

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

3 _____)

4 WEATHERFORD U.S., L.P.,

5 Petitioner,

6 v. IPR2024-00990

7 HALLIBURTON ENERGY U.S. Patent No.

8 SERVICES, INC., 11,333,007

9 Patent Owner.

10 _____)

11

12 DEPOSITION OF ROBERT A. DURHAM, Ph.D.

13

14

15 September 17, 2025

16 10:02 a.m. Central Time

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20 Reported by: Lori J. Goodin, RPR, CLR, CRR,

21 RSA, California CSR #13959

22 Job No. 00169737

1 REMOTE DEPOSITION of
2 ROBERT A. DURHAM, Ph.D., in the above-titled
3 action, held on Wednesday, September 17, 2025,
4 commencing at approximately 10:02 a.m. before
5 Lori J. Goodin, RPR, CRR, RSA, California CSR
6 #13959, Registered Professional Reporter,
7 Certified Realtime Reporter, Realtime Systems,
8 Administrator, and Certified Shorthand Reporter,
9 and Notary Public of the State of Florida, State
10 of California, State of Maryland, District of
11 Columbia, and State of Delaware.

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1	INDEX TO EXHIBITS	
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2	Weatherford U.S., L.P., v Halliburton Energy	
	Services, Inc.,	
3	Wednesday, September 17, 2025	
	Lori J. Goodin, RPR, CRR, RSA,	
4	California CSR #13959	
5	PREVIOUSLY MARKED EXHIBITS	
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1 WEDNESDAY, SEPTEMBER 17, 2025, 10:02 a.m.

2

3

PROCEEDINGS

4

THE VIDEOGRAPHER: This is the

5

beginning of the videotaped deposition of

6

Dr. Robert A. Durham in the matter of

7

Weatherford U.S., LP versus Halliburton

8

Energy Services, Incorporated.

9

Today's date is September 17th,

10

2025, and the time is 10:02 a.m. Central.

11

Counsel, please introduce

12

yourselves, after which our court reporter

13

will swear in the witness.

14

MR. WILSON: So, I am Douglas Wilson

15

of the firm Armand Wilson LLP for the, for

16

the petitioner, Weatherford. And with me is

17

Monica Arnold.

18

MR. MCDONALD: Jacob McDonald for

19

Baker Botts for patent owner, Halliburton.

20

* * *

21

Whereupon,

22

ROBERT A. DURHAM, PH.D.

1 a witness called for examination, having been
2 first duly sworn, was examined and testified as
3 follows:

4 * * *

5 EXAMINATION

6 BY MR. WILSON:

7 Q. Good morning, Dr. Durham.

8 A. Good morning.

9 Q. Can you please state your full name.

10 A. Robert Allan Durham.

11 Q. Okay. And, since we have previously
12 had a deposition in this case, I'm going to
13 assume that you understand how a deposition
14 works; is that correct?

15 A. Yes, sir.

16 Q. Okay. And you do understand that
17 you are under oath today, correct?

18 A. Yes.

19 Q. Is there any reason, medical or
20 otherwise, why you can't testify fully,
21 completely and accurately as you sit here this
22 morning?

1 A. No, sir.

2 Q. Okay. Our deposition today is over
3 what has been marked as Exhibit 2014, 2-0-1-4.

4 So, that should populate and if not
5 let me know.

6 A. I don't see it.

7 THE VIDEOGRAPHER: You wanted to
8 mark this as which number?

9 MR. WILSON: So, it has already been
10 marked. So, it is Exhibit 2014, EX 2-0-1-4.

11 THE VIDEOGRAPHER: All right, it
12 should be in there now.

13 THE WITNESS: Okay. Let me get that
14 downloaded. All right. I've got that here.

15 (Whereupon, previously marked
16 Exhibit 2014,
17 first referral.)

18 BY MR. WILSON:

19 Q. Okay. If you can turn to the last
20 page of Exhibit 2014. That will be Page 45.

21 A. Last night I had it. Hold on a
22 second. Okay. Okay. I've finally got it open.

1 Yes, sir. I'm on the last page.

2 Q. Okay. And that is your signature on
3 the last page, Page 45?

4 A. Yes, sir.

5 Q. Okay. Dated September 12, 2025,
6 correct?

7 A. Yes, sir. That's correct.

8 Q. Okay. You reviewed your declaration
9 in preparation for your deposition, correct?

10 A. I did.

11 Q. Did you find any mistakes or
12 anything you thought needed to be corrected?

13 A. No, sir.

14 Q. Okay. And did you work with anyone
15 at Halliburton in preparing Exhibit 2014?

16 A. No, sir.

17 Q. Okay. Let's take a look at
18 Paragraph 19.

19 A. Okay.

20 Q. Now, in Paragraph 19 you provide a
21 list of materials you reviewed, correct?

22 A. Yes, sir.

1 Q. Is this a complete list of the
2 materials you considered and relied on in forming
3 your opinions expressed in your declaration?

4 A. Paragraph 19, as well as the list of
5 exhibits in Section 4.

6 Q. Okay. Let's take a look at
7 Paragraph 70.

8 A. Okay.

9 Q. Okay. And just to back up a second.
10 If you look at Paragraph 65. This is your
11 section addressing Mr. Chambers' testimony
12 regarding varying packing tube, nozzle size, and
13 spacing, correct?

14 A. Yes, sir.

15 Q. Okay. So, back to Paragraph 70.
16 And at the bottom of Paragraph 70, you include
17 Figure 15 from Yeh2, correct?

18 A. Yes, sir.

19 Q. And the second sentence of Paragraph
20 70 you refer to the pressure profile in Yeh's
21 Figure 15. Do you see that?

22 A. Yes, sir.

1 Q. Okay. That is the blue, the blue or
2 I guess violet, depending on how you view it,
3 line in Figure 15?

4 A. Yes, sir.

5 Q. Okay. And that line shows the
6 pressure profile from heel to toe for the
7 pressure inside the transport tubes of the sand
8 screens, correct?

9 A. It is actually showing the
10 differential pressure between the inside of the
11 sand screens and the formation.

12 Q. Okay. The inside of the transport
13 tubes of the sand screens --

14 A. Right.

15 Q. -- in the annular space outside the
16 sand screens, correct?

17 A. Yes, the differential pressure of
18 those, yes.

19 Q. Okay. Okay. And the pressure is a
20 little over 5,200 PSI at the heel and down close
21 to 0 at the toe, correct?

22 A. Yes, sir, thereabouts.

1 Q. And the pressure drops along the
2 course of this, well, from heel to toe due to
3 friction in the transport tubes, correct?

4 A. Yes, sir, that is correct.

5 Q. Okay. Let's look at Paragraph 72.
6 Now, the last sentence in Paragraph 72 you say,
7 "Increasing nozzle size or decreasing nozzle
8 spacing would increase friction pressure drop as
9 discussed above and work directly against Yeh's
10 reasons for using eccentric screens."

11 Did I read that correctly?

12 A. Yes, sir.

13 Q. Can you point me to where you
14 discussed that increasing nozzle size or
15 decreasing nozzle spacing would increase friction
16 pressure drop?

17 A. Sure. Well, I think it comes from
18 the bottom of Paragraph 71. "Yeh² and Hurst,
19 however, both teach a POSITA that nozzles above a
20 certain size increased leakoff, and to avoid
21 excessive fluid leakoff by sizing nozzles
22 accordingly."

1 And I believe if we look at those
2 sections, yes, of Yeh2 and Hurst, it talks about
3 as the fluid dehydrates, it increases the
4 friction of the fluid in the transport tubes.

5 So, maybe it is not as explicit as I
6 would have probably written it today.

7 But, I think the references to Yeh2
8 and Hurst in the footnote make it clear that that
9 is what I am talking about.

10 Q. Okay. So, in Paragraph 72, your
11 opinion is that increasing nozzle size or
12 decreasing nozzle spacing would increase the
13 friction pressure drop of the travel slurry as it
14 travels down the transport tubes from heel to
15 toe.

16 Correct?

17 A. Right.

18 MR. MCDONALD: Objection to form.

19 THE WITNESS: Yes, as -- if we
20 increase the nozzle size or decrease spacing,
21 there is more risk of dehydration or the
22 fluid will dehydrate more and increase the

1 friction of that pressure -- in the trans --
2 the friction of that fluid in the transport
3 tubes per foot.

4 BY MR. WILSON:

5 Q. Okay. So, as the --

6 So, as leakoff occurs, as the slurry
7 travels down the sand screens from heel to toe,
8 more things are occurring than just the gravel
9 concentration is increasing and thus causing an
10 increase in viscosity, correct?

11 A. Yes, there are more things
12 happening, that is correct.

13 Q. So, for example, because fluid is
14 leaking off, the volumetric flow rate of the
15 slurry also goes down, correct?

16 A. Yes, sir.

17 Q. Okay. So, did you run any
18 calculations to determine whether the decrease in
19 volumetric flow rate would have a more
20 substantial affect on the friction pressure drop
21 than the viscosity increase?

22 A. No, I simply went by the disclosures

1 of Yeh and Hurst talking about why you would --
2 why they teach not to increase nozzle size and
3 their statements regarding friction.

4 Q. Okay. Now, you would agree that
5 the, as the volumetric flow rate decreases, the
6 velocity of the fluid in the tubing decreases
7 proportionally, correct?

8 A. Yes, sir, it does.

9 Q. And, pressure drop, at least in a
10 turbulent flow regime, is proportional to the
11 square of the velocity, correct?

12 A. Yes, sir, that is my recollection.
13 Correct.

14 Q. Okay. But, pressure drop is only
15 proportional to, is only proportional to
16 viscosity, correct?

17 MR. MCDONALD: Objection, form.

18 THE WITNESS: I think that is
19 correct. That sounds right.

20 But, I don't have Darcy's form up in
21 front of me to remind myself exactly, but I
22 think that is correct.

1 BY MR. WILSON:

2 Q. Okay. If we take a look at
3 Figure 15.

4 A. Uh-huh.

5 Q. Which is just above in your
6 Paragraph 70. And I'm going to call the pressure
7 profile line a blue line.

8 I apologize if you see it as violet.
9 I kind of see it as violet myself, but I'm going
10 to call it blue.

11 A. Okay.

12 Q. So, you can see that the gravel
13 slurry concentration, the gravel concentration in
14 the slurry is shown there in a yellow line,
15 correct?

16 A. Correct. Yes, sir.

17 Q. And you see it increasing across,
18 from heel to toe, correct?

19 A. Yes, sir, it does.

20 Q. Okay. And, the gravel slurry is
21 shown there on the right-hand Y-axis as
22 concentration in ppa, correct?

1 A. Yes, sir, that is correct.

2 Q. And ppa stands for pounds of gravel
3 per gallon added, correct?

4 A. Yes, that's correct.

5 Q. Okay. So, at the heel, the gravel
6 slurry is flowing at about 4 barrels per minute.

7 Do you see that?

8 A. No, sir, I think it is really closer
9 to 5.

10 Q. Yeah, okay. You are right. Sorry.
11 It is about 5 barrels per minute.

12 A. Yes, sir.

13 Q. And that is the red dash line,
14 correct?

15 A. Yes.

16 Q. Okay. And at the toe, it is now
17 down to maybe 2 and a half barrels per minute?

18 A. 2.6, 2.7, somewhere in there.

19 Q. Okay. And the concentration
20 increases from about 4 pounds of gravel per
21 gallon, added to about almost 9, correct?

22 A. I agree.

1 Q. Okay. Now is what is effectively
2 happening is as we travel from heel to toe, we
3 are losing the carrier fluid that carries the
4 gravel because it is leaking off through packed,
5 packing tube nozzles, correct?

6 A. Well, yes, sir. Or through the
7 packed tubes themselves. Once the nozzles pack
8 the tubes themselves, the packing tubes back off.

9 Q. Okay. And you can see that the
10 yellow line here, the gravel concentration goes
11 up almost linearly until about 35 feet --
12 3500 feet from the heel.

13 Do you see that?

14 A. Yes, I see that, some 3500, 4,000,
15 somewhere in there, it starts to transition.

16 Q. Yeah. And it starts to kind of
17 level off.

18 Do you see that?

19 A. Right. Yes, sir, that is correct.

20 Q. And so if you look, the gravel
21 slurry concentration went from about 4 to about 8
22 pounds of gravel per gallon added, as it traveled

1 about 3500 feet from heel toward the toe.

2 Correct?

3 A. In round numbers, that's right. A
4 little different than that, but that is close
5 enough.

6 Q. Okay. So, that is about 1 pound --
7 1 ppa, let's say, concentration increase every
8 875 feet.

9 Does that make sense?

10 A. I see it closer to 1 every
11 1,000 feet. But, 900 something maybe, somewhere
12 in there.

13 Q. Okay. And then from 3500 feet from
14 the heel to the toe, or 5,000 feet from the heel,
15 the concentration went from about 8 to about
16 9 ppa, correct?

17 A. Yes, sir.

18 Q. So, that concentration increased by
19 about 1 ppa over 1,500 feet, correct?

20 A. Yes.

21 Q. Okay. So, the leakoff rate is
22 dropping as you go down the well, correct?

1 A. Yes, sir. As the differential
2 pressure falls off, the leakoff rate drops off.

3 Q. Okay. Okay. Now let's look at the
4 slurry rate, the red dash line. Okay -- actually
5 we already talked about -- we already talked
6 about rate.

7 So let's go back to our blue line,
8 our pressure line. Now, you can see that the
9 blue line is almost a straight line, correct?

10 A. Almost. Yes, sir.

11 Q. Okay. But it is not quite a
12 straight line, is it?

13 A. Not quite, no.

14 Q. It is, it is curved slightly toward
15 the bottom of the graph, correct?

16 A. It is.

17 Q. And that means the slope of that
18 line is changing from, from something negative to
19 something slightly less negative, as you approach
20 the toe, correct?

21 MR. MCDONALD: Objection, form.

22 THE WITNESS: I would agree with

1 that characterization.

2 BY MR. WILSON:

3 Q. Okay. What that means is that the
4 pressure drop rate, the rate at which friction is
5 removing pressure from the flowing slurry is
6 decreasing ever so slightly as you move toward
7 the toe, correct?

8 A. Correct. And I agree with that
9 characterization, ever more slightly, yes.

10 Q. So, what that means effectively is
11 that as leakoff occurs, as the gravel slurry
12 moves from heel to toe, the pressure drop due to
13 friction is actually decreasing slightly,
14 correct?

15 A. I would say the pressure drop due to
16 friction, yes, it is dropping slightly. It is
17 the balance between the decreasing flow rate and
18 the increasing viscosity of the fluid, slightly
19 towards the reduction in leakoff direction.

20 Q. Okay. Let's take a look at
21 Exhibit 1008. This is E-X 1-0-0-8.

22 (Whereupon, previously marked

1 Exhibit 1008,

2 first referral.)

3 DOCUMENT TECHNICIAN: It should be
4 in there now. And also, counsel, do you want
5 me to put this on the screen?

6 MR. WILSON: Sure.

7 THE WITNESS: Okay. No, not
8 quite -- hold on. Okay. I've got 1008 up.

9 BY MR. WILSON:

10 Q. Okay. 1008 is Jones 2. Correct?

11 A. Let me check that to make sure. I
12 think that is right. Yes, sir. That is correct.

13 Q. And you have seen Jones 2 before,
14 correct?

15 A. Yes, sir, I have.

16 Q. Okay. So, take a look at Figure 2
17 in Jones 2.

18 A. Okay.

19 Q. Now, Jones 2, Figure 2 has three
20 packing tubes in parallel, correct?

21 A. Yes, sir. That is what it appears
22 to be.

1 Q. Okay. And the nozzles on each of
2 these packing tubes have uniform spacing, except
3 that a couple of them have a greater distance
4 from the manifold to the first nozzle, correct?

5 MR. MCDONALD: Objection, form.

6 THE WITNESS: I would say the
7 spacing between the nozzles is uniform. The
8 spacing between the first nozzle and 227
9 which I -- and 227 is different between the
10 three.

11 BY MR. WILSON:

12 Q. Okay. Now, if you break these three
13 packing tubes collectively up into regions.
14 Let's say you have an upper region, a middle
15 region and a lower region.

16 In the upper region of the packing
17 tubes, you have five total nozzles across three
18 packing tubes, correct?

19 A. Yes. If you are talking about the
20 upper region being the first five in the
21 rightmost packing tube.

22 Q. Yes. Okay. Now let's take a look

1 at the middle region which are the five nozzles
2 in the middle -- or, sorry in the packing tube on
3 the right, that region that encompasses those
4 five nozzles.

5 Do you see what I am talking about?

6 A. Yes, sir. I think I understand.

7 Q. Okay. So, in that middle region,
8 you have ten total nozzles, correct?

9 A. That is a fair characterization.

10 Q. Okay. And then in the bottom
11 region, you have a total of 15 nozzles across the
12 three packing tubes, correct?

13 A. Yes, sir.

14 Q. Okay. So, Figure 2 shows, in the
15 upper section, the upper one third of the packing
16 tubes. You have one third as many total nozzles
17 as you do in the bottom section of the packing
18 tubes, correct?

19 A. Taking all three packing tubes as a
20 group, that is correct.

21 Q. Okay. And a person of ordinary
22 skill in the art would understand that the point

1 of this design is to increase the density of
2 nozzle opening for gravel slurry as you progress
3 through the packing tubes, correct?

4 A. Let's see what Jones 2 says.

5 Jones 2 really doesn't describe it, the reasons
6 why.

7 It just shows the figure and
8 describes the figure. Each of the conduits, 226,
9 A to C, have approximately the same length, but
10 each width is perforated over different portions
11 of its length.

12 Q. Okay. And that is why I asked you
13 what a person of ordinary skill in the art would
14 understand.

15 A person of ordinary skill in the
16 art would understand that the point is to
17 increase the density of nozzles as you progress
18 down the packing tubes, correct?

19 MR. MCDONALD: Objection, form.

20 THE WITNESS: I don't know if I can
21 agree if that was the point of Jones 2 in
22 doing that.

1 That is the result of what happened.

2 But, I don't think we can read into Jones 2's

3 point or intent, based on this figure alone.

4 BY MR. WILSON:

5 Q. Okay. Take a look at Figure 3.

6 A. Okay.

7 Q. Okay. In Figure 3, Jones 2 again
8 discloses three separate regions over the length
9 of a packing tube, correct?

10 A. Yes, sir. Explicitly grouping
11 Jones 2 in Figure 3. Yes.

12 Q. Okay. In Region 326C, the uppermost
13 region, do you see that?

14 A. Yes, sir.

15 Q. And in Region 326C, there are only
16 three very small nozzles that are spaced far
17 apart relative to the other sections, correct?

18 A. They are definitely smaller than the
19 other sections.

20 They are definitely further apart
21 than B. It looks like they may be further apart
22 from each other than the ones in 326A. Hard --

1 kind of hard to tell from the screen.

2 Q. Okay. So, if we look at
3 Section 326B, you have five, what I am going to
4 call medium diameter nozzles, with shorter
5 spacing than is in 326C, correct?

6 A. Yes, sir, that is correct.

7 Q. And in the third section, 326A, you
8 have three large nozzles with a spacing that
9 looks to be somewhere between 326B and 326C,
10 correct?

11 A. That may be so. It is hard to tell
12 what the distance on center would be because of
13 the varying size of the nozzles.

14 But, it is certainly larger than
15 326B and at least similar to 326C.

16 Q. Okay. So, you would agree that
17 Jones 2 discloses varying nozzle spacing over the
18 length of a packing tube, correct?

19 A. Yes, sir.

20 Q. And Jones 2 also discloses varying
21 nozzle diameter over the length of a packing
22 tube, correct?

1 A. Yes, sir.

2 Q. Okay. You can set that one aside.

3 Now, let's look at Exhibit 1001,
4 which is the '007 patent.

5 (Whereupon, previously marked
6 Exhibit 1001,
7 first referral.)

8 BY MR. WILSON:

9 Q. Okay. And what I want to do --

10 A. Give me just another minute or so,
11 counsel. It takes a little bit on this --

12 MR. WILSON: Okay. I'm going to
13 talk to DeAndrae here for a second.

14 DeAndrae, is there any way you can
15 put up a text portion of this figure and --
16 or of this patent and Figure 3 at the same
17 time?

18 DOCUMENT TECHNICIAN: I can, yes.

19 MR. WILSON: Okay. So we want
20 Figure 3 up, and then we will talk about a
21 text portion which we will move around a bit.

22 Oh, sorry, not Figure 3 of Jones 2.

1 Figure 3 of Exhibit 1001.

2 Okay. And let's start at, if you

3 have the patent, Column 6, Line 34.

4 All right. That is good for now.

5 BY MR. WILSON:

6 Q. Dr. Durham, you have Exhibit 1001?

7 A. Yes, sir. I do.

8 Q. Okay. All right. So, at Column 6,
9 Line 34, the '007 patent begins the discussion of
10 Figure 3.

11 Do you see that?

12 A. Yes, sir. I do.

13 Q. And, it describes it as, "a side
14 view of a lower completion assembly 200 is
15 illustrated, with first sand screen assembly 202
16 interconnected with second sand screen assembly
17 204."

18 Do you see that?

19 A. Yes.

20 Q. Okay. So, now let's move to
21 Column 7, Line 2.

22 Now, here what we are referring to

1 are the packing tubes 312 in Figure 3.

2 Correct?

3 A. In 7, Line 2?

4 Q. Yes. "Each packing tube 312

5 includes one or more nozzles 316."

6 Do you see that?

7 A. So, you are looking at actually

8 Column 7 Line 4. Okay.

9 Q. Oh, sorry, you are right. Column 7,
10 Line 4.

11 A. Yes, sir. Packing tube 312 includes
12 one or more nozzles 316.

13 Q. Okay. So, you can see that there
14 are packing tubes 312A, B, C, and D in Figure 3.

15 Do you see that?

16 A. Yes, sir. That is correct.

17 Q. Okay. And A and B are in the high
18 pressure sand screen on the left, and C and D are
19 on the lower pressure sand screen on the right;
20 is that correct?

21 A. Yes, sir. That's correct.

22 Q. Now, the packing tubes shown in

1 Figure 3, 312A and B on the high pressure screen
2 are only connected to the downstream shunt tube
3 system via the junction blocks 314A and B on the
4 high pressure screen, correct?

5 MR. MCDONALD: Objection, form.

6 THE WITNESS: I wouldn't say that
7 those are connected to the downstream shunt
8 tubes at all. They receive fluid flow from
9 the same source 314.

10 But, I would not say that they are
11 connected at all to the downstream tubes in
12 this figure.

13 BY MR. WILSON:

14 Q. Okay. So, let me try it a different
15 way.

16 The packing tubes 312A and B end
17 before the end of the sand screen, as shown in
18 Figure 3, correct?

19 A. Yes. I agree with that.

20 Q. The transport tubes on the high
21 pressure screen, which are 310A and B, they are
22 connected to the transport tubes 310C and D on

1 the low pressure screen through jumper tubes 240

2 A and B, correct?

3 A. Yes, sir. That is correct.

4 Q. Okay. Now, I want you to take a
5 minute and look at the '007 patent and tell me if
6 there are any other figures describing the
7 connection of packing tubes of the high pressure
8 shunt tube assembly to the low pressure shunt
9 tube assembly.

10 A. Figure 2 does. Yes, Figure 2 and
11 Figure 3, it looks like.

12 Q. Okay. And how does Figure 2 show
13 the interconnection of the high pressure shunt
14 tube systems to the low pressure shunt tube
15 system?

16 A. Again through jumpers 240.

17 Q. Okay. And it again does not show a
18 connection between the end of the high pressure
19 packing tubes 312A and B and the low pressure
20 shunt tube system, in your opinion, correct?

21 MR. MCDONALD: Objection, form.

22 THE WITNESS: Correct. It looks

1 like those packing tubes end before jumper
2 240 in that figure, or end at 240.

3 BY MR. WILSON:

4 Q. Okay. And so Figures 2 and 3 are
5 the only figures in the '007 patent that show an
6 interconnection, or lack thereof, between the
7 high pressure shunt tube system and the low
8 pressure shunt tube system, correct?

9 A. Hold on a second. I need to look
10 back at the text. Just a second.

11 Q. Okay.

12 A. You know what, Figure 2 actually
13 shows, it shows shunt tubes 224, which the text
14 describes, "in the form of a transport tube or a
15 packing tube disclosed along and generally
16 parallel to base pipe 206."

17 And I am reading in Column 5, 24 to
18 26.

19 And then if we go over to Column 6
20 it says in the illustrated embodiment, Line 12 --
21 or starting at Line 10, "Shunt tubes 224 of
22 adjacent sand screen assemblies may be joined

1 together in fluid communication by a jumper tube
2 240."

3 But, I think my answer earlier where
4 I said the packing tubes do not interconnect was
5 incorrect. I was looking actually at the sand
6 filter 226 when I said that.

7 But, if we look at 224, which may be
8 either transport tube or packing tube according
9 to the text, then those are connected with jumper
10 tube 240.

11 MR. WILSON: So, okay. Let's go off
12 the record, take a quick break. We may be
13 done.

14 THE WITNESS: Okay.

15 MR. WILSON: Let's just say just 10
16 minutes.

17 THE WITNESS: Sounds good. Thank
18 you.

19 (Recess taken -- 10:43 a.m.)

20 (After recess -- 10:54 a.m.)

21 MR. WILSON: We don't have any
22 further questions.

1 MR. MCDONALD: No. No, further
2 questions.

3 THE WITNESS: Thank you

4 * * *

5 (Whereupon, signature not having been waived,
6 the deposition suspended at 10:54 a.m.)

7 * * *

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1 CERTIFICATE OF NOTARY

2 * * * * *

3 I, LORI J. GOODIN, RPR, CRR, RSA,
4 CA CSR # 13959 the Notary for this proceeding, do
5 hereby certify that the witness whose testimony
6 appears in the foregoing proceeding was sworn by
7 me; that I am neither counsel for, related to,
8 nor employed by any of the parties to the action
9 in which this deposition was taken; and, further,
10 that I am not a relative or employee of any
11 attorney or counsel employed by the parties
12 hereto, or financially or otherwise interested
13 in the outcome of this action.



15 LORI J. GOODIN, RPR, CRR, RSA

16 CA CSR# 13959

17 Notary Public in and for:

18 STATE OF FLORIDA, COUNTY OF SARASOTA
Notary Commission Number: GG987804
19 My Commission expires: May 12, 2028

20 STATE OF CALIFORNIA, CA CSR# 13959
My Commission expires: February 22, 2026

21 DISTRICT OF COLUMBIA, WASHINGTON DC
22 My Commission expires: June 1, 2026

1 Case: Weatherford U.S. vs Halliburton Energy Services

2 Witness Name: Robert Durham, Ph.D.

3 Deposition Date: 09/17/2025

4

5

6 Please be advised that the transcript in the above
7 referenced matter is now complete and ready for signature.

8 The deponent may come to this office to sign the transcript,
9 a copy may be purchased for the witness to review and sign,
10 or the deponent and/or counsel may waive the option of
11 signing. Please advise us of the option selected.

12 Please forward the errata sheet and the original signed
13 signature page to counsel noticing the deposition, noting the
14 applicable time period allowed for such by the governing
15 Rules of Procedure. If you have any questions, please do
16 not hesitate to call our office at (202)-232-0646.

17

18 Sincerely,

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4 SIGNATURE PAGE

5 Case: Weatherford U.S. vs Halliburton Energy Services

6 Witness Name: Robert Durham, Ph.D.

7 Deposition Date: 09/17/2025

8 I do hereby acknowledge that I have read

9 and examined the foregoing pages

10 of the transcript of my deposition and that:

11 (Check appropriate box):

12 () The same is a true, correct and

13 complete transcription of the answers given by

14 me to the questions therein recorded.

15 () Except for the changes noted in the

16 attached Errata Sheet, the same is a true,

17 correct and complete transcription of the

18 answers given by me to the questions therein

19 recorded.

20 _____
DATE

WITNESS SIGNATURE

21

22 _____
DATE

NOTARY

1 Errata Sheet

2 NAME OF CASE: Weatherford U.S. vs Halliburton Energy Services

3 DATE OF DEPOSITION: 09/17/2025

4 NAME OF WITNESS: Robert Durham, Ph.D.

5 Reason Codes: 1. To clarify the record.

6 2. To conform to the facts.

7 3. To correct transcription errors.

8 Page _____ Line _____ Reason _____

9 From _____ to _____

10 Page _____ Line _____ Reason _____

11 From _____ to _____

12 Page _____ Line _____ Reason _____

13 From _____ to _____

14 Page _____ Line _____ Reason _____

15 From _____ to _____

16 Page _____ Line _____ Reason _____

17 From _____ to _____

18 Page _____ Line _____ Reason _____

19 From _____ to _____

20

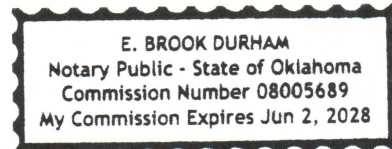
21 _____

22 ROBERT DURHAM, PH.D.

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5 Case: Weatherford U.S. vs Halliburton Energy Services
6 Witness Name: Robert Durham, Ph.D.
7 Deposition Date: 09/17/2025
8 I do hereby acknowledge that I have read
9 and examined the foregoing pages
10 of the transcript of my deposition and that:
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12 () The same is a true, correct and
13 complete transcription of the answers given by
14 me to the questions therein recorded.
15 () Except for the changes noted in the
16 attached Errata Sheet, the same is a true,
17 correct and complete transcription of the
18 answers given by me to the questions therein
19 recorded.
20 2025-09-26 [Signature]
DATE WITNESS SIGNATURE
21 9-26-25 [Signature]
DATE NOTARY
22

3



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1 Errata Sheet
2 NAME OF CASE: Weatherford U.S. vs Halliburton Energy Services
3 DATE OF DEPOSITION: 09/17/2025
4 NAME OF WITNESS: Robert Durham, Ph.D.
5 Reason Codes: 1. To clarify the record.
6 2. To conform to the facts.
7 3. To correct transcription errors.
8 Page 15 Line 20 Reason clarity
9 From form to formula
10 Page 18 Line 8 Reason clarity
11 From back to pack
12 Page ____ Line ____ Reason ____
13 From ____ to ____
14 Page ____ Line ____ Reason ____
15 From ____ to ____
16 Page ____ Line ____ Reason ____
17 From ____ to ____
18 Page ____ Line ____ Reason ____
19 From ____ to ____
20
21 [Signature]
22 ROBERT DURHAM, PH.D.

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