

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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10X GENOMICS, INC.,  
Petitioner  
v.

BIO-RAD LABORATORIES, INC.  
Patent Owner

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IPR2020-00086, IPR2020-00087 (Patent 9,562,837 B2)  
IPR2020-00088, IPR2020-00089 (Patent 9,896,722 B2)<sup>1</sup>

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Record of Oral Hearing  
Held: January 27, 2021

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Before CHRISTOPHER M. KAISER, KIMBERLY McGRAW, and  
ELIZABETH M. ROESEL, *Administrative Patent Judges*.

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<sup>1</sup> The parties are not authorized to use a multi-case caption.

IPR2020-00086, IPR2020-00087 (Patent 9,562,837 B2)  
IPR2020-00088, IPR2020-00089 (Patent 9,896,722 B2)

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The above-entitled matter came on for hearing on Wednesday,  
January 27, 2021, commencing at 12:00 p.m. EDT, by video.

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

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3 JUDGE ROESEL: Good afternoon everybody. We are convened by  
4 video conference today to hear argument in four cases. IPR2020-00086 and  
5 87 concerning U.S. Patent 9,562,837, and IPR2020-00088 and 89  
6 concerning U.S. Patent 9,896,722. The cases are captioned 10X Genomics  
7 versus Bio-Rad Laboratories.

8 I am Administrative Patent Judge Elizabeth Roesel. And with me  
9 today are Judges Kimberly McGraw and Christopher Kaiser. A court  
10 reporter is here to transcribe the arguments. It's also possible that members  
11 of the public or press are also listening to the arguments.

12 Counsel, please introduce yourselves, starting with Petitioner.

13 MS. JAMESON: May it please the Board, I am Samantha Jameson,  
14 lead counsel for Petitioner 10X Genomics. And with me is my partner  
15 Robert Gerrity.

16 MR. GERRITY: Good morning, Your Honors.

17 MR. BAKER: Good morning, Your Honors, this is Jim Baker, Quinn  
18 Emanuel, representing Patent Owner Bio-Rad. And with me I have my  
19 colleague, John Collin who is on the telephone line as well.

20 JUDGE ROESEL: Thank you. According to our January 29th Order,  
21 each party will have a total of 120 minutes of argument time for all four  
22 cases. So we will begin with IPR2020-00086 and 88, which involve  
23 Petitioner's Ismagilov led grounds. And after the arguments on those cases  
24 are complete we will hear arguments for IPR2020-00087 and 89, which  
25 involve Petitioner's Thorsen led grounds.

1           Now we understand there are some issues common to both sets of  
2 cases, and for that reason the entire transcript will be entered in the record of  
3 all four cases. And there is no need to repeat arguments for the second set of  
4 cases that have already been presented for the first set.

5           For each set of cases Petitioner will argue first and may present  
6 rebuttal limited to responding to Patent Owner's arguments. And for each  
7 set of cases Patent Owner will argue second and may present surrebuttal  
8 limited to responding to Petitioner's rebuttal arguments.

9           We will take a 10-minute break after the arguments on the Ismagilov  
10 led grounds, and if someone needs a break sooner, just please let us know.

11           We leave it to the parties to time their own arguments and allocate  
12 time between the two sets of cases while staying within the 120 minute limit  
13 for each side. We don't foresee either party needing to exceed or even  
14 approach that limit.

15           Each party has filed demonstrative exhibits and we've received no  
16 objections to the demonstratives. The demonstratives may be used as a  
17 visual aid in presenting your arguments. However, neither the  
18 demonstratives nor your oral presentations today may be used to advance  
19 arguments or introduce evidence that has not already been presented in the  
20 record.

21           Each Judge has the entire record available to him today, including the  
22 demonstratives. If your argument refers to a demonstrative or a paper or  
23 exhibit, please identify it and pause for a few seconds to give us time to find  
24 it.

25           As a courtesy, counsel should refrain from interrupting the other  
26 side's presentation. Any objections should be stated as part of your own

1 argument. And when you are not speaking, please mute yourself. If  
2 anybody has technical difficulties hearing or being heard, please let us know  
3 immediately by contacting the people who set up the video conference.

4 And especially for the court reporter's benefit, please introduce  
5 yourself before you begin speaking each time.

6 With that, if there are no questions of a procedural nature, then we can  
7 begin with Petitioner.

8 MS. JAMESON: Thank you, Your Honors, may it please the Board,  
9 I'm Samantha Jameson and as I said, I'm lead counsel for Petitioner 10X  
10 Genomics. I'll be arguing the IPR2020-00086 and 00088 we have  
11 Ismagilov as the lead reference. My partner Robert Gerrity will be arguing  
12 the two Thorsen IPRs. And I am planning to reserve about 20 minutes of  
13 my time for rebuttal.

14 The Ismagilov grounds are shown on Slide A-1 of Petitioner's  
15 Demonstratives. There are four references or groups of reference for the 837  
16 and 722 patents. The first is Ismagilov 091, and that's an anticipatory  
17 reference. Ismagilov 091 in combination with Quake renders the claims  
18 obvious. Ismagilov 119 also renders the claims obvious. And Ismagilov  
19 119 and a combination of Pamula renders the claims obvious.

20 The grounds are under Bio-Rad claims construction. The second two  
21 groups of grounds are under both Bio-Rad and 10X claims constructions. In  
22 Institution, the Board applied Bio-Rad's construction.

23 The independent claims of the 837 and 722 patents are on Slides A-2  
24 to A-4. These claims are about two things. First, generating droplets in  
25 microfluidic devices. And second, a separation chamber with certain

1 structural requirements where the droplets can separate from the surrounding  
2 immiscible fluid.

3 Both of those concepts were well known by the time of the 837 and  
4 722 patents. By way of background, as shown on Slide A-5, making  
5 droplets in microfluidic devices was very well known and disclosed by  
6 multiple groups.

7 It was also well known, as shown on Slide A-6, that droplets in a  
8 vessel will rise to the top of the vessel if they are less dense than the  
9 surrounding fluid, which is known as creaming. Or they will sink to the  
10 bottom if they are more dense than the surrounding fluid, which is known as  
11 sedimentation. That is illustrated in a standard emulsion technology  
12 handbook from 2001.

13 As I mentioned, multiple grounds are under Bio-Rad's claim  
14 construction. At the time of the petition, Bio-Rad had not yet provided its  
15 formal claim construction but we knew what they would be from Bio-Rad's  
16 infringement contention, which is what was relied upon in the Petition, as  
17 shown on Slide A-7. Bio-Rad has now proposed formal constructions and  
18 those constructions don't change anything. Even Bio-Rad's addition to the  
19 separation chamber construction, of sized to accommodate multiple droplets  
20 in immiscible fluid and separated already covered by other claim limitations,  
21 and so added nothing that hadn't been already addressed.

22 I'll discuss next Ismagilov anticipates the claims of 837, 722 patent.  
23 And that's summarized on Slide A-9. Under Bio-Rad's reading of the  
24 claims, Ismagilov discloses the microfluidic generation of droplets, wells  
25 into which those droplets are collected, and droplets with different densities

1 from the immiscible fluids. But should they inherently separate in the  
2 disclosed wells.

3 Bio-Rad does not dispute that Ismagilov discloses the microfluidic  
4 droplet generation. An example of one of the many Ismagilov disclosures  
5 showing microfluidic droplet generation is shown on Slide A-10.

6 But, Your Honor, I apologize, I can't hear you if you're speaking.

7 JUDGE ROESEL: I apologize. Counsel, I have a question. This is  
8 Judge Roesel. About claim construction. Is Petitioner still advocating the  
9 constructions it proposed in the Petition? Is that an issue we need to decide?  
10 Or can we simply adopt the constructions that Patent Owner presents in the  
11 Patent Owner Response?

12 MS. JAMESON: 10X's claimed construction positions are provided  
13 in the Petitions on Ismagilov, those continue to be 10X's position. But the  
14 Board can proceed under Bio-Rad's construction as the Board did at  
15 Institution. Those are positions that Bio-Rad has taken on the scope of these  
16 patents. Those are the positions that Bio-Rad took in the District Court and  
17 that is arguing should be applied to those constructions. And so the Board  
18 can continue to proceed under Bio-Rad's constructions.

19 Bio-Rad has alleged for the independent claims only that the  
20 separation chamber limitations are not sufficiently disclosed by Ismagilov.  
21 But Ismagilov 091 has a separation chamber. Bio-Rad accuses an open well  
22 of 10X's product as the separation chamber of the 837 and 722 patent in  
23 District Court as shown on Slide A-12. Ismagilov discloses the same thing  
24 that Bio-Rad accused of infringement, an open well. The Board found in  
25 Institution that Ismagilov's well or reservoir was the separation chamber,  
26 and that's shown on Slide A-13.

1           The Board relied on multiple citations in the Ismagilov Institution,  
2   and two are shown by Slide A-14, which are Ismagilov Column 9, Lines 5  
3   through 7, and Column 14, Lines 36 through 40. As Ismagilov's 091  
4   discloses an outlet with a well and that the outlet collects the plugs, which  
5   are droplets.

6           Bio-Rad argues that Ismagilov has not sufficiently disclosed the  
7   structure requirements of the separation chamber. But the structure  
8   limitations are shown on Slide A-16, and they are straightforward. The  
9   claims of the 837 and 722 patent require both that the separation chamber be  
10   upright or perpendicular to the main channel and that the separation chamber  
11   have a wider cross-section than the main channel. The 837 and 722 patents  
12   also required a droplet receiving outlet, and that's it. Ismagilov disclosed  
13   each of these limitations.

14          The Board correctly found in Institution as shown on Slide A-17, that  
15   the open top of the Ismagilov's well where a micropipette is inserted is a  
16   droplet receiving outlet. This is the same thing that Bio-Rad had accused of  
17   infringement. The Board found that the wells in Ismagilov disclosed the  
18   other dimensions and configuration limitation as a separation chamber  
19   shown on Slide A-18. The upright/perpendicular and wide limitations are  
20   shown by three parts of the disclosure in Ismagilov and are further  
21   confirmed by Bio-Rad's admission.

22          First, there is an upright or perpendicular chamber based on how the  
23   microfluidic devices are manufactured. This is shown on Slide A-19 and in  
24   Ismagilov's Column 16, Lines 38 to 41.



1           10X's expert, Dr. Fair, explained as shown on Slide A-20, that the  
2 channels are closed on the bottom of the glass coverslip and structures such  
3 as a well will extend upward not down to the coverslip.

4           Second, as Ismagilov expressly discloses the well as shown on Slide  
5 A-21 which is at Column 14, Lines 36 through 40. Dr. Fair explained, as  
6 shown on Slides A-22 and A-23 that a well with an open-top bucket-like  
7 structure that extended vertically.

8           Third, as Ismagilov discloses, collection of droplets by micropipettes,  
9 which is shown on Slide A-24 and that shows at Ismagilov Column 17,  
10 Lines 27 through 30.

11           JUDGE ROESEL: Counsel, may I interrupt you here. About the  
12 micropipettes, what evidence is there that it was known in the art to collect  
13 solutions from an outlet well of the type that's described in Ismagilov. In  
14 other words a well that's formed in the PDMS chip.

15           MS. JAMESON: There are multiple disclosures. I mean I could go  
16 through more of them showing these types of wells in microfluidic chips. It  
17 was also generally well known to use the common laboratory equipment of a  
18 micropipette. And there's no dispute about what the micropipette is that Dr.  
19 Fair has relied on in his Declarations.

20           And so Dr. Fair explained in his Declarations what was known about  
21 micropipettes and how they operated and so how it was known what was  
22 necessary for the micropipette to operate with these well type structures and  
23 what was known about the wells that would be necessary for the  
24 micropipette to operate the cell.

25           And that's shown on Slide A-26.

1 JUDGE ROESEL: Yes, but is there any evidence that it was known  
2 to insert the tip of a micropipette into one of these bucket-like structures that  
3 Dr. Fair is talking about?

4 MS. JAMESON: So that was known, and what Dr. Fair is explaining  
5 is that's really the only way that one could operate the micropipette would  
6 be to insert it into a depth of liquid, which is what these wells are. And so in  
7 order to operate a micropipette it needs to be able to be inserted all of the  
8 way into a liquid, that's been submerged so that it's not sucking up air, it's  
9 able to suck up just the liquid. And so there's a minimum volume it needs to  
10 be inserted into. And it needs to be free to be able to use the pressure in the  
11 device to draw those liquids. And so it needs to be in this open container so  
12 that it can reach in, suck up the liquid after being submerged in it, and then  
13 withdraw it to another location.

14 And the micropipette is absolutely a standard tool for sampling small  
15 volumes of liquid like this. And Dr. Fair explains that the sizes can go down  
16 to 0.1 microliters, and those are the minimum sizes that you could be  
17 drawing up and you would need additional volume around that to be able to  
18 insert the micropipette.

19 JUDGE ROESEL: Okay. Aside from Dr. Fair's testimony, is there  
20 any other evidence about inserting the tip of a micropipette into one of these  
21 holes in the PDMS?

22 MS. JAMESON: Ismagilov itself says that you can do selections by  
23 micropipettes in the outlet, and that's in the Column 17 disclosure that I  
24 pointed you to. Dr. Fair addresses that for example in Paragraph 161 as I've  
25 been pointing to. So Ismagilov itself is one of the primary places that this is  
26 being disclosed.

1 JUDGE ROESEL: Okay. Thank you. Please continue.

2 MS. JAMESON: And as I was just mentioning, collection by  
3 micropipette is described on Slides A-25 to A-30, and collection by  
4 micropipette confirms for example that the wells were upright and  
5 perpendicular. Micropipettes need to be inserted into a volume of liquids to  
6 collect it. And the micropipette has to be operated vertically, not horizontal,  
7 which is shown on Slide A-30 in Exhibit 1040.

8 Finally, Bio-Rad's admissions confirm that there is a separation  
9 chamber. Bio-Rad's expert admitted, as shown on Slide A-31, that  
10 Ismagilov's outlet ports and wells were commonly known elements made by  
11 cork borers.

12 Bio-Rad's expert admitted, as shown on Slide A-31, that Ismagilov  
13 outlets ports and wells, excuse me, that the outlet cork borers were  
14 commonly known. Cork borers are also described on Slide A-32 to A-41.  
15 While supporting Bio-Rad, Bio-Rad's admission said Ismagilov wells  
16 created by cork borers further supports the disclosures of the separation  
17 chamber of Ismagilov.

18 The picture on Slide A-32 from Exhibit 2033, shows the type of holes  
19 that a cork borer can make. Bio-Rad's expert admitted this, as shown on  
20 Slide A-33. Bio-Rad's expert also admitted on Slide A-34 that she would  
21 interpret the gray lines the channel. The wells in the figure on Slide A-32  
22 are shown wider and higher than the small volume channels at the bottom.  
23 The wells are also upright and perpendicular to the channel.

24 Bio-Rad's argument about cork borers was that they were too small  
25 for 1 millimeter pipettes. And as shown on Slide A-37, Bio-Rad's expert  
26 admitted in deposition that she didn't actually know what sizes cork borers

1 came in. Dr. Fair explained, as shown on Slide A-38 that cork borers larger  
2 than 1 millimeter were available, which would have accommodated a  
3 micropipette.

4 Dr. Fair created an illustrative to show these Ismagilov wells by a  
5 cork borer, as shown on Slide A-39. This uses the shape of the structure  
6 10X's expert admitted was the type made by a cork borer. So they used the  
7 dimensions in Ismagilov.

8 As shown on Slide A-40, the Ismagilov well and accused well of the  
9 10X products are not different with respect to the claims. They have similar  
10 dimensions. Both permit collection by micropipettes, both are perpendicular  
11 or upright, and both are wider than the channel. Bio-Rad argues that the  
12 Ismagilov chamber is made by a hole punch. But that's not relevant to the  
13 claims.

14 Bio-Rad argues that the Ismagilov outlet ports and outlet passages  
15 must be done separately, but they are part of the same disclosure shown on  
16 Slide A-42. The passages in Ismagilov appear in sections defining terms,  
17 describing channel and devices and the fabrication of those channels and  
18 devices. Bio-Rad has no evidence that these are separate embodiments.

19 Bio-Rad also argues in sur-reply that 10X made new arguments that  
20 should not be considered. 10X properly provided rebuttal evidence and  
21 arguments to show, for example, that Bio-Rad was incorrect about cork  
22 borers. And that Bio-Rad admissions in fact (inaudible). Bio-Rad also had  
23 the opportunity to respond through sur-reply and second deposition of Dr.  
24 Fair.

25 The final independent claim limitation relate to volume position to  
26 separate a plurality of droplets from the immiscible fluid in the 837 patent,

1 and separation of the plurality of droplets from the immiscible fluid in the  
2 separation chamber in the 722 patent. These limitations are described on  
3 Slides A-44 to A-49.

4 As shown on Slide A-46 which is shown at Ismagilov Column 20,  
5 Lines 17 through 22 and Lines 37 through 40. Ismagilov expressly disclosed  
6 the preferred droplet fluid is water and a preferred oil as fluorinated oil.

7 Dr. Fair confirmed, as shown on Slide A-47, those fluids were  
8 different densities and less than half had separated, confirming all the  
9 limitations of the independent claims were met under Bio-Rad's  
10 construction.

11 Slide A-50 and A-54 list the many dependent claims for which there  
12 has been separate arguments. And those claims fall with the independent  
13 claims and other dependents on which they themselves depend.

14 Ismagilov 091, Bio-Rad makes a separate argument for 722 dependent  
15 claims 2 through 3. These claims relate to collecting separated droplets and  
16 doing so in the vessel. And that's shown on Slide A-51 to 53. Ismagilov  
17 discloses collecting from micropipette, which is the same thing as Bio-Rad  
18 used in its infringement contentions. The purpose of pipetting is to transfer  
19 the droplets to another container, which is the vessel, and these things are  
20 disclosed.

21 I'll next discuss the combination of Ismagilov with Quake, which  
22 starts on Slide A-65. Ismagilov discloses well, but if the Board Agrees with  
23 Bio-Rad that additional well structures are required by Ismagilov, a person  
24 of ordinary skill would be motivated to look to Quake.

25 Quake is an important figure in the microfluidics field. The Quake  
26 reference isn't just analogous art. Quake was the leader in exactly the same

1 microfluidic applications as Ismagilov and was copied by Ismagilov. This is  
2 a straightforward obviousness combination, and Quake expressly disclosed  
3 the well structure.

4 All of Bio-Rad's arguments that Ismagilov lacks the structure of the  
5 separation chamber are addressed by Quake. And Bio-Rad doesn't seriously  
6 dispute that the separation chamber structure is disclosed by Quake.

7 As shown on Slide A-57 to A-61, Quake disclosed the well that was  
8 wider than the micro channel, upright, perpendicular to the channel, and  
9 Quake did include those images, including an image of actual device as well  
10 and descriptions of well and channel connections.

11 Bio-Rad argues that Quake does not propose separating, but this  
12 mistakes the combination. 10X relies on Quake for well structure, not as  
13 fluids, but using the combination from Ismagilov and they separate for the  
14 same reasons as discussed with Ismagilov.

15 Let's turn now to the motivation to combine Ismagilov and Quake.

16 JUDGE ROESEL: May I interrupt you here, counsel. Is Petitioner's  
17 Ismagilov and Quake grounds, the obviousness ground, does that rely on  
18 micropipettes in any way?

19 MS. JAMESON: The Quake grounds uses the well that's in Quake  
20 and so while micropipettes could be used with it, the Quake structure is  
21 sufficient on its own and doesn't require reliance on the Ismagilov  
22 description micropipette. The combination is though based on Ismagilov's  
23 reference to wells and the well structure. That includes the micropipette  
24 exposure, or the micropipette disclosures in Ismagilov, but really the  
25 combination would be sufficient based on the Ismagilov disclosure of the

1 well absent any additional structures required, then one could look to Quake  
2 for the specific and express disclosures of the well.

3 JUDGE ROESEL: Thank you. Please proceed.

4 MS. JAMESON: Regarding motivation to combine. The motivation  
5 to combine, there is a motivation to combine. And that's because if there are  
6 any additional structural descriptions of a well that will require beyond  
7 Ismagilov, a person of ordinary skill would have looked to Quake. The  
8 Board in Institution confirmed there was a motivation to combine Ismagilov  
9 with Quake, and that's shown on Slide A-66.

10 Bio-Rad focuses their reply in arguing that the Quake embodiment as  
11 well as operating electrodes and not the pressure-driven flows that is  
12 Ismagilov's droplets. But the Board already correctly found that Quake  
13 disclosed the pressure-driven modes that Ismagilov described was used with  
14 open-topped wells. And that was shown in Quake, Paragraph 197.

15 Bio-Rad also argued that the Quake embodiment of the well did not  
16 relate to droplets. This is unnecessary for motivation and is correct. First,  
17 Quake was well known in microfluidic, which is well known in the droplet  
18 microfluidic field, yes, he was a leader in that field. What else microfluidic  
19 teaches would be considered. Quake's similar fabrications that leads to  
20 those of Ismagilov, including the plastic in the coverslips from the substrate  
21 also show motivation to combine because a person of ordinary skill with a  
22 similar device, conditional structural information.

23 Finally, the Quake well structure is related to droplets. As shown on  
24 Slide A-70, Quake disclosed that its described invention generally as  
25 relevant to multiple applications, including droplets, as shown on Slide A-71

1 to A-72. Example 8 discloses similar T-junctions and well structures as  
2 mainly with droplets.

3 I'll also just briefly discuss secondary considerations which are  
4 described on Slide A-73 to A-78. Bio-Rad argued secondary considerations  
5 in Patent Owner's preliminary response. The Board in Institution found that  
6 Bio-Rad has failed to show nexus, as shown on Slide A-74. Bio-Rad's  
7 Patent Owner Response offers substantially the same argument and they're  
8 equally deficient as shown on Slide A-75. And Bio-Rad did not offer a  
9 multi-test analysis.

10 Bio-Rad's secondary consideration assertions are also deficient in  
11 other respects. They fail to address whether features other than those related  
12 to the 837 and 722 patents contributed to, for example, commercial success.  
13 Bio-Rad never addressed that the ITC had found that the success of 10X's  
14 products resulted from 10X's part. Bio-Rad has also never addressed that its  
15 own DBC product was a complete commercial and technological failure.

16 Slides 79 to 83 list the many dependent claims for which there is no  
17 separate argument. Those claims followed the independent claims and other  
18 dependent claims to which they relate.

19 Bio-Rad raises four categories of dependent claim disputes for the  
20 combination of Ismagilov and Quake. First, Bio-Rad argues that the  
21 combination of Ismagilov and Quake does not render obvious that which is  
22 two dependent claims 2 to 3 which are addressed on Slides A-80 through A-  
23 83. These are the same claims related to the collection of droplets in the  
24 depth that Bio-Rad disputes anticipated by Ismagilov.

25 It now appears whether the same disclosure collecting by  
26 micropipettes only standard obvious plus being successful for the purpose of



1   pipetting droplets in a liquid container, and that does render the claims  
2   obvious.

3           JUDGE ROESEL: Counsel, may I interrupt here again, please. For  
4   claims 2 and 3, is there any difference between the Ismagilov ground and the  
5   Ismagilov plus Quake ground?

6           MS. JAMESON: The primary difference, Your Honor, is that the  
7   Ismagilov alone ground is anticipation whereas the Ismagilov plus Quake is  
8   obvious. And so in one case it's whether there's an anticipatory disclosure  
9   and the second is whether what is being disclosed by Ismagilov renders the  
10   claims obvious. It is relying on the same disclosures as Ismagilov.

11          JUDGE ROESEL: And Petitioner is not relying on any additional  
12   teaching from Quake for claims 2 and 3, is that correct?

13          MS. JAMESON: That's correct, Your Honor.

14          JUDGE ROESEL: So going back to Ismagilov, the Ismagilov alone  
15   ground for claims 2 and 3, what's the legal theory for how Ismagilov teaches  
16   collecting separated droplets in a vessel? And I would like to put the  
17   emphasis on the word "separated" because I understand that Petitioner is  
18   relying on inherency for the droplet separation in the well. And then claims  
19   2 and 3 then require an additional step, and that is collecting the separated  
20   droplets. So how do we get to that limitation?

21          MS. JAMESON: Let me direct you first, before I address your  
22   question, to address first what's required in terms of separation of the  
23   droplets, if I could, because that's where your questions focused, and there  
24   are some issues that need to be addressed first, in terms of what it means to  
25   be separated according to these claims.

1           Essentially the separation is that the separation occurs in the well, and  
2 as Ismagilov has stated, you collect that by a micropipette. But there is  
3 nothing required beyond that under Bio-Rad's construction. Bio-Rad has  
4 specifically opposed the construction of 10X, that said that the droplet  
5 receiving outlet, which you will find at the 837 patents, requires that  
6 essentially only droplets are going to be removed from that outlet. There's  
7 no requirement of a continued separation of those droplets as you remove  
8 them. Bio-Rad's expert confirms that Bio-Rad's construction, for example  
9 droplet receiving outlets, don't place any restriction on how much droplet  
10 and how much other material is received at that outlet so as the droplets exit  
11 the chamber there's no limit on how separated they need to remain.

12           JUDGE ROESEL: I'm sorry to interrupt again. Please. I mean we  
13 are talking about claims 2 and 3 of the 722 patent, right? The method  
14 claims, right?

15           MS. JAMESON: Yeah.

16           JUDGE ROESEL: And so the independent claim requires the step of  
17 separating, right, and then the dependent claims then go on and require an  
18 additional step, which is collecting; is that right? So we're not talking only  
19 about Bio-Rad's claim construction for the term "separation chamber," but  
20 rather we're talking about the work, you know, the active step of separating.

21           MS. JAMESON: Yes, Your Honor.

22           JUDGE ROESEL: So please continue.

23           MS. JAMESON: Of course. And so that separating is disclosed as  
24 being done by micropipettes and that's exactly what Bio-Rad has identified  
25 as satisfying the separating limitation in the 722 patent under its  
26 infringement contention. And that's exactly what Ismagilov is disclosing.

1           And so it's that removal by micropipette that's the separating that's at  
2   issue. And that's what's identified in Bio-Rad's infringement contentions  
3   for these limitations on 722. And so that's at Pages 23 to 24.

4           JUDGE KAISER: I'm sorry, may I interrupt you for just a moment?  
5   Judge Kaiser.

6           MS. JAMESON: Yes.

7           JUDGE KAISER: Does Ismagilov disclose removing the contents of  
8   the well by micropipette, or removing one phase or just the droplets or  
9   something along those lines? I guess that seems to be the stumbling block  
10   here for me, at least for claims 2 and 3, is that in essence you've got two  
11   immiscible fluids entering the well and they're going to sit there for long  
12   enough, and of course eventually they're going to separate. And I think you  
13   can probably make an inherency case out of that but I'm not sure that, you  
14   know, sticking a micropipette into the well and, you know, activating the  
15   trigger of the micropipette necessarily removes the separated droplets or  
16   collects the separated droplets, as opposed to just sort of collecting whatever  
17   happens to be in the well.

18          I think that seems to be either what's missing or what I'm not clear  
19   where it is.

20          MS. JAMESON: And, Your Honor, in terms of what Bio-Rad has  
21   identified in its infringement contention for claim 2 on the 722 patent.  
22   That's in Exhibit 1026 for the 00088 Petition, and Page 23 of that.

23          And what Bio-Rad identifies as meeting this limitation is that after the  
24   droplets are generated they are transferred and collected in a tube strip. And  
25   so all that's required by this limitation as Bio-Rad has applied it, is this  
26   transfer by micropipette.

1           And so the droplets are separated in that well, they are going to be  
2     collected by micropipette and that's how this limitation is argued to be met  
3     by Bio-Rad and be shown the same thing for Ismagilov.

4           JUDGE ROESEL: Counsel, may I interrupt again. So I'm looking at  
5     the page you directed us, Exhibit 1026, Page 23. And I see that Bio-Rad has  
6     quoted from some manual where it says "slowly aspirate 100 microliters of  
7     these droplets from the lowest point of the recovery wells." So is there any  
8     sort of teaching along those lines in Ismagilov?

9           MS. JAMESON: So in Ismagilov, let me start first with the claims.  
10    The claims say collecting separated droplets and not collecting only the  
11    separated droplets. And at Page 2 of Bio-Rad's infringement contentions.  
12    Sorry, Page 22 of Bio-Rad's infringement contentions the claims are  
13    addressing the separating steps of the independent claims, and that confirms  
14    that the collection of those droplets and oil. There isn't any reliance or  
15    arguments in Bio-Rad's contention that placing the droplets at the bottom of  
16    the tube would somehow be collecting only, by placing the micropipette at  
17    the bottom of the tube that that would somehow be collecting only droplets.  
18    There are droplets that float, as Ismagilov itself describes. And Bio-Rad's  
19    contentions on these claims don't have further requirements that anything  
20    else be disclosed.

21           And what Ismagilov is saying is that there's going to be collection.  
22    As Ismagilov says, collection can also be done by micropipette. And those  
23    micropipettes are going to be collecting the droplets. And Dr. Fair is  
24    explaining how the micropipettes need to be essentially configured in order  
25    to do that, and that the collection is not going to be taking, even if it takes

1 some oil with it, the point is to collect. And what's being collected and  
2 what's at issue in Ismagilov is those droplets.

3 So there isn't a disclosure that one would collect only the oil, that's  
4 not what's of interest in Ismagilov. The collection in Ismagilov is being  
5 done of the droplets that are going to be separated in the chamber.

6 In terms of the other dependent claims, Ismagilov also discloses 837,  
7 claims 7 and 9, which are obvious because the droplet receiving outlet is  
8 coupled to a vessel, it's obvious to couple the droplet receiving outlet for  
9 vessel and that type of vessel, including the PCR tube it is attached to, it's  
10 obvious to collect the droplets by micropipette and transfer them to a vessel.  
11 And these are examples you can see in Ismagilov.

12 JUDGE ROESEL: Counsel, what slide are you on now, please?

13 MS. JAMESON: I am on Slide A-84. In terms of claims 12 and 13  
14 which are on Slide A-86, Bio-Rad is disputing that those are rendered  
15 obvious by Ismagilov, but claims 12 and 13 are also obvious as Ismagilov  
16 discloses (inaudible) and Quake provides specific details, including  
17 specifically you don't want to use an antibody with a saccharide.

18 The final claims are claims 15 to 17, they're all rendered obvious.  
19 Bio-Rad doesn't raise disputes regarding the substance of these obviousness  
20 arguments and is shown on Slide 89 that these claims relate to the second  
21 continuous phase carrier and destabilizing surfactants and destabilizing the  
22 droplets. (Inaudible) destabilizing surfactants and is in fact the one  
23 mentioned by the 722 patents. This is a (inaudible) Ismagilov, it was  
24 obvious to use from several multiple droplets and the use of destabilizing  
25 surfactants to make emulsions was well known.

26 I'll turn now to the final two groups of --

1 JUDGE ROESEL: Counsel, may I interrupt you again, please, on  
2 claims 15 through 17. When I read these claims, placing the droplets onto a  
3 second continuous carrier fluid. I guess I'm not quite sure I understand the  
4 scope of those claims, but I was thinking it was referring to actually being  
5 the droplets and transferring them to a second continuous phase, carrier  
6 fluid, after they had been separated from the first carrier fluid. Am I  
7 misunderstanding the claims?

8 MS. JAMESON: Bio-Rad has interpreted these claims, which is  
9 shown on Page 26 of Exhibit 1026 is that following separation by a process,  
10 the droplets are placed into a tube and then another agent is added to them.  
11 And Bio-Rad says that that's sufficient.

12 JUDGE ROESEL: And is that disclosed by Ismagilov?

13 MS. JAMESON: So what Ismagilov is disclosing is there are multiple  
14 disclosures that are relevant. As Ismagilov discloses, droplets where you  
15 will need to recover what's in the droplet. And then it teaches certain  
16 surfactants that are used with the droplets. It also teaches that there are  
17 surfactants that are used and can be used in droplet merging, which means  
18 multiple droplets can come together in the experiment that's being run.

19 And it was obvious based on the well-known use of destabilizing  
20 surfactants with weight emulsion, that you could use a surfactant like that  
21 disclosed by Ismagilov to break these emulsions.

22 JUDGE ROESEL: Does Ismagilov teach transferring droplets from  
23 one continuous phase carrier fluid to another?

24 MS. JAMESON: In terms of specifically adding a second continuous  
25 phase carrier, that's obvious in Ismagilov 091. But it is taught in Ismagilov  
26 119, which is the next ground. There's a specific disclosure of adding a

1 second continuous phase carrier. And so that's actually a disclosure that's  
2 shown on Slide 112 of the 119 combination.

3 JUDGE ROESEL: And does Ismagilov teach using a surfactant to  
4 destabilize or merge droplets? And what I mean, I'm talking about the 091  
5 reference.

6 MS. JAMESON: Yes, Your Honor. Ismagilov 091 teaches droplet  
7 merging. And there are multiple disclosures of that in the Ismagilov patent.  
8 And so Ismagilov teaches surfactants that are used as corner bottom balance.  
9 And then it was well known in the art, and some of that art is described in  
10 Section 6 of the Petition where it's explained that it was well known that  
11 surfactants and various chemicals could be used to destabilize droplets.

12 And so Ismagilov is disclosing multiple parts of droplets where you  
13 need to be extracting the compounds from them. For example multiple  
14 synthesis reactions. Those are the places where you will be able to break the  
15 droplets and this is the obvious way to do that.

16 And I will just briefly address the Ismagilov 119 grounds. But those  
17 are grounds that the Board found in Institution, it's not a substantial  
18 likelihood of success. 10X respectfully disagrees, but 10X did adequately  
19 address Bio-Rad's claimed constructions which were broadening. And so  
20 Bio-Rad addressed this under both parties' construction. Regarding the  
21 disclosures of Ismagilov 119, the Board had interpreted a disclosure of  
22 Ismagilov 119 that's shown on Slide 102 as referring to droplets that were  
23 being sorted from each other based on the relative density of the carrier, not  
24 certain droplets from the immiscible fluid. 10X disagrees with that as stated  
25 in its Petition. But regardless, with interpretations aside, the same separation  
26 chamber structure would have been obvious to a person of ordinary skill

1 because in both cases you're still separating droplets based on the density of  
2 elements of the carrier fluid.

3 Ismagilov 119 did not sufficiently render the structure obvious, it was  
4 obvious based on the combination of Ismagilov, which did teach the key  
5 elements of structures that were from droplets by separating droplets from  
6 the immiscible fluid.

7 And unless there are further questions, I'll reserve the rest (audio  
8 disruption).

9 JUDGE ROESEL: Thank you. Mr. Baker, you may proceed.

10 MR. BAKER: Thank you, Your Honor, and good afternoon. Before I  
11 begin, I just want to thank the Board and Mr. Slay as well for setting up and  
12 facilitating this video conference today. I know that pandemics and snow  
13 storms and arise in outages and all kinds of things. So I know it's not easy,  
14 but we do appreciate the opportunity to present oral argument today. So  
15 thank you.

16 Your Honors, before I get started I'd like to talk about the specifics of  
17 my argument today. I want to jump right to Ismagilov and address one of  
18 the fundamental flaws that Ismagilov that counsel for Petitioner, I think,  
19 skipped over.

20 And the fundamental flaw in Ismagilov is that he does not use a  
21 collection well or a collection reservoir. There are over 45 figures, sub  
22 figures, in Ismagilov and you will not see a collection well or a collection  
23 reservoir in any of them. And in addition to the pictures that Ismagilov  
24 mentioned wells or reservoirs in four places, but you will not see in any of  
25 those four places anything about using a well or a reservoir at the outlet.



1           What those passages are referring to is using a well or a reservoir to  
2 introduce fluid at the inlet to the system, not the outlet to begin with. Now  
3 why would Ismagilov mention the use of a well or a reservoir, the possible  
4 use of use of a well or a reservoir at an inlet and not at an outlet.

5           JUDGE ROESEL: Counsel, may I interrupt you? What about  
6 Column 14?

7           MR. BAKER: I'm going to get there, Your Honor.

8           JUDGE ROESEL: Okay. All right. I'll wait.

9           MR. BAKER: I'm going to get there. I'll answer your question now.  
10 But we have a slide on that specifically as well.

11           Column 14, I believe says that the outlet well may be, I'm sorry, the  
12 inlet port and the outlet port may be fully engaged with a well or a reservoir.  
13 If that's the passage that you're referring to, I think it is.

14           And in that paragraph, two sentences later I believe, it talks about  
15 again introducing fluid. And so what we believe Ismagilov is referring to is  
16 again, using a well at the inlet for introduced fluid. Now it's true that the  
17 outlet port would be in full communication with a well or a reservoir at the  
18 inlet because all of the micro channels are connected on the device. But we  
19 don't believe that that passage supports the idea that it's using a well or a  
20 reservoir at the outlet. And it's inconsistent with the other passages that I'll  
21 refer to to talk about wells or reservoirs.

22           So the question is, if Ismagilov is using a well for a reservoir only at  
23 the inlet and not the outlet, why would he do that? And the answer is pretty  
24 simple and it's because he was not collecting droplets. He was not  
25 interested in collecting droplets from the outlet. And he certainly wasn't  
26 interested in collecting separated droplets from the outlets. All he was doing

1 was taking the fluid, droplets, immiscible fluid, everything, and routing it off  
2 the device.

3 Our expert, Dr. Shelly Anna explained why this is. And Dr. Anna is a  
4 Professor of Chemical Engineering at Carnegie Melon, and she has over 25  
5 years' experience in micro fluid dating all the way back to the 1990s. And  
6 what she explained in her Declaration was that in the early days of micro  
7 fluid, around the time of Ismagilov, the people working on these devices  
8 were not focused on collecting droplets, the best ways to collect droplets to  
9 transfer them off the chip for downstream processing. That would come  
10 later with patents like the ones that we're dealing with here, the Link patent.

11 At the time of Ismagilov in those early days, the focus was just on the  
12 best way to generate droplets and to move the droplets around the device,  
13 not on separating droplets or collecting droplets. And so what Ismagilov  
14 was doing is he was just moving the fluid off the device. He wasn't  
15 interested in separating or collecting. And what we're going to see is that  
16 the factual record in these proceedings has developed to show that, shows  
17 that in fact he was just moving fluid off the device. There were no wells or  
18 reservoirs at the outlet.

19 JUDGE ROESEL: But, counsel, what about the testimony of Dr.  
20 Anna in Paragraph 68 of her Declaration where she says to create inlets and  
21 outlets it was common at the time to punch a hole through the PDMS at the  
22 ends of the channels where fluid was desired to be introduced and to exit.  
23 To me that counters exact your argument just now.

24 MR. BAKER: Well I don't think so because all she's saying is those  
25 holes, and this was on the point that we made when they refer to our  
26 infringement contentions, right? Those holes can just be punched with a

1 very small and tiny syringe needle. And when we get to Thorsen in  
2 particular we're going to see that that's what he did. He punched a hole with  
3 just something like a 500 micron syringe needle. And, you know, these are,  
4 you have to have fluid flow in these devices, right? And so you need an  
5 inlet and you need an outlet in order to push the fluid in and out of the  
6 device. But that doesn't mean that that hole punch at the end that Dr. Anna  
7 was referring to is a separation chamber. That doesn't mean that it's a large  
8 enough vessel or well or whatever to separate droplets and from which you  
9 go in and then collect separated droplets with a pipette. All she's talking  
10 about is that it was very difficult to punch holes with a tiny needle so that  
11 you could flow fluid through because you need, you know, you need a hole  
12 at the beginning and a hole at the end in order to be able to flow the fluid  
13 through. And that's all she was referring to. So I think it is consistent.

14 If we can go to Slide 4 now I want to spend some time up front and  
15 talk just briefly about the leading patent. It's the 837 patent. It is an  
16 assembly patent, it talks about micro channels, droplet formation modules,  
17 separation chambers. And then you see the specific structures and design of  
18 the separation chamber and some of the elements below.

19 And going on to Slide 5, the 722, they have the same idea here except  
20 it's a method patent, it uses some slightly different language. But the same  
21 ideas are basically here in the 722.

22 Now let's go to Slide 7. We have a section here on claim construction  
23 of a few terms. I don't think it's necessary to really spend a lot of time on  
24 claim construction. Petitioner has made clear I think that they are willing to  
25 accept the claim constructions that we have proffered. And they are -- well,  
26 I'll mention a couple of things.

1           Number one, on separation chamber, they said that they're willing to  
2   accept our construction but they did ask to adopt a construction saying that  
3   our construction is broad enough to include an open well. And that's the  
4   issue that I want to address.

5           And the point is pretty simple. I think it's fair to say that some open  
6   wells will be separation chambers, but some will not. And in order to  
7   determine which is which, you have to look at the design and the structure of  
8   the well. And for it to be a separation chamber it needs to be a chamber size  
9   to accommodate multiple droplets and immiscible fluid in separated form,  
10   which is the construction that we have proffered. So to the extent that  
11   Petitioner is trying to say that all open wells are separation chambers, we  
12   don't agree with that.

13          Same thing if you go to Slide 8 on droplet proceeding receiving outlet.  
14   The same issue there. They're agreeing with our construction but they're  
15   saying, they're asking the Board to say that a droplet receiving outlet is  
16   broad enough to include the open top of an open well. It's the same issue  
17   here. It's true that some of the tops in some of the wells will be droplet  
18   receiving outlets. But in order to determine if it is, because not all will be  
19   droplet receiving outlets, nor if you determine if it is, number one, you have  
20   to have a separation chamber. And number two, you have to ask yourself  
21   whether you were able to collect the droplets as we have construed droplet  
22   receiving outlets.

23          So to the extent, again, that they are saying that all, not all the wells,  
24   would be droplet receiving outlets. We would not agree with that. That's  
25   not a position that we take either here or in District Court.

1 All right. Let's go to Slide 11, please. I want to talk, look generally  
2 at Ismagilov/Quake before we get into specific elements that are missing.  
3 On Slide 11 you will see here the Ismagilov reference, a few things I want to  
4 point out. It was filed in 2003, it published in 2005, and it issued in 2006.  
5 So published 2005, issued in 2006. And I'll come back to that slide.

6 The title is Device Method for Pressure Driven Plug Transport and  
7 Reaction. Ismagilov talked about conducting various reactions. For  
8 example, he talked about methods for forming plugs with compositions for a  
9 protein crystallization. That's one example he uses. Again, there are over  
10 45 figure and sub-figures, we have some of those figures here on the right-  
11 hand side of the slide. As I said, you will not see any wells, collection wells  
12 or reservoirs on any of those.

13 Let's go to Slide 12, please. Slide 12 is a Quake reference. Petitioner  
14 relies only on one portion of Quake and that is Figure 6. And we have here  
15 Paragraph 197 where he talks about Figure 6 and explains that is not a  
16 droplet example. Quake is not using multi droplets in Figure 6. It is a self-  
17 sorting example. He's taking strings of colored beads and flowing them  
18 through channels into wells. So again, not a droplet example.

19 If you can go to Slide 15, please. I want to talk now about the  
20 specifics of Petitioner's argument with respect to the elements of the claims.  
21 On this slide we have testimony from Petitioner's expert, Dr. Fair, where he  
22 explains that there are essentially two grounds.

23 Ground One, he is referring to and explains that they are relying on  
24 collection wells that are allegedly disclosed again as Ismagilov. And then he  
25 says for Ground Two it's the combination with Quake. So you would think

1 he used Ismagilov wells that's allegedly disclosed and you would turn to  
2 Quake to pick up specific other details.

3 So where does Petitioner gets this idea, as I said, we don't think that  
4 there are wells, collection wells, in Ismagilov. So where does Petitioner get  
5 the idea that there are? Let's look at that specifically.

6 If we go to Slide 16, please. So this is a quote from the Petition.  
7 What they have done to get to this idea that Ismagilov has collection wells is  
8 they've hacked together different quotations and different pieces of  
9 Ismagilov. They refer to one place as we see here, they refer to one place  
10 that talks about an outlet work. They refer to another place that talks  
11 specifically about wells or reservoirs. They refer to another place in Column  
12 17 that uses the word "collect." And they sort of put all of this together and  
13 they say that Ismagilov is using a well or a reservoir at the outlet, that it's  
14 deep enough to collect droplets using a micropipette. And then they say if  
15 it's deep enough to collect droplets using micropipettes it must be a  
16 separation chamber.

17 But, Your Honors, if we actually look at these places, and one of these  
18 is Column 14 that we've already discussed, it becomes very clear that  
19 Ismagilov is not talking about collection wells. He's talking about  
20 something very different. And so let's look at the quotes.

21 If we can go to Slide 17. The first place that they refer to is Column  
22 9. That's on the right-hand side of this slide. And we've highlighted the  
23 portion. And it's the definition of "outlet port." And Ismagilov says the  
24 term "outlet port" refers to an area of a substrate that collects or dispenses  
25 the plug fluid, carrier fluid, plugs, or reaction product. A substrate may  
26 contain more than one outlet port if desired.

1           Now they say that when Ismagilov uses the word “outlet port” here  
2           that he’s referring to a collection well or reservoir. But he doesn’t say that.  
3           And in fact what he meant for a port to have a well or a reservoir, he said it.  
4           If we look over, just one column over in Column 8 where he gives the  
5           definition of inlet port, what did he say there? He said the term “inlet port”  
6           refers to an area of a substrate that receives plug fluid. The inlet port may  
7           contain an inlet channel, a well or reservoir, an opening, and other features  
8           that facilitate the entry of the chemicals into the substrate.

9           So here when he wanted to make it clear that the port had a well or a  
10          reservoir, he said it. He was aware of the issue, he was aware of the  
11          possibility of using a well or a reservoir at a port, but half a column later  
12          when he’s talking about this outlet, he did not make any reference to a well  
13          or reservoir.

14          And so that is evidence that in fact there is no collection well, there is  
15          no well or reservoir at the outlet. Kind of begs the question though, what  
16          was he doing at the outlet port.

17          Let’s take a look now at Column 17 of that same. We think that he  
18          was very clear about this actually. So if you go to Slide 18, we’ve  
19          reproduced Column 17, Lines 18 through 30. And this is where Ismagilov  
20          describes exactly what the setup is. So let’s look at the first sentence. He  
21          says a group of manifolds are regions consisting of several channels that  
22          lead to or from a common channel can be included to facilitate the  
23          movement of plugs from different analysis units during the plurality of  
24          branch channels and to the appropriate solution outlet.

25          So breaking that down a little bit, he’s talking about three things.  
26          He’s talking about a manifold, analysis unit, and analysis. And he explains

1 that a manifold is just a region of channels that leads to or from a common  
2 channel. So just think about it kind of like a tree structure, right, where you  
3 have the branches are various micro channels and they all lead to a single  
4 central channel that would be like the trunk of the tree.

5 Now he also talks about analysis units. Earlier in fact, in Column 7,  
6 he defines an analysis unit as a part or a location of the substrate with  
7 channel where some sort of detection or analysis takes places. So what he's  
8 saying is that there will be various places on the device, possibly in the  
9 various branches, that have these analysis units.

10 And then he explains that what you do is you use the manifold to  
11 bring together or collect all the fluid from the various analysis units and  
12 branches into a single channel and then route that fluid to the outlet.

13 All right. So let's look at the next sentence. The sentence that starts  
14 with the word "Thus." He said "Thus, devices according to the invention  
15 may have a plurality of analysis units that can collect the solution from  
16 associated branch channels of each unit into a manifold which routes the  
17 flow of solution to an outlet." So that's exactly what he's talking about.  
18 Just taking the fluid from the various analysis units and channels and  
19 bringing it together into a single channel that then goes to an outlet.

20 Now the question becomes what happens at the outlet, right? He  
21 answers that in the very next sentence. He says "The outlet can be adapted  
22 for receiving for example a segment of tubing or a sample tube such as a  
23 standard 1.5 mil centrifuge." And then he explains "And collection can also  
24 be done using micropipettes." Now what he's talking about here is not  
25 taking a micropipette and dipping it into a well and collecting separated  
26 droplets. He's talking about making an incision and plugging it into a port,



1 an outlet port and routing the fluid off the device. And he says instead of a  
2 tube, if you want you can use a micropipette. Just get a micropipette, put it  
3 into the outlet port and drop the fluid off the device. That's it.

4 Now how do we know that? Well again, we think the language is  
5 pretty clear and unambiguous that that's what he's talking about. Petitioner  
6 though disagrees, and in Dr. Fair's deposition I asked him about this part of  
7 this paragraph. And not surprisingly, he disagreed. So in our Response we  
8 submitted evidence that supports our interpretation. I mean I want to talk  
9 about that now.

10 Let's go to Slide 19. So in our Response we submitted two  
11 references, contemporaneous references from Ismagilov to show exactly  
12 what we're talking about. This is the first reference. And you'll see  
13 Ismagilov is the last big column. You'll see the publication date that's 2005.  
14 That's the same year that Ismagilov patent published and it's just before the  
15 actual Ismagilov patent issued.

16 The title is Using Nanoliter Plugs in Microfluidic to Facilitate and  
17 Understand Protein Crystallization. Exactly the kind of reaction that he's  
18 talking about in his patent. So it's even a similar figure at the top on the  
19 right there above he's used similar figures in his patent.

20 So this reference describes exactly what he's talking about in Column  
21 17. Right? The difference is the right side of the picture. And if you look at  
22 the picture on the right-hand side, it is exactly what I described in exactly  
23 Patent Owner's certification of Column 17.

24 JUDGE ROESEL: But, counsel, the problem with this exhibit is that  
25 the words that are used here to describe that figure, I think it's Figure 2,

1 right, is “insert receiving capillary.” So it doesn’t use the term  
2 “micropipette” to describe what’s going on there.

3 MR. BAKER: It doesn’t, Your Honor, that’s true, we call it the  
4 capillary here. To me it looks exactly like a pipette that everyone has used  
5 in their labs. He calls it a capillary instead of a micropipette. We think he’s  
6 talking about the same thing. When you look at how he describes 17 and  
7 then the figure, I think this is exactly what he’s talking about. And the fact  
8 that he calls it a capillary instead of a micropipette, and I think that’s a pretty  
9 extenuation for Petitioner to rest its invalidity argument on. This seems to  
10 be exactly what he’s describing in Column 17.

11 And there’s another, he even uses the word “flex” the same way. He  
12 says, you know, there’s this dispute about what the word “collect” means in  
13 Column 17. And in the middle of the paragraph he uses the word  
14 “collecting” as the movement of collecting fluid, moving fluid into that  
15 single branch channel. And we said the word “collect” in the last sentence  
16 of that paragraph should be used the same way. But Petitioner disputes that.  
17 Well he uses the word “collect” here exactly like what we’re talking about.  
18 He’s saying that he’s just collecting the drops, not just droplets, but all the  
19 fluid. He shows it, he’s collecting it and moving it off the device.

20 And then if you go to Slide 20 this is the second reference that we  
21 submitted. And this time it’s 2006, the year that Ismagilov has at issues.  
22 You’ll see again Ismagilov, it’s last named author. We have the same  
23 images on the right, images of the plugs, same image of the device. And  
24 then if you look in the description underneath, it says, uses the word  
25 “collection,” says the resulting array of plugs is transferred into a receiving  
26 capillary and the trials are collected. Again, called a capillary, not a

1 micropipette, but it's describing the same thing and it's using the word  
2 "collected" in the same way. All he talked about is routing the fluid off the  
3 device. Right?

4 Then let's jump to Slide 21. This is Column 14, which we already  
5 discussed.

6 JUDGE ROESEL: Counsel, can I interrupt just one second. So I  
7 think in the papers Patent Owner relied on another exhibit, Exhibit 2021, to  
8 show what Patent Owner's interpretation of this statement in Ismagilov  
9 about collecting by micropipette. Is Patent Owner still relying on that  
10 Exhibit 2021, or --

11 MR. BAKER: 2021, if you'll give me just one second here, let me  
12 pull 2021 up, Your Honor, I apologize. I believe 2021 is, is that the 513  
13 patent?

14 JUDGE ROESEL: That's what I have.

15 MR. BAKER: Yeah. And I believe that in our brief, yes, we had  
16 referred to that as a patent that showed sustained sort of transfer, if you will,  
17 of fluid off the device. So, yeah, I mean it is just more evidence that at the  
18 time what people were doing was just moving fluid off the device. They  
19 weren't collecting separated droplets.

20 JUDGE ROESEL: Okay. But what about Exhibit 2033 that Dr. Anna  
21 relies upon, which shows the, you know, the holes that are made by cork  
22 borers, both at the inlet and the outlet. Why can't we rely on that to  
23 understand what Ismagilov is referring to when it talks about collection by  
24 micropipette?

25 MR. BAKER: Well I think in that exhibit she has exactly what she's  
26 talking about with respect to the tubing. She shows tubing going into, now

1   Petitioner calls this a bucket shaped well, because they want it to seem more  
2   like a separation chamber. But those are just ports, just like Ismagilov, and  
3   she had the tubing going into the inlet port and a tubing going into the outlet  
4   port. And the tubing at the outlet port is transferring all of the fluid and  
5   droplets mixed together, off the device just like Ismagilov is doing. That's  
6   not showing a separation chamber where you can go in and collect separated  
7   droplets with a pipette. No one can do it that way.

8           JUDGE ROESEL: Counsel, though, that Exhibit 2033 shows, and  
9   I'm talking about Figure 1-A, and it's reproduced in the Petitioner's Reply at  
10   Page 8. And it shows, the way I understand it, it shows two ways to operate  
11   pressure driven flow. One is to apply pressure at the inlet, the syringe pump,  
12   and the other way is to apply a vacuum at the outlet. Well the first example  
13   where you're applying the syringe pump at the inlet, the outlet is just shown  
14   as simply a hole, right, in the PDMS, which Dr. Anna tells us is something  
15   that was common at the time, to punch a hole through the PDMS at the end  
16   of the channels to create inlets and outlets.

17           So why can't we use that Exhibit 2033 to interpret what Ismagilov  
18   means when it talks about collection by micropipette?

19           MR. BAKER: A couple of reasons. Because number one is I think  
20   Ismagilov told us exactly what it means. I base that he says, when you  
21   looked at everything, all the quotations from his patent, especially Column  
22   17 that it is clear that he's just talking about routing fluid off of the device  
23   and that's how he's using micropipettes. And then if you look at the  
24   contemporaneous references that's even stronger evidence. And so when  
25   you put all that together, you know, to answer your question, the reason is  
26   because Ismagilov is very clear about what he's doing, and he wasn't using a

1 micropipette and go in and collect separated droplets. I think the evidence  
2 shows, in fact the reference shows that what he was doing was routing fluid  
3 off the device.

4 Now looking at 2033, 2033, again, they characterize it as these  
5 bucket-shaped structures, but there are no dimensions in this figure. I mean  
6 this is all Dr. Anna was referring to is again, just a pin prick into the device  
7 to facilitate fluid flow. There's nothing that says these are these huge wells  
8 or reservoirs. Even if she hooked up a syringe pump, even if you took the  
9 syringe pump into this tiny hole punch and there's a tiny hole punch on the  
10 other side, we don't know what's happening on the other side. There's  
11 nothing, there's no evidence that says that the other outlet there is a huge  
12 well or reservoir. There's no evidence that says that a tube isn't hooked up  
13 routing it off the device. The point of this was just to show people were  
14 making these tiny hole punches in their devices, right, and in the accused  
15 device there is a tiny hole punch. And the point she was making was that's  
16 how people were doing it, and in the accused device the prior art is just like  
17 that tiny hole punch of the accessed device.

18 Now the reason we say the accused device infringes is because on top  
19 of that tiny hole punch you have this huge separation chamber, right? But  
20 you don't see that in the prior art. So in the accused device there's this red  
21 hole punch, and then we'd highlighted the separation chamber in yellow.

22 In 2033 these little bucket structures would be analogous just to the  
23 red small hole punch. There's no separation chamber on top of these  
24 buckets like there is in in the accused device. So that's the difference.

25 JUDGE ROESEL: Counsel, was it known in the art to insert the tip of  
26 a micropipette into one of these hole punches like you've shown in Figure 1-

1 A in Exhibit 2033? And what's the evidence in the record one way or the  
2 other on that?

3 MR. BAKER: Let's go to Slide 35, Your Honor. This is cross-  
4 examination testimony of Dr. Fair. I asked him the same exact question at  
5 his deposition. I said "When is the first time you've used the pipette to  
6 remove a droplet from a chip and move it off chip." He said "I don't think  
7 I've done that." I said "You've never done that?" He said "Not on electro  
8 wetting chips, no." And I thought okay, maybe he's going to wiggle out of  
9 this by distinguishing a kind of chip. So I said "On any other chips?" He  
10 said "Not that I can recall."

11 Their own expert says, to answer your question, there is no evidence.  
12 And it was not known in the arts to do it, and no one was doing it. And their  
13 own expert testified unequivocally that he was not doing it either, and that  
14 he had not done it to this day. So that's the evidence in the record. And,  
15 you know, it goes our way.

16 So just to back up again to Slide 21 this is Colum 14 which we have  
17 already discussed. I don't think we need to spend too much time on that.  
18 And then Slide 22 to 24, all of the arguments that I've just made is supported  
19 by our expert, Dr. Anna, so Slides 22 and 24 are quotes from her  
20 Declaration. I'm not going to read those quotes.

21 If you can go to Slide 25 I do want to spend some time on Quake and  
22 their motivation to combine arguments. So on Slide 25 we have Quake.  
23 Again the only example that they rely on, Figure 6, there's no dispute that  
24 Figure 6 is not a droplet example.

25 If you go to Slide 26, I asked Dr. Fair about this. I said, and actually  
26 at the deposition I was going to challenge him. I thought that he had

1 misunderstood Figure 6 to be a droplet example. And so I was going to  
2 challenge him on that. And I said “It’s your opinion that Quake used these  
3 wells to collect droplets; is that right?” And I was surprised when he said  
4 “No.” I said “How did I get that wrong?” And he said “Quake did not use  
5 droplets, he injected dye which then he sorted based upon red or green. This  
6 is not a droplet based system.”

7 So, you know, I guess to his credit he, you know, admitted that Figure  
8 6 is not a droplet based system. But there’s no dispute about that. So how  
9 did they get to Quake if it’s not even a droplet system?

10 Let’s go to Slide 27. And this is from the Petition. They argue that  
11 “If a POSA with Ismagilov would want additional information regarding  
12 microfluidic structures, the POSA would have looked to the work of a leader  
13 in developing early microfluidic devices. Quake.” Your Honor, this is pure  
14 speculation. And all you have to do is look at that first word “If,” to prove  
15 it.

16 It’s not enough to say that a person with a primary reference would  
17 turn to a secondary reference if they thought about it or if they wanted to.  
18 You have to provide a reason, a motivation why a person would do that.  
19 And they haven’t given us any reason for that. As we just saw, Ismagilov  
20 does not use collection wells. So there’s no reason he would look to  
21 incorporate the specific wells of Quake. And more than that, even with  
22 respect to the wells and the reservoirs that he does mention, that Ismagilov  
23 does mention, doesn’t identify any droplets that he had in making those  
24 wells or reservoirs, there’s no reason a person would look at that, those  
25 references to the wells or reservoirs at the inlet and say oh, I need to turn to  
26 Quake.

1 Another Board has faced a similar argument and rejected it. If we go  
2 to Slide 28, this is the *Free-Flow* case that we cited in our Brief. And in  
3 here, in this case, the Board said Petitioner does not explain what problems  
4 exist in the web of Perkins, which was the primary reference, or how those  
5 problems would have been solved by Mykleby, which was the secondary  
6 reference. By Petitioner's own analysis, the problem of continuous, quick  
7 production of plastic bags is addressed by the web and apparatus of Perkins,  
8 the primary reference itself. It is unclear why a person of ordinary skill in  
9 the art would have considered it desirable to further modify the primary  
10 reference to include the variable perforations of the secondary reference.

11 JUDGE ROESEL: Can I interrupt you again here. Why would it be  
12 improper for us to look to Quake simply to understand the dimensions of the  
13 channels and wells disclosed in Ismagilov? I mean that's not really  
14 modifying Ismagilov, it's just understanding the dimensions.

15 MR. BAKER: The answer is because there's nothing in place that  
16 says the dimensions, I'm sorry, there's nothing in Ismagilov that says that  
17 the dimensions are important. The only thing that they were using, they  
18 were punching holes, right, to facilitate fluid flow in and out, and he was  
19 using a well to introduce fluid at the inlet. He never said anywhere that the  
20 dimensions are important. Now Petitioner says that the dimensions are  
21 important because you need the well to be of a specific height and volume.  
22 Why? They can separate the fluid droplets. But that's hindsight, Your  
23 Honor.

24 There's nothing in Ismagilov that talks about the importance of  
25 dimensions. And so there's no reason that a person with Ismagilov would  
26 think to themselves, well, I see a well here. And by the way, this puts aside



1 our argument. We don't think that there's collection wells at the outlet  
2 anyway, right? But even with respect to the inlet wells, a person with  
3 Ismagilov would not look at that reference to a well and think to themselves,  
4 you know, what are the dimensions. There's no reason that they would do  
5 that, and there's nothing in Ismagilov that suggests that they will.

6 So going back to Slide 29. This is another reason why they say that  
7 there is a motivation as far as Ismagilov and Quake, and that is simply  
8 because Ismagilov, that a person would know about Quake. And there's a  
9 few references discussed on similar subject matter.

10 The Board in *Free-Flow* addressed this as well, and they said that  
11 noting that the references differ only in their perforation patterns, basically  
12 Petitioner made the same argument in that Petitioner here is making. In a  
13 second quote the Board said Petitioner's argument may be enough to show  
14 the two references are analogous art, but simply demonstrate that a set of  
15 references are all directed to the same problem is not by itself sufficient  
16 rationale to combine references. The same is true here.

17 I want to make one other point on this argument, and to do that I want  
18 to look at Petitioner's Slide A-68. I'll give you a minute just to pull that up.

19 Okay. So if we look at Slide A-68, another argument that they've  
20 made on motivation to combine is they say, and this is in the second bullet  
21 on their slide, that says Bio-Rad is incorrect. And then the second sub bullet  
22 under that says Quake disclosures were even copied into Ismagilov. So they  
23 say look, Ismagilov knew about Quake, and a person with Ismagilov would  
24 know about Quake. And in fact, there were entire portions of Quake that  
25 were copied over to Ismagilov. So that's further evidence on motivation to  
26 combine.

1           Your Honor, that actually cuts the other way. Because it's true that  
2 Ismagilov did copy over portions of Quake, but guess which portions he  
3 didn't copy over? The portions about wells or reservoirs. He copied over  
4 some of the other portions. But Quake talks about wells and reservoirs. If  
5 Ismagilov knew about and he did not copy over those portions, why?  
6 Because he wasn't using a collection well or a collection reservoir. This is  
7 all hindsight.

8           This is a classic example of a Petitioner and an expert that have fallen  
9 into the trap of hindsight. They started with the idea that a person of  
10 ordinary skill would want to separate and collect droplets, and then they  
11 worked backwards. And that's impermissible. And it's not just me saying  
12 that by the way. I note that, you know, patent owners often say that. But  
13 their expert has admitted it.

14          Let's look at Slide 33. At his deposition, this is again cross-  
15 examination testimony of Dr. Fair. And at his deposition I said "Now as  
16 part of your obviousness analysis did you start with the idea that a person of  
17 ordinary skill would have recognized the contamination problem and then  
18 solved it, or did you start with the claim language and then analyze the prior  
19 art?" He answered "I would have to say I started with looking at the claim  
20 language and I found appropriate references to cite in an invalidity analysis."  
21 Later on in his deposition, on the right-hand side, he said that he was looking  
22 for reading the method of the limitations on the prior art. And so he admits  
23 that he did it backwards. And I would submit that it doesn't get much  
24 clearer than that.

25          So my last slide, Your Honor, is just Slide 36. We have cited the *In re*  
26 *Fritch* case just for the general proposition on hindsight. And just to sum up

1 here, we do think that this is all based on hindsight. There's no collection  
2 wells or collection reservoirs in Ismagilov and we think the factual records  
3 supports us on this. And there is no motivation for him to turn to Quake.

4 So with that I will rest unless there are other questions. Well I say  
5 rest, but I would like to reserve the rest of my time, if the Board will permit  
6 me, for a short surrebuttal if necessary.

7 JUDGE ROESEL: Like I said in the beginning, we're not really  
8 keeping time here, so it's up to you to keep the time. We just don't want to  
9 go past the total of 120 minutes per side. So you can take as much as you  
10 need for surrebuttal.

11 MR. BAKER: Thank you, Your Honor.

12 JUDGE ROESEL: And we'll now hear from Petitioner.

13 MS. JAMESON: Thank you, Your Honors. There's a number of  
14 points that I will be responding to. Bio-Rad wants you to believe that even  
15 though Ismagilov says to use a cork borer to make its outlet ports and wells,  
16 even though it says to use a micropipette to collect them. Instead we're  
17 supposed to understand that this is a totally safe bore disclosures that means  
18 that there's only a tiny hole, there's only a tiny cork bore. And that is not  
19 using a micropipette in the normal way that everyone agrees that a cork  
20 borer, that a micropipette is used. Instead this is how we're using a tubular  
21 capillary. Your Honor, that's in Ismagilov.

22 They point to other documents that are using different words to  
23 describe different things. It's well known that cork borers are large, as  
24 Ismagilov disclosed them as a category. Bio-Rad's point is that Ismagilov is  
25 not saying, it's trying to say that these are small, this isn't true, and Bio-  
26 Rad's expert didn't look into it.

1           And Bio-Rad is saying that you need to be able to collect some other  
2 way with micropipettes. And that's not the case. Micropipettes are used in  
3 the ordinary way. It's an ordinary word and an ordinary device. And when  
4 a person or ordinary skills sees a disclosure that person doesn't face unusual  
5 or unconventional limits on the words being used. Using a micropipette  
6 means putting the tip into a reservoir of liquid vertically and pulling it out.

7           Bio-Rad is arguing that there is no picture in Ismagilov of a well. But  
8 there's no reason Ismagilov would need to include a picture. The wells are  
9 described in multiple locations. For example, you can take a look at Slide  
10 A-25 in 10X's stack. That describes the collection by micropipettes.

11           Bio-Rad is arguing that there isn't collection disclosed in Ismagilov,  
12 but there is. Other parts of this description include the use in collecting a  
13 standard micro 1.5 millimeter centrifuge tube or a sample tube more  
14 generally. That's collecting the samples. What's being described in this  
15 paragraph is the movement of plugs. That's shown on Patent Owner's Slide  
16 18, they have this passage, more of this passage is at Column 17. And that  
17 passage talks about moving plugs. It's not just moving liquids around.

18           In Column 14 there's a disclosure, which is identified A-21. That  
19 both outlet and inlet ports can communicate with the well. The reason  
20 they're saying that is because you can have a well at either one, that's the  
21 point of Ismagilov. There is collection, there are wells, and there is  
22 collection by micropipette.

23           And there shouldn't be any dispute about what a micropipette is. So if  
24 you take a look at Slide A-27, that's showing a picture of a micropipette.  
25 It's a hand-held device. It tells you on this picture that there's a finger hook.  
26 It's a large device and that's what a micropipette is.

1           If you take a look at Slide A-28, Bio-Rad's expert admitted that that's  
2 a micropipette, and that's a picture of it.

3           If you take a look at Slide A-30 that explains that you can't use  
4 micropipettes horizontally. They have to be used vertically. The  
5 micropipette is a well-known piece of laboratory equipment and its use is  
6 well known. These are general descriptions and general instructions for how  
7 you use them.

8           Now Patent Owner's Slide 19 refers to a separate article that Your  
9 Honors have already pointed out that showed a picture of a capillary, not a  
10 micropipette. Bio-Rad hasn't pointed to anything that describes a  
11 micropipette as being inserted horizontally as they're explaining. That  
12 picture was shown to Dr. Fair in his deposition. Dr. Fair explained, in  
13 Exhibit 2017 at Page 150, Line 25 through Page 151 at Line 11 that those  
14 did not look like the ends of micropipettes. Dr. Fair also confirmed that the  
15 paper called them glass capillaries and Dr. Fair said that they did not look to  
16 him like they were micropipettes. Micropipettes can't be inserted the way  
17 Bio-Rad is arguing.

18           And Bio-Rad can't have it both ways on the size of the outlet. Bio-  
19 Rad is starting their argument by saying the holes are too small and that they  
20 are smaller holes that are made by cork borers. But if they're less than a  
21 millimeter as Bio-Rad is asserting, then there isn't any dispute that a  
22 micropipette tip would be too large to insert into them. Bio-Rad has said  
23 micropipette tips are a millimeter.

24           What Bio-Rad is pointing to, particularly in terms of cork borer, is  
25 confirming what Ismagilov described as a collection well. The cork borers,  
26 which are described, which are shown on Slide A-32, shows the holes that

1 are made by cork borers. And then on Slide A-37 shows that Bio-Rad's  
2 expert didn't know what size the cork borers were. She was asked whether  
3 cork borers at the time came in sizes other than 1 millimeter. She said she  
4 didn't know what sizes they came in despite offering an opinion based  
5 specifically on the size of cork borers. Dr. Fair did know what size cork  
6 borers came in. He said they could be 2 millimeters, they could be 4  
7 millimeters, he cites evidence showing that.

8       These are again well known pieces of laboratory equipment and they  
9 have much larger sizes than what Bio-Rad is arguing.

10       Bio-Rad also argues on Slide 35 that Dr. Fair hasn't personally  
11 withdrawn a droplet by micropipette. But that's irrelevant whether Dr. Fair  
12 has personally done that or not. Dr. Fair testified right before this, at Page  
13 42, Lines 21 through Page 43, Line 4, that using micropipettes to remove  
14 droplets is a standard industry practice. He said removing droplets by  
15 micropipette "Was a standard industry way to starting with the microscopic  
16 plate, 96 well plate." Then he goes on to describe how he used those to  
17 other locations using that micropipette tip and that he would repeatedly put  
18 the micropipette tip in and move the droplets to other locations.

19       Dr. Fair also testified in his Declaration that he was personally  
20 familiar with micropipettes. So if you take a look at the Declaration in the  
21 086 IPR, that's Exhibit 1008 at Paragraph 130, he describes that. The fact  
22 that he didn't use them to remove, here the question asks about a single  
23 droplet, doesn't negate his familiarity with how they're used and how they  
24 can work. And that was all well-known. He offered detailed opinions about  
25 that.

1           Moving on to Quake and the droplets. Bio-Rad again points to Dr.  
2 Fair's testimony about this. And Dr. Fair testified specifically regarding  
3 what was shown in Figure 6, that what was shown in Figure 6 was not  
4 specifically in that example related to droplets. But Dr. Fair wasn't  
5 testifying about the surrounding disclosures or saying that it couldn't be used  
6 for droplets or that that would be in any length accountable to Quake. And  
7 in fact Dr. Fair explained in his Declaration at Paragraph 44, in his second  
8 Declaration I should say, at Paragraph 44, that Quake elsewhere disclosed  
9 the same structure was used with droplets. And that avoids any doubt that  
10 one of ordinary skill would have known that the pipette is to be used with  
11 droplets.

12           And actually if you take a look at Slide 12 in the Patent Owner's  
13 stack, Patent Owner cites Paragraph 197 of Quake. That's the very same  
14 paragraph that describes that these embody in Figure 6, which 10X is  
15 specifically relying on and is shown in Petition in Figure 8, can be used, in  
16 the middle of that paragraph, it says in the system but flow control can be  
17 provided by both its electrodes for electronic control or by capillary for  
18 pressure driven control. That pressure driven control is exactly what  
19 Ismagilov uses for droplets, and that's being disclosed in place as well.

20           Bio-Rad then disputes that the disclosures, or that Ismagilov, there  
21 would be motivation to combine Ismagilov with Quake. There isn't any lack  
22 of motivation and 10X has explained that at length both in its Petition and  
23 from its expert.

24           Bio-Rad's argument in fact points to what the motivation is. If it's  
25 found that there is no sufficient disclosure for wells one of ordinary skill  
26 would have needed to look somewhere to find out where that structure is,

1 they would have looked to Quake. This is not a case like *Free-Flow*  
2 *Packaging* where the petitioner merely relied on similarities between the  
3 references. 10X has relied on a number of different things, including the  
4 (inaudible), including that if you were trying to understand what the  
5 structure is in one device, you would look to a similar device that had the  
6 same structure that's being described.

7 In *Free-Flow Packaging* the petitioner had argued for the combination  
8 because both patents are simply directed to the same problem. And that's  
9 not at all what 10X is arguing.

10 So if the Board believes that Bio-Rad is correct and Ismagilov does  
11 not sufficiently disclose the structure of the well, the combination of Quake  
12 addresses that problem specifically in Ismagilov.

13 And wells were well-known structures at the time, which Dr. Fair has  
14 also explained, those have well-known meanings. There isn't any  
15 significance in that Ismagilov didn't copy that particular disclosure  
16 complaint because those are the sign that Ismagilov were well-known  
17 structures.

18 Also I want to address the point that neither Dr. Fair nor 10X has used  
19 hindsight in its obviousness combination. In both the Petition and in Dr.  
20 Fair's analysis there was word from Ismagilov's disclosures through the  
21 motivation of what one of ordinary skill would have found. And they would  
22 have been motivated to look from Ismagilov to Quake to find the details on  
23 the wells. And that made the combination obvious. It was explained that  
24 Quake was well-known and it was explained why specifically if there's a  
25 problem in Ismagilov, it was solved by Quake. The obviousness analysis  
26 requires of course lining up the combination with the claim. You can't do an



1 obviousness analysis without knowing what the claimed invention is. And  
2 that's what Dr. Fair was describing in his testimony that the Patent Owner  
3 was referring to.

4 The mechanical order of preparing a declaration that you first need to  
5 see what the claims cover and then we need to identify the relevant part, is  
6 not hindsight. The claims were not used as a template for the combination  
7 and they were not the road mark.

8 And, Your Honors, if I could go back just to claims 2 and 3 for a  
9 moment that you had asked me about earlier in the argument today.

10 JUDGE ROESEL: Counsel, did Patent Owner touch on claims 2 and  
11 3 in its arguments?

12 MS. JAMESON: No, Your Honor, I don't believe that they did allege  
13 specific, different questions. And let me direct you to one other part of  
14 Exhibit 1026.

15 JUDGE ROESEL: Well I think rebuttal is limited, as I said in the  
16 beginning, to responding to what Patent Owner's presented. So I think we'll  
17 have to not hear that argument.

18 MS. JAMESON: Thank you, Your Honor. And then that concludes  
19 questions you asked.

20 JUDGE ROESEL: Thank you.

21 MR. BAKER: Thank you, Your Honors. Just a couple of sur-rebuttal  
22 points if I may.

23 Number one, a fundamental assumption that Petitioner is making and  
24 that their Petitions and this idea that you would use a micropipette to collect  
25 from a well or reservoir. We of course pointed to the deposition testimony  
26 of their own expert, Dr. Fair, where he said he's never done it, they said he

1 had and that testimony is irrelevant. It's not irrelevant, it is highly relevant.  
2 It is the only evidence in the record and it says, their own expert says that  
3 he's never done it.

4 Now in his declaration he said Quake was well known to do this, but  
5 the proof is in the book, and when I asked him "Have you ever done it?" he  
6 said "No." And he said he'd never done it to this day. So that's highly  
7 relevant testimony on a critical issue with the Petition's hedge on.

8 My second point would be, you know, they talk about the fact that  
9 Ismagilov mentions making holes or bores, but what they don't say is that in  
10 the same place, Column 15 where he mentions cork borers he said that the  
11 holes can be made with a syringe needle. If I did adopt his huge cork bore to  
12 make a well that's big enough to separate chip droplets, it's simply  
13 hindsight. And they say no, this is not hindsight, we're not using the claims  
14 as a template, but that's actually exactly what they've done.

15 If you go to Slide 34 of Patent Owner's deck in their reply this is  
16 exactly what they've done. They've used the claims of the template. On the  
17 left side is the infringing device. And then they draw, they use that template  
18 and literally draw their own well that they say is an illustrative example of  
19 the Ismagilov collection well. There's nothing illustrative about it at all.  
20 Ismagilov doesn't use collection wells, and he certainly doesn't use a well  
21 with these dimensions. They pick these specific dimensions to try to match  
22 it up in claims and make it seem like a separation chamber. They say that  
23 the thickness is 1 centimeter but as Ismagilov explains, that the thickness can  
24 go all the way down to 1 micron. There's no reason to use 1 centimeter.  
25 But the diameter they've chosen is at least 1 millimeter because that's what  
26 they say is the minimum diameter of the micropipette. But there's no reason

1 to use 1 millimeter. They're picking these specific dimensions because they  
2 want to make the well in Ismagilov look like a separation chamber. They  
3 start with the idea that you're going to separate and collect and work  
4 backwards.

5 With that, Your Honor, I will rest unless the Board has any further  
6 questions for me.

7 JUDGE ROESEL: No further questions. I think at this time we're  
8 going to take about a 10 minute break. So I have 1:51. How about we  
9 reconvene at approximately 2:02.

10 MR. BAKER: Thank you, Your Honor.

11 JUDGE ROESEL: Thank you.

12 (Recess)

13 JUDGE ROESEL: Okay. The same rules as before, and we will now  
14 proceed to IPR2020-00087 and 89, the Petitions that address the Thorsen  
15 grounds.

16 MR. GERRITY: Thank you, Your Honor. Robert Gerrity, also of  
17 Tensegrity on behalf of Petitioner. I'll be addressing these Thorsen based  
18 petitions. Our slides on these are in the B slide deck, and I'll start with Slide  
19 B-1, which is a summary of the Thorsen reference.

20 This is a doctoral thesis from Cal Tech from 2002. Dr. Thorsen  
21 describes the development of a droplet-based microfluidic device for high  
22 throughput chemical screening. There's really no dispute here that he does  
23 teach and disclose the droplet formatted related aspects of the claims. Again  
24 our discussion today I think will focus as it did per Ismagilov on the  
25 separation chamber related limitations with the claims.

1 For those, Thorsen teaches two separate structures, each of which  
2 independently discloses a separation chamber of the challenged claims. He  
3 teaches an incubation chamber, and we'll talk about that. He also includes  
4 outlet wells or collection wells, which again independently are separation  
5 chambers as well.

6 Looking at Slide B-2 this is a summary of the Thorsen-based grounds.  
7 There are three anticipation grounds based on whether you read Thorsen  
8 Chapters 3 and 4 together or separately.

9 There's a single referenced obviousness ground, Ground 2, and then  
10 there are two obviousness grounds based on the combination of Thorsen and  
11 Ismagilov.

12 I'm going to begin by discussing portions disclosures specifically,  
13 which relate of course to the Ismagilov grounds and the single reference  
14 obviousness ground. The claim language again is repeated on Slide B-3  
15 through B-5 for the independent claims.

16 I'd like to start at B-6 by talking about claim construction before we  
17 dig in. For the Thorsen-based petition, they're proceeding solely under Bio-  
18 Rad's interpretation of the claims. At the Petition stage we did not have  
19 constructions until we based proposed constructions for Bio-Rad in the  
20 Petition based on their infringement contention. You see those at Slide B-6  
21 in the center column. We now have formal constructions from Bio-Rad  
22 from their Patent Owner Response, that's in the right-hand column. We will  
23 be discussing these three terms in particular, separation chamber, sample,  
24 and droplet receiving outlet.

25 As we discussed in the Reply and as I'll discuss today, even under  
26 Bio-Rad's formal constructions, all of these limitations that are disclosed

1 and all the challenged claims are invalid. So even if Your Honors, whether  
2 you proceed with the Petition-based construction or Bio-Rad's formal  
3 construction, the result will be the same here.

4 At Slide B-7 there are a couple of other terms where Bio-Rad has  
5 proposed construction then disputed their meaning, like "coupled" and  
6 "polymerase chain reaction." I don't think any of the disputes that are now  
7 briefed up are going to turn on either of those terms or construction, but  
8 certainly as we proceed today if you have questions about any of them I'm  
9 happy to address those.

10 Turning to Slide B-8, I'd like to start by focusing on Thorsen's  
11 incubation chamber and why that discloses the challenged claims. There's  
12 really only three disputes here as to the independent claims. First is whether  
13 it is a separation chamber, second is whether it includes a droplet receiving  
14 outlet, and third, something they raised in their Patent Owner Response but  
15 is not argued in their Sur-reply or in their demonstratives today, is whether  
16 the incubation chamber disclosures include a sample.

17 I'll start with separation chamber. The big difference here from what  
18 we just talked about in the context of Ismagilov, there's no dispute that  
19 Thorsen's incubation chamber discloses all the size and orientation  
20 requirements of the separation chamber. There's no dispute that it's upright,  
21 vertical, perpendicular, out of the channel or out of the plane of the channel  
22 or that it's got a wider cross section than the channels. Those are all  
23 undisputed and addressed in the Petition.

24 Instead, the only dispute raised by Bio-Rad as to the separation  
25 chamber limitation or Thorsen's incubation chamber is whether it separate  
26 droplets from oil.

1           And as we dig in on that let's keep in mind their proposed  
2 construction of separation chamber, mainly that it be a chamber sized to  
3 accommodate multiple droplets and an immiscible fluid in separated form.  
4 The construction is just that it has to be big enough, big enough to hold  
5 droplets and oil, multiple droplets and oil in separated form.

6           We turn now to Thorsen's disclosures of that. Looking at Slide B-10.  
7 These are passages from the thesis at Pages 99 and 101. Throughout these  
8 slides, and as we discussed today I'm using the exhibit stamped page  
9 numbers of the Thorsen exhibit, exhibit stamped Pages 99 and 101.

10           He tells us here that he added the incubation chamber for a specific  
11 purpose. It's to accommodate chemical screening reactions for incubations  
12 of several minutes to a few hours are optimal. So he's added this chamber  
13 so that the reactions can take place before he sorts them in his height  
14 through-put chemical screening, trying to run a reaction that will have a  
15 desired result in some of the droplets but not in others. And then he'll sort  
16 the good droplets to one side, the bad droplets to another after this chamber.  
17 But that reaction takes time to complete, that's what he created this chamber  
18 for.

19           He tell us it's large, about 500 microns high, significantly larger than  
20 his channels. And he also tells us the volume, he tells us how it was made.  
21 That it was made by using a microliter of resist to prevent the PDMS  
22 material from filling this cavity. And so we know the volume is on the order  
23 of a microliter. And Dr. Fair has analyzed Thorsen and testified that  
24 Thorsen's droplets are on the order of a picoliter, that's one 1 millionth of a  
25 microliter. And so given that the droplets are on the order of 30 picoliters,  
26 this chamber has room to hold 300,000 of Thorsen's droplets. It certainly is

1 a chamber sized to accommodate multiple droplets and an immiscible fluid  
2 in separated form.

3 Beyond those textural disclosures in Thorsen, Thorsen also has  
4 pictures of the incubation chamber. For that I'll turn to Slide B-11. This is  
5 Thorsen Figure 3.28 which has a few sub-parts. In Part A you see a  
6 schematic diagram of Thorsen's system. At the top of that schematic  
7 diagram you have the droplet formation junction where the droplets are  
8 formed. They then flow towards a dark circle, black circle in the middle of  
9 the figure, that's the incubation chamber. They then leave that circle and  
10 they progress downwards towards the sorting valves. Those valves are  
11 controlled by those gray lines to again sort the good droplets in one  
12 direction, the bad droplets that didn't have the desired reaction in the other  
13 direction.

14 Box B of the same figure is a photograph of the incubation chamber  
15 entrance and the droplet formation region. Box C is a photo of the  
16 incubation chamber exit and the channel that leads out of the chamber into  
17 those sorting valves.

18 Turning to Slide B-12, Thorsen also took a picture of what happens  
19 inside the chamber, that's Figure 3.29. Remember that Thorsen is built up  
20 using an inverted microscope to take these pictures so he's actually looking  
21 up through the bottom of the cover slip into the chamber. And we see at  
22 Figure 3.29 a stream of droplets entering the chamber. We see them  
23 collecting and separating out at the bottom of that glass cover slip in a big  
24 clump in the middle of that figure, the dark region. And we're looking at it  
25 upwards, and we're seeing the left and right dimension. We also see to the  
26 left and the right clear regions of just oil. That's oil separated out with no

1 droplets in it. We also have Dr. Fair's testimony that based on the different  
2 density of these fluids, there's going to be an inherent vertical separation as  
3 well because the oil enforcement system is mineral oil, less dense than  
4 water, it will float to the top, rise to the top, and the droplets will sink to the  
5 bottom.

6 As Dr. Fair testified --

7 JUDGE McGRAW: Excuse me, this is Judge McGraw. I do have a  
8 question about this figure. How can we be certain that the droplets are  
9 actually sinking to the bottom as opposed to, and I think Patent Owner had  
10 argued that we cannot tell where along the plane these droplets are?

11 MR. GERRITY: Let me address that. In Patent Owner's Preliminary  
12 Response they acknowledged that this figure shows the drop in focus and  
13 that they actually tried to make a different argument, but they acknowledged  
14 and showed them in focus and they made a big deal about the narrow focal  
15 range of this microscope. That alone confirms that they're on the bottom  
16 because they're in focus and where you see a narrow focal image.

17 But you are right that they've now made the argument that maybe  
18 there's an additional stack of droplets piling up towards the top of the  
19 chamber, maybe there's oil in between that. We know from their densities  
20 that they are going to sink, there's no dispute that the densities are different,  
21 that the mineral oil density is less than the water droplet density. And that's  
22 noted that because of that density difference they will sink.

23 I will address what appears to be Patent Owner's argument for the  
24 first time in Sur-reply that somehow to meet the claims you have to remove  
25 100 percent of the oil from between the droplets. And that's just



1 inconsistent with any positions they've taken before in this proceeding. It's  
2 also directly inconsistent to positions they've taken at District Court.

3 But to your question, we do know that at least some of the droplets are  
4 right there in the coverslip because we see them in focus, you know, that  
5 they have sunk to the bottom. There may be droplets on top of them that are  
6 pushing down on them because of the density difference, but there's going to  
7 be a clump of droplets collected at the bottom.

8 And again, looking at the left and right side regions we see clear  
9 regions of just oil. And comparing that back to the actual claim construction  
10 proposed by Patent Owner, we certainly see from this picture that it is a  
11 separation chamber because it is sized to accommodate multiple droplets and  
12 immiscible fluid in separated form.

13 Dr. Fair's testimony --

14 JUDGE McGRAW: Judge McGraw again. Can the Board simply  
15 accept the parties' claim constructions, or does the Board have an obligation  
16 to independently construe separation chamber and determine whether or not  
17 some form of separation of the droplets needs to occur within the separation  
18 chamber?

19 MR. GERRITY: So here in this Petition there's really only one  
20 party's proposed construction, they are all under Bio-Rad's proposed  
21 construction, there's no 10X proposed constructions here. What we have are  
22 our best guess of their construction before institution. And now their formal  
23 construction after institution.

24 So the Board can and should proceed under Bio-Rad construction.  
25 The result will be the same. I don't believe any of the disputes today turn on  
26 whether to adopt our pre-institution guess at their construction or their

1 formal post-institution construction. If you do believe that the disputes do  
2 turn on that you can look at this issue. But there is a difference in the  
3 surrounding claim language between the 837 and 722 patents, and that can  
4 be addressed.

5 Here it seems to be agreed that Bio-Rad's view, when you're  
6 construing just the separation chamber, whether it is that chamber or not, it's  
7 just a chamber size to accommodate all the droplets and immiscible fluid in  
8 separated form. We take them at their word on that and for purposes of  
9 evaluating these claims.

10 JUDGE MCGRAW: Can you address Patent Owner's argument that  
11 the incubation chamber cannot be a separation chamber because the material  
12 that enters the chamber is the same as the material that exists the chamber?

13 MR. GERRITY: Absolutely. Let's turn for that to Slide B-17. This a  
14 portion of their sur-reply argument. That's really the first time they made  
15 this argument was in sur-reply. The first time that they argued that 100  
16 percent of the oil has to be removed from between the droplets and then a  
17 mixture of oil and droplets leaving the chamber would not meet the claim.

18 Now the fact that they raised that for the first time in sur-reply is  
19 already one basis to discount that or give it little weight. But I also address  
20 that it is directly inconsistent with other statements they made both to  
21 District Court, the United States District Court, and to this Board.

22 Looking first at Slide B-18, they proposed a claim construction in  
23 District Court of separation chamber, and it's exactly the same construction  
24 they proposed here, merely that the chamber has to be big enough to hold  
25 multiple droplets and immiscible fluid in separated form.

1 In briefing that claim construction and arguing for it at the District  
2 Court, this is at Slide B-19, the Patent Owner told the District Court in no  
3 uncertain terms “The claims of the 837 patent are directed to an assembly.  
4 They do not require separation to occur.” But then they disclaimed this  
5 argument after the 837 patent.

6 To address Your Honor’s question and the inconsistency for the 722  
7 patent, I would direct you to their infringement contentions, which are  
8 Exhibit 1026, and that’s in the 089 IPR, 089 IPR Exhibit 1026. It’s not in  
9 the demonstratives so I’ll give you a minute to bring it up. But I think it’s  
10 useful for us to look at together. In particular I’m going to look at pages 21  
11 and 22.

12 At page 21 you’ll see on the left-hand side the claim language by Bio-  
13 Rad is saying is infringed, and on the right-hand side, the right-hand column,  
14 their disclosures from 10X documents they rely on. But here we’re looking  
15 at the separating step of the 722 patent. The claim limitation that requires  
16 separating a plurality of droplets from the immiscible fluid in the separation  
17 chamber based on the different densities of the droplets and the fluid.

18 Looking at page 22, you’ll see an image at the bottom, a figure taken  
19 from 10X’s diagram. Just above that is a line that starts “After dispensing,”  
20 which they quoted from 10X’s literature. It says “After dispensing the  
21 GEMS,” those are the droplets “into a PCR plate,” that’s the second vessel  
22 that Bio-Rad says the droplets are moved to, “Note that a thin layer of  
23 Partitioning Oil (clear) will naturally separate after GEMS are allowed to  
24 settle for (greater than) five minutes.” This tells you that even in their own  
25 infringement contentions they said you can pipette the droplets out of the

1 well, move them over to another vessel after the separating step, and they  
2 can still contain partitioning oil, they can still contain immiscible fluid.

3 And you see that in the figure as well. The figure shows that the  
4 droplet formation junction, using a dark blue color for the oil flowing in, and  
5 a light blue color for the circle of droplets. And under Bio-Rad has drawn a  
6 box around this step of the collection of the droplets. And you can see it  
7 shows light blue circles with these colored beads inside of them, all still  
8 surrounded by dark blue oil.

9 So even once they're collected, they're still collecting those droplets  
10 and oil. And in fact Bio-Rad's characterization, in a parenthesis here in their  
11 contention, characterizes that diagram as "Showing a plurality of droplets  
12 separated by immiscible fluid in the separation chamber." So not only  
13 infringement contentions and the way that they read the separation step, still  
14 contains a mixture of drops and oil.

15 So their position here in sur-reply that you have to remove 100  
16 percent of the oil is just simply contrary to that and is not consistent with  
17 what they said before.

18 JUDGE MCGRAW: I believe Patent Owner also argued that there is  
19 no separation when it's the same quantity of droplets and oil that enter and  
20 leave the chambers. Can you address that argument?

21 MR. GERRITY: Again, I believe that's raised for the first time in  
22 their Sur-reply. I don't see any support for that in the claim limitations or  
23 their proposed constructions. I'm not sure what limitation they're linking  
24 that to. Again, the separation chamber construction they have proposed is  
25 that is it big enough to hold these things. And it is.

1           And additionally, if we look at Thorsen and what Thorsen does, it  
2       leaves a great deal of oil behind in the chamber. Recall the chamber, the  
3       volume of the chamber is a microliter, big enough to hold 300,000 droplets.  
4       That's going to leave, you're going to leave a lot of oil behind in that  
5       chamber, and just the droplets are flowing out through the channel as they  
6       exit.

7           I'll note just for Your Honors, that Slide B-20 and B-21 in the  
8       Ismagilov Petitions that we've just addressed, there was a claim construction  
9       dispute about whether the outlet should receive substantially only droplets  
10      because in those Petitions 10X did propose its own affirmative construction.  
11      Bio-Rad argued against that construction. They argued against any  
12      construction of the outlet receiving substantially only droplets from the  
13      chamber and that institution of the 086 IPR based on Ismagilov Your  
14      Honor's sided with Bio-Rad's construction. And in their Patent Owner  
15      Response there, Bio-Rad said that the Board, this is at Slide B-21, quoting  
16      their Patent Owner Response at 26, Bio-Rad said "The Board correctly  
17      rejected Petitioner's second alternative construction requiring that  
18      substantially only droplets exit the chamber through the outlet because it is  
19      inconsistent with the specification and depending claim 10 of the 837  
20      patent."

21           The Patent Owner has said that their own argument that they're now  
22      making is inconsistent with the patent specification and dependent claims.

23           Looking at some of the specification they quoted in that same  
24      briefing, this is at B-22, they rely on Column 4, Lines 12 through 16 of the  
25      specification, which describe an example of using mineral oil and water  
26      droplets, just as Thorsen does. And in that example, the patent notes that the

1 droplets will sink because mineral oil is lighter, lower density. And it  
2 describes that you would then place the outlet at the bottom of the chamber,  
3 again, just as Thorsen does.

4 Moving ahead to Slide B-24, there's also disclosure in the 837 and  
5 722 patent specification that the separation chamber outlet can be connected  
6 to a channel just as it is in Thorsen. It says here that the outlet is connected  
7 to a channel, it describes, this is at Column 53, Lines 38 to 46 of the 837  
8 patent describes the continued flowing of the immiscible fluid is what moves  
9 the droplets through the chamber to the outlet and into the channel. That's  
10 how Thorsen works as well, the continued flowing of Thorsen's fluid to  
11 move the droplets through the chamber and into the outlet channel.

12 With that, your Honor, I'll turn to the second dispute at slide B-25 if  
13 I've addressed your questions on the separation chamber. The second  
14 dispute is, is there a droplet receiving outlet? Bio-Rad argues there is no  
15 droplet receiving outlet in the incubation chamber, but again let's look at  
16 what their proposed claim construction is. There needs to be a portion of the  
17 separation chamber where droplets are collected. We see that in Thorsen.  
18 Looking at slide B-26, again this is figure 3.28, we see that there is a channel  
19 where droplets exit the incubation chamber. They are collected from the  
20 chamber at that outlet channel so that they can be further used, right. That's  
21 the entire purpose of Dr. Thorsen's device, so that you can then collect them  
22 after the reaction has occurred and sort them, good from bad, at these valve  
23 systems. But we know that they're collected out of the chamber right there  
24 at that outlet shown in Box C.

25 Looking at Slide B-27, there's another image showing this. This is  
26 Figure 3.29B. The B aspect of that figure shows the sorting valves, again,

1 and show the picture of a little circle at the right-hand side of the B box  
2 being sorted to the right. That is a droplet that has been collected from the  
3 chamber and is being sorted to the right using the valves. Thorsen  
4 confirmed in his text that after about an hour all of the droplets had passed  
5 entirely through the cavity and reentered the narrow 60 micron-wide outlet  
6 channel. The droplets are in fact collected at that outlet channel. It is a  
7 portion of the chamber where droplets are collected.

8 Slide B-28 is another passage from Thorsen. This one of Thorsen,  
9 page 111. Here he's describing an example test he did with the incubation  
10 chamber where he was sorting red drops from green droplets. He added red  
11 and green dye to different droplets, sorted them based on their color after  
12 they passed through the incubation chamber, and he said: Droplet frequency  
13 passing through the detection region was low with a single droplet or a small  
14 cluster of droplets leaving the microcavity of the incubation chamber and  
15 passing through the detection region every few seconds.

16 This tells us again not only he collected the droplets out of the  
17 chamber, but to the extent that Bio-Rad is now arguing their construction  
18 requires aggregating the droplets, clumping them together in some way, but  
19 we saw that that happens in the chamber, too. We saw that in the picture.  
20 We also see it here that sometimes the droplets exit the chamber in a small  
21 cluster so they are collected. Whatever meaning of that term, Bio-Rad is  
22 now trying to give as a construction of its construction, and again, Thorsen  
23 confirms that at the end of his experiment that thousands of sorted droplets  
24 were collected in each well, and he actually did a pretty good job sorting  
25 them. Only a small fraction, 1 to 2 percent were of the wrong dye type.

1           There is discussion of that same concept from Dr. Fair. I've  
2 highlighted some of that at slide B-29. Again, and again at slide B-30, I've  
3 repeated that specification text from the 837 and 722 Patents confirming that  
4 the outlet can be connected to a channel, and that you can use an immiscible  
5 fluid to move the droplets through the chamber and into a channel just as  
6 Thorsen does. A last dispute, Your Honor, is sample. Because that's not  
7 addressed in Bio-Rad's Sur-reply and not in their demonstratives today, I'd  
8 like to reserve that for rebuttal and see if they raise it today or if they have  
9 dropped that dispute, but if Your Honors have any questions about the  
10 sample related to the incubation chamber, I'd be happy to address that.

11           With that, I'll move ahead to slide B-38, and I'd like to turn to  
12 discussing Dr. Thorsen's outlet wells and why they also independently  
13 disclose the separation chamber. Here there's four disputes. The first is the  
14 size and orientation related aspects of the separation chamber. The second is  
15 whether separation occurs. That's really the same argument we just  
16 addressed. There's the sample dispute, and another droplet-receiving outlet  
17 dispute. I'll start with the size and orientation requirements of the claim.

18           Looking at slide B-40, this is the passage we just looked at from  
19 Thorsen at page 111. He confirms that his outlet wells collect thousands of  
20 sorted droplets. That tells us something about their size and orientation  
21 (inaudible) large to collect the thousands of sorted droplets in his red/green  
22 experiment. For one thing it tells us their proposed claim construction isn't  
23 met. Certainly the outlet well is a chamber sized to accommodate multiple  
24 droplets and an immiscible fluid in separated form because it contains  
25 thousands of droplets.



1           As Your Honors found at institution, containing thousands of droplets  
2 also support that's going to be vertical and upright for how Thorsen  
3 fabricates his system, and that it's going to have a wider cross-section than  
4 the channels because the channels are depicted as only having room to  
5 accommodate one droplet. Thorsen's figures also support this, looking at  
6 slide B-41. This is Figure 4.2. You'll see his plus and minus outlet wells.  
7 Plus and minus again is denoting this good and bad droplet result. One well  
8 is collecting all the good droplets; one well is collecting the bad droplets;  
9 they are both depicted as substantially wider in cross-section than the  
10 channels just as the claims require.

11           JUDGE MCGRAW: Is there any indication in Thorsen that Figure 4  
12 is drawn to scale? How do we know that just because these circles at the  
13 plus and the minuses are larger than the serpentine channel, that in fact the  
14 wells are larger than the channel?

15           MR. GERRITY: And I think that the best disclosure and support for  
16 that is his disclosure that accommodates thousands of sorted droplet whereas  
17 in 4.2 you can see the zoom-in of the channel, is that little photograph blow-  
18 up shows that the channel is barely wide enough to accommodate one  
19 droplet, so we know that they are going to be wider in order to accommodate  
20 many droplets. Looking back again at slide B-40, he tells us a little bit more  
21 about that red/green test. He says also that the PM -- this is in the middle of  
22 the paragraph -- the PM2 readings- this is the device he was using to  
23 measure whether he sorted successfully or not were not especially useful as  
24 neighbor droplets washed out the signal from improperly sorted droplets.

25           But this again suggests that there is neighbors getting in the way of  
26 each other. He tried to visualize this well which again tells us it's wide

1 enough to accommodate multiple droplets across just as is depicted in Figure  
2 4.2. But if Your Honor is correct, there's not a scale bar there, but it is  
3 consistent with all of his disclosures of how the outlets worked.

4 JUDGE MCGRAW: And how do we know that this outlet well  
5 would be upright to the micro channel?

6 MR. GERRITY: Well, let's take a look for that at slide B-42, Your  
7 Honor, and this really goes to his fabrication technique. This is Thorsen's  
8 Figure 3.27, and here it's what he describes as the multilayer soft  
9 lithography technique that was used to generate his device and got multiple  
10 steps to it, and this is sort of a representative diagram. He's not just making  
11 a straight red line and a straight blue line, but those are to represent the  
12 layers of channels. You see in the first step he's making a thin layer with  
13 this red line that represents the flowing channels. That's where the fluids  
14 will actually flow and where droplets will form. Those channels are  
15 patterned on the bottom of that thin layer. He then also at the same time is  
16 creating a thick layer, a poured thick layer of PDMS with this blue line, and  
17 he tells us that blue line is actually a series of channels to control the valve,  
18 not where the fluid flows, but he needs that to open and close the valves to  
19 do his sorting.

20 He then puts that thick layer on top of the thin layer and cures them  
21 together. That way the valves can actuate so we know that there's a pattern  
22 of channels at the very bottom, a thin layer of PDMS on top, and then a  
23 further thick layer on top of that. That's the finished structure, and then he  
24 punches the wells vertically down through all of those layers to form the  
25 inlets and outlets. The Patent Owner actually agrees that's how he forms the  
26 wells here. There's no dispute on that. That's at slide B-43 from the Patent

1 Owner's Response at 2. Thorsen fabricated the openings in his devices by  
2 punching holes in the microchip itself at the channel ends as was standard  
3 practice at the time.

4 So we know the channels are only patterned on the bottom of that thin  
5 layer, and we know the outlet wells are punched through the entire chip  
6 including that thick layer on top. So we know there's going to be a vertical  
7 perpendicular upright aspect to the outlet wells as well. And then slide B-  
8 44, I've just summarized in a few bullets, prepare support for what we just  
9 walked through which is that, oh, the collection of thousands of droplets, the  
10 fabrication techniques, and the understanding of a person of ordinary skill in  
11 the art all confirm that the size and orientation limitations would be met.

12 JUDGE MCGRAW: Now, are the outlet wells that are used in the  
13 system of chapter 3 the same outlet wells that are described in the system  
14 just of chapter 4?

15 MR. GERRITY: Yes. And there's no --

16 JUDGE MCGRAW: And then --

17 MR. GERRITY: He has a single section describing how he forms his  
18 devices, and then he describes two uses of them, of the incubation chamber  
19 example and the serpentine example. There's been no dispute between the  
20 parties that he's done something differently in chapter 4. The other support  
21 for that, Your Honor, is that in describing how he made chapter 3, although  
22 it comes earlier in the chapter numbering, chapter 3 is actually a  
23 modification of the chapter 4 system. He tells us he replaced the serpentine  
24 outlet- channel that's in chapter 4 with the incubation chamber because it  
25 was a more space-sufficient way to let the reaction take place. So that

1 suggest the outlet wells are unchanged, right. The only different between  
2 the two is replacing the serpentine channel with the incubation chamber.

3 At institution Your Honors credited these same disclosures that's  
4 slides to B-45 through B-48. At slide B-49, I'll address what I expect to be  
5 Bio-Rad's argument here and has been their argument since before  
6 institution. They've argued that the outlet well could be just the same height  
7 as the channel; that it can be very wide but not very tall. They've never  
8 cited any evidence in Thorsen that it was made that way. They still have  
9 not, and you noted that at institution, they still have not corrected that  
10 missing evidence, and moreover Dr. Fair explained that if you tried to do it  
11 that way, you would actually break Thorsen's system, and that discussion  
12 from Dr. Fair is at slide B-50, and again this relates to how Thorsen's system  
13 is built because he patterns the channels on the bottom of the PDMS layer  
14 and then punches the outlet well through the entire thickness, if they were  
15 the same height, that would mean that the channels also extend through the  
16 whole thickness of the PDMS which would mean the channels are open on  
17 the top exposed to the air.

18 That would break Thorsen's system because he actually needs to  
19 create a pressure buildup to flow his fluids through and form droplet. And  
20 Dr. Fair walk through all of that and pointed to Thorsen's disclosures of  
21 using pressurized fluids to form the droplets as well as the fabrication steps  
22 that confirm you could not make the outlet wells in Thorsen nearly the same  
23 height and the same plane as the channels.

24 The next dispute, Your Honor, at slide B-51; this is whether  
25 separation occurs in the outlet wells. Again I think we've walked through  
26 that, but Dr. Fair explained and Thorsen makes clear the density is different

1 between the droplets and the oil. The droplets will sink to the bottom of  
2 those outlet wells. They will separate out in the outlet well.

3 I'll turn now to slide B56. This is a dispute over "sample." There's a  
4 few aspects of this dispute. There are sample-related limitations in both  
5 claims. First, Thorsen discloses in chapter 3 that he uses red and green dye  
6 inside the droplets in his droplet-sorting experiment, and that meets Patent  
7 Owner's construction of sample. Their proposed claim construction  
8 includes molecules. Inorganic or organic molecules contained in a fluid  
9 certainly include the dye molecules under their construction. They have no  
10 response for why that red and green dye is not a sample sufficient to disclose  
11 these limitations.

12 As to chapter 4, Patent Owner admits that the bacteria cells used in  
13 that cell asset are a sample, and recall in chapter 4, he's actually mutated an  
14 *E.coli* bacteria to express an enzyme he's interested in, and he's trying to  
15 determine which ones successfully are expressing the enzyme and which are  
16 not, and again sort good from bad cells with that behavior and without that  
17 behavior. Bio-Rad concedes that's a sample and a disclosure of sample.  
18 Their only dispute is whether it's an enabling disclosure. There's two issues  
19 there. First, whether the reference is enabling is only relevant to the  
20 anticipation crowds. So their concession that it is a sample already answers  
21 this question for the obviousness crowd. He has a disclosure of using a  
22 sample both in chapter 3 for red and green dye, and chapter 4, the cells.

23 As to their argument of enablement for anticipation, their enablement  
24 argument really focuses on Thorsen's discussion of troubleshooting on his  
25 way to developing his prototype. What their argument does not address is  
26 the finished prototype that he discloses. Right. He talks at length about the

1 steps he took to try to arrive at what he describes as “the perfect operating  
2 condition,” while he was developing (inaudible), but he ultimately does  
3 obtain successful results, and we see that in his figures. Looking at slide B-  
4 58, we see that he successfully incorporates bacteria in droplets. That’s  
5 Figure 4.4. There’s no dispute that he’s successfully incorporated sample in  
6 droplets.

7 At slide B-59, Figure 4.5, there’s no dispute that he got some good  
8 results of the florescent assay step as well. And there’s testimony from Dr.  
9 Fair on this issue as well. I summarize that at slides B-61 and B-62. And  
10 lastly, as to this enablement dispute, Your Honor. Your Honors noted at  
11 institution, slide B-63, that the claims don’t require any particular kind of  
12 sample. They don’t require specifically the use of cells or enzymes, just any  
13 kind of sample, and again, as I said Bio-Rad’s proposed construction of  
14 sample is met both by the red and green dye and by the cell example, both  
15 disclosures of Thorsen.

16 Looking at B-64, the last dispute for the outlet wells is whether they  
17 contain a droplet-receiving outlet. Again, Bio-Rad’s proposed construction  
18 is just a portion of the chamber, separation chamber, where droplets are  
19 collected. Their argument hinges on whether or not you could collect by  
20 micropipette, but neither the claims nor their claim limitations specifically  
21 require collection by micropipette. That’s just one example. That’s the  
22 example they use for infringement, but it’s not the example required  
23 specifically by the claim.

24 Thorsen tells, us looking at slide B-65 -- this again is Thorsen page  
25 111 -- he does collect droplets in the outlet well. There’s no question. He  
26 collects them there. He says he does; he collects; he collects thousands of

1   them. So there is a portion of the outlet well where droplets are collected.  
2   That's true for chapter 4 as well, slides B-66 and B-67, show that the  
3   droplets in that example also flow to the outlet well. Slide B-68, this is  
4   looking at some of Dr. Fair's testimony at paragraph 129. It says: He points  
5   to those same passages of Thorsen, and then explains that the droplets will  
6   sink to the bottom of the well. They will collect at the bottom of the well,  
7   and then also have an opening at the top; he explains where you could  
8   collect by micropipette.

9           There was a great deal of discussion about this in the first argument  
10   today that there is a number of places where Dr. Fair has explained in his  
11   declaration that this kind of collection by micropipette by inserting it in an  
12   outlet well was routine and well known, so I've got the citations for his 087  
13   declaration, paragraph 129, 141, 83, 108, and 130. He says again and again  
14   that that use of micropipettes to collect droplets out of wells was routine and  
15   well known, and it's telling that Patent Owner's expert doesn't disagree.

16           There's a lot of discussion, and it was discussion in the first argument  
17   about whether Dr. Fair has personally done it, but their expert does not say  
18   that collection by micropipette was not known at the time. There is no  
19   dispute about that. It just said, well, does Dr. Fair really know what he's  
20   talking about. He does. He's been working in that field for years --

21           JUDGE ROESEL: But wait a minute. Counsel, isn't there a  
22   distinction between collection by micropipette in general, and collection  
23   from a hole on a chip such as the outlet wells disclosed in Thorsen.

24           MR. GERRITY: And, Your Honor, I do understand the distinction  
25   you're making. My point is there's not a dispute between the parties that  
26   both were well known, though, for example, Dr. Fair at paragraph 129 of his

1 087 declaration said using a pipette to remove droplets from an open well  
2 would be routine and well known to a person of ordinary skill in the art. He  
3 repeats that same discussion at some of those other paragraphs I've cited.  
4 He's not just saying that the use of pipettes was known. He is saying that  
5 the use of pipettes to remove from a well was known also, and Dr.  
6 (inaudible) --

7 JUDGE MCGRAW: This is Judge McGraw. I think there is a  
8 dispute, though, as to whether or not the wells of Thorsen are large enough  
9 for a micropipette.

10 MR. GERRITY: That is disputed here, and I will address that, Your  
11 Honor, but I first wanted to make clear that there is not a dispute that it was  
12 well known to do it. A dispute here for Thorsen, as you said, really turns on,  
13 "could you do it with his outlet wells; were they big enough," and they were.  
14 First, Thorsen describes in his fabrication section the use of a variety of  
15 different bore of punch-hole sizes ranging from a half millimeter up to 5  
16 millimeters, and as Dr. Fair explained, the use of punches, a millimeter or  
17 greater including 2 millimeters, 4 millimeters, 5 millimeters was well known  
18 in the art. We see that not just in Thorsen's use of a 5-millimeter punch, but  
19 we saw it in Quake. There's a 2-millimeter punch.

20 We saw in some of the other articles that were used in the party's  
21 reply briefing and the Patent Owner Response other examples of 2-  
22 millimeter and 4-millimeter punches being well known for using in  
23 punching holes to make these outlet wells in PDMS. For example, we talked  
24 at the last argument about the article 2033 relied on by Dr. Anna from  
25 professor George M. Whitesides, we discussed in reply our own Exhibit  
26 1076 which is another G. M. Whitesides' article from the same time where



1 they specifically use a 4-millimeter punch, or a millimeter cork borer that  
2 was commercially available and that matches the example commercially  
3 available cork borers that Dr. Fair disclosed.

4 So, you know, as to whether there's a droplet-receiving outlet, the first  
5 argument is micropipette collection isn't required by the claim, and it's just  
6 required collection of Fair. Even as to micropipette collection, at a  
7 minimum that's obvious, and Dr. Fair explains that it's how one of ordinary  
8 skill in the art would understand a collection well, and certainly they were  
9 readily available punches to make the holes big enough to do that. The other  
10 thing that Dr. Fair discloses in many of those same paragraphs is that the  
11 high-throughput chemical screening used by Dr. Thorsen makes it important  
12 to collect your droplets afterward. The whole point is sorting good droplets  
13 from bad droplets. The only reason to do that is to take your good droplets  
14 and use them for something.

15 But under Patent Owner's proposed misreading of Thorsen, it's  
16 apparently a system where you can't ever get the droplets back out. Why  
17 would you sort them then, right? Why sort your droplets containing a  
18 bacteria that produced your desirable enzyme if you can't get them out of the  
19 well afterward? Of course you can get them out of the well, and an obvious  
20 way to do that and a well-known way to do that was by micropipette. It was  
21 at a minimum one of the known ways to try.

22 With that, Your Honor, I'd like to turn to the dependent claims. This  
23 is at slide B-70. There's a number of dependent claims here where Bio-Rad  
24 has raised no additional disputes, and so those claims should rise or fall with  
25 the independent claims. For the 722 patent, that's claims 5 through 7, 10  
26 through 13, and 15 through 17, and the 837 patent that's claims 2 through 4,

1 10 through 13, and 19. There are a handful of claims Bio-Rad has raised  
2 additional disputes for dependent claims. I'll address those first, and then  
3 I'll be happy to address any questions Your Honors have about the other  
4 undisputed dependent claims.

5 Start it first with 722 patent. Claims 2 through 4 have additional  
6 disputes. That's at slide B-71. I've shown that language and talked about  
7 these a little bit in the first argument. They required the further step of  
8 collecting the separated droplets. Claim 2 collecting them in a vessel.  
9 Claim 3 collecting them in a vessel that happens to be a PCR tube or a test  
10 tube, claim 4. For claim 2, we already looked at the fact that Thorsen  
11 collects the separated droplets. We know that they collect in the outlet  
12 wells. So first, he collects them out of the incubation chamber at the exit of  
13 the chamber. He collects them again in the outlet wells, and then yet a third  
14 time as we've discussed, it would be obvious to further collect them yet  
15 again by micropipette.

16 Looking at slide B-76, whether they're collected in a vessel, and slide  
17 B-77, we've explained that the outlet well itself is a vessel, and we've  
18 compared that to what Bio-Rad has pointed to in its infringement  
19 contentions. They don't seem to dispute that the outlet well could be a  
20 vessel. The argument that Bio-Rad raised as to this claim was if the outlet  
21 well is the vessel, it can't also be the separation chamber, in their view.  
22 Well, recall that Thorsen also has the incubation chamber. The incubation  
23 chamber is the separation chamber. The droplets then flow to an outlet well  
24 where they are further collected in a vessel. That anticipates and discloses  
25 claim 3 as well.

1 For claim 4, slide B-79, there is not an express disclosure in Thorsen  
2 of using a PCR tube or test tube, but we've explained why that would be an  
3 obvious thing to do, obvious in two different ways. First, because he's  
4 doing high-throughput chemical screening where you want to collect your  
5 good droplets. It is obvious to collect them and move them for use in a  
6 further experiment. That's the purpose of the screening, and it was well  
7 known to use the PCR tubes or test tubes to collect solutions of drop.

8 The second thing that you could do instead is simply replace the outlet  
9 well with a test tube directly so that the channel flowed directly into a PCR  
10 tube or a test tube. Again, the Petition and Dr. Fair have explained why that  
11 would be another obvious modification to make that would be well known at  
12 the time, and either of those would disclose this claim. Some of the  
13 passages discussing high-throughput chemical screening are shown here at  
14 slides B-80, B-81, and Dr. Fair's summary on B-82.

15 Looking at slide B-84, these are the dependent claims of the 837 for  
16 which there's additional disputes. Claims 7 and 9 where the droplet-  
17 receiving outlet is coupled to a vessel, and the vessel is a PCR tube or test  
18 tube. These are disclosed really for the same reason we just discussed. He  
19 expressly discloses coupling the incubation chamber of an outlet. Well,  
20 that's a vessel, and it would be obvious to either couple the micropipette by  
21 moving them via micropipette to a PCR tube or test tube, or it would be  
22 obvious to replace the outlet well with a PCR tube or test tube.

23 For claim 8 where the coupling has to be sealable, they've shown  
24 support for that as well. And for that, I'll direct you to slide B-88. Bio-Rad  
25 hasn't raised any additional dispute as to the sealable coupling, but we  
26 showed that as Ismagilov confirms that that kind of sealable coupling is also

1 known. Looking at slide B-89, this is a passage of Ismagilov we've already  
2 looked at today, but Ismagilov is clear, that the outlet can be adapted for  
3 receiving a sample tube such as a standard 1.5-millimeter centrifuge tube,  
4 and at slide B-90, Ismagilov discloses how to do that adapting in a leak-  
5 proof or sealable way, and in particular here it discloses using half-cured  
6 PDMS meaning a PDMS material that is still somewhat liquid, it's not yet  
7 solid, and you use that to coat the gap between the capillary and the wall of  
8 the channel with PDMS so that the junction became leak proof.

9 We've explained in the Petition and in Dr. Fair's declaration that that  
10 would be an obvious thing to do in order to avoid losing any of your fluid  
11 and your important droplets that you've created. Again keeping in mind that  
12 Dr. Thorsen's system is a pressure-driven flow, you can't have leaks or  
13 you're going to be squirting out your fluid. So this well-known technique of  
14 creating a sealable junction, something that they would adopt.

15 And, Your Honor, the other dependent claims that I know we talked  
16 some about in the first argument were claims 15 through 17, those are  
17 addressed in the 089 petition for pages 68 and 69, and Dr. Fair's declaration  
18 at paragraphs 54 to 56, and 188 to 191. Now, as we talked about in the first  
19 argument, based on Bio-Rad's infringement contentions, the second  
20 continuous based carrier fluid is really just the first fluid with new things  
21 added to it, and for purposes of infringement, they're pointing to adding a  
22 surfactant to the same vessel on the same droplets and saying, well, that's  
23 now a second fluid, so you've now placed the droplets on a second fluid.

24 We've explained why that kind of a reading would be met because it  
25 was well known to add a surfactant to break droplets so he could collect  
26 their contents. We've also explained again as I said that it would be obvious

1 in the context of Thorsen to extract your good droplets by micropipette and  
2 take them to a further experiment where you might break them and would  
3 need to break them to acquire what was inside. And Dr. Fair explained  
4 particularly at paragraph 54 through 56 that those kind of surfactants that  
5 you would add to destabilize droplets have actually been known and used for  
6 decades and were well known here.

7 Your Honor, if there is no further questions on the merits of Thorsen,  
8 Your Honors did have a question about the procedure of whether you need  
9 to address Thorsen or address Ismagilov if you find for Petitioner as to the  
10 other. And there's two aspects that I want to address, first the legal aspect  
11 and then a practical one. On the legal question, looking at 35 U.S.C. 318,  
12 this requires that if an *inter partes* review is instituted, the Board "Shall  
13 issue a final written decision with respect to the patentability of any patent  
14 claim challenged by the Petitioner." Here, where you have instituted based  
15 on both Ismagilov-based petitions and Thorsen-based petitions, that requires  
16 a final written decision on each, on both the Ismagilov-based challenge and  
17 the Thorsen-based challenge. The *SAS Institute v. Iancu* Supreme Court  
18 case from 138 Supreme Court Reporter 1348 from 2017, particularly at  
19 pages 1354 to 58, that case addressed obviously the institution discretion,  
20 but it talked about this same statute and statutory scheme confirming that  
21 that was a mandatory requirement in Section 318 and confirming that the  
22 scheme as a whole makes clear that it's the Petition that sets out the guide  
23 for the life of the litigation rather than the Director's discretion. That's at  
24 pages 13 -- that's at page 1356.

25 So here, where there are Petitions as to both (inaudible) of Thorsen  
26 and Ismagilov, you should address those in the final written decision.

1 There's practical reasons for the doing that here as well. The 837 Patent  
2 claim 20 is challenged only under the Ismagilov petition, so if you found all  
3 claims invalid under Thorsen, you would still need to address Ismagilov to  
4 address claim 20. 837 Patent claim 3 is also challenged only on an  
5 obviousness ground in the Ismagilov petition, but in the Thorsen Petition it's  
6 challenged as both anticipated and obvious, so again to address both of those  
7 102 and 103 bases, you'd have to address Thorsen even if you found for  
8 Ismagilov. Similarly the 722 Patent claim 4 is challenged only as obvious in  
9 Thorsen but is anticipated and obvious in the Ismagilov-based petition.

10 If there are no further questions, Your Honor, I'll reserve the  
11 remaining time for rebuttal.

12 JUDGE ROESEL: Thank you very much. We'll hear from Patent  
13 Owner now.

14 MR. BAKER: Thank you, Your Honors. Our presentation we have  
15 submitted a single slide that our presentation on Thorsen begins at slide 43,  
16 so I'll give you just a minute to get to that slide. Now, as with Ismagilov  
17 there's several issues that I want to discuss, and also address some of the  
18 points raised by those in counsel. At the beginning here, though, I want to  
19 just jump right into Thorsen and what Thorsen actually is. So if you'd go to  
20 slide 51, please. So this is Thorsen as those in counsel said it's a Ph.D.  
21 thesis from around 2003. I think it's important to know that they are only  
22 relying on chapters 3 and 4. Nothing else was relied on in their opening  
23 Petition. There are some other passages that the parties talk about in their  
24 briefs, but it's only chapters 3 and 4 that they are relying on in their opening  
25 Petition.

1           If we go on to slide 52. This is a depiction of the incubation chamber  
2 system. I won't dwell on it. It's already been discussed in detail. I'll just  
3 point out a few things. So in the top figure here, you see the black  
4 microchannel leading into the black circle which is the incubation chamber.  
5 Below that are the gray valves. These are the valves that direct flow of a  
6 single droplet in one direction or the other. In the bottom left, we see a  
7 microscopic image of the incubation chamber, and you see a microchannel  
8 leading into the incubation chamber; that's the inlet. And then right next  
9 door there, there's another microscopic image of the microchannel coming  
10 out of the incubation chamber and leading down to the valves.

11           Let's go on to slide 53. I want to mention a couple of things about  
12 these other additional images. On this slide on the left, we see another  
13 microscopic image of the incubation chamber, and on the left is the image of  
14 the droplets begin going into the chamber. As we see them coming in, they  
15 are each surrounded by oil. They are not separated; they're each surrounded  
16 by oil. And then on the right-hand side is the microchannel coming out of  
17 the incubation chamber, and the two gray things on each side of the square  
18 are the valves, and if you look on the right-hand valve, you see a single  
19 droplet that is within that valve. So what does this mean?

20           What it means is there is no dispute that the droplets coming into the  
21 incubation chamber are not separated. They are surrounded by oil. They're  
22 coming out of the incubation chamber exactly the same way, one at a time  
23 surrounded by oil. Okay? So there's no dispute that as they come out of the  
24 incubation chamber, the droplets have remixed with the oil. The only  
25 question is what's going on inside the chamber, and the only evidence we  
26 have of that is on the left-hand side in the black what has been referred to as

1 a clump of droplets, and I'll get to that in just a couple of slides. But that is  
2 the only evidence we have of what is actually going on inside the chamber.

3       Want to make a couple of other points here about the incubation  
4 chamber. This is a -- there's fluid flowing into the chamber; there's fluid  
5 flowing out of the chamber. The purpose of the chamber is to slow down  
6 the movement of the droplets, and Thorsen explains that as the droplets enter  
7 the chamber, they experience a sharp decline in velocity. So you can image  
8 the droplets are rushing into the chamber, and then the present chamber is  
9 bigger, they experience a sharp decline in velocity. But there is still fluid  
10 flowing through the chamber; whatever goes in also goes out, and the point  
11 here is the chamber is not a place where droplets flow in and then, you  
12 know, there's no outlet, and there's nothing else going on in the chamber  
13 such that they can sink or rise. There is fluid flow in the chamber itself.

14       The droplets in the chamber are not only subjected to density, to  
15 gravity. They're also subjected to this other fluid flow, and I think that  
16 that's why you see on either side of that black clump we see only oil. You  
17 can imagine -- if this were only about density, right, that the droplets go into  
18 the chamber. They're coming in at the bottom of the chamber on the floor.  
19 You can imagine that if they go into the chamber, right, and they're followed  
20 by other droplets, and only gravity, only density is at issue here, what is the  
21 picture that we would see? We would see a bunch of droplets in a single  
22 layer covering the floor of the incubation chamber. That's not what we have  
23 here. We have a clump of droplets that exist in multiple layers because  
24 there's fluid also flowing through the chamber, and I'll talk about that more  
25 in a few slides.



1           Slide 54, this is the chapter 4 system. It's a serpentine channel  
2 system, and instead of the incubation chamber, Thorsen is using this S-  
3 shaped channel to slow down droplets. The top image is a schematic of the  
4 microchannels leading to the plus and minus wells, and then on the  
5 microscopic again in the image on the bottom, we see the individual droplets  
6 going through the microchannel.

7           All right. I want to start with the incubation chamber and in particular  
8 why it is not evidence of separation. Let's go to slide 57. Now, as I said,  
9 the first reason why this does not show separation is simple. The droplets  
10 coming out of the chamber are exactly like they were going into the  
11 chamber, meaning they are mixed with the oil. The incubation chamber  
12 where the result is droplets mixed in with the oil cannot be considered a  
13 separation chamber. That is not what the Raindance patents are talking  
14 about. They're not talking about some chamber that may or not separate  
15 droplets for some time, and then it remixes the droplets and sends them out  
16 the door. That's not what the Raindance patents are talking about, and there  
17 is no dispute that that's what the incubation chamber here does.

18           On the right-hand side of the slide, you see the single droplet in the  
19 valve coming out of the chamber. It's mixed in with the oil. So whatever  
20 happens inside the chamber, the droplets leave the chamber mixed together  
21 with the oil that have not be considered a separation chamber.

22           JUDGE KAISER: Can I interrupt you just --

23           MR. BAKER: YES.

24           JUDGE KAISER: -- for a minute here? I'm curious how you square  
25 that argument with the claim construction you've offered that says the  
26 separation chamber just needs to be large enough to accommodate, you

1 know, some number of, you know, multiple droplets and a separated  
2 continuous phase, or I can't remember the exact words because I don't have  
3 that in front of me at the moment. But that seems to be the sort of  
4 construction you're offering is, separation chamber is a chamber that is a  
5 particular size as opposed to a chamber where separation occurs, and I don't  
6 know how you square that with this argument.

7 MR. BAKER: Yes, sure. I think that it is a chamber where separation  
8 occurs. I think the separation is required, and you can look at that a couple  
9 of different ways. We've offered a construction of separation chamber that  
10 says that it's sized to accommodate separated droplets. Now, in my mind,  
11 what that means is separation is required. You have to add separation in a  
12 separation chamber this is sized to accommodate separated droplets. I think  
13 what that means is that separation occurs. There's other limitations, though,  
14 where you could also hang your hat on why separation is required, and, for  
15 instance, the claims also say that the volume has to have a volume sufficient  
16 essentially to cause separation, and that could also will be the requirement  
17 for separation.

18 There was a dispute during claim construction about whether our  
19 construction was correct because Petitioner said that the volume sufficient  
20 language is what requires separation, and so our construction that we said  
21 required separation because it was of a size that would accommodate  
22 separated droplets. They said well, you can't have two limitations that both  
23 require separation, and we said, no, that's not what we're saying. The  
24 volume sufficient language doesn't require separation. It's the separation  
25 chamber that requires separation. But if they disagree, and they don't think  
26 the separation chamber actually requires separation, well, then the volume

1 sufficient language does. One way or another, it's a separation chamber, and  
2 you have to have separation.

3         And they pointed to a statement in the claim construction brief that  
4 said separation is not required, but that's not what we're talking about. We  
5 were only referencing their argument where they said that the words  
6 "volume sufficient" required separation. We said, no, it doesn't. It just says  
7 sufficient, and when you have an apparatus claim, the word "sufficient"  
8 doesn't mean that it's required, but it is required by the separation chamber  
9 limitation itself. But again if you disagree with that or Petitioner disagrees  
10 with that, it doesn't really matter which limitation you rely on. The point is,  
11 it's a separation chamber and separation is required, and in the incubation  
12 chamber, you have droplets that are mixed together entering and droplets  
13 that are mixed together leaving, and I don't see how that can be a separation  
14 chamber.

15         And our expert agreed, that if you go onto slide 58, this is the direct  
16 testimony of our expert Dr. Anna, and on the left-hand side she points out  
17 Thorsen also describes in chapter 3 how the droplets and oil enter and leave  
18 the incubation chamber together, and she said, look, if that's what's  
19 happening, this is not a separation chamber. On the right-hand side, the last  
20 sentence, she says because the oil and droplets would re-disburse and both  
21 would exit the incubation chamber together. The separation and collection  
22 of droplets described in the 837 Patent that takes place in a separation  
23 chamber does not occur (inaudible) on the incubation chamber.

24         Their expert also agreed. If you go onto slide 59, this is testimony  
25 from Dr. Fair, and on the right-hand side, I asked him, I said, so as the  
26 droplets leave the chamber, they go out with the oil, right? He said the

1 outlet channel is drawing some of the oil that's present in the system. Then  
2 he went on to say, the droplets by sedimentation clump to the bottom down  
3 to the glass floor, and I'll address that in a minute. The oil is lighter, it floats  
4 up, but the droplets are surrounded by oil. As they are leaving you're  
5 drawing both droplets and oil. So there's no dispute that what leaves the  
6 chamber is droplets mixed with oil. Again, I would submit that, you know, a  
7 chamber that remixes the oil and the droplets as it sends them out the door  
8 cannot be considered a separation chamber.

9 Now, let's go on to slide 60 and talk about what happens while the  
10 droplets are inside the chamber because I don't think the evidence is  
11 sufficient to show that the droplets are actually separating inside the  
12 chamber either. I think it shows the opposite. They rely very heavily on this  
13 black, what has been referred to as a clump of droplets, to say that there is  
14 separation, but our expert Dr. Anna has explained that that's not what you're  
15 looking at here. This is an image taken by a planar microscope coming up  
16 through the bottom floor of the separation chamber -- oh, I'm sorry -- you  
17 know, the incubation chamber.

18 In our Preliminary Response, we actually got this wrong, right. The  
19 Board pointed out that this was a bottom-up view. I think we had made the  
20 reference to a top-down view. The Board pointed out, no, this is a bottom-  
21 up view. We didn't support our Preliminary Response with an expert  
22 declaration. Once we talked to Dr. Anna, she explained exactly what was  
23 going on here. It is a bottom-up view with a glass coverslip of the  
24 incubation chamber, and it's taken with a planar microscope, and she  
25 explains that as a matter of science, and what we know about planar  
26 microscopes, this does not show separation.

1           Let's go on to slide 61. Basically what Dr. Anna explained is, look, a  
2 planar microscope is not capable of resolving 3D dimensions. So she said  
3 even though the image can look like a clump, it's actually that's not what  
4 you're looking at. If you look at the image you see that some of the circles  
5 are clearer than other circles. Especially at the bottom as the droplets come  
6 in, you see that there is more clear circles and then as you work your way up  
7 some of the circles are darker, and what she said is that's an indication that  
8 the -- based on the light refraction, that these droplets are actually in  
9 different layers.

10           Again, as I mentioned before, if they were all coming in and just  
11 settling on the bottom of the floor, the image you would see is a bunch of  
12 clear circles scattered across and filling the bottom of the floor. That's not  
13 what we see here. Some of the clear circles are in different layers than the  
14 dark circles, and so the question is, what's going on between those layers. Is  
15 there a bunch of oil in there, or is it, you know, just a column of droplets.  
16 And Dr. Anna said, there's no way to know. Without additional images or  
17 additional angles, there is no way to know what is between the layers of  
18 droplets, and in fact, whether they have separated or not.

19           And this makes sense because as I said, you've got fluid flowing  
20 through the chamber, right, and so it's not the case that gravity is the only  
21 thing working on these droplets. So the fact that there is different layers and  
22 oil flowing in-between the layers, it's consistent with the idea that there is  
23 fluid flowing through the chamber.

24           Let's go to slide 62. These are the elements -- I want to talk for a  
25 minute not just about separation but also about why the incubation chamber  
26 is missing elements that have to do with collection, and in the 837 patent, we

1 have the claim term “droplet proceeding outlet,” and then in the 722 patent,  
2 we have in dependent claim 2, the limitation of collecting the separated  
3 droplets. Now, Petitioner tries to say that these limitations only require the  
4 droplets to collect in some place. In other words, they all have to reside in  
5 some location. That’s true, to be separated, but these collection terms also  
6 require that you have to be able to go in and actually collect the droplets, and  
7 that doesn’t happen in the incubation chamber.

8 Let’s go to slide 63. The reason this doesn’t happen is because the  
9 incubation chamber is a closed system. We don’t think that the droplets  
10 separate, or at least there’s no evidence that they do in the incubation  
11 chamber, but even if they did, there’s no way to go in and collect the  
12 droplets. It’s a closed system. And if we go to slide 64, and back to  
13 Dr. Fair’s testimony, you see on the left-hand side, I asked him, could you  
14 collect only droplets from the incubation chamber? He said not with the  
15 configuration shown here because you need immiscible oil surrounding the  
16 droplets in the outflow flow, and he went on to explain so this is more or less  
17 a flowthrough system where you get separation in the chamber, in the  
18 incubation chamber, and then you take the output for sorting.

19 So he admitted that there’s no way to collect droplets from the  
20 chamber. Now, going onto slide 65, I just want to make one additional point  
21 on this. You know, Petitioner said again that all this required for collection,  
22 the collection limitations, is that the droplets, you know, sort of reside in a  
23 single location, and they said that the outlet of the incubation chamber is that  
24 location. I asked Dr. Fair about this at his deposition, and where this ended  
25 up is him admitting that he had this backwards. He thought that what he was  
26 looking at was the outlet of the incubation chamber.

1           So if you look in the image on the left with the black clump, he  
2   thought that was the outlet, and that all of those droplets that were by the  
3   outlet that that's why it would be a droplet receiving outlet; that they had all  
4   collected by the outlet. But that's not right, Your Honor. That's the inlet of  
5   the incubation chamber. And then on the right-hand side, if we look at his  
6   testimony, I asked him, I said, so it's your belief, on page 74 of your  
7   declaration, we see droplets. There is a clump of droplets, right? He said,  
8   right. And I said, and then there is what looks like a curved part of the  
9   incubation chamber, right? And there is a single line of droplets, right?

10          And then if you go onto slide 66, his testimony continues. I said, and  
11   your understanding is that that is showing the outlet of the incubation  
12   chamber? Because he had testified that way earlier. So I said, that's the  
13   outlet? He said, correct. And then I said, that's what your opinion is based  
14   on? Correct. And I said, the basis for your opinion that there is a droplet  
15   receiving outlet as cited by the claims? Yes. Go on to claim -- slide 67. On  
16   redirect, counsel for Petition tried to clean that up, and they asked Dr. Fair,  
17   they said, looking at the sentence that you read -- excuse me -- earlier on the  
18   page, you were reading the sentence, generated water droplets enter the  
19   incubation cavity where they encounter a sharp drop in flow velocity, Figure  
20   3.29A, was that the sentence you were reading from?

21          So basically in their question, they led him, and they said, look, this is  
22   -- look at this quotation. This is not the outlet. This is the inlet. And what  
23   did he say? He said, yes. Okay, so (inaudible) and the caption says, water  
24   droplets entering the cavity, they slow down and accumulate, so I had that  
25   backwards. So he had -- his entire opinion is based on an understanding that  
26   was backwards. Now, to be fair, in his declaration, right, he called -- he got

1 it right. He said that this was the inlet and not the outlet, but at his  
2 deposition, he was avid that this was the outlet. He had it backwards. So at  
3 the very least, I think that affects the credibility of Dr. Fair on this point.

4 So unless Your Honors have any questions for me on the incubation  
5 chamber, I want to move on to the outlet wells, leading -- the bottom line for  
6 the incubation chamber is, you know, they're mixed going in, they're mixed  
7 going out. The only evidence we have of what's happening in the chamber  
8 itself is this black clump that our expert Dr. Anna has explained is not  
9 sufficient evidence of separation, and then more than that on the collection  
10 limitations, they require them to be able to go in and actually collect  
11 droplets. Dr. Fair admitted you can't do that in the incubation chamber, and  
12 his other opinions were based on a wrong interpretation of the image.

13 JUDGE ROESEL: Yes, I do have one question. Counsel, this is  
14 Judge Roesel, and that is I think I heard Petitioner argue that this collection  
15 could also be the collection from the outlet wells, so can you respond to that  
16 argument? So even with the incubation chamber embodiment where they  
17 are reading the separation chamber on the incubation chamber for the  
18 collection claims, the ones that requires collecting the separated droplets, I  
19 thought I heard them argue that that occurs in the outlet wells. Could you  
20 respond to that, please?

21 MR. BAKER: Yes, sure. I'm glad you raised that because that stood  
22 out to me as well. I don't think that's an argument that I've seen them raise.  
23 Perhaps it's in there, but I don't remember that argument. But regardless, it  
24 doesn't -- I don't see how that's possible, and how that meets the limitation  
25 to the claims because what they're saying is that the incubation chamber  
26 would be the separation chamber, right? And then as the droplets leave, they



1 remix with the oil. They don't dispute that point. They don't dispute that  
2 they remix with the oil. So they're saying the incubation chamber is the  
3 separation chamber, then the droplets remix with the oil, and they go to the  
4 outlet well where you collect droplets that are no longer separated?

5 That doesn't meet the limitation to the claims, and if they're -- what  
6 they're saying is, well, the incubation chamber is the separation chamber,  
7 the droplets and the oil remix, and then you get to an outlet well that is also a  
8 separation chamber, well, that doesn't make sense either. Now, you've got -  
9 - now, they're saying two separation chambers. That's not an argument that  
10 I think that they've made in their briefs, and as we're going to show that the  
11 outlet wells can't be the separation chamber either. So it doesn't matter, but  
12 to say that you would -- the incubation chamber is the separation chamber,  
13 and then you go and collect droplets from the outlet well that have remixed,  
14 that doesn't make sense to me. That doesn't meet the claims.

15 Turning now to the outlet wells, if we go to slide 71. So first of all,  
16 again on the left is the incubation chamber system. There are no outlet wells  
17 joining the incubation chamber system. On the right-hand side, there is the  
18 chapter 4 serpentine system where you have the plus and minus wells, but  
19 they are -- there are no dimensions for those wells, so there is no way to tell  
20 how big they are with respect to the microchannels.

21 Now, they say that even though there are no dimensions that the wells  
22 would have to be upright and large enough to cause separation because they  
23 hold thousands of droplets, but that's just not the case, Your Honor, and if  
24 we go to slide 72, we had made this point in our preliminary response about  
25 the possibility of having a well that is the same height as the microchannel,  
26 and so, you know, the way that I think about this is if you got like a river

1 that's the microchannel, they're saying that the river flows into this upright,  
2 you know, tank or chamber, right, but it's possible that the river is just  
3 flowing into a lake that has the same height as the river, right, and if that  
4 happens the droplets are not going to separate.

5 If the well is the same height as the microchannel, the droplets don't  
6 separate. They just spread out. And so we have made the point that it was  
7 possible to have a well like that in our preliminary response with that there  
8 was no reason to think that the (inaudible) is doing something else, and I  
9 think the Board said that that was more of a factual issue that should be  
10 developed and to proceed, and so that's what we tried to do. And on slide  
11 72, we have the cross-examination testimony of Dr. Fair again, and at his  
12 deposition I asked him, I said if I asked you to design a system where the  
13 outlet well was in the same plane as the channel, could you do that?

14 And he said, you could do that, but if the collection well that you're  
15 describing has the same height as the channel, then it would be very difficult  
16 to do separation of oil and liquid and droplets, and then he goes on, he says,  
17 in the early years, so the early waste reservoirs that we built were in fact  
18 designed to have the same height as the channels in our device, and they  
19 were just holding --

20 JUDGE MCGRAW: Excuse me for a moment.

21 MR. BAKER: Yes --

22 JUDGE MCGRAW: This is Judge McGraw. In Thorsen, however,  
23 they discuss how they make the outlet wells which involves punching the  
24 hole, and Petitioner, I believe, argued that based on that disclosure in  
25 Thorsen you would know that the outlet well would be larger than the  
26 microchannel and would come out of the plane of the microchannel.

1 MR. BAKER: That's not -- and I want to talk about that in a little  
2 more detail perhaps later, but I'll go ahead and say now that that's not what  
3 Thorsen says. What Thorsen talks about in his PDMS section which is what  
4 the chapter 3 and 4 devices are made out of, he said that the hole is punched  
5 with a 585-micron syringe needle. That's what he says, not a cork borer, all  
6 right? So the idea would be that you can have this sort of lake-like well  
7 structure, right, and then it's covered with PDMS, but you need fluid flow.  
8 You need some sort of an outlet to provide pressure out. So what do you  
9 do? You take a syringe needle and you poke it down into the middle of this  
10 lake-like well.

11 They're saying you take a cork borer that's the same diameter of the  
12 entire well, right, and so you have this sort of tunnel running up through the  
13 PDMS, but that's not the only way to do it. You can have a well that is the  
14 same height as the microchannel and still have a hole punch that is much  
15 smaller than the diameter of the well. And in fact, at his second deposition,  
16 that's exactly what Dr. Fair admitted, that you can do that, and so I think  
17 that's all that Thorsen is doing. He has these waste reservoirs that Dr. Fair  
18 was using, right, and he has this very small hole punch that facilitates fluid  
19 flow by allowing pressure (inaudible).

20 But the well themselves are not these tunnels up through the PDMS.  
21 At least that's what he says in the section where he talks about the PDMS  
22 and how he fabricated that whichever (inaudible) devices in chapter 3 and 4  
23 are made. Does that make sense?

24 JUDGE MCGRAW: So if I understand correctly, you're saying that  
25 what Thorsen discloses is making a well that is the same height as the

1 microchannel, and then punching a smaller -- using the -- not the cork borer,  
2 the other -- the smaller unit to create a --

3 MR. BAKER: Right.

4 JUDGE MCGRAW: -- release for pressure, and the well --

5 MR. BAKER: Yes.

6 JUDGE MCGRAW: -- is the wider dimension, and then the more  
7 narrow bore that goes up that creates the release hole for pressure.

8 MR. BAKER: I think that's right. Now to be fair, it's not entirely  
9 clear, but what is clear is that he uses the 585-micron needle to punch the  
10 hole. That part we know. And I'll get to this, but that we know that that's  
11 what he's doing, and regardless of separation, if he's using a 585-micron  
12 needle, there is no way to go in and collect droplets. So the part about the  
13 well and what the structure of the well is, it is, you know, that I think the  
14 bigger issue would be you can't into the hole that he has punched and collect  
15 droplets because it's only 585 microns. But to answer your question, that is  
16 what I'm suggesting, that the structure that you've described I think is what  
17 the structure that Thorsen is using. It certainly the kind of structure that Dr.  
18 Fair testified is possible and that he was using himself back in the early days.  
19 So this idea that Thorsen necessarily discloses this sort of large cork borer  
20 tunnel down through the PDMS is just -- is not right. That's not what the  
21 evidence shows.

22 JUDGE ROESEL: Counsel, this is Judge Roesel. How does your  
23 argument square with figure 4.2 of Thorsen which is shown on your slide 71  
24 where it shows these two outlet wells, and I think you've said those are  
25 outlet wells with plus and minus --

26 MR. BAKER: Yes.

1 JUDGE ROESEL: -- doesn't that indicate that there are open-top  
2 wells with electrodes inserted into the wells much like what was shown in  
3 the Quake reference?

4 MR. BAKER: I don't think so, Your Honor. I think what this is  
5 showing is -- I mean, look, it's a two-dimensional drawing, but so we really  
6 don't know, I guess, but this is showing wells that are in the same plane as  
7 the microchannels, and it's showing wells that are much wider, but it doesn't  
8 say anything about the height. And so what I'm suggesting -- what I'm  
9 saying is that the height of those wells can be the same height as the  
10 microchannel. Now, they come back and they say, well, no, there's a hole  
11 punch. So the point is that the hole punch doesn't have to be the same  
12 diameter as those plus and minus wells. It can just be a very small punch  
13 right down to the center of the wells using the very small syringe needle, and  
14 that's exactly what Thorsen says he did. When you look at the section on  
15 PDMS, he said that he used the 585-micron needle to punch the hole. So I  
16 think it is all consistent.

17 JUDGE MCGRAW: Is there a dispute about whether the well is  
18 wider than the hole punch? Is that at issue?

19 MR. BAKER: Whether the well is --

20 JUDGE MCGRAW: In other words is the width --

21 MR. BAKER: Yes --

22 JUDGE MCGRAW: -- of the well the same as the hole punch, or the  
23 width of the well is different than the punch?

24 MR. BAKER: I think that is in dispute. They say that it's the same  
25 width and that you use, you know, a 5mm cork -- a huge cork borer, and that  
26 the hole, you know, is the same diameter as the actual diameter of the well,

1 and we say, no, there's no evidence of that. Dr. Fair has said you can have  
2 this really large well that would hold thousands of droplets that's the same  
3 size -- the same height as the microchannel, right. That's possible. In that  
4 case, though, there would be no separation, and then the only question --

5 JUDGE MCGRAW: Could you point to us -- this is Judge McGraw.  
6 Could you point us to something in the record that would support this  
7 argument that the width of the well in Thorsen is not the same width as the  
8 hole punch?

9 MR. BAKER: Well, sure. I can show you in -- well, what I can show  
10 you, Your Honor, is if you go to slide 80, this is the section on Thorsen  
11 where he's talked about silicon-based polymers, right. This is the section  
12 where he talks about the kinds of polymers that are used to fabricate his  
13 devices in chapters 3 and chapter 4. And what he says is that holes were  
14 then punched with a 20 gauge for 585-micron beveled steel punch. 585  
15 microns -- (inaudible) number one, you can't go in and collect your output,  
16 but the 585-micron steel punch, there's no evidence that that would hold  
17 thousands of droplets like he said.

18 In order to hold the thousands of droplets, you've got to have  
19 something sitting below that punch that is more expansive, right? And what  
20 Dr. Fair had said is what he was doing, it's like a waste reservoir. It has the  
21 same height as the microchannel. I can still hold thousands of droplets, but  
22 you have the 585-micron punch to facilitate fluid flow. And so that's what I  
23 would point to. Like I said, in his second deposition, there is also testimony  
24 where he says that -- I talked to him about this idea, and he said, yes, that's  
25 something that can be done. But I think this evidence from Thorsen is the  
26 best evidence where he says I used the 585-micron punch.

1           And if you think about it too, it's consistent with the fact that he was  
2 looking at red and green droplets, right. He was taking this planar  
3 microscope and looking up through the well and was able to determine, you  
4 know, how many -- with pretty good precision how many green and red  
5 droplets there were, right. So it's likely that they were all just scattered on  
6 the bottom of this lake-like structure that has the same height as the  
7 microchannel. But again, the point is just that the idea that it has to be a,  
8 you know, 5-millimeter cork borer where the well has the same diameter as,  
9 you know, the hole punch with itself. That's not what Thorsen says. And the  
10 factual record now reflects that in fact it's very possible that it was the other  
11 way.

12           If you'll bear with me just one second, I want to find where we were.  
13 I think we were beginning the outlet well section itself, and I think we've  
14 probably hit most of the important points all ready. But I'll just to reiterate,  
15 you know, the outlet wells -- and I'm back up on slide 71 -- there are no  
16 outlet wells in the incubation chamber system depicted in the figures. For  
17 the serpentine system in chapter 4, we have the plus or minus wells, but we  
18 don't know what the dimensions are, and Dr. Fair has said that you can  
19 design a well with the same height as the microchannel.

20           Our expert Dr. Anna agrees with that. If you go to slide 73 now, in  
21 paragraph 136 she says: I agree with the testimony Dr. Fair provided during  
22 his deposition where he explained that it was not necessary for an outlet well  
23 to be out of the horizontal plane in order to accommodate thousands of  
24 droplets. Take a look at slide 76. I want to make sure -- I think I've covered  
25 this, but I want to make sure. These are the elements again that deal with  
26 collection of the droplets. Regardless of the dimensions of the diameter of

1 the well itself, one thing we know for sure is that you cannot collect droplets  
2 from the wells in Thorsen.

3 Now, going on to slide 77. In order to collect droplets with a  
4 micropipette, Dr. Fair said you need to do -- know three things. You need to  
5 know that the container for the well is a (inaudible) embodiment for the  
6 pipette tip to be inserted to have an opening through which the pipette can be  
7 inserted, and that the liquid of a sufficient body for the micropipette to  
8 collect it. Now, he didn't view -- he didn't come to any conclusion about  
9 any of those or Thorsen. What he did is he started with the assumption that  
10 a person of ordinary skill would want to collect droplets, and then he  
11 concluded that the outlet wells would have to be at least 1 millimeter in  
12 diameter because that's the smallest micropipette that was known.

13 Going on to slide 78, in our response we pointed out that 1 millimeter  
14 was way too big to collect any of the droplets from the wells in Thorsen, and  
15 then on slide 78, we have a clip from Petitioner's reply where they said, no,  
16 1 millimeter is not too big because the hole punches in Thorsen are 5  
17 millimeters. They said that they were punched with 5-millimeter beveled  
18 steel punches.

19 Going on to slide 79, as I said, I pointed out earlier they were looking  
20 at the wrong section. This idea that the wells in Thorsen were punched with  
21 a 5-millimeter beveled steel punch that's found in section 2.2.2 which is  
22 diene-based polymers. But the relevant section -- and this is now moving on  
23 to slide 80. The relevant section is 2.2.1. That's the silicon-based polymers  
24 such as polydimethylsiloxane or PDMS, and that's what the devices in  
25 chapter 3 and 4 were fabricated out of. And Thorsen explains that for those  
26 devices, he used the 585-micron beveled steel punch.



1           And that is obviously, you know, too small to collect with a  
2 micropipette. They said numerous times that they've -- the smallest  
3 micropipette is 1 millimeter. There's no way you can collect droplets from a  
4 585-micron outlet on Thorsen.

5           Now, going on to slide 81, they say, well, that doesn't matter. If you  
6 find that you could not collect droplets from Thorsen because the hole  
7 wasn't big enough, a person of ordinary skill knew about larger cork borers,  
8 and they would know that you need to just use a large enough cork borer so  
9 that you could go in and collect with a micropipette. Well, that takes me  
10 back to -- moving on to slide 82, that takes me back to Dr. Fair's testimony  
11 where he says that he's never collected with a micropipette. So this idea  
12 that, you know, they say forget about 585-micron holes. You can just make  
13 a bigger hole because everybody knows that you want to collect the droplets.  
14 Well, Dr. Fair testified he's never done that.

15           Going on to slide 83, again all of this is just hindsight, and we cited  
16 again (inaudible) case here for the hindsight proposition, but there are  
17 obviously numerous cases on this. That the point is they decided -- they  
18 started with the assumption that you wanted to separate and collect droplets,  
19 and then they went and determined how big the outlet wells of Thorsen need  
20 to be, and that's impermissible. I just want to -- finally moving on to slide  
21 84, I want to make a couple of points on the enablement point.

22           You know, Thorsen -- and let's move on to slide 85, actually -- in  
23 Thorsen's conclusion section in chapter 4, he says that there were problems  
24 that plagued the pNB esterase system, and he pointed to several of those  
25 problems including the fact that the pNB esterase that he was using in  
26 chapter 4 was sticking to the walls. He called this cell adhesion. He pointed

1 out a couple of other problems as well. He was not able to fix those  
2 problems. He was not able to solve those problems. And so his devices are  
3 not enabled or biological samples at the very least, and for that reason his  
4 well cannot anticipate.

5 And with that, Your Honor, I'd like to reserve the rest of my time for  
6 any necessary sur-rebuttal.

7 JUDE ROESEL: Okay, thank you very much. We will hear from  
8 Petitioner.

9 MR. GERRITY: Thank you, Your Honors. Robert Gerrity again on  
10 behalf of Petitioner. I heard I believe not one but two brand new claim  
11 constructions proposed for the first time here in response to questions from  
12 Your Honors by the Patent Owner. Obviously this is not the proper time to  
13 be doing that. They had their opportunity to propose claim constructions,  
14 and they did so. The idea that the separation chamber requires separation to  
15 occur, they didn't propose that. They didn't argue it in their Patent Owner  
16 Response. They argued it for the first time in sur-reply and again here  
17 today.

18 The argument that you need to be able to go in and collect the droplets  
19 out using a micropipette, again that's not a claim construction they proposed,  
20 and it's not a limitation that's present in the claims, but that argued for the  
21 first time today. Also at the start of Patent Owner's argument, they asserted  
22 incorrectly that the Thorsen Petition relies only on chapters 3 and 4. The  
23 Petition is clear about what it relies on. It relies on the systems in Thorsen  
24 chapters 3 and 4. There is discussion relied on and discussed in the Petition  
25 of the earlier parts of Thorsen where he describes high-throughput chemical  
26 screening, what that is, what it's for, what the systems are for. Your Honors

1 obviously can see what is in the Petition and understand what is being relied  
2 on there, but it's incorrect to say that it's relying solely on the pages between  
3 chapters 3 and 4.

4 Turning to the question of separation and whether that occurs. I heard  
5 from the -- first time here again speculation that the picture in Thorsen if it  
6 were separating in the view of Patent Owner, it would show an even layer of  
7 droplets all scattered across the chamber floor. Their experts never opined  
8 on that. Their experts never asserted that. Again we heard that for the first  
9 time today. What is undisputed about that separation chamber is the  
10 difference in densities between the water and the oil, and the fact that the  
11 droplets because of that difference in density will sink.

12 Their expert has never disputed that fact. The patent specification,  
13 both the 837 and 722, made clear that the separation they're relying on and  
14 describing is just based on that density difference, the same density different  
15 that exists in Thorsen. So that is going to exist and is going to occur here.  
16 It's not correct to say we don't know what's happening in those other layers.  
17 We do. We know the density is different, we know the droplets are going to  
18 sink and pile up. They don't have to form a neat even layer all the way  
19 across the bottom of the chamber in order to meet these claim limitations.

20 And moreover, I heard no explanation from Patent Owner of the clear  
21 disclaimer that the made in front of the District Court which is quoted at  
22 slide B-19 of our slides that the claims do not require separation to occur.  
23 Your Honors can look at that exhibit and their brief at Exhibit 1082 in the  
24 087 IPR, and you'll see the disclaimer they made there I also heard no  
25 response from that nor about their infringement contentions where they  
26 plainly point to as infringing mixtures of droplets in oil to have already been

1 collected out of what they point to as the separation chamber, so all of that  
2 discussion that because Thorsen still has oil mixed in after the incubation  
3 chamber, it somehow doesn't meet the claims that's directly inconsistent  
4 with what they've already pointed to and said in U.S. District Court, and  
5 that's directly contrary to what they've argued in claim construction on  
6 droplet receiving outlet.

7 JUDGE MCGRAW: Counselor, this is Judge McGraw. Are we  
8 bound to follow the claim construction that was proposed in the District  
9 Court or do we have an independent obligation to construe the claims  
10 properly?

11 MR. GERRITY: So the District Court construction never reached an  
12 order, Your Honor, just, and maybe that was clear or not that I wanted to  
13 make sure that was clear. That was briefing where Bio-Rad took a position  
14 about the proper claim construction, and it's clear to me from their argument  
15 today, they are trying to have it both ways. They want to proceed with that  
16 broader view for infringement in District Court without proposing a clear  
17 claim construction here that would narrow them and limit them in District  
18 Court. That's what they've tried to do, and that's why you heard those  
19 arguments for the first time today, and --

20 JUDGE KAISER: But so are you, right? I mean, you're also trying  
21 to have it both ways. You're trying to get us to adopt claim construction that  
22 Bio-Rad has proposed in District Court without proposing one yourself.

23 MR. GERRITY: Well, Your Honor, we have proposed our  
24 construction in the Ismagilov-based Petitions, and we've explained why the  
25 claims are invalid even under those constructions that was in the Ismagilov-  
26 based Petitions, but, yes, here as your precedent allows and as you've found

1 at institution, we are asking you to evaluate the validity of these claims  
2 based on Bio-Rad's view of how broad they are, and that's proper, and  
3 you've cited in your Institution Decision cases where that has been done and  
4 is done by this Board. You do have an obligation to construe the claims to  
5 resolve the dispute, but here where they're raising new claim construction  
6 arguments for the first time in oral argument, that's not proper, and those  
7 arguments should be deemed waived, not just because they were raised late,  
8 but also because they're directly contrary to statements that Patent Owner  
9 has already made about the breadth of these claims.

10 They're also contrary to the specification. I pointed to you at slide B-  
11 24 to one of the many examples in the specification. This is again 837  
12 Patent, column 53, lines 38 to 46, but the same quote is in the 722 Patent  
13 also column 53, but there it's lines 47 to 55. This is a description in the  
14 patent that you can have the separation chamber with an outlet that connects  
15 to a channel where you flow the immiscible fluid to move the droplets  
16 through that whole circuit, the immiscible fluid that moves the droplets in  
17 and moves them through the outlet, and moves them into the channel, and  
18 even ends by saying, where the droplets may be collected in the vessel. So  
19 you can move them all the way through the separation chamber through the  
20 outlets through a subsequent channel and into another vessel all based on the  
21 flow of the immiscible fluid. That's what Thorsen shows.

22 Moreover their expert at deposition -- I point you to Dr. Anna's  
23 deposition transcript at page 156, lines 4 through 14. Their expert admitted  
24 that their construction and droplet receiving outlet Patent Owner's  
25 construction places no restriction on, "how much droplet and how much  
26 other material," is received at the droplet outlet or the separation chamber

1 outlet. Their argument today as to Dr. Fair's mix-up at his deposition about  
2 whether the picture showed the inlet or the outlet of the incubation chamber,  
3 both his declaration and the Petitioner are straightforward and clear on that.

4 His declaration at paragraph 128 in the 087 IPR and the Petition at  
5 page 46 both make this very clear that the figure was properly understood in  
6 both the petition and his declaration. He was deposed for a full day where  
7 he was responsible for all four of these proceedings. He got the figure  
8 mixed up at one point in his questioning. He corrected it at the end of the  
9 day, and said, oh, I had that backwards earlier today. Patent Owner then had  
10 the chance to have asked follow-up questions, to say, okay, now that you've  
11 corrected it, you know, here's my follow-up questions. They chose not to.  
12 They chose not to ask any more questions about it after he corrected it.

13 They wanted the "gotcha," and that's just not proper here and doesn't  
14 go to his credibility. It's not a memory test at deposition. Once he was  
15 shown the document, he cleared it up, and today his views are still consistent  
16 with what was in the petition and his declaration.

17 There was discussion that you can't go in and collect the droplets by  
18 micropipette from the incubation chamber. Again collection by micropipette  
19 isn't required by the claims or the limitations. I heard no response by Patent  
20 Owner to our argument that the droplets are in fact collected out of that  
21 incubation chamber. There's really no dispute about that. They come out  
22 the other side. They are collected within the meaning of their claim  
23 construction, and again consistent with that passage in the specification at  
24 column 53.

25 There was a suggestion that perhaps we were raising a new argument  
26 that for the claims that require the further step of collecting the droplets, that

1 can happen either at the exit of the chamber or at the wells. That's not a new  
2 argument. I direct you to our 089 Petition on the 722 Patent. It's at pages  
3 57 and 58. It makes clear that you can collect -- that the collecting there  
4 happens at wells, and that that was one of the theories argued.

5 With that, Your Honor, turning to the outlet wells, we heard a theory  
6 today for how Thorsen makes them; that they're somehow wide at the  
7 bottom with a narrow chimney on top. But what I didn't hear is what  
8 limitations that such a well would not meet. If it's wide at the bottom, it has  
9 a wider cross section. If it has a chimney extending vertically up top, it's  
10 upright and out of the plane of the microchannel and it's perpendicular, and  
11 it still has the volume sized to accommodate multiple droplets and  
12 immiscible fluid in separated form.

13 So even under their hypothetical scenario of how these outlet wells  
14 are formed, they still meet the claim requirements under Bio-Rad's  
15 construction of the claim. There was also a lot of emphasis on this 585-  
16 micron needle. Well, 585-microns is about half a millimeter, and Thorsen  
17 actually calls it a punch, a beveled punch, and he described using other sized  
18 beveled punches as well up to 5 millimeters. That's in chapter 2 where he's  
19 doing tests of different materials. So it's clear that he had access to and did  
20 use punches of a wide variety of these.

21 Now, that question is really only relevant to the dependent claims 837  
22 claim 9 and 722 claim 4 where they require a PCR tube or test tube. That's  
23 where the obviousness argument is being made that either you would move  
24 the droplets by pipette to a PCR tube or test tube or you would replace the  
25 outlet well with the PCR tube or test tube. That's the one place where we  
26 have to show micropipetting; that we have explained why that would be

1 obvious, but because the high-throughput screening use of the system  
2 motivates, one, to collect the droplets that are desirable, and the availability  
3 of these punches to make big enough holes certainly allows one to try  
4 making a big hole and using a pipette which again Dr. Fair has said would  
5 know and routine and Dr. Anna tellingly is silent and does not say it was not  
6 known or it was somehow not.

7 We also heard an argument in here that in the context of Thorsen if  
8 you did use that half-millimeter punch, it would be too small to collect by  
9 micropipette. We heard earlier today the exact opposite statement from  
10 Patent Owner saying that Ismagilov's channels are big enough to fit these  
11 tiny glass capillary tubes into, and that that counts as collection by  
12 micropipette where they were trying to justify why Ismagilov's wells could  
13 be small despite the disclosure of collection by micropipette. They can't  
14 have that both ways. We've been consistent that collection by micropipette  
15 means a well that's at least a millimeter across as that was the known size of  
16 the pipettes. We've been consistent that that's how you know Ismagilov  
17 discloses the wells were at least that size so that they could be collected  
18 from, and similarly it would be obvious to make Thorsen's wells that size  
19 using a punch that was at least that size.

20 When Judge McGraw asked counsel for Patent Owner to point to any  
21 support that Thorsen builds his wells in the way they described where  
22 they're wide at the bottom with the chimney on top, they didn't point to any  
23 in the record because there isn't any.

24 JUDGE MCGRAW: But, counselor, let me ask you about that also  
25 because it is your burden to show that the claims are unpatentable, and claim  
26 element, claim 1 of the 822 Patent -- 873 Patent -- I'm sorry -- requires that



1 the separation chamber be upright to the microchannel and out of the  
2 horizontal plane. So if the outlet well was in fact manufactured so that it is  
3 within the same plane of the microchannel, and it is wide enough to collect  
4 the thousands of droplets that were disclosed in Thorsen, why would we  
5 assume that that outlet well is also out of the horizontal plane?

6 MR. GERRITY: Well, and we talked in my opening argument about his  
7 fabrication techniques at right around page 100 of Thorsen. He is clear that  
8 he's punching all the way through using a punch, punching all the way  
9 through both layers. We talked about the thin layer at the bottom and the  
10 thick layer at top. You have to punch all the way through to get down to the  
11 channels. There was no response to that by Patent Owner. That their theory  
12 is that you could make a large vessel and still punch a small hole on top.  
13 Well, if you view that at the outlet, well, it is still perpendicular and upright  
14 in that small punch hole that he's pointing to as the pressure release. That  
15 would still meet the limitations of the claim.

16 But again, there's no description of Thorsen doing it that way.  
17 Thorsen talks about patterning the channels, and then punching the hole all  
18 the way through. And in fact, in their Patent Owner response, they conceded  
19 that that's how Thorsen forms his channels, by punching the hole all the way  
20 through the chip.

21 JUDGE MCGRAW: Is that how they form the channel or how they  
22 form the well?

23 MR. GERRITY: I'm sorry. I misspoke. That is how Thorsen forms  
24 the outlet wells, punching a hole all the way through the chip to reach the  
25 ends in the channels. Again there was an insertion of hindsight here as to  
26 our obviousness arguments, but that's not the case. Dr. Fair and the

1 Petitions both explain why the high-throughput chemical screening nature of  
2 Thorsen's project would motivate a forward-looking desire, right, not a  
3 hindsight desire, a forward-looking desire to collect the droplets out, and  
4 again there was no explanation in their theoretical formulation of the system  
5 for how you would get droplets out through that narrow chimney.

6 If they're right, that it's impossible to get the droplets out, then that  
7 would again frustrate the purpose of Thorsen's device which is to collect the  
8 positive-sorted droplets. That's a forward-looking motivation; it's not  
9 hindsight. And again, to the implement question there was the assertion  
10 made that Thorsen didn't solve the problems he had. That's not true.  
11 You've seen in my opening presentation he had slides showing he  
12 successfully encapsulated droplets and he successfully completed his assay.  
13 Moreover there's no dispute that his red and green dye samples correctly  
14 were enabled both (inaudible).

15 If there are no further questions, Your Honor, I think that that is it for  
16 my argument section.

17 JUDGE ROESEL: Thank you. We'll hear again from Patent Owner.  
18 Oh, I'm sorry.

19 MR. GERRITY: Thank you, Your Honor.

20 JUDGE ROESEL: Do you have a question?

21 MR. BAKER: Thank you, Your Honor. I would like to address a few  
22 points. First of all, I've heard a question a couple of times today about  
23 whether the Board could simply adopt claim constructions that were needed  
24 to construe the claims yourselves. I think that for all of us, we have to  
25 construe the claims. I mean, before we reach the Board for Patent Owner,  
26 before we reach, you know, this hard (phonetic) part of validity or even

1 infringement analysis, the first step is to construe the claims, so I do think  
2 that that needs to be done. Now does that -- we think that you should look at  
3 what would be a proper claim construction and adopt what we have  
4 proposed for the reasons that we said in our brief, and also because they're  
5 undisputed. But I do think that claim construction is the first step, and we  
6 think that our claim constructions are proper.

7         Number two, I heard opposing counsel say that that we did not say  
8 that collection was needed. I'm not sure where that comes from because we  
9 specifically said it in our claim construction of droplet receiving outlet. We  
10 say that it is the portion of the separation chamber where droplets are  
11 collected. So that was specifically addressed. We have specifically made  
12 that argument, and that is one of the major clause of course is Thorsen and  
13 Ismagilov that you cannot collect droplets.

14         The third point I want to address is counsel said that we had  
15 disclaimed the idea that separation is required by the claims and that he  
16 heard no response to that in my presentation, and so I just want to revisit  
17 that. I thought that I had addressed that and made clear it was actually one  
18 of the very first points that was braved in my argument I think by a question  
19 to the Board, but I'll just reiterate. The statements that he is referring to was  
20 in our Markman brief in District Court. There was a dispute over the  
21 construction of separation chamber.

22         We said that it was sized to accommodate to separate the droplets or  
23 something along those lines. They came back and said, no, that cannot be  
24 right because that would require separation, and there's another limitation  
25 that requires separation, the volume sufficient language, and we responded  
26 and said, no, this is an apparatus claim. Volume sufficient would not itself

1 necessarily require separation. So the idea that the separation chamber is the  
2 element that requires is perfectly fine. That's what we were referring to in  
3 our brief, but as I said during my presentation whether you say that you hang  
4 your hat on separation chamber or volume sufficient, I'm not sure it really  
5 matters. The point is this is a separation chamber, and it requires separation,  
6 and I think that that's an obvious point.

7 Point number four, counsel for Petitioner said that in fact they do  
8 know what happens in-between the layers in the black clump. There's no  
9 evidence of that. The only evidence of what is going on with that black  
10 clump in the incubation chamber is from our expert Dr. Anna who explained  
11 that when you're using the planar microscope there is no way to tell what is  
12 going on between the layers. Point number five, counsel for Petitioner said  
13 that the outlet holes in Thorsen would have to be the same diameter as the  
14 wells because he said that, but he didn't say that. All he said -- when he was  
15 talking hole punches, Thorsen said that he punches through the entire  
16 thickness, but he explained he did that with a syringe needle that was -- so  
17 that you would have fluid that could -- the fluid could flow due to the  
18 pressure difference. He doesn't say that he fabricated the wells by punching  
19 the core borers through and that that constituted the wells. He doesn't say  
20 that what he did was something other than a waste reservoir where the height  
21 of the well is the same as the microchannel.

22 And then the closing counsel also said even if that's the case, even if  
23 you have a well that is large to accommodate thousands of droplets but it's  
24 the same height as the microchannel and then you have this sort of thinner  
25 syringe needle chimney going up, that we did not point out what limitation  
26 that that would not meet, so I just want to be clear it wouldn't meet several

1 limitations including separation chamber. It would not be a separation  
2 chamber. It would not be a volume sufficient to separate droplets. There are  
3 -- the point is separation would not occur in a well like that, and he says,  
4 well, it would still be perpendicular, but he said if you consider that syringe  
5 needle hole punch to be part of the separation chamber. Well, I mean,  
6 there's no evidence for that, and the point is again that in the well itself,  
7 there would be no separation.

8 And then the last point I want to make is this idea that the claims  
9 cover droplets that come out of the incubation chamber mixed in with the  
10 oil, and then can flow down to a collection, to a well where that you can  
11 collect them. And I think the idea there is that Petitioner said that there is no  
12 limitations that require or talk about how much oil can be mixed in with the  
13 droplets in order for them to be considered separated, and they also say that  
14 we rejected a construction that requires substantially only droplets.

15 Well, the reason we rejected that construction is because that's in one  
16 of the dependent claims, right? The Board pointed out, though, that doesn't  
17 mean that you can have a lot of clumps of oil mixed in with the droplets  
18 even for the independent the claims. The claims -- the specifications that  
19 talks about leaving the large part of the oil behind, right? So the  
20 specification addresses this, and says, look, what we're talking about with  
21 separated droplets is no separated droplets. It has to be mostly just droplets.  
22 The specification says it has to be, you know, largely droplets, and then  
23 there's the dependent claims that specifies substantially only droplets.

24 But the point is, you can't have fluid and droplets mixed together in  
25 steps by the claims. The claims go to separation; that's the whole point.  
26 And so the idea that you can remix the droplets coming out of the incubation

1 chamber and send them through the channel, and that that would meet the  
2 claims here is just I think wrong. And with that, Your Honor, unless the  
3 Board has any further questions, I will rest.

4 JUDGE ROESEL: Okay, there being --

5 MR. BAKER: Oh, actually if you wouldn't mind, I do want to make  
6 one other point just to answer the Board's question about addressing both  
7 references. If the Board does find -- and of course we don't think that any of  
8 these claims are invalid. We think they're valid for all the reasons that I've  
9 said today, but if the Board did find that any particular claim was invalid, we  
10 don't think that it would be necessary to address both references. And with  
11 that, I will rest.

12 JUDGE ROESEL: Okay, we thank the parties for their presentations.  
13 That concludes today's hearings, and final decisions in all four cases will be  
14 issued in due course. The hearing is adjourned.

15 MR. BAKER: Thank you.

16 (Whereupon, the proceedings at 4:01 p.m. were concluded.)

IPR2020-00086, IPR2020-00087 (Patent 9,562,837 B2)  
IPR2020-00088, IPR2020-00089 (Patent 9,896,722 B2)

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