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Transcript of Steven J. Dietl

Date: December 21, 2023

Case: Canon U.S.A., Inc., et al. -v- Slingshot Printing, Inc. (PTAB)

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WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

Transcript of Steven J. Dietl
Conducted on December 21, 2023

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2 (5 to 8)

5 1 PROCEEDINGS 2 THE REPORTER: We will go on the record. 3 Will counsel please announce your appearance 4 and state whom you represent, beginning with the taking 5 attorney. 6 MR. FORGHANY: Ehsun Forghany, Morgan, 7 Lewis & Bockius, representing Petitioners Canon. 8 MR. BORSOS: Mark Borsos from Fitch, Even, 9 Tabin & Flannery, representing Slingshot Printing. 10 STEVEN DIETL, 11 a witness herein, having been first duly sworn by the 12 certified reporter to speak the truth and nothing but 13 the truth, was examined and testified as follows: 14 EXAMINATION 15 BY MR. FORGHANY: 16 Q. Good morning, Mr. Dietl. My name is Ehsun 17 Forghany. I represent the Petitioners Canon in the 18 subject IPRs. 19 And I understand you're here to give 20 testimony on behalf of Slingshot for IPR2023-313, which 21 is for the '708 patent, and for the '823 patent. That's 22 the 314. Is that correct? 23 A. That is correct. 24 Q. And the testimony that you're going to be 25 giving today, it can be applied to both of those IPRs,	7 1 to try to finish my question before you respond. It 2 would be a nightmare for the court reporter if we talk 3 over each other. 4 And, again, try to answer my questions orally 5 rather than shaking your head or with gestures. 6 And with that, you know, is there any reason 7 you believe you cannot fully and accurately answer any 8 of my questions today? 9 A. No, no reason. 10 Q. Perfect. 11 So we can start from the top. What did you 12 do to prepare for today's deposition? 13 A. I read through the IPRs from Canon to the 14 court. I read through the reference materials, the 15 patents involved in both the -- the Slingshot patents 16 and the references cited by Canon's attorneys and 17 Dr. Pond. I met with counsel yesterday. We talked 18 about the case in preparation, went through the 19 references, and -- my declaration and those reference 20 materials. 21 Q. And was yesterday the first time you met with 22 counsel about your deposition today? 23 A. Yes. About the deposition today, that's 24 correct. 25 Q. And how long did you spend during that
6 1 correct? 2 A. Yes. 3 Q. And before we begin -- I know that you were 4 just freshly deposed in the other IPR, but just for the 5 purposes of completeness, are you on any medication 6 today that would prevent you from testifying truthfully 7 or accurately? 8 A. I am not. 9 Q. And do you understand that the testimony you 10 give under oath today is going to be subject to the same 11 penalties of perjury as though you were testifying in a 12 court of law? 13 A. I do. 14 Q. And do you understand that until this 15 deposition is over you cannot discuss your testimony 16 with Slingshot's counsel? 17 A. Yes, I understand. 18 Q. And for purposes of you and I, I'm going to 19 assume that you understand the questions I ask you 20 unless you tell me that you didn't understand. And if I 21 ask a question that's unclear or I speak too quickly, 22 just please ask me to clarify. I'll try to slow down 23 and explain a different way. Does that sound fair? 24 A. Yes. That sounds fair. I'll try. 25 Q. And so on top of that, please just allow me	8 1 meeting with counsel? 2 A. Probably about six hours, three hours on each 3 patent. 4 Q. And other than the documents that have been 5 filed or -- on the record in the IPRs or the ones that 6 were referenced in Dr. Pond's deposition, were there any 7 materials that you reviewed in preparation for this 8 deposition other than those I just mentioned? 9 A. No, no other documents. 10 Q. Other than counsel for Slingshot present 11 today, did you meet with any other attorneys -- 12 A. No. 13 Q. -- who represent Slingshot in this matter? 14 A. No, no other attorneys. 15 Q. Have you met with anyone at Slingshot? 16 A. No. 17 Q. And what was your rate in this case to 18 prepare your opinions in this case? 19 A. \$230 per hour. 20 Q. Was that contingent on the outcome of the 21 case? 22 A. No. It's irrelevant to the outcome of the 23 case. 24 Q. And that was the same rate that you applied 25 yesterday?

9 1 A. Yes. 2 Q. And are there any other people that work for 3 you or are part of your team that helped prepare your 4 opinions in this matter? 5 A. No. 6 Q. How long would you say you've spent preparing 7 your opinions in this matter for both IPRs? 8 A. Including the declarations? 9 Q. Yes. 10 A. Yeah. It was a substantial amount of time. 11 It was, you know, probably 30, 40 hours. 12 Q. 30, 40 hours on the declarations? 13 A. Yes, and in preparation of this -- for this 14 deposition, in total. 15 Q. So about 34 hours declaration, 6 hours 16 prepping for this deposition? 17 MR. BORSOS: Objection. 18 A. I think the 6 hours -- 19 Q. You can go ahead, Mr. Dietl. 20 A. I think the 6 hours are part of that 21 30 hours. I'd have to go back and look. I don't have 22 it right in front of me, the amount of time I spent. 23 Q. And did you make any assumptions in 24 connection with your opinions? 25 A. Assumptions --	11 1 that was quite a long time ago. I don't remember a lot 2 of details around what was advised at the time. 3 Q. And so you were not providing an expert 4 opinion in that matter, then, correct? 5 A. I was not. I -- 6 MR. BORSOS: Objection to form. 7 Q. Do you recall the topic of the -- that you 8 were designated to testify about? 9 A. It was a patent infringement case that 10 Hewlett-Packard asserted against Xerox Corporation. I 11 don't remember the number of the patent. The primary 12 inventor was Baker. 13 Q. Do you recall the technology? 14 A. It was related to the inkjet cartridge ink 15 supply technology. 16 Q. And your testimony concerned the products 17 that HP had accused of infringement? 18 A. That was part of it. Again, it was a long 19 time ago, so I don't remember a lot of the details. 20 Q. But you weren't opining on the scope of the 21 claims or anything like that, correct? 22 A. I don't believe so. I don't believe I was 23 opining on those. 24 Q. So you prepared a declaration for the -- what 25 I'm going to refer to just for shorthand purposes today
10 1 MR. BORSOS: Objection to form. 2 A. I don't understand the question. Can you be 3 more specific? 4 Q. Yeah. When you rendered your opinions in 5 this matter, did you rely on any assumptions that were 6 provided to you by counsel? 7 A. No. I didn't rely on any assumptions. 8 Q. Did counsel instruct you to make any 9 assumptions in this case? 10 A. Counsel instructed me on some aspects of the 11 law regarding definitions of obviousness and 12 anticipation and what -- some of the rules of evidence 13 and things like that. Those are all things that counsel 14 advised me on. 15 Q. Very thrilling conversation, I'm sure. 16 A. Yes, wonderful. 17 Q. And is this -- so was it the first time you 18 were learning about those concepts? Or have you opined 19 on it in a patent case before this one? 20 A. Before this -- these particular two patents, 21 yes. 22 Q. How about any other cases besides the ones 23 that are involving Slingshot? 24 A. So quite a long time ago, I was a 30(b)(6) 25 witness for Xerox Corporation in a patent lawsuit. And	12 1 as the '708 IPR. And that has been referenced to, 2 you know, IPR2023-313 for the '708 patent. 3 MR. FORGHANY: Can we go ahead and mark -- it 4 should be titled "Dietl Exhibit 1." 5 THE TECHNICIAN: Okay. Counsel, it's still 6 not in the repository. I'd be happy to download them 7 and show them to the witness from chat. 8 MR. FORGHANY: Yep. 9 (Exhibit Number 1 introduced.) 10 Q. Mr. Dietl, please take a moment to just -- 11 you know, you can request control of the mouse -- or of 12 the document. And go ahead and just scroll through this 13 document, and just make sure it's the -- you recognize 14 it. 15 A. I mean, I recognize this document. Sure. 16 Q. And what is this document? 17 A. This is my declaration regarding the IPR on 18 the '708 -- regarding the '708 patent. 19 Q. And is that your signature at the end of the 20 document? 21 A. Yes, it is. 22 Q. You mentioned that the last time you reviewed 23 this document was yesterday? 24 A. Yes. 25 Q. And are you aware of any errors in this

13 1 declaration? 2 A. Not -- other than typos or something, no, I'm 3 not aware of any errors. 4 Q. Is there anything you want to change in this 5 declaration? 6 A. No, not that I know of. 7 Q. And how much time did you spend preparing 8 this declaration specifically? 9 A. 10 to 15 hours. 10 Q. And I'm sorry. I didn't catch the last part 11 of it -- your statement. 12 A. I said 10 to 15 hours. 13 Q. And when did you begin working on your 14 declaration? 15 A. I don't recall the dates. 16 Q. Approximately -- was it -- 17 A. It was in the -- it was in -- 18 Q. -- before or after October 1? 19 MR. BORSOS: Objection; relevance. 20 THE REPORTER: And, Counsel, for the court 21 reporter, could you repeat your question. I did not get 22 it all. 23 Q. Was it before or after October 1 that you 24 started working on your expert declaration? 25 A. I'd have to go back and take a look at my	15 1 Q. Now, for the sake of convenience and to move 2 things along, I'm going to be referring to the papers 3 and exhibits that were filed in the '708 IPR unless I 4 state otherwise. Does that sound fair? 5 A. Okay. Yes. That sounds fair. 6 Q. So can you turn to the "Materials Considered" 7 section of your declaration, which starts on page 5. 8 Let me know when you're there and you've read 9 through it. 10 A. The list of exhibits? 11 Q. Yeah, materials considered. 12 A. I'm not quite sure... 13 Q. It starts on page 5, paragraph 18. 14 Let me know when you've had a chance to 15 review. 16 A. I apologize. I was looking at the wrong 17 document. 18 Okay. Page 5, yes. 19 Q. And do you recognize this as part of your 20 report? 21 A. Yes. I do recognize this as part of my work. 22 Q. And are all the written materials that you 23 considered in rendering your opinions listed in this 24 "Materials Considered" section of your declaration? 25 A. To the best of my knowledge, yes.
14 1 records. 2 Q. What records would you need to review? 3 A. A calendar. 4 Q. If you could pull it up quickly, feel free to 5 do so. 6 MR. BORSOS: Objection. 7 Counsel, can you let me know the relevance of 8 this line of questioning? 9 MR. FORGHANY: Sure. Why don't we just go 10 off the record briefly. 11 THE REPORTER: We're off the record. 12 (Off the record: 9:24 a.m. to 9:26 a.m.) 13 MR. FORGHANY: Let's go back on the record. 14 THE REPORTER: Okay. We're back on the 15 record. 16 Q. So, Mr. Dietl -- 17 A. Can we pause a moment. I'm having a 18 technology problem. 19 Okay. I'm back. 20 Q. Did you begin drafting your declaration 21 before or after Dr. Pond's deposition in this IPR? 22 A. It was after Dr. Pond's deposition. 23 Q. And the same thing for the declaration in the 24 '823 IPR? 25 A. Yes.	16 1 Q. Have you reviewed any additional materials 2 since providing your expert declaration or -- that 3 aren't listed here? 4 A. I looked at the patent by S. Glend (phonetic) 5 that was referenced as part of the case history, but 6 the -- about this Barkley '708 patent. 7 Q. When you says cases, you're referring to 8 the -- 9 A. File -- 10 Q. -- '823 and the '708 patent? 11 A. Correct, the file history of '708. 12 Q. And did your review of that document change 13 your opinions at all from what you had presented in 14 this -- in your declaration? 15 A. No. 16 Q. Do you plan on considering any other written 17 materials prior -- in this case other than what you've 18 listed here -- 19 A. No. 20 Q. -- sitting here today? 21 A. Not that I know of. 22 Q. Now, I'd like to go ahead and mark as 23 Exhibit 2 your CV. 24 THE TECHNICIAN. I can, Counsel, if you could 25 just drop that in the chat, pull it up.

17 1 MR. FORGHANY: It's already in the chat. 2 (Exhibit Number 2 introduced.) 3 Q. So do you recognize this document, Mr. Dietl? 4 A. Yes, I do. 5 Is it possible to make it larger? 6 Q. And feel free -- you can actually download 7 the document from the chat yourself if you wanted to 8 control it and zoom in on different areas. 9 MR. BORSOS: Just for the record, I do not 10 see documents in the chat, but obviously they're going 11 to Michelle. 12 MR. FORGHANY: I'll just send it to 13 everybody. 14 MR. BORSOS: Thank you. 15 Q. Have you had a chance to review the document, 16 Mr. Dietl? 17 A. Yes, I have. 18 Q. Is this the -- what's been marked as Exhibit 19 Number 2 an accurate and updated version of your CV? 20 A. Yes, it is. 21 Q. And so I want to get a better understanding 22 of your background and what kind of led you to get into 23 the printer field. And it's tied to a statement that 24 you have made in your declaration under "a person of 25 ordinary skill in the art," and you mentioned that you	19 1 education doesn't hone in on specific applications 2 typically. 3 Q. I just was more interested here, you know, if 4 you worked on any specific projects that would involve 5 that or if you had a thesis that you wrote involving 6 this subject matter. 7 A. I did not. 8 Q. And then from there, you were a design 9 engineer, it looks like, at South Korea? 10 A. Well, the -- so before South Korea, I was a 11 design engineer -- right? -- at Xerox, starting from 12 1981 to 1995. I started out working on laser printers 13 for a -- pagewide laser printers and then moved into an 14 advanced technology development engineer role where we 15 evaluated various technologies for marking that included 16 inkjet as one of those technologies. 17 And as a part of that team, the company 18 decided that they would take further investment in 19 commercializing inkjet, and so that's where I became 20 more focused on inkjet. Product design, I was a product 21 design engineer and subsystem team leader designing 22 printheads, ink cartridges, maintenance station systems 23 in the -- as a product design engineer. 24 Q. And that answered the clarification I was 25 seeking. In your CV, under the Xerox on page 3, all of
18 1 had experience in this field, and I want to get a better 2 understanding of that experience. 3 So if you could start maybe explaining, 4 you know, what, if any, background you had in inkjet 5 printers before joining Xerox. 6 A. I had no experience in inkjet printers before 7 joining Xerox. I was a student. 8 Q. And what did you study specifically in 9 school? 10 A. Before joining Xerox, I studied engineering 11 science and mechanical engineering, my bachelor's of 12 science in mechanical engineering, at the state 13 University of New York at Buffalo. And then subsequent 14 to joining Xerox, I continued my education and earned my 15 master's of systems engineering from the Rochester 16 Institute of Technology. 17 Q. And did any of that coursework involve or 18 specialize in thermal heat management or anything of 19 that nature? 20 A. Definitely. Yes. Heat transfer, 21 thermodynamics are key parts to a mechanical engineering 22 degree. 23 Q. In an inkjet application? 24 A. Well, by transferable skills of how to apply 25 that knowledge to inkjets, sure. But no. The broad	20 1 those titles are essentially for Xerox. They're not 2 separate entities that you were working for in those 3 roles. 4 A. That's correct. They're all as an engineer 5 at Xerox Corporation. 6 Q. So after you graduated in 1981, you joined 7 Xerox. And I understand you joined a group that was 8 managed by Philip Harrison. Is that correct? 9 A. That's interesting. Yes. That's -- that was 10 the advanced technology development team. Yeah. 11 Q. And that was a team where you were looking 12 for, you know, print technologies other than Xerox's 13 core xerography for use in their printers and plotters 14 and copiers and everything, correct? 15 THE REPORTER: I'm sorry. Can you repeat the 16 question for the court reporter a little slower. 17 Q. I'll rephrase the question. 18 What was the advanced development group that 19 Harrison was leading? What was its focus? 20 A. So Xerox Corporation, as you may be aware, is 21 a company that was based on some technology developed 22 and invented by Chester Carlson which he called 23 xerography, and thus the name Xerox came out of that 24 name. It has to do with electrostatic -- applying a 25 pattern of electrostatic forces onto a photoreceptor

21 1 drum and then getting toner, which is a dry ink 2 particle, to attach to the drum in the pattern that you 3 desire and then transfer from that drum that image onto 4 a sheet of paper and then fuse the dry ink into the 5 paper to make the image. 6 Xerox was seeing other activity in the world, 7 and they were -- the company was interested in knowing 8 whether there were technologies that might take away 9 some of their market force. They were dominant in that 10 field -- in that technology at the time. They wanted to 11 make sure that they stayed dominant in the printing 12 world, and if new technologies were to emerge, they 13 wanted to make sure that they were aware of those. 14 So our job in the advanced technology group 15 was to evaluate these alternate technologies and make a 16 recommendation to the company on areas where it would 17 be better to make additional investment or areas where 18 it wouldn't be as wise to make additional investment. 19 Q. And as part of that group, your job was also 20 to take technology that was developed by other groups at 21 Xerox and basically engineer early prototypes for 22 demonstrations to senior management, correct? 23 A. That was part of the group responsibility. 24 Yes. 25 Q. And one of the groups that you worked with	23 1 printheads and thermal inkjet printheads, correct? 2 A. I think that was part of their 3 responsibility. Yes. But I think if you wanted to get 4 more details of the things they were working on, it 5 would be better to talk to Dr. Pond. I'm sure they had 6 other things they were working on also. 7 Q. And Dr. Pond's group, they had access to a 8 semiconductor process fabrication laboratory where they 9 would make silicon and other semiconductor devices for 10 these early prototype testing, correct? 11 A. Yes. I think -- and I think it was limited 12 to mostly the MEMS-related processes. They might have 13 had some metal process. But they couldn't do logic, and 14 I don't believe they could do CMOS or NMOS. But, 15 you know, again, Dr. Pond would be better to -- 16 Q. Right. And -- 17 A. -- question. 18 Q. But you -- at least, you know, Harrison's 19 group -- the advanced development group, that group 20 would attend technology demonstrations that would be 21 hosted by Dr. Pond and his research team, correct? 22 A. I don't recall. We collaborated on product 23 design and development with that group. Whether there 24 were presentations on technology, I don't recall. 25 Q. So Dr. Pond's group never, you know, provided
22 1 was a Xerox corporate research group. 2 A. Correct. 3 Q. And that was a group that Dr. Pond managed at 4 the time, correct? 5 A. Yeah. He managed an inkjet subdivision of 6 the corporate research group. I'm not sure if he was in 7 charge of the entire corporate research, but he might 8 have been. I don't recall. 9 Q. And that was -- that research group, they 10 were developing technology for Xerox that included 11 continuous inkjet printheads and thermal printing 12 printheads and thermal inkjet printheads, correct? 13 A. Can I make a point of order? I see that my 14 counsel has disappeared from the meeting. 15 THE WITNESS: And you're muted, Mark, so... 16 MR. BORSOS: Sorry. I am muted. 17 I haven't said anything lately. I just had 18 to go off camera for a second, but I am still present. 19 THE WITNESS: Okay. 20 A. I'm sorry. Mr. Forghany, could you ask the 21 question again? 22 Q. Sure. The group that Dr. Pond was managing, 23 Xerox's corporate research group, that group was 24 responsible for developing technology -- non-xerographic 25 technology for Xerox, including thermal printing	24 1 you with a demonstration printhead that, you know, your 2 group would then incorporate into printers and copiers 3 they were trying to assemble? 4 A. They did provide a prototype printhead -- 5 Q. The thermal inkjet printhead. 6 A. Thermal inkjet printhead, yeah. Yeah -- 7 Q. And they're the ones that had developed it, 8 correct? 9 A. Yes. Yes. 10 Q. And what was your role once it was supplied 11 to you? 12 A. So I didn't have direct responsibility 13 initially in this area, but one of our other engineers 14 worked with them to integrate that prototype printhead 15 into a demonstration model so that we could demonstrate 16 inkjet printing for management -- 17 Q. And -- 18 A. -- and to evaluate the technology. 19 Q. Your role during that time -- you reported to 20 John Stevens during that time period, correct? 21 A. No. What we're talking about is when we're 22 still reporting to Philip Harrison where we made the 23 demonstration fixture for -- 24 Q. I see. 25 A. -- for the printhead that was provided by

25 1 Dr. Pond's group. 2 Q. So during this time period, what was your 3 role -- what did you work on with -- the thermal inkjet 4 printhead that was developed by Dr. Pond's group, what 5 was your contribution to that project? 6 A. So we just jumped -- I'm just -- jumping 7 around a little bit because of the timeline, right? 8 There was the advanced development team, and 9 they had this initial, very small prototype printhead 10 that they provided. And that group worked to integrate 11 it into a demonstration fixture. 12 Subsequent to that, we decided to 13 commercialize the technology, and then we worked with 14 Dr. Pond's group to design an inkjet printhead that 15 would be suitable for product requirements for a 16 low-cost, multifunction printer -- "multifunction" 17 meaning printer, copier, fax, scanner integrated into 18 one unit -- and we collaborated with them to develop 19 that printhead. They focused on the printhead silicon 20 aspect of it, and then we worked back and forth to 21 design a printhead around that, which is the, you know, 22 part that connects to that inkjet printhead, and then it 23 was inserted into the printer itself to make connection 24 with the printer. 25 Q. Sure. And you mentioned there's -- you	27 1 Q. Isn't it true that you worked -- I'm sorry. 2 Go ahead. 3 A. You know, they had CMOS -- they had CMOS 4 design or NMOS design engineers that worked on the 5 project. They also had some packaging technology people 6 that were very helpful. They had -- there were 7 physicists that worked on the drop ejection -- right? -- 8 and firing chamber and how to optimize that. There was 9 color modeling people on both sides, between the 10 engineering team and the research team. So it was a 11 collaborative -- collaborative effort at the time. 12 Q. Did you contribute to the decision about 13 which resistors to use on the printhead? 14 A. I -- 15 MR. BORSOS: Objection to form. 16 A. I collaborated on the -- evaluating the 17 options, and then when we made test samples, either 18 through what they could do in their lab or we had 19 external silicon partners that we worked with, to 20 evaluate those options and to make decisions together on 21 the right materials, the right heater design, the right 22 drop ejector design. 23 Q. Isn't it true that your responsibilities were 24 limited to -- on the inkjet -- thermal inkjet printhead 25 that Dr. Pond's group developed, your responsibility was
26 1 bifurcated this experience, and I didn't mean to suggest 2 that they were one and the same. But you mentioned 3 that, you know, there was an initial period where 4 Dr. Pond's group -- you know, the Xerox corporate 5 research group provided you with a thermal inkjet 6 printhead they had developed. 7 A. Correct. 8 Q. And then at another later point there was a 9 decision to commercialize that printhead. Is that fair? 10 A. Correct. Yes. 11 Q. What was your -- what contributions did you 12 make to the thermal inkjet printhead itself prior to the 13 decision to commercialize it? 14 A. So the thermal inkjet printhead, the assembly 15 has the ink supply, the interface to the printer, all 16 the mounting hardware that you would need to physically 17 locate the silicon die part of the inkjet printhead. 18 And I was responsible for all the printhead 19 support design, and then I worked with them, with their 20 team of engineers and -- to opt -- to select the design 21 features around that printhead silicon die that would 22 meet the product requirements that would integrate well 23 into a printhead design that we could then put into a 24 printer design. So it was a collaborative -- it was a 25 collaborative effort. I worked with --	28 1 limited to working on the printhead carrier and 2 maintenance station? 3 MR. BORSOS: Objection to form. 4 A. No. That's not true. 5 Q. Did you work on the ink -- the printhead 6 carrier for the thermal inkjet printhead that Dr. Pond 7 developed? 8 A. So you're -- I'm not sure what a printhead 9 carrier is. We worked on the cartridge. 10 Q. What about the maintenance station? 11 A. I worked on the maintenance station. I 12 worked on the ink supply that was part of the cartridge. 13 And we worked on the integration of the silicon die into 14 the printhead. 15 We also worked on the specification of that 16 silicon die, because not only did it have to be 17 something that -- it's not something that Dr. Pond 18 developed and just handed -- his group just handed it 19 over a wall and said "Here, integrate this." It was a 20 collaboratively effort to decide all the features that 21 we would put on that product collaboratively. 22 Q. And that product was code named Steelhead, 23 correct? 24 A. I don't -- I don't recall. 25 Q. And do you recall that your group had made a

29 1 unique printer that moved Dr. Pond's printhead over a 2 sheet of paper held on a flatbed support in an X-Y 3 skating motion? 4 MR. BORSOS: Objection to form. 5 A. That's correct. That was what -- it was a 6 precursor to a commercialized product, and it was -- I 7 think the program name was called AMPS, but I don't know 8 that -- now we're getting into things that probably were 9 proprietary knowledge. 10 Q. Which is -- 11 A. Code names of products, I probably shouldn't 12 say for -- yeah. 13 Q. During the 1981 to '87 time frame, were you 14 aware of anybody else at Xerox -- any other group that 15 was a source of thermal inkjet devices other than 16 Dr. Pond's group? 17 A. I'm not sure. There was -- there were some 18 people in a small research group in Toronto that was 19 working on -- technology. There was another small 20 research group in Texas -- I forget exactly where in 21 Texas -- that were part of the daisy wheel printing -- 22 printer group. They were doing some technology work. 23 But that was a long time ago. I can't remember any 24 details about that. 25 Q. And would it be fair to say that during that	31 1 printer, into a product. 2 Q. I think we're misunderstanding the question. 3 So was -- were you solely -- were you only 4 working -- was the advanced development group's sole 5 purpose to support Dr. Pond's research? 6 MR. BORSOS: Objection to form. 7 A. So we've moved beyond the advanced 8 development group. You're talking about beyond that 9 time where we decided to commercialize this product, I 10 think, and so -- I think that's what you're talking 11 about. 12 At that point in time, we collaborated with 13 Dr. Pond's group. We made engineering decisions 14 together in order to make the right product decisions to 15 make a final product, and all of those -- the inkjet 16 printhead -- the silicon part of the inkjet printhead 17 was -- most of the technology experts were in Dr. Pond's 18 group, but we worked collaboratively with them and had 19 to make trade-offs and decisions all along the way. And 20 it wasn't, you know, one team or another "You're just 21 focused on this" or "You're just focused on that." We 22 worked on it together. And in the end, the printhead 23 silicon documentation and drawings and design were 24 produce by the engineering team, by my team, not Dr. -- 25 Q. Again -- I see where the confusion is.
30 1 same time period, you know, when you were active in 2 Harrison's group, that group was -- you know, Harrison's 3 group was chiefly, you know, developing ink container 4 concepts and printhead maintenance procedures and 5 hardware? Is that a fair characterization? 6 MR. BORSOS: Objection to form. 7 A. So I don't think Mr. Harrison was involved 8 for very long, so I -- you asked that question. He was 9 more involved in the advanced technology development 10 group. And as it went to commercialized technology, I 11 believe Dr. Pond was in charge of the project, and we 12 all then reported up through him at that time with -- 13 you know, with other levels of management in between, 14 but... 15 Q. And I can reframe my question. I'll just -- 16 is it fair to say that the advanced development group 17 that you were a part of, that it was chiefly developing 18 ink container concepts and printhead maintenance 19 procedures and hardware and not focused on thermal 20 inkjet printheads? 21 A. That's not true. 22 MR. BORSOS: Objection to form. 23 Q. What part of that is not true? 24 A. We were focused on the -- all the aspects of 25 commercializing thermal inkjet technology into a	32 1 So earlier you mentioned that the purpose of 2 the advanced development group was to look at a wide 3 variety of non-xerography technologies and make 4 recommendations to the company about which avenues to 5 pursue, correct? 6 A. Correct. 7 Q. So I was asking essentially that, like, your 8 group wasn't specialized in focusing -- in chiefly 9 looking at thermal inkjet printheads. You were looking 10 at a wide variety of printheads, and your work involved 11 generally developing ink container concepts and 12 printhead maintenance procedures and hardware for a 13 wide -- 14 THE REPORTER: I'm sorry. He's frozen for 15 me. Is he frozen for -- 16 THE WITNESS: Yeah. He's frozen for me too. 17 MR. BORSOS: He is. 18 THE WITNESS: It's not me this time. I was 19 freezing last time. 20 THE REPORTER: Should we go off the record, 21 Mr. Borsos -- oh, are you back? 22 MR. BORSOS: Mr. Forghany, are you -- 23 MR. FORGHANY: Yeah. 24 MR. BORSOS: -- back with us? You froze for 25 about 30 seconds.

33 1 MR. FORGHANY: Oh. Do -- 2 THE REPORTER: And you're frozen again. 3 MR. BORSOS: And you're doing it again. 4 I believe your question was going to be did 5 we hear your last question, and the answer is no. 6 THE WITNESS: No. 7 MR. BORSOS: You're back. 8 We did not hear your last question. 9 MR. FORGHANY: Oh. 10 MR. BORSOS: And we didn't hear the question 11 asking if we had heard your question, but I inferred 12 that that was what you were asking. 13 Q. So, Mr. Dietl, earlier you had described the 14 purpose of the advanced development group as looking at 15 a wide variety of non-xerography technologies, not just 16 focused on thermal inkjet printheads. Is that statement 17 still correct? 18 A. Correct. We were evaluating technologies. 19 Q. And Dr. Pond's corporate research group had 20 specifically focused on thermal inkjet printheads by 21 contrast, correct? 22 A. As I said earlier, you'd have to talk to 23 Dr. Pond about whether or not they were working on any 24 other technologies other than thermal inkjet. They did 25 provide the early prototype of a small inkjet printhead	35 1 and then evaluate them based on a set of criteria that 2 we had at the time on whether or not they were going to 3 be disruptive or advantageous or something that we 4 should consider. 5 Q. Right. I think we kind of lost -- we lost -- 6 we fell out of sync when I asked you whether -- I 7 confirmed that your group was not solely responsible for 8 supporting Dr. Pond's project. 9 A. Correct. I -- sure. 10 Q. And so during this -- the time period, were 11 you supporting any other group with thermal inkjet 12 printhead technology other than Dr. Pond's group? 13 MR. BORSOS: Just for clarification -- 14 A. No. 15 MR. BORSOS: -- this is in the time period of 16 up to 1995? 17 MR. FORGHANY: This is -- well, it's the time 18 when -- I'll rephrase my question. 19 Q. Mr. Dietl, while you were working within the 20 advanced development group at Xerox, were -- did you 21 support any other group besides Dr. Pond's group with 22 thermal inkjet printhead technology? 23 A. No. Dr. Pond's group was the primary source 24 that we worked with on thermal inkjet technology. 25 Q. And Dr. Pond's research group, they developed
34 1 that we were asked to integrate into a printer 2 demonstration model and to -- and use that, together 3 with them, to demonstrate the technology to management. 4 Q. And you were -- so you were working with 5 other groups other than Dr. Pond's group during this 6 time period when you were at the advanced development 7 group. 8 A. Correct. We were working with outside 9 companies also. Right? We were -- some companies were 10 trying to sell -- they had a new technology called 11 magnetography, and this was going to -- this was going 12 to, you know, change the world. Or ionography. There 13 was -- and so we worked with some companies -- LCD image 14 bars, LED image bars. These were companies, primarily 15 in Japan, providing different imaging technologies to 16 compete with the laser that was used in xerography in 17 Xerox machines. 18 And then we had other technologies that we 19 worked with corporate research on. Like, direct toner 20 marking was one where a scientist in the research labs 21 had developed a way of gaining toner particles using 22 electrostatics direct onto paper. 23 And so, you know, those were -- we would work 24 with those companies or scientists. We would get early 25 samples. We would try to put together a demonstration	36 1 and fabricated the silicon device designs and prototype 2 printheads and then gave them to the engineering teams, 3 including the one that you worked on, the advanced 4 development group, correct? 5 A. Only during the -- 6 MR. BORSOS: Objection to form. 7 A. Only during the advanced development group 8 period. Subsequent to that, we collaborated on the 9 printhead designs, and we worked with outside silicon 10 fabricators to make the device. 11 Q. Understood. Thank you for clarifying. 12 And so around 1988, '89, you know, Xerox 13 reorganized its thermal inkjet resources in a new 14 business unit that included Harrison's team, correct? 15 A. Yes. That's correct. 16 Q. And Dr. Pond left the research group and 17 joined this new business unit as the manager of the 18 engineering and manufacturing team that was responsible 19 for the thermal inkjet printheads and inks. 20 A. Yes. That's what I recall. Yes. 21 Q. And that's at the point where you became -- 22 you came -- no -- and started reporting two levels down 23 from Dr. Pond in that same team, correct? 24 A. Correct. 25 MR. BORSOS: Objection to form.

37 1 Q. And so as I understand it, within this group, 2 Dr. Pond was leading it, and then the manager was Ken 3 Altfather, who reported to Dr. Pond, and then you, 4 Mr. Dietl, reported to Mr. Altfather. Is that correct? 5 A. That's correct. 6 Q. And -- 7 A. I mean, there was -- I can't tell you all the 8 different reporting relationships over time. You know, 9 there was a lot of changes over time. But my primary 10 job responsibilities were the same, designing inkjet 11 printheads, ink supplies, and maintenance station 12 subsystems and integrate them into a printer. 13 Q. And so one of the things that you were 14 working on to integrate was desktop printer programs. 15 Is that correct? 16 A. That was one of the early products that we 17 decided to commercialize -- try to commercialize. Yes. 18 Q. And you and Mr. Altfather were responsible 19 for the mechanical engineering aspects of those 20 printers, correct? 21 A. More than the mechanical engineering aspects. 22 Mr. Altfather's team had the systems -- had systems 23 engineering, mechanical engineering. There was some, 24 you know, fixture teams in order to be able to develop 25 the evaluation. There was also test -- a test	39 1 Corporation in terms of how to fluidly interconnect the 2 plastic components of an inkjet cartridge to the silicon 3 components of an inkjet cartridge, the evaluation of 4 printing performance, the evaluation of trying to 5 develop the subrequirements around -- you know, what are 6 the requirements around the pressures that the ink has 7 to be delivered to the inkjet printhead at, and then how 8 to best deliver that. 9 It goes on and on and on, hundreds of 10 decisions, technology decisions as well as design 11 decisions, and in the end, making those decisions, 12 getting prototypes made, having those -- evaluating 13 those prototypes, making iterative changes, then, to 14 that design until it meets the requirements of the 15 product. 16 Q. You said that you developed new technologies 17 in this space. 18 A. Yes. 19 Q. What new technology did you develop in the -- 20 for a thermal inkjet printhead? 21 MR. BORSOS: Objection to form. 22 A. I have 35 patents -- US patents that I got 23 over those years -- 24 Q. And the question was just for thermal inkjet 25 printheads.
38 1 organization in order to evaluate the product to the 2 requirements of the product. There was -- I'm not sure 3 if the ink development and ink chemistry reported to Ken 4 Altfather. I don't recall. 5 Q. And you -- your primary responsibility was 6 for printhead maintenance and station hardware designs 7 as well as contributing to the print cartridge ink 8 container design and fabrication. Is that a fair 9 characterization? 10 A. No. That's not a fair -- 11 MR. BORSOS: Objection to form. 12 Q. How would you characterize your response- -- 13 primary responsibilities for that group? 14 A. My primary responsibilities was printhead 15 design and ink supply with some support to maintenance 16 station design. 17 Q. When you say "printhead design," what are you 18 referring to? 19 A. I'm referring to getting a set of 20 requirements on what the product has to perform, how it 21 has to perform, making decisions around the architecture 22 of the product, making trade-offs with both the printer 23 side of the design team and the device side of the 24 design team in terms of what's possible, developing 25 technologies that had never been done before at Xerox	40 1 A. -- technologies that were developed to 2 address challenges. 3 They were all in thermal inkjet printheads. 4 THE REPORTER: And I lost part of the answer, 5 as the witness froze, just so counsel is aware if you'd 6 like him to repeat it. 7 Q. Yes, please. 8 A. So I'm not sure what you lost. 9 Over the years, I was granted 35 -- as an 10 inventor or co-inventor of 35 US patents. All of them 11 related to inkjet technology and -- that came out of 12 challenges and -- which I consider opportunities -- that 13 present themselves when you're trying to design a new 14 product using a new technology, so... 15 Q. Did you, while at Xerox, ever contribute any 16 design alternatives involving temperature management of 17 a thermal inkjet printhead? 18 MR. BORSOS: Objection to form. 19 A. So the temperature management of the 20 printhead and the performance of the printhead have 21 multiple aspects. Right? And we -- I was definitely 22 deeply involved in coming up with ways to measure and to 23 characterize the temperature of the silicon substrate 24 and of the surrounding elements of the printhead in 25 order to understand and optimize thermal deviations that

41 1 occurred in the device and work on ways to make 2 decisions and come up with ideas and work on ways to 3 improve the products such that they were within 4 acceptable level and we had acceptable print quality. 5 Q. Was that a yes or a no? 6 A. So that was a yes. 7 Q. What design alternatives did you propose for 8 a temperature management concept? 9 MR. BORSOS: Objection to form. 10 A. So one example was the heat sink design that 11 we used in the printhead design. The silicon substrate 12 had to be bonded to that heat sink. It had to be bonded 13 with a conductive epoxy, a very thin bond line 14 optimizing that -- those materials, both the heat sink, 15 the adhesive, and then the bonding process to achieve 16 good performance. 17 Q. That you specifically proposed? 18 A. Yes. Sure. 19 Q. And for -- what device was that for? 20 A. It was for a -- the first monochrome 21 printhead device that was commercialized and actually 22 went to market. 23 Q. The one that was developed by Dr. Pond's 24 group? 25 A. No. It was developed collaboratively with	43 1 printhead -- I forget how many nozzles were in that 2 printhead -- and that had an integrated ink supply and 3 cartridge body and printhead. And we worked with a 4 printer partner in Japan to integrate the Xerox-supplied 5 components into the printer that was supplied by the 6 Japanese partner and to put out a product under the 7 Xerox name. 8 And then subsequent to that, using a very 9 similar platform of that design, we did a three- -- a 10 four-color version of that printhead that had 11 replaceable -- replaceable ink cartridges, CMYK separate 12 ink cartridges. And then on that product, worked with a 13 different printer partner in South Korea. And then the 14 next part of my CV kind of goes into some of the things 15 that happened there with that product. 16 Q. But until 1995, you said that your work kind 17 of in this -- focused on these -- the flatbed system, 18 the black-and-white printer, and the application of a 19 similar platform as the black-and-white printer but in a 20 multi-via printhead. 21 A. It was a multi-color printhead. I don't know 22 if we would call it a multi-via printhead, but 23 multi-color printhead. 24 Q. So what was -- is the flatbed system -- did 25 it have a name we could refer to for today's purposes?
42 1 the design engineering group and Dr. Pond's group. 2 MR. FORGHANY: Why don't we take a break and 3 go off the record right now. 4 THE REPORTER: Okay. We're off the record. 5 (Off the record: 10:14 a.m. to 10:31 a.m.) 6 Q. Mr. Dietl, before we took a break, we were 7 discussing a heat sink approach or alternative that you 8 had proposed for a thermal inkjet printhead project that 9 you were working on with Dr. Pond in the larger group at 10 Xerox. Approximately what time frame did this work 11 occur? 12 A. Oh, you know, in between 1987 and 1995, 13 '88 to '95, something in that ballpark. We were working 14 on various product designs and product 15 commercialization. 16 Q. And was this for a specific product, like a 17 stand-alone product? Or was it for a family of 18 products? I'm just trying to get some terminology 19 around this project. 20 MR. BORSOS: Objection to form. 21 A. So the original product that we started to 22 commercialize that I mentioned earlier, which was a 23 flatbed system, multifunction, that was discontinued. 24 And then we worked then on a black-and-white 25 printer that we did commercialize. It was a 300 dpi	44 1 A. The platform -- 2 MR. BORSOS: Objection to form. 3 A. -- was -- we called it AMPS. 4 Q. AMPS? Could you spell that, please? 5 A. A-M-P-S. 6 Q. And what was the time frame that you were 7 working on that project? 8 A. It would have to be in the '97 and '98 time 9 frame -- I'm sorry -- the '87 and '88 time frame. 10 Q. And the black-and-white printer, what was the 11 commercial name, if you recall, of that printhead? 12 A. I don't recall the commercial name of the 13 product. 14 Q. Do you recall the time period that you were 15 commercializing it? 16 A. It was subsequent to the AMPS, so -- 17 you know, so it would be 1988 to '90, '91. 18 Q. And you mentioned that it was -- you do 19 recall that it was 300 dpi? 20 A. I do recall it was 300 dpi. Yes. 21 Q. And it was a monochrome printhead? 22 A. That's correct. 23 Q. And then the third product was a multi-color 24 version of that same printhead? 25 A. It was -- no. It was a multi-color version

45 1 on the same platform. It was definitely a different 2 printhead. 3 Q. I see. 4 A. Yeah. But it was on that same platform, 5 still a 300 dpi, but segmented into the four colors in a 6 row on an edge shooter device. Side shooter I think we 7 called it at Xerox. 8 Q. Yeah. That's my next question -- go ahead. 9 A. That was not me. 10 MR. FORGHANY: I'm sorry. The court 11 reporter, did you have a question? 12 THE COURT: No. I believe there was some 13 background noise from another participant. 14 MR. FORGHANY: Oh, okay. 15 Q. So could you describe generally what you're 16 referring to when you use the term "edge shooter"? 17 A. So edge shooter and side shooter are the kind 18 of terms that I've heard referred to as the type that -- 19 where the ink is ejected from the printhead in a 20 direction parallel to the surface of the heater. 21 Q. And that's different from a roof shooter 22 design. 23 A. Correct. 24 Q. Could you describe the difference between the 25 two?	47 1 we're referring to now, the black-and-white printhead, 2 that was bonded to a nickel heat sink with a thermally 3 conductive epoxy, correct? 4 MR. BORSOS: Objection to form. 5 A. Bonded to a zinc heat sink with a nickel 6 plating with a thermally conductive epoxy. 7 Q. And was that something that you yourself 8 worked on and decided to do? 9 A. Yes. 10 Q. And did the heat sink itself buffer? Did it 11 conduct heat away into the printer printhead mounting 12 features? 13 A. It conducted heat away from the silicon die 14 and then dissipated that heat to the ambient air. 15 Q. And that was a design decision that you 16 personally decided to do? 17 A. Well, it -- 18 MR. BORSOS: Objection to form. 19 A. It was a collaborative design decision along 20 with -- like everything was. Right? We worked on one 21 of the best technologies to make the product perform to 22 the requirements, and certainly I consulted people in 23 the R&D organization, physicists, and the like in order 24 to make those decisions. 25 Q. Understood. Yeah.
46 1 A. In a roof shooter design, the ink is ejected 2 in a direction perpendicular to the surface of the 3 heater. 4 Q. And Xerox was primarily using a side shooter 5 design for this black-and-white monochrome printhead 6 assembly? 7 A. Yes. 8 Q. And had you worked on any roof shooter 9 printhead assemblies prior to that black-and-white 10 monochrome printhead? 11 A. On -- not on development. We evaluated some 12 products from competitors. 13 Q. So I'm trying to get an exhibit up on the 14 chat. 15 MR. FORGHANY: Have the exhibits been 16 uploaded on your side yet? 17 A. I don't see any new exhibits in the -- 18 Q. Oh, I was speaking to the tech. I'm sorry. 19 A. Yes. I'm sorry. 20 THE TECHNICIAN. No, they haven't. I'm not 21 sure what's going on today. 22 MR. FORGHANY: Okay. So I'll just ask 23 questions about it generally. It's not letting me drop 24 it into the chat. 25 Q. So the edge shooter printheads at Xerox that	48 1 And I'm assuming by the collaborative 2 process, you're referring to the weekly or sometimes -- 3 I understand it to be quarterly meetings that would be 4 happening within the group itself, correct? 5 A. We had meetings and working sessions 6 continuously, multiple times a week. We worked -- this 7 was not a distant relationship between the groups at 8 Xerox Corporation. We were all hands on deck working on 9 the project to commercialize this technology and didn't 10 consider -- I didn't consider any barriers or lines 11 between organizations. We worked collaboratively as one 12 team. 13 Q. And, you know, the group that we're referring 14 to here with yourself, Dr. Pond, and Altfather, that had 15 weekly technical meetings in which yourself and the 16 other engineers, as well as ink development chemists and 17 thermal inkjet device designers, printhead manufacturing 18 engineers, firmware engineers, they would all 19 participate in these meetings to try to implement this 20 technology in a -- to commercialize it, correct? 21 A. That's correct. 22 MR. BORSOS: Objection to form. 23 Q. And Dr. Pond was the chairman of these 24 meetings, correct? 25 A. No. I don't believe so.

49 1 Q. Dr. Pond was not responsible for conducting 2 these meetings? 3 A. No. I don't believe -- 4 MR. BORSOS: Objection to form. 5 A. -- meetings. 6 Q. Who was responsible for -- 7 THE REPORTER: I'm sorry. I need the answer 8 repeated, please. 9 A. I don't believe Dr. Pond conducted the 10 meetings. 11 THE REPORTER: Thank you. 12 And, Mr. Dietl, if you could just wait/pause 13 for a second after the question for Mr. Borsos to get 14 his objection in, that would be helpful. Thank you. 15 Q. Who was responsible for ensuring that the 16 inkjet components would meet their cost, quality, and 17 time schedule for the particular product program? 18 A. So I was responsible for that for the 19 components that I was responsible to deliver, but 20 ultimately, you know, as you go up the management chain, 21 everybody is responsible that the product makes those 22 cost, quality, and schedule performance requirements. 23 So, you know, I think Dr. Pond was also responsible for 24 that for as long as he was involved with the project. 25 Q. And that was until 1993, correct?	51 1 code named Corbell (phonetic)? 2 A. That sounds right. And Corbell was the name 3 of the printhead. 4 Q. And that's the X4004? 5 A. Yeah, what was that again? I couldn't recall 6 the name of the product, the printer product. 7 Q. X4004. 8 A. X4004. Okay. It was a long time ago. 9 Q. I would be surprised if you remembered that. 10 And after Dr. Pond stepped down, you 11 continued to work on follow-on products to the X4004, 12 correct? 13 A. That's correct. 14 MR. BORSOS: Objection to form. 15 Q. And one of those was the XJ4C? 16 A. That's correct. 17 Q. And you eventually became the team lead. 18 In fact, you had mentioned before having a seven-month 19 stay in Korea with Lucky-Goldstar. 20 A. That's correct. 21 Q. After you -- Dr. Pond stepped down, you 22 started reporting to Ken Altfather, who was now in the 23 role that Dr. Pond had relinquished. Is that correct? 24 MR. BORSOS: Objection to form. 25 A. I don't recall the management structure. I
50 1 A. Yeah. I don't recall his departure date, but 2 I know he didn't -- at some point in time he decided to 3 move on to a different direction. 4 Q. Well, up until that point, he was the chief 5 engineer on the technical team. 6 MR. BORSOS: Objection to form. 7 A. Yeah. That's -- that sounds about right. 8 Yeah. 9 Q. And you were the team lead on the inkjet 10 components, the ink supply specifically as well. 11 A. The printhead design, the ink supply, and 12 some parts of the maintenance station design and also 13 the integration of that -- those components into the 14 printer. 15 Q. And I was going to say "maintenance 16 functions," but then I recalled you didn't like that 17 term too much, so I was trying to avoid it, but -- so 18 what -- your responsibilities did include some 19 maintenance functions as well. 20 A. Yes. 21 MR. BORSOS: Objection to form. 22 A. Yes. 23 Q. And is it consistent with your recollection 24 that Dr. Pond stepped down as chief engineer in 1994 25 after Xerox launched its first inkjet product, which was	52 1 know that Dr. Stoffel came in there too, but, you know, 2 I don't recall the organizational structure. 3 Q. Did you still report to Ken Altfather? 4 A. Yes. At the point where I went to Korea for 5 seven months, I still reported to Ken Altfather. Yes. 6 Q. Did you keep in contact with Dr. Pond after 7 he left the team? 8 A. We saw each other on occasion. You know, we 9 were quite friendly, and our wives were friendly. And 10 my wife was an artist and a craft maker, and we had 11 given them some Christmas decorations that my wife made 12 back in the day, so we'd talk about that. So yeah. 13 We'd -- you know, I saw them at, like, dinners and 14 things like that. 15 Q. And I was asking because I was wondering if 16 you ever had any further collaborations with Dr. Pond 17 after he relinquished his role on the team. 18 A. I don't think -- I don't recall where he went 19 afterwards and how his involvement was with the inkjet 20 team after that point. I know that after he left -- 21 after he left Xerox and became a licensed patent 22 agent -- I think is what he became -- I did talk to him 23 about an invention that I had that Xerox had released to 24 me that -- what it would take to get that patented 25 outside of the Xerox system. But that's just friends.

53 1 But I decided not to pursue it, which I regret to this 2 day. 3 Q. And are you aware of a -- that Dr. Pond 4 joined and headed an advanced development chain that was 5 parallel to his old role at Xerox? 6 A. I don't recall. 7 Q. Okay. And you don't recall working on any 8 projects with him while he was heading the advanced 9 development chain. 10 A. I don't recall. 11 Q. Now, in your expert declaration, you opined 12 on the level of ordinary skill in the art for the '708 13 and '823 patent. Do you recall that opinion? 14 A. Yes. 15 Q. And you took issue with some portion of 16 Dr. Pond's definition of what the ordinary skill in the 17 art would be at the time of the patented inventions. 18 A. Only a minor aspect of a materials scientist. 19 Q. Could you explain what you meant by that, 20 what the disagreement is about? 21 A. A materials scientist typically doesn't get 22 involved in the structure of electromechanical devices 23 and, I don't think, would have run into the trade-offs 24 and experiences that the other roles that I described 25 would have.	55 1 A. Oh, by, like, imaging -- imaging the foreign 2 material with a scanning electron microscope or doing an 3 FTIR spectrum on a material to try to identify what the 4 foreign material was, comparing that to libraries to 5 identify materials, things like that. 6 Q. Are you referring to, like, a piece of 7 contamination -- a contaminant that would enter into the 8 ink supply? 9 A. Could be, yes. 10 Q. Oh. Okay. Materials scientists weren't 11 consulted about what type of materials to use, for 12 example, for the resistors? 13 A. You know, I'm sure they were. Yeah. I'm 14 sure -- I don't know if we had specifically materials 15 scientists assigned to that, but we had, you know, 16 physicists and device scientists that had exposure to 17 those different types of materials and how to evaluate 18 them. So I don't know if their title was materials 19 scientist or not. I think not. I think mostly it was 20 electrical engineers and physicists. But they made 21 those decisions. 22 Q. Would a materials scientist -- someone with a 23 degree in materials science be able to make those 24 decisions as well? 25 MR. BORSOS: Objection to form.
54 1 Q. So it's your opinion that someone that 2 possessed a materials science degree and met the 3 experiential requirements of designing thermal inkjet 4 printheads and systems, that person would not be a 5 person of ordinary skill in the art? 6 A. I think that they could be a person having 7 the ordinary skill in that case if they had the 8 experiential, you know -- 9 Q. I see. 10 A. -- role -- yeah. 11 Q. Your opinion is, in a sense, that just -- 12 someone that only has a materials science degree would 13 not be a person of ordinary skill in the art. 14 A. That's correct. 15 Q. What role does a -- in your experience at 16 Xerox, for example, did materials scientists have on the 17 team that developed the AMPS printhead, which later 18 became the aptly named X4004 printhead? 19 A. So, you know, I believe we had some materials 20 scientists in the research group that were analytical 21 chemists. Right? And they helped in the evaluation of 22 problem -- you know, problem solving, being able to 23 identify foreign materials that might be causing a 24 problem, things like that. So we had that type of role. 25 Q. Causing a problem how?	56 1 A. If they -- you know, if they had the 2 experience in the field. 3 Q. Did you ever consult anyone on the team about 4 what materials to use for the temperature sense 5 resistors on the X4004 printhead? 6 A. I worked with the device designer, who was an 7 electrical engineer, and we just discussed the various 8 options. And his recommendation was a photo -- a 9 thermal diode, I believe, and I agreed with that 10 recommendation, and that's what was used in the device. 11 So it was more of a -- 12 Q. In your -- 13 A. The materials scientists that would know how 14 to make a thermal diode would be at the silicon 15 fabrication company. 16 Q. During the commercialization stage before 17 the -- 18 A. Correct. 19 Q. -- internalized at Xerox in the prototyping 20 phase. 21 A. I didn't. No. 22 Q. So you were -- you had participated in 23 discussions about, you know, a temperature management 24 approach that would heat the heat sink used in a Xerox 25 edge shooter printhead by means of a heater located in

57 1 what I'm assuming is the printer's printhead carrier. 2 MR. BORSOS: Objection to form. 3 A. No. I don't think any of that was -- I'm 4 sorry. There's some confusion there. 5 There was no heater on the heat sink. The 6 heat was generated by the drop ejection process. The 7 heat sink was simply a pathway for the heat to escape 8 the silicon die and then to be dissipated. There was no 9 heater -- 10 Q. Sorry for assuming things. 11 A. Yeah. Other than -- 12 Q. Okay. Yeah. I'll rephrase my question. 13 A. -- other than a drop -- yeah. 14 Q. I'll rephrase my question. 15 So you participated in discussions of a 16 temperature management approach that would heat the 17 heat sink used in a Xerox edge shooter printhead. 18 MR. BORSOS: Objection to form. 19 A. I participated in discussions that would make 20 the design decisions around how the heat sink 21 participated along with the silicon die in order to 22 create the operating environment for the printhead that 23 was acceptable for inkjet printing, some of which -- 24 which consisted of heat going into the heat sink from 25 the silicon die and dissipating out to the environment.	59 1 Q. And that -- would that also apply to the 2 positioning of, like, temperature sensors? 3 A. I believe we did collaborate in that 4 discussion on the position of temperature sensors as 5 well as the position of the temperature sensor bond 6 pads. 7 Q. And, again, it's that you would identify, 8 you know, features or issues with the current design, 9 and then there would be a troubleshooting phase where 10 changes were then identified that would need to be -- 11 the sensors would need to be repositioned to accommodate 12 the features that you were working on. 13 MR. BORSOS: Objection to form. 14 A. If necessary. I don't recall that particular 15 need to change. 16 Q. But do you recall ever personally being 17 responsible for redesigning the layout or for 18 repositioning a sensor personally? Or was that 19 something that was delegated to others on the team? 20 A. The layout of the silicon die was the 21 responsibility of someone else on the team. There was 22 an electrical engineer whose job was CMOS/NMOS design 23 and MEMS layout. I participated in -- such that -- 24 you know, we developed all the fixturing and evaluation 25 hardware and test protocols to put the printhead at
58 1 Q. And I'm just trying to get more specific when 2 we're talking about, like, decisions. So did you decide 3 on the layout of the inkjet silicon device itself? 4 A. I participated in trade-off decisions with 5 the person who was responsible to do the layout of the 6 silicon device in terms of the size of the device, the 7 openings provided for ink connection, how much surface 8 area was needed in order to make a reliable ink seal, 9 the bond pads and the spacing of the bond pads and how 10 they matched up with the circuitry on the printhead 11 circuit board. You know, we had to collaborate between 12 the interface -- all the interface points between the 13 silicon die and the rest of the printhead. 14 Q. Understood. I think -- I like the word -- I 15 mean, it was a more accurate way of saying the 16 trade-off. 17 So what I'm asking is: You contributed in 18 that you provided changes that needed to occur to 19 accommodate features that you were responsible for, and 20 then that person who was in charge of the layout design 21 of the inkjet device would then implement those layout 22 design changes that you -- that was discussed during -- 23 collaboratively as a meeting. 24 A. Yes. Correct. 25 MR. BORSOS: Objection to form.	60 1 various stages of its development maturity through 2 rigors of testing and different duty cycles and 3 different document stress and speeds and producing 4 graphs of the temperature of the silicon die and the 5 heat sink and surrounding environment in order to 6 characterize the system was performing to 7 requirements -- 8 Q. So if -- so if, for example, there was a need 9 to modify the drop-firing pulse energies to manage the 10 printhead temperature, you might have participated in 11 identifying the reason for the need to modify it, but 12 you would not personally have implemented or modified 13 the pulse energies yourself. 14 MR. BORSOS: Objection to form. 15 A. Yeah. I think that's accurate. 16 Q. So is it accurate to say that you have not 17 personally designed a thermal inkjet device that had an 18 on-chip thermal sensor but you've participated in 19 discussions about potential redesigns of that device? 20 MR. BORSOS: Objection to form. 21 A. I participated in the design and any 22 potential redesign. I didn't actually put the lines on 23 the computer screen that produced the design. Right? 24 But I participated as much as any collaborative 25 engineering team does around making design trade-offs

61 1 and decisions. 2 Q. And you mentioned earlier that you don't 3 recall contributing or participating in the -- in any 4 decisions around, you know, where to place thermal 5 sensors on the device. 6 MR. BORSOS: Objection to form. 7 A. I don't recall the specific discussion. I'm 8 quite sure that I was involved in those decisions and 9 then asked to evaluate whether or not they were 10 performing properly to meet the requirements. 11 Q. Do you recall where the temperature sense -- 12 temperature sensors were located in the X4004? 13 A. I'm not a hundred percent sure, but I 14 think -- I recall that they were quite close to the edge 15 of the die in the back -- in the backside along the bond 16 pads. 17 Q. So they're on the silicon. 18 A. They're on the silicon. The temperature 19 sensor was a thermal diode in the silicon. 20 Q. And how was the firing pulse energy modified? 21 A. I didn't say the firing pulse -- I don't know 22 what you're talking about. What's the question? 23 Q. Did you fire energy pulses to maintain the 24 temperature of the silicon? 25 MR. BORSOS: Objection to form.	63 1 A. There was not vias on that printhead. There 2 was a separate channel plate that came in the top. It 3 was not in the silicon -- the device was in -- was a 4 separate piece of silicon. The temperature sensor was 5 located in the -- on the silicon chip in the location of 6 the bond pads, close to the bond pads on that back end 7 of the die. 8 Q. Was there the -- did that device have the 9 capability to widen firing pulses? 10 MR. BORSOS: Objection to form. 11 A. I don't recall. I don't recall if -- I'm 12 pretty sure that it did, but I don't -- I'm not a 13 hundred percent sure. 14 Q. Who was responsible for the firing pulse 15 power modification features of the X4004 printhead on 16 the team? 17 A. So we had some engineers on the 18 commercialization team. Mr. Donahue was one engineer on 19 the commercialization team. And then we had physicists 20 in the research team. Dr. Marcum (phonetic) was one 21 that I recall. There were others. There was hundreds 22 of people on this program. 23 Q. Who on the team would be responsible for 24 monitoring or tracking how heat would be conducted in 25 various areas of the silicon device during the
62 1 A. No. We did not fire energy pulses to 2 maintain the temperature of the silicon. We fired 3 energy pulses to eject ink and produce prints, which, in 4 turn, generated some inefficiency -- right? -- and some 5 excess heat, which then had to be transferred away from 6 the silicon device and dissipated to the environment. 7 Q. How were the thermal sensors -- temperature 8 sensors sensing temperature? 9 MR. BORSOS: Objection to form. 10 A. A thermal diode is a standard component that 11 was in the tool kit from the silicon fab company that 12 you energize the thermal diode and then get a signal 13 out. And I believe that at the time we actually had an 14 A-to-D converter in the silicon, and so the output of 15 that diode was converted to a digital signal in the 16 silicon, and a digital response was received by the 17 printer. 18 Q. And this was monitored continuously? 19 A. I don't believe so. No. I think that it was 20 only monitored in the time of not printing. 21 Q. Do you recall where the sensors -- the 22 temperature sensors were located on the silicon? Like, 23 were they in between the vias? 24 A. There was not -- 25 MR. BORSOS: Objection to form.	64 1 commercialization phase of the project? 2 A. I was -- 3 MR. BORSOS: Objection to form. 4 A. I was responsible for characterizing the 5 thermal performance of the device and then -- 6 Q. And then -- 7 A. -- and then finding the limits for where that 8 result caused defects and then developing means to keep 9 the performance of the device below those limits. 10 Q. And you're talking about the temperature on 11 the silicon, correct? 12 A. Correct. 13 Q. And you would provide -- that tracked 14 information or the data that you collect, would you 15 apply that and decide where to place the sensor? Or 16 would you give that data to somebody else to help guide 17 the decision on where to place the sensor? 18 A. No. The -- 19 MR. BORSOS: Objection to form. 20 A. The data was created after the sensor was 21 already placed. This was a characterization of the 22 performance as a system. So it didn't influence us 23 changing a sensor location. 24 Q. Who decided to put the sensor in its original 25 location?

65 1 A. So -- 2 MR. BORSOS: Objection to form. 3 A. It was decided collaboratively, as I said 4 earlier, between me and the design team and the CMOS 5 designer who was doing the layout. 6 Q. So the CMOS designer that did the layout for 7 the printhead presented you with a layout that did not 8 have a sensor located on it? 9 MR. BORSOS: Objection to form. 10 A. No. I think that -- you know, we sat down 11 and we said "Okay. This device needs a sensor." He 12 would recommend that it would go in a certain location 13 and the bond pad would be in a certain location. We 14 talked over what trade-offs that we'd have to make in 15 terms of the board design and the function of the 16 device, and then he went ahead and made those decisions 17 final. 18 Q. Do you still have your CV in front of you, 19 Mr. Dietl? 20 A. Yes. 21 Q. Could you explain the circumstances around 22 your departure from Xerox and what you were working on 23 right before then and then where you worked after that? 24 A. Okay. So I was a technical program manager 25 working on the next generation inkjet technology beyond	67 1 people find jobs and sell off part of the business. 2 I mean, I want to just -- before -- I want to 3 dig into that a little bit more with why the business 4 kind of wound down. But just for purposes of making 5 sure I'm -- we're on the same page with the 6 terminology -- I don't mean to frustrate you with my use 7 of some terms rather than others, but I want to make 8 sure I understand what you mean by the term "platform." 9 You said "Caribbean and Aruba platform." 10 What part of the printer system are you referring to 11 when you say "platform"? 12 A. Okay. So in an engineering product design, 13 there's certain key components that you want to reuse in 14 as many products as possible. Right? They're the ones 15 that would require the most investment of time, money, 16 technology. Right? And -- 17 Q. Uh-huh. 18 A. And so things like the silicon die design and 19 the inks are kind of key, low-level platform elements 20 that you want to reuse as many times as possible, and in 21 getting those stabilized and getting a good design takes 22 the biggest investment. And so Caribbean was the lead 23 product that established the platform of this next 24 generation, which was different than the X4004 and the 25 XJ4C.
66 1 the XJ4C at higher resolution, larger chip, better 2 performance with still image, side shooter/edge shooter 3 type of device. 4 And as I was in Korea, the Caribbean project 5 was going on, and I was asked to lead the Aruba project 6 as a technical project manager, which is a non-line 7 responsibility. Right? I was like a chief engineer of 8 all the different functional groups that delivered 9 subcomponents for the Aruba product design. And Aruba 10 was an extension of the Caribbean platform but smaller, 11 lower cost. 12 And then we also, as part of that, 13 revolutionized the design of the maintenance station to 14 make it a tenth of the cost for the same function and 15 then worked -- I -- you know, a primary part of my 16 responsibility was to work with the Japanese printer 17 manufacturer to integrate that into the product. 18 And then -- so during that period, Xerox made 19 a decision to discontinue the chip business as a whole, 20 and I was asked to stay on for a while to help people 21 find jobs and move on to the next thing, to sell assets, 22 and to close down the business. It was quite an 23 experience. And then at -- I believe in November of 24 2001 I left Xerox. 25 Q. Well, that was admirable of you to help	68 1 Q. What kind of a system was it? 2 A. It was a thermal inkjet printer, an edge 3 shooter, but it was a longer die and higher resolution. 4 Q. And you mentioned that you -- part of your 5 responsibilities on this project was to -- I'll use the 6 word "participate." I know you like that word a lot. 7 You participated and helped develop the design that 8 allowed it to be printing at a higher resolution, 9 correct? 10 A. Not on the Caribbean platform, no. I was not 11 involved with that. I came in -- you know, I was 12 working on finishing up the XJ4C -- right? -- and 13 getting that into manufacturing; working with the 14 printer partner, because they were delayed; and getting 15 the printer done and then finalizing, you know, the 16 transition to mass production and the integration of 17 that at the same time while the Caribbean platform was 18 being developed. 19 And so when I came off of the XJ4C and came 20 back from Korea, I was asked to lead the follow-on to 21 the next generation of the platform, which would be a 22 lower cost version, and solving some key problems around 23 costs, primarily. But it used the same silicon chip. 24 Q. I see. So that's why you're referring to the 25 platform, because you're reusing the same chip, but

69 1 you're cutting -- you're shaving off features that 2 wouldn't affect the functionality. 3 A. Correct. 4 MR. BORSOS: Objection to form. 5 A. And it had met different requirements. 6 Right? There's different segments of the market. 7 There's higher end market requirements and -- but when 8 you want to sell products out of Walmart, you need to 9 have a price point that's \$49. Right? And so you might 10 have a smaller printhead, smaller ink supplies with a -- 11 you know, a lower cost printer mechanism. So Aruba was 12 that next generation to try -- 13 Q. Oh, I see. So by -- so I see what you're 14 saying. So -- 15 A. The broader -- you know, depending on your 16 price point -- 17 Q. And it's because the -- during the 18 manufacturing phase, is it correct that some ink supply 19 mechanisms might be considerably more expensive than 20 some more rudimentary ones, and so the cost of the 21 product would be significantly different even though 22 they use the same printhead as the other products? 23 A. That's correct. And then the amount of ink. 24 Right? Ink is expensive. And so they had smaller ink 25 supplies, and they had a redesigned maintenance station	71 1 Q. Did they increase the amount of heater arrays 2 that were next to the nozzles? 3 A. Correct. The number of nozzles and the 4 number of heater arrays increased from the XJ4C. 5 Q. And that was done -- that was done to 6 obviously increase the resolution by drop size. 7 MR. BORSOS: Objection to form. 8 A. It was done to increase the resolution, 9 decrease the drop size, and increase the productivity. 10 Q. Yep. 11 And what year was that -- did you take on 12 that Aruba role? 13 A. 1996 to 2001. 14 Q. So obviously, by 1996 it was known in the 15 industry that if you wanted to increase the resolution 16 and decrease the drop size, you just could add more 17 nozzles and heaters. 18 MR. BORSOS: Objection to form. 19 A. No. I mean, that's -- you make it sound so 20 simple. I mean, there's hundreds of trade-offs, lots of 21 ways to do it. Obviously it's known that to get a 22 higher quality image you want a smaller spot, but -- and 23 then when you have a smaller spot, you've got to put the 24 spots closer together. Therefore, that drives you 25 wanting to do a higher resolution or a smaller pitch.
70 1 that was a tenth of the cost of the maintenance station 2 that was in the Caribbean platform. 3 Q. So by the time you joined the Aruba team, the 4 platform had -- the printhead had already achieved its 5 higher resolution goals. Your job was to maintain that 6 resolution while finding ways of cutting -- of producing 7 it at a lower cost. 8 A. Correct. And there was some overlap there. 9 Right? It was started -- the Aruba was started before 10 the Caribbean was actually finalized. 11 Q. And you -- I know that you came on after the 12 project, but during your role, did you ever learn or do 13 you recall how that high resolution was achieved in the 14 Aruba? 15 MR. BORSOS: Objection to form. 16 A. In the Caribbean and Aruba platform, the -- 17 there were changes made to the internal microfluidics of 18 the printhead. We went away from some wet etching 19 techniques to form the channels and used more of a thick 20 film material and depended on thick film more. 21 You know, and so that helped get the higher resolution. 22 The die was also longer -- right? -- bigger. So it was 23 higher productivity, so not just -- that was a key part 24 of the Caribbean platform was to improve the 25 productivity.	72 1 But that doesn't come without trade-offs and -- 2 Q. And my question is about the principle versus 3 the application, which I think you're just 4 differentiating. So my question is whether the 5 principle was known, not whether or not someone knew how 6 to implement it in a specific device. 7 MR. BORSOS: Objection to form. 8 A. The principle was known, but it's not an 9 absolute principle. Right? Because -- 10 Q. Yes. 11 A. -- there's a point of diminishing returns 12 that you wouldn't want -- you would trade-off 13 productivity for image quality. You've -- 14 Q. Or space on the -- or space on the silicon, 15 right? 16 A. Right. There's a balance. 17 Q. Yep. 18 And is that the term -- when referring to 19 these kind of principles, like, is that the term you 20 prefer? Or do you have different, more accurate 21 terminology that you think is more -- better captures 22 that idea? 23 MR. BORSOS: Objection to form. 24 A. No. I don't really know what you're 25 referring to, but --

73 1 Q. So the concept of a physical principle like 2 increasing the heat around a nozzle for -- to eject ink 3 in smaller droplets, that concept was known in the 4 industry, but it wasn't an absolute concept. How would 5 you describe a principle like that? 6 MR. BORSOS: Objection to form. 7 A. So I don't know that the term "increasing the 8 ink around a nozzle -- heat around the nozzle" is an 9 appropriate statement. That's not something you would 10 do. You're optimizing the density, the heater resistor 11 and its resistance, its voltage and pulse duration in 12 order to achieve the correct drop jetting and also the 13 nozzle size, of course, which is a big factor in drop 14 size. 15 Q. When you say "factor," what do you mean by 16 that, the term "factor"? 17 A. It's a design choice. Right? You've got to 18 decide on the correct nozzle size for the drop mass that 19 you're trying to eject from the printhead to achieve the 20 spot size that you're trying to get on the page. 21 Q. And I guess what I'm asking for is how would 22 you -- that statement right there assumes that there's a 23 static relationship or a cause-and-effect relationship 24 between nozzle size, right? 25 MR. BORSOS: Objection to form.	75 1 operating window, an operating range that you want to 2 run your device in, and that's based somewhat 3 experientially and somewhat based on the realities of 4 the environment you're working in. 5 Q. And what is that relationship? Is it -- as 6 the heater arrays get hotter, what happens to the ink 7 drop size? 8 A. So the -- if you don't change anything else 9 around the jetting parameters, like the pulse length or 10 the -- there's a thing called pre-pulsing that can be 11 used. If you don't change those, then the drop size 12 will increase with temperature until the point where it 13 gets too large and can cause an air -- what's called an 14 air ingestion problem and which will result in a print 15 defect. 16 Q. And that's the case for everything, right? 17 If everything was -- for every application of the ink 18 printhead -- is if you -- if the heater array gets -- 19 continues to increase in temperature and everything else 20 stays the same, then the drop size will always increase. 21 MR. BORSOS: Objection to form. 22 A. Yeah. I hate to use absolutes like that, but 23 I think it's a good -- it's a good guiding principle. 24 Q. So -- okay. That's what I'm -- that would 25 be a -- one principle, for example, that you would
74 1 A. The nozzle size is one of the factors that 2 participates in drop mass. It's not the only factor. 3 It's one of the factors you consider. And it's a very 4 complex set of trade-offs that you have to make in 5 optimizing any chip for a head drop ejector and system. 6 Q. And those factors that were -- that are 7 considered, you know, when it comes to implementation or 8 commercialization, do you prefer, like -- those were -- 9 those same factors are considered during every 10 development project. There's -- 11 MR. BORSOS: Objection to form -- objection 12 to form. 13 A. It depends on the development project and 14 whether or not you're changing the key -- those parts of 15 the drop ejector to achieve your goal of that project. 16 Q. So would you agree that temperature is a 17 factor, the temperature of the board, like, how hot the 18 heater array -- is the temperature of the board a factor 19 in the resolution -- ink resolution or print resolution? 20 MR. BORSOS: Objection to form. 21 A. Temperature of the substrate surrounding the 22 heater arrays is an important factor in the drop jetting 23 performance. Right? And so whether or not that -- 24 whether it's one resolution versus another resolution, 25 that's always an important factor. There's an optimal	76 1 consider every time you want to develop and 2 commercialize a printhead. 3 MR. BORSOS: Objection to form. 4 A. You have to pay attention to the thermal 5 performance of the device. Yes. 6 Q. What was the principle around -- how would 7 you describe the principle around nozzle size? 8 A. The principle around nozzle size. So you 9 have to have a nozzle size that matches -- when you 10 generate a vapor bubble and you push ink towards that 11 nozzle, if it's a smaller nozzle, less ink will come out 12 and be retained in the printhead, and you'll have a 13 smaller droplet. If it's a bigger nozzle, you can have 14 a bigger droplet. 15 Q. And so a smaller nozzle would be high 16 resolution in that instance? 17 MR. BORSOS: Objection to form. 18 A. Not always. So "resolution" is an 19 interesting term. Resolution is typically a product 20 specification that relates to the pattern of droplets on 21 the page. Right? When you have a spec for a printer 22 and it says it's 600-by-600 dots per inch resolution, 23 that means on the paper there's a grid of 600 droplets 24 per edge vertically and 600 droplets per edge 25 horizontally. Right?

77 1 There's a particular drop size that you want 2 in that 600-by-600 grid such that they overlap just 3 enough to fill the raster. Right? You don't want lines 4 on the page between the droplets, but you don't want too 5 much ink down there so that it floods and puddles. And 6 so resolution on the page is very important in terms of 7 what drop mass you use. 8 But some people talk about resolution of the 9 printhead itself, its pitch. And you could have a 10 printhead with a lower resolution but have a smaller 11 droplet and then use multi passes and things like that 12 in order to get the same grid pattern on the page. 13 So it's a -- there's a complex set of factors 14 that go into, you know, what is the right drop size for 15 the product you're trying to design, for the 16 productivity you're trying to achieve, and its -- 17 Q. But if you want the drop size -- I'm sorry. 18 Go ahead. 19 A. I just said and the image quality you're 20 trying to achieve. 21 Q. But if one were seeking to minimize or 22 decrease the drop size, if everything else was constant, 23 they could achieve that by decreasing the nozzle size. 24 MR. BORSOS: Objection to form. 25 A. To some extent. You know, it's not your only	79 1 engineer and a subsystem team leader designing 2 printheads, ink cartridges, maintenance station 3 systems." The maintenance station systems is what I'm 4 asking, what that means, that term. 5 A. So a term -- I think I might have said 6 subsystem. And it's a term at Xerox that we use when we 7 refer to various parts of the overall printer design. 8 Right? You've got the main board, the printhead. The 9 maintenance station subsystem is one of those 10 subsystems. It has -- it becomes -- it's part of a 11 printer, and its job is to help maintain the nozzle 12 health of the printhead printing system. 13 And the -- it was done by Xerox as opposed to 14 being done by the printer manufacturer. The design was 15 retained by Xerox, because it's very much integral for 16 the overall performance of the inkjet jetting system, 17 and so we felt it's best to design the printhead and the 18 maintenance station in conjunction. Right? 19 Q. When you say "performance," are you referring 20 to the longevity of the product or -- of the printhead? 21 Or it would improve the functionality of it as well? 22 MR. BORSOS: Objection to form. 23 A. Primarily reliability and jetting robustness. 24 Right? 25 Q. I mean, so -- yeah. Do you mean that, like,
78 1 knob, and you've got to do that in conjunction with the 2 other factors. You don't want to overpower the heater 3 and just have a small nozzle. You want to do them 4 together. 5 Q. That's one of the -- that would be fair to 6 say that's one of the principles or factors you would 7 consider. 8 MR. BORSOS: Objection to form. 9 A. Yes. You want to optimize the drop ejector. 10 Q. And these were all things that the Xerox team 11 for the Caribbean would most likely have considered or 12 factored into when they were designing the layout of the 13 printhead for the Aruba? 14 MR. BORSOS: Objection to form. 15 A. Yes. 16 Q. You also used the term -- and I'm just 17 dead set on understanding this correctly -- the term -- 18 I'll just get the exact word. 19 Maintenance functions. What maintenance 20 functions -- what do you mean with that term? 21 MR. BORSOS: Objection to form. 22 A. So when the printhead returns -- 23 Q. I apologize. I want to strike that question. 24 I was looking at the wrong part of the transcript. 25 You used the term "I was a product design	80 1 if someone used the printhead -- a printer cartridge and 2 then they only -- it fell apart in a month or two, they 3 would be less likely to keep buying printheads from 4 Xerox? 5 A. That's for sure. 6 Q. So you said printer platform and maintenance 7 station. Those are all -- those are subsystems that 8 were the cost-cutting focus of your role as the lead 9 engineer -- project manager for the Aruba and Caribbean. 10 A. Technical program manager. Yep. 11 MR. BORSOS: Objection to form, 12 mischaracterizes testimony. 13 Q. How would you differentiate between the 14 printhead and the maintenance station and the platform? 15 Why are the latter considered subsystems? 16 MR. BORSOS: Objection to form. 17 A. I mean, the printhead is a subsystem, but 18 it's designed in a platform approach. Right? The 19 platforming is an approach to how a company designs its 20 products so that they can get the most reuse out of the 21 engineering effort and dollars that you spend on 22 commercializing a product. You want it to have legs. 23 So platforming is used in order to make sure you pay 24 attention to that and optimize -- you know, you have a 25 vision of where it's got to go, and you design it to

81 1 have that future in mind and to reuses and 2 extensibility. So that's what platforming is. It's an 3 approach. 4 A subsystem is an item of the printer design 5 that you deliver. Right? It's a completed part of the 6 product. So a printhead -- a completed printhead is a 7 subsystem. The ink supply could be a subsystem. And 8 the maintenance station is a subsystem. 9 Q. Right. I guess I'm trying to differentiate 10 between what you consider to be the leading reason why 11 something is selected to be a -- you know, the 12 platforming approach versus -- why wasn't the printhead 13 versus the maintenance station? 14 MR. BORSOS: Objection to form. 15 A. There's probably a college course on this. I 16 mean, it's -- platforming has multiple levels. And the 17 lowest level, the items that require the biggest 18 investment, that have the biggest impact on the 19 performance of the system, and that are also your kind 20 of key differentiating technologies for the company, 21 those are at the bottom of the pyramid of levels. 22 Right? 23 As you go up, there are other subsystems in 24 the product that are important but not as important, and 25 so they could change from product family to product	83 1 A. It was developed in the time frame between 2 1994 to 1997, '98. 3 Q. By Dr. Pond's team. 4 A. Well, Dr. Pond wasn't there at the time, so 5 it was not by Dr. Pond's team. 6 Q. Was it based on the thermal inkjet printhead 7 design that Dr. Pond developed as part of the working 8 research group? 9 MR. BORSOS: Objection to form. 10 A. Not -- a lot of those same people -- 11 right? -- were there that were involved when Dr. Pond 12 was there, but it wasn't based on that original 13 platform. It changed considerably over time to respond 14 to market forces and product requirements. 15 Q. But at some point it stopped changing and it 16 became the -- adopted a platform approach to the 17 printhead for the Caribbean and Aruba? 18 MR. BORSOS: Objection to form. 19 A. Eventually you have to settle down on the 20 design and commercialize and get the product out. 21 Q. So as the project manager, you did not make 22 any design changes to the printhead die. 23 MR. BORSOS: Objection to form, 24 mischaracterizes testimony, asked and answered. 25 A. So for one thing, it was technical program
82 1 family, let's just say. 2 And then the next level up are -- off of a 3 product family, you might have multiple products with 4 just features -- slight feature changes. And so you can 5 do multiple products that might have slightly different 6 speed or a color scheme in the covers or -- you know, 7 there's all kinds of things that people might want to do 8 to get multiple products over the time. 9 So platforming has multiple levels. The key 10 at the bottom of the level is the most important aspects 11 of the product design. 12 Q. So out of the printhead, the maintenance 13 station, and the platform -- the printer platform 14 subassemblies that you were referencing earlier, for the 15 Aruba and the Caribbean, the printhead, then, was the 16 most important or competitive technology for Xerox. 17 MR. BORSOS: Objection to form. 18 A. Yeah, I'm not sure I would say that it was 19 the most important competitive -- it's a key -- it's a 20 key contributor to the performance of the product at 21 Xerox. And it's not the printhead necessarily. It's 22 the -- you know, the silicon die. 23 Q. And that silicon die was which -- when was it 24 developed that was used in the Aruba -- 25 MR. BORSOS: Objection -- objection to form.	84 1 manager, not project manager. 2 And I don't recall. There might have been 3 some fine tuning changes to the printhead die, but there 4 might not have been. I don't recall -- between 5 Caribbean and Aruba. But for the most part, the size 6 was the same. Right? And the nozzle spacing was the 7 same. Fundamentally, it was very close. 8 Q. I guess to describe it inversely, as the 9 technical program manager for both the Caribbean and 10 Aruba platforms, your responsibility was on changing the 11 maintenance station and other non-printhead subsystems 12 for the Xerox Caribbean and Aruba products. 13 A. For -- 14 MR. BORSOS: Objection to form. 15 A. So for the Aruba follow-on product to 16 Caribbean, we used the same -- if not exactly the same, 17 very close to the same -- silicon die as was used in 18 Caribbean. And the ink supply was redesigned and costs 19 reduced, and the maintenance station was redesigned and 20 costs reduced. 21 Q. And then why did Xerox decide to wind down 22 its chip business? 23 MR. BORSOS: Objection to form. 24 A. The inkjet business was not a chip -- not a 25 chip business. So interesting term. That's --

85 1 Q. Oh. I thought you meant the heater chip -- I 2 think your testimony in the record says chip. But 3 anyways, you meant the inkjet? 4 A. I said inkjet. 5 Q. Okay. 6 A. I didn't say chip. The ink chip business was 7 shut down at Xerox. 8 I mean, it's high-level, big decisions that 9 were made between, you know, looking at the investment, 10 the marketing investment. You know, Xerox is a 11 business-to-business company. Right? If you look at 12 how Xerox operates, they usually have a direct sales 13 force. They go out and visit customers. They sell them 14 big printers. They weren't a retail company. 15 And with this inkjet business, you're trying 16 to become a retail company. The investment to enter 17 that market is large -- right? -- particularly from a 18 marketing and name brand recognition -- you don't in 19 Staples looking for Xerox printers. Right? You go in 20 there, and that's not a brand you see. And so they were 21 trying to get themselves established as one of those 22 brands that you see when you walk into Staples. 23 So that investment was large. The start-up 24 costs were high. The business was losing money. They 25 tried to make some big deals with some companies to keep	87 1 Q. So when you were tasked with winding down 2 the team, it was just focused on the work around the 3 thermal inkjet printheads, not any other type of 4 technology. 5 MR. BORSOS: Objection to form. 6 A. That's correct. 7 Q. So presumably, when you were part of the 8 advanced development team, Xerox -- its experimentations 9 in those other inkjet printer systems were still ongoing 10 and hadn't been wound down by the time -- by this time 11 in 2001. 12 MR. BORSOS: Objection to form. 13 A. I don't understand the question. 14 Q. I'll move on. 15 MR. BORSOS: Is this a good time to take a 16 break? 17 MR. FORGHANY: Yes. Actually, yes. We can 18 go off the record -- well, actually, I have one more 19 question, if you don't mind, Mark. I can just move on 20 to the next topic after the break. 21 MR. BORSOS: No problem. 22 Q. Mr. Dietl, the group that was responsible for 23 those three thermal inkjet products, the AMPS, the 24 black-and-white printhead, the multi-color one that 25 eventually became the X4004, what was the name of that
86 1 it going and get some investment and some cash flow. 2 That didn't work. And so when that didn't work, the 3 business was shut down. 4 Q. It's only, like, the non-xerography, like, 5 part of the business, like, that you're referring to, 6 correct? They maintained their core business going 7 forward still? 8 A. Yep. Yeah. The core business -- 9 MR. BORSOS: Objection to form. 10 A. The core business was -- of xerography was 11 still maintained. Yeah. 12 Q. Were there any other parts of the business 13 besides the thermal inkjet printer systems that Xerox 14 had made an investment in and wound down? 15 MR. BORSOS: Objection to form. 16 A. Do you mean at that exact same time? 17 Q. No. Since then or before then. 18 A. I mean, companies go through investment in 19 areas and -- the investment in areas all the time. I'm 20 sure the answer is yes. 21 Q. I meant that you personally have experience 22 with -- I apologize -- that you personally have 23 experience with at Xerox. 24 MR. BORSOS: Objection to form. 25 A. No, not that I have experience with.	88 1 group? Did it have a formal name? 2 MR. BORSOS: Objection to form. 3 A. I'm sure it had -- I'm sure it did. I don't 4 recall what it was. 5 Q. Would you consider the members that were in 6 the group -- would those members have qualified, in your 7 opinion, as a person of ordinary skill in the art? 8 MR. BORSOS: Objection to form. 9 A. Not every member of the team would qualify as 10 that for these cases. 11 Q. After two years of working on the team, they 12 wouldn't -- they still wouldn't qualify? 13 MR. BORSOS: Objection to form, misstates 14 character -- mischaracterizes testimony. 15 A. So not necessarily. There's all different 16 roles in an engineering and manufacturing team that -- 17 you know, some have the right wherewithal and knowledge 18 of all the technology and others do not. 19 Q. Could you give an example about a position on 20 that team that after two years would still not qualify 21 as a skilled artisan? 22 MR. BORSOS: Objection to form. 23 A. In respect to these patents? 24 Q. Yes. 25 A. All right. So let's say a technician with an

89 1 associate's degree or even armed services experience 2 and -- a technician working on an engineering team under 3 an engineer who is responsible to put fixtures together 4 and run testing and generate data, that person isn't 5 involved in the day-to-day, bigger picture trade-offs 6 and understanding of the technology to a level to be a 7 person having an ordinary skill in the art. 8 Q. I guess I'm confused. You're saying there 9 were people on your team that weren't involved in the 10 project on a day-to-day basis? 11 A. They were. Their role was more focused in 12 the laboratory on minutia and details that didn't expose 13 them as much to bigger picture decision-making -- 14 right? -- and overall trade-offs. This is all -- 15 standard engineering teams is a mixture of diverse 16 talents and responsibilities, and they all together make 17 up a whole that works. 18 Q. So someone, in your opinion, needed to be 19 involved with the high-level decisions to be considered 20 a skilled artisan at the time? 21 MR. BORSOS: Objection to form, 22 mischaracterizes testimony. 23 A. I didn't understand the question. 24 Q. When you said someone on your team that 25 wasn't, quote, involved in the day-to-day, bigger	91 1 ordinary skill in the art is, by and large, agreed 2 between the parties and is clear from the declarations 3 of both experts. If you'd like to ask particular 4 questions about how that's spelled out, that's fine, but 5 I don't see the relevance to these questions. 6 Q. I'll ask it simply. 7 How -- when you were determining and opining 8 on the level of skill in the art, Mr. Dietl, did you -- 9 how did you relate it, if any, to the patent claims? 10 A. So I relate it to having experience in those 11 particular trade-offs in those areas of the design 12 around the selection of ink vias, heaters on both sides 13 of a via, multiple vias on a chip, and the thermal 14 performance that occurs between those vias, having that 15 experience to know what those trade-offs are and what 16 effect it has on the performance of the system. 17 Q. Right. So the example that you gave earlier 18 about -- wouldn't necessarily then apply, correct? 19 A. On the fluid-- 20 MR. BORSOS: Objection to form. 21 Q. I'm sorry? 22 A. The answer on whether or not -- the fluid 23 seal material would not apply. 24 Q. And the decisions about, you know, where and 25 how many vias and the placement of the sensors and the
90 1 picture trade-offs and understanding of technology, why 2 is that a requirement or a prerequisite to qualifying as 3 a person of ordinary skill in the art, in your opinion? 4 MR. BORSOS: Objection to form. 5 A. So I don't think that they would have the 6 experience and -- to be able to make the -- to 7 understand the trade-offs of the design and how it 8 influences all the technology elements in order to 9 make -- to be a skilled artisan. 10 Q. What -- can you give me an example of a 11 trade-off of a design that they may not appreciate? 12 A. So an example would be the decision to -- on 13 what ink seal material you use on the -- to seal to the 14 ink slots in the device and its processing parameters 15 around that to be reliable and have a lifetime. Some 16 people don't have enough exposure to the overall process 17 to be able to understand all those trade-offs. 18 Q. What does that have to do with the 19 temperature management system? 20 A. You didn't ask me about the temperature 21 management system. 22 Q. The level of skill in the art is tied to the 23 patent -- the claimed invention of the patents, correct? 24 A. Okay. 25 MR. BORSOS: Objection to form. The level of	92 1 nozzle size, those were all principles that one would 2 learn on the job? 3 MR. BORSOS: Objection to form. 4 A. I think for the most part that that is true 5 in terms of inkjet in particular, since it's a 6 technology that kind of evolved and grew over time 7 organically in a lot of these companies. So there's a 8 lot of experiential knowledge, probably not college 9 courses that you would take on inkjet product design. 10 I -- 11 Q. Presumably -- presumably someone -- I think 12 the example you gave was someone that was tracking data 13 or testing and collecting information. If someone is 14 collecting information on the nozzle dies, they 15 presumably know how that affects -- that it has some 16 correlation or -- to drop -- ink drop size, correct? 17 A. Not necessarily, no. I mean, a technician in 18 the laboratory -- an engineer writes a test plan, asks 19 them to test it in this way, to collect this amount of 20 data, this type of data, these parameters, report it 21 this way. Then the engineer takes that information and 22 understands how that relates to the performance of the 23 system and whether or not trade-offs have to be made. 24 Q. Right. So then how would they know whether 25 trade-offs need to be made if they don't realize that

93 1 nozzle size affects drop size? 2 MR. BORSOS: Objection to form. 3 A. I don't think that that's part of what we 4 said that was required in a person having ordinary skill 5 in the art for these thermal patents was. I think in 6 general they understand nozzle size affects drop size, 7 but not -- that's not what these patents are about. 8 Q. Right. I'm more talking about the -- the 9 engineer that you're referring to that were on your team 10 that were collecting data, is it your opinion that those 11 engineers, despite that engineering degree, would not 12 understand that the increase in the temperature of the 13 heater array would affect the drop size of the ink 14 that's ejected out of the nozzle? 15 MR. BORSOS: Objection to form, 16 mischaracterization of testimony. 17 I'm just going to jump in and try to cut to 18 the chase here. We can have the question read back if 19 necessary, but I believe the testimony was clear that 20 the engineers would work with non-engineers that would 21 handle data, and I think that your questioning is 22 conflating the two. 23 A. And that was what I was going to say is I 24 didn't say engineers. I said technicians, associate 25 degree --	95 1 (Off the record: 12:10 p.m. to 1:23 p.m.) 2 THE REPORTER: We're back on the record, 3 then. 4 Q. Mr. Dietl, before the break, we were 5 discussing your opinions surrounding a person of 6 ordinary skill in the art. Could you explain how you 7 arrived at the skill level that you propose in your 8 declaration? 9 A. I essentially agreed with Dr. Pond's 10 assessment of it and, you know, made the subtraction 11 of -- the alteration of materials scientist but started 12 from there and agreed with his proposal. 13 Q. And to what extent did you rely on your 14 personal experiences to render that opinion? 15 MR. BORSOS: Objection to form. 16 A. It sounds very reasonable. It was all based 17 on my personal experience. Right? 18 Q. And so that would include your experiences at 19 Xerox? 20 A. At Xerox and Kodak, yes. 21 Q. And so if we could please turn to page -- or 22 actually what has been marked as Exhibit 3, the 23 '708 patent. Let me know when you have access to it. 24 A. Okay. Did you say page 3? 25 Q. Is it marked as Exhibit 3. Please take a
94 1 MR. BORSOS: If you'd like to rephrase your 2 question with that in mind, I think you'll get a clearer 3 response. 4 Q. I'm just looking quickly through the 5 transcript. 6 Okay. So you're saying that a technician -- 7 that your team had technicians on there that did not 8 have engineering degrees and that those technicians 9 would then not -- your statements about what these 10 technicians may or may not have understood were limited 11 just to the technician, not to engineers on your team. 12 A. That was my response. Yes. 13 MR. BORSOS: Objection to form. 14 Q. Understood. So that does clarify things. So 15 I'll rephrase my question -- my original question. 16 Of the members on -- at your Xerox team that 17 were working on the thermal inkjet printhead product, of 18 those whom were engineers, would you have considered 19 those engineers to be a person of ordinary skill in the 20 art as long as they had two years of experience working 21 on the team? 22 A. Yes. 23 Q. Thank you. 24 MR. FORGHANY: I'd like to take a break now. 25 THE REPORTER: Okay. We're off the record.	96 1 moment to review it, and let me know if it's -- 2 A. Okay. 3 Q. -- once you're done. 4 (Exhibit Number 3 introduced.) 5 A. Yes. I'm familiar with this patent. 6 Q. And on the third page, Column 1 of the 7 patent, under the background of the invention, it 8 discusses, you know -- there's a discussion there 9 surrounding what's being called a traditional heater 10 chip there on Column 1, line 26. Do you see that term 11 there? 12 MR. BORSOS: Objection to form. 13 A. Yes. "In particular, as shown in Figure 1, a 14 traditional heater chip." 15 Q. Yes. 16 What is your understanding of the traditional 17 heater chip as it's being used or referred to in that 18 sentence? 19 A. So in this sentence, he's referring to a 20 multi-color semiconductor printhead, I believe, that has 21 three vias for three colors, cyan, magenta, and yellow. 22 Q. And what makes that traditional? What makes 23 the heater chip traditional? 24 A. I think -- 25 MR. BORSOS: Objection to form.

97 1 A. I think it's probably, you know, similar to 2 other products that they were, at Lexmark, designing at 3 the time. Right? That was a traditional, typical 4 design they were using at the time. 5 Q. The fact that there was three ink vias? Or 6 the fact that they were assigned next to -- or had a 7 corresponding heater array to one side of them? What 8 part of it makes it traditional? 9 MR. BORSOS: Objection to form. 10 A. You know, I think that, you know, the fact 11 that there were three colors with three ink vias. I'm 12 not sure what makes it traditional in terms of whether 13 or not the heaters only on one side is traditional and 14 on two sides is less traditional at this particular 15 time. 16 Q. In your experience, in the 2000- -- 2005 17 timeline, what was more traditional? What arrangement? 18 A. I think the market had both. There was not 19 one more traditional than the other. They had nozzles 20 on one side of the via and nozzles on two sides of the 21 via during that time frame. 22 Q. And this part of the '708 patent, the 23 sentence that we're referring to on line 26, Column 1, 24 it's referring to Figure 1, which is described as a 25 prior art system, correct?	99 1 Q. Right. And so what other structures would 2 there be needed in order for it to operate -- in order 3 for a heater array to operate with an ink via or vice 4 versa? 5 MR. BORSOS: Objection to form. 6 A. So I -- many times what there is, is adjacent 7 to the via, there's a section between the semiconductor 8 substrate and the nozzle plate in the partition material 9 layer that's left open for a period of space until you 10 reach -- and that connects that into the channels that 11 are formed with the partition material. And inside the 12 channel or -- and then the -- inside the channel is the 13 firing chamber -- right? -- where the heater resides and 14 ejects ink out the nozzle. So that -- there's that 15 shelf, many times, adjacent to the via that provides ink 16 down along that whole length of channels. 17 Q. And that's consistent with what you expect a 18 traditional via chip to have, those components? 19 A. Yes. 20 Q. And is that for a roof shooter or a side 21 shooter? Does it matter at all? 22 A. Yes. It definitely matters. This is -- 23 Q. How so? 24 A. Yeah. This is a roof shooter. A side 25 shooter, the ink is -- there's no via as there is in a
98 1 A. Correct. 2 Q. And your opinion is that traditional could 3 just be referring to what was more traditional at 4 Lexmark, maybe not so much the industry. 5 A. I think it was both. 6 Q. And what was your understanding of this 7 diagram show in Figure 1? Is it -- when it says that it 8 may include three ink vias and that those ink vias each, 9 quote, operate with a heater array, what is it referring 10 to there? 11 MR. BORSOS: Objection to form. 12 A. So you're to the next sentence? The cyan ink 13 via operates with the cyan heater array. The magenta 14 ink via operates with the magenta heater array. And the 15 yellow ink via operates with the yellow heater array. 16 Q. Yes. How is -- what does the term "operate" 17 mean there? What's physically happening? 18 A. So what a via does, its function is to 19 basically provide a supply of ink to the heater array in 20 combination with other structures in the inkjet 21 printhead. 22 Q. And -- sorry. 23 MR. FORGHANY: Madame -- could you repeat 24 back the last statement from the witness. 25 (The record was read as requested.)	100 1 roof shooter, the via which comes through the 2 semiconductor substrate and feeds into the channels in 3 the roof shooter. There's a top plate that's a separate 4 piece of silicon that gets attached to provide an ink 5 manifold to the device in a side shooter. 6 Q. And the roof shooter design, there's the 7 resistor that's, you know, going to be fixed to the 8 silicon substrate, and that essentially forms the ink 9 droplets by being positioned within a chamber, heating 10 up the ink through -- that's being fed in through an ink 11 feed slot, correct? 12 MR. BORSOS: Objection to form. 13 A. So it feeds -- it heats up the ink that 14 resides in the chamber, which fires the droplet, and 15 then the channel refills with capillary action and pulls 16 ink into the firing chamber from the -- yeah. 17 Q. And the '708 patent, that doesn't ever 18 describe the specific structures that are needed to -- 19 for the heater array to operate with the via. It 20 just -- correct? 21 MR. BORSOS: Objection to form. 22 A. Well, I mean, it describes the via is there 23 and it's positioned next -- it's positioned -- I'm not 24 sure it says exactly where it's positioned in this 25 section, but I'd have to read it more carefully to get

101 1 into what specifically it says about the via and its 2 design. 3 Q. So I'll represent to you that the words 4 "chamber," for example, don't appear, as others. You 5 can confirm that with a search. 6 My question is: Is that consistent with what 7 you'd expect a person of ordinary skill in the art to 8 already know would be the structure just from reading -- 9 from looking at the teaching that the ink via is 10 positioned next to a heater array? 11 MR. BORSOS: Objection to form. 12 A. I think that it's describing a traditional 13 roof shooter design where an array of heaters are 14 positioned adjacent an ink via. 15 Q. So just for accuracy, it's your opinion that 16 a person of ordinary skill in the art reading -- who 17 looks at the '708 patent's disclosure and teaching of 18 the use of the word "traditional heater chip" would 19 understand that that term refers to a roof shooter 20 design and includes the components that would be needed 21 and you described earlier for the heater array to 22 operate with the ink via. 23 MR. BORSOS: Objection to form. 24 A. Yes. I think a person having an ordinary 25 skill in the art would recognize the '708 patent as	103 1 a traditional heater chip design? Or what part of 2 Figure 1 makes me think it's a roof shooter? 3 Q. Why don't we start with the first question. 4 What part of it makes you think it's a traditional 5 heater chip design? 6 A. It's -- because that's what Barkley calls it, 7 a traditional heater chip design. 8 Q. Right. And -- 9 A. This is one embodiment that he's using as 10 exemplary to talk about the problem that he's trying to 11 solve. 12 Q. In Figure 1, the heater arrays are sharing a 13 border in the diagram with the ink vias, correct? 14 MR. BORSOS: Objection to form. 15 A. In the drawing, there's a line between the 16 ink via and the heater array. Yes. 17 Q. So it's -- the heater array is on -- sharing 18 a common border on -- is on the actual -- it's shown to 19 be on the side of -- one side of the ink via. 20 A. It's shown to be on one side of the ink via. 21 And it's not -- in my opinion, it's not intended to be 22 shown to scale or anything like that. It's just 23 intended to show a relative location. 24 Q. Right. And even though it's not drawn to 25 scale, the positioning of the Boxes 108, 110, and 112 in
102 1 describing a roof shooter design and would know about 2 the features that are associated with a roof shooter 3 design. 4 Q. And I guess what I'm saying is -- I'm asking 5 is the term "traditional heater chip" means something to 6 a person of ordinary skill in the art. It means that it 7 has those structures. 8 MR. BORSOS: Is that a question? 9 MR. FORGHANY: Yeah. That was a question. 10 MR. BORSOS: Objection to form. 11 A. Traditional -- 12 Q. So what I'm asking is whether or not the 13 term -- a person of ordinary skill in the art would 14 understand the term "traditional heater chip" to refer 15 to a system that has those components that you described 16 earlier. 17 MR. BORSOS: Objection to form. 18 A. I think that they definitely would in the 19 context of the rest of the patent and the diagrams in 20 the figures. 21 Q. Looking at Figure 1, for example, what part 22 of Figure 1 makes you believe that is a traditional 23 heater chip design? 24 MR. BORSOS: Objection to form. 25 A. So what part of Figure 1 makes me think it's	104 1 relation to the long rectangular shapes of the vias, 2 that was intentional, correct? 3 A. Yes. 4 MR. BORSOS: Objection to form. 5 A. Yes. He's intending to show that for -- 6 they're a pair. The via and the heater array are 7 together in this single heater array system. Each one 8 needs it. 9 Q. And -- 10 A. Each array needs -- it needs a supply of ink, 11 and so -- and he's intending to show in this case that 12 they're on one -- only one side of the ink via. 13 Q. And what is your understanding when they're 14 shown to share a border on one side? Does that show -- 15 even though it's not drawn to scale, what do you -- 16 what, if anything, do you understand that to convey? 17 MR. BORSOS: Objection to form. 18 A. I think that the yellow heater array is 19 associated with the yellow via, and the magenta heater 20 array is associated with the magenta ink via, and the 21 cyan heater array is associated with the cyan ink via. 22 I don't think there's anything more implied there. 23 Q. So if it was -- well, first, what do you mean 24 by the term "associated with"? 25 A. The ink for the yellow heater array is

105 1 supplied from the yellow ink via. 2 Q. So the yellow heater array is essentially, 3 you know, sitting above the chamber of the yellow ink 4 via. 5 A. Can you say that again? I'm not quite sure I 6 understood the question. 7 Q. Earlier we were talking about how the heater 8 arrays -- where they were positioned in relation to the 9 ink vias in a traditional heater chip, and we had -- and 10 you had described some of the components that were, 11 you know, commonly found in traditional heater chips for 12 the heater arrays to operate with the via, and one of 13 those components was the chamber. Do you recall that 14 conversation? 15 A. Yes. 16 Q. So when you say that the yellow heater array 17 is associated with the yellow ink via, are you 18 suggesting that it -- it's approximately located within 19 the chamber of the -- within that chamber that's 20 associated with the yellow ink via? 21 MR. BORSOS: Objection to form. 22 A. No. I don't think the -- the via and the 23 chamber are two different things. The ink is a -- the 24 via is a supplier of ink from the backside of the -- so 25 it can substrate to the topside of the silicon	107 1 correct? 2 A. You would expect a chamber, but -- 3 MR. BORSOS: Objection to form. 4 A. You would expect a chamber, but, you know, 5 you don't know where it is in position to this -- in 6 this via. It varies per product. 7 Q. The chamber would need to be located 8 proximately to the heater array, though, correct? 9 A. The heater resides in a chamber. Right? And 10 so it's -- the chamber itself is associated with the 11 heater. 12 Q. Right. And so then what is Figure 1 telling 13 you about the chamber? 14 A. I mean, Figure 1 is -- I assume that the 15 heater -- the heater array has a series of heaters and a 16 series of chambers. 17 Q. That's because the -- again, the term 18 "traditional heater chip" and the disclosure that 19 there's these ink via that's associated with and 20 operates with the heater array, correct? 21 MR. BORSOS: Objection to form. 22 A. That's because as a person having ordinary 23 skill in the art looking at a roof shooter design, 24 you know, that's how they're structured within a -- 25 you know, within a reasonable range of different
106 1 substrate, and then the ink flows along the topside of 2 the silicon substrate until it gets to the drop ejectors 3 and the heater array. 4 Q. The ink heat slot is part of the via, 5 correct? 6 MR. BORSOS: Objection to form. 7 A. It is a term that is sometimes used 8 synonymous in these patents. Right? Some patents it's 9 called ink feed slot, and in some patents it's called 10 via, and they refer to the same thing but different 11 terminology. 12 Q. So what is being graphically represented in 13 Figure 1 with the -- with Box 102, 104, and 106? What 14 components are within those boxes in a traditional 15 heater chip design? 16 MR. BORSOS: Objection to form. 17 A. It's a slot through the silicon. That's -- 18 Q. And is there a chamber within that -- 19 somewhere near that slot? 20 A. At some point away from it there's a firing 21 chamber, but it's not specified clearly in this figure, 22 you know, the details of -- between the ink via and the 23 chamber. 24 Q. But that's what you would expect in a 25 traditional heater chip design, to have that chamber,	108 1 architectures and configurations. 2 Q. And so what is your understanding for how -- 3 let me strike that. 4 If you look at Figure 2 next, what is your 5 understanding about how that figure operates in 6 comparison to the -- sorry. Let me rephrase that 7 question. 8 What is your understanding of Figure -- of 9 the arrangement shown in Figure 2? 10 A. So in the arrangement shown in Figure 2, the 11 inventor is illustrating that in a device that has three 12 ink vias with heater arrays associated with each ink 13 via, that the temperature sensor resistor can be 14 positioned adjacent each of those heater arrays in order 15 to measure the temperature that is of interest for the 16 operation of that heater array. 17 Q. And so the same diagram box -- like, 18 illustrations of a box, a rounded, elongated box 19 representing an ink via being positioned on the same 20 border as a heater array, you understand -- do you 21 understand that to have any -- let me start over. 22 What, if any, significance did you find in 23 the '708 patent's use of the same box diagram to show a 24 via and array in Figures 2 and 1? Was that intentional? 25 MR. BORSOS: Objection to form.

109 1 A. I don't -- can you repeat the question? 2 Q. So Figure 2 uses the same type of shape in 3 the diagram to illustrate or to symbolize an ink via, 4 right? 5 A. Yes. 6 Q. And it uses the same box shape to illustrate 7 or symbolize, you know, the heater array's relative 8 position with the via, correct? 9 A. Yes. 10 MR. BORSOS: Objection to form. 11 Q. As a person of ordinary skill in the art, 12 what impact, if any, did that have on you? 13 MR. BORSOS: Objection to form. 14 A. I don't -- does it have an effect on me. I 15 mean, I -- this is the similar device as in Figure 1 but 16 with a different approach for positioning a temperature 17 sensor, one for each heater array. 18 Q. And that is my -- is what I'm getting at here 19 is, you know, because of -- was the reason -- was 20 Barkley's decision to illustrate the via and heater 21 arrays in the same way in Figure 1 and 2 -- did that 22 inform your opinion about whether or not the system in 23 Figure 2 was also a traditional heater chip design? 24 MR. BORSOS: Objection to form. 25 Q. I'm sorry. Did you respond?	111 1 make that distinction. Right? Is there any 2 difference -- so he doesn't point out a difference. 3 Q. Right. What does that -- but does that 4 suggest one way or the other -- how does one of skill 5 know what's going to be -- what components are needed or 6 used in that to operate with the heater array? 7 A. I don't think -- 8 MR. BORSOS: Objection to form. 9 A. I don't think he's trying to show a 10 difference in how the vias operate and how ink is 11 supplied to the heater array. He's illustrating a 12 difference between how temperature sensors are routed in 13 an average of the entire die approach versus a 14 per heater array approach, per color approach. 15 That's -- 16 Q. And is it fair to say that by highlighting 17 that distinction he's trying to convey that everything 18 else stays the same? 19 MR. BORSOS: Objection to form. 20 A. I don't think it -- I don't think he says it 21 matters. Right? So... 22 Q. Earlier you mentioned how, you know, this 23 is -- heater array designs were particularly, you know, 24 often a cost-benefit analysis where, you know, adjusting 25 one feature or factor would affect another. Is it fair
110 1 A. I did not respond. No. 2 So I don't see anything in the specification 3 that says that Figure 2 is implying something different 4 than what's in Figure 1 in terms of the heater arrays -- 5 heater array design in respect to the vias. 6 Q. Did you interpret Figure 2 to be the 7 untraditional heater chip arrangement and Figure 1 to be 8 the more traditional one? 9 A. No. I just consider Figure 1 to be one 10 arrangement and Figure 2 to be an alternate arrangement 11 whereas the temperature of each heater array is measured 12 in Figure 2 separately. 13 Q. So both the heater chip arrangement in 14 Figures 1 and 2 were both known to one of skill in the 15 art. 16 A. I think they're both understood by one 17 skilled in the art. Yes. 18 Q. And does Barkley's use of the same 19 rectangular, you know, form of the ink via and a heater 20 array and their positioning -- position on the border of 21 the via -- does that suggest to you, as one of skill in 22 the art, that the ink vias shown in Figure 2 operate 23 with the heater arrays in the same way that the vias in 24 Figure 1 operate with the via arrays there? 25 A. I don't think he goes into enough detail to	112 1 to say that by emphasizing one distinction here being 2 the location and placement of a temperature sensor 3 resistor and not highlighting any other differences, 4 that one of ordinary skill in the art would understand 5 that the -- Barkley's use of the same illustrations and 6 location of heater arrays next to the vias was intended 7 to show that all other, you know, factors were going to 8 be maintained -- be the same? 9 MR. BORSOS: Objection to form. 10 A. I don't know what his intention was in terms 11 of whether or not he expected someone to think all other 12 features were the same between the position of the via 13 and the heater arrays. His intention was to show the 14 difference between different ways to position the 15 thermal sense resistor. 16 Q. I appreciate that distinction. I'm more 17 asking about your opinion about what a person of 18 ordinary skill in the art would take away from reading 19 this. I mean, they'd have to know that something -- 20 some structure is going to be there. And so what would 21 be the -- their -- what would they walk away with after 22 reading, you know, the '708 patent? 23 MR. BORSOS: Objection to form. 24 A. I think they would walk away saying it's not 25 really relevant to the idea that he's trying to

113 1 communicate and the problem that he's trying to describe 2 that he's trying to solve. And they wouldn't -- a 3 person having ordinary skill in the art wouldn't dwell 4 on whether or not there's differences between that. 5 They're both referred to as traditional heater chips. 6 Right? 7 Q. Right. And so -- 8 A. So... 9 Q. If in Figure 1 a traditional heater -- it 10 says a traditional heater chip has -- the heater array 11 is going to be on one side of the ink via and -- forming 12 nozzles from those chambers and that it would share one 13 side from it, changing that orientation or location in 14 Figure 2 would make a difference, correct? 15 MR. BORSOS: Objection to form. 16 A. In what way? 17 Q. So if the heater array was further apart from 18 the ink via or had a larger nozzle size -- resulted in a 19 larger nozzle size, that whatever orientation or 20 arrangement you -- it would ultimately affect what it 21 talks about as being -- providing ink drop sizes. 22 MR. BORSOS: Objection to form. 23 A. None of those details are shown in these 24 rudimentary figures. I don't have, you know -- nor 25 discussed. So I don't know -- I don't know how to	115 1 heater arrays on one side of an ink via versus 2 positioning heater arrays on both sides of an ink via 3 allows you to use interleaving to get higher resolution 4 and smaller drops. 5 Q. Understood. 6 Would you have interpreted Figure 2 7 differently if it had drawn the heater arrays as a 8 triangle and it kept them in a square in Figure 1? 9 MR. BORSOS: Objection to form. 10 A. I don't know what you mean by "a triangle." 11 Q. So in Figure 1, the heater arrays are drawn 12 in 20- -- in 10- -- they're shown as 108, 110, and 112. 13 They're drawn as long rectangles, correct? 14 A. Yes. 15 Q. And if, then, in Figure 2 they were drawn as 16 triangles that were not sharing a border with the ink 17 via, as a person of ordinary skill in the art, would 18 that tell you something or inform your opinion about 19 what's going on in Figure 2? 20 A. If they -- 21 MR. BORSOS: Objection to form. 22 A. If they used a different shape to outline the 23 resistor array in those two figures, one having ordinary 24 skill in the art would ask: Is the inventor trying to 25 show me that there's a difference between -- and look
114 1 answer that question. 2 Q. So on Figure -- on Column 1, line 40, it says 3 "The configurations providing ink drop sizes of less 4 than 4 picoliters while achievable -- achieving a 5 vertical resolution of about 1200 dpi, dots per inch, or 6 better. Therefore, it is desirable to position heater 7 arrays on both sides of the ink vias, which allow the 8 ink vias to provide smaller ink drops in order to 9 achieve higher printing resolutions." 10 A. Okay. That's true. When you go to smaller 11 drop sizes and you're trying to get higher resolution, 12 there's physical constraints around how tightly you can 13 put the nozzles together. So putting them on opposite 14 sides of the ink via allows you to use pitch doubling to 15 interleave those heaters and allow you to achieve higher 16 resolutions and use a smaller drop size. 17 Q. And that's -- 18 A. True statements. 19 Q. That's desirable -- it says it's desirable to 20 position heater arrays. So this is all -- so the 21 position of a heater array is an important factor into 22 determining the correct drop size, correct? 23 A. He's saying -- 24 MR. BORSOS: Objection to form. 25 A. What he's saying is that the position of	116 1 for that difference in the specification. What are they 2 describing? 3 Q. And so inversely, it's fair to assume, then, 4 if every -- if those shapes stayed the same, the 5 inventor is telling me that it's not important and there 6 isn't any meaningful differences. 7 MR. BORSOS: Objection to form. 8 A. I would agree that the inventor was saying 9 it's not important to the point that they're trying to 10 make in this patent. 11 Q. How does the -- Barkley refers to -- in 12 Column 1, line 38, he says, quote, traditional use of a 13 single heater array on a single side of an ink via 14 limits the achievable printing resolution, including the 15 vertical resolution. 16 How does positioning the heater array on one 17 side of the via limit the achievable printing 18 resolution, in your opinion? 19 MR. BORSOS: Asked and answered. 20 A. So the technology limitations of how closely 21 you can space heaters and chambers limits how -- what 22 resolution you can get in a column near array. Now -- 23 and so what they can do is -- you know, the technology 24 only supports so small a density -- or so high a density 25 of nozzles, but if you want higher resolution, then you

117 1 can put a whole equivalent number of drop ejectors on 2 the other side of the via and position them vertically 3 offset by one-half of the pitch between the heaters on 4 the other side, and that would give you a vertical 5 resolution twice that of what you have on a one side. 6 Q. And when Barkley uses the phrase "the 7 traditional use of single heater array on a single side 8 of an ink via," what is the -- what is -- traditionally, 9 how far apart are the heater arrays from the chamber? 10 MR. BORSOS: Objection -- 11 Q. Is there a range that they traditionally fall 12 into? 13 A. I'm not quite sure you're asking the question 14 correctly. Are you asking what was the -- what was the 15 typical pitch that was achievable in 2005? 16 Q. No. Let me just read it back. 17 So you mentioned that -- you mentioned the 18 distance between the chamber and the heater array in 19 your prior answer. You referenced that distance. 20 A. I -- 21 MR. BORSOS: Object based on a 22 mischaracterization of testimony. 23 You can go ahead and answer if you can, 24 Mr. Dietl. 25 A. What I referenced was the center-to-center --	119 1 did you reach that implication? 2 A. Because the person having ordinary skill in 3 the art understands that how you -- how you improve 4 vertical resolution of an inkjet device is by 5 positioning a heater array on the opposite side of the 6 ink via and offsetting the position of that array by 7 one-half of the pitch of the heaters on the other side 8 of the array. And that gives you twice the resolution. 9 So each side has half the resolution. 10 Q. One of ordinary skill in the art, how would 11 they know how far the offset needs to be in terms of 12 microns? Is it, like, a known number? 13 MR. BORSOS: Objection to form. 14 A. The center-to-center spacing at 60 -- at 15 600 dpi is approximately 43.3 microns between the 16 centers of heaters. And so that's the number you're 17 looking for. 18 Q. That's what -- you're saying one of ordinary 19 skill in the art would generally know that information. 20 A. Correct. 21 Q. And so by suggesting the staggering approach 22 and putting them on both sides of the vias, Barkley is 23 teaching that having the heater array on both sides 24 would essentially provide smaller ink droplets, which 25 translates to a higher resolution, correct?
118 1 what I was trying to say is the center-to-center 2 distance between heaters is limited by the barrier 3 material technology, the chamber material technology, 4 and how tightly you can position them. 5 Q. How tightly you can position... 6 A. Position heaters is limited by the design of 7 the heater, the chamber surrounding it, the minimum wall 8 thickness that you need between chambers, and the 9 manufacturing tolerances associated with putting this 10 device together. 11 Q. Right. And what I'm asking is: In the 12 traditional heater array -- in the traditional use of a 13 single heater array on a single side, what is typical in 14 the -- numerically in the range of constraints between 15 the heater array and the chamber walls? 16 MR. BORSOS: Objection to form. 17 A. I can only tell you what the '708 patent says 18 is that they're able to achieve a vertical resolution of 19 1200 dots per inch when they're on two sides of the -- 20 when they put a heater array on each side of the via. 21 And so that would -- that would imply that they can do 22 600 dpi on one side of the via. Right? So that would 23 be the limit of the technology that he considers 24 traditional at the time. 25 Q. How does -- why does that imply that? How	120 1 MR. BORSOS: Objection to form. 2 A. So that's what he's saying in that paragraph. 3 Right? That -- 4 Q. Yeah. 5 A. -- the configurations shown in Figure 1 and 6 Figure 2 may have difficulty -- significant difficulty 7 providing ink drop sizes of less than 4 picoliters while 8 achieving a vertical resolution of about 1200 dots per 9 inch or better. 10 Q. Right. And that was -- I mean, the principle 11 or factor of, you know, increasing -- making the drop 12 size smaller by increasing or -- you know, the 13 temperature or adding the heater arrays to make the ink 14 size smaller, that's the principle that one of ordinary 15 skill in the art would have known at the time, correct? 16 MR. BORSOS: Object to the form. 17 A. So, you know, the way it's phrased is not 18 what one having ordinary skill in the art would say -- 19 you're doing it to make the spot size -- to make the 20 drop size smaller, but the drop size smaller is a 21 consequence of achieving the 1200 dpi spacing. And 22 then, of course, once you get twice the resolution and 23 twice the nozzles, you can reduce the drop size to still 24 fill the raster. 25 Q. I see. Yeah. And I think we're saying the

121 1 same -- I'm not suggesting that one of ordinary skill in 2 the art would have known where to put the heater array. 3 I'm suggesting that they knew that positioning a heater 4 array near a via results in smaller drop sizes. 5 MR. BORSOS: Objection to form. 6 A. No. What results in smaller drop sizes is 7 the design used -- the heater you use, the heater size 8 used, the heater resistance, the nozzle size. The pulse 9 length determines the drop size, not whether -- you can 10 print with a small drop size with this configuration in 11 Figure 2. Okay? But you may have to -- you may have to 12 do multiple passes of the printhead across the page in 13 order to fill the raster. 14 Q. I'm just trying -- I understand what 15 you're -- how you interpret line 44 through 46 in 16 Column 1 of Barkley where it says "Therefore, it is 17 desirable to position heater arrays on both sides of the 18 ink vias" rather than one. 19 And then he says "Which will allow the ink 20 via to provide smaller ink drops in order to achieve 21 higher print resolution." 22 And I'm asking. How do you reconcile that 23 statement in Barkley? 24 MR. BORSOS: Asked and answered. 25 A. So I don't think it's the best use of the	123 1 shared ink via in most cases. I think there -- I don't 2 know if there were other cases where they did it in 3 other means, but the case I know about is they would do 4 it on -- put an array on each side of the ink via and 5 then use pitch doubling to have the net resolution be 6 1200 dpi. 7 Q. And then how would they compensate or provide 8 adequate thermal control, then, once the heater arrays 9 are positioned on both sides of the via? 10 MR. BORSOS: Objection to form. 11 A. It would depend upon their requirements and 12 the problems that they faced. I think -- I don't recall 13 any example that I know of whether or not they had a 14 temperature sensor positioned in between -- in the 15 regions in between the vias. I don't think they did. I 16 think that the case that I'm aware of used average die 17 temperature and managed image quality from that single 18 average temperature measurement. 19 Q. How would they take the average temperature 20 measurement of the die? 21 MR. BORSOS: Objection to form. 22 A. In a manner similar to Figure 1. 23 Q. A serpentine configuration? 24 A. Yes. 25 Q. What would be the purpose of measuring the
122 1 English language in the world in how he wrote that, but 2 what I interpret, being a person having ordinary skill 3 in the art, is that if he is limited to 600 dots per 4 inch and -- on one side of the array, that he can then 5 get the vertical pitch to 1200 dots per inch in 6 combination by putting heater arrays on both sides of 7 the via. And then, in turn, he can -- because he has 8 more jets to fill the raster, he can reduce the drop 9 size. 10 MR. BORSOS: Mr. Forghany, I'd just like to 11 make a suggestion that you ask a yes or no question 12 about whether reducing drop size necessarily increases 13 resolution. 14 MR. FORGHANY: No, I understand that point of 15 it. I'm just trying to get at another issue. 16 Q. So is it fair to say, then -- give me one 17 second. Let me just pull up the realtime. 18 At the time in 2005, are you aware of any 19 printing systems that were able to achieve a vertical 20 resolution of about 1200 dpi that were in the market? 21 MR. BORSOS: Objection to form. 22 A. I would say yes. I think there were. Yeah. 23 Q. And how did they achieve that resolution? 24 A. I think they achieved that resolution by 25 putting heater arrays on each -- one on each side of a	124 1 temperature of the average die in that instance if you 2 can't control -- or you can't regulate -- or the 3 temperature in specific regions of the board? 4 MR. BORSOS: Objection to form. 5 A. If -- it's very possible that for some 6 architectures and some configurations that -- because 7 the silicon is very conductive, that the average 8 temperature of the die is adequate to give you the 9 information you need to manage the firing parameters to 10 compensate for temperature. And so those 11 temperatures -- any temperature differences that might 12 be in those regions would not -- are not causing a 13 problem so that they're able to do it without concern of 14 that. 15 Q. So what would be the benefit of them 16 monitoring on a per region basis? 17 A. So in the -- 18 MR. BORSOS: Objection to form. 19 A. In this particular case, the inventors of the 20 '708 patent had identified a reason that in their 21 configuration it was consequential, and they had to -- 22 they had to put a temperature sense resistor in between 23 each set of two 8 vias to manage the temperature in that 24 region between the vias. 25 Q. Where does Barkley explain the reason why it

125 1 was consequential to do so and if so? 2 MR. BORSOS: Objection to form. 3 A. So Barkley says in Column 1, line 47, "For 4 proper functionality, inkjet heater chips need to 5 monitor and maintain the silicon substrate of the heater 6 chip at an acceptable temperature for printing. If the 7 temperature is too low, the ink drops formed will be 8 smaller and have a lower drop-weight than required for 9 good image quality. As the temperature rises, the 10 drop-weight of the drop will rise. Variations in 11 drop-weight will cause visible hue shifts in the printed 12 image." 13 Q. How does that relate to his specific system? 14 A. Then he goes on to say that "When a heater 15 array is positioned on both sides of an ink via, the 16 temperature sensing and regulating devices utilized in 17 the prior art do not provide adequate thermal control. 18 A serpentine temperature sense resistor, as depicted in 19 Figure 1, is not capable of discriminating between 20 individual colors of the heater array and does not 21 provide any feedback on temperature difference between 22 the various areas of the heater chip. Further, 23 monitoring and regulating the operating temperature on a 24 per color basis by situating a temperature sense 25 resistor on the same side of each respective ink via, as	127 1 a temperature? 2 A. Because not every -- 3 MR. BORSOS: Objection to form. 4 A. Because not every design has the same 5 constraints and has -- experiencing the same problems. 6 Or the heater arrays are not -- the drop ejectors are 7 not as sensitive to temperature in some as in others. 8 Or they have additional means for modulating the drop 9 size based on the average temperature. 10 So in this case, Barkley is saying that he 11 thinks it's a problem and he needs to solve his problem 12 and -- because that's what they're experiencing. That 13 doesn't mean that every design out there would have this 14 same problem. 15 Q. So the features that Barkley tells you are 16 not important, like how the heater array operates with 17 the via, are the same ones that he relies on to show 18 that in some applications they might be a problem? 19 MR. BORSOS: Objection to form, 20 mischaracterizes testimony. 21 A. I'm not sure I understand the question. 22 Q. How is one of skill in the art able to 23 understand the conditions that would cause errors in 24 providing fire pulses that would warrant or need the 25 arrangement that Barkley teaches in the '708 patent?
126 1 shown in Figure 2, is insufficient due to the fact that 2 heater arrays of more than one color now occupy the 3 silicon region between ink vias. Without accurate 4 temperature readings, the method of providing fire 5 pulses to regular thermal conditions on a per color 6 basis would also be subject to error." 7 Q. That just refers to the first arrangement, 8 generally, the serpentine, which you acknowledge was not 9 as accurate as the second arrange- -- as the, you know, 10 putting a sensor in the middle, but you could basically 11 get close enough. 12 MR. BORSOS: Objection to form, 13 mischaracterization of testimony. 14 A. The paragraph I read refers to both cases. 15 The serpentine and also the temperature sense resistor 16 on the same side of each respective ink via, as shown in 17 Figure 2, is insufficient due to the fact that heater 18 arrays of more than one color now occupy the silicon 19 region between ink vias. Without accurate temperature 20 readings, the method of providing fire pulses to 21 regulate thermal conditions on a per color basis would 22 be subject to error. 23 Q. My question is: How do you reconcile that 24 statement with your previous explanation of how the 25 serpentine can get you, you know, close enough value of	128 1 MR. BORSOS: Objection to form. 2 A. They would test and characterize their 3 devices and make a determination of whether or not it's 4 needed or not based on the functionality that they're 5 achieving. 6 Q. So another way -- one of ordinary skill in 7 the art would understand the fact that a heater array -- 8 "more than one heater array now automatically occupies a 9 region between ink vias" does not mean that it will 10 result in the system automatically becoming subject to 11 error. It'll depend on the specific system and the test 12 data of the -- a skilled artisan collects. 13 MR. BORSOS: Objection to form. 14 A. That's correct, in my opinion. 15 Q. Looking at Figure -- 16 MR. FORGHANY: I'm going to send something in 17 the chat. Let's just mark this as Exhibit 4. 18 (Exhibit Number 4 introduced.) 19 Q. Please feel free to quickly flip through it, 20 and you'll see pretty quickly what it -- and let me know 21 when you're done reviewing it. 22 A. It's not in my chat yet. 23 Okay. What am I seeing? A table of your 24 directory? 25 Q. No. It's the -- do you have Exhibit 4,

129 1 annotated PDF? 2 MR. FORGHANY: And, Michelle, the -- I just 3 pulled it up right now too. This has been marked as 4 Exhibit 4. 5 MR. BORSOS: There's an image that was 6 dropped in prior to Exhibit 4. I think it was on your 7 clipboard, so -- just to clear things up. 8 MR. FORGHANY: Oh. Thank you. 9 MR. BORSOS: There should be a Dietl 10 Exhibit 4 that appeared more recently than that. 11 MR. FORGHANY: That was the image I sent to 12 try to explain where the documents I uploaded were. 13 MR. BORSOS: Yeah. That appears twice in the 14 chat, so -- 15 MR. FORGHANY: I see. 16 MR. BORSOS: It was just dropped a minute ago 17 and then Exhibit 4. 18 A. Okay. 19 Q. And do you recognize Exhibit 4 just to be 20 colored and annotated, you know, versions of Figures 1 21 and 2 of the '708 patent? 22 I can represent that they are. It wasn't a 23 trick question. 24 A. Yeah. Yes. 25 Q. And so looking at Figure 1 on page 1 of the	131 1 heater array on the right side of the cyan ink via and 2 another magenta heater array on the right side of the 3 magenta ink via and another yellow heater array on the 4 right side of the yellow ink via. 5 Q. When you say on the right side of it, do you 6 mean, like, directly attached to it on the border? 7 A. So there's a -- 8 MR. BORSOS: Objection to form. 9 A. There's a cyan heater already on the left 10 side of the cyan via in Figure 1. Do you agree? 11 Q. Yeah. So why don't we look at the -- in 12 Exhibit 4 -- 13 MR. FORGHANY: If you could zoom out, 14 Michelle. 15 Q. In the box/column that's titled "Number 3," 16 you see that we have via 102 and then cyan ink via. And 17 then cyan heater array, that's 108. And then the 18 magenta heater array, 110. 19 Now, I guess what I'm asking is: Why is it 20 your opinion that a person of ordinary skill in the art 21 would not see this and interpret it as being one heater 22 array on each side on the left -- one on the left side 23 and one on the right side of the cyan ink via? 24 A. Because a person having ordinary skill in the 25 art would look at Figure 3 where Barkley shows exactly
130 1 Exhibit 4, you see here that we've -- the vias are all 2 highlighted there. And that's 102, 104, and 106. 3 MR. FORGHANY: I'm getting some feedback on 4 my end. 5 If you'd please go to the next page, 6 Michelle. 7 Q. So if you look at Figure 1 on the left there 8 for the cyan ink via. And Barkley says in Column 2 -- 9 Column 1, lines 40 through 47, it -- "The configurations 10 providing ink drop sizes of less than" -- 11 THE REPORTER: Can you slow down for the 12 court reporter, please. 13 MR. FORGHANY: I'm sorry. 14 Q. In Column 1, lines 40 through 47, Barkley 15 explains that, quote, the configurations shown in 16 Figures 1 and 2 may have significant difficulty 17 providing ink drop sizes in that resolution. Therefore, 18 it is desirable to position heater arrays on both sides 19 of the ink vias. 20 And my question is: Doesn't Figure 1 already 21 show a heater array positioned on both sides of at least 22 the ink via shown as 102? 23 MR. BORSOS: Objection to form. 24 A. No, not in what he's intending to say. He's 25 intending to say that the -- you'll have another cyan	132 1 what he's referring to. 2 Q. And the difference between Figures 1 and 3 3 would just be that the heater arrays -- that there's one 4 heater array literally bordering each side of the ink 5 via. 6 MR. BORSOS: Objection to form. 7 A. It shows that there's a cyan heater array on 8 the left side of the cyan ink via and a cyan heater 9 array on the right side of the ink via; a magenta heater 10 array on the left side of the magenta ink via, a magenta 11 heater array on the right side of the ink via; and a 12 yellow array on the -- and vice versa for -- 13 Q. Let me rephrase my question. 14 Are you suggesting that it's more important 15 that the phrase "cyan heater array" appear in the box? 16 Or that it's more important that the box be positioned 17 directly next to the ink via? 18 A. It's more important that they all have the 19 same color, because the ink is coming out of one via 20 supplying two heater arrays. 21 Q. Okay. In Figure 1, if what's being labeled 22 as "magenta heater array 110" -- I'm sorry. 110 -- if 23 that was labeled instead "cyan heater array," would that 24 then be an example -- would that then -- would one of 25 ordinary skill in the art understand that to then be a

133 1 disclosure of a heater array on each side of the cyan 2 ink via? 3 A. That is too speculative. You know, that 4 doesn't make any sense given what -- the configuration 5 that they've shown here and a person having ordinary 6 skill in the art's understanding of how ink vias work. 7 And so I don't -- 8 Q. So there's no significance in the fact that 9 there's some physical distance, a gap in white space 10 between the ink via and the heater array -- while 11 they're not drawn to scale, as a relative -- positioning 12 wise, is that distance significant to you at all as a 13 person of ordinary skill in the art? 14 A. Yeah. I -- 15 MR. BORSOS: Objection to form. 16 A. I'm not sure it's the distance. It's just 17 the -- it's not necessary when you have a Figure 3 that 18 shows you exactly what he's talking to. And so this 19 isn't something that would come into question. 20 Q. Well, it's informative -- would you agree 21 that it's informative in that the arrangement that's 22 shown in Figure 1, while a heater array is shown as -- 23 one on the left side and on the right side, it helps to 24 inform a person of ordinary skill's opinion about what 25 the term -- you know, an array disclosed on each side of	135 1 A. It's a schematic representation of the order 2 and position of these elements of this inkjet printhead 3 and... 4 Q. Is the magenta heater array 110 in 5 Figure 1 -- is that adjacent to the cyan ink via 102? 6 MR. BORSOS: Objection to form. 7 A. Can you repeat the question? 8 Q. Looking at Figure 1 of the '708 patent, is 9 the magenta heater array 110, in your opinion, disposed 10 adjacent a longitudinal side of cyan ink via 102? 11 A. No. 12 Q. Why not? 13 A. Because I know as a person having ordinary 14 skill in the art that you wouldn't associate a magenta 15 heater array adjacent to a cyan ink via because it's -- 16 that's the wrong color ink to feed through those 17 channels. You would position the magenta heater array 18 adjacent to the magenta ink via. 19 Q. And so because it's not sharing a border and 20 there's a gap of white space between the heater 21 array 110 and ink via 102 in the diagram, a person of 22 ordinary skill in the art would understand that it's not 23 disposed adjacent to, correct? 24 MR. BORSOS: Objection to form, and it 25 mischaracterizes testimony, asked and answered.
134 1 the ink via must mean? 2 MR. BORSOS: Objection to form. 3 A. I think it's pretty clear what he means, 4 because he demonstrates it in Figure 3. 5 Q. Okay. What does the term -- do you have an 6 opinion on the plain, ordinary meaning of the term 7 "disposed adjacent" to -- "disposed adjacent"? "A 8 heater array disposed adjacent each longitudinal side of 9 the ink via," what does that term mean to you? 10 MR. BORSOS: Objection to form. 11 A. That is the ordinary meaning of "adjacent." 12 It's next to. 13 Q. Not within. 14 A. Next to is, I think, the ordinary -- the 15 ordinary meaning. 16 Q. Is it immediately next to or near? 17 A. Functionally next to, I think. You know, 18 adjacent for its function. For the ink to get into that 19 heater array, it has to be adjacent to the point where 20 it's functionally next to the via. 21 Q. So what in Figure 2 -- Figure 3 informs you 22 that the magenta heater array 315 is functionally next 23 to the magenta ink via? What is illustrated there that 24 conveys that to you? 25 MR. BORSOS: Objection to form.	136 1 A. So I wouldn't -- you know, this isn't a real 2 case. This is a hypothetical. But I wouldn't consider 3 the magenta heater array adjacent to the cyan ink via 4 for the reasons that I've already said. It's a 5 different color ink. 6 Q. Right. But the patent claims require that a 7 heater array be disposed adjacent each longitudinal side 8 of the ink vias. That's what Claim 1 says. 9 And so my question is: Looking at Figure 1, 10 in your opinion, is the magenta heater array shown in 11 Figure 1 a heater array that's, quote, disposed adjacent 12 one longitudinal side of the cyan ink via? 13 MR. BORSOS: Objection to form, asked and 14 answered. 15 A. I'd say it's not, and I'd say that Figure 3 16 shows what is meant as the -- according -- which is 17 according to the embodiment of the present invention, 18 not the prior art. 19 Q. And the difference between Figure 1 and 20 Figure 3 with respect to that specific heater array is 21 that it's sharing a border with and directly next to the 22 ink via, correct? 23 A. That's correct. And then, you know, you have 24 to look at -- you can look at the overall pattern. 25 Right? I mean, this is a -- there's a pattern here

137 1 where the cyan heater array is on the left side of the 2 cyan ink via, and the cyan heater array is on the right 3 side of the ink via. Whether or not -- if there was a 4 little gap shown there between those two on both sides 5 and the same little gap shown between the magenta ink 6 via and the heater array on both sides -- as long as 7 that pattern was maintained, I mean, you would get this 8 idea that, you know, this is the arrangement that he's 9 describing. 10 Q. And I'm not suggesting that, you know, 11 they're drawn to scale. Like you pointed correctly out, 12 it's a schematic diagram. But I'm just confirming that 13 it's your opinion that a person of ordinary skill in the 14 art would understand that these spaces or the gaps 15 between them aren't -- are meant -- convey some 16 information in and of themselves to the skilled artisan. 17 A. Yes. They definitely convey some 18 information. You know, the cyan heater array is getting 19 its ink from the cyan ink via. 20 Q. And so I want to quickly turn to the next 21 diagram -- next page. 22 MR. FORGHANY: The next one. 23 One more. 24 Q. And so looking at Figure 2, again, we've 25 highlighted the vias here. If you go to page 6,	139 1 that's labeled "210" -- because of that distance, it 2 would not qualify or constitute a heater array disposed 3 adjacent each longitudinal side of the cyan ink via. 4 MR. BORSOS: Objection to form. 5 A. I would agree with that. Also, the same 6 comment I made in the previous one was that and they 7 have the benefit of Figure 3 to show what is meant by 8 adjacent -- 9 Q. Right. And that's -- what's meant by 10 adjacent would be what's shown as, you know, heater 11 array 208 and how that's sharing a border with ink via 12 202. That would be considered, in your opinion, a 13 heater array that's disposed adjacent a longitudinal 14 side of an ink via, 202. 15 A. I can't see these numbers. 16 MR. FORGHANY: Michelle, can you zoom in on 17 the figure that's all the way to the right. 18 Maybe just center it. 19 Q. Mr. Dietl, do you see the cyan ink via in the 20 image all the way to the right? It's labeled "202." 21 A. I do. 22 Q. So my question is: Would one of ordinary 23 skill in the art then know, similar to Figure 3, that 24 Figure 3's placement of heater array 208 directly next 25 to and sharing a border with ink via 202 shows that it
138 1 starting with the -- Cell Number 1. 2 Again, we have the two sides. And, again, 3 the gap between ink via 202 and heater array 210, that 4 physical space -- white gap there and the distance 5 between the two would convey to one of ordinary skill in 6 the art that the magenta heater array is not disposed 7 adjacent a longitudinal side of ink via 202, correct? 8 A. I'm trying to get to the same place you are 9 in this document. 10 Q. It's being shown on the Zoom if it's helpful 11 too. 12 A. Yeah. I'm not sure -- 13 Q. Oh, it's too small? 14 A. It's kind of small, but -- so it's -- okay. 15 Q. Would you like me to reask my question? 16 A. Okay. So you -- okay. Yes, please. So this 17 is Figure 2. 18 Q. Figure 2 but Cell Number 3. So on the cell 19 that's all the way to the right, you'll see that the 20 cyan and magenta heater arrays are both highlighted red. 21 And my question is: Would a person of 22 ordinary skill in the art understand from looking at 23 Figure 2 that the presence of a physical distance or a 24 gap in -- symbolized by that white space between the 25 cyan ink via and the magenta -- and the heater array	140 1 is a heater array that is disposed adjacent a 2 longitudinal side of ink via 202? 3 A. Yes. They would know that. But this isn't 4 the exemplary embodiment here. Right? This is the -- 5 Q. Yes. 6 A. -- prior art. Yeah. 7 Q. But they would -- a person of ordinary skill 8 in the art would reasonably rely on the disclosures in 9 the figures not for proportion purposes but just for 10 relative positioning purposes. 11 A. Yes. I think this is a -- is meant to show 12 relative positioning. 13 Q. What does the rectangular shape -- the long 14 rectangular shape of the ink via suggest to you? 15 MR. BORSOS: Objection to form, asked and 16 answered. 17 A. The ink via supplies ink to all the heaters 18 in an array. Right? And so what it means is it's -- in 19 this case, it's as long as the heater array so that the 20 ink can get to each firing chamber and to each heater. 21 Q. Ink vias are normally in -- are normally 22 symbolized or conveyed pictorially as, like -- as long 23 skinny rectangles, correct? That's -- they commonly are 24 used to -- they appear symbolically like that in 25 schematics and diagrams.

141 1 A. You know, not always. And sometimes, in some 2 inkjet printheads, they're actually segmented. Right? 3 And so there would be a series of shorter rectangles 4 that make up the long. In some cases they're shown as, 5 like, an oval, an oval shape. 6 Because during this period of time, some of 7 the products -- the ink vias were sandblasted through 8 the substrate, and it didn't create a real uniform 9 rectangular-like shape for an ink via. It was more 10 oblong or oval shaped. So -- 11 Q. Would you agree that the traditional shape 12 and more common shape out of the two would be the long 13 skinny rectangle? 14 A. There was -- 15 MR. BORSOS: Objection to form. 16 A. It was a mixture of both in the art. 17 Q. What do you mean by that? 18 A. Some of these patents -- 19 MR. BORSOS: Objection to form. 20 A. Some patents show it as an oval, and some 21 patents show it as a rectangle, and some patents show it 22 as segments. 23 MR. BORSOS: I'd just ask, if there's an 24 opportunity fairly soon, to take a break. I'd 25 appreciate it.	143 1 resistor on the same side of each ink via, as shown in 2 Figure 2, is insufficient due to the fact that the 3 heater arrays of more than one color now occupy the 4 region between ink vias." 5 So my question is -- 6 MR. FORGHANY: If you could scroll to the 7 next slide. 8 Yeah. Right there. Perfect. 9 Q. How would this temperature sensor -- for 10 example, if you were to add a cyan ink heater array 11 between the cyan ink via and the temperature sensor, how 12 does that temperature sensor now determine the 13 temperature on a per color basis if the region is 14 defined by two different color heater arrays? 15 MR. BORSOS: Objection to form. 16 A. So you have to go to my declaration where I 17 added an illustration of what he was talking about in 18 this section regarding adding another heater array as in 19 Figure 3 but then another temperature sensor adjacent to 20 that like you have here in Figure 2 on the magenta. 21 Then there would be two temperature sensors in between 22 the two vias. 23 And that is problematic in trying to measure 24 temperature per color, because the -- if the magenta 25 heater array is printing heavy color magenta and the
142 1 MR. FORGHANY: Yeah. Let me just finish this 2 line of questioning. 3 If you could please go to the next slide. 4 Zoom out. 5 Next slide, please. 6 Next slide. 7 Next slide. 8 Next one. 9 Right. 10 Q. So if you look at Figure 2, you mentioned 11 that... 12 MR. BORSOS: For the record, can we note that 13 this is page 11 of 14 of Exhibit 4. 14 MR. FORGHANY: Yes. Thank you so much. 15 Q. We're looking at Exhibit -- page 11 of 16 Exhibit 4. 17 And we were discussing the difference between 18 the temperature sense resistor in Figure 1 versus the 19 one in Figure 2 and the benefits that replicating -- or 20 adding another temperature sensor in the manner shown in 21 Figure 3 would add to the system. 22 And Barkley says in Column 2, as you pointed 23 out -- you read this earlier into the record -- that 24 "Monitoring and regulating the operating temperature on 25 a per color basis by situating a temperature sense	144 1 cyan heater array in that same region is printing 2 lightly, the cyan temperature sensor would get 3 influenced by the temperature of the magenta heating and 4 create an error. And that is what Barkley teaches about 5 why -- why you can't control well by color and it's 6 preferable to control by region with one sensor. 7 Q. So it's your opinion that Barkley 8 acknowledges that his invention is meant to control the 9 temperature by region and it cannot control temperature 10 by color. 11 A. What he's saying is he's not controlling by 12 color because the color is on both sides of the via. 13 And so he controls by region, and that controls the two 14 colors that are in that region in the center of the die 15 or the one color that's in that region between the edge 16 of the die. 17 Q. I see. 18 So you're interpreting Column -- that 19 sentence in Column 2 as suggesting that Figure 2's 20 solution is unique to -- is basically an approach for 21 controlling temperature on a per color basis that 22 wouldn't -- and that per color approach wouldn't apply 23 where the -- there's two different color heater arrays 24 in between the two vias. You're not suggesting that 25 Barkley's invention somehow also manages to control

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1 temperature on a per color basis.
2 MR. BORSOS: Objection to form.
3 **A. Barkley is saying that it's more advantageous**
4 **to control temperature in a region on a per region basis**
5 **than by trying to add another temperature sensor in that**
6 **region and try to measure and control temperature on a**
7 **per color basis.**
8 Q. That's only -- it's only more advantageous
9 where you had two heater arrays -- one heater array on
10 each side of the via. Correct? Otherwise, it's more
11 advantageous to do -- it might be -- it might not be
12 more advantageous to have it on a per region basis.
13 **A. Well, in that second case that you just had,**
14 **per color and per region end up being the same, don't**
15 **they? Like in Figure 2. So this is really specific**
16 **around having heater arrays positioned on both sides of**
17 **a via --**
18 Q. Exactly.
19 **A. -- and therefore, when you have two heater**
20 **arrays in a region, Barkley is saying that it's**
21 **preferable to control that with one temperature sensor**
22 **centrally located -- substantially centrally located so**
23 **that just controlling by the region is good enough and**
24 **doesn't -- and gets out of the problem of unwanted**
25 **errors that you would get when you have two sensors.**

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1 MR. FORGHANY: And then now -- I think now is
2 a good time to take a break. I don't think I've -- I'm
3 nearing the end anyway.
4 So do you mind if I take a 15-minute break,
5 Mark, now just to, like, go over my outline and we touch
6 base again at 3:15 my time?
7 MR. BORSOS: That's fine with me.
8 Let me just ask. Mr. Dietl, you don't have
9 any trouble with continuing on a bit longer, right?
10 We're at the time period where we thought we'd be
11 ending, but I just want to make sure we're not
12 interfering with your schedule.
13 THE WITNESS: Yeah. What's a bit? What's --
14 MR. FORGHANY: I think another 45 minutes, an
15 hour max.
16 THE WITNESS: Okay. I'm okay with that.
17 MR. FORGHANY: Thank you.
18 (Off the record: 3:01 p.m. to 3:17 p.m.)
19 Q. Mr. Dietl, we're referring to what's been
20 marked as Exhibit 4 on page 12.
21 And do you recall that prior art system you
22 referred to earlier that you mentioned, at least one
23 system you're aware of that met the 1200 dpi or better
24 vertical resolution? Do you, by chance, remember who
25 manufactured it, if not the name?

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1 **A. What I was thinking about was Kodak.**
2 Q. When you were at Kodak, you remember working
3 on a device like that?
4 **A. Yes, I do.**
5 Q. So -- and that was around what time frame?
6 **A. It was introduced in 2000- -- middle of 2004.**
7 Q. And so one of skill in the art, then, would
8 have achieved -- would have known that they could have
9 achieved that printing resolution by adding heater
10 arrays on both sides of the ink via?
11 MR. BORSOS: Objection to form.
12 **A. Yes. I think that was something that was**
13 **known in the art even when it was 300 dpi printing to**
14 **get to 600 dpi printing.**
15 Q. And so my -- do you happen to -- by looking
16 at the Figure 2 system or how it's described in -- by
17 Barkley, do you happen to know what the Figure 2 system
18 is capable of printing based on its arrangement?
19 MR. BORSOS: Objection to form.
20 **A. I don't. Barkley implies that the -- that**
21 **they could only get to 600 dpi in the Figure 2 system.**
22 Q. Right. It says that it might -- may have,
23 quote, significant difficulty providing ink drop sizes
24 that are less than 4 picoliters while achieving a
25 vertical resolution of about 1200 dpi.

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1 So is it fair to say that necessarily Barkley
2 suggests that it was less than 1200 dpi?
3 **A. Yes. That's what I would interpret. Yes.**
4 Q. And so one of skill attempting to, for
5 whatever reason, improve the Figure 2 system, let's
6 say -- let's turn to Figure 2 -- and reach 1200 dpi,
7 they would have done so, for example, by adding a second
8 heater array -- or adding one heater array on each of
9 the sides of the ink via shown in Figure 2. That would
10 have been one of the options they would have, like,
11 tried to do first or turned to first given the --
12 **A. Yes.**
13 Q. -- given the knowledge.
14 **A. That's one --**
15 MR. BORSOS: Objection to form.
16 **A. That's one way. They might also keep the**
17 **heater array on one side of the via and use the**
18 **staggered nozzles approach, which was used in some**
19 **designs, so that the distance between the via and the**
20 **heater was not the same for every nozzle. Every other**
21 **nozzle was -- or sometimes in groups of four they had**
22 **different spacings away from the via that allowed them**
23 **to use trigonometry to get more space between --**
24 **physically between the heaters and allow them higher**
25 **density. But I don't know --**

149 1 Q. Right. 2 A. I don't know if that was -- at that time 3 frame was achievable, 1200 dpi. 4 Q. Using the staggered approach. 5 A. Yes. I don't recall. 6 Q. So you're not aware of a product that used 7 the staggered approach to achieve the 1200 dpi -- not to 8 say that one didn't exist, just that you don't recall 9 one because you didn't work on one. 10 A. I just don't recall. That's correct. 11 Q. Got it. 12 And so if one of ordinary skill in the art 13 would turn to the approach of putting a heater array on 14 each side of the ink vias on the -- and would modify the 15 Figure 2 system in that manner, then isn't it true, 16 then, that, for example, the cyan ink via would have a 17 heater array positioned between itself and what's shown 18 in Figure 2 as a temperature sense resistor on 222? 19 A. I think it's probably easier to look at 20 Figure 3 -- 21 Q. I just want to look at Figure 2 for the 22 purposes that we know that that system was in the prior 23 art because it's labeled "prior art." 24 And so my question is: A person of ordinary 25 skill in the art who is working in the prior art time	151 1 Q. And so if we just go to -- for the purposes 2 of our discussion today -- one minute. 3 The chat thing is really unfortunate. Thank 4 you for your patience. 5 And looking at Figure 2, the temperature 6 sense resistor, where -- based on how it's depicted in 7 Figure 2, is it fair to say that the temperature sense 8 resistor is being positioned somewhere in the center 9 of -- somewhere near the center of the region that's 10 defined by the two thermal barriers of cyan -- 11 MR. BORSOS: Objection to form. 12 Q. -- cyan ink via and magenta ink via? 13 A. In Barkley '708, they talk about the -- 14 you know, if you have it substantially centrally 15 located, it's better in order to measure the average 16 temperature of the region representative of those two 17 arrays. 18 Q. Right. And I'm asking -- but that's 19 referring to, like, the patented invention, correct, 20 that part of Barkley's disclosure? 21 A. That's correct. Well, that's what we know 22 about. 23 Q. It's not using that language to describe 24 Figure 2. 25 A. No. That's -- no --
150 1 period, when they go and they implement this 2 modification to achieve 1200 dpi and they went and put a 3 heater array on each side of the ink vias, what ends up 4 resulting is a heater array filling the gap between the 5 cyan ink via and the temperature sense resistor 222 and 6 another heating array that fills the gap between the 7 magenta ink via and the temperature sensor resistor at 8 224, correct? 9 MR. BORSOS: Objection to form, 10 mischaracterizes testimony. 11 A. So if you were to take this device and try to 12 do pitch doubling to add -- to double the resolution, 13 you would put the cyan heater array -- another cyan 14 heater array on the right side of the cyan ink via. 15 You'd put another magenta heater array on the right side 16 of the magenta ink via, and you'd put a yellow heater 17 array on the right side of the yellow ink via. 18 Q. Right. And so -- and that would be the -- 19 that would be what they would -- you called it double 20 pitching? What was the terminology you used? 21 A. Pitch doubling. 22 Q. Pitch doubling. Is that correct? 23 A. Yes. I thought I -- 24 Q. Oh, sorry. I didn't hear you. 25 A. Yeah.	152 1 Q. Right. 2 A. It's just easier for me to answer 3 non-hypothetical than hypothetical. 4 Q. Right. No, and I'm -- so if Barkley 5 disclosures about the -- substantially, you know, 6 central to the region, the textual disclosures that it 7 has in the '708 patent, those were all being -- 8 referring to, you know, Figure 3 and 4 and 5 and the 9 patented invention, and Barkley, however, also 10 discloses -- you know, the only other figure where a 11 temperature sensor is shown, you know, in a region is 12 Figure 2, and while Barkley is silent on, you know, 13 like, whether or not that is -- in the text about it 14 being centrally disposed, my question is: Does the 15 figure inform a person of ordinary skill in the art's 16 understanding about where the temperature sense resistor 17 would likely be positioned relative to the two ink vias? 18 MR. BORSOS: Objection to form. 19 A. Yeah, I really don't think so. I don't think 20 that that's what he was trying to communicate with the 21 figure. 22 Q. So would you agree that the figure is showing 23 the temperature sense resistor in what would be near the 24 center point of the region between the cyan ink via and 25 the magenta ink via? That's where it's depicted.

153 1 A. Yeah. But I don't think that that's 2 physically what he was trying to show. 3 Q. You mean that it was -- 4 A. You have to -- 5 Q. -- it was inadvertently done. 6 A. Correct. I think that -- 7 Q. Why do you think that? 8 A. Because it's -- a heater array takes up maybe 9 120 microns, maybe up to 200 microns. Right? And the 10 driver electronics are much larger than that. And so 11 this isn't intended to be proportional in size. The 12 heater arrays are much narrower than the via, but it's 13 not shown that way. So it's -- I don't think this is 14 intended to be proportional or spatial in this view, 15 that that thermal sense resistor is supposed to be in 16 the center in this view. 17 Q. Right. No, and I understand that it's not 18 supposed to be proportional. Right? And I think we're 19 both in agreement there. 20 But it could be -- I thought before you 21 mentioned that -- you described the diagram as having 22 components that were positioned relatively -- relative 23 to each other is what was intended to be conveyed 24 through the diagrams. 25 A. Yeah, position in order, but not -- you know,	155 1 Q. How about this? What would a person of 2 ordinary skill in the art understand from the drawing? 3 Would it be a sequence? Or would it be position? 4 MR. BORSOS: Objection to form. 5 A. It's order, and I don't think it's -- 6 physical position is trying to be shown in this diagram. 7 Q. Why, then, would he bother to put spaces in 8 between some of the blocks, 222 and 202, and not put 9 spaces in between others? 10 MR. BORSOS: Objection to form. 11 A. I think what he's trying to imply is he's 12 trying to get a temperature that's representative and 13 important to the magenta heater array. 14 Q. And why would creating a gap between the two 15 help convey that -- or it would be understood as 16 conveying that by a person of ordinary skill in the art? 17 A. He's just -- 18 MR. BORSOS: Objection to form. 19 A. He's just showing in that area of the magenta 20 heater array. I don't think that there's any intention 21 there. 22 And maybe it is. I haven't seen his design. 23 Maybe there's something there where the magenta heater 24 array is more biased -- or the temperature sensor is 25 more biased towards the heater array, but I don't --
154 1 not -- 2 Q. The sequence, you're saying, not distance. 3 A. Not dimensional. Right? Not dimensional. 4 And I think that, in a functional sense, 5 silicon is highly thermally conductive, and it would 6 work in multiple positions across that range. If you 7 position that temperature sense resistor in a range 8 across there, I'm sure it would probably be adequate to 9 control the magenta heater array. 10 Q. I think what you're suggesting is that it's 11 just showing the relative order. So it's that, like, 12 right after the cyan ink via, the next thing that would 13 appear would be the -- you know, out of all the 14 components that are shown would be the temperature sense 15 resistor, and then after that would be the magenta 16 heater array. Is that what you meant by that? 17 A. The other way around. Magenta ink via, then 18 the magenta heater array, and then the temperature sense 19 resistor. 20 Q. Sure. But the positioning of those 21 components in the diagram, you're suggesting that 22 Barkley has intended them to convey a sense of sequence. 23 A. Yes. You know, I'm not sure that he's 24 intending that, but then I'm not sure that he's not. 25 Right?	156 1 from this diagram, it's not indicating its position, 2 whether it's center or biased to the right. 3 Q. But would you -- even though it's not -- it 4 would be difficult to know what he intended, isn't it 5 reasonable to assume that a person of ordinary skill in 6 the art could arrive at that conclusion that, you know, 7 these gaps in distance -- in the diagram were intended 8 to show position as well as sequence? 9 MR. BORSOS: Objection to form, asked and 10 answered. 11 A. They could, or they may not. Right? I think 12 a person having ordinary skill in the art could 13 interpret it either way, that it's not important but the 14 order is more important than the actual physical 15 position. 16 Q. So my last question for this -- using these 17 diagrams is -- 18 MR. FORGHANY: I'm just going to put it in 19 the chat. And, Michelle, can you just create -- mark 20 this as its own file or exhibit. It's just a further 21 annotation of Exhibit 4. Maybe you can just mark it as 22 Exhibit 5 and put it up on the screen, please. 23 THE TECHNICIAN: It's still not in the 24 chat -- oh, there it goes. 25 MR. FORGHANY: It's the wrong image. Let me

1 just fix it real quick. 2 There we go. 3 (Exhibit Number 5 introduced.) 4 Q. So Exhibit 5 is looking at Figure 2 of the 5 '708 patent. And on the left-hand side is the colored 6 version that we were just looking at earlier where the 7 temperature sense resistor is positioned between -- is 8 colored -- the 222 one is colored green, and it's 9 positioned in the region between the ink via and the 10 cyan ink via. And we were talking about this pitch 11 doubling. 12 Was that the correct term, Mr. Dietl? 13 A. I'm not sure. You'd have to ask the whole 14 question. I'm not -- 15 Q. Pitch doubling? Pitch doubling, was that 16 the -- 17 A. "Pitch doubling" is the term used when you 18 have heaters positioned each on opposite sides of an ink 19 via staggered by one-half of the pitch of the distance 20 between heaters. 21 Q. Understood. 22 And so Exhibit 5, on the right-hand image 23 is -- has now been annotated and dropped in. You see 24 two big red blocks in the sequence between where you had 25 testified, you know, the heater array would result upon	157 1 A. Figure 5 in the '708 patent does a nice job 2 of showing what that would look like with pitch 3 doubling. 4 Q. And Figure -- referring to the Figure 2 5 illustration that's marked as Exhibit 6. 6 Now, admittedly, Barkley does not say that 7 the Figure 2 system would be able to, you know, 8 regulate -- how it would regulate, you know, the 9 temperature when you have two heater arrays that are 10 associated with two different vias in the same region. 11 That's the part of the invention that he describes in 12 '708, Figure 5. 13 And my question to you is: In that 14 description in Figure 5 where he's -- where Barkley is 15 describing, you know, the means in which one would -- 16 could regulate and monitor the temperature with a pitch 17 doubling arrangement, were those -- any of those methods 18 or solutions involving novel manufacturing processes for 19 the die or novel temperature sense resistors or 20 components that were not in existence before the filing 21 date of the patent? 22 MR. BORSOS: Objection to form. 23 A. You know, I don't think he specifies any 24 novel temperature sensor construction. Right? So I 25 would say that it's manufacturable given the technology
158 1 pitch doubling occurring in the system. 2 And my question is: As modified to reach the 3 1200 dpi in the image on the right, Figure 2 now has a 4 heater array on both sides of the cyan ink via and on 5 the magenta ink via, as shown in the picture, correct? 6 A. I -- 7 MR. BORSOS: Objection to form. 8 A. The image is not clear to me. I can't see -- 9 the shaded images are too light. I can't interpret 10 this. 11 Q. Oh. Okay. Sorry about that. 12 MR. FORGHANY: All right. Michelle, second 13 chance. Let's see if it gets -- I get this right. 14 We'll mark this as Exhibit 6. 15 (Exhibit Number 6 introduced.) 16 Q. And would you agree, looking at Figure 6, 17 that it depicts the arrangement that would result from a 18 person of ordinary skill in the art implementing pitch 19 doubling in the Figure 2 prior art system? 20 A. Yeah. It's not, you know, quite proportional 21 and the like, but in the order it is. And it's -- if 22 you look at the figure in the '708 patent, it's probably 23 clearer, because I think they -- you know, they show 24 that in Figure 4 in the '708 patent -- or Figure 5. 25 Q. Yes. And --	160 1 known at the time. 2 Q. And so, for example, he talks about how the 3 heaters may also be formed of other technologies besides 4 thin film resistors, as are known to those of skill in 5 the art. That's an example of what you're referring to, 6 that these are -- that he chose one implementation of a 7 resistor that was known technology. He did not -- a 8 novel resistor was not invented by Barkley in order to, 9 you know, more accurately sense the temperature with a 10 pitch double arrangement. 11 MR. BORSOS: Objection to form. 12 A. So the first thing you said was, I think, the 13 thin film resistor in terms of the heater. I don't 14 think he disclosed that -- a novel heater in the 15 '708 patent. 16 Q. I think you're breaking up my question. 17 THE REPORTER: Mr. Forghany, can you slow 18 down for the court reporter, please. Thank you. 19 MR. FORGHANY: I'm sorry. I'm trying to get 20 this done before 6:00. 21 Q. So in Column 4, Barkley -- line 55 of the 22 '708 patent, Barkley says, quote, these thin film 23 resistors may be formed of a variety of materials, 24 including platinum, aluminum, alloys, and other 25 materials. The heaters may also be formed of other

161 1 technologies besides thin film resistors, as are known 2 to those of skill in the art. 3 And my question is: All those materials and 4 thin film resistors, those were all conventional 5 equipment that was known at the time of the filing of 6 the '708 patent, correct? 7 MR. BORSOS: Objection to form. 8 A. Yeah. You know, I'm not sure if all the 9 things that he listed there -- if they were actually 10 commercialized, but they were certainly mentioned in 11 various patents at the time as thin film material 12 options. 13 Q. And Barkley doesn't describe a novel 14 manufacturing method for the die that would be necessary 15 to correct any errors in temperature sensing with a 16 pitch double arrangement. 17 MR. BORSOS: Objection to form. 18 A. No, he does not. 19 Q. And is it your opinion, then, that the 20 absence of that instruction suggests that one of 21 ordinary skill in the art would understand how to 22 implement Barkley's invention without the need of that 23 instruction? 24 MR. BORSOS: Objection to form. 25 A. No. Because they would have to have built	163 1 MR. BORSOS: Objection to form. 2 A. I don't understand the question. 3 Q. As I was saying it, I was realizing that I 4 should probably just refer to Figure 5 for this one. 5 MR. FORGHANY: Can we go to Exhibit 3, 6 Figure 5 of the '708 patent. 7 Q. So if you look at the second temperature 8 sense resistor, 542, is that temperature sense resistor 9 sensing color -- sensing temperature on a per color 10 basis? Or on the per region basis? 11 A. As Barkley describes it, he's using it to 12 measure -- to sense temperature on a per region basis. 13 Q. And Barkley describes how even if you wanted 14 to sense it on a per color basis and you tried to put 15 two sensors, you know, next to each other in that 16 region, one for each of the heater arrays, that it 17 wouldn't be feasible, correct? 18 A. No. He didn't say that. He said it would be 19 subject to error. 20 Q. Sorry. Subject to error. What does that -- 21 A. Yeah. 22 Q. Would it be commercially feasible errors? 23 MR. BORSOS: Objection to form. 24 A. You know, I think it could be commercially 25 feasible. It's just not desirable. You have those
162 1 the device and run into the same problems that Barkley 2 would have and been inventive enough to put that 3 resistor and use it in a way that Barkley discloses. So 4 it's not obvious. 5 Q. Oh, no. I think my question is a little bit 6 different. 7 So given that Barkley doesn't take the time 8 to explain, you know, how to implement a thin resistor 9 in this embodiment, the absence of a detailed 10 instruction of how to do that suggests that he considers 11 that knowledge to be within the understanding of one 12 skilled in the art, and so he doesn't need to spend -- 13 spill the ink to explain it. 14 A. Right. He -- 15 MR. BORSOS: Objection to form. 16 A. He describes the technologies available at 17 the time that they were -- was available to them. So -- 18 Q. And my question is: In this -- I'm showing 19 in Figure -- in Exhibit 6 the temperature sense resistor 20 that's labeled "222" between the cyan ink via and the 21 magenta ink via in a highlight of green. This sensor 22 senses the temperature of the region between the two -- 23 via 202 and the via 204. It is incapable of sensing the 24 region -- the temperature of -- on a per color basis 25 even if it had implemented Barkley's invention, correct?	164 1 errors that you're going to have to deal with, and then 2 you have additional bond pads and connections for 3 heat -- for temperature sensors that are, as he would 4 look at it, as redundant. Right? He doesn't -- he -- 5 you know, bond pads cost money, and they go along with 6 connections and wires and the cable, all that. So 7 this also is a -- 8 Q. But you also -- 9 A. It's a good way to save money in die size 10 and... 11 Q. And if the rationale for including it -- two 12 sensors there in the first place was to be able to sense 13 color -- or sense temperature on a per color basis, 14 adding two sensors there wouldn't necessarily guarantee 15 that you were accurately sensing temperature on a per 16 color basis, correct? 17 A. Right. As he disclosed -- 18 MR. BORSOS: Objection to form. 19 A. It would be subject to error. 20 Q. Now, for the temperature sense resistor 21 that's shown as 550, could the metal runs of that 22 temperature sense resistor -- could that be -- could 23 that traverse over -- can the ink via essentially be 24 traversed over by the metal runs or the TSR? Or is that 25 something that you couldn't do?

165 1 MR. BORSOS: Objection to form. 2 A. Are you referring to something in the figure? 3 Q. Yeah. So looking at 542, the second 4 temperature sensor, presumably that temperature sensor 5 has metal runs. And I'm wondering, from a layout 6 perspective, would a person of ordinary skill in the 7 art -- would they know that the metal runs couldn't 8 traverse over the ink via? They had to be, you know, 9 confined to that space you were referring to earlier 10 between the via and the -- between the two heater 11 arrays? 12 MR. BORSOS: Objection to form. 13 A. So there's many ways that the leads that 14 connect to these temperature sensors could be run. I 15 mean, you could just run it up in a U shape and back. 16 Right? As -- or you could -- 17 Q. What couldn't you do? Could you -- 18 A. Well, I mean, what you said was -- 19 Q. Could you traverse over -- 20 A. You can't traverse over the ink via. No. 21 That would be inappropriate. That would -- 22 Q. Why? 23 A. Because the trace could -- would be broken. 24 Right? It's a -- any electronics or metal that you put 25 over the via would be disrupted and left as an open.	167 1 questions about the figures, but if you need to review 2 the entire patent, please take your time. 3 You've accessed the document, correct, 4 Mr. Dietl? 5 A. I do -- I have accessed the document, and I'm 6 running down -- 7 Q. Just making sure. Take your time. 8 A. Yeah. I'm running down through the figures 9 right now. 10 Okay. I'm not going to read -- take the time 11 to read the whole thing. If I have to go back and ask 12 you for time to read it, I will, but I -- 13 Q. Could you describe what's being shown in 14 Figure -- well, what kind of printer system is being 15 depicted and described through Figures 2A through 3 -- 16 13? Is it a nozzle -- sorry -- edge shooter? A roof 17 shooter? 18 A. It's a roof shooter design with multiple vias 19 and pitch doubling with heater arrays situated on each 20 side of each via with a -- and staggered with a pitch 21 of -- with one-half of the pitch of the distancing 22 heaters on one side. It is novel by the fact that it 23 used two different drop sizes in the two parallel 24 columns. 25 Q. And do you remember working on this patent?
166 1 Q. So essentially, you know, you could no longer 2 achieve a shared thermal equilibrium temperature quickly 3 in that region. 4 A. Well, it's -- 5 MR. BORSOS: Objection to form. 6 A. It's kind of a ridiculous question. Nobody 7 would do it. Right? 8 Q. And the sensor output would not reasonably 9 represent the temperature at both the heater arrays 10 anymore, right? 11 A. Well, the sensor would be inoperable. 12 Q. Yeah. So it wouldn't represent the 13 temperature of both heater arrays. 14 MR. BORSOS: Objection to form. 15 A. It wouldn't represent the temperature of 16 anything. It would be broken. 17 MR. FORGHANY: I'm going to -- Michelle, 18 could you please publish as -- mark as Exhibit 7 the 19 document I put in the chat. This will be the last one. 20 (Exhibit Number 7 introduced.) 21 Q. What I'm marking as Exhibit 7, US Patent 22 Number 7,350,902 to Steven Dietl, et al., from your time 23 at Eastman Kodak Company. 24 Please take a moment to review it just 25 quickly. I'm just going to ask you some high-level	168 1 A. I do. 2 Q. Do you remember whether it was ever 3 commercialized? 4 A. Yes. It was commercialized. 5 Q. Do you happen to recall the name of the 6 product that was -- that practices the patent? 7 A. There was a lot of products that were using 8 this silicon die, maybe up to 40 products. 9 Q. So you were platforming, as I learned today. 10 A. It was a platform. Right. 11 So it was the EasyShare line of printers, the 12 Kodak ESP office line of printers. There was -- what 13 was the name of that? 14 There was other lines and multiple models 15 under each line of printers. There was a significant 16 number of products -- 17 Q. And the -- 18 A. -- were produced using this. 19 Q. The die was one of those critical components 20 that was being maintained and designed throughout 21 multiple products? 22 A. Yes. 23 MR. BORSOS: Objection to form. 24 Q. And looking at Figure 2B -- or 2A -- I guess 25 there's no -- yeah, either one of those -- what are the

169 1 ink vias -- can you point me to the ink vias here? 2 A. So ink vias are -- it looks like they're 3 labeled as 128 and 138. 4 Q. And that shape is consistent with the same 5 shape as shown -- a long cylindrical version -- a long 6 cylindrical shape, a rectangular shape, as the -- 7 similar to the long rectangular shape of the -- let me 8 just restart that -- start over with that question. 9 And you depicted and pictorialized the ink 10 vias as a long rectangle with two long sides and two 11 very short faces, which I believe you marked as 128 on 12 the first one and 138 on the second one? 13 A. Yeah. They're not -- those aren't the faces. 14 Those are the -- 128 and 138 are pointing to the vias 15 themselves. 16 Q. Why did you decide to depict it as -- in this 17 shape of a long skinny rectangle, each of the vias? 18 MR. BORSOS: Objection to form. 19 A. I think it's more schematic. In the end 20 product there was some curvature on the ends, but for 21 the most part, it was a long, straight, single slot in 22 the device, I believe. I don't think we had any bridges 23 in the center or anything. 24 Q. And you intended for a person of ordinary 25 skill in the art to look at that rectangular shape and	171 1 A. Well, it's -- 2 MR. BORSOS: Objection to form. 3 A. It's a schematic diagram. It's easier to 4 draw a rectangle than getting into little details of 5 corner radii or anything like that. It was filed -- the 6 patent -- the architecture was envisioned, and the 7 patent was filed before the final product was completed. 8 Right? So it is not intended to represent sharp corners 9 and in the corner or anything like that. It's intended 10 to indicate that it's a slot for ink to come up through 11 the silicon substrate and feed two arrays of heaters. 12 Q. And you also -- what are those circles 13 representing on each side of the slot -- on the ink 14 slot? 15 A. They're nozzles. 16 Q. And there's an array of nozzles or a row of 17 them on each side of the via, but they're just off that 18 to be pitched a little bit higher up the -- I don't know 19 if "higher" is the right word -- but positioned 20 offset -- in an offset manner on one side of the via 21 than the other. Is that correct? 22 MR. BORSOS: Objection to form. 23 A. As I described pitch doubling, right, that 24 each side is -- the array is offset by the distance of 25 one-half the pitch of the nozzle -- difference between
170 1 understand that that was symbolizing an ink via. 2 A. Well, with the help of the specification. 3 Q. So you could have chosen -- 4 A. Right? You know, you have to look at the 5 images and then look at the specification and say "Okay. 6 This is what 128 is and 138 is defined in the 7 specification." So it's -- 8 Q. But you -- 9 A. -- it's called a fluid -- 10 Q. Sorry. 11 A. It's called fluid delivery slot 128 and fluid 12 delivery slot 138. So from that, I would expect a 13 person having ordinary skill in the art to understand 14 that that's an ink slot or an ink via. 15 Q. Because an ink slot is pictorially 16 represented in the shape of a long skinny rectangle. 17 That's what a slot is. 18 MR. BORSOS: Objection to form, asked and 19 answered, mischaracterizes -- 20 A. Not always. 21 MR. BORSOS: -- testimony. 22 Q. I'm wondering, like, did you not 23 intentionally choose the long skinny rectangle? Was 24 that just inadvertently you just landed on this shape 25 for the via?	172 1 the heaters on the other side. 2 And this design basically has pitch 3 quadrupling. Right? Because the next row is offset by 4 a quarter of that pitch between heaters -- 5 Q. So my question is -- 6 A. -- although it's not the same -- it's not the 7 same color. 8 Q. And my question is: You know, in your 9 Figure 2, a schematic where you elected to graphically 10 represent the ink via as a long rectangle, you also 11 graphically represented the position of the nozzles in 12 an offset manner in relation to each other. Even though 13 they're not drawn to proportion, you intentionally 14 showed them offset positionally from one another in 15 relation -- in -- to the ink via, correct? 16 MR. BORSOS: Objection to form. 17 A. They're shown to be offset from the pitch on 18 one side of the ink via versus the pitch -- the position 19 on the other side of the ink via. I don't think they're 20 really intended to be off -- shown to be offset in 21 respect to the ink via. Right? The -- 22 Q. To each other, yes. But they're -- 23 A. -- schematic. Yeah. But it's -- 24 Q. Yeah. But the -- 25 A. -- heater array to heater array or nozzle

173 1 array to nozzle array. It's intended -- 2 Q. Right. The presence of the ink via just 3 helps illustrate that they're off center. 4 MR. BORSOS: Objection to form. 5 Q. And so earlier we were describing how -- we 6 were discussing how, in your opinion, one of ordinary 7 skill in the art would look at, you know, Figure 5 or 8 Figure 2 or Figure 1 of the '708 patent, and you thought 9 that a person of ordinary skill in the art could 10 reasonably interpret the location of the different, 11 you know, callouts of depicted ink vias and heater 12 arrays as being just a disclosure of in sequence. And 13 you said also that you could -- someone might interpret 14 it as being -- you know, also having positional 15 disclosures as well. Does -- 16 MR. BORSOS: Objection to form. 17 Q. Is Figure 2A an example of how a person of 18 ordinary skill in the art would have expect- -- would 19 have read a positional disclosure from your -- from 20 Figure 2A of the '902 patent? 21 MR. BORSOS: Objection to form. 22 A. I think they would have interpreted the 23 position of the ratios of these staggers as it's spelled 24 out in Figure 2A. Right? That there's a pitch doubling 25 and then the other via and two arrays of nozzles are	175 1 A. We were careful to show this P/2, P/4 2 relationship between these -- between these nozzle 3 arrays. 4 Q. And I want to talk about those. Because the 5 second -- the second arrays, the nozzles are smaller. 6 Is that what you intended to -- what were you intending 7 to depict by having the circles be smaller in 8 circumference than the ones in the via 120? 9 MR. BORSOS: Objection to form. 10 A. We were intending to show that the nozzles in 11 the right -- that are surrounding the right-hand via 12 were smaller nozzles than the nozzles in the left-hand 13 via. 14 Q. So you -- in this illustration, you're 15 depicting the spatial distance between nozzles by 16 offsetting some, and you're also depicting the 17 difference between the nozzle size circumference in 18 the -- in Figure 2A, correct? 19 A. Yeah. Diameter is usually what's important 20 is how it's -- nozzle diameter. So nozzles of the 21 second nozzle array have a second opening area. Right? 22 So... 23 Q. And you -- in both of these instances, you're 24 depicting the nozzle arrays 120, 130, 140. They're all 25 drawn very close to the ink via edges 129 and 139 and
174 1 then offset from that by another -- by a quarter of the 2 pitch. 3 Q. And you depicted the offset nature of them by 4 putting a white space where it would originally have 5 been if it had not been offset. 6 MR. BORSOS: Objection to form. 7 A. I don't know what you mean by that. 8 Q. So if it was not offset, there would be -- 9 everything would shift down, and it would be in line 10 with -- each side of the nozzles would be, you know, in 11 the exact same position facing each other, not offset. 12 But when you've offset them, the resulting depiction 13 shows a white blank spot where the nozzle would have 14 otherwise been. 15 MR. BORSOS: Objection to form. 16 A. Okay. I think really -- that's not -- this 17 schematic, I don't think there was a lot of focused 18 attention to that, leaving a blank spot. But I think -- 19 Q. You did not add anything to suggest that -- 20 in this drawing to suggest that you've moved -- you've 21 positioned it differently or that there's been some 22 positional change. You've just drawn it and then left 23 it blank where it was blank. 24 A. It's, you know -- 25 MR. BORSOS: Objection to form.	176 1 ink feed slot 128, 138, 148. That was also intentional, 2 correct? 3 A. I don't know if it was precisely 4 proportional. I don't recall. I don't -- 5 Q. But -- 6 A. -- think so. 7 Q. -- they're here very close to your order on 8 the ink feed edge line. That was an intentional 9 placement of the nozzle arrays in that location. 10 A. No. I don't believe so. No. I don't think 11 that that would -- that's an accurate depiction that 12 the -- 13 Q. So -- 14 A. -- the larger nozzles would be, like, 15 touching up against the ink via. I don't believe that's 16 an accurate depiction. 17 Q. Oh, no. My question is different. 18 I'm asking: You chose in both instances to 19 have the nozzle -- the circles, you know, adjacent to 20 the ink via, like near it, like right next to it. Maybe 21 not on top of the line, but it's near it. You did not 22 depict them as being, you know, on the other side of 23 the -- in the middle between, like, the ink via and the 24 edge of the silicon. You chose to depict them near each 25 other not having a substantial gap and space between the

177 1 two, between the via and the nozzle. 2 MR. BORSOS: Objection to form. 3 A. Yes. And if you look at Figure 2B, that's 4 probably -- you know, it looks like more care was taken 5 in Figure 2B in showing the via 128 and 138 and the 6 nozzles 130 that are relatively close to the via 138 and 7 120, which are pretty close. I think 114 and 115 are 8 probably the heaters. 9 Q. And so if you had intended to put some 10 distance and design the -- or to configure this 11 arrangement in a manner that the nozzle arrays were 12 actually some distance away from the ink feed slot, you 13 wouldn't have depicted Figure 2B in that manner where 14 the nozzle arrays -- in that position that's currently 15 depicted in Figure 2B. 16 MR. BORSOS: Objection to form. 17 A. Yeah. I'm not sure -- 18 Q. So -- 19 A. -- I understand the question. I mean -- 20 Q. That was a bad question. Let me rephrase it. 21 You -- 22 A. I -- 23 Q. -- how Figure 2B was consistent with what's 24 shown in Figure 2A. 25 A. It's probably a better representation than	179 1 certain components in a schematic and when they can't. 2 And it seems like in this example you've shown the 3 nozzle arrays close to and adjacent to the ink via in 4 2A, and then -- by positioning them near the ink via, 5 and then that's corroborated by the fact that in 6 Figure 2B they're also intentionally shown as being in a 7 consistent sequence and proximity to the ink via and the 8 heater. 9 MR. BORSOS: Objection to form. 10 A. You know, I think that the depiction here was 11 not intended to be precise about the distance of these 12 heaters in respect to the ink via or from heater 120 on 13 one side of the via to heater -- or nozzle 120 on one 14 side of the via to nozzle 120 on the other side of the 15 via, that distance. The important thing that was trying 16 to be portrayed here was how they're offset by 17 proportions of the pitch between nozzles, and I don't 18 think anything in this patent drives an importance 19 around the other dimension the other direction. It's 20 just -- 21 Q. Right. And I -- 22 A. -- what's important. 23 Q. Right. And I think that we're in agreement 24 that a person of ordinary skill in the art would not 25 look at dimensions or try to figure out the exact
178 1 what's shown in 2A -- right? -- in terms of -- 2 Q. How is it better? What is it doing better 3 than Figure 2A? 4 A. If you look at the nozzles 120, they're over 5 the heater, and they're not -- they're not right up 6 grazing the 128 ink via. Right? They're farther away 7 than that -- than they're shown in Figure 2A. 8 Q. And just for the record -- for the record, 9 could you please identify on the -- by number the heater 10 you're referring to? 11 A. So 114 and 115 are the heaters, and they're 12 directly below the nozzles 120 and 130. 13 Q. And you said that was intentional. 14 A. Well, the heaters were definitely positioned 15 directly below the nozzles in the -- yes. 16 Q. Oh, no. I meant that the drawing 17 intentionally shows them being positioned there. 18 A. Yeah. You know, I don't know when these 19 drawings were done in terms of the proportions of the 20 final design, but it isn't -- you know, the final design 21 was probably not hugely different. 22 Q. Yeah. And what I'm really getting at here is 23 I'm trying to understand, you know, when a person of 24 ordinary skill in the art would understand to -- it's 25 okay to rely on, you know, the location and proximity of	180 1 distance that a component needs to be based on the fact 2 it's a schematic and a diagram. I'm more asking about 3 the relative position and what would -- what they would 4 understand to be, you know -- how that would operate in 5 conjunction with other components that are depicted. 6 So, for example, by depicting -- what a 7 person of ordinary skill -- would you think it was fair 8 to say that a person of ordinary skill in the art 9 looking at Figure 2A and the depiction of the nozzle 10 adjacent to the ink via -- that they would understand 11 that the ink edge arrays -- sorry -- that those 12 rectangles would include the appropriate ink feed slots 13 like a conventional roof shooter design practice so that 14 they could achieve, you know, practical drop firing 15 sequences? They could basically operate with the ink 16 via. 17 MR. BORSOS: Objection to form. 18 A. I don't think there was any intention of 19 trying to show that in this diagram. 20 Q. Not intention, but would it be fair to assume 21 that a person of ordinary skill in the art would 22 understand that -- from that drawing that the two -- 23 that the ink feeds -- that the rectangles have an ink 24 feed slot that works with the -- that is operationally 25 associated with the nozzles?

181 1 MR. BORSOS: Objection to form. 2 A. A person having ordinary skill in the art 3 would know and would be able to interpret from these 4 drawings that the ink feed slot is where ink is fed to 5 the nozzles into the firing chambers of this device. 6 And that's very -- that's standard in a roof shooter. 7 Q. And what about Figure 2A would make someone 8 understand that? 9 A. I don't think -- 10 MR. BORSOS: Objection to form. 11 A. I don't think 2A does show you that, because 12 it doesn't show you the firing chamber. Personally, I 13 don't recall this exactly, but I'm guessing that in a 14 way we actually exaggerated the diameter of the 15 nozzles 120, because we were trying to make a point that 16 they were different, but in practice, they're not that 17 different, and that created maybe an anomaly that you're 18 trying to push at. I don't know. 19 Q. No. I'm just trying to understand how this 20 is similar to -- how a person of ordinary skill in the 21 art would interpret lines on a drawing in the 22 '708 patent. And I understand that it's your opinion 23 that a person of ordinary skill in the art would not 24 pay -- give any heed to the exact proportions and 25 dimensions of these -- of what's being shown here.	183 1 that. 2 In this patent, the patent is teaching that 3 you can improve print quality and get a certain 4 improvement in productivity by staggering the nozzles in 5 the vertical direction by pitch over 2 per via and then 6 also have another -- have the two nozzle arrays have 7 different nozzle diameters or nozzle area to produce 8 different spot size and so to focus on that. 9 Q. Could you look at Column 6, line 43, of your 10 patent. If you want to just quickly maybe read that 11 column just so that you have the benefit of the entire 12 text. 13 Let me know when you're finished. 14 A. I'm reading down to Count 7 to get to the end 15 of this paragraph. It's a long paragraph. 16 Q. Yes. Thank you. 17 Just -- line 20, I think, is all I'm going to 18 be -- that would be necessary -- actually, maybe 25, 19 just related topically. 20 A. Okay. 21 Okay. 22 Q. So starting on Column 6, it says "Fluid 23 delivery slots 128 and 138," which we equated as 24 being -- to be another term for ink vias. And it 25 describes how they're extending through the length of
182 1 But in the '708 patent, you testified that a 2 person of ordinary skill in the art would understand 3 that there would be chambers in the traditional heater 4 chip, as depicted in Figures 1 and 2, just based on the 5 fact that there was this rectangular shape that had the 6 words "ink via" on it. And I'm wondering. Is your 7 opinion different for the '902 patent? You're saying 8 that a person of ordinary skill in the art would 9 interpret that differently for the '902? 10 MR. BORSOS: Objection to form and misstates 11 testimony. 12 A. I think that when a person reads -- a person 13 having ordinary skill in the art reads the patent -- 14 reads a patent, they do so in context of what's being 15 taught. Right? And they're not -- they're not looking 16 for precise conclusions around the positions of things 17 in a dimension that the patent is not really even 18 talking about. 19 And so in the '708 patent, the -- what's 20 being taught is how to control -- how to sense 21 temperature on a per region basis between heater arrays 22 that are adjacent to ink vias and between two adjacent 23 parallel ink vias. And so that's what -- because of 24 that context, they're going to interpret those -- the 25 drawings in '708 and how it -- what it teaches about	184 1 the substrate in the X direction. 2 And then "Each slot thereby forming a channel 3 to supply fluid to the nozzles arranged along its 4 respective length." 5 So in this instance in the patent, the -- 6 your disclosure in the specification, in the text, is 7 identical to what's being drawn in the Figure 2 where 8 you're showing that the nozzles are extending along the 9 length of the fluid slots onto -- in the same direction 10 you're describing in the text, and they're forming a 11 channel, right? 12 A. Yeah. Yes. 13 Q. And you're also showing that, just like the 14 text -- it describes how the nozzles are broken up and 15 arranged into two groups. You similarly break up and 16 group them visually in the -- in your schematic diagram 17 as well. 18 MR. BORSOS: Objection to form. 19 Q. Correct? 20 A. Yes. That's correct. The... 21 Q. And just like in the text where it describes 22 how the nozzle array is spaced apart from the nozzle 23 array 130 in the Y direction, Diagram 2A also shows that 24 same array spaced apart in the same Y direction. 25 MR. BORSOS: Objection to form.

185 1 Q. Did I miss your answer? I'm sorry. 2 A. Yeah. I'm reading -- you're not reading it 3 verbatim, and so I'm reading along to see what it 4 actually says. 5 Q. Oh, sure. I can quote verbatim. 6 A. "Nozzle array 120 is spaced apart from the 7 nozzle array 130 in the Y direction." 8 Yes. So that -- 9 Q. And -- 10 A. As is the via, the slot. 11 Q. And just like Figure 2A, Column 6A, the next 12 sentence says that the nozzle array are shown to be 13 arranged in a straight line in the Y -- x direction. So 14 you also intentionally drew them in a straight line in 15 that figure. 16 A. And -- 17 MR. BORSOS: Objection to form. 18 A. And that's correct. But then it also says 19 they could be staggered. 20 Q. Right, in a sawtooth pattern. 21 A. A sawtooth pattern, yes. 22 Q. And it says "Generally speaking, the nozzles 23 are arranged along the fluid delivery slots 24 substantially in a straight line in the X direction." 25 What did you mean by that sentence, generally	187 1 substantially in a straight line in the X direction. 2 So what I think we meant by that -- I don't 3 think it's a matter of, you know, out of 20 products 4 19 are going to be in a straight line. I don't think 5 that's how it was at the time. But what I do think 6 is -- it's saying is if you -- it's desirable to have 7 them in a straight line if you can. 8 Q. Wouldn't it be the same as saying, generally 9 speaking, you know, a football is brown but it could 10 also be white? 11 MR. BORSOS: Objection to form. 12 A. I don't know. 13 Q. Isn't that suggesting that the more common or 14 more conventional or more typical array -- you know, 15 character -- way that it presents itself and so it's 16 necessarily is tied to maybe a frequency and an 17 appearance to the person with ordinary skill in the art? 18 MR. BORSOS: Objection to form. 19 A. I don't believe it's intending to imply that. 20 Q. That one is more common than the other. 21 You're not intending that? 22 A. No. 23 Q. And so... 24 (Discussion off the record with the court 25 reporter.)
186 1 speaking? 2 MR. BORSOS: Objection to form. 3 A. I think what we meant by that line is that 4 it's desirable to arrange them in a straight line along 5 the X direction if you can. But if you can't, then you 6 might have to use a sawtooth pattern. I think that's 7 kind of what that line is -- how I would interpret it at 8 this point. 9 Q. The use of the word "Generally speaking, the 10 nozzles are arranged," that suggests that there's -- 11 you're talking about, you know, how frequently they're 12 arranged in a straight line versus a sawtooth one and 13 that, as a general matter, they're much more frequently 14 arranged in a straight line. 15 MR. BORSOS: Objection to form. 16 A. I don't think that frequency would be the 17 right term I would use. They basically are saying they 18 could be in a straight line, but generally speaking, I 19 think you would prefer to arrange them along -- 20 they're -- let me say this again. 21 They're saying in some applications, adjacent 22 nozzles in each subgroup may be designed with a slight 23 offset in the Y direction, for example, arranged in a 24 sawtooth pattern. And then, generally speaking, the 25 nozzles are arranged along the fluid delivery slots,	188 1 Q. On Figure -- on line -- Column 7, line 20, 2 you say "In many applications, it is desirable to have 3 the opening area of nozzles in groups 120a be the same 4 as the opening area of nozzles in group 120b, but in 5 some applications, it may be desirable to have nozzles 6 in group 120a with different opening areas than those in 7 group 120b. The same is true for groups 130a and 130b." 8 Do you see that? 9 A. Yes. 10 Q. What did you mean by that and -- by that 11 sentence? 12 MR. BORSOS: Objection to form. 13 A. I mean in an alternate -- it's meant to say 14 that in an alternate embodiment, that the nozzles 120a 15 and 120b, each on the side of the ink slot, could be 16 different nozzle diameters. And the same with 130a and 17 130b. 18 And you can use this silicon chip in 19 different applications for different purposes and get 20 multiple drop sizes for color in this embodiment. 21 Right? This alternate embodiment would allow you to 22 have two different dot sizes on the page per color. 23 Q. And that's consistent with what you showed 24 pictorially in Figure 2A, correct, that the nozzles 25 could have different diameters?

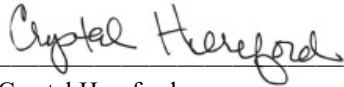
189 1 A. No. This is different. This is saying the 2 nozzles 130 on each side of the same via would have 3 different sizes on each side of this via. 4 So in the picture on the view here, it's up 5 and down. On the patent, it's left to right. But -- 6 you've got it rotated here. But if you look at where 7 it's pointing to 130, the one on the bottom 130 would be 8 a different diameter than the 130 at the top, and all 9 those nozzles in the row on the top would be a different 10 diameter than the row at the bottom. 11 Q. I'm sorry. You're looking at Figure 3? Or 12 Figure 2? 13 A. I'm looking at Figure 2A. 14 Q. Yeah. I understand the -- 130a would be a 15 different diameter than 130b? 16 A. Correct. That's what that paragraph says. 17 Q. But what is -- which one is shown in 18 Figure 2A? Which of these -- is it the -- 19 A. This embodiment -- this embodiment -- 20 MR. BORSOS: Objection to form. 21 A. This embodiment is not shown in Figure 2A. 22 Q. But the -- so the sentence says that in many 23 applications it's desirable to have the opening be the 24 same, but in some applications the opening can be 25 different. So isn't it true that in Figure 2 it's	191 1 MR. BORSOS: Not for now. We'll make a 2 decision on that. 3 (Proceedings concluded at 4:39 p.m.) 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
190 1 showing you the embodiment where they're the same 2 diameter? 3 A. Yes. 2A is the embodiment where 120a and 4 120b are the same diameter. 5 Q. And you know that because they're drawn the 6 same size. 7 A. Right. 8 MR. FORGHANY: No further questions. Thank 9 you. 10 MR. BORSOS: Yeah, I'm not going to ask any 11 questions. 12 THE REPORTER: Mr. Forghany, would you like 13 to order the transcript? 14 MR. FORGHANY: Definitely. 15 THE REPORTER: Okay. And then I'll get you a 16 rough in a few days. 17 MR. FORGHANY: Friday -- Saturday or Friday 18 night would be good for, like, an interim one, and then 19 the final could be next week. 20 THE REPORTER: Okay. What day next week 21 would you like the final? 22 MR. FORGHANY: Thursday -- Wednesday, 23 Thursday. 24 THE REPORTER: Okay. And, Mr. Borsos, any 25 transcript for you?	192 1 CERTIFICATE OF SHORTHAND REPORTER 2 I, CRYSTAL HEREFORD NAME, certified shorthand 3 reporter for the State of California do hereby certify: 4 5 That STEVEN J. DIETL, the witness whose 6 deposition is hereinbefore set forth, was duly sworn by 7 me before the commencement of such deposition and that 8 such deposition was taken before me and is a true record 9 of the testimony given by such witness. 10 11 I further certify that the adverse party, 12 PATENT OWNER, was represented by counsel at the 13 deposition. 14 15 I further certify that the deposition of 16 STEVEN J. DIETL occurred via Zoom videoconference on 17 Thursday, December 21, 2023, commencing at 9:09 a.m. to 18 4:39 p.m. 19 20 I further certify that I am not related to 21 any of the parties to this action by blood or marriage, 22 I am not employed by or an attorney to any of the 23 parties to this action, and that I am in no way 24 interested, financially or otherwise, in the outcome of 25 this matter.

Transcript of Steven J. Dietl
Conducted on December 21, 2023

49 (193 to 196)

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1 IN WITNESS WHEREOF, I have hereunto set my
2 hand this 28th day of December 2023.

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