BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ABBOTT LABORATORIES,

Plaintiff,

v. Case No.

MIRACOR MEDICAL SA, IPR202500096(PTAB)

Defendant.

_____

DEPOSITION OF

PETER CROSBY

DATE: Thursday, September 4, 2025

TIME: 9:05 a.m.

LOCATION: Winston & Strawn, LLP

333 South Grand Avenue, 38th Floor

Los Angeles, CA 90071

OFFICIATED BY: Ruby Moreno

JOB NO.: 7565630

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1 I N D E X
2 EXAMINATION: PAGE
3 By Mr. Cahill 5
4
5 E X H I B I T S
6 NO. DESCRIPTION PAGE
7 Exhibit 2012 Article from European Journal
8 of Cardio-thoracic Surgery 25
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1 P R O C E E D I N G S
2 THE OFFICER: Good morning. My name is
3 Ruby Moreno; I am the reporter assigned by Veritext to
4 take the record of this proceeding. We are now on the
5 record at 9:05 a.m.
6 This is the deposition of Peter Crosby
7 taken in the matter of Abbott Laboratories vs. Miracor
8 Medical SA on September 4, 2025, at Winston & Strawn,
9 LLP, 333 South Grand Avenue, 38th Floor, Los Angeles,
10 California 90071.
11 I am a notary authorized to take
12 acknowledgments and administer oaths in California.
13 Additionally, absent an objection on the
14 record before the witness is sworn, all parties and the
15 witness understand and agree that any certified
16 transcript produced from the recording of this
17 proceeding:
18 - is intended for all uses permitted
19 under applicable procedural and
20 evidentiary rules and laws in the same
21 manner as a deposition recorded by
22 stenographic means; and
23 - shall constitute written stipulation
24 of such.
25 At this time, will everyone in attendance

1 please identify yourself for the record, beginning from
2 my left.
3 MR. CAHILL: Ron Cahill from Barnes &
4 Thornburg for the patent owner, Miracor Medical.
5 MR. BORDER: Scott Border here on behalf
6 of the witness and Abbott, and with me is Kevin Boyle.
7 We're with the law firm of Winston & Strawn.
8 MR. CROSBY: Peter Crosby, the witness
9 today.
10 THE OFFICER: Thank you. Hearing no
11 objection, I will now swear in the witness.
12 Please raise your right hand.
13 WHEREUPON,
14 PETER CROSBY,
15 called as a witness and having been first duly sworn to
16 tell the truth, the whole truth, and nothing but the
17 truth, was examined and testified as follows:
18 EXAMINATION
19 BY MR. CAHILL:
20 Q Thank you for coming in this morning,
21 Mr. Crosby. I have placed two binders in front of you,
22 and we'll be using some of the documents in those
23 binders to ask questions today. One of the binders has
24 your declaration from the 096 IPR. We'll probably just
25 use one. We're here to talk about six IPRs today.

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Miracor Ex. 2014, p. 2 of 30

1 Could you take a look inside that binder and just
2 confirm that's your declaration for the 096 IPR?
3 A Yes, I see this.
4 Q And then the second binder has some of the
5 references that we're going to talk about. It includes
6 the 356 patent, which is the patent at issue in the 096
7 IPR, the Akamatsu reference, the Bourque reference, the
8 Schima reference, the Wampler reference, and then also
9 Exhibit 1019, which is some infringement allegations
10 made by Miracor Medical that you cite to in your
11 declaration. So you have those two binders there?
12 A I have the two binders, yes.
13 Q Okay. Have you had your deposition taken
14 before, Mr. Crosby?
15 A Yes.
16 Q How many times?
17 A Twenty.
18 Q And how many of those were patent related
19 matters?
20 A In what period of time?
21 Q I guess in the period of time that you've been
22 giving depositions. How about in the last ten years?
23 A About six, I think. Plus or minus.
24 Q Okay. And you understand that today I
25 represent Miracor Medical, and I will be asking you

1 questions related to IPRs in which Abbott is challenging
2 Miracor Medical patents. Do you understand that?
3 A I do understand that.
4 Q Okay. Is there any reason why you cannot give
5 truthful answers to questions I pose today?
6 A No.
7 Q Did you prepare for your deposition today?
8 A Yes.
9 Q What did you do to prepare for your
10 deposition?
11 A I read many, many documents or reread many
12 documents, including my declaration. I met with
13 attorneys for Abbott on a couple of occasions. That's
14 the major work I did to prepare.
15 Q Okay. And how many times did you meet with
16 counsel for Abbott?
17 A I met in person the last two days and by Zoom
18 once or twice I think last week.
19 Q Okay. And what do you think the total amount
20 of time was?
21 A I'm having difficulty hearing. I have hearing
22 aids, so I have real hearing problems, and you speak
23 quietly. So try it again, please.
24 Q Sure. What was the total amount of time that
25 you spent meeting with Abbott's attorneys?

1 A Meeting with the attorneys? Twelve to fifteen
2 hours, thereabouts.
3 Q Now, you reviewed one or more of your
4 declarations given in these matters as part of your
5 preparation. Did I hear that right?
6 A Yes.
7 Q During your review, did you see any errors
8 that you need to correct?
9 A I think there are a few typographical errors
10 that you'd expect in any long document. I can't recall
11 what they are specifically at the moment. Nothing that
12 changes the substance of my arguments or my opinions.
13 Q And in your preparation, did you review the
14 Bourque 2001 reference?
15 A Yes.
16 Q Did you review the Wampler reference?
17 A Which one?
18 Q The one that's cited in the grounds. So the
19 published patent application, Exhibit No. 1008. It's
20 number 2002 0102169.
21 A Yes. I did review that.
22 Q Did you review other Wampler publications?
23 A I think there are multiple Wampler
24 publications listed in my materials considered.
25 Q Did you review the Akamatsu reference?

1 A Akamatsu is a body of work referred to as
2 Akamatsu. I reviewed the paper, I think that you're
3 referring to, plus one or two other articles, yes.
4 Q And did you review the Schima reference?
5 A Which one are you referring to?
6 Q It's in there in your binder. It's Exhibit
7 No. 1005, published patent application number 2003
8 0124007.
9 A Yes. I did review that.
10 Q And do you understand those four references to
11 be cited in the grounds on which Abbott alleges
12 Miracor's patent claims are invalid?
13 A Could you repeat that question, please? What
14 do I understand?
15 Q Sure. We just mentioned four references.
16 A Yes.
17 Q And do you understand those four references to
18 be references cited in the grounds of invalidity
19 provided by Abbott in these IPRs?
20 A Yes, I do.
21 Q Now, you worked for a company called
22 Ventracor; didn't you?
23 A Yes.
24 Q And did you leave Ventracor in 2009?
25 A Yes.

Q Have you worked with continuous flow blood pumps since you left Ventracor?
A What do you mean "worked with"? You mean, have I designed? Have I run a company? Have I implanted that? It's a very vague term. What do you mean "worked with"?
Q Well, let's start with that. Have you, sort of, worked with in the hands-on sense that you have been employed directly by a company that was designing or building or implanting continuous flow blood pumps?
A No. I have not been employed by a company working with designing or selling continuous flow blood pumps.
Q Have you consulted for any companies that develop or sell continuous flow blood pumps?
A In a sense, yes.
Q Okay. Could you describe that circumstance?
A Sure. Ventracor Limited, the Australian company, was put into receivership in early 2009. I retained my position as CEO for a while. I also retained my position as president of the U.S. subsidiary of Ventracor, Ventracor Inc., and I retained that position until the company was wound up in, gosh, early 2010.
Q Okay. Are there any other circumstances where

you consulted with a company that was -- in the time since you left Ventracor, have you consulted with a company that was designing or selling continuous flow blood pumps?
A No.
Q Have you, yourself, ever designed a continuous flow blood pump?
A I don't think there's anyone on earth who -- who has alone designed a continuous flow blood pump. I've certainly been parts of research and development teams that have worked on continuous flow blood pumps. It's rarely a solo effort.
Q Okay. Could you describe those circumstances where you worked with R&D teams to design a continuous flow blood pump?
A When I joined Ventracor in 2005 initially as chief operating officer, all of the research and development and manufacturing parts of the organization were responsible to me. I subsequently became chief executive officer of Ventracor in, gosh, early 2006, I think, and was actively involved in all aspects of the business, including having the last signoff of all design documentation for the blood pumps that the company was designing and manufacturing. I was involved in many of the research and development meetings.

Q Okay. And what were the blood pumps that Ventracor was developing at that time?
A Ventracor developed a blood pump called the VentrAssist, V-E-N-T-R-A-S-S-I-S-T, which was a centrifugal blood pump with hydrodynamic bearings. It was implanted in several hundred people, eventually got approval for bridge to transplant, eventually got CE mark approval for sale in Europe and was conducting -- in the process of being -- conducting multiple clinical trials.
Q Okay. And now, the VentrAssist blood pump had been implanted in humans before you joined Ventracor; is that right?
A I think so. A small number, yes.
Q So then were your contributions to the research and design -- were those design changes to the Ventracor pump?
A Well, the first of the Ventracor pumps, the VentrAssist, which was implanted in humans as you talked about, was the first of a series of products. We had a pipeline of products. I was involved not only in working to improve the existing device, but also in the pipeline of new products that was under development.
Q And did that pipeline include continuous flow blood pumps?

A Yes.
Q Did it include centrifugal flow blood pumps?
A Yes.
Q In human anatomy, what is the diaphragm?
A Are you asking me as an anatomy specialist? I didn't know that was the brief.
Q Diaphragms appear in some of the references that we're talking about, and I'd just like to get your understanding of what it is.
A The diaphragm is a large flat muscle that spans the width of the abdomen underneath the lungs and between the lungs and the peritoneal cavity, and it is the muscle that is used primarily to cause breathing. When the diaphragm contracts, the lungs inflate. When it relaxes, they expel air.
Q Okay. So the diaphragm moves during breathing?
A I beg your pardon?
Q So the diaphragm moves during breathing?
A Yes. Most of your body does.
Q How close is the diaphragm to the apex of the heart?
A You mean in humans?
Q Yes. In humans.
A 'Cause it's different in different animals.

It's generally very close to it. It depends. The diaphragm moves, as we say, so it can be -- it can be close sometimes, and it can be far away sometimes. So there's no one answer to your question. It's closer than the foot.

Q Okay. So then if I understand you correctly, when one exhales, the diaphragm will be closer to the apex than when one inhales?

A It may be. You can exhale just by moving your rib cage. It doesn't necessarily require the diaphragm.

Q But typically, the diaphragm does move during breathing?

A Typically.

Q How does the apex of the human heart move during a heartbeat?

A How does the apex of a human heart during -- move during heartbeat? Well, it depends on the individual's anatomy. And if you're talking about a normal heart, generally the apex moves in a slightly circular motion. The heart will contract, so the apex will contract longitudinally towards the coronal area plane. And it may also move in a slightly twisting movement when the -- the ventricle contracts. In different types of cardiac disease, the movement can be quite different.

Q But in general, it does move during your heartbeat; is that right?

A It? You mean the apex or the heart?

Q Yes. The apex.

A The apex of the heart generally can move during a heartbeat, yes.

Q And it moves in a way that's not linear; is that right?

A Not regular, did you say?

Q Linear.

A Not linear. It can.

Q I thought you --

A The -- the heart is a very flexible organ. They can move in any way you like. I've held a heart in my hands, and it moved in multiple directions.

Q I thought you described the motion as being circular.

A It -- it can be.

Q Well, I guess, when it is circular, I'm trying to envision what that means, in which direction it curves. Can you describe that?

A Think of you contracting your fist; right? If -- sometimes when you contract your fist, you might rotate your arm. So which direction does your -- does your fist move? Sometimes you might rotate it in the

opposite direction. So it just depends whether you are sitting or standing or lying or running or walking or swimming. There is no single answer to your question.

Human anatomy is very variable, and the motion of the heart depends on what it's trying to do. The motion of your heart when you're running a marathon and your heart is beating 200 beats a minute is quite different from the motion of your heart when you're asleep and it's beating 55 beats a minute. There's no single answer to your question.

Q You're aware, aren't you, Mr. Crosby, that the Miracor patents use the term "at a position axially adjacent"?

A Can you refer to which patent, so I know -- there are lots of terms in the patents. So can you tell me which one you're referring to, please?

Q Well, tell you what. Why don't we go to paragraph 355 of your declaration that's in front of you.

A Three-fifty-five. I have that.

Q Now you see claim element 1H that you discuss here uses the phrase "at a position axially adjacent." Do you see that?

A Yes.

Q What does "axially adjacent" mean in this

context?

A Well, I think there are multiple answers to that question depending on which context you're asking. The context of the claims in the 356 patent that this declaration is concerning? The claims in other patents may use that term differently the way a person of ordinary skill in the art might understand that term to mean and then the way that the patent owners would understand that term to mean, and -- and you referenced before, I think, their claim chart. So which way would you like me to approach that question? There are multiple answers.

Q How would a person of ordinary skill in the yard reading this claim element in the context that you use it here -- what would they understand the term position "axially adjacent" to me?

A That's -- can you show me where in the 356 patent? Can I read the 356 patent claim? 'Cause this is one fragment of a claim. So it had to be seen in context of the whole claim, I think.

Q Well, I think you've already done this.

A I've already done what?

Q I think you've already done this work, Mr. Crosby. So in paragraph 355 at the bottom of page 184, you say, "Passively magnetic element are axially

adjacent along the central axis." So as you apply that term, does that mean axially adjacent means they're adjacent along the central axis?

A Well, that -- that's what I say in my -- thank you for reading out my declaration. That's exactly what I say.

Q And then in the next sentence, you say, "Further, in order to provide the torque necessary to rotate the impeller, the passively magnetic elements are axially adjacent," and then you say, "situated next to each other on the same axis."

A Where -- where are you reading? And --

Q It's the next sentence. It's right underneath the figure on the top of page 185.

A Oh, I see. Yes. "The passively magnetic elements are axially adjacent, situated next to each other on the same axis to the impeller, such that when the magnetic forces applied to rotate the passively magnetic elements, the impeller may then rotate about its axis."

Q So as you've applied it, is "situated next to each other on the same axis" -- is that a fair definition of "axially adjacent"?

A That -- that is fair in the context of this discussion of the Bourque device, yes.

Q Would it be fair to say "at a position axially adjacent" means at a position adjacent to one another as measured along a central axis?

A Where are you reading from in my report?

Q That isn't in your report. I'm asking you a question.

A Well, ask me the question again, and -- and in what context? I'm -- I'm trying to understand the question. All my answers are in the report. So if it's something that's not in the report, I have to think about it afresh. If you refer to something in my report, that's great.

Q So I'm asking you if this definition is consistent with what we just talked about in your report as to what "axially adjacent" means. Is it fair to say that "axially adjacent" means adjacent to one another as measured along a central axis?

A That could be one -- one meaning, yes. I'm sure there are many other meanings.

Q Based on what you know today, that definition isn't wrong; is it?

A Well, we're discussing this in the context of the 356 patent. The term "axially adjacent" appears only in the claims. The patent itself does not define what "axially adjacent" is. So a person of skill in the

art would have to read the claims in conjunction with the description and try and figure out what the inventor means in that claim.

Q So as you sit here today, would you object to the definition of "axially adjacent" as meaning adjacent to one another measured along a central axis?

MR. BORDER: Object to form.

THE WITNESS: I think that's acceptable as one definition. I don't think it's the only definition, and it depends on the context in which it's being used.

BY MR. CAHILL:

Q So, Mr. Crosby, I'd like to talk about the person of ordinary skill in the art for a moment. So you discuss the qualifications of a person --

A Where -- where are you looking in my report, please?

Q I am about to tell you.

A Sorry. I shouldn't interrupt. I apologize.

Q You discuss the qualifications of a person of ordinary skill in the art in your declaration at paragraph 18. You're welcome to look at it.

A Eighteen?

Q Yes.

A Here we go. Yes. I have it here.

Q Okay. And this definition in paragraph 18, is that the person of ordinary skill in the art that you had in mind when you did your analysis described in your declaration?

A Yes.

Q Now, you say here, "The person of ordinary skill in the art would have knowledge and experience in the anatomy and physiology of the human circulatory system," and I'd like to ask you what you mean by that. So, I mean, we talked a little bit about the nature of the human diaphragm and how it moves. Is that something that the person of ordinary skill in the art should know in your definition?

A Well, the diaphragm is not part of the human circulatory system, but someone who has knowledge and experience of anatomy and physiology of the human circulatory system would clearly have knowledge and experience of the things that surround the human circulatory system.

Q Would that person have knowledge of where and how left ventricular assist devices had typically been implanted?

A Perhaps. Not necessarily by this definition. Someone who had knowledge and experience of human left ventricular assist devices would satisfy most of this,

provided that experience and design and development is at least five years, and that was the only medical device that person had been working on.

Q So should the person of ordinary skill in the art for these purposes -- should that person know how left ventricular assist devices have typically been implanted in humans?

A The definition as written here doesn't require that. It would certainly be helpful if that person does have that knowledge.

Q You talked about this a little bit already, but I'd like to follow up in just a little bit more of a structured way. Your role with Ventracor. Now, you started there in 2005; is that right?

A Yes.

Q And you were COO when you started?

A Yes.

Q And what were your responsibilities as COO?

A The chief operating officer is responsible for all the operations of the company. That generally means research and development, manufacturing, quality systems, procurement, but does usually not involve sales and marketing, finance, government relations. It may involve regulatory and clinical trials depending on the company.

Q Were there clinical trials going on for the VentrAssist product in 2005?

A Multiple.

Q And were you involved in those?

A Yes.

Q And what was your role in those clinical trials?

A I contributed to the clinical trial protocol design and development. I was one of the authors of that. I was part of the clinical trial steering committee. I think I signed off on most, if not all of the contracts between the company and the clinical trial investigators and the institutional review boards. I reviewed and contributed to most of the submissions to the regulatory authorities, such as the United States Food and Drug Administration and the notified body in Europe leading to CE mark. So my fingers were all over those clinical trials.

Q And then in July 2006, you became CEO of Ventracor; is that right?

A That's -- about that time, yes.

Q And with respect to the VentrAssist product, how did your responsibilities changed when you moved from COO to CEO?

A Well, as in any company, a chief executive

officer is the person responsible for literally everything. And so my responsibility wingspan got bigger, and so I took on additional responsibilities of the other things we talked about, like finance, sales and marketing.

Q Now, you were familiar with the design of the VentrAssist pump; weren't you?

A Yes.

Q Could you describe -- could you give an overview of the important features of the VentrAssist pump?

A The VentrAssist pump would be described as a third generation centrifugal pump with a fully hydrodynamically supported impeller, machined from titanium. It had a flow rate of about ten liters per minute against a head of about a hundred millimeters of pressure. It had an external controller attached to the pump or connected to the pump via an electrical cable that came through the skin, a so-called percutaneous lead. Which other aspects would you like to know?

Q How was the VentrAssist pump implanted in the human body? Where did it go?

A It had a -- an inflow tube made of hard silicone rubber attached to the central axis of the pump, and that was implanted in the apex of the heart.

So the pump was positioned either inside or outside the peritoneal space, depending on the patient's circumstances, at the apex of the heart. The cable then transitioned laterally across the abdomen and exited the abdomen, usually about the -- six inches or so laterally to the right of the umbilicus.

MR. CAHILL: Could we mark this 2012?

(Exhibit 2012 was marked for identification.)

MR. BORDER: Thank you.

BY MR. CAHILL:

Q Mr. Crosby, I've handed you Exhibit No. 2012, and this is an article from the European Journal of Cardio-thoracic Surgery entitled, "VentrAssist left ventricular assist device: clinical results and clinical development plan update." Do you see that?

A I see that, yes.

Q Have you seen this paper before?

A Yes. Not for a while, but I have seen it before. I think I contributed to it.

Q So it looks like this paper was published in 2007. Does that seem right?

A It's copyrighted 2007. It was received 13th of March 2007 and available online September 2007.

Q And that was during the time that you were CEO

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at Ventracor; is that right?
A That is correct.
Q Who is John Woodard?
A John Woodard was one of the founders of Ventracor, a Ph.D. in biophysics if I remember correctly, and one of the inventors of the VentrAssist pump. At the time, I think he was the chief technology officer of Ventracor.
Q So this article -- and I'm looking specifically at page 736, the second page of the article in the first column.
A I haven't read this article for a while. Can I read it now, or do you want to point out just some parts of it?
Q I have a couple of specific questions and let me know -- if you need to read more of it to answer the question, let me know. So the article states that VentrAssist was conceived in 1998 with first human use in June 2003?
A Where are you looking at that?
Q Page 736, first column, second full paragraph.
A The first column?
Q First column, second full paragraph.
A Oh, yes. Yes.
Q So that timeline conceived in 1998 and first

human use in 2003, I mean, does that seem right to you? Does that accord with your recollection of the history?
A Yeah. I think the first human use in 2003 was an acute use, not a chronic use, you know. We'd put it in and see if it worked and take it out again. But the timeline is about right.
Q In your experience, is that a typical timeline for the development of a left ventricular assist device?
A Is what a typical timeline? What are you referring to?
Q Conceived in 1998, first human use in 2003.
A It depends. In 1998, the field of left ventricular assist devices was in its infancy. So the development time or the time from conception to first human use was pretty long in the early years. Nowadays, if you were doing one in 2025, it would be shorter, because there's 30 years of experience behind us that -- that answers some of the questions. So I imagine, if necessary, one could do it a bit faster today.
Q Do you see figure two on page 736?
A Yes. I see figure two. Yep.
Q So that appears to illustrate an implantation of the VentrAssist system; is that right?
A That's an artist's rendition of how the system might be used, yes.

Q Was the system used that way?
A Which way are you referring to?
Q The way that it appears in the figure two.
A Well, are you referring to the shoulder strap and the external controller? Because that was certainly different by the time I was there. Are you referring to the exit location of the percutaneous lead or how the -- there are multiple elements of that system. So I'm not sure which element you're asking about.
Q How about the inflow cannula and pump?
A It's hard to see with my old eyes exactly what that's talking about. But that appears to be an inflow cannula, which is sewn to the apex of the left -- left ventricle and then connected to the pump. I think that whole inflow cannula system had developed a bit differently by the time I was there and by the time the device was available for market.
Q How was it different?
A Difficult for me to answer that, because as I say, this is a -- an artist's rendition that's just difficult to see. I know what it looked like by the time I was there, but I don't know what this is -- it's hard to tell. I'd refer you to some of the actual photographs of the device that appear at other publications or some of the FDA submissions that will

tell you the design details. This is an artist's rendition. Doesn't tell me much.
Q Okay. There's a description of the location of the pump on page 737 at the top of the second column.
A This -- 737 top of the second. Okay.
Q Right. It says, "The pump is placed in a pocket on the left side below the diaphragm, either in a pocket formed in the" --
A I'm sorry. You're talking, and I'm reading. Which --
Q Sure. The sentence at the top of the second column, if you could read that.
A "The VentrAssist was primarily designed as a permanent alternative to heart transplant for patients with heart failure." That sentence?
Q No. At the -- on page 737, the top of the second column.
A Oh, second column. Beg your pardon. "The pump is placed in a pocket on the left side below the diaphragm, either in a pocket formed in the posterior rectus sheath or in a preperitoneal position behind the rectus. The diaphragm is reflected off the anterior chest wall to allow passage of the inflow and outflow cannula."
Q So is that description generally accurate from

your recollection of the time, 2007, when this published?
A It's one way the pump was implanted at that time. Surgical procedures developed along with development of the engineering. So surgeons did a lot of work to try and find -- make the surgical procedure better, easier, more reliable. That's one way.
Q So you've described this as one way you might implant VentrAssist. Do you know why someone would choose to implant it this way, to place the pump in a pocket on the left side below the diaphragm?
A You're referring to the VentrAssist pump or all left ventricular assist devices?
Q The VentrAssist pump.
A Just the VentrAssist pump?
Q Yep.
A Gosh, I haven't thought about this for a while. I think in the early days, the surgical approach was fairly conservative, and there was some attempt to try and retain a natural motion of the heart. As time went on, people realized natural motion of the heart with an LVAD implanted is irrelevant, 'cause the heart's not doing the pumping.
So if the heart's immobile, it kind of doesn't matter. And over time there were experiments done on

there?
A Which drawings are you referring to in Wampler?
Q So let me just ask you a general question first, and then we'll -- we can turn and look at it. If you can't answer without looking at it, that's fine too. Wampler has at least one version of a pump that has a thrust bearing; is that right?
A I -- which drawing are you referring to?
Q Why don't we turn to -- so figures 1 to 8 of Wampler.
A Okay.
Q Do those describe a pump that has a thrust bearing?
A The thrust bearing is at the -- yes. I can see the thrust bearing in figures 1 to 8.
Q And then in figures 11 to 16, Wampler describes a pump or pumps that have hydrodynamic bearings but not thrust bearings; is that right?
A I think figures 11 to 16 have a combination of hydrodynamic bearings and electromagnetic bearings, but you're correct. There is no thrust bearing.
Q Now, the motor illustrated, for example, in figure 11, that has dual stators; doesn't it?
A I'm sorry. What was the question?

implanting it between the apex of the heart and the diaphragm. In other words, not having a penetration through the diaphragm. In some pumps, that worked; in some patients, that worked. Patients are of different sizes. And so what might work in a 300 pound man might be quite inappropriate for a 120 pound child.
So the surgeons had to develop ways of implanting a device that would be appropriate for the patient's anatomy and also for the device to be implanted. So as I said, early human trials were done with a fairly limited range of human sizes, and as time went on and surgeons became better, the surgical approach became better and was more tuned to the patient's anatomy.
Q I'd like to change gears and discuss the Wampler reference. You refer to it in your declaration as Wampler 169.
A At 16, I think.
Q Yeah. So the -- yes.
A It's Exhibit 1008? Is that the one you're referring to?
Q Yes. That's right.
A Okay.
Q Now, there's more than one embodiment of a centrifugal blood pump described in Wampler; isn't

Q The pump illustrated in, for example, figure 11 of Wampler.
A Yes.
Q That has dual stators; doesn't it?
A Dual stators. I'd have to look at the -- the reference again. Which -- which elements are you referring to for that dual stators?
Q So paragraphs 83 and 84 of Wampler.
A I've read them.
Q Okay. And those describe two stators; don't they? One on either side of the rotor.
A Yes. Paragraph 83 describes a first motor stator at number 90, and paragraph 84 describes a second motor stator at 94.
Q And actually, if you turn in your declaration to paragraph 205.
A Two hundred and five. Yes. I've read it.
Q So you've colored there the two stators blue; haven't you?
A Well, technically, what's colored is the sub-components, the motor windings, the back iron, the windings, the back iron, and the teeth, which together form the stators.
Q Okay. But there are two stators; right? Motor stators 90 and 94. And you've colored them blue;

correct?
A Paragraph 205 says, "Elements of the pump motor, including motor stators 90 and 94, which are colored in light blue."
Q And the pump that Wampler describes in figures one to four -- I'm sorry -- one to eight, that pump does not have dual stators; does it?
A I wonder if you could have printed this with any smaller font. Where are you referring to -- maybe you can save us both some time. Where are you referring to in the Wampler patent?
Q Well, I'm not. We just looked at the versions that have dual stators; right? And in your declaration --
A Yes.
Q -- we looked at the example where you color the dual stators light blue. And my question is, the pump that Wampler illustrates in figures one to eight, that pump does not have dual stators; does it?
A Well, Wampler has multiple embodiments of his pump and his patent. I think my report only refers to the second embodiment, which is figures -- whatever we talked about before. I don't think I talk about the first embodiment in my report. I only talk about the embodiment that's in figures 11 through -- whatever it

is. So I haven't referred to that first embodiment in my report that I remember.
Q Certainly, you refer to figure five. Also in your report, you refer to several paragraphs that describe the pump at figures one to eight. So as you sit here today, you can't look at figures one to eight of Wampler and tell me whether or not they have dual stators?
MR. BORDER: Objection to form.
THE WITNESS: I don't think that's what I said. I -- I'll read the Wampler patent and see what it says about figures one to eight. But the analysis in my report which talks about stators is at least with the second embodiment. So I don't recall sitting here today whether the first embodiment has zero, one, or 57 stators. And I could read the patent and answer your question if that's what you'd like me to do.
BY MR. CAHILL:
Q Okay. Could you look at figure eight of the Wampler patent?
A Figure eight. Yes.
Q Have you looked at, analyzed, thought about this figure before?
MR. BORDER: Objection. Form.
THE WITNESS: Do I refer to it in my

report anywhere?
MR. CAHILL: I don't know.
THE WITNESS: I don't think I refer to it in my report. So to the extent that I've looked at it, yes, I've looked at it. I don't think I've provided any opinions on it or any analysis of it in my report.
BY MR. CAHILL:
Q Do you see in figure eight that there are a number of magnets numbered 23, 24, 28, 29?
A I -- I can see a number of magnets in figure eight, but again, I haven't analyzed this in any particular way. And I don't think I refer to it in my report.
Q Do you know what function those magnets perform?
A I can read the patent and see what the -- what the description is of those -- of the function of those magnets if you'd like me to today.
Q So you do see those magnets in figure eight; don't you? See where they are?
A I see several magnets depicted in figure eight, yes.
Q Well, in particular, I'm talking about the ones number 23, 24, 28, and 29.
A Okay. There's also a 34 and 32 maybe, maybe

31. So there's multiple magnets in this configuration.
Q But I'm asking you about the magnets number 23, 24, 28, and 29. Do you see those?
A I -- I see them in the illustration, yes.
Q Do those magnets appear in, for example, the Wampler pump illustrated in figure 13?
A Well, figure 13 is a different embodiment of a pump described in this patent. So they -- and it's a completely different view of the patent of -- of a -- of a pump. One is a 3D isometric view; one appears to be a -- almost a cross-sectional depiction. So the illustrations at least are not identical.
Q Could you turn to paragraph 160 of your report?
A One six zero, yes?
Q Yes. I'd like to ask you some questions about your use of the term "rotor." Now, you refer to Wampler 169 in this paragraph 160, and in particular, in that first paragraph, there's a parenthetical at the end. You quote Wampler, and you say, "A centrifugal pump impeller is attached to an impeller support shaft or spindle to form the pump rotor."
A I say that, yes.
Q Now, later in the paragraph -- and I encourage you to read the paragraph if you would like to -- you

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1 limit your application of the term rotor, it appears to
2 me, to only the impeller portion; is that correct?
3 A Yes. I say, "For the purpose of my analysis,
4 I mapped the limitation of a magnetically driven rotor
5 to the impeller 74 of the embodiment of the rotor 17
6 described in figure 11 of Wampler 169 in the same way."
7 Q Okay. So Wampler calls the rotor number 17?
8 A I understand your question. Yes.
9 Q And you limit rotor to the impeller portion
10 74; is that right?
11 A For this analysis, yes.
12 Q So why isn't the support shaft or spindle part
13 of the rotor?
14 A Well, it seems from your question that you're
15 suggesting that everything that rotates is called the
16 rotor, but that's not how it's used in common use. You
17 drove here in a car presumably, which has disc brakes.
18 The disc brakes themselves are what's called the rotor,
19 but that's not the only thing that moves in the wheel.
20 The rotor is just that part of the brake -- of
21 the wheel system that is compressed between the brake
22 pads. So the idea that a rotor is everything that
23 moves, it's just not borne out in common usage. Because
24 the term is not -- the term is a little ambiguous in the
25 365 patent, I'm trying to map the use of the term

1 "rotor" to what it appears to be it is in the 365
2 patent.
3 And in the 365 patent, there are multiple
4 elements that move, only one of which is labeled the
5 rotor. In Wampler, there are multiple elements that
6 move. He uses the term "rotor," but I'm trying to map
7 it to what's in the 365 patent. And this seems to make
8 sense to me.
9 Q What is the function of the support shaft or
10 spindle?
11 A In what?
12 Q In Wampler.
13 A In which embodiment?
14 Q The one you're discussing in this paragraph
15 160.
16 A What is the function of the support shaft? So
17 is your question referring to the illustration figure 11
18 that you mentioned before?
19 Q I'm trying to understand your paragraph 160,
20 and you quote Wampler from paragraph 51 saying, "A
21 centrifugal pump impeller is attached to an impeller
22 support shaft or spindle to form the pump rotor." And
23 you've described why you believe the impeller portion is
24 actually the rotor, and I'm just wondering what the
25 function then is of the shaft or spindle. I think we

1 both agree that it rotates, but why is it there? What
2 does it --
3 A What -- what do we both agree? I didn't hear
4 that.
5 Q Well, I think we both agree that the support
6 shaft or spindle rotates; is that true?
7 A It rotates, yes.
8 Q Okay. What is the function of that support
9 shaft or spindle in the Wampler patent?
10 A As I understand Wampler, one of the functions
11 of that support shaft is to provide stability of the
12 rotating elements within the pump. If you were to look
13 at the 357 patent -- or excuse me -- the 356 patent,
14 which is Exhibit 1001, the similar situation occurs
15 here. And that is, if you look to figure two, element
16 18 is described as or listed as the rotor, but it's not
17 the only thing that rotates. There's also a shaft and a
18 magnet that rotates.
19 So the idea that a rotor is everything that
20 rotates is not supported by the 356 patent itself. So
21 I've tried to map the way the 356 patent uses the term
22 to the way Wampler uses the term. And it appears that
23 the 356 patent, the term rotor is really used to
24 describe the element that rotates that pumps the blood,
25 and I've tried to use the same approach in the Wampler

1 description. So to make them consistent here.
2 Q Now, I think I heard you say that the support
3 shaft or spindle provides stability in Wampler. Does it
4 perform any other functions?
5 A I'd have to read Wampler again to see how he
6 describes it as the function. I didn't focus much
7 attention on it at that -- at this time. But let's have
8 a look, see what he says. Page seven. Very difficult
9 for my old eyes. I'm sorry. I couldn't find anything
10 in Wampler where he specifically describes the function
11 of the support shaft 18.
12 I may have missed it, 'cause I have just read
13 it again today. He mentions the shaft or spindle 18 in
14 paragraph 81, but I am -- so far haven't found anywhere
15 else that he mentioned it in terms of its function. If
16 you can point me to somewhere that would help me
17 understand that, it'd be great. When you have a moment,
18 it's a good time to have a break when you're ready,
19 please.
20 MR. CAHILL: Yes. There is no question
21 pending. We can go ahead and take a break now if you'd
22 like.
23 THE WITNESS: Thank you.
24 THE OFFICER: It is 10:19 a.m. We are
25 now off the record.

(Off the record.)
THE OFFICER: We are now back on the record. It is 10:28 a.m.
BY MR. CAHILL:
Q Mr. Crosby, I would like to ask you some questions about figure five in Wampler.
A Figure five in Wampler?
Q Yes. Is figure five an anatomically correct illustration of the implantation of a Wampler pump?
A Figure five is an artist's illustration of how the pump would be implanted in a heart. I don't think its intent is to be anatomically correct, but in which aspect are you asking?
Q I'm not asking in an aspect. I'm just asking generally whether it's anatomically correct.
A Well, the heart doesn't lie on its side. So that's anatomically not correct. The orientation is not horizontal in the chest.
Q Anything else about it?
A Well, I can't see any of the details about the coronary arteries or the four cardiac valves or the papillary muscles that connect to the valve inside the ventricle. So to me it looks like it's an artist depiction of the essential elements to illustrate the concepts and not intended to be anatomically correct.

mounting of left ventricular assist devices to the heart.
Q Do you know if the HeartWare left ventricular assist device was the first centrifugal flow pump to be implanted in humans mounted directly to the apex of the heart?
MR. BORDER: Object to form.
THE WITNESS: Well, the HeartWare device was the resurrection of a Florida company that went bankrupt that was developing a centrifugal pump. So the origin of that pump, which is Rick Wampler's pump by the way, goes back many years prior to HeartWare. I don't know if it was implanted in a human even on a temporary basis at around this timeframe. I just don't know.
I know that the Akamatsu pump that we refer to, which was developed by Terumo, certainly was implanted in animals by around this time in -- in the early 2000s. I think there were a couple of experimental devices in Europe that -- which didn't go anywhere that were tested in -- in animals at around this time.
BY MR. CAHILL:
Q So the pump that's illustrated in figure five, do you know how big it is?
A Well, there are no dimensions on the figure,

So it's missing some anatomical elements, which in my view are probably not necessary to explain the concepts that I've been trying to explain with this illustration.
Q And it doesn't show you how the pump is connected to the heart; does it?
A Doesn't show how the what?
Q How the pump is connected to the heart.
A No. There are multiple ways it could be connected to the heart.
Q So at the time -- Wampler is dated on the top of it, 2002 --
A Oh, I'm sorry. I'm having real trouble hearing.
Q Yeah. Wampler is dated on the top of it, 2002. In 2002 timeframe, were there centrifugal flow pumps that were mounted to a heart in the manner that figure five shows?
A I think there were several experimental devices that were mounted to hearts, at least in animals, in a similar way. Many of them would have had a Dacron suture ring surrounding the inflow cannula, which was sutured to the left ventricle. There are lots of ways of mounting it. I don't think the mounting of the pump in the heart is the focus of this particular patent. That's another complete body of work to do with

and I don't know which heart that is, if it's a human or a -- or an elephant or a sheep or a calf. I don't know. So it's hard to really know what the dimensions are of this artist's rendition of how it's configured in a heart.
Q Do you know its weight?
A I beg your pardon?
Q Do you know the weight of this pump in figure five?
A I don't recall that Wampler disclosed the weight of the pump. He may have, but I don't recall.
Q Do you know whether anyone actually built the pump that's illustrated in figure five?
A I don't know.
Q Do you know whether anyone ever tried to implant one in a human?
A Well, if I don't know if it was ever built, then I could not also know if it was implanted in a human.
Q Now, you mentioned that the HeartWare pump was one of Wampler's pumps. Did I hear that correctly?
A Wampler was one of the key inventors of and contributors to the HeartWare pump, yes.
Q But that pump was different than the one we see in figure five; wasn't it?

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A In what way are you -- are you thinking?
Q Well, it was shaped differently; wasn't it?
A Well, the HeartWare pump, to my recollection -- and I don't think I've talked about it much in my report, but my recollection it is a centrifugal pump of a similar configuration to the Wampler device that's described here. There's some changes, but, you know, it's while since I've looked at one.
Q In the LVAD business, does the term "second generation" have a generally understood meaning?
A In the LVAD industry, the first generation pump term is used to describe pulsatile devices, like the HeartMate XVE or the World Heart device. The term "second generation pump" is generally used to describe rotary pumps, and there are multiple versions of that. And the term "third generation" is generally used to apply to left ventricular assist devices without bearings.
Q Now, I'm looking at paragraph 47 of your declaration. Now, you say there that HeartMate II was a second generation device; don't you?
A Yes.
Q And it's typically implanted in a preperitoneal pocket in the patient?
A Yes.

Q Okay. And then you provide an artist's rendition that illustrates preperitoneal placement of the HeartMate II pump; is that right?
A Yeah.
Q And that pump is located below the diaphragm; isn't it?
A Well, yes.
Q And there's an inflow tube or cannula that's connected to the left ventricle; right?
A Well, it's not marked in that illustration, but I know there is, yes.
Q And you can see it there; can't you?
A Well, I can see part of it.
Q Fair enough. Part of it is hidden behind the skin of the patient; right?
A Yes.
Q As is part of the pump itself?
A Yes.
Q But there is a change of direction there; isn't it?
A Change of direction of what?
Q Of the inflow of the blood into the pump.
A There's a change of direction of the inflow and of the outflow, yes.
Q So the inflow tube or cannula extends

generally downward; is that right? From the heart?
A Well, you're assuming this patient is standing up?
Q Yes.
A If the patient is lying down, it's not extending downward. So it extends distally from the heart in the general direction along the line of the left ventricle.
Q That sounded like a long-winded way of saying generally down. But the pump extends horizontally; doesn't it?
A It's in a generally transverse location, yes.
Q And so there will be an elbow somewhere in the portion of the apparatus that we can't see; is that right?
A The flow changes direction, whether it's through an elbow or a -- a compressible tube or a -- a bellows mechanism, it's not shown in this. And the reason I say that is because all of those ideas have been tried at one time or another.
Q But this illustration is taken from the HeartMate II patient management guidelines; right?
A Yes.
Q And HeartMate II was implanted in many patients; wasn't it?

A Indeed, yes.
Q And it didn't have a bellows between the inflow cannula and the pump; did it?
A It didn't have a what?
Q A bellows.
A A bellows?
Q Isn't that what you said could be there?
A I think it had a flexible element of the whole inflow assembly, which was kind of bellows shaped. It's not illustrated here, but my recollection is that.
Q Okay. So the inflow changes direction to go through the pump, and then when it comes out of the pump, it changes direction again; correct?
A You said the inflow changes direction. Do you mean the blood flow changes direction to enter the pump and then exiting the pump?
Q Yes.
A That is correct.
Q On the outflow side of the pipe, there appears to be -- I'm sorry -- on the outflow side of the pump, there appears to be an elbow; is that correct?
A I'm trying to understand. On the outside -- on the outflow side of the pump, there appears to be what?
Q An elbow.

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A Can you define what you mean? Elbow? I mean, this is an elbow, but it's movable. So what -- what do you exactly mean by "elbow"?
Q Well, you used the term "elbow" --
A Yes.
Q -- in your declaration more than once when talking about the Bourque 2001 reference.
A Okay. So you're using the term "elbow" in the same way I use it in my declaration?
Q Yes.
A Okay. In that case, yes. There is an elbow on the outflow side of the HeartMate II.
Q And that's an axial flow pump; isn't it?
A It is.
Q If one were to replace that pump with a centrifugal pump in the same orientation, the blood would come out of the pump at a 90 degree angle compared to what we see in this figure; is that right?
A Well, it depends on the orientation of the pump. If you put the pump in oriented so that the rotation axis is transverse to the pump, then the outflow of that pump could be exactly in the correct direction of the outflow tube, and the inflow of that pump would be exactly in the correct direction of the inflow tube. But that's only one of many possible

orientations of the pump. So there's no single answer to your question. Depends how the pump is oriented.
Q Well, my question was based on the pump being oriented in the same place, the inflow in the same as the --
A But it can't be. Because the inflow and outflow of the HeartMate II pump are generally on the same axis. The inflow and outflow of a centrifugal pump are not on the same axis. So you can't replace one with the other.
Q So the outflow from a centrifugal pump is 90 degrees offset from the inflow; is that right?
A The axis of the outflow of a centrifugal pump is generally at about 90 degrees to the axis of the flow entering the pump along the center of the impeller, yes.
Q So if I were to hold two pumps side by side, an axial flow pump and a centrifugal flow pump, and the inflow to both pumps came from above, the inflow came straight down, the outflow from the axial flow pump would go straight down; wouldn't it?
MR. BORDER: Objection. Form.
THE WITNESS: If -- if what you're saying is I hold an axial flow pump so that -- and I'm standing vertical, and the inflow is higher than the outflow, the outflow would be below the pump, yes.

BY MR. CAHILL:
Q And if and by other hand, I'm holding a centrifugal flow pump with the inlet oriented in the same direction, so the flow enters from above, the flow would exit laterally from the centrifugal flow pump; is that right?
A Yes. In at least one direction.
Q All right. I think you alluded to this a little while ago. Paragraph 52 of your report, you mention a device called the HVAD. Is that the HeartWare device?
A The HVAD is the HeartWare device, yes.
Q Do you know generally when the HeartWare device was FDA approved?
A There were two clinical trials for two different indications in the U.S. One was for short-term implant, otherwise referred to as bridge to transplant, which is six months or less, and the other one is called destination therapy, which is long-term implant. My recollection -- and, gosh, it's going back a few years -- is the HVAD was approved for bridge to transplant around 2010 or thereabouts. I don't know if it ever obtained approval for long-term implant.
Q Now, many patients received HeartWare implants; didn't they? Thousands of patients perhaps?

A I understand so, yes.
Q Do you know how big the HeartWare device was?
A My recollection is it was about 12 centimeters in diameter or thereabouts, maybe three to four centimeters thick in a disc shape, with an inflow cannula maybe five to eight centimeters long and about 15 millimeters in diameter. But that's really based on trying to remember holding it in my hand a decade ago, 15 years ago.
Q Do you know whether the HeartWare device was or larger or smaller than VentrAssist
A Than the VentrAssist?
Q Yeah.
A They were similar size. Slightly different shape, but similar size, similar volume, similar mass.
Q Do you know whether the HeartWare device was bigger or smaller than the Bourque 2001 device?
A The Bourque 2001 device, I don't know the exact dimensions of that, but just eyeballing the pictures in the publications of Bourque, the Bourque device looks to be a little bigger than the HeartWare device. That -- you're comparing a device in 2001 with a device in 2007. So of course they're going to be different.
Q Do you know if the HeartWare device weighed

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more or less than the Bourque 2001 device?
A Gosh, this is really not part of my declaration. I -- I haven't studied that recently. I don't know the answers to those questions. I could speculate, but it's not part of my report. And, you know, I don't -- sitting here, I don't have an opinion today other than a speculation.
Q Fair enough. I think you may have already touched on this, but what distinguishes a third generation device from a second generation device?
A The generally accepted understanding is a third generation left ventricular assist device does not have mechanical bearings, whereas a second generation left ventricular assist device would be a rotary pump with mechanical bearings.
Q Are there any other ways in which the industry distinguishes between second and third generation devices, or is it pretty much just the presence or absence of mechanical bearings?
MR. BORDER: Object to form.
THE WITNESS: My understanding is that the presence or absence of bearings is the primary distinguishing characteristic.
BY MR. CAHILL:
Q And do you know why that's important, that

difference between having mechanical bearings or not?
A Based on my experience of working in the ventricular assist device industry, mechanical bearings are subject to areas of stagnation of the blood, which can lead to coagulation of the blood and development of thrombus. And thrombus can be a real problem in LVADs. It can lead to clinical problems. So as an LVAD designer, one wants to eliminate areas of stagnant blood as much as possible, and one of the ways to do that is to eliminate bearings. Blood is a funny stuff. It's a liquid as long as it's flowing.
Q We talked about some embodiments of Wampler having a thrust bearing. Would you consider a thrust bearing to be a mechanical bearing?
A Yes.
Q So then would that make -- that version of Wampler's pump in your mind, would that be a second generation device?
A Under the definition I just offered, yes.
Q Whereas the pump Wampler discloses, I think, in figures 11 through 16 that has hydrodynamic bearings, perhaps some magnetic bearings too, but no thrust bearing, would those be a third generation device?
A Under the definition I just offered, yes.
Q Could we turn to the Bourque 2001 reference?

Could you turn to figure three?
A Three?
Q Yes. Now, figure three, is that an artist's rendition of how a future version of the Bourque pump might be implanted?
A It appears to be, yes, as it was envisaged in 2001.
Q Because the Bourque 2001 paper didn't report on implantation in humans; did it?
A My recollection is no.
Q It did have an animal study; is that right?
A I certainly recall reading multiple papers of which Bourque was at least one author of animal studies of -- of this device or variations of it, yes. And in fact, it says on page 403, "Three sets of parts were fabricated from which three fully functional implantable LVADs were assembled, and all three have been implanted in calves."
Q So it does report on an animal study using the --
A Yes. It says it was implanted in calves, yes.
Q Now, the illustration in figure three that shows the pump below the diaphragm, assuming the patient is standing up; correct?
A Yes.

Q And that pump would be located in a preperitoneal pocket; wouldn't it?
A It's located below the diaphragm, yes.
Q And this diagram shows transcutaneous energy transmission system; doesn't it?
A It does.
Q Now, the Bourque authors didn't have one of those in 2001; did they?
A The Bourque what?
Q The Bourque authors.
A Yes.
Q They didn't have a TET in 2001; did they?
A I don't think anyone has one even today that -- that is commercialized.
Q Now, transcutaneous energy transmission system transmits energy across the skin; doesn't it?
A Well, it transmits at least energy. Usually, it's configured to transmit energy and information to control the pump -- to control the parameters of the pump.
Q In 2001, were there TETS that could control parameters of the pump across the skin?
A By 2001, I think people were conducting experiments with TET systems that could transmit both power and information. The challenge of a TET systems

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is not the information. It's the heating of the skin transmitting that much power. To highlight that answer, in -- I worked on a -- for a company called Cochlear, which was developing a cochlear implant. I joined them in 1981, and we were using a TET system to transmit power and information across the skin in 1981 to an implantable cochlear implant. The problem was not the information.

Q What kind of information was transferred in that case?

A I beg your pardon?

Q What kind of information was transferred in that case?

A In that -- in that case, it was information to cause the implant to deliver electrical stimulation to the nerves of hearing, to reproduce the sensation of hearing in people who were profoundly deaf.

Q Now, the orientation of the pump in figure three, Bourque and co-authors specifically intended that orientation; didn't they?

A They did what to the orientation?

Q They specifically intended that orientation; didn't they?

A Well -- well, I'm not in their head, so I don't know what they intended. That's the orientation

long axis?

A Approximately, yes. Depends on surgical vagaries, but yes.

Q Now, the inflow to the Bourque 2001 device includes a flexible section; doesn't it?

A Where are you reading that?

Q Well, I'm looking, for example, at figure 1A.

A Yes. It describes a flexible section or depicts a flexible section in that artist's illustration on figure 1A, yes.

Q Are there any advantages to providing that flexible section on the inflow?

A The -- can you point to me where the authors discussed the advantage of that in this paper?

Q I don't know if I can.

A Then I don't know if the authors described what the advantages were, if any, of that flexible section.

Q Okay. But I was asking you if there were any advantages to having a flexible section there?

A Well, I'm not the inventor of the HeartMate III, so I don't know what their thinking was of putting their flexible section in.

Q Does the flexible section help with anatomical fit?

they described in their paper.

Q Well, they gave reasons for selecting that orientation; didn't they?

A Where are you referring to, please?

Q So, for example, on page 402, the paragraph that starts in column one. So their plan was to orient the pump in the least obtrusive position.

A At least as well as it was understood in 2001, yes.

Q Now, they say they decided that the orientation -- that the rotational axis of the pump's rotor should be perpendicular to the body's long axis; right? That's what they say.

A That's what the document says, yes.

Q So looking at figure three, what is the long -- what is the body's long axis?

A Well, it's from your head to your feet.

Q So straight up and down on the page.

A Straight up and down on the page.

Q And then the rotational axis of the pump's rotor should be perpendicular to that axis. So in general, it looks to me like the rotational axis of this pump would be straight out of the page; is that fair?

A In this configuration, yes.

Q And that would be perpendicular to the body's

A It may. I don't see how, but it may.

Q Does flexibility on the inflow side help to decouple the pump from cardiac motion?

A I wouldn't see that as being relevant by 2007. People knew at that time that when you put an LVAD in a patient, particularly if the patient has cardiomyopathy, the heart doesn't move anyway, and the heart doesn't need to move. So a motivation to decouple the pump from heart motion doesn't seem to be relevant at all by the time we're talking about in 2007.

Q Now, you're describing a circumstance where the LVAD takes over completely the pumping of blood; aren't you?

A Well, generally, what an LVAD does, you replace most of the flow through the heart. Instead of going out the aortic valve, it goes through the LVAD, and it's a continuous flow pump. So you don't have a pulse.

Q Sir, are you suggesting that anytime you implant an LVAD, you don't have a pulse?

MR. BORDER: Object to form.

THE WITNESS: Anytime you implant a second or third generation device that's a rotary pump, you don't have a pulse. In fact, there was a huge debate around the time of the Bourque article, the early

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2000s, about whether there were any physiological disadvantages and/or disadvantages of having a pulse or not having a pulse.
BY MR. CAHILL:
Q But are you saying it's a fact that there is a -- there is never a pulse?
MR. BORDER: Object to form.
THE WITNESS: I didn't say there's never a pulse. It's most likely an LVAD patient would not have a pulse. In some cases where the heart may recover after being unloaded for a while, you may be able to detect a pulse. Generally, LVAD patients do not have a pulse, 'cause their heart doesn't move much. Certainly, the few hundred LVAD patients I've seen would often describe the wonder of being alive without a pulse.
BY MR. CAHILL:
Q Does the flexible section in figure 1A provide a point for clamping during pump explant?
A For doing what? Sorry.
Q Pump explant.
A Does the flexible section help with that?
Q Yes.
A It may. Depends on the configuration. Generally, when I've seen pumps explanted, they just take the whole thing out and put another one in. The

flexible section doesn't really make much difference in my view. If you're taking your pump out to replace it because of infection, you take it all out.
Q On page 405 --
A You're referring to Bourque?
Q Yes. The second paragraph starts, "For example."
A Four-oh-five. I see that.
Q So it says there that "clinical experience has suggested that some freedom of movement between the native heart and the pump ameliorates stresses imposed on the heart by an imperfectly placed pump, and it subdues unnecessary pump motion." Do you see that?
A I see that.
Q Do you disagree with the clinical experience reported by Bourque and his co-authors?
A Well, remember this is a paper from 2001. The only human clinical experience by that time was pulsatile left ventricular assist devices. For those type of pumps, it may have been important to retain some freedom of movement, because they were pulsatile pumps. There was very little, if any, clinical experience by that time with rotary pumps to suggest that that was important with rotary pumps. That was 2001. By 2007, which I understand as the priority date of the patents

at issue, that statement, I don't think, was anymore true.
Q But at that time, there was experience with the HeartMate II; wasn't there?
A There was experience with the HeartMate II, yes.
Q And that's a rotary pump?
A It is a rotary pump. But it doesn't talk to me here in this paragraph about which clinical experience it's referring to. And certainly by 2007, people understood, although that may have been the consideration in 2001, it -- it faded into obscurity by the time the field developed.
And as I said, it doesn't really help you with a surgical explant, because if the main reason for surgical explant is infection, if you have an infection, you got to take it all out. You can't risk leaving any parts in the body that might be a continuing source of infection. So although that may have been true in 2001, by 2007, people would not have believed that.
Q All right. Just to make sure I understand, the statement there about clinical experience, it's your opinion that by 2007 a person of ordinary skill in the art would not have believed that; is that right?
A It's my opinion that by 2007, they would not

have thought that was an important consideration. That is correct.
Q Do you know whether the pump described in Bourque 2001 was ever implanted in humans?
A I think you asked that before. I said I don't know.
Q You're aware, aren't you, that Abbott markets a HeartMate III pump today?
A I'm aware Abbott markets the HeartMate III Roman three today. This is labeled as the HeartMate III, I-I-I. So there are different pumps. Even though you might say them the same, they're different pumps.
Q Okay. So the pump that's marketed today, but regardless -- I'm actually not sure the use of Roman numeral three or cursive three -- I'm not sure that's been consistent. But just so we're clear, the HeartMate III pump that Abbott markets today, recently, that's a different pump than the HeartMate III that appears in Bourque 2001?
MR. BORDER: Objection. Form, outside the scope.
MR. CAHILL: Is that correct?
THE WITNESS: Well, I haven't examined the pump that Abbott manufactures and sells today, other than reviewing some of the documents in this case. It

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is a centrifugal pump. Bourque is a centrifugal pump. It is magnetically suspended. Bourque is magnetically suspended. It has an inflow along the axis of rotation. Bourque has an inflow along the axis of rotation. It has an outflow at right -- right angles to the axis of rotation.

Bourque has an outflow right angle to the axis of rotation. So the fundamental characteristics of the Bourque pump and the HeartMates III are, in my opinion, the same. There are some differences in the way those characteristics are engineered, but they're basically the same. It's my understanding that. But again, I'll caveat that with I haven't studied that question.

BY MR. CAHILL:

Q Do you know whether the current HeartMate III is larger or smaller than the pump illustrated in Bourque 2001?

A I haven't studied that question.

Q Do you know -- well, you have reviewed the infringement allegations. I think it's in Exhibit 1018; is that right?

A 1018?

Q It's the last one in your --

A Nineteen, I think.

Q -- Exhibit 7.

A Yes. I have it here.

Q Okay. It is Exhibit No. 1019; is that right?

A Yes, it is. It's marked as Exhibit 7 and Exhibit 1019. So it's both, just to make it easier for us all.

Q So based on your review of that, do you have an understanding as to any of the engineering differences between the pump that's illustrated in Exhibit 1019 and the pump that's illustrated in Bourque 2001?

A I haven't studied it from that perspective, so I don't really have an opinion on that today.

Q I am going to hand you, Mr. Crosby, Miracor Exhibit No. 2009.

MR. BORDER: Thank you.

THE WITNESS: This is -- okay.

MR. CAHILL: Actually, could I check that? There was one of these that I highlighted. No, this one is fine.

MR. BORDER: I'm not seeing any highlighting here.

BY MR. CAHILL:

Q Okay. Mr. Crosby, have you reviewed that exhibit before?

A This is a patent by Bourque dated December 10, 2019, with a -- I'm just trying to figure out the priority date. I think it's 2017; is that correct?

Q I don't know off the top of my head. My question is, have you reviewed it before?

A I think I may have seen it. I think to say reviewed it is probably too strong.

Q Have you formed any opinions about the pump that's described in that patent as compared to the Bourque 2001 pump?

A Do you know if I express any of those opinions in my report?

Q You do not.

A Then I have not formed any opinions on it.

Q Very good. You can put that aside. Can you turn to the Wampler patent publication, Exhibit No. 1008?

A Exhibit 1008 again?

Q Yes. And in particular, I'd like to ask you about paragraph 76.

A Seventy-six?

Q Yes.

A I've read paragraph 76.

Q So there's a reference there, in a centrifugal pump, a 90 degree redirection of the blood is affected.

Do you see that?

A Yes.

Q Now, that 90 degree redirection, is that what we were talking about earlier where a centrifugal pump -- the outflow will be perpendicular -- the axis of the outflow will be perpendicular to the axis of the inflow?

A I think that's what it's referring to in 76, yes.

Q Right. Because it says, "axial inflow and radial outflow."

A I see that, yes.

Q So that means the outflow is at 90 degrees from the inflow; is that right?

A That's a characteristic of all centrifugal pumps.

Q And it says that that redirection is effective without the necessity of a flow restrictive elbow fitting. Do you see that?

A I see that.

Q Do you know what flow restrictive elbow fitting Wampler is referring to?

A Well, I think he's referring to any flow restricting elbow fitting. I don't think he's referring to any one in particular.

Q Well, for example, when we talked about

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1 HeartMate II, we saw an elbow on the outflow side.
2 A In the outflow graph, yes.
3 Q And if you could redirect the flow 90 degrees
4 without --
5 A But that doesn't make sense; does it? Because
6 the outflow of the pump in Wampler is in exactly the
7 same direction as the outflow of the HeartMate II. You
8 still need to redirect the flow for the outflow graft to
9 reach the aorta.
10 Q But the Wampler pump is oriented differently
11 with respect to the heart; isn't it?
12 A But the outflow of the Wampler pump is in
13 exactly the same direction of the outflow as the
14 HeartMate II. We can go back to the illustration.
15 You'll still need an elbow to go from the outflow of the
16 Wampler pump up to the aorta exactly the same as you
17 need in the HeartMate II.
18 Q Figure five of Wampler, it doesn't show an
19 elbow on the outflow side; does it?
20 A But it -- it does show a 90 degree change in
21 flow; doesn't it? The outflow of the pump 11 is at 90
22 degrees from the inflow to the aorta 67. So somehow you
23 have to change the blood 90 degrees, the blood flow.
24 Q But there's not an elbow there; is there?
25 A There's not a -- an elbow in the sense that

1 there's no hard sharp turn. That is correct. If you
2 have a look at Bourque 2001 figure three, it also shows
3 there's no elbow, because the orientation of the output
4 of that particular device is exactly the direction you
5 want it to flow towards the aorta. So Wampler would
6 require some sort of change of direction of the outflow.
7 Bourque 2001 would not.
8 Q Because the outflow of the centrifugal pump is
9 in the right direction; is that right?
10 A In which device?
11 Q In Bourque 2001.
12 A In Bourque 2001, the outflow is oriented to be
13 the direction that you want the outflow to go towards
14 the aorta.
15 Q So the outflow of the Bourque 2001 device
16 doesn't need an elbow?
17 A Doesn't need a --
18 MR. BORDER: Objection. Form.
19 MR. CAHILL: An elbow.
20 MR. BORDER: Objection. Form.
21 THE WITNESS: The Bourque 2001 device is
22 illustrated without an elbow on the outflow.
23 BY MR. CAHILL:
24 Q Could we look back at the Bourque 2001
25 reference, in particular the conclusion on the last

1 page? So it says, "Several enhancements to HeartMate
2 III are presently being implemented."
3 A All right. Let me read this if I --
4 Q And the conclusion.
5 A Yes. I read the conclusion.
6 Q So several enhancements are being
7 contemplated. One of them is incorporation of motor
8 drive and control electronics within the pump. Do you
9 know why they would do that?
10 A Again, I'm not one of the authors of the
11 paper, so I don't know the motivation here of why they
12 might want to do that in 2001.
13 Q And another enhancement would be the
14 integration of a transcutaneous energy transmission
15 system, as we've talked about before. Do you see that?
16 A Yes.
17 Q Now, it's your understanding, isn't it, that
18 no one has implemented a TET system for an implantable
19 LVAD?
20 A I don't believe there's any commercially
21 available TET system for an LVAD today. There have been
22 commercially available TET system for a total artificial
23 heart. There were two.
24 Q Could you look at paragraph 471 of your
25 declaration?

1 A Four-seventy-one?
2 Q Yes.
3 A You're certainly jumping around. It's hard to
4 keep up.
5 Q So in that paragraph, you talk about placement
6 of LVADs in preperitoneal pocket position --
7 A I'm sorry. I'm really having trouble hearing.
8 Q Okay. In that paragraph, you talk about the
9 placement of LVADs in the preperitoneal pocket position,
10 and you talk about some of the disadvantages of that.
11 Do you see that?
12 A Yes.
13 Q Now, the Bourque 2001 authors planned for
14 their pump to be implanted in a preperitoneal pocket;
15 didn't they?
16 A That's what it said in 2001, yes.
17 Q Right. And --
18 A That was the state of the art of the day. No
19 longer by 2007.
20 Q Okay. So is it your opinion then that by 2007
21 a person of ordinary skill in the art would have looked
22 at Bourque 2001 and said, "Change the position," for
23 this reason?
24 A This paragraph is part of a large section on
25 motivations to combine. And this is one set -- one

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1 collection of reasons of a motivation to combine amongst
2 any -- excuse me -- amongst many. So it is my opinion
3 that by 2007 it would have been -- as it says in the
4 declaration, it would have been obvious to combine
5 Bourque 2001 with the actually aligned inflow tube of
6 Wampler 169. And a person would have been motivated to
7 do so based on the teachings at that time of the
8 placement of VADs.
9 Q The teachings at what time?
10 A By 2007.
11 Q Mr. Crosby, I'm going to hand you Abbott
12 Exhibit No. 1018. Now, this is a patent belonging to
13 Thermo Cardiosystems; correct?
14 A That's one of Vic Poirier's, yes.
15 Q Now, the pump illustrated on the front page
16 and in figure one, that's an axial flow pump; isn't it?
17 A Do I refer to this in my report somewhere?
18 Q You do.
19 A Can you tell me where, so I can just put it in
20 context of what I've said before?
21 Q In paragraph 473.
22 A Four-seventy-three.
23 Q So the front page in figure one of Exhibit
24 1018 and the Poirier patent, that's an axial flow pump;
25 isn't it?

1 A It is, yes.
2 Q Does that pump look like HeartMate II?
3 A It certainly looks similar. I haven't studied
4 a comparison of this and the actual device, but they
5 certainly look similar.
6 Q Now, the pump illustrated in figures 4A, 4B,
7 and 4C --
8 A Of the 975 patent?
9 Q Yes.
10 A I see that. What -- yes?
11 Q That's a centrifugal flow pump; isn't it?
12 A Yes.
13 Q Do you recognize it as having some similarity
14 with Bourque 2001? I realize it's not the same, but
15 does it have some similar features?
16 A It looks like it has a similar configuration,
17 yes.
18 Q So in the paragraph in the Poirier patent,
19 Exhibit 1018, in the bottom of column six to the --
20 A Which paragraph are you referring to?
21 Q The bottom of column six to the top of column
22 seven.
23 A Okay. Thank you.
24 Q So that paragraph is talking about the tubing
25 and adapters for use with a centrifugal flow pump; is

1 that right?
2 A Yes. It says it can be attached to
3 conventional tubing adapters 403 and 427 to connect it
4 between the left ventricle and aorta to provide
5 ventricular assistance.
6 Q And then in another embodiment, the pump 400,
7 which is the centrifugal pump of figures 4A, B, and C;
8 right?
9 A I'm sorry. What's the question?
10 Q It says, "In another embodiment of pump 400."
11 A Yes.
12 Q And I'm asking if you agree that pump 400 is
13 the centrifugal flow pump of figures 4A, 4B, and 4C?
14 A It appears to be, yes.
15 Q "May be implemented using various components
16 of pump ten." And would you agree with me that pump ten
17 is the axial flow pump of figure one?
18 A Yes.
19 Q So it says it may be modified to incorporate
20 inflow cannula adapter 40, inflow cannula elbow 43,
21 inflow cannula apical tube 45, outflow cannula elbow 49,
22 and outflow graft 52.
23 A I see that, yes.
24 Q Now, all four of those elements, 40, 43, 45,
25 49, and 52, those all appear in figure one; don't they?

1 A Yeah. They appear to, yes.
2 Q So what this paragraph is saying is that you
3 can use those elements from the axial flow pump of
4 figure one on the centrifugal flow pump of figures 4A,
5 4B, and 4C; is that right?
6 A Sure. The pump itself is the bit in the
7 middle. The cannula that connect to the heart and to
8 the aorta can be used with different types of pump.
9 That's basically what it's saying. Let's -- let's reuse
10 the parts we have that we know work. They look, by the
11 way, to be similar to the inflow and outflow graph shown
12 in the Bourque 2001 paper.
13 Q Could you turn to paragraph 476 of your
14 declaration?
15 A All right myself. Okay.
16 Q So you say there that a PHOSITA would have had
17 a reasonable expectation of success that the Bourque
18 Wampler combination would fit well between the apex of
19 the heart and the adjacent diaphragm. Do you see that?
20 A Yes.
21 Q And then you suggest that the Bourque 2001
22 HeartMate III was already planned for enhancements, and
23 you said, for example, enhancements to make the device
24 smaller.
25 A I see that, yes.

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Q Now, I think it's the case that you don't know how big the Bourque 2001 pump is; do you?
A I -- I don't know.
Q You don't know whether it's bigger or smaller than the Wampler pump?
A I don't know.
Q You don't know whether it's bigger or smaller than the Akamatsu pump?
A Well, no. I don't know.
Q Now, you say, "enhancements to make the device smaller." What enhancements are discussed that would make the device smaller?
A Where are you referring?
Q You cite to page 405 of Bourque 2001, and I think that's the conclusion paragraph that talks about enhancements.
A Yes. It talks about various enhancements there.
Q Which enhancements does it -- which enhancements will make the Bourque 2001 device smaller?
A All of them could.
Q So incorporation of motor drive and control electronics within the pump, would that make the pump smaller?
A It could.

Q But you don't know what those ten things are; do you?
A Well, I don't know specifically for this device, but I know from my 45 years of experience in this industry that there's a drive to make things smaller all the time, unless it's hips or joints.
Q Okay. So there's a drive to make things smaller.
A Yes.
Q But Bourque 2001 itself isn't proposing changes to make the pump smaller; is it?
A Well, it's -- it's proposing -- several enhancements are presently being implemented, including incorporation. A person of skill in the art would read that and say, "Okay. That's one of the things they're doing, and -- and they're trying to do all the other enhancements, like reduce power, make it smaller, make it easier to manufacture, make it lower cost."
Q So a person of ordinary skill in the art would understand that from Bourque's conclusion. That's your opinion?
A Well, I haven't discussed that particular question in my report. So what I'm giving you is a background of my experience in the medical device industry that a personal of skill in the art would look

Q If you're adding more parts to the pump, it's going to make the pump smaller.
A I designed pacemakers for many years. Today's pacemakers have got about ten times as many parts as the pacemakers designed in 1960, but they're one tenth the size. The number of parts have got nothing to do with the size.
Q But if you're adding more parts, you're reducing the size some other way; aren't you?
A Well, you may. Adding parts will reduce size. Sure.
Q But adding parts will reduce size if you actually engineer it to have a reduced size; isn't that the case?
A I'm sorry. I don't understand the question.
Q Well, if you're adding parts to reduce the size, you have to take the size away from someplace else; don't you?
A Well, the paragraph says, "Several enhancements to HeartMate are presently being implemented, including." It's not an exclusive list. So it's including incorporation of motor drive and control electronics within the pumps. There could be another ten things that they're doing, which includes that.

at this as a prototype device that's been designed for use and has been experimented on in animals. And as part of the progression -- I think it even talks about -- these enhancements will continue the progression of this VADs development as a compact, reliable device. So a person of skill in the art would see this as being one step in that progress.
Q So then a person of ordinary skill in the art would understand that the Bourque 2001 authors were making other changes to the device that would make it smaller, ones that aren't specifically enumerated here?
MR. BORDER: Object to form.
THE WITNESS: A person of skill in the art reading this would understand -- as I said, this is a first iteration of a device intended for use in humans. It has been shown to work in animals to prove the concepts, and part of the progression to develop a compact, reliable device to treat chronic heart failure in humans would be along multiple axes.
BY MR. CAHILL:
Q And do you know when HeartMate III was first implanted in humans?
A You mean this HeartMate III or the current one?
Q Well, any one. Any -- right. I think we've

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1 talked a little bit about the current HeartMate III and
2 the Bourque 2001 HeartMate III. And now if I understand
3 you correctly, what you're saying is a person of
4 ordinary skill in the art would understand that they
5 would have been motivated to make changes all along. So
6 do you know if there was a time when the HeartMate III
7 device was ready to be implanted in humans?
8 A I haven't looked at that question. I don't
9 recall exactly the dates of the HeartMate III first
10 human chronic implantation. I don't know.
11 MR. CAHILL: Okay. Can we go off the
12 record?
13 THE OFFICER: Sure. It is 11:56 a.m. We
14 are now off the record.
15 (Off the record.)
16 THE OFFICER: We are now back on the
17 record. It is 12:32 p.m.
18 BY MR. CAHILL:
19 Q Mr. Crosby, we're going to change gears a
20 little bit now and talk about the Akamatsu reference.
21 So let's see. Could you turn to Akamatsu -- it's
22 Exhibit No. 1006. And this paper was published in 1999;
23 is that right?
24 A Yes. Received February 3, 1999, published in
25 1999.

1 Q I want to ask you about a turn of phrase in
2 Akamatsu. I want to ask you about a turn of phrase in
3 Akamatsu. In his discussion on page six --
4 A Page six?
5 Q Yes.
6 A There isn't a page six. Oh, sorry. That page
7 at the top, yes. Okay.
8 Q So near the top of the second column there, he
9 talks about approaches to mechanical reliability as well
10 as non-thrombogenicity. And he says, "We have developed
11 a seal-less centrifugal pump with a magnetically
12 suspended impeller." Do you know what he means by
13 "seal-less"?
14 A You're asking what seal-less means?
15 Q Yes.
16 A Well, a mechanical bearing will have a seal to
17 make sure the blood doesn't get into the bearing. So
18 seal-less usually refers to, in my experience at least,
19 a -- a pump that doesn't have seals.
20 Q So does that mean that all of the, sort of,
21 blood contacting surfaces will be continuous, and there
22 won't be seals?
23 A Well, what it -- in the context of this
24 discussion, it means there is no mechanical bearing with
25 the seal. Does that answer your question?

1 Q Yeah. I guess, is -- does "seal" only refer
2 to mechanical bearings?
3 A I guess it may refer to something else, but my
4 understanding is, in the context of a blood pump, the
5 seal refers to the seal of the mechanical bearing. Of
6 course the whole assembly itself is sealed, so that the
7 blood can't leak out. In that sense, there are other
8 seals, but the concept of a seal-less pump means no seal
9 for mechanical bearings. That's my understanding.
10 Q Is -- that sentence, "We've developed a
11 seal-less centrifugal pump follows approaches to
12 mechanical reliability and non-thrombogenicity," does a
13 seal-less --
14 A Okay.
15 Q Does the property of being seal-less -- does
16 it relate to both mechanical reliability and non-
17 thrombogenicity or one of them or neither of them?
18 A A little. I mean, mechanical -- any
19 mechanical bearing will have a reliability issue. And
20 even sealers bearings, like a pivot bearing in a
21 HeartMate II, will have thrombogenicity issues. Because
22 there is a point at which the blood is not flowing and
23 will form thrombus, a blood clot.
24 Q Other than not having mechanical bearings,
25 what are other general design parameters for an LVAD for

1 achieving non-thrombogenicity?
2 A I don't think I've opined on that in my
3 report. So you're asking, kind of, in general
4 engineering terms?
5 Q Yes. As someone who's experienced in the
6 field and contributed to blood pump designs.
7 A Sure. As I -- as I mentioned before, blood is
8 a funny fluid. It's only a fluid when it's flowing. If
9 it stops flowing, it turns into a solid. That's why you
10 have a scab when you hurt your knee. So one of the
11 things one needs to do in any blood pump is ensure that
12 there are no areas of stagnation where the blood is not
13 flowing.
14 One also -- it has to ensure that the shear
15 force applied to the blood is small enough that you
16 don't break apart any of the cells. One of the big
17 problems with early blood pumps was there was so much
18 shear force, it broke apart the red blood cells, which
19 leaked hemoglobin into the blood. Hemoglobin is
20 poisonous. It only does a useful function if it's
21 inside a cell wall. So there are multiple aspects to
22 ensure mechanical reliability and non-thrombogenicity.
23 Q What about the surfaces of the -- like, the
24 blood contacting the surfaces?
25 A What about the blood contacting surfaces?

Q Yeah. Would they be specially treated to prevent thrombus?
A Some are. People have done work on special surfaces, blood contacting for reducing thrombogenicity. The earlier versions of the pumps -- any pump did not. But there have been a lot of work on different types of materials to reduce thrombogenicity in the blood contacting surfaces. In the VentrAssist pump we talked about today, we used what's called diamond like carbon, vitreous carbon to coat the surfaces. That's one method that people have used.
Q In the Akamatsu pump, do you know what the housings and the impeller are made out of?
A I -- I'm having trouble hearing. I'm sorry.
Q I'm sorry. In Akamatsu, do you know what materials the housings and the impeller are made out of?
A I don't know. There's a photograph figure five. It looks like it's some sort of polymer, but I don't know, unless you can point to me where it says in the paper.
Q Okay. Could we look at figure one of Akamatsu? And this is a rendering of the Akamatsu pump as it might be implanted in a human; is that right?
A It appears to be a rendering -- an artist's rendition, yes.

Q It looks like the patient's heart is cut away in this figure. Do you see --
A Okay.
Q Well, do you see extending from the pump up into the left a little bit a partially white element?
A That appears to be the outflow graft that connects the output of the pump to the aorta.
Q So could I come over and just draw a couple circles?
A Sure. What is that, are you asking? I have no idea.
Q That makes two of us. So I've drawn a couple of circles about features that seem to appear inside the heart. And my question is, do you know what's being illustrated there?
A No idea. It could be an anatomical structure in the heart.
Q Now, in this paper, Akamatsu does not report on implanting his pump in humans; does he?
A No.
Q It's an animal study; isn't it?
A This one is, yes.
Q The pump that's illustrated here, was this pump ever implanted in humans?
A As we talked about before, Akamatsu is a body

of work, and this pump became the Terumo DuraHeart, which was implanted in humans. I've held one in my hand a couple of times. I've actually met Dr. Nojiri, who's the first author of this paper. So whether it's this exact pump that was implanted in humans, it's the -- this pump design has been implanted in humans is my understanding.
Q Do you know when?
A Are you asking for the first one?
Q Yes.
A I don't know exactly. I think it was during the time that I was at Ventracor they reported their first human implant. So it would have been in the 2005 to 2009 frame -- timeframe.
Q I'm looking at figure one. Can you tell how this pump is connected to the heart in the figure?
A Well, it's difficult to see, because it's -- this is a photocopy of the article. I'm not sure if the article would be easier to see, but it appears that the -- there's an inflow tube which is inserted into the apex of the heart, and the outflow graft from the pump goes to the ascending aorta.
Q Can you tell whether the pump in figure one is implanted above or below a patient's diaphragm?
A No. It doesn't describe that in the

illustration.
Q Now, I understand this article refers to three different models of Akamatsu's pump, four if you include modified model two. Do you agree with that?
A Where are you referring to three different models?
Q So in the abstract, it refers to model one, model two, and modified model two?
A Model one, model two, and modified model two are the three you are referring to?
Q And then the very last paragraph of the article refers to model three.
A Are you talking about the abstract again?
Q No. The very last paragraph of the Akamatsu reference.
A Oh, I see. I see that -- that model three.
Q So model one was a paracorporeal device; is that right?
A Paracorporeal, yes, meaning outside of the body.
Q And then model two was implanted in sheep but had issues with blood leakage; is that right?
A Model two was intrathoracic, I said, I think. The implantable model two was evaluated ex vivo in two sheep and intra-thoracically implanted in one sheep. So

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1 two different implant sites.
2 Q And model two had problems with blood leakage;
3 is that right?
4 A The model two what? I'm still having trouble
5 hearing.
6 Q Model two had problems with blood leakage; is
7 that right?
8 A I think that's what it said, yes.
9 Q And then modified model two was implanted in a
10 sheep; is that right?
11 A Yes. That's what it talks about in this
12 paper. But remember, as we said before, when I say,
13 "Akamatsu," I refer to a body of work of which Akamatsu
14 is an author. The first author of this is Dr. Nojiri,
15 not Akamatsu. But -- but -- and if you look at the
16 whole body of work, there are many, many implants and
17 many, many animals that they refer to.
18 Q Okay. But those are referred to in other
19 references.
20 A Say the first?
21 Q They're referred to in other references. Is
22 that what you're saying?
23 A Yes. I think I refer to the Akamatsu
24 references in my report somewhere. All of them.
25 Q And then model three is described as for the

1 next phase; is that right?
2 A I didn't hear the question. Model three?
3 Q Model three is developed for the next phase?
4 A From this paper, yes.
5 Q Okay. So model three has a pump with a
6 sensor-less motor. Do you see that?
7 A Sensor-less motor, yes.
8 Q And an implantable controller?
9 A I see that, yes.
10 Q And then towards the bottom, it says,
11 "Further" --
12 A There's a picture of model three in figure
13 seven --
14 Q Yep.
15 A -- where you can see the pump, the implantable
16 controller, and a wire exiting that controller to the
17 outside of the body with a AC to DC converter and a
18 computer that controls the operation.
19 Q Now, towards the very end -- in fact, I think
20 it's the last sentence -- it says, "Further developments
21 towards a totally implantable LVAS, including a
22 transcutaneous energy and information transfer system
23 and internal/external batteries are underway." Do you
24 see that?
25 A Yes.

1 Q Is that what's illustrated in figure one?
2 A Well, I -- it doesn't refer to figure one in
3 that paragraph. What does it say when I talk about
4 figure one? I don't think the text refers to figure one
5 at all. So I guess it could be, but I -- I don't think
6 the text says that's what it is.
7 Q Yeah. The reason I ask is because that is --
8 I think that sentence is the only reference to a TET,
9 and figure one does use a TET; doesn't it?
10 A Yes.
11 Q So do you know whether the Akamatsu pump is
12 bigger or smaller than the VentrAssist pump?
13 A I -- I think we've talked about this topic
14 before. I don't know the actual size of the Akamatsu
15 pump here or the weight, so I can't answer that
16 question.
17 Q So just for completeness of the record, do you
18 know whether the Akamatsu pump is bigger or smaller than
19 the Bourque 2001 pump?
20 A I don't know the size and weight of either of
21 those pumps, so I can't answer that question.
22 Q Do you know whether the Akamatsu pump is
23 bigger or smaller than the Schima pump?
24 A Same answer. I don't know the size and weight
25 of the Schima pump, so I can't answer that question.

1 Q Do you know whether Akamatsu's model three
2 pump is bigger or smaller than the model two pump?
3 A In this paper, there's no information about
4 the size of the model three pump, so I don't know.
5 There may be information in some of the other papers.
6 Q Do you know if Akamatsu and his coworkers ever
7 deployed a transcutaneous energy system?
8 A I don't think a transcutaneous energy transfer
9 system was deployed for the Terumo pump, which is the
10 derivative of this one. So I don't think so.
11 Q Now, this last sentence in Akamatsu that we've
12 talked about, "Further developments toward a totally
13 implantable LVAS." What makes an LVAS qualify as
14 totally implantable?
15 A In the context of this sentence, it means
16 there will be no opening through the skin, no
17 percutaneous lead. That term could mean that the LVAS
18 itself is implantable but still have a percutaneous
19 lead. In the context of this paper, I think they're
20 referring to no percutaneous wire.
21 Q Could I direct your attention, Mr. Crosby, to
22 paragraph 603 of your declaration?
23 A I think the answer to that question is yes.
24 Q I'm glad. I'd hate it if you had said no.
25 A Say again?

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Q I'd hate it if you had said no.
A I wouldn't do that to you.
Q Now, you quote Akamatsu in that paragraph where you talk about continuously measuring aortic pressure and pump flow rate. Does Akamatsu expressly use those measurements to control the pump?
A I think I refer to Exhibit 1006 at page three -- four. Now I'm confused about which page number, 'cause there are two lots of page numbers on this. Akamatsu 1999 says, "The pump was operated at a fixed rotational speed." So it's not clear if the aortic pressure and flow rate were used to control that fixed rotational speed. I can't tell from the way the paper's written.
Q When you do an animal study, is it common to track parameters of the animal like these, like aortic pressure or other physiological parameters?
A You mean -- you mean in -- in general or --
Q Yes.
A If you're conducting animal studies on an LVAD, you would monitor multiple physiological parameters. Some of those might be used to control the pump. You might want to adjust flow rate, for example. When I say, "flow rate," I mean volume of flow rate of blood, not the speed. So yes, you would try and monitor

as much -- much as you can. There's never so -- such a thing as too much data in a -- in an experiment.
Q And if I understand you correctly, it's possible that some of those parameters could be used to adjust the operation of the pump.
A Typically, you would use those parameters to -- to control the operation of the pump. If you have a 75 kilogram calf, and you don't provide enough blood flow, the calf will die. So you need to monitor those to control the operation of the pump, so the animal lives through the experiment.
Q So at this time in 1999, would -- so if you were measuring aortic pressure, like Akamatsu says, would there be some kind of feedback circuit that ran the pump, or would it be an engineer looking at the readings and changing the speed of the pump?
A Well, I'm not going to speculate about how Akamatsu ran the experiment other than what's described here. So I don't know how I can answer that experiment -- that question.
Q So then is it fair to say you don't know in this context --
MR. BORDER: Objection. Form.
MR. CAHILL: -- of Akamatsu?
MR. BORDER: Objection. Form.

THE WITNESS: I don't know how those parameters were used to control the speed of the pump. What it says is they measured multiple parameters, including aorta pressure and the flow rate, I think. And they operated the pump at a constant speed. So if the speed was not enough to keep the animal alive, they would have had to adjust the speed. And the way to know that is if the flow rate and aorta pressure are adequate.
BY MR. CAHILL:
Q Could I direct your attention to paragraph 612 of your declaration?
A The same answer. Yes.
Q So there you quote Akamatsu as saying, "The electric current of the electromagnet is controlled by using three position sensors to maintain the impeller floating at the center of the pump housing." Do you see that?
A That's correct.
Q And does Akamatsu say that the signals from the position sensor are fed back to an external controller?
A I think Akamatsu has no controller in the pump itself. So if there are signals from the position sensor that are used to control the free floating

impeller, it must be from a controller which is external to the pump, certainly in versions one and two that he talks about. So by deduction, yes, those signals are fed back to an external controller.
Q Okay. But Akamatsu doesn't say they're fed back to an external controller. You infer it.
A Well, where else could it be? Can't be anywhere else.
Q So what do these electromagnets do?
A I think Akamatsu is pretty clear that the electromagnets maintain the impeller free floating at the center of the pump housing.
Q So in real time, the electromagnets are adjusting the location of the rotor within the housing?
A Well, let's see what Akamatsu says himself about that. It -- it says, "The electric current of the electromagnet is controlled by using three position sensors to maintain the impeller free floating at the center of the pump housing." That's the purpose.
Q Right. And so my question for you is, doesn't that mean that the electromagnets are adjusting the position of the rotor in real time as it's spinning in the housing?
A Well, technically, they're sensing. If there's a need for adjustment, it happens in real time.

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1 If there's no need for an adjustment, there's no
2 adjustment. So the electromagnetics are sense -- excuse
3 me. The position sensors are sensing the position, and
4 if there's a need for an adjustment, then the power to
5 the electromagnets is adjusted to keep the rotor in the
6 right position. It doesn't mean that the currents
7 changing in real time all the time.
8 Q Not all the time, but --
9 A Well, it's -- it's like the speed control of
10 your car, you know. You set the speed control to be
11 constant. Doesn't mean you adjust the motor speed all
12 the time.
13 Q Right. But this isn't about controlling the
14 speed of the rotor; right? There's a different motor
15 for that; right?
16 A It's about controlling the position of the
17 rotor.
18 Q Right. So if the rotor tilts or if the rotor
19 goes off center, in real time, the electromagnets have
20 to pull it back, so it stays centered; isn't that right?
21 A Sure. Then I'll use a different analogy. I
22 have a Tesla Model X. It's got full self-driving. If I
23 want to drive down the center of a lane, it keeps the
24 steering wheel so that it's at the center of the lane.
25 But it's not always changing the position of the

1 steering wheel. It only changes the position of the
2 steering wheel in response to deviation from that lane.
3 The same as this one. The electromagnetics only change
4 the power in response to the position sensors telling
5 the controller that there's a deviation.
6 Q Right. But when the position sensors detect a
7 deviation, those electromagnets have to operate in real
8 time. Otherwise, the rotor is going to bounce into
9 things; isn't it?
10 A Well, I'm trying to understand what you mean
11 by "operate in real time." The whole system operates in
12 real time.
13 Q So what I'm trying to get to is, are you
14 saying that the signals from the position sensors are
15 sent out to an external controller, some kind of
16 comparison or processing happens there, and then a
17 signal is sent back to the electromagnets in order to
18 prevent the rotor from getting too far out of position?
19 A Well, that's what Akamatsu says in this -- in
20 this paper, yes.
21 Q But he doesn't say that; right? You infer it.
22 A Well --
23 MR. BORDER: Objection. Form.
24 THE WITNESS: "The electric current of
25 the electromagnet is controlled by using three position

1 sensors to maintain the impeller free floating." Well,
2 that's exactly what it's doing.
3 BY MR. CAHILL:
4 Q Yes. It's controlled, but nothing about that
5 says it's an external controller.
6 A Well, there's no internal controller. So
7 we've talked about that before. It has to be external.
8 Q Certainly, there's some circuitry within the
9 implantable palm.
10 A Can you point that -- point me to that?
11 Q Can you point to something that says there
12 isn't any?
13 A You asked me to prove a negative. You just
14 said there's certainly -- I think you said, "Certainly,
15 there's an internal circuitry." I asked you to show me
16 where you -- you -- where that is and how you reached
17 that conclusion.
18 Q Yeah. I'm -- if you don't mind, I'll ask the
19 questions. Is there any place in Akamatsu where it says
20 no control takes place within the pump?
21 A I don't think Akamatsu uses those words, but
22 an engineer reading this paper would understand that if
23 there's no elements of a control circuitry within the
24 pump, and there's a wire that leads away from the pump,
25 then the only way that that pump position -- the

1 impeller position could be controlled is with an
2 external controller.
3 Q Well, the wire could be there to control the
4 speed of the pump; couldn't it?
5 A The wire probably has multiple functions.
6 It's not a single conductor.
7 Q Akamatsu uses the passive voice about
8 controlling the electromagnets; right?
9 A You -- you're -- you're asking an opinion on
10 the use of the language in the paper?
11 Q The electromagnet is controlled; correct?
12 A Yes. The electromagnet is controlled.
13 Q It doesn't say what's doing the controlling;
14 does it?
15 A I'm -- I'm really struggling to understand
16 your questioning.
17 Q Akamatsu doesn't say what is doing the
18 controlling of the electromagnets; does it?
19 A Akamatsu says the electric current is
20 controlled. Even though that's passive voice, I think
21 anyone would understand that, if it's controlled, it
22 must be controlled by something. So presumably, it's
23 controlled by our controller. The controller uses the
24 three position sensors to maintain the impeller free
25 floating. That's what the -- one of the functions of

1 the controller is, at least for the position.
2 Q But Akamatsu doesn't say that about the
3 external controller; does he?
4 A Akamatsu didn't say what?
5 Q That it is the external controller that
6 controls the electromagnets.
7 A I'm not sure Akamatsu has to say that, because
8 anyone reading this would understand there has to be
9 something controlling it. There has to be a controller.
10 It's not part of the pump. There's a cable going from
11 the pump with multiple conductors, and it -- it doesn't
12 show an illustration of how the -- this particular pump,
13 model two, is implanted or connected.
14 So a person reading this, a person of skill in
15 the art, would understand this model two device is
16 implanted in a sheep. There is an external controller
17 which controls the free floating impeller in response to
18 signals from position sensors. That's what Akamatsu
19 describes. It says on the next paragraph, "The model
20 one and the modified model two had dual electric wires
21 separately connected to the motor and the
22 electromagnets." The wires have to go somewhere.
23 Q Right.
24 A They go to a controller
25 Q Or they go to a power source.

1 A I don't think it's either/or. You have to
2 provide power to the pump, which is a power source, but
3 you also have to control the pump. That might be in the
4 same external box, or they could be in separate boxes.
5 He doesn't describe that. But the wires lead from the
6 pump to something that provides power and controls the
7 function of the pump, including keeping the impeller
8 free floating in the space.
9 Q Let's turn to Schima.
10 A Turn to?
11 Q Schima. So it's Exhibit 1005. So in
12 paragraph one of Schima --
13 A Paragraph 20?
14 Q Paragraph one.
15 A Oh, one. I beg your pardon.
16 Q So it says, "The present invention relates to
17 a rotary pump for moving blood and other shear sensitive
18 liquids with a rotor journaled hydraulically and if
19 necessary magnetically in a housing." Do you see that?
20 A I see that.
21 Q Do you know what "other sheer sensitive
22 liquids" could refer to?
23 A I don't recall the Schima gives a list of
24 other shear sensitive liquids. So I don't know what
25 he's referring to.

1 Q Do people use rotary pumps to move shear
2 sensitive liquids in an industrial setting?
3 A I'm not an industrial engineer, and I don't
4 think I've provided opinions on areas outside left
5 ventricular assist device in my report. I'm aware of
6 some applications of pump, but I'm not an expert on
7 that.
8 Q The Schima never describes its pump as being
9 connected to a heart; does it?
10 A If I go back to my report where I describe
11 where I refer to -- to Schima, can I just refer to that
12 again, please? I think it's in the --
13 Q Yeah. It starts at paragraph 628.
14 A How much? Say again.
15 Q Six-twenty-eight.
16 A Six-twenty-eight. Yes. But I think there's
17 an earlier section. Ah, summary of Schima on page 83.
18 So he -- he, in his description, talks about addressing
19 problems with existing heart assist pumps and presenting
20 his invention as a way of addressing those problems of
21 existing heart assist pumps. So clearly, this has to do
22 with heart assist pumps.
23 Q Okay. Schima never describes its pump as
24 being connected to a heart; does it?
25 A Well, Schima describes an inlet 13 and an

1 inlet opening 36 that distributes the incoming liquid to
2 both sides of the rotor. And since he's describing this
3 as being -- solving some problems of previous versions
4 of heart assist devices, a person of skill in the art
5 would take that to mean that, if this was used for
6 pumping blood, that inlet port would have to be
7 connected to the heart. It's a blood pump. You take
8 blood from the heart; you -- you pump it out. Where
9 else could it be?
10 Q Well, it could be anywhere; couldn't it?
11 A As a blood pump?
12 Q Sure. So I'm going to ask one more time.
13 Schima never describes its pump -- Schima never says it
14 that its pump is connected to a heart; does it?
15 A I -- I haven't memorized all of the -- all of
16 the text in Schima. He -- he talks about this as being
17 a blood pump that solves some of the problems of left
18 ventricular assist devices, previous heart pumps. So if
19 it's talking about solving problems of other left
20 ventricular assist devices, which are connected to the
21 heart, and he says this is a better version of that,
22 than it must be connected to the heart.
23 I don't think he uses those words that "this
24 is connected to the heart" in the sense that you would
25 seem to be implying, but anyone reading this in the

1 field would understand that this is connected to the
2 heart.
3 Q Schima never describes its pump as being
4 implantable; does it?
5 A I -- I think the similar sort of answer
6 replies. He -- he talks about problems with previous
7 versions of implantable pumps, and he talks about this
8 as being a way of solving some of those problems. So
9 it's an implantable blood pump.
10 Q But Schima doesn't say it.
11 A Schima doesn't say what color it is either or
12 what material does there. Lots of things Schima doesn't
13 say.
14 Q Okay. But Schima doesn't say that its pump is
15 implantable; does it?
16 A Shall I read the whole Schima or see if I can
17 find that word, or you -- or you --
18 Q Well, this one really shouldn't be hard.
19 Could you look to paragraph 780 of your declaration,
20 please?
21 A Seven-eighty?
22 Q Seven-eighty. All right. So you say, "Schima
23 is silent regarding implanting its pump in the body."
24 A I agree. I also say, "However, it would have
25 been readily apparent to a person of skill in the art

1 for the reasons below that Schima's pump would be
2 implanted in the same way as Akamatsu's device.
3 Schima's inlet of the pump would be inserted into a
4 ventricle of the heart to collect blood from the left
5 ventricle."
6 Q There are extracorporeal blood pumps; aren't
7 there?
8 A There are some, yes.
9 Q And they sit outside the body and pump the
10 patient's blood; right?
11 A That's the definition of extracorporeal, yes.
12 Q The pump illustrated in Schima, do you know if
13 anyone has ever built this pump?
14 A I don't know.
15 Q Do you know if anyone has ever implanted this
16 pump?
17 A Well, if I don't know if anyone has built it,
18 I don't know if anyone has implanted it.
19 Q Now, in paragraph four of Schima, Schima is
20 discussing the Akamatsu pump there; isn't it?
21 A I read that.
22 Q I'm sorry. I didn't -- I didn't hear.
23 A Yes, I did read it. I apologize.
24 Q Okay. And Schima provides some criticisms of
25 Akamatsu; doesn't he?

1 A He does, yes.
2 Q It says, "The Akamatsu pump is of complex
3 construction"; correct?
4 A That is Schima's opinion. I'm sure Akamatsu
5 would probably disagree with him.
6 Q Now, outside of this paragraph four, Schima
7 doesn't address Akamatsu again; does it?
8 A Again, I haven't read the whole thing right
9 now. If you present to me that he doesn't, I'll believe
10 you.
11 Q Do you know how big the Schima pump is?
12 A I don't recall that Schima talks about the
13 size in -- of this pump. There are multiple
14 embodiments, so I don't know which embodiment you're
15 referring to either.
16 Q Do you know whether the Schima pump is bigger
17 or smaller than the Akamatsu pump?
18 A It's smaller than the Akamatsu pump?
19 Q It it bigger or smaller than the Akamatsu?
20 A I don't know. But going back to your earlier
21 questions about size, I noticed in the Akamatsu
22 reference that he did talk about the size and weight of
23 it. I missed that before. So I don't think Akamatsu
24 talks about the size and weight of the pump, so I don't
25 know.

1 Q Does the Schima pump have a different shape
2 than the Akamatsu pump?
3 A Well, yes, in the sense that the Schima pump
4 has a conical impeller, whereas the Akamatsu pump has a
5 circular flat torus impeller.
6 Q Are you aware of any other -- strike that.
7 Are you aware of any implantable left ventricular assist
8 pumps that have a similar shape to Schima?
9 A Yes.
10 Q What are they?
11 A The VentrAssist device had a similar shape to
12 Schima. It had a conical impeller. It implanted in
13 several hundred people.
14 Q Do you know whether the pump disclosed in
15 Schima is bigger or smaller than VentrAssist?
16 A Well, since the Schima reference doesn't
17 disclose, to my recollection, the size of the pump, then
18 I can't know if it's bigger or smaller than the
19 VentrAssist.
20 Q Does Schima disclose an external controller?
21 A Does Schima disclose a what?
22 Q An external controller.
23 A Schima's disclosure is directed towards the
24 pump itself. It is -- it has electrical requirements.
25 So presumably, there has to be a cable of some sort

1 leading away from the pump to a controller which
2 controls those electrical signals. But that's not the
3 focus of the Schima invention. A person of skill in the
4 art reading this would understand that if it uses
5 electromagnets to control the pump, then you have to
6 somehow have an electrical connection to a controller
7 that controls those electromagnets.
8 Q Schima doesn't say the control is external;
9 does it?
10 A External to what?
11 Q An external controller.
12 A The controller by definition is external to
13 the pump, 'cause it's not shown as being incorporated in
14 the pump.
15 Q Is that the definition of external controller
16 that you've used in forming your positions?
17 MR. BORDER: Object to form.
18 THE WITNESS: Where are you referring to
19 in my report where I used that?
20 BY MR. CAHILL:
21 Q I am not. You just said that anything outside
22 the pump is external, and I'm asking you, is that the
23 definition? That definition of external, is that what
24 you applied to the claim term external control unit in
25 forming your opinions?

1 with a controller, which is external to the pump but
2 internal to the body.
3 MR. CAHILL: No further questions.
4 MR. BORDER: All right. Why don't we
5 take a ten-minute break?
6 MR. CAHILL: Yep.
7 MR. BORDER: See if we have redirect.
8 THE OFFICER: It is 1:35 p.m. We are now
9 off the record.
10 (Off the record.)
11 THE OFFICER: We are now back on the
12 record. It is 1:44 p.m.
13 MR. BORDER: Petitioners have no
14 questions.
15 THE OFFICER: We can go off the record?
16 Okay. Mr. Border, would you like to purchase a copy of
17 the transcript?
18 MR. BORDER: Oh, I didn't -- what did we
19 decide? I wasn't paying attention.
20 MR. BOYLE: Yes.
21 THE OFFICER: Yes. Okay.
22 MR. BOYLE: Whatever the --
23 MR. BORDER: Yes. Standard delivery.
24 We'll take a rough. No rush on the rough. We don't
25 need paper copies of anything.

1 MR. BORDER: Object to form.
2 THE WITNESS: I was responding to your
3 question, which I thought was difficult to respond to
4 with precision, because it didn't define the term
5 "external." So you asked if the Schima disclosed an
6 external controller. I asked you what external means,
7 and then I said, "Well, the controller is external to
8 the pump."
9 BY MR. CAHILL:
10 Q And my question for you is, is that the
11 definition you used in your report when you formed your
12 opinions?
13 A Where -- where in my report are you referring
14 to where I use the term "external controller"? Then
15 I'll answer that question.
16 Q It's a claim term. So just as one example,
17 page 789 or -- yeah, paragraph 789.
18 A Seven-eighty-nine?
19 Q Yeah.
20 A Well, in the context of Akamatsu, which is
21 referred to in paragraph 789, the external controller
22 is -- is something which is external to the body. In --
23 in Schima, the controller is external to the pump and
24 probably external to the body as well. 'Cause it
25 doesn't disclose how it would be controlled with a --

1 THE OFFICER: Okay. And, Mr. Cahill,
2 would you like to purchase a copy of the transcript?
3 MR. CAHILL: Yes, please.
4 THE OFFICER: Okay. All right. It is
5 1:44 p.m. We are now off the record.
6 (Signature reserved.)
7 (Whereupon, at 1:44 p.m., the
8 proceeding was concluded.)
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CERTIFICATE OF DEPOSITION OFFICER

I, RUBY MORENO, the officer before whom the foregoing proceedings were taken, do hereby certify that any witness(es) in the foregoing proceedings, prior to testifying, were duly sworn; that the proceedings were recorded by me and thereafter reduced to typewriting by a qualified transcriptionist; that said digital audio recording of said proceedings are a true and accurate record to the best of my knowledge, skills, and ability; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this was taken; and, further, that I am not a relative or employee of any counsel or attorney employed by the [illegible] ally or otherwise interested [illegible] on.

RUBY MORENO
Notary Public in and for the
State of California

[X] Review of the transcript was requested.

CERTIFICATE OF TRANSCRIBER

I, RACHEL ROBERTS, do hereby certify that this transcript was prepared from the digital audio recording of the foregoing proceeding, that said transcript is a true and accurate record of the proceedings to the best of my knowledge, skills, and ability; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this was taken; and, further, that I am not a relative or employee of any counsel or attorney employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

RACHEL ROBERTS

SCOTT BORDER, ESQ.
sborder@winston.com

September 17, 2025

RE: Abbott Laboratories v. Miracor Medical SA
9/4/2025, Peter Crosby, (#7565630).

The above-referenced transcript has been completed by Veritext Legal Solutions and review of the transcript is being handled as follows:

__ Per CA State Code (CCP 2025.520 (a)-(e)) – Contact Veritext to schedule a time to review the original transcript at a Veritext office.

_x_ Per CA State Code (CCP 2025.520 (a)-(e)) – Locked .PDF Transcript - The witness should review the transcript and make any necessary corrections on the errata pages included below, notating the page and line number of the corrections. The witness should then sign and date the errata and penalty of perjury pages and return the completed pages to all appearing counsel within the period of time determined at the deposition or provided by the Code of Civil Procedure. Contact Veritext when the sealed original is required.

__ Waiving the CA Code of Civil Procedure per Stipulation of Counsel - Original transcript to be released for signature as determined at the deposition.

__ Signature Waived – Reading & Signature was waived at the time of the deposition.

__ Federal R&S Requested (FRCP 30(e)(1)(B)) – Locked .PDF Transcript - The witness should review the transcript and make any necessary corrections on the errata pages included below, notating the page and line number of the corrections. The witness should then sign and date the errata and penalty of perjury pages and return the completed pages to all appearing counsel within the period of time determined at the deposition or provided by the Federal Rules.

__ Federal R&S Not Requested - Reading & Signature was not requested before the completion of the deposition.

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