyway, I think I said that the flows were
2 isolated past 472 and I just marked this way for
3 convenience; otherwise, the orange and the yellow would
4 have been on top of each other which, as you can see, I
5 tried to avoid.

6 MR. JARRATT: All right. I think we've been
7 going about an hour. Let's take a break.

8 THE WITNESS: Sounds good.

9 (A recess was taken.)

10 BY MR. JARRATT:

11 Q. Dr. Durham, did you speak with anybody during
12 the break?

13 A. Yes.

14 Q. Did you speak about the substance of your
15 testimony today with anybody during the break?

16 A. No, sir. Not at all.

17 Q. Going back to the annotated figure on page 10
18 of your reply declaration.

19 Is it your understanding that the pressure
20 pumps 130 on each side of the manifold 120 are separate?

21 A. Yes, that's my understanding. They -- those
22 would increase the pressure of the fluid separately.

23 Q. So it's correct that isolated manifold path 122
24 has one set of pumps and the other isolated manifold
25 path 124 has a separate set of pumps; is that correct?

1 A. Well, if you're only talking about pumps 130,
2 that's true. But, of course, they share pumps back in
3 105 area. But if you're only talking about 130, yes,
4 then that's true.

5 Q. Yes, my question was specifically about
6 pumps 130.

7 A. Yeah.

8 Q. So what's the purpose of having separate pumps
9 on each manifold path?

10 A. Well, according to Carr, you can use the pump
11 rates to control or to help control flow as well. So
12 having those separate pumps you can control the flow
13 rate or help control the flow rate with use of the pumps
14 in addition to the valve as Carr discloses, and some
15 configurations of Carr there's no valve and some
16 configurations of Carr there's no 474 valve. There's
17 various configurations to control that flow.

18 Q. You just stated in some configurations, there's
19 no valves.

20 A. Yeah.

21 Q. How would Carr control a flow rate with no
22 valves?

23 A. By controlling the pump rate.

24 Q. What would happen if you turned on instead of
25 pumps 130 attached to the isolated manifold path 122 but

1 not the set of pumps on the opposite side of the
2 manifold 120? Can you explain -- can you explain that
3 operation?

4 A. Well, I didn't study that, but generally
5 speaking, you would have, more likely than not,
6 significantly more flow into well 140 than you do into
7 well 142.

8 Q. We'll call them the pumps attached to 122,
9 we'll call them, just for ease, the top pumps.

10 Do those top pumps pull fluid into the
11 manifold 120 from the isolated manifold path 122?

12 A. Can you restate that question?

13 Q. Do the top pumps pull fluid into the
14 manifold 120 on the path 122 side?

15 MS. MARGONIS: Objection. Form.

16 THE WITNESS: The -- maybe, maybe not. The --
17 it's the relationship between the suction of pumps 130
18 and the discharge of the pumps on 105 that determines
19 when and how fluid goes into 122. So I don't think
20 there's an answer to your question without additional
21 information about the particular configuration of those,
22 of all of those pumps.

23 BY MR. JARRATT:

24 Q. Can you explain to me when -- in the operations
25 of Carr, when well 140 is being individually stimulated?

1 Can you walk me through what happens in that case?

2 A. Well, I think Carr describes that and I've
3 described it in my declaration pretty consistently.

4 Paragraph 33, for example -- let's see. You
5 can stimulate it individually by opening the valve 470
6 and 472 and closing the other valve. That's how would
7 you control.

8 In the particular embodiment of Figure 5, there
9 are other embodiments. But in that particular
10 embodiment, that's how you do it, by opening valve 470
11 or 472 and closing the other of the pair.

12 Q. And in the instance where you're stimulating
13 both wells, 140 and 142 simultaneously, both valves 470
14 and 472 would be opened; is that correct?

15 A. Yes.

16 Q. And so when you're -- you're stimulating
17 individually and you're stimulating simultaneously,
18 there's different operations occurring within the system
19 of Carr; is that correct?

20 A. No, it's just -- well, yes, there's different
21 operations because in one case you're fracking one well
22 at a time in Carr and second cases you're fracking two
23 wells at a time in Carr. That's a difference in
24 operations. I can agree with that.

25 Q. Would you typically have one frack plan for an

1 individual stimulation and a different frack plan for a
2 simultaneous stimulation?

3 A. It depends. You could run the same frack plan
4 on both wells and do them simultaneously or
5 individually. That's not something I really studied
6 because that's not in the claims. But generally
7 speaking, you can do it either way, different or the
8 same.

9 Q. So you may -- so if I'm understanding your
10 testimony, you might reuse the same frack plan if you're
11 just stimulating 140 individually or stimulating 142
12 individually; is that correct?

13 A. Yes, they could have the same frack design. Or
14 they can have the same frack design if they're being
15 stimulated simultaneously.

16 Again, it's not something I spent a lot of time
17 with, with Carr, because that -- the frack plan or any
18 of that doesn't have anything to do with the claim so I
19 didn't spend a lot of time on it.

20 Q. Going to paragraph 30 of your reply
21 declaration, can you please read the third sentence?

22 A. Does that start with "for example"?

23 Q. The third sentence, I believe, starts with
24 "Carr and Beuterbaugh." Paragraph 30. Did I say 3?

25 A. You said 30.

1 Okay. Gotcha.

2 "Carr and Beuterbaugh both teach
3 simultaneously or concurrent
4 fracturing operations on multiple
5 wells and are 'directed to solving
6 the same problem, controlling well
7 operations.'"

8 Q. Can you explain how simultaneous well
9 stimulation is performed in Carr?

10 A. Yes, sir. As we just read, for example, one
11 location's in paragraph 33. I believe it is. Hold on a
12 second.

13 Right.

14 "Further, in some embodiments,
15 the first valve 470 and the second
16 valve 472 can be used to control the
17 flow rate to the first well 140, the
18 second well 142, or to both the first
19 well" 142 and the second well 142
20 simultaneously -- "the first well 140
21 and the second well 142
22 simultaneously."

23 Q. For the record, that was the last sentence in
24 paragraph 33; is that correct?

25 A. Yes, sir, that's correct.

1 Q. And so this sentence is about stimulating the
2 wells 140 and 142 simultaneously; is that correct? Is
3 that what you just read?

4 A. That's one place it talks about that in Carr.
5 There's others.

6 Q. So would valves 470 and 472 both be open during
7 that simultaneous stimulation?

8 A. Yes, sir, they would both be open to some
9 extent. And to varying extents.

10 Q. Would you ever close either of those valves
11 during simultaneously stimulation?

12 A. No, as Carr teaches, and I believe it's the
13 next-to-last sentence of paragraph 33, the first
14 valve 470 and the second valve 472 can allow for the
15 first valve -- I'm sorry, the first well 140 and the
16 second well 142 to each be stimulated individually by
17 opening the respective valve 470 or the second valve 472
18 and closing the other valve.

19 So in the case that you want to do individual
20 stimulation in Carr, you would open one valve and close
21 the other valve.

22 Q. And that's what this sentence is about, is
23 individual stimulation?

24 A. It teaches how you would go from, for example,
25 simultaneously to individual stimulation, but it also

1 teaches how you would go to the -- to individual
2 stimulation as well. So yeah, open one valve and close
3 the other valve to do it individually.

4 Q. To do it individually; correct?

5 A. Wherever you're coming from.

6 Q. When wells 140 and 142 are stimulated
7 simultaneously, are the valves 470 and 472
8 simultaneously opened and closed?

9 A. No, Carr doesn't teach that.

10 Q. Is it possible that they're opened and closed
11 simultaneously?

12 A. Possible if that's the way the operator wanted
13 to -- wanted to operate it. But it doesn't teach --
14 that's not what it generally talks about.

15 Q. Does it have any disclosure of controlling the
16 valve, the mechanics of controlling the valves during
17 simultaneously stimulation?

18 A. That's a pretty broad question. I didn't study
19 that at all because that's not in the claims so that
20 would take some study of Carr that I haven't performed.
21 I can't answer that off the head -- off the top of my
22 head.

23 Q. The claims require opening and closing specific
24 valves; correct?

25 A. It -- the claims do talk about opening and

1 closing valves, yes.

2 Q. So did you analyze in Carr whether Carr's
3 valves 470 and 472 are opened and closed and at what
4 points?

5 A. Yes.

6 Q. I believe you just testified you did not study
7 what happens with Carr's valves during simultaneously
8 stimulation; is that correct?

9 A. No, that was not -- I'm sorry.

10 MS. MARGONIS: Sorry. Objection.

11 THE WITNESS: That was not my answer.

12 BY MR. JARRATT:

13 Q. Did you study what happens with Carr's valves
14 during simultaneously stimulation?

15 A. Yes.

16 Q. So what happens with Carr's valves during
17 simultaneously stimulation in terms of which valves are
18 opened and closed?

19 A. Both valves 470 and 472 are open, at least to
20 some level, to control the flow rate in simultaneous
21 fracking in Carr.

22 Q. If -- if -- as you testified, Carr's valves are
23 not operated simultaneously during simultaneous
24 stimulation. Which valve, 470, 472, was opened first?

25 MS. MARGONIS: Objection. Form.

1 THE WITNESS: I disagree that that was my
2 testimony. Could you rephrase that question, please.
3 BY MR. JARRATT:
4 Q. You testified that valves 470 and 472 would not
5 be simultaneously opened and closed during simultaneous
6 stimulation; is that correct?
7 A. No.
8 Q. So valves 470 and 472 would be operated
9 simultaneously during simultaneous stimulation; is that
10 your testimony?
11 A. No, sir, that's not my testimony either.
12 Q. What is your testimony on that point?
13 A. That they -- as we just talked about, if the
14 operator wanted to run them simultaneously for whatever
15 reason, he could. Or -- and they would also not open
16 and close simultaneously; in other words, to control
17 flow rate, for example, they would both be opening and
18 closing at various times and not operating
19 simultaneously.
20 Q. So is it your testimony Carr does not
21 specifically say when the valves 472 and 472 are opened
22 and closed during simultaneous stimulation?
23 A. Could you rephrase that question, please.
24 Q. Does Carr disclose when valves 472 and 470 are
25 opened and closed during simultaneous stimulation?

1 A. Yes. They're opened and closed during
2 simultaneous stimulation to control flow rate as one
3 example.

4 Q. Does Carr specify which valve is opened first
5 during simultaneous stimulation?

6 A. Yes, sir. Well, no, it doesn't specify which
7 valve is opened first during simultaneous stimulation
8 that I can recall.

9 It just says both valves are open and closed.
10 During simultaneous stimulation to control flow rate.

11 Q. And if Carr's wells are being stimulated
12 individually, would you open only one of valve 470 and
13 472?

14 A. No, that's not what Carr teaches.

15 Q. What does Carr teach in terms of opening and
16 closing valves 470 and 472 during individual
17 stimulation?

18 A. Again, going back to that same next-to-the-last
19 paragraph in 33, as one example, you would open
20 respective valve 470 or second valve 472 and close the
21 other valve.

22 Q. Would individual stimulation happen as
23 described in that sentence is a particular ordering
24 required by that sentence you just read?

25 A. It reads in a particular order, yes.

1 Q. Could the -- could the opposite order be
2 performed and Carr's wells would still be individually
3 stimulated?

4 A. The opposite order from what Carr teaches?

5 Q. Correct.

6 A. It's not what Carr teaches. So I don't see any
7 disclosure of that in Carr doing the opposite order. I
8 don't see that anywhere as I recall.

9 Q. If valves 470 and 472 are opened at the same
10 time, is that still individual stimulation?

11 A. Well, I don't see -- I don't see any discussion
12 of Carr about opening valves 470 and 472 at the same
13 time. But in the abstract, separated from any claim
14 analysis or the teachings of Carr, if you open both 470
15 and 472, then you would not be individually stimulated.
16 That would lead you to simultaneous stimulation.

17 MR. JARRATT: Let's take a five-minute break,
18 please.

19 (A recess was taken.)

20 MR. JARRATT: All right.

21 BY MR. JARRATT:

22 Q. Dr. Durham, did you speak with anybody during
23 the break?

24 A. Yes.

25 Q. Anything about the substance of your testimony

1 today?

2 A. No.

3 MR. JARRATT: Patent owner has no more

4 questions. We pass the witness.

5 MS. MARGONIS: Can you just give us a

6 five-minute break?

7 MR. JARRATT: Sure.

8 (A recess was taken.)

9 MS. MARGONIS: We don't have any questions. We

10 will read and sign. That's it.

11 MR. JARRATT: Thank you, Dr. Durham.

12 THE WITNESS: Thank you, sir, take care.

13 THE STENOGRAPHER: Any further stipulations or

14 concerns for this transcript?

15 MR. JARRATT: I don't believe so, just

16 expedited for tomorrow.

17 THE STENOGRAPHER: That's fine. We are off the

18 record.

19 - - -

20 (Deposition was concluded at 11:49 a.m.)

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Note: If you are adding to your testimony, print the exact words you want to add. If you are deleting from your testimony, print the exact words you want to delete. Specify with "Add" or "Delete" and sign this form.

DEPOSITION OF: ROBERT DURHAM, Ph.D, PE, CFEI

CASE: IWS, INC. V DWE, LLC

DATE OF DEPOSITION: JANUARY 28, 2025

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Declaration Under Penalty of Perjury

I, ROBERT DURHAM, Ph.D, PE, CFEI, the witness herein, declare under penalty of perjury that I have read the foregoing in its entirety; and that the testimony contained therein, as corrected by me, is a true and accurate transcription of my testimony elicited at said time and place.

Executed this _____ day of _____ 20__, at _____,
(city) (state)

ROBERT DURHAM, Ph.D, PE, CFEI

1 REPORTER'S CERTIFICATE

2 -000-

3 I, LYNETTE M. NELSON, CA CSR No. 11585, OR CSR
4 No. 250121, TN LCR No. 896, RPR, CRR, CCRR, CRG, duly
5 licensed and qualified in and for the State of
6 California, Oregon, and Tennessee, do hereby certify
7 that there came before me on the 28th day of January,
8 2025, via web videoconference, the following named
9 person, to-wit, ROBERT DURHAM, Ph.D, PE, CFEI, who was
10 duly sworn to testify the truth, the whole truth, and
11 nothing but the truth of knowledge touching and
12 concerning the matters in controversy in this case; and
13 that he was thereupon examined under oath and his
14 examination reduced to typewriting under my supervision;
15 that the deposition is a true record of the testimony
16 given by the witness.

17 I further certify that pursuant to FRCP Rule
18 30(e)(1) that the signature of the deponent:

19 (x) Was requested by the deponent or a party
20 before the completion of the deposition;

21 () Was not requested by the deponent of a
22 party before the completion of the deposition.

23 I further certify that I am neither attorney or
24 counsel for, nor related to or employed by any of the
25 parties to the action in which this deposition is taken,

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and further that I am not a relative, employee of any attorney or counsel employed by the parties hereto, or financially interested in the action.

CERTIFIED TO BY ME on this 28th day of January, 2025.



LYNETTE M. NELSON,
CA CSR No. 11585, OR CSR No. 250121,
TN LCR No. 896, RPR, CRR, CCRR, CRG,
REALTIME SYSTEMS ADMIN.

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