UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SEMICONDUCTOR COMPONENTS INDUSTRIES, LLC,

Petitioner

v.

GREENTHREAD LLC,

Patent Owner

IPR2023-01242

IPR2023-01243

IPR2023-01244

DEPOSITION OF DR. TRAVIS BLALOCK

May 2, 2024

8:58 a.m.

Reported by: Eileen Mulvenna, CSR/RMR/CRR

DIGITAL EVIDENCE GROUP

1730 M Street, NW, Suite 812

Washington, D.C. 20036

(202) 232-0646

1 DEPOSITION of DR. TRAVIS BLALOCK, a
2 witness on behalf of Petitioner in the above-titled
3 action, held on Thursday, May 2 , 2024, commencing
4 at approximately 8:58 a.m., before Eileen Mulvenna,
5 CSR/RMR/CRR/RDR, Certified Shorthand Reporter,
6 Registered Merit Reporter, Certified Realtime
7 Reporter, Registered Diplomate Reporter, and Notary
8 Public of the State of New York.
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1 A P P E A R A N C E S:

2

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21

22 ALSO PRESENT: Daniel Anderson (Newman Jones)

1 I N D E X

2 WITNESS EXAMINATION BY PAGE

3

4 DR. TRAVIS BLALOCK

5

6 MR. JAIRAM-CROSS 6

7 MR. SPEEGLE-REDIRECT 208

8 E X H I B I T S

9 PAGE

10

11 Exhibit 1005 Previously marked 93

12 Exhibit 1006 Previously marked 183

13 Exhibit 1007 Previously marked 121

14 Exhibit 1040 Previously marked 209

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(Witness sworn.)

THE REPORTER: Will counsel please state your appearances for the record.

MR. JAIRAM: This is Arvind Jairam, J-A-I-R-A-M, for the patent owner, Greenthread. And I'm with the firm McKool Smith. And I am joined by telephone -- or Zoom by my colleague Nick Matich, M-A-T-I-C-H.

MR. SPEEGLE: This is Mark Speegle with Baker Botts for petitioner, Onsemi, and the witness. And with me from Baker Botts via Zoom is Ellyar Barazesh. And also for Onsemi by Zoom from Newman Jones is Dan Anderson.

THE REPORTER: Counsel, you can begin.

1 DR. TRAVIS BLALOCK,
2 having been duly sworn by Eileen Mulvenna,
3 a Notary Public of the State of New York,
4 was examined and testified as follows:
5 CROSS-EXAMINATION
6 BY MR. JAIRAM:
7 Q. Good morning, sir.
8 A. Good morning.
9 Q. Would you please state and spell your
10 full name for the record.
11 A. Travis Blalock, T-R-A-V-I-S, and
12 Blalock, B-L-A-L-O-C-K.
13 Q. Before we begin, I just want to remind
14 you of some basic ground rules. You may already
15 know this, but I'll repeat this for the sake of
16 completeness.
17 You understand you've been placed
18 under oath today just as though you were in court?
19 A. Sure.
20 Q. Do you understand that you're bound to
21 answer my questions truthfully today?
22 A. Yes.

1 Q. And if a question is unclear, please
2 let me know so that I may rephrase as necessary;
3 otherwise I'll assume that you understood my
4 question. Okay?
5 A. Okay.
6 Q. Because your testimony is being
7 transcribed by the court reporter, do you understand
8 that you need to answer my questions verbally
9 instead of with gestures?
10 A. Yes.
11 Q. I'm going to do my best and I'm going
12 to ask that you do your best that we each speak one
13 at a time to make the court reporter's life easier.
14 Is that okay?
15 A. Yes.
16 Q. In terms of breaks, we will take
17 breaks during this deposition, but if you need one
18 at any time, please let me know. If a question is
19 pending, I'll probably request that you answer the
20 question before taking the break. Okay?
21 A. Okay.
22 Q. Any reason or issue that may prevent

1 you from answering my questions truthfully today?
2 A. No.
3 Q. Any medications or health conditions
4 that would prevent you from providing honest,
5 accurate and complete answers?
6 A. No.
7 Q. Do you understand that you have to
8 answer my questions, even if your counsel objects,
9 unless he directly instructs you not to answer?
10 A. Yes.
11 Q. I would also like to caution you not
12 to discuss the substance of your testimony during
13 your breaks.
14 A. Okay.
15 Q. Do you have any documents in hard copy
16 form with you that you brought to this deposition?
17 A. We just -- my counsel brought copies
18 of the declarations.
19 Q. Okay. Great.
20 I also have put in the chat window of
21 this Zoom electronic copies of some of the documents
22 we may be talking about. And I believe you are able

1 to access them; is that correct?
2 A. Yes. Yes.
3 Q. And I will also give you paper copies
4 of some of the key documents as we may discuss them
5 just for your convenience, and you could refer to
6 either the electronic one on your computer or the
7 paper one.
8 A. Okay.
9 Q. If you have any questions about which
10 document is being referred to, please let me know
11 and I'll do my best to clarify.
12 A. Okay.
13 Q. Do you understand that there are three
14 IPR, or inter partes review, proceedings that are
15 the subject of today's deposition?
16 A. Yes, I do.
17 Q. And those three IPRs are
18 IPR2023-01242, -01243 and -01244.
19 Do you understand that?
20 A. Yes.
21 Q. I will refer to them for brevity as
22 the 1242, 1243 and 1244 proceedings or IPRs. Okay?

1 A. Yes.
2 Q. And I may alternatively refer to them
3 in terms of their patent. The 1242 is the first IPR
4 proceeding for US Patent 11,121,222.
5 Do you understand that?
6 A. Yes.
7 Q. And --
8 A. Quick question.
9 Q. Yes.
10 A. May I write "42," "43" and "44" on the
11 front of these?
12 Q. Sure.
13 A. The --
14 Q. 1244 proceeding is the second IPR for
15 the same '222 patent that I just mentioned.
16 A. Okay, yes.
17 Q. And the 1243 proceeding is regarding
18 US Patent 10,510,842, or the '842 patent for short.
19 A. Okay.
20 Q. So at various times, we may refer to
21 either the declarations or other documents from one
22 or the other of the IPRs, and I will do my best to

1 specify which one. If it's at all unclear, please
2 feel free to ask and I will certainly clarify.
3 A. Okay. Thank you.
4 Q. You understand that the petitioner in
5 these IPRs is Semiconductor Components Industries
6 LLC, also called Onsemi, O-N-S-E-M-I?
7 A. Yes.
8 Q. And you understand that the patent
9 owner is Greenthread LLC?
10 A. Yes.
11 Q. And you submitted declarations in each
12 of these IPRs; correct?
13 A. That's correct.
14 Q. The declarations in these IPRs are
15 Exhibit 1003 in each of these three IPRs, and you
16 have a paper copy of them here with you; right?
17 A. Yes.
18 Q. And do those appear to be correct
19 copies of your declarations?
20 A. Yes, they do. Seems to be.
21 Q. Okay. And the patents at issue in
22 these proceedings are the '222 patent, which is

1 Exhibit 1001 in the 1242 and 1244 proceedings. And
2 I'm going to hand you a paper copy of it.
3 A. Thank you.
4 Q. And the other patent is the
5 '842 patent, which is Exhibit 1001 in the 1243
6 proceeding. And I'm going to hand you a paper copy
7 of that as well.
8 For the 1242 and 1244, since the same
9 patent is at issue, I've given you one copy of it,
10 but it's the same document --
11 A. Yes.
12 Q. -- in both of those proceedings.
13 Do you understand that?
14 A. Yes.
15 Q. I may at various times refer to both
16 of the patents collectively as "the challenged
17 patents" and the claims that are challenged as "the
18 challenged claims."
19 Is that okay?
20 A. Okay.
21 Q. I may refer to these three IPRs
22 collectively as "these three IPRs" or "these three

1 proceedings" or "these three cases." Okay?
2 A. Okay.
3 Q. Dr. Blalock, have you been deposed
4 before?
5 A. Yes.
6 Q. How many times have you been deposed
7 before?
8 A. Oh, maybe a dozen. I'm not sure. I'd
9 have to go back.
10 Q. And approximately how many times --
11 was that in the context of district court or in the
12 context of an IPR or any other kind of proceeding?
13 A. Gosh, I don't really remember, but --
14 I think they were mostly district court, but I don't
15 remember the specifics.
16 Q. And do you know approximately how many
17 times you were on behalf of a patent owner or how
18 many times you were on behalf of a defendant in
19 district court or a petitioner in an IPR?
20 A. No, I don't remember the numbers.
21 District court often it's going both ways, so -- but
22 I don't remember the specific numbers.

1 Q. Without telling me the substance of
2 any communications you may have had with the
3 attorneys, what did you do to prepare for your
4 deposition today?
5 A. Oh, I reviewed the reports and looked
6 at the various references as I went through the
7 reports.
8 Sorry. The screen went blank.
9 And then Mark and I met for a little
10 while on a couple days. So basically just reviewed
11 the documents and -- went through the documents,
12 went through the declarations with counsel.
13 Q. Okay. Have you read the board's
14 institution decisions in any of the IPRs?
15 A. I actually have not.
16 Q. Have you read the petitions filed by
17 Onsemi in these IPRs?
18 A. Yes. It's been a while, but, yeah, I
19 read them way back.
20 Q. Who were the --
21 A. Pretty sure. I think I did. Let me
22 make -- I know that we discussed parts of them. I

1 just want to make sure. It's been a while.
2 I think we may have discussed parts,
3 but I didn't depend on any of that for these
4 declarations.
5 Q. Who wrote the declarations that were
6 submitted in these IPRs?
7 A. These declarations are my opinions.
8 And I wrote them and -- with help from attorneys and
9 counsel and lots of drafts back and forth.
10 Q. Do you have a typical process that you
11 follow when drafting a declaration in terms of what
12 parts of it you write, what parts of it you may rely
13 more on the lawyers for?
14 MR. SPEEGLE: I'm going to object to
15 the extent it calls for privileged
16 communications.
17 But if you can answer without
18 disclosing communications with counsel, you
19 can.
20 THE WITNESS: Well, I certainly focus
21 on the technical aspects the most. I get
22 help with specific legalese and putting

1 things in the right structure and things like
2 that, but I really focus on all the positions
3 and the technical details. But there's a lot
4 of back and forth.
5 BY MR. JAIRAM:
6 Q. Are you aware of any errors in your
7 declarations?
8 A. We did happen to see a couple typos.
9 I don't know if you want to go through those right
10 now. They were minor. They're not substantive, but
11 there are some typos.
12 Q. Apart from typos, any substantive
13 errors or incorrect positions that you wish to
14 mention?
15 A. No, not in any positions. I will say
16 in the 44 -- several cases, as the text went back
17 and forth between different word processors,
18 "micron" became "millimeters" a couple of times and
19 became I think the letter "P" one time, so -- but if
20 you're looking at it in the context with the patent,
21 you would see what the correct numbers were.
22 Then a couple of other places I might

1 have -- I think I might have found a -- I think
2 there was one that was to a Wolf -- reference to
3 Wolf, and maybe the page number was wrong, something
4 like that, but no substantive.
5 Q. In your declaration in the '842 IPR,
6 that's the 1243 proceeding, if you can look at
7 paragraph 51, please.
8 A. Okay.
9 Q. And let me know when you're there.
10 A. You said the 43?
11 Q. Yes, 1243 proceeding.
12 A. Yes, I'm there.
13 Q. That section is referring to claim
14 construction; correct?
15 A. Yes, it is.
16 Q. You didn't say that any claim terms
17 need to be construed; correct?
18 A. Well, I'm saying you can take the
19 plain meaning. And especially in light of this
20 prior art, I think it's such good prior art that it
21 becomes pretty clear.
22 Q. You said the same thing in your other

1 two declarations; correct? We can turn to each of
2 them if you want.
3 A. Yes, I did.
4 Q. So you specifically said in your
5 declarations that you were not construing, yourself,
6 any claim terms; correct?
7 MR. SPEEGLE: Objection,
8 mischaracterizes the document.
9 THE WITNESS: Well, I mean, as I went
10 through the terms, I discussed my reading of
11 what the terms meant. And then I explained
12 the relationship between that meaning and the
13 claims in the patent, the prior art in the
14 patent. If you want to look at some specific
15 cases, we can do that.
16 BY MR. JAIRAM:
17 Q. I'm asking about proposed
18 constructions. I see that you listed various patent
19 owner-proposed constructions and Intel's proposed
20 constructions.
21 Do you see that?
22 A. Yes, I see that.

1 Q. There are not any constructions that
2 you've mentioned that are proposed by the
3 petitioner; correct?
4 A. Not here, no.
5 Q. Are there any in the other two
6 declarations, any constructions proposed by the
7 petitioner?
8 A. In -- I'll just double-check.
9 (Document review.)
10 THE WITNESS: Yes, I think this
11 paragraph is similar. I'll just -- so as I
12 stated in I believe all three of these, I
13 state -- I previously stated -- well, this
14 is -- that I supported Intel's proposed
15 constructions. "However, I do not believe
16 any terms need to be construed to resolve the
17 issues presented in this Petition because, in
18 my opinion, as the Challenged Claims are
19 unpatentable under either party's proposed
20 constructions (except for the term 'active
21 region...within which transistors can be
22 formed', which I address under Patent Owner's

1 proposed construction)."
2 BY MR. JAIRAM:
3 Q. Did you independently form any
4 opinions about the meaning of the claim terms in any
5 of these three patents independently from what the
6 attorneys in either the Intel IPRs or these Onsemi
7 IPRs may have told you?
8 A. Well, as I said before, I went through
9 the claims. And I've stated in my declarations how
10 I interpreted those claims. And I addressed the
11 proposed constructions that were available at the
12 time. So if you'd like to look at any of those in
13 particular, we can certainly do that.
14 Q. Can you take a look at paragraph 51 in
15 the '842 declaration. And can you please read that
16 paragraph out loud.
17 THE REPORTER: And slowly, please.
18 THE WITNESS: "I understand that the
19 44 claims in the '222 patent, including the
20 challenged claim, issued without prior
21 art" --
22

1 BY MR. JAIRAM:
2 Q. Sorry. If I could just pause you
3 there. I think we're talking about a different
4 paragraph. Are you looking at paragraph 51?
5 A. Yes, of 42?
6 Q. My mistake. Of the '842, which is the
7 1243. And we're probably going to have numerous
8 such occasions of -- if I interrupt you, it's only
9 because I'm just trying to make sure we're looking
10 at the right thing. I'll try and not interrupt you,
11 though.
12 Can you please read paragraph 51 of
13 the '842 declaration.
14 A. Yes, just one second.
15 THE REPORTER: Doctor, please slow
16 down when you're reading.
17 THE WITNESS: All right.
18 Wait a minute. For the '842?
19 BY MR. JAIRAM:
20 Q. Yes, it's the 1243.
21 A. Oh, okay.
22 Q. So if you could please read aloud

1 paragraph 52 of the '842 declaration.
2 A. "It is my opinion that for purposes of
3 this proceeding," this IPR proceeding, "the claimed
4 terms may not be construed to resolve the prior art
5 issues presented in this petition."
6 Q. So when you said "in this petition,"
7 what did you mean?
8 A. Oh, well, in the IPR filing related to
9 this declaration.
10 Q. Okay. Okay.
11 A. It doesn't mean you don't give meaning
12 to the claims. There just wasn't a specific --
13 there were proposed constructions at the time. And
14 as we go through the document, you'll see that, in
15 many cases, I looked at the claims with respect to
16 plain and ordinary meaning and then I also looked at
17 the claims with respect to the proposed
18 constructions.
19 Q. Well, you're referring to "this
20 petition." So is this some part that the attorneys
21 wrote and gave you this text?
22 MR. SPEEGLE: Objection to the extent

1 it calls for attorney-client communications
2 and work product.
3 But you can answer without disclosing
4 communications with counsel if you can.
5 THE WITNESS: You're talking about
6 this paragraph or these constructions?
7 BY MR. JAIRAM:
8 Q. I was just asking about how it says
9 "this petition." It doesn't refer to "this
10 declaration."
11 A. Oh, well. Sorry. Yeah, I think
12 that's probably a typo on my part. Apologies for
13 that. There was drafts and language going back and
14 forth, so certainly I intended to say "this
15 declaration." I get what you're getting at.
16 Q. So did you reach any opinions about
17 specific constructions other than the plain meaning
18 of what any of the claim terms should be?
19 A. As I said, throughout the report, I
20 make reference to several -- to the proposed
21 constructions at times and discuss my opinion with
22 respect to those proposed constructions.

1 Q. Are those only the proposed
2 constructions of patent owner and of Intel, or are
3 they the proposed constructions of the petitioner in
4 these Onsemi IPRs?
5 A. These are the proposed constructions
6 shown here on this page -- in this document. Those
7 were the only constructions available at the time.
8 Q. When you say "available at the time,"
9 what do you mean?
10 A. Well, we generated these -- I mean, as
11 you know, this IPR -- this declaration has a
12 history, but when I was working with Onsemi, these
13 were the only constructions I was aware of.
14 Q. Are you basing it off of prior
15 existing constructions, or did you come up with any
16 constructions on your own?
17 A. I believe the patent owners and
18 counsel had already had discussions about
19 constructions, and so that's where these originated.
20 Q. Did you disagree with any of the
21 then-existing constructions and feel that any
22 constructions should be different?

1 A. Well, I address this throughout the
2 report -- the declarations. I -- as we go through
3 the different claim elements, at times I take the
4 plain and ordinary meaning. And then I also -- when
5 there are -- when there were proposed constructions
6 available, I expressed opinions with respect to
7 those also.
8 Q. Okay. But in the claim construction
9 sections of the '842 IPR declaration and also the
10 other two declarations, you do not list any Onsemi
11 proposed constructions; correct?
12 A. I do not list any Onsemi
13 constructions.
14 Q. Sitting here today, do you believe
15 that any of the claim terms in the challenged claims
16 of the '842 or '222 patents need to be construed?
17 MR. SPEEGLE: Objection, form.
18 THE WITNESS: I mean, my opinions are
19 in these declarations and I haven't
20 considered any other constructions.
21 BY MR. JAIRAM:
22 Q. I know. I'm just trying to kind of

1 understand your opinions specifically in the claim
2 construction section. I'm trying to understand if
3 you believe -- quite apart from what other parties
4 may have proposed in the past, I'm asking if you
5 believe that any of the claim terms of the
6 challenged claims of either of the two challenged
7 patents need to be construed.
8 MR. SPEEGLE: Objection, form.
9 Objection, scope.
10 THE WITNESS: My opinion expressed in
11 these declarations is that I was able to show
12 that even with plain and ordinary meaning, as
13 an expert and as a person of skill in the
14 art, I was able to -- let me put it this way:
15 When I'm looking for invalidity, especially
16 with respect to this proceeding, I am --
17 if -- I'm sort of giving the claim drafter
18 the benefit of the doubt and trying to make
19 the best meaning of it I can.
20 And there are cases -- there are
21 places where I felt things were -- there are
22 certainly claim terms that are less clear

1 than others, but as -- I've been asked to try
2 to understand what those claim terms mean and
3 then look at the prior art with respect to
4 that, and so I try to give -- in this
5 context, I try to give the drafter the
6 benefit of the doubt.
7 I haven't expressed opinions in this
8 as to whether they're, you know, vague or
9 things aren't clear enough. So I'm looking
10 at the prior art, and what I'm finding is
11 that the prior art is like really right down
12 the middle of what's in these patents and the
13 challenged claims. And I express that in the
14 report. If you'd like to look at some of
15 those opinions, let's do that.
16 BY MR. JAIRAM:
17 Q. Are the claim terms of the challenged
18 claims of the two challenged patents understandable
19 to a person of ordinary skill?
20 MR. SPEEGLE: Objection, form.
21 Objection, scope.
22 THE WITNESS: I'm trying to determine

1 if these claims are disclosed by or made
2 obvious with respect to the prior art. I
3 am -- a person of skill in the art who is
4 trying to implement the technology in these
5 patents needs to understand the prior art.
6 The person of skill in the art was not
7 examining these patents.
8 So my opinion is that the person of
9 skill in the art would understand this prior
10 art to express the technology in the patents.
11 And as an expert, I can look at these patents
12 and do my best to understand them and then
13 look at the prior art and see how well it
14 discloses or makes obvious that technology.
15 BY MR. JAIRAM:
16 Q. Were you able to understand the claims
17 that you analyzed in your declarations?
18 A. I was able to -- as you see, I have
19 opinions on all the claims, and I expressed what
20 those opinions meant to the best of my ability. And
21 I'm doing that as an expert trying to -- trying to
22 give the drafter the benefit of the doubt so that I

1 can then understand -- attempt to understand what
2 that's doing and look at the prior art in that
3 context.
4 Q. So is that a, yes, you were able to
5 understand the claims?
6 A. That was what I just said. I think I
7 answered your question.
8 Q. I'm trying to see. It's a little hard
9 to tell from your response. Can you just --
10 A. I expressed an opinion on the claims
11 in light of the prior art. And so as an expert, I
12 came to an understanding of those particular claims.
13 Q. Does coming to an understanding mean
14 that you ultimately did understand the claims?
15 A. Some of the language is not very good.
16 And I came to an understanding and people could
17 probably discuss whether or not -- in other words,
18 I'm not reading -- I'm not trying to understand the
19 claims as a POSITA. I'm doing that as an expert.
20 I'm looking at the prior art from the perspective of
21 a POSITA.
22 But given a claim and given that we're

1 trying to understand how the prior art relates to
2 the current claim, I looked at the language and did
3 the best I could. And I expressed that in these
4 declarations.
5 Q. When you say that you're not trying to
6 understand the claims as a POSITA, as I heard you
7 say in your last response, what do you mean by that?
8 A. Well, in this case, I'm an expert
9 looking at these patents and I'm trying to
10 understand what the claims mean. Of course, there
11 are lots of attorneys discussing what the claims
12 mean. But I'm looking -- understanding the
13 technology and what's being expressed and then
14 considering, in light of the prior art, how a POSITA
15 would operate given that prior art if they were
16 trying to do the things I discussed in the claims.
17 If I -- I mean, I -- yeah.
18 Q. Did you present your opinions from the
19 perspective of a POSITA, P-O-S-I-T-A, as a person of
20 ordinary skill in the art?
21 A. Yes.
22 Q. And are your opinions about what the

1 claims mean from the perspective of a POSITA?
2 A. Well, wherever possible. If there
3 were claims that were a little harder to understand,
4 I might have had to -- like I said, give the drafter
5 sort of the benefit of the doubt and come to an
6 understanding. And I've expressed that within the
7 report.
8 Q. Are there any specific claims or claim
9 terms that you were not able to understand?
10 A. I read the claim terms and did the
11 best to come to an understanding and then looked at
12 that with respect to the prior art.
13 Q. Okay. But do you want to point us to
14 any specific claim terms in either the '842
15 declaration or in either of the other two
16 declarations where you weren't able to understand
17 what is meant?
18 A. I don't remember the specifics. I do
19 remember there were cases where I -- the language
20 was not terribly clear. And so I tried to give the
21 drafter the benefit of the doubt and come to an
22 understanding and then look at the prior art with

1 respect to that.
2 Q. Can you give an example of what you're
3 referring to about -- can you point to a specific
4 paragraph or claim in any of these declarations when
5 you're saying you gave the drafter the benefit of
6 the doubt because the language was, as you put it,
7 not terribly clear?
8 A. No, I can't remember specifically. We
9 may see some of those as we go through it today.
10 It's been a while.
11 Q. Okay. Is there anything in the claim
12 construction sections of any of your three
13 declarations that mentions any claim language that's
14 unclear or less than clear?
15 A. As I said in paragraph 52, "Nothing in
16 this section should be construed as expressing any
17 opinion as to whether the claims constitute
18 patentable subject matter...or whether they satisfy
19 the definiteness, enablement, best mode, or written
20 description requirements...."
21 I'm not forming an opinion on those
22 things.

1 Q. You had to understand the claims in
2 order to map them to prior art; right?
3 A. I -- I've already answered this. I
4 read the claims and came to the best understanding I
5 could, but I was not reading them in light of trying
6 to understand whether they satisfied definiteness,
7 enablement, best mode or written description
8 requirements.
9 Q. And you were able to map all the claim
10 terms to prior art?
11 A. I expressed opinions on all those,
12 yes.
13 Q. Did your opinions express that you
14 were able to or, instead, that you were perhaps not
15 able to for any claim terms?
16 A. I've already answered that several
17 times.
18 Q. Were you able to map all of the claim
19 terms in all of the challenged claims to prior art?
20 A. In this report, I -- as I said, I went
21 through the claims. I made the best interpretation
22 I could of that meaning. And then I mapped -- and I

1 found and did map prior art to those elements. I
2 was not in that -- as I was doing that procedure, I
3 was not looking at them in light of specific
4 definiteness, enablement, best mode or written
5 description requirements.
6 Q. Okay. Are there any specific terms
7 that you wish to identify - and we can talk in more
8 detail - where you were not able to map to prior art
9 because you couldn't understand what the terms
10 meant?
11 A. I said I formed an understanding and I
12 mapped prior art, but I was not forming that
13 understanding in the context of deciding whether
14 that specific language satisfied the legal
15 definitions of definiteness, enablement, best mode
16 or written description requirements. I'm not
17 expressing opinions on those terms.
18 Q. I hear you saying that you formed an
19 understanding and you mapped prior art, but I'm
20 trying to figure out, did that apply to all the
21 claim terms? Or are you saying generally you did
22 that and maybe there were some that you had trouble

1 with and couldn't? Could you please clarify if you
2 were doing that -- if you were able to do that
3 mapping for all the claim terms in all the
4 challenged claims?
5 MR. SPEEGLE: Objection, compound.
6 Objection, asked and answered.
7 THE WITNESS: I mean, I don't know how
8 many times I need to tell you this. You keep
9 asking me the same question and I keep giving
10 you the answer.
11 This report has claims -- has opinions
12 regarding the mapping of prior art and
13 showing disclosure and obviousness to the
14 prior art with respect to these claims. This
15 prior art is so down the middle of this
16 technology, that it's -- if you look at the
17 patents as a whole and the claims, this prior
18 art is really good for it.
19 So I never felt it was -- it was very
20 clear and obvious how -- that this prior art
21 disclosed and/or made obvious these claims.
22 But as I said, I was not looking at the

1 claims with respect to the specific legal
2 requirements of definiteness, enablement,
3 best mode or written description
4 requirements.
5 BY MR. JAIRAM:
6 Q. Can you please turn to page 42 of your
7 '842 declaration.
8 A. Oh, so 43?
9 Q. Page 42, please.
10 A. 42?
11 Q. Yes.
12 A. Okay.
13 Q. You analyzed Claim Element 1.2 of the
14 '842 patent here; right?
15 A. Yeah.
16 Q. And Element 1.2 includes the phrase
17 "first active region"; correct?
18 A. Yes, that's there.
19 Q. What is meant by "active region" in
20 that claim element?
21 MR. SPEEGLE: Object, form. Object,
22 scope.

1 THE WITNESS: It's the active region
2 of the transistor and includes the
3 source-drain regions and the channel. That's
4 the way I'm reading it here.
5 BY MR. JAIRAM:
6 Q. What are you basing that on when you
7 say that's the way you're reading it here?
8 A. That's a common usage of the term
9 "active region."
10 Q. You did not present a construction
11 with the term "active region"; correct?
12 MR. SPEEGLE: Objection,
13 mischaracterizes the document.
14 THE WITNESS: I'm sorry. I was
15 reading. What was your objection?
16 MR. SPEEGLE: Mischaracterized the
17 document.
18 THE WITNESS: Yeah, I -- I mean, as I
19 said, there are constructions. Let me go
20 back.
21 (Document review.)
22 THE WITNESS: I discuss the

1 constructions of "active region," but I --
2 hold on a second.
3 Where were we before? Which paragraph
4 or which page?
5 BY MR. JAIRAM:
6 Q. I'm asking about Element 1.2, which
7 begins on page 42.
8 A. Good. Thank you.
9 Now I'm remembering it.
10 Yeah, this language, it's a little --
11 it's a little odd because we generally talk about
12 the active region with respect to -- you saw in the
13 table here this entire term, the patent owner had a
14 construction, "doped silicon region at the surface
15 of a semiconductor device where a transistor can be
16 formed."
17 And then Intel at that time felt it
18 was indefinite, but I wasn't expressing an opinion
19 about whether it was indefinite or not.
20 But I -- for the purposes of this,
21 even though active region is usually discussed with
22 respect to a source -- oh, I'm sorry.

1 Are you asking about "active region"
2 or this entire term?
3 Q. Either one.
4 A. The only -- I mean, this language of
5 "within which transistors can be formed" is a little
6 odd in that normally transistors -- when we speak
7 about an active region, we're talking about the
8 source and drain and channel region of the
9 transistors.
10 So this language is talking about
11 something, but then it's saying where it could be.
12 And so I'm trying to give this the most
13 straightforward meaning I can. And I construed it
14 as I -- or understood it as I described in the
15 following text.
16 Q. On page 44 of your '842 declaration,
17 you've got a figure that appears to be annotated at
18 the bottom, some colors and some labels.
19 Did you add those labels?
20 A. No. The numbers -- the numerical --
21 you're talking about the red label.
22 Q. Yes. It says, "First Active Region,"

1 "NMOS Transistor." It looks like those are
2 annotations that are not in the patent.
3 A. Yes. Yes, those two were annotations.
4 Q. Did you add those annotations or is
5 that something that was provided to you?
6 A. Oh, I --
7 MR. SPEEGLE: Object to the extent it
8 calls for privileged and work product
9 communication.
10 But if you can answer without
11 disclosing privileged or work product
12 communications, you can.
13 THE WITNESS: As I said, we went back
14 and forth on drafts and things. I don't know
15 specifically when those...
16 BY MR. JAIRAM:
17 Q. So you listed something as -- in
18 purple, as the first active region. And it looks
19 like you color-coded some portions of the
20 cross-section in purple.
21 Do you see that?
22 A. Yes. As I -- as I said here, Kawagoe

is -- Kawagoe -- I can spell it.

MR. SPEEGLE: It's best to spell it for the record.

THE WITNESS: K-A-W-A-G-O-E. I'm going to say Kawagoe, although I know that's not the correct pronunciation, but it's easier for me.

So, yeah, I'm using active region as the -- the source-drain regions of the NMOS transistor and including the channel.

BY MR. JAIRAM:

Q. Is the active region exactly just the portions that are shown in purple in your annotated figure on page 43, or is there any additional portion that's also part of the active region?

MR. SPEEGLE: Objection, form. Objection, scope.

THE WITNESS: As I say, the active regions are those in which transistor action occurs, the channel and the heavily doped source and drain regions.

1 BY MR. JAIRAM:
2 Q. Is there any other portion of that
3 cross-sectional figure that's also part of the
4 active region, or is it just those parts that you
5 color-coded in purple?
6 MR. SPEEGLE: Objection, form.
7 Objection, scope.
8 THE WITNESS: I mean, there's an
9 additional transistor. Is that what
10 you're...
11 BY MR. JAIRAM:
12 Q. I'm just asking with respect to the
13 transistor that is annotated there, the 4N
14 transistor.
15 Is there any other portion of that
16 figure that is active region, or it's just the
17 portion that you've color coded in purple?
18 MR. SPEEGLE: Objection, form.
19 Objection, scope.
20 THE WITNESS: Yeah, I mean, I'm -- I'm
21 not forming an opinion on the outer limits of
22 these patents in the sense that does the

1 prior art disclose or make obvious a
2 reasonable expert or POSITA - either,
3 actually - opinion about what this claim
4 term, in this case "active region," means.
5 So, you know, I'm finding -- I've
6 described here an active region. This is
7 source-drain regions and the channel. And
8 I've identified those in the figure,
9 Figure -- I don't know what kind of precision
10 you're wanting. The figures aren't terribly
11 precise, but in the text, I explain it's the
12 source-drain regions and the channel.
13 BY MR. JAIRAM:
14 Q. Okay. In terms of your background and
15 experiences, you mentioned in your declaration that
16 you worked with CMOS chips. That's C-M-O-S;
17 correct?
18 A. Yes.
19 Q. What are CMOS chips?
20 A. Complementary metal oxide
21 semiconductors. They're technology that has N- and
22 P-type MOSFETs at least.

1 Q. So when you're referring to MOSFETs
2 or -- I'm going to spell out some of these acronyms
3 for the benefit of the court reporter. And to the
4 extent that you feel it would be helpful, please
5 feel free to do so as well in your responses.
6 When you're referring the MOSFETs,
7 which are M-O-S-F-E-T, these are transistors; right?
8 A. Well, MOSFETs, they are typically used
9 as transistors, but they can be used as resistors,
10 they can be used as capacitors. They can take on a
11 variety of roles depending on how they're used in a
12 particular circuit.
13 Q. What are the kinds of CMOS
14 transistors? You mentioned N, P. Can you say what
15 that is?
16 MR. SPEEGLE: Objection, form.
17 THE WITNESS: Sure. There are NMOS,
18 or N-type, transistors, and there are PMOS,
19 or P-type, transistors.
20 BY MR. JAIRAM:
21 Q. What does that mean? What are you
22 referring to when you say "N-type" or "P-type"?

1 A. Referring that for a transistor, we're
2 talking about the dopant, D-O-P-A-N-T, types used
3 for the source and drain diffusions -- to form the
4 source and drain diffusions.
5 Q. So you're saying if it's an N-type,
6 then you've got N-type dopant at the source and
7 drain; is that right?
8 A. Yeah.
9 Q. And if it's P-type transistor, then
10 it's P-type doping in the source and drain; is that
11 right?
12 A. Yes.
13 Q. Is the -- is the channel also N- or
14 P-type or does that vary?
15 A. An NMOS transistor is constructed
16 within a P-type well.
17 Q. When you say it's "constructed within
18 a P-type well," what do you mean?
19 A. Well, just like in this figure, we can
20 see the P figure on page 43, the well labeled "P."
21 And the 4N transistor that's annotated is an NMOS
22 transistor and it has N-type source and drain. And

1 then there is -- the P-well is present under the
2 channel between the source and drain.
3 Q. Had you designed NMOS or PMOS
4 transistors before?
5 A. When you say "designed," do you mean
6 from the foundry level?
7 Q. I don't know. Whatever level you feel
8 is appropriate to constitute design.
9 A. Well, in terms of circuit design, I've
10 absolutely designed integrated circuits that use
11 NMOS and PMOS transistors. And I've designed their
12 geometries for the layout for the circuit.
13 Q. When you said at "the foundry level,"
14 what do you mean in terms of that kind of design?
15 A. Well, there are specialists who decide
16 how thick a diffusion should be and how much dopant
17 should be added and lots of those very precise
18 details.
19 Q. So in terms of forming, as you said,
20 an N transistor in a P-well, have you ever done that
21 before?
22 A. Have I gone into the foundry and

1 operated the machinery to form an NMOS transistor?
2 Q. Maybe not operating the machinery
3 yourself, but have you directed or designed or --
4 A. I've designed many chips and they've
5 been manufactured. And they had NMOS and PMOS
6 transistors.
7 Q. And is an NMOS transistor always
8 sitting in a P-well? I think you said that -- well,
9 let me just rephrase.
10 If you have a P-well, do you form an
11 NMOS transistor or a PMOS transistor in the P-well?
12 A. You typically form an NMOS transistor.
13 There are some unusual cases that aren't in the
14 scope of this where you might do that differently,
15 but that's for a very specific thing that's not --
16 it's not the -- within the scope of these patents or
17 the prior art.
18 Q. But in the typical cases, you form an
19 NMOS transistor in a P-well; is that right?
20 A. Yes.
21 Q. And you form a PMOS transistor in an
22 N-well?

1 A. Yes, that's the normal usage.
2 Q. Again, just to get the terminology
3 clear between us, when you're saying the "NMOS
4 transistor," you're referring to the source and
5 drain and not to the channel; is that correct?
6 A. No, the channel is part of the
7 transistor.
8 Q. So if -- an NMOS transistor, is that
9 an N-channel?
10 A. When it is operating, the channel
11 becomes inverted and it has N-type -- has electrons
12 as the carriers.
13 Q. Okay.
14 A. But an NMOS transistor is manufactured
15 with N-type source and drain diffusions.
16 Q. And as it's manufactured, can you ever
17 have an NMOS transistor with N-channel and N source
18 and drain?
19 MR. SPEEGLE: Objection, scope.
20 THE WITNESS: An NMOS transistor is
21 typically -- and in examples here, are built
22 in P-wells. When you use the transistor in a

1 circuit and you drive the gate, you form an
2 inversion layer. And that inversion layer
3 end of the channel is N-type. But the
4 substrate without any electrical signals
5 attached in the -- underneath the channel is
6 P-type. It's part of the well. But it's
7 part of --
8 BY MR. JAIRAM:
9 Q. And you're saying --
10 A. Sorry. The channel portion and where
11 the transistor action is going to occur is part of
12 the transistor. It's part of the active region.
13 Q. So the channel as manufactured, you're
14 saying that it's part of the well, so it's the same
15 doping type as the well --
16 A. It is --
17 MR. SPEEGLE: Objection, scope.
18 THE WITNESS: It's built within the
19 well and -- but the channel is part of the
20 transistor.
21 BY MR. JAIRAM:
22 Q. Okay. Would it make sense to have the

1 NMOS transistor have N source and drain and
2 N-channel in a P-well before you operate the
3 inversion, as you said?
4 MR. SPEEGLE: Objection, form.
5 Objection, scope.
6 THE WITNESS: In the transistors that
7 we're discussing here, these transistors are
8 all built in the P-well. And these are all
9 enhancement-mode transistors, meaning you
10 have to apply a voltage greater than the
11 threshold voltage to invert and form the
12 conduction between the source and drain
13 diffusion, form that conduction layer.
14 If you're -- I don't think it's
15 important for this, but there are very rarely
16 used things called enhancement-mode
17 transistors, and then the doping under the
18 channel might be adjusted a little bit,
19 but -- so that the transistor could be on
20 before a voltage is applied. But, again,
21 that's outside of the scope of what we're
22 talking about here.

1 BY MR. JAIRAM:
2 Q. I don't want to talk about what's
3 outside the scope. So whatever -- this enhancement
4 mode that you just mentioned, that does not apply to
5 the patent or to the prior art that you've analyzed;
6 right?
7 A. Well, it's a type of transistor. It's
8 just not necessary -- look, I'm looking for prior
9 art that fulfills the claims. So I'm not trying to
10 explain every possible usage. So I'm not forming an
11 opinion as to whether enhancement-mode transistor
12 couldn't be part of this technology.
13 You asked me a question and I was
14 trying to discuss the technology, but -- I mean,
15 these are hypotheticals. I think it probably makes
16 more sense to look at the opinions here.
17 Q. And I'm just trying to understand what
18 kinds of terminology and what kinds of transistors
19 we're talking about that's in the prior art.
20 So I guess putting aside the
21 enhancement-mode transistors that you just now
22 mentioned, is there a term or something that we can

1 call the other transistors, which I think you're
2 saying are the more typical kind? Is that called --
3 A. No, I'm sorry. I may have gotten that
4 wrong. The depletion-mode transistors are the ones
5 that are on when there's no voltage applied at the
6 gate. These are enhancement-mode transistors,
7 meaning you have to apply voltage at the gate to
8 form the conduction layer.
9 Q. So --
10 A. And these are the typical transistors
11 used in CMOS.
12 Q. And so I'm just trying to avoid
13 confusion here.
14 The transistors that you have analyzed
15 in, you know, the prior art or in the challenged
16 patents here, what kind of transistors are they?
17 A. These appear to be -- well, I mean,
18 they haven't -- I don't think they've expressed
19 whether they're particularly -- I'd have to look --
20 whether they particularly were enhancement or
21 depletion mode, but they are MOS transistors. And
22 the vast majority of CMOS circuits are

enhancement-mode transistors. So I think it's easiest to just call these transistors.

Q. Does that apply to the prior art references that you've analyzed -- let's say the references in the grounds of the three IPRs, are they all one type of transistor, depletion mode, or are any of them enhancement mode --

A. Well, enhancement mode is the far more common.

Q. Okay.

A. I actually at the moment don't remember specifically, but I believe --

Q. And --

A. -- they're most likely enhancement mode.

Q. So enhancement mode is the more common --

A. Yes.

Q. -- mode?

As we talk about specific prior art references, I may ask you again what type of transistor it is so that we can be kind of talking a

1 common lingo. Is that okay?
2 A. Let's just call them transistors.
3 Q. Okay. So for MOSFET, M-O-S-F-E-T,
4 transistors, did you say that there are N-type and
5 P-type transistors?
6 A. Yes.
7 Q. Are there any other types of MOSFETs?
8 A. Well, in a typical CMOS process, yes,
9 there are only N-type and P-type transistors.
10 Q. So for an enhancement-mode MOSFET, are
11 the transistors in an NPN configuration or a PNP
12 configuration for their source, channel and drain?
13 MR. SPEEGLE: Objection, form.
14 THE WITNESS: Hang on a second. I was
15 just looking at -- we never describe CMOS
16 transistors as NPN or PNP.
17 BY MR. JAIRAM:
18 Q. Can you tell me if you know what is
19 meant by an NPN transistor or a PNP transistor?
20 A. Well, it's outside -- that's not
21 what's being discussed here, but NPN and PNP are
22 typically terms used for bipolar transistors.

1 Q. And when you say "bipolar
2 transistors," what do you mean?
3 A. It's not -- it's a different type of
4 transistor technology that's not the subject of
5 these claims.
6 Q. Okay. Are the prior art references
7 bipolar transistors?
8 A. The prior art references are CMOS
9 transistors.
10 Q. So do -- the terms "enhancement mode"
11 and "depletion mode," those are referring to CMOS
12 transistors --
13 A. Yes.
14 Q. -- or -- okay.
15 Do those have applicability for
16 bipolar transistors?
17 MR. SPEEGLE: Objection, form.
18 THE WITNESS: The terms "enhancement
19 mode" and "depletion mode"?
20 BY MR. JAIRAM:
21 Q. Yes.
22 I'm just trying to understand --

1 A. Yes, they're not -- that term is not
2 normally used with bipolar transistors.
3 Q. Okay.
4 MR. JAIRAM: Let's take a short break
5 here. We've been going for an hour. We can
6 go off the record.
7 THE REPORTER: We're off the record.
8 (Recess from the record.)
9 MR. JAIRAM: Eileen, we are all good
10 to go back.
11 THE REPORTER: Okay. We're back on
12 the record.
13 BY MR. JAIRAM:
14 Q. Dr. Blalock, you mentioned before the
15 break that designing transistors could be referring
16 to, as you said, I think foundry-level design or
17 other levels of design.
18 Can you just say again kind of the
19 different senses in which one may think of designing
20 a transistor?
21 MR. SPEEGLE: Objection, form.
22 Objection, scope.

1 THE WITNESS: I'm just trying to
2 understand how that's relevant to what
3 we're -- transistors we're examining here
4 have already been designed and built.
5 BY MR. JAIRAM:
6 Q. Well, the challenged patents here, the
7 '222 and '842 patents, are talking about different
8 layers. I'm trying to understand if you have
9 experience with those technologies.
10 A. I have vast experience using and
11 understanding these technologies. And in order to
12 do design, you have to understand these structures
13 and how they operate and how they work, and, you
14 know, what different dopants and all these things
15 mean. So as I explained at the beginning in my
16 background, I utilize that knowledge in the design
17 of circuits.
18 Q. So when you say "circuits," is that
19 saying what a transistor is used for, like -- what
20 do you mean by "circuits"?
21 A. Circuits are where you combine
22 different circuit elements together to implement a

1 particular function.
2 Q. But in terms of what goes into the
3 transistor in a particular circuit, do you have
4 experience of actually designing the things that go
5 into the transistor?
6 MR. SPEEGLE: Objection, form.
7 THE WITNESS: I mean, I -- in grad
8 school, we did some of those things. My
9 particular -- as a circuit designer, I used
10 those. In other words, a foundry produces a
11 process that has certain diffusions and wells
12 and all of those structures. And I -- and
13 I've taught students how these things work.
14 And so I feel comfortable as an expert
15 talking about these structures and how they
16 are formed -- how they were formed and
17 what -- especially within the context of
18 these patents.
19 BY MR. JAIRAM:
20 Q. Okay. Apart from grad school, which
21 you mentioned, did you elsewhere implement or design
22 what goes into a transistor? I'm not talking about

1 the circuit itself. I'm talking about the
2 transistor.
3 MR. SPEEGLE: Objection, form.
4 THE WITNESS: My background is as I
5 described at the beginning of the
6 declarations. I was primarily -- well, I've
7 been a professor teaching how these
8 structures are formed, and I've designed lots
9 of circuits where it was essential to
10 understand the structures and how they
11 operate.
12 BY MR. JAIRAM:
13 Q. You said earlier that there are
14 specialists who design -- who decide how thick a
15 diffusion layer should be.
16 Do you consider yourself one of those
17 experts?
18 MR. SPEEGLE: Objection,
19 mischaracterizes testimony.
20 THE WITNESS: As I just said, I have
21 not -- and it's -- I didn't claim this in my
22 background. I haven't worked in the foundry

1 operating the machinery and making that.
2 What I have done as a designer is I have
3 utilized understanding and knowledge of the
4 implications that those different structures
5 have, how they're formed, their sizes, and
6 I've used that knowledge to design circuits.
7 BY MR. JAIRAM:
8 Q. Do you think that there is a different
9 set of skills or knowledge for those specialists who
10 decide things like how thick a diffusion layer
11 should be compared to your skills in terms of
12 circuit design?
13 MR. SPEEGLE: Objection, form.
14 THE WITNESS: I'm comfortable that I
15 understand how -- the meaning of these
16 structures and how they work well enough to
17 understand the technology in these
18 conversations here and these patents and this
19 prior art.
20 BY MR. JAIRAM:
21 Q. Apart from operating the machinery in
22 a foundry, have you worked in a foundry in any other

capacity?

A. I -- my role has been primarily design, utilizing knowledge of the structures of the transistors.

Q. So the structure of the transistors, has it always been fixed or finalized by the time it gets to your task?

MR. SPEEGLE: Object to form.

THE WITNESS: As a circuit designer, we do use a process that has already been chosen. The various steps and structures have been set. But that's completely irrelevant to being able to understand this technology in these patents.

BY MR. JAIRAM:

Q. Have you ever provided input into the process, parameters or details -- and by that I mean fabrication process by which a transistor is made?

A. Yes, actually. At Hewlett-Packard Labs, we requested that the foundry make some changes. We were trying to form a particular type of element, in this case a capacitor. And we asked

1 them to adjust some of those parameters.
2 Q. And did you adjust -- or request to be
3 adjusted details of any layers of a transistor?
4 A. It was -- it was part of the
5 transistor. We asked them to make a transistor that
6 would be depletion mode rather than enhancement mode
7 so the capacitor would be -- when using it as a
8 capacitor, it would have a high capacitance value
9 independent of the voltage bias.
10 MR. SPEEGLE: I'm going to state this.
11 Mark the transcript confidential.
12 BY MR. JAIRAM:
13 Q. Have you had any input into the doping
14 type of a specific region in a transistor?
15 MR. SPEEGLE: Objection, form.
16 THE WITNESS: Without -- well, without
17 getting into details that were proprietary to
18 HP, I -- we did ask them to make certain
19 changes, as I've said, so the capacitor
20 voltage versus capacitance characteristic
21 would be different than it was by default.
22

1 BY MR. JAIRAM:
2 Q. Is the skill set of a circuit designer
3 different than the skill set of specialists who
4 decide the thickness of a diffusion layer?
5 MR. SPEEGLE: Objection, form.
6 THE WITNESS: The scope of the --
7 there's lots of -- there can be lots of
8 overlap, but the specific focus of those
9 people can be different.
10 A circuit designer can understand the
11 process details, and the person who's more
12 focused on process details can also
13 understand circuits.
14 BY MR. JAIRAM:
15 Q. When was the Hewlett-Packard example
16 which you mentioned a short while ago?
17 A. It was in the '90s.
18 Q. When was your grad school period?
19 A. Late '80s, early '90s.
20 Q. Is the Hewlett-Packard example the
21 only example in your career of identifying the depth
22 of doping?

1 MR. SPEEGLE: Objection, form.
2 THE WITNESS: First off, I -- I have
3 to say I don't -- if you're trying to imply
4 that I can't understand the structures that
5 are in these patents, then that's wrong.
6 My career has been focused primarily
7 on circuit design, but that's always in the
8 context of understanding structures and
9 doping and depths and parasitic capacity and
10 on and on and on. There are all sorts of
11 details that are associated with these kind
12 of details that we're discussing here in
13 these patents.
14 So it seems like you're trying to
15 insinuate that I can't understand these
16 structures, and that's -- I don't agree with
17 that.
18 BY MR. JAIRAM:
19 Q. Can you provide any other examples in
20 your career, besides the Hewlett-Packard example, of
21 identifying the depth of doping?
22 MR. SPEEGLE: Objection, form.

1 THE WITNESS: Do you mean directing
2 how the foundry should set the depth?
3 BY MR. JAIRAM:
4 Q. Yeah.
5 Have you -- have you -- in other
6 contexts than the Hewlett-Packard example that you
7 mentioned, have you directed the setting of the
8 depth of doping in a transistor?
9 MR. SPEEGLE: Object to form.
10 THE WITNESS: Again, you know, you're
11 driving down a path implying that I can't
12 understand these structures. I've taught
13 electronics. In my textbook, I describe
14 these basic CMOS structures. And so I'm very
15 comfortable with what we're discussing here
16 in these patents and in this prior art.
17 My role in the IC industry and -- has
18 been primarily one of circuit design where I
19 use the transistors that the foundry built or
20 configured.
21 BY MR. JAIRAM:
22 Q. The phrase "active region" in Claim 1

1 of the '222 patent --
2 A. Which element?
3 Q. Element 1 point -- I think that's
4 Element 1.2. We were talking about the phrase
5 "active region" before the break.
6 Do you recall?
7 A. Yes.
8 Q. And that phrase appears -- "active
9 region" appears in the claims of each of the three
10 challenged -- in each of the three IPRs' patents;
11 correct?
12 A. I believe it's used in the others as
13 well.
14 Q. Does the "active region" have the same
15 meaning in each of those three IPRs?
16 A. I'd rather look at each one
17 independently because each patent has its own
18 context.
19 Q. I'm just trying to kind of ask about
20 what a claim term is in one of the patents. And
21 then kind of to avoid excessive questioning and
22 duplication of kind of the same line of questioning,

1 I'll ask if it's the same or different in the
2 others. But we can go through the other one in
3 detail as well.
4 So let's turn to the -- for right now,
5 let's turn to the --
6 A. You want to look at Element 1.2 or --
7 Q. Whatever you like.
8 MR. SPEEGLE: Wait for a question.
9 THE WITNESS: Yes, sorry.
10 BY MR. JAIRAM:
11 Q. Is there any difference between
12 "active region," that term, in the '842 patent
13 claims compared to the '222 patent claims?
14 A. Well, in this particular claim
15 element, we have to be a little bit careful. We've
16 got the first active region and we have the first
17 surface of the substrate. And we're referring to it
18 as having a second doping type.
19 And so this active region -- in
20 general, the active region is the source-drain as
21 well as the channel in between them. And that
22 portion of this claim element, active region --

1 yeah, I think -- I think I've been pretty consistent
2 there in that it is the source and drain -- whoops,
3 where did I -- okay -- as well as the channel in
4 between.
5 Q. Okay. Do you have any different
6 meaning of "active region" in any of the other two
7 declarations compared to the '842 declaration?
8 MR. SPEEGLE: Objection to form.
9 THE WITNESS: Well, I was using the
10 plain and ordinary meaning. And then I also
11 addressed -- tried to address, as we
12 discussed earlier, the proposed constructions
13 that existed at that time. But in general,
14 the active region is always the source and
15 drain as well as the channel, the silicon in
16 between the source and drain.
17 BY MR. JAIRAM:
18 Q. And you say there's the plain meaning
19 and then the proposed constructions. Sounds like
20 those are different things.
21 Is there one of those that you think
22 is more correct than one of the others?

1 MR. SPEEGLE: Objection, scope.
2 THE WITNESS: I didn't -- I didn't
3 opine on that. I simply -- where there were
4 proposed constructions, I pointed out that
5 the prior art also satisfied those proposed
6 constructions.
7 BY MR. JAIRAM:
8 Q. Okay. Although you may not have
9 opined on it in your declaration, sitting here now,
10 do you have any belief or opinion as to whether
11 plain meaning is more correct or any of the proposed
12 constructions is more correct for the term "active
13 region"?
14 MR. SPEEGLE: Objection, outside the
15 scope of the direct testimony.
16 THE WITNESS: Yeah, I'm not -- I'm not
17 evaluating that. I'm just looking to see if
18 the prior art satisfies those.
19 BY MR. JAIRAM:
20 Q. Okay. I'm just asking just, as we sit
21 here -- you can just say, yes, you can give an
22 answer to that or, no, you are unable to give an

1 answer to that.
2 The question is: Are you able to tell
3 me if you have a belief as to whether the plain
4 meaning is more correct or if any of the proposed
5 constructions are more correct?
6 MR. SPEEGLE: Objection, form.
7 Objection, scope.
8 THE WITNESS: Yeah, I haven't opined
9 on that. I'm primarily using the plain and
10 ordinary meaning, the source and drain and
11 then the channel region in between them. And
12 then I also opine on whether the prior art
13 satisfied the proposed constructions.
14 BY MR. JAIRAM:
15 Q. Let's take a look at your '842
16 declaration in the 1243 proceeding at page 48,
17 please.
18 Do you see Element 1.5?
19 A. Yes, I do.
20 Q. And that element includes the phrase
21 "aid carrier movement."
22 Do you see that?

1 A. Yes, I see that.
2 Q. You were able to understand the phrase
3 "aid carrier movement" in Claim 1 as shown here?
4 A. Well, as we discussed earlier, I did
5 my best to form an interpretation of this claim.
6 And I -- I actually express that right here. Let me
7 find that for you.
8 And I used the idea that this graded
9 dopant concentration would -- as discussed in all of
10 these documents, but it gives rise to an electric
11 field. And that field imparts a force on the
12 carriers, which helps them move down into the
13 substrate.
14 Q. Okay. Does that mean you were able to
15 understand it, or does that mean you weren't able to
16 understand the phrase "aid carrier movement"?
17 A. As I said before, I did my best to
18 give the -- within this context, I did my best to
19 give the drafter the benefit of the doubt. I wasn't
20 opining on whether it was definite or enabled or
21 best mode or satisfied written description
22 requirements. I'm simply taking this language and

1 saying, well, can I form an opinion about what this
2 means?
3 And I used the -- my opinion was the
4 graded dopant concentration led to an electric
5 field, which assisted, aided, actually put a little
6 force on the carriers to help them move from the
7 first surface down towards the -- to the second
8 surface of the substrate. So I did form that
9 opinion.
10 Q. You mentioned something just now about
11 an "electric field." Where did you mention the
12 electric field in your --
13 A. Oh --
14 Q. -- in your declaration for
15 Element 1.5?
16 A. I may not have. It's discussed -- let
17 me make sure.
18 Yes, on page 55, I'm pointing out that
19 the patent owner, the applicant, said itself -- they
20 said that "The graded dopant concentration itself
21 creates a 'built-in' electrical field that forces
22 the movement of carriers into a particular

1 direction, whereby the 'direction' of the electrical
2 field and the resulting direction of the carrier
3 movement depends solely on the slope of the graded
4 concentration of dopant."
5 Q. Okay. And just to -- kind of a note
6 for the efficiency of this, when reading quotes, if
7 you could just slow down just a tad. I think it's
8 probably a lot of unusual terms. It's a little hard
9 for the court reporter to keep up.
10 A. Okay.
11 Q. I'll try and do the same. If you're
12 wondering why I'm speaking so slowly --
13 A. Okay.
14 Q. -- it's for that.
15 Apart from the passage from your
16 declaration in paragraph 94 that you just now
17 mentioned, which I think is from the prosecution
18 history, as it said --
19 A. Yes.
20 Q. -- was there some part of Kawagoe
21 itself that mentioned the electric field I think
22 that you were talking about?

1 A. Kawagoe says, for instance, that those
2 carriers are attracted to the substrate body by the
3 concentration gradient. So a POSITA understands --
4 this was, you know, well understood that if you have
5 a concentration gradient, that gives rise to an
6 electric field, and that leads to movement of the
7 carriers.
8 Q. You're saying that this was well
9 understood by a POSITA?
10 A. Oh, that a concentration gradient led
11 to an electric field?
12 Q. What you just now said. You said "a
13 POSITA understands," and it's "well understood that
14 if you have a concentration gradient, that gives
15 rise to an electric field...that leads to movement
16 of the carriers."
17 Is it your position that that was well
18 understood by a POSITA?
19 A. At the time of the '842 and '222
20 patents, yes.
21 Q. Okay. When you provided your
22 opinions, including regarding Limitation 1.5, but

1 more generally throughout the declarations, was that
2 from the perspective of a POSITA or from the
3 perspective of an expert?
4 A. A POSITA.
5 Q. Okay. And I'm just trying to
6 understand. For this "aid carrier movement" term,
7 is there a part of Kawagoe that you can specifically
8 point me to that -- and you may have got it in your
9 declaration. I'm just trying to figure it out --
10 that discloses aiding carrier movement?
11 A. Yes, Kawagoe -- let me make sure.
12 As I said in page 51, Kawagoe is
13 teaching basically the same thing that is in the
14 '842 patent and the '222 patent. It is teaching
15 that "The impurity concentration of the P-well 6p is
16 given such a gradient that it is gradually lowered
17 in the depth-wise direction from the surface of the
18 epitaxial layer...so that the influence to be caused
19 by the carriers (or electrons) due to the alpha ray
20 is lowered. Specifically, the electronics produced
21 by the alpha ray are attracted to the substrate
22 body...by that concentration gradient so that the

1 soft errors can be reduced in case the MIS memory of
2 the DRAM or the like is formed in the P-well...."
3 So that is teaching that that gradient
4 will lead to these electrons being influenced,
5 aided, to move towards the substrate.
6 Q. I want to look at the phrase, similar
7 to "aid carrier movement," in the other two
8 declarations. Can you look at paragraph 90 of your
9 first '222 declaration, please. That's the 1242
10 declaration, paragraph 90.
11 Do you see Element 1.5 there?
12 A. Yes.
13 Q. And does the phrase "aid carrier
14 movement" in Limitation 1.5 of Claim 1 of '222
15 patent mean the same thing as "aid carrier movement"
16 in the '842 patent?
17 MR. SPEEGLE: Object to form.
18 THE WITNESS: Are you talking about
19 that aid movement in isolation or aid
20 movement within the context of this patent?
21 BY MR. JAIRAM:
22 Q. The phrase "aid carrier movement," I'm

1 just wondering if we have to go through all the same
2 questions again for this patent, if there's any
3 difference in meaning, or if you think that it means
4 the same thing in the context of this patent as it
5 did in the context of '842 patent.
6 A. It's -- in both cases, as I've
7 expressed here, aiding the movement -- the
8 concentration gradient leads to a force on the
9 carriers that moves them toward the substrate. And
10 that concentration gradient is aiding that movement.
11 Q. Is that the same thing as what you
12 were talking about for the '842 patent or is it
13 something different?
14 A. No, it's the same fundamental physics,
15 that -- those three words, but these particular
16 elements have other language around them, and so we
17 have to understand those words within that entire
18 context.
19 Q. In your second '222 declaration for
20 Claim 44, at paragraph 90, do you see Element 44.5?
21 A. Yes, I do.
22 Q. And you see that Element 45 -- I'm

1 sorry -- Element 44.5 includes the phrase "aid the
2 movement of carriers"?
3 A. Yes, uh-huh.
4 Q. And does that phrase mean the same
5 thing as the "aid carrier movement" phrase that we
6 just now discussed for the '842 and the '222
7 Claim 1?
8 A. The concentration gradient leads to an
9 electric field, which applies a force on the
10 carriers, and that aids the movement of the
11 carriers. And I said that for both of these
12 patents.
13 Q. Are we talking about the same thing
14 for the similar phrases, "aid carrier movement,"
15 "aid the movement of carriers," across these
16 different claims of these different patents?
17 MR. SPEEGLE: Objection, form.
18 THE WITNESS: In both cases,
19 Element 1.5 and 44.5 -- in the one case, it's
20 in the context of a concentration gradient
21 without specifically mentioning the electric
22 field. In the other case, it's -- 44.5, it's

1 mentioning the electric field, but they're
2 both due to concentration gradients and those
3 lead to a force that aids the movement. So
4 that is the same fundamental mechanism.
5 BY MR. JAIRAM:
6 Q. Okay.
7 MR. JAIRAM: Mark, can we just go off
8 the record just to discuss some just
9 logistics details about the deposition just
10 for a minute or two here?
11 MR. SPEEGLE: That's fine.
12 MR. JAIRAM: We'll go off the record
13 for a second, please.
14 THE REPORTER: We're off the record.
15 (Discussion off the record.)
16 THE REPORTER: We're back on the
17 record.
18 BY MR. JAIRAM:
19 Q. So now let's consider the second '222
20 declaration. The phrase "aid the movement of
21 carriers" -- just that phrase alone, "aid the
22 movement of carriers," is there anything different

about that compared to the phrase "aid carrier movement," which appears in your first '222 declaration and in your '842 declaration?

MR. SPEEGLE: Objection, form.

(Reporter seeks clarification.)

MR. SPEEGLE: I offered to clarify my objection if Arvind wanted me to, but I don't think he did.

THE WITNESS: This aiding of carrier movement in both these cases is due to the same fundamental mechanism.

BY MR. JAIRAM:

Q. And you have described the mechanism in each of the three declarations in basically the same way; is that right?

A. Well, there's specifics, of course, but, in general -- you know, Claim 44 has different terminology for the different parts of the transistor, but the repeating theme, you could say, is that there's a concentration gradient and that concentration gradient, via an electric field, imposes a force on the carriers and leads to

1 movement of the carriers.
2 Q. Okay. Let's look at your second '222
3 declaration. This is for Claim 44, at paragraph 68.
4 Do you see, at paragraph 68, you are
5 talking about Element 44.1, which is "a surface
6 layer"?
7 A. Yes, I see that paragraph.
8 Q. You were able to understand the phrase
9 "surface layer "in Claim 44 of the '222 patent?
10 A. Well, I'm using the definition -- as I
11 said here in the paragraph, "According to patent
12 owner, a 'surface layer' is 'a layer at the surface
13 of the silicon'" and I show the annotation. And so
14 what I'm -- my opinion is that that description is
15 also met by a similar structure in Payne.
16 Q. Have you ever authored any technical
17 publications, such as articles or books?
18 A. Oh, yes.
19 Q. Have you ever used the phrase "surface
20 layer" in any of your publications?
21 A. Oh, gosh.
22 MR. SPEEGLE: Objection, scope.

1 THE WITNESS: Did I -- I couldn't
2 possibly remember.
3 BY MR. JAIRAM:
4 Q. Would it surprise you if you have used
5 the phrase "surface layer" in any of your
6 publications?
7 A. As I said, I can't remember. So it
8 might have been in a textbook somewhere. I don't
9 know.
10 Q. Is it an unusual phrase, or is it one
11 that you would find not unusual, the phrase "surface
12 layer"?
13 MR. SPEEGLE: Objection, form.
14 Objection, scope.
15 THE WITNESS: The problem is this
16 phrase isn't existing all by itself. It's
17 within the scope of this patent claim. And
18 so I'm thinking about it in the context of
19 this patent claim. Do -- I mean, if you want
20 me to say "surface layer" always means the
21 same thing everywhere, I don't know how we
22 could come to that conclusion. We have to

1 take it in the context of the patent claim.
2 BY MR. JAIRAM:
3 Q. Do you agree that a surface layer is a
4 layer at the surface?
5 MR. SPEEGLE: Objection, form.
6 THE WITNESS: I -- I mean, what I'm --
7 I'm opining as to whether or not Payne is
8 satisfying the patent owner's description of
9 "surface layer." And I find that Payne does
10 have the same structure, and I use the patent
11 owner's description of "surface layer."
12 BY MR. JAIRAM:
13 Q. Do you think that "surface layer" is
14 understandable by its plain meaning?
15 MR. SPEEGLE: Objection, scope.
16 THE WITNESS: Within the -- plain
17 meaning within the scope -- within the patent
18 language itself.
19 BY MR. JAIRAM:
20 Q. Is that a yes or a no?
21 A. I -- I said -- in this IPR and my
22 declaration, I'm opining whether or not Payne is

1 satisfying the element to the same extent that
2 Figure 5B in the patent meets it. I'm not opining
3 on -- as I said before, I'm not opining on
4 definiteness, enablement, best mode or written
5 description requirements. I think my text is quite
6 clear.
7 Q. When you said just a minute ago
8 "within the -- plain meaning, within the scope --
9 within the patent language itself," was that you
10 saying that, in that context, you can understand
11 "surface layer" by its plain meaning?
12 MR. SPEEGLE: Objection, form.
13 THE WITNESS: As I said, I'm opining
14 in this that it -- that Payne satisfies the
15 term "surface layer" in the same way that the
16 patent owner describes. I'm not opining
17 whether that's the best way to define it.
18 I'm just saying this is what the patent owner
19 says and Payne meets that.
20 BY MR. JAIRAM:
21 Q. Let's look at that same declaration.
22 That's still the Claim 44 1244 proceeding

1 declaration, at paragraph 80.
2 A. Wait. 1244?
3 Q. Yes.
4 A. Oh, okay.
5 Q. If you can turn to paragraph 80 of
6 your 1244 declaration.
7 A. But that's -- yeah, I've actually
8 labeled this incorrectly.
9 Q. Yes, Claim 44 is in the 1244. It's a
10 neat little pneumonic there.
11 A. Yeah.
12 Q. And --
13 A. I've been looking at -- I think I may
14 have -- make sure I'm on the right...
15 (Document review.)
16 THE WITNESS: Yeah, so this is --
17 okay.
18 BY MR. JAIRAM:
19 Q. Okay. Do you see paragraph 80 talking
20 about Limitation 44.4?
21 A. Yes. I'm just reading the element.
22 Q. I just want to check.

1 When you said that you had labeled
2 some --
3 A. I asked you if I could label this.
4 Q. I know.
5 When you -- when you just now
6 mentioned that you labeled some declaration
7 incorrectly, I just want to make sure that that
8 doesn't change any of your prior answers here in
9 your deposition testimony.
10 A. When we've been talking about specific
11 elements, I've been -- this declaration is the only
12 one that refers to Claim 44, so I think we're okay.
13 Q. If you can think of anything that you
14 require revising your previous testimony because you
15 were labeling something wrong, please let me know.
16 A. I will.
17 Q. But, otherwise, I will assume that
18 your deposition testimony up to now was
19 substantively correct, regardless of what you may
20 have annotated on the face of it in the declaration.
21 A. Okay.
22 Q. So in paragraph 80 and the following

1 paragraphs of your declaration, where you were
2 talking about Limitation 44.4, you analyzed the
3 limitation, which includes the phrase "graded
4 concentration of dopants"; correct?
5 A. That's part of this element, yes.
6 Q. Did you construe the term "graded
7 concentration of dopants" in your declaration?
8 A. I'm -- in this description here, I'm
9 referring primarily to the -- again, as with the
10 last element -- the patent owner's descriptions and
11 I'm using those.
12 Q. Did you provide the plain meaning of
13 "graded concentration of dopants" in your analysis
14 to Limitation 44.4?
15 A. As I say, "graded dopant
16 concentrations were known," which simply means that
17 along in -- along some axis within the material, the
18 dopant concentration varies. And so, yes, I think
19 "graded dopant concentration" just by itself is
20 something that a POSITA understands and it has a
21 plain meaning.
22 Q. Okay. Can you please look at your

1 1242 declaration at paragraph 90 for Limitation 1.5
2 and tell me when you see it.
3 A. Yeah, I've got it.
4 Q. Do you see Limitation 1.5 similarly
5 uses the phrase "grade dopant concentration"?
6 MR. SPEEGLE: Object to form.
7 THE WITNESS: That phrase is -- I'm
8 just checking because I described this in
9 terms of several -- but, yes, there is a
10 "graded dopant concentration" phrase, yes.
11 BY MR. JAIRAM:
12 Q. And does "graded dopant concentration"
13 in Limitation 1.5 mean the same thing that it does
14 in Claim 44, which we just talked about a couple
15 minutes ago?
16 A. The general term "graded dopant
17 concentration" has the meaning that's understood by
18 a POSITA at the time. As I said, that is the
19 concentration -- the dopant concentration varies
20 along an axis in the material in a -- in a
21 continuous way, sort of monotonic.
22 In this case, we're talking about it's

1 graded and it's continually increasing as we go
2 deeper into the substrate.
3 Q. How do you know the magnitude of the
4 force a dopant concentration puts on carriers?
5 A. Well, as the patent owner discussed --
6 I have references to it, but it's -- I don't know.
7 Anyway, it's related to the -- the steepness of the
8 gradient, the slope of the concentration gradient.
9 And that was also well known by a POSITA as well,
10 which the patent owner pointed out also.
11 Q. Do you believe that the proper
12 construction of "graded concentration of dopants" or
13 "graded dopant concentration" is dopants that
14 continuously decrease in concentration over
15 increasing depth?
16 MR. SPEEGLE: Objection, scope.
17 THE WITNESS: "Graded dopant
18 concentration" by itself?
19 BY MR. JAIRAM:
20 Q. I'm asking about "graded dopant
21 concentration" by itself.
22 A. Within the context of this, as I said,

1 it's a concentration that varies along some axis.
2 In these claim elements, it's a concentration that
3 decreases as we go deeper into the substrate.
4 Q. Does the dopant concentration have to
5 continually decrease over increasing depth?
6 MR. SPEEGLE: Objection, scope.
7 And I'll note that you're asking about
8 litigation positions during a deposition,
9 which is not appropriate, and I object to the
10 form.
11 THE WITNESS: The examples that we
12 are -- I mean, the -- how do you say this?
13 The concentration is decreasing as we
14 continue to move -- as we move into the
15 substrate. I'm not -- I'm not asserting a
16 particular slope or anything like that. I'm
17 just saying the trend of the concentration is
18 it decreases as you go -- for graded
19 concentration, it -- in this context, it's
20 decreasing as you go into the substrate.
21 BY MR. JAIRAM:
22 Q. Do you say that in your declaration?

1 A. In general, I used the -- every time I
2 used the term? Boy, I'm not sure. For the most
3 part, I use -- can you repeat the question. Sorry.
4 THE REPORTER: Do you want me to read
5 it?
6 MR. JAIRAM: That's okay. I'll
7 mention it again.
8 BY MR. JAIRAM:
9 Q. Dr. Blalock, you gave a response about
10 a trend of concentration decreasing as you go into
11 the substrate. And I want to know, is that
12 something that you put in your declaration?
13 MR. SPEEGLE: Objection, form.
14 THE WITNESS: I -- I didn't -- I
15 didn't propose a claim construction, but I --
16 I did use the meaning as expressed within the
17 patent and by the patent owners during
18 prosecution and found the same concentration
19 gradients in the prior art.
20 BY MR. JAIRAM:
21 Q. Do you need to know the magnitude of
22 the force on carriers to know if their movement is

1 being aided?
2 A. Well, the patent owner -- the patent
3 hasn't given us a threshold for aiding. It's a
4 little -- you know, there's no -- there's no
5 language to help us understand how strong the force
6 has to be.
7 So in that sense, I'm -- if I'm --
8 when I look at the prior art, when I find a
9 concentration gradient, then I've determined that
10 it's -- since I don't have a specific threshold to
11 use, I did -- my basis was if there was a gradient,
12 then it was producing that force and aiding the
13 movement.
14 MR. JAIRAM: How long have we been
15 going now?
16 Let's take a short break here. We'll
17 go off the record.
18 THE REPORTER: We're off the record.
19 (Discussion off the record.)
20 THE REPORTER: We're back on the
21 record.
22

1 BY MR. JAIRAM:
2 Q. So in your 1244 declaration about
3 Claim 44, you had two grounds of prior art reference
4 bases for invalidity; correct?
5 A. Yeah, I believe it's just two. Yes.
6 Q. And in Ground 1, you analyzed the
7 Payne reference, which is P-A-Y-N-E, Exhibit 1005;
8 is that correct?
9 A. Yes, that's correct.
10 Q. I've put a copy of Payne in the chat
11 box, but I'll also give you a hard copy of it for
12 your convenience.
13 (Exhibit 1005, Previously marked.)
14 BY MR. JAIRAM:
15 Q. Do you recognize this document as
16 being the Payne reference that you analyzed?
17 A. Yes.
18 Q. For the "graded dopant concentration"
19 in Claim Element 44.5, you pointed in your
20 declaration to Figure 11 of Payne; correct?
21 A. Yes, I did.
22 Q. Actually, let me correct -- I

1 misstated the limitation.
2 For the "graded concentration of
3 dopants" limitation in Element 44.4 --
4 A. Yes.
5 Q. -- you referred to Figure 11 of Payne;
6 is that correct?
7 A. Yes, it is.
8 Q. I think you included Figure 11 also in
9 44.5, but 44.5 is for something else.
10 So I'm talking now about, in 44.4,
11 when you have that figure of Payne, did you annotate
12 that figure?
13 A. Yes, I added some annotations.
14 Q. What annotations did you add?
15 A. Oh, the -- the depth captions and a
16 couple of the concentrations.
17 Q. Why did you add those annotations?
18 A. Well, it was illustrating -- and
19 here's one of the corrections. In paragraph 87, you
20 see it says millimeter, 0-millimeter, 2-millimeter,
21 8-millimeter? Those are microns as in Payne and as
22 in the figure. So, anyway, that was a translation

1 issue between versions of Word probably.
2 Anyway, as I said, I have annotated
3 Figure 11 to represent the doping concentrations at
4 various depths disclosed in Payne. These are
5 example concentrations.
6 Q. How would those concentrations --
7 those values have been obtained?
8 A. Oh, they're in -- in Payne at -- let's
9 see at 5 -- Column 5 -- 51, 55.
10 Q. In Payne itself, how would Payne have
11 figured out what the concentrations are? Or is that
12 something that is set?
13 A. It's -- it's set when the device is
14 manufactured.
15 Q. Have you ever, in your experience, set
16 dopant concentrations in that manner such as done by
17 Payne?
18 MR. SPEEGLE: Objection, form.
19 THE WITNESS: First off, I don't
20 know -- I don't think Payne set those either.
21 I don't know. But as I said before, I have
22 worked with these processes for decades. I

1 understand how these things were done. I
2 understand what a dopant density is.
3 My job has not -- my primary focus --
4 my focus has not been to work in the foundry
5 and decide the specific concentrations. I'm
6 analyzing the concentration gradients in
7 these references and understand these
8 references.
9 BY MR. JAIRAM:
10 Q. Where you said just now you don't
11 think Payne set those either --
12 A. Well --
13 Q. I'm just trying to understand your
14 earlier response that "it's set when the device is
15 manufactured."
16 Who is setting it? Or what did mean
17 by "it's set when the device is manufactured"?
18 A. I meant --
19 MR. SPEEGLE: Objection, vague.
20 MR. JAIRAM: Let me rephrase.
21 BY MR. JAIRAM:
22 Q. You said just now that you don't think

1 Payne set those either --
2 A. Actually, I don't know that. So I'd
3 rather -- you know, I don't know specifically
4 whether he was in charge of setting that or not or
5 if he was just associated with this.
6 MR. SPEEGLE: I'll remind you not to
7 talk over each other, so --
8 THE WITNESS: Sorry.
9 BY MR. JAIRAM:
10 Q. How would one set the concentration
11 values?
12 A. You would -- typically you would do --
13 you would set up an ion implantation process where
14 you would specify how deep the implantation is going
15 to be, what dopants are going to be used, how long
16 the implantation is going to go on. If you implant
17 for a longer time, you get more dopants. If you
18 implant for a shorter time, you get less dopants.
19 Q. And I understand that you said that
20 you are qualified in whatever way that you said.
21 So I'm asking specifically, have you
22 had experience with setting how deep the doping is

1 going to be or how long the implantation is going to
2 go on, like you were just talking about?
3 A. I haven't had any job in the industry
4 where that was my role. In graduate school, I
5 worked with these things and, of course, that's
6 where we made -- made those decisions, but I didn't
7 do it as my job later.
8 Q. For transistor performance or
9 correctness, do you think it is important to
10 correctly set how long an implantation is going to
11 occur?
12 MR. SPEEGLE: Objection, scope.
13 THE WITNESS: For good transistor
14 performance in -- for the foundry or the
15 process to be a good process, a useable and
16 good process, all of those and many, many,
17 many more parameters have to be set as part
18 of that manufacturing process.
19 BY MR. JAIRAM:
20 Q. Do you think that the people or
21 operator, whoever sets those parameters, needs to
22 have some experience in setting those parameters in

1 order for the end result to be a good transistor?
2 MR. SPEEGLE: Objection to form and
3 object to scope.
4 THE WITNESS: Yeah, I -- we're just
5 getting off into hypotheticals that --
6 certainly -- generally experience makes --
7 leads to better job performance, sure.
8 BY MR. JAIRAM:
9 Q. You don't have that experience;
10 correct?
11 MR. SPEEGLE: Objection, misstates
12 testimony.
13 THE WITNESS: As I said, I did some of
14 these things in graduate school as part of
15 learning how these processes work and how
16 this -- to enable me to be a better designer.
17 Because as a designer, I need to understand
18 these structures and what it means to have
19 different depths and doping levels and all
20 the rest, so --
21 BY MR. JAIRAM:
22 Q. Okay.

1 A. -- that's it.
2 Q. Can you tell me about some of these
3 things in graduate school that you were referring to
4 just now?
5 A. We had to do -- we used -- I don't
6 remember the name of the software package, but --
7 this was a very long time ago. But we used software
8 to kind of design a device. And with the software,
9 you could simulate things like drive-in time and
10 implantation time. And then it would simulate and
11 show you the doping profiles that resulted from
12 those choices.
13 Q. Okay. Would you say that you
14 understood how those things worked at the time that
15 you took that class in graduate school?
16 A. How those things worked? What things?
17 Q. The things that you just now
18 mentioned, implantation time, doping profiles, would
19 you say that you had a good understanding of those
20 concepts at the time that you used that software
21 package in a class during your schooling?
22 MR. SPEEGLE: Objection, form.

1 Objection, scope.
2 THE WITNESS: Well, I did well in the
3 class. We were learning the fundamentals of
4 semiconductors and junctions and doping and
5 all those sorts of things.
6 BY MR. JAIRAM:
7 Q. Do you think that the technology in
8 the challenged patents and then the claims of the
9 challenged patents has to do with fundamentals of
10 semiconductors, as you just mentioned in your
11 response?
12 A. I mean, we're talking about graded
13 concentrations and how that leads to an electric
14 field which exerts a force on carriers and so, yeah,
15 those are fundamental aspects of how a semiconductor
16 operates.
17 Q. You provided an opinion on the
18 qualifications of a person of ordinary skill in each
19 of these declarations; correct?
20 A. Yes.
21 Q. Let's look at -- this is the 1244
22 declaration, at paragraph 54.

1 Do you see the sentence about a person
2 of ordinary skill in the art?
3 A. Uh-huh.
4 Q. And you said that a person of ordinary
5 skill would have had "a Bachelor's degree...and four
6 year of experience in semiconductor design and
7 manufacturing or equivalent work experience"; right?
8 A. Yes.
9 MR. SPEEGLE: Objection,
10 mischaracterizes the document.
11 BY MR. JAIRAM:
12 Q. Do you know --
13 A. Could you state that again just to
14 make sure I heard it correctly.
15 Q. Can you please read aloud the first
16 sentence of paragraph 54.
17 A. "It is my opinion that a POSITA at the
18 time of the '222 Patent would have had a Bachelor's
19 degree in electrical engineering, material science,
20 applied physics, or a related field and four years
21 of experience in semiconductor design and
22 manufacturing or equivalent work experience."

1 Q. Do you still stand by that statement?
2 A. "Additional education might compensate
3 for a deficiency in experience, and vice versa."
4 Q. Do you still stand by the first
5 sentence of paragraph 54?
6 A. Yes.
7 Q. At the time you took that graduate
8 class where you did the software package that you
9 just mentioned, did you have the qualifications of a
10 person of ordinary skill as you specified in
11 paragraph 54?
12 MR. SPEEGLE: Objection, form.
13 THE WITNESS: Well, let's make sure we
14 understand what we're talking about. I've --
15 when I say "experience in semiconductor
16 design and manufacturing," I'm talking about
17 someone who has worked in the semiconductor
18 design and manufacturing industry and has
19 understood and needed to understand, you
20 know, semiconductors and diffusions and
21 transistors and those type of things that are
22 in this patent.

1 So at the time in grad school, I had
2 the degree. I did not yet have the four
3 years of experience in doing design and
4 manufacturing.
5 BY MR. JAIRAM:
6 Q. And is the experience from the grad
7 school class the only experience that you've had at
8 setting different depths and doping levels or
9 implantation times and so forth related to processes
10 of making a transistor?
11 A. Well, I mentioned that, you know,
12 another aspect where I impacted the process was at
13 Hewlett-Packard. But "semiconductor design and
14 manufacturing" I think is a broad term. And I feel
15 like, as a mixed-signal circuit designer, especially
16 with plenty of experience in designing circuits that
17 are sensitive to the structures that are -- that
18 we're talking about here today, that is an example
19 of semiconductor design and manufacturing
20 experience.
21 Q. I'm asking about the things that you
22 said, that you set certain parameters in that

1 software package in the grad school class.
2 Do you recall that testimony?
3 A. Yes.
4 Q. Did you do -- that kind of setting
5 parameters in a software package about how you
6 actually formed the transistor, did you do that
7 later on after that grad school class?
8 A. The difficulty I'm having is we're
9 trying to pigeon hole some concept of experience.
10 When you work in the industry and you work on
11 different -- difficult problems, people have
12 different roles, but it doesn't mean that the -- the
13 circuit designer can still understand what's
14 happening in the semiconductor and the person who's
15 spending -- who's focused on setting depths and
16 gradients and things like that can also have
17 experience in circuits, as I've indicated before.
18 So as I said, and as I said in my
19 background, my focus has been on circuit design, but
20 it depended on knowledge of these things. And I
21 was -- I designed semiconductors and we
22 manufactured -- had them manufactured and then

1 evaluated those and tested them, which further
2 developed our understanding of all these things,
3 so...
4 Q. Okay. Just to be clear, what year did
5 you finish your Bachelor's degree, please?
6 A. I believe '85. I think that's right.
7 Q. What year did you take that graduate
8 course that involved the software package about
9 setting certain parameters about making a
10 transistor?
11 A. Oh, it was, I don't know, late '80s,
12 beginning of '90. I finished my Ph.D. in '91, so
13 sometime around there.
14 Q. Would you be able to say what year
15 that graduate course was?
16 A. Oh, gosh. Not offhand. It was in
17 that time frame.
18 Q. In that intervening period between
19 Bachelor's completion and the graduate school
20 course, were there four years of experience in
21 semiconductor design and manufacturing or equivalent
22 work experience during that intervening period?

1 A. While I was in graduate school, I did
2 not have four years of experience in semiconductor
3 design.
4 Q. Does your circuit experience -- I'll
5 withdraw that question.
6 Have you written any textbooks?
7 A. Yes.
8 Q. Have you written a circuit design
9 textbook?
10 A. It's a textbook used for teaching
11 undergraduate electronic circuit design.
12 Q. Just for the record, what's the title
13 of that textbook, if you recall?
14 A. Microelectronic Circuit Design.
15 There's six editions. It's widely used.
16 Q. I'll just refer to that as your
17 circuit textbook.
18 Does your circuit textbook discuss the
19 level of doping in individual transistors?
20 A. Yes, we do some examples of junctions
21 and some calculations related to those aspects.
22 Q. Do you have examples of concentrations

of dopants in that textbook?

A. Yeah. We calculate -- for instance, we do a calculation of the built-in potential of a PN junction. And in order to calculate that, you have to know the dopants, just as an example.

Q. What about -- apart from built-in potential, does your textbook include examples of concentrations of dopants at various depths like you have annotated in the figure from Payne?

A. We have -- yeah, we -- I do believe there are still -- we've had six editions, so it's varied over time, but we have -- pretty sure there are some grades -- grades are usually associated with junctions, and we calculate various properties as examples within the textbook.

Q. You mentioned that there are apparently at least six editions; is that correct?

A. Yes.

Q. Were the examples of concentrations that you just now mentioned in your recent response -- were they in the second edition of your textbook?

1 MR. SPEEGLE: Objection to form.
2 THE WITNESS: Yeah, I believe so. Or
3 in the first edition also. I can -- I don't
4 know. We can pull it up and I can look at
5 it. It's been a while.
6 BY MR. JAIRAM:
7 Q. What are the -- let me rephrase.
8 Apart from setting a concentration
9 through a software package, like you mentioned, is
10 there any way to figure out what the concentration
11 is at various depths for an existing transistor?
12 A. Well, you can do a lab analysis and
13 figure it out. Or if you know how it was built, you
14 can use equations to calculate.
15 Q. Let's talk about those in turn.
16 What do you mean by "lab analysis"?
17 What kind of analysis would you need to do to figure
18 out the concentration of dopants at various depths?
19 A. I believe there are ways to, you know,
20 cut through a junction. And there's some chemical
21 process to help understand how the gradients are. I
22 haven't done that myself, but I believe that exists.

1 Q. Okay. Apart from not having done it
2 yourself, have you -- well, are you aware of what
3 the techniques are?
4 A. Not in enough detail to speak to, no.
5 Q. So you are not aware of any laboratory
6 techniques for analyzing the concentration of an
7 existing, already-manufactured transistor; correct?
8 MR. SPEEGLE: Objection, form.
9 Objection, scope.
10 THE WITNESS: I mean, I've seen, you
11 know, cross-sectional figures that some
12 process had been done to, to try to ascertain
13 where the junction -- the depth of the
14 junction and things like that. But I haven't
15 done it myself, so I couldn't speak to the
16 specifics.
17 BY MR. JAIRAM:
18 Q. You would not yourself be able to
19 figure out the concentration-versus-depth profile
20 for an existing transistor; is that correct?
21 MR. SPEEGLE: Objection, form.
22 Objection, scope.

1 THE WITNESS: No, like I said, if you
2 knew the process, there are ways to simulate
3 and/or calculate where the dopants end up and
4 how deep they are and what the concentrations
5 are.
6 BY MR. JAIRAM:
7 Q. The term "graded dopant concentration"
8 or slight variations of it, such as "graded
9 concentration of dopants," which appears in all of
10 the challenged claims of all of the challenged
11 patents, that's referring to something about
12 concentration of dopants; right?
13 MR. SPEEGLE: Objection to form.
14 THE WITNESS: Sure. Yes.
15 BY MR. JAIRAM:
16 Q. But you have yourself not ever
17 analyzed to find out what the concentration of
18 dopants is for any transistor, whether in the
19 context of this litigation or in any of your past
20 experience; correct?
21 MR. SPEEGLE: Objection,
22 mischaracterizes the testimony.

1 THE WITNESS: I haven't done a lab
2 analysis. I've used tools to predict where
3 they would be, but -- you know, I don't --
4 the line of questioning is just -- you're
5 somehow implying that someone can't
6 understand a graded doping concentration if
7 they haven't done a lab analysis of dopants
8 in semiconductor material. And I just think
9 that's completely untrue.
10 BY MR. JAIRAM:
11 Q. Do you think that the subject matter
12 of this technology regarding dopant concentrations
13 is easy?
14 A. I think --
15 MR. SPEEGLE: Objection, scope.
16 THE WITNESS: -- a POSITA that has the
17 experience that I indicated can absolutely
18 understand these and would absolutely
19 understand that the things expressed in the
20 '222 and '842 were present in the prior art
21 that I've pointed out.
22

1 BY MR. JAIRAM:
2 Q. At the time that you took your
3 graduate class that involved software for setting
4 transistor parameters, you still would not have had
5 the requisite qualifications of a POSITA; correct?
6 MR. SPEEGLE: Objection to form.
7 Objection, scope.
8 THE WITNESS: I would have a portion
9 of those. I did not yet have four years of
10 experience.
11 BY MR. JAIRAM:
12 Q. So then why did you say that four
13 years of experience is also needed in addition to
14 the Bachelor's degree in order for someone to be a
15 person of ordinary skill in the art?
16 A. Because we're looking at CMOS
17 processes and details of those things. And we are
18 trying to understand the implications of that in
19 prior art and what was known to someone skilled in
20 the art. And so experience is a part of that
21 knowledge.
22 Q. Did you or someone else suggest four

1 years of experience in particular?
2 MR. SPEEGLE: Objection to the extent
3 it calls for privileged or work product
4 communications.
5 If you can answer without disclosing
6 privileged or work product communications,
7 you can.
8 THE WITNESS: I don't recall.
9 BY MR. JAIRAM:
10 Q. Do you agree with that stated level of
11 qualifications, including, in particular, four years
12 of experience?
13 A. It's certainly sufficient to
14 understand the material.
15 Q. When you say it's "sufficient," you're
16 saying if you had four years of experience, that you
17 would have understood the material? Is that what
18 you mean when you say "sufficient"?
19 A. I'm saying that -- I'm using the model
20 of a person of ordinary skill in the art of somebody
21 who's been involved in semiconductor design for
22 four years and has a Bachelor's degree.

1 Q. Is that the minimum level of
2 qualifications, or is something lower than
3 four years the proper definition of a person of
4 ordinary skill?
5 A. I haven't really opined on that. I
6 haven't -- yeah, I think this is sufficient. I
7 haven't -- no, I don't know. I haven't thought
8 about it in terms of could it be less than that.
9 BY MR. JAIRAM:
10 Q. Would you say that a Bachelor's degree
11 plus ten years of experience would be sufficient for
12 a level of skill of a person of ordinary skill in
13 the art?
14 MR. SPEEGLE: Objection, form.
15 THE WITNESS: Well, I chose four. You
16 know, ten would certainly understand all
17 these concepts, but I'm not proposing that as
18 a model.
19 BY MR. JAIRAM:
20 Q. Why did you not write ten if ten is
21 sufficient?
22 MR. SPEEGLE: Objection, form and

1 scope.
2 THE WITNESS: If you -- when I say
3 "sufficient," I mean is that person capable
4 of understanding this material. And
5 certainly someone with more experience is
6 also capable of understanding the material.
7 I offered four. It seems like a reasonable
8 number.
9 But I haven't really spent a lot of
10 time evaluating whether it could be three or
11 three and a half or four and a half. I mean,
12 you know, you have some experience in
13 semiconductor design. You have some -- not a
14 trivial amount of experience, but good
15 experience.
16 BY MR. JAIRAM:
17 Q. Four is kind of a specific number, so
18 I'm trying to understand. Is that like tied to --
19 undergraduate school, people typically think that's
20 four years of college. Is there some significance
21 to the four years of experience as opposed to some
22 other number?

1 MR. SPEEGLE: Objection, form.
2 Objection, scope, asked and answered.
3 THE WITNESS: Yeah, I mean, this is
4 just based on my experience in industry.
5 People, when they first get out, still have a
6 lot to learn and they learn. And four seemed
7 like a good length of time. That would be
8 somebody that had a solid understanding of
9 these principles.
10 BY MR. JAIRAM:
11 Q. As you're sitting here now, do you
12 think that that number should be revised or do you
13 still believe it should be four?
14 A. I'm fine with four.
15 Q. Do you think a person who had fewer
16 than the qualifications listed in your declaration
17 would have qualified as a person of ordinary skill
18 in the art?
19 MR. SPEEGLE: Objection, form, scope,
20 asked and answered.
21 THE WITNESS: Yeah, I -- I think four
22 is a good number. I think you have a solid

1 amount of experience. You're no longer --
2 you're beginning to -- well, you've just got
3 a solid amount of experience. Some people,
4 maybe -- everybody's different, but I think
5 this is a reasonable number and for most --
6 most people, this hypothetical POSITA
7 would -- would be able to understand this
8 material and grasp the state of the art at
9 the time. So I'm good with this number.
10 BY MR. JAIRAM:
11 Q. Have you written statements about the
12 level of ordinary skill in the art for other
13 declarations or expert reports, not the three
14 present declarations of -- you know, of discussion
15 today?
16 A. Yes, of course.
17 Q. And when you have written comparable
18 statements about the level of skill in the art in
19 such other expert reports or declarations, have you
20 written what the minimum threshold for
21 qualifications is, or is it your practice to write
22 something that's higher than the minimum?

1 MR. SPEEGLE: Objection, form.
2 THE WITNESS: I didn't say -- well,
3 I'm not agreeing with the second half of your
4 question, but I have -- based on my own
5 experience, I tried to make a reasonable
6 assessment of a person -- a POSITA and what
7 their qualifications were. And I've done
8 that in the past for other patents, and this
9 was my feeling about what would be a
10 reasonable amount of experience.
11 BY MR. JAIRAM:
12 Q. Okay.
13 MR. JAIRAM: Why don't we stop here
14 for lunch. We can go off the record.
15 MR. SPEEGLE: We can go off the
16 record.
17 THE REPORTER: We're off the record.
18 (Luncheon recess from the record.)
19
20
21
22

1 A F T E R N O O N S E S S I O N
2 THE REPORTER: We're back on the
3 record.
4 DR. TRAVIS BLALOCK,
5 having been previously sworn, resumed the
6 stand and testified further as follows:
7 EXAMINATION (Cont'd.)
8 BY MR. JAIRAM:
9 Q. Dr. Blalock, can you please turn to
10 your 1242 declaration, to paragraph 90, regarding
11 Claim Element 1.5.
12 A. Okay.
13 Q. And in this section, you are analyzing
14 the Kawagoe reference; is that right?
15 A. Yes.
16 Q. I previously placed the reference in
17 the electronic chat box. You should have an
18 electronic copy of it. I'll also give you a copy of
19 it. Looks like it's Exhibit 1007 in the 1242
20 proceeding.
21 Does that look to be a copy of the
22 Kawagoe reference that you analyzed?

1 A. Yes.
2 (Exhibit 1007, Previously marked.)
3 BY MR. JAIRAM:
4 Q. And the Kawagoe reference is also
5 Exhibit 1007 in your other two declarations, 1243
6 and 1244 proceedings; is that right?
7 A. I believe so, yes.
8 Q. So we'll talk about Kawagoe with
9 respect to Claim Element 1.5 of the '222 patent.
10 Specifically, do you see, at
11 paragraph 90, you have said that Kawagoe is what
12 you're relying on for this claim limitation?
13 A. Yes.
14 Q. And you showed some figures from
15 Kawagoe, Figures 17 and 23.
16 And it looks like you added some
17 annotations; is that right?
18 A. Yes.
19 Q. Among the things that you've annotated
20 is you've annotated a "graded concentration"; is
21 that right?
22 A. Yes.

1 Q. And is that what you are mapping to
2 the claim term "graded dopant concentration"?
3 A. Yes.
4 Q. And you've said, at paragraph 94, that
5 there's a downward slope to the graded dopant
6 concentration; is that right?
7 A. Yes.
8 Q. In your earlier testimony today before
9 the lunch break, you said that you looked to see if
10 there's a downward slope to a dopant graded
11 concentration and, if there is, then that means that
12 it's aiding the movement of carriers.
13 Is that what you said earlier?
14 MR. SPEEGLE: Objection,
15 mischaracterizes testimony. Objection, form.
16 THE WITNESS: Well, I think
17 specifically I said that a graded dopant
18 concentration gives rise to an electric
19 field, which puts some force on carriers,
20 which does tend to move them deeper into the
21 substrate. To the extent creating that force
22 and -- which tends to move them. To the

1 extent that fulfills aided, then sure.
2 BY MR. JAIRAM:
3 Q. What do you mean, "to the extent" --
4 is there some situation in which a downward-sloping
5 graded dopant concentration doesn't aid carrier
6 movement, specifically carrier movement from the
7 active regions to an area of the substrate where
8 there are no active regions?
9 A. Well, again, in this situation, I'm
10 trying to map this -- look at this prior art with
11 respect to this claim. And "aid" is not defined
12 very well. It's a very sort of generic term. But,
13 you know, as in any invalidity, I'm simply saying
14 this -- at least it falls within the -- I would
15 think the scope of "aid" -- but the patent doesn't
16 really help us with specific thresholds or anything
17 like that. It doesn't tell us how much force do we
18 need.
19 And so there's certainly -- we know
20 that Kawagoe is teaching the gradient for the
21 purpose of moving carriers into the substrate, just
22 like in the challenged patents. And so, yeah, I

1 find that it anticipates -- well, discloses or
2 renders obvious.
3 Q. Can you tell me a situation in which a
4 graded dopant concentration, the sloping downwards,
5 doesn't aid the carrier movement?
6 MR. SPEEGLE: Objection, form.
7 Objection, scope.
8 THE WITNESS: As I said, if you have a
9 graded dopant concentration, there will be
10 some electric field, and it will produce a
11 force to try to move these carriers. I think
12 that's what I'm opining, is that is within
13 the scope of "aid," but I'm not trying to
14 define the limits of "aid."
15 But certainly what's described here is
16 aiding helping carriers move, but I'm not
17 explicitly saying let's define the word "aid"
18 and its limits or anything like that.
19 BY MR. JAIRAM:
20 Q. I'm just asking kind of as a physical
21 matter of physics.
22 Does every downward-sloping graded

1 dopant concentration have to aid carrier movement?
2 MR. SPEEGLE: Objection, form.
3 Objection, scope.
4 THE WITNESS: Yeah, I mean, I'm not --
5 in general, if you have a graded dopant
6 concentration, as I said, it will yield a
7 field which will then yield a force which
8 will tend to move carriers deeper into the
9 substrate. I'm not opining on, you know, the
10 scope of that.
11 But within this definition, I am -- I
12 do find that these concentrations discussed
13 in Kawagoe disclose or render obvious that
14 claim element.
15 BY MR. JAIRAM:
16 Q. When you say "these concentrations,"
17 you mean specific values or do you mean just the
18 shape of the downward-sloping concentration curve?
19 A. I'm talking this -- combined with the
20 teachings of Kawagoe, which is basically telling us
21 that if we create this concentration, it will move
22 these -- these carriers into the substrate.

1 Q. Are you able to tell me any example of
2 a situation in which there would be a
3 downward-sloping graded dopant concentration, but it
4 somehow doesn't aid carrier movement?
5 MR. SPEEGLE: Objection, form.
6 Objection, scope.
7 THE WITNESS: Again, you know, I'm not
8 trying to define the limits of "aid." What I
9 can tell you, if you do have a
10 downward-sloping gradient, it will create an
11 electric field and it will create a force.
12 To the extent that is sufficient to
13 define the word "aid," but I'm not -- I'm not
14 saying -- I'm not trying to say the complete
15 definition of "aid" and how big something has
16 to be or small or whatever. I'm just saying
17 if you have a gradient, you'll get a force
18 and it will tend to move carriers. I'm
19 trying to find prior art that maps to the
20 structure sufficiently.
21 BY MR. JAIRAM:
22 Q. And you just said, "if you have a

1 gradient, you'll get a force and it will tend to
2 move carriers."
3 Will it move carriers or -- what do
4 you mean "tend to move carriers"?
5 A. Well, it creates a force on the
6 carriers. All other things being equal, they'll
7 move. I mean, you could have, I suppose -- I don't
8 want to theorize. I'm not -- I mean, again, the
9 point of this declaration is are the teachings of
10 Kawagoe disclosing what's in the '222 and '842?
11 And I find that they're right on track
12 with what's appearing in '842, but that doesn't mean
13 I've tried to define the full scope of the word
14 "aid."
15 Q. How do you know that movement of
16 carriers is aided other than by what Kawagoe says?
17 MR. SPEEGLE: Objection, form.
18 THE WITNESS: Because it is -- Kawagoe
19 is aiding carriers to move into the substrate
20 because it's putting a force on them and that
21 helps them move into the substrate.
22

1 BY MR. JAIRAM:
2 Q. So you said "all...things being
3 equal" -- you said specifically, "all other things
4 being equal, they'll move."
5 What did you mean by that?
6 A. Well, it's outside the scope of this,
7 but -- I mean, an example, you could apply a voltage
8 to affect the -- you can apply an additional field,
9 which might negate the other. But that's not what
10 this is about. This is if you build this device and
11 you have a concentration gradient, it creates a
12 force and it tends to move the carrier.
13 Q. Again, you said "tends to move."
14 Does that mean move or does "tends to
15 move" somehow mean it doesn't move?
16 MR. SPEEGLE: Objection to form, asked
17 and answered.
18 THE WITNESS: It creates a force and
19 that moves them. How far it moves them is --
20 it's based on other things, the recombination
21 rate and -- but there's a force and, on
22 average, the electrons are being moved -- or

1 the carriers are being moved into the
2 substrate.
3 BY MR. JAIRAM:
4 Q. So as long as the force is created, it
5 moves them. It's just a matter of how far it moves
6 them that might depend on other things, as you said;
7 is that right?
8 MR. SPEEGLE: Objection,
9 mischaracterizes testimony. Objection,
10 scope.
11 THE WITNESS: It creates a force. And
12 that force, acting on those carriers, will
13 tend to move them into the substrate.
14 BY MR. JAIRAM:
15 Q. How does the recombination rate affect
16 how far they move, the carriers, how far they move?
17 A. Well, it's a statistical process, but
18 the -- the higher the recombination rate, the faster
19 they may be -- they may recombine within the
20 substrate.
21 Q. So does every downward-sloping
22 gradient -- graded dopant concentration create the

1 force that you mentioned?
2 A. Within that -- yeah, locally within
3 that gradient, there's a -- like I said, if you
4 haven't applied some sort of large external voltage
5 or something, it's just the device, and you've got
6 the graded concentration, because of the way the
7 carrier is rearranged, you'll end up with an
8 electric field. And if you then introduce a
9 carrier, you'll have a force on it and that will
10 move. On average. All of these carriers are moving
11 in a stochastic process.
12 Q. And there's no way that they wouldn't
13 move, on average?
14 MR. SPEEGLE: Objection, form.
15 THE WITNESS: If they -- if there
16 aren't any other fields present and the
17 carrier was introduced into that field, it
18 will move so.
19 BY MR. JAIRAM:
20 Q. For the points about electric field
21 that you've mentioned, are you relying on what you
22 think that the applicant said during prosecution?

1 MR. SPEEGLE: Objection, form.
2 THE WITNESS: Relying on the
3 applicant -- oh, well, a POSITA understands
4 that a concentration gradient will lead to an
5 electric field, which will lead to a force.
6 But that's also -- but I'm -- here I'm just
7 happy to use what the patent owner said. And
8 it basically says when the dopant
9 concentration is graded in a particular
10 direction, charged carriers will move in the
11 same gradient direction.
12 BY MR. JAIRAM:
13 Q. I'm saying apart from what the patent
14 owner said and whatever your interpretation of that
15 may be, are you saying that as a matter of physics,
16 such an electric field will definitely be created
17 and will definitely move carriers?
18 MR. SPEEGLE: Objection, form.
19 THE WITNESS: I mean, it depends on --
20 as I said, if there are no other fields --
21 and I guess I should qualify for not an
22 absolute zero temperature, all this stuff,

1 but in normal circumstances, if you have a
2 concentration gradient, it will result in an
3 electric field, which will then act on the
4 carriers.
5 BY MR. JAIRAM:
6 Q. So you mentioned that if there aren't
7 other fields present and the carrier was introduced
8 into that field, you'll move the carrier.
9 Where could other fields come from?
10 A. Externally applied voltages from the
11 circuit, if the structure's in a circuit, things
12 like that. Or I suppose some environmental effect.
13 I don't know.
14 Q. Is anything like that described in the
15 prior art reference that you are relying on,
16 Kawagoe?
17 A. As I said, none of that is -- all
18 these discussions are about we built this device and
19 we put in a gradient to create this electric field,
20 which tends to move carriers down into the
21 substrate. And we don't need to get into the rest
22 of it. That's what's in the structure. That's

1 what's described in the '222 and '842 and that's
2 what's in Kawagoe.
3 Q. Could the other fields come from
4 anything other than externally applied voltages?
5 A. You know, I'm just not going to --
6 you're asking me to like list all possible things.
7 And, you know, I'm not going to answer such a
8 definitive question without going off and making a
9 bunch of analysis of any other thing.
10 The point of my opinion is '222 and
11 '842 disclose gradient to create a field to move
12 carriers. Kawagoe does exactly the same thing.
13 Q. So I don't think you answered the
14 question.
15 Anything other than an externally
16 applied voltage capable of generating the other
17 fields that you mentioned?
18 MR. SPEEGLE: Objection, form, asked
19 and answered.
20 THE WITNESS: Yeah, I mean, I've --
21 I'm not going to -- it's not -- you're asking
22 an open-ended question. I'm not going to try

1 to say I can list every single possible way
2 that something could happen. But it's not
3 even important because Kawagoe discloses what
4 the '222 and '842 disclose.
5 BY MR. JAIRAM:
6 Q. It sounds like you're refusing to
7 answer my question. I asked it twice, but you said
8 you're not going to answer it. I'll give you a
9 chance to answer it and then I'll move to something
10 else, but --
11 A. I'm saying I don't think it's a
12 reasonable question that I can answer.
13 MR. SPEEGLE: Same objections.
14 BY MR. JAIRAM:
15 Q. My question is relating to how
16 carriers move because there's a claim limitation
17 that says, "aid carrier movement." You've provided
18 analysis regarding how a prior art reference
19 allegedly meets the limitation.
20 A. Yes.
21 Q. I'm trying to understand the analysis
22 that you have provided.

1 So can you say that in every
2 circumstance, any downward-sloping gradient will aid
3 carrier movement?
4 MR. SPEEGLE: Objection, scope.
5 Objection, form, and asked and answered.
6 THE WITNESS: I mean, I think I've
7 described my opinion numerous times. I can
8 read it out of here if you want. But in
9 order to try to meet you where you're -- meet
10 you halfway, I did allow that there might be
11 some other thing acting in a particular
12 situation.
13 But that's not what we're describing
14 here. We're describing a technique to move
15 carriers into the substrate. And no one is
16 trying to account for every possible corner.
17 I'm trying to say does this disclose what's
18 over here. And these are the same -- this is
19 the exact same description -- same mechanism,
20 for the same reason, the same purpose as is
21 over here in the '222 and the '842. So I
22 think I've answered it.

1 BY MR. JAIRAM:
2 Q. When you say that you allowed "that
3 there might be some other thing acting in a
4 particular situation," are you agreeing that in some
5 conceivable circumstances, a downward-sloping
6 gradient would not aid carrier movement?
7 MR. SPEEGLE: Same objections.
8 THE WITNESS: Well, what I said and
9 what I continue to say, and my opinion's the
10 same, the gradient will create a force that
11 acts to -- that acts to move carriers -- lore
12 the carriers towards the substrate.
13 If someone comes up with some
14 pathological situation where you put some
15 other force on the carriers, then the
16 gradient will still be acting on the
17 carriers, but some -- if someone imagines
18 some other scenario, they may act on it also,
19 but the -- the gradient is still acting to
20 move the carrier. It doesn't get rid of the
21 mechanism that the gradient has created.
22

1 BY MR. JAIRAM:
2 Q. And does the same apply to the phrase
3 "aid carrier movement" or "aid movement of carriers"
4 in the other two IPRs? Your same testimony
5 regarding everything you've just now been testifying
6 about with respect to -- with respect to the '222,
7 number 1.
8 A. What I've said is consistent with what
9 I've described in the reports. And these
10 descriptions, especially with respect to Kawagoe,
11 are very similar. And basically, the patent owner
12 says gradient leads to movement of carriers in the
13 substrate. Kawagoe teaches the same thing. And so,
14 therefore, it discloses. And to the extent my
15 descriptions are the same, then obviously my
16 opinions are the same.
17 Q. Is there a gradient that would be so
18 steep or so shallow, that it would not aid carrier
19 movements?
20 MR. SPEEGLE: Objection, form and
21 scope.
22 THE WITNESS: It will create a force.

1 A shallow or a steep one will create a force.
2 As I said a few moments ago, as I've already
3 answered, if there are -- through some other
4 imagined, who knows, means, someone creates
5 an additional force, that might be larger
6 than the force created by the gradient.
7 But there will be a force -- that
8 mechanism, the gradient mechanism which
9 creates the force, which acts in the
10 direction to move the carriers, will be
11 there.
12 BY MR. JAIRAM:
13 Q. Suppose there is no additional force.
14 Like you mentioned just now there might be some
15 additional force. Assume for now there's not, then
16 will the presence of a downward-sloping dopant
17 gradient concentration automatically cause aiding
18 carrier movement?
19 A. Well, as I pointed out, consistent
20 with patent owner, carriers must move in a
21 particular direction when the dopant concentration
22 is greater than a particular direction. That's

1 disclosed by the patent owner, it's disclosed in
2 these patents, it's disclosed in Kawagoe. So
3 Kawagoe discloses or makes obvious these patents.
4 That's my opinion.
5 Q. If there is another force that is
6 greater than the force created by the gradient, does
7 the gradient aid carrier movements?
8 A. Again, I'm not opining on the
9 broadness of the definition of the word "aid" or
10 whatever, but the gradient -- the field created by
11 the gradient will still create a force acting in the
12 direction to move the carriers, yes.
13 Q. Assume that there is no additional
14 force. Okay. I understand you're saying that
15 Kawagoe does not describe any additional force; is
16 that correct?
17 A. No -- correct.
18 Q. In a world where there is no
19 additional force, then does a downward-sloping
20 graded dopant concentration have to result in aiding
21 carrier movements?
22 A. As I said, it creates a force and that

1 force acts to move them. And if that is a
2 sufficient definition to meet the word "aid," then
3 it would be. But I'm not -- I'm opining on whether
4 Kawagoe discloses the same material, but I'm not
5 trying to define the full scope of the -- you know,
6 the word "aid" or the claim, the outer bounds of...
7 Q. You pointed to certain disclosure at
8 Column 16 of Kawagoe in paragraph 94 of your '442
9 declaration; right?
10 A. Let me take a look at it. Yes.
11 Q. Do you see paragraph 94?
12 A. Yes, I do.
13 Q. In a passage of Column 16 of Kawagoe
14 that you cited and quoted, there's some mention of
15 "electrons produced by the alpha ray."
16 Do you see that?
17 A. Yes.
18 Q. What is the alpha ray?
19 A. Oh, it's a radiation -- it's a form of
20 radiation. And sometimes there -- alpha rays are a
21 type of radiation. And when they come into a
22 semiconductor, they sort of impact. And you get a

1 bunch of carriers as that tracks through -- there's
2 an illustration in Kawagoe -- I believe it's
3 Kawagoe -- oh, no. It was -- oh, no. I think I
4 used an illustration. I have an illustration of
5 that earlier in the declaration.
6 But basically when that alpha ray
7 comes in, a number of carriers are generated because
8 of the energy from the alpha ray. And Kawagoe is
9 teaching the same idea that's in Rao '222 and '842
10 because it's telling us that because of the
11 concentration gradient, those electrons are
12 attracted to the substrate body.
13 Q. Where are the electrons?
14 A. They're generated from the energy. As
15 the alpha ray impacts a semiconductor, some
16 electrons become free from their atoms and can be
17 moved. They're kind of there and free. And if --
18 and they're using this -- this concentration
19 gradient to put a force there to get them to move
20 into the substrate.
21 Q. The electrons are produced below the
22 wells; right?

1 A. Well, depends on exactly where the
2 alpha ray hits. If the alpha ray -- I mean, we
3 don't have control over that. That's a random
4 process. They're just coming from the environment.
5 If they hit in the vicinity of the gradient, then
6 the electrons that are generated will have a force
7 on them to move them into the substrate.
8 Q. You said in your declaration that the
9 electrons are produced in the body below the wells;
10 right?
11 A. Let's be careful. In 6 -- so I
12 pointed out, in the footnote here on page 47, that
13 "Kawagoe states that 'electrons produced by the
14 alpha ray [are]...prevented from entering the
15 P-well."
16 In that section, those are referring
17 to electrons produced in the large substrate body
18 below the wells. However, the fact that this is
19 acting from the concentration gradient tells us that
20 if we've -- anywhere there's a concentration
21 gradient of this form that's been described here in
22 Kawagoe, then it will move them or it will create

1 the force, which moves them.
2 Q. But Kawagoe specifically states that
3 the electrons are actually prevented from movement
4 into the P-well; right?
5 A. Well, in this particular case, let's
6 be careful, the substrate -- yeah, I believe this is
7 N-type substrate. Careful. I don't want to
8 misspeak. If you are -- I mean, we've shown all
9 these gradients, like this -- where's the
10 specific -- Figure 17 I showed earlier.
11 And this gradient is from the top of
12 the well through to the substrate. It's in my
13 figure in paragraph 92. And so if you create things
14 in the substrate below that gradient, if they try to
15 move towards the gradient, they will then begin to
16 experience the force and will be repelled back
17 toward the substrate.
18 And Kawagoe's pointing out most of the
19 volume of the semiconductor is down there in that
20 substrate because the layers up on top are all
21 fairly thin. However, it's clear also that if
22 you -- if you introduce a carrier and it's near this

1 concentration gradient, it will be -- it will
2 experience this force.
3 So it could be -- one thing, it's
4 repelling because if it's in the substrate deep
5 enough -- if you see the figure, there's not a
6 concentration gradient, but if it tends to move
7 toward the concentration gradient, it will then
8 begin to experience the force and be repelled.
9 But if it happened to land like right
10 in the middle of the concentration gradient, it will
11 also experience that force and will tend to move
12 toward the substrate.
13 Q. You agree that electrons are repelled
14 from moving upwards into the P-well?
15 MR. SPEEGLE: Objection, form.
16 THE WITNESS: I mean, one of the
17 things that happens is if an electron is
18 generated below the concentration gradient in
19 the well and happens to be moving toward the
20 well and toward -- more importantly, towards
21 the concentration gradient, it will be --
22 when it approaches the concentration

1 gradient, it will be approach- -- it will be
2 acted upon by the electric field and then
3 repelled.
4 But Kawagoe also tells us that
5 electrons produced by the alpha ray are
6 attracted to the substrate body by the
7 concentration gradient.
8 So, basically, if the electrons
9 created in the well around this -- in the --
10 where this gradient is present, they'll be
11 attracted to the substrate body. If they
12 happen to be generated in the substrate where
13 there is no gradient, as they approach the
14 gradient, they'll experience the force and be
15 repelled. This is all -- it's entirely
16 consistent. There's no inconsistency here.
17 BY MR. JAIRAM:
18 Q. Where does Kawagoe say that electrons
19 are produced up near the top, near the surface?
20 A. This is an alpha ray strike. You have
21 no control over where it hits. So some of them -- I
22 mean, it could hit anywhere. I mean, that's what

1 they're discussing here. So if it happens to
2 generate electrons in the concentration gradient in
3 the well, it will still experience the force.
4 Q. Kawagoe doesn't specifically state
5 that the electrons are produced by the surface.
6 That's what you are reading into Kawagoe?
7 A. No.
8 MR. SPEEGLE: Objection, form.
9 THE WITNESS: That's simply -- you
10 know, it's a -- well, first off, I don't
11 remember all the text of Kawagoe. And
12 Kawagoe may have pointed that out in
13 particular, but let me make sure because I
14 put -- well, I do have a cite in 16:2-11
15 that's clear. "Electrons produced by the
16 alpha ray are attracted to the substrate body
17 by that concentration gradient."
18 That is saying if the alpha ray
19 strikes in the well and the electron is
20 generated -- or many electrons that are
21 generated experience the field caused by the
22 concentration gradient, they'll be attracted

1 to the substrate body. They'll be attracted
2 down into the body.
3 BY MR. JAIRAM:
4 Q. You're referring to Column 16, lines 2
5 through 11, of Kawagoe?
6 A. Uh-huh.
7 Q. In that passage that you quoted of
8 Kawagoe, it doesn't say that some of the electrons
9 produced by the alpha ray are up near the surface;
10 right? Can you point me to where it says that?
11 MR. SPEEGLE: Objection, form, asked
12 and answered.
13 THE WITNESS: Kawagoe doesn't need to
14 say that. This is obvious. If you have a
15 random alpha ray strike, you cannot predict
16 where it will happen. If it happens --
17 Kawagoe teaches us that if it happens near
18 the concentration gradient, it will
19 experience the force and be attracted to the
20 substrate body.
21 He doesn't -- I mean, Kawagoe doesn't
22 need to list, okay, it can happen at

1 1 micron, it can happen at 2 microns, it can
2 happen at 3 microns. That's nonsensical. If
3 it happens and it experiences the force
4 created by the concentration gradient, it
5 will be attracted to the substrate body.
6 BY MR. JAIRAM:
7 Q. You say that "Kawagoe doesn't need to
8 say that."
9 Do you agree that Kawagoe doesn't
10 say --
11 A. Oh, I'd have to go through and read it
12 all again. I don't remember every single -- yeah,
13 I'd have to go back and review the whole thing to
14 make sure.
15 Q. Well --
16 A. But I'm not -- what I'm saying is
17 Kawagoe teaches that if the alpha ray produces
18 electrons, they're going to be attracted to the
19 substrate body by that concentration gradient. And
20 a POSITA understands that that concentration
21 gradient generates a field. And so if the electrons
22 are produced in a place where that field exists,

1 they will be attracted to the substrate. That's all
2 we need to know.
3 Q. But you didn't say that in the portion
4 of your declaration for Limitation 1.5; right? You
5 didn't say that Kawagoe doesn't disclose the alpha
6 ray electrons being near the surface, but somebody
7 would have seen that to be part of what has to
8 happen? You didn't say anything like that; right?
9 MR. SPEEGLE: Objection to form.
10 THE WITNESS: I said that the
11 dopant -- Kawagoe teaches us, right at the
12 top of Column 16, they "have their impurity
13 concentrations gradually lowered in the
14 depth-wise direction" -- now top of 16 --
15 "from the principal surface of the epitaxial
16 layer."
17 That's the top. And there's a figure
18 and it shows that gradient extending from the
19 top of that structure all the way down into
20 the substrate body.
21 And Kawagoe teaches us that if an
22 electron ends up in the field produced by

1 that gradient, it will be attracted to the
2 substrate. So I am telling you the whole
3 story. This is the whole story.
4 BY MR. JAIRAM:
5 Q. Why did you leave out the part about
6 preventing electrons from entering the well? Why
7 did you leave that out of your block quote and move
8 that down to a footnote?
9 A. Well, just as we discussed -- I mean,
10 I could have included it. There's no -- there's no
11 conspiracy here. What the -- what I'm trying to
12 show is that Kawagoe discloses or makes obvious
13 what's in the '222 and '842. And the '222 and '842
14 are about the gradient creating a force that tends
15 to move the carriers deeper into the substrate. And
16 I am block quoting the portion that has that exact
17 same teaching.
18 Now, I'm also pointing out -- I'm
19 including in the footnote that, by the way, Kawagoe
20 also teaches us that if it happens to be generated
21 below the concentration gradient, the concentration
22 gradient is still helpful because, if an electron

1 moves into that gradient area, region, whatever you
2 want to call it, it will be repelled by the field
3 coming from the concentration gradient.
4 Q. Just in paragraphs 90 through 98 of
5 your 1242 declaration, which are the paragraphs for
6 Limitation 1.5, where did you say that alpha ray
7 electrons are produced at the surface?
8 A. I've already answered that.
9 Q. Just tell me. I don't see it from
10 your answers. Which paragraph?
11 A. I already answered your question. The
12 alpha ray is a random process. Kawagoe teaches us
13 that if the alpha ray generates electrons in the
14 vicinity -- you know, that are affected by that
15 concentration gradient, they will be moved toward
16 the substrate.
17 It is not necessary -- it's not in
18 '222, it's not in '842 to have to say exactly -- I
19 mean, we know that the concentration gradient
20 generates a field. So if the electron experiences
21 that field, it will be attracted to the substrate
22 body. And that's all we need to know. That tells

1 us that it happens everywhere there's a gradient.
2 That means all the way to the top.
3 Q. And for the "aid carrier movement"
4 part of Limitation 1.5, it looks like you have
5 addressed that in paragraphs 97 and 98; is that
6 correct? This is, again, your 1242 declaration.
7 A. Yes.
8 Q. All right. So in paragraph 97, you
9 are saying that the dopant concentration is downward
10 sloping and, "thus, according to patent
11 owner...causes carriers to move deeper into the
12 substrate as well."
13 Do you see that in the last sentence
14 of the paragraph?
15 A. Yes, the -- yes.
16 Q. So you are saying that the limitation
17 is met according to patent owner; is that correct?
18 MR. SPEEGLE: Object to form.
19 THE WITNESS: The patent owner is
20 saying -- let's be clear. The patent owner
21 is saying if there's one of these graded
22 dopant concentrations that we talked about --

1 if it's there, then it will move carriers in
2 the gradient direction. And the patent owner
3 is saying if the graded dopant concentration
4 is there, then it meets this claim.
5 And I'm saying, by your definition,
6 Kawagoe also meets that claim because it has
7 a concentration gradient.
8 BY MR. JAIRAM:
9 Q. Okay. Apart from patent owner's view
10 or statements, is it your opinion, looking at this
11 as a technical expert, that Kawagoe meets the "to
12 aid carrier movement" term? And where have you said
13 that?
14 MR. SPEEGLE: Objection, compound.
15 MR. JAIRAM: I will rephrase it.
16 BY MR. JAIRAM:
17 Q. Putting aside patent owner's
18 statements or alleged statements, is it your
19 opinion, as the technical expert, that as a matter
20 of science and physics, Kawagoe discloses "aid
21 carrier movement" cited in Limitation 1.5?
22 MR. SPEEGLE: Objection, unclear.

1 MR. JAIRAM: Okay. I will restate it
2 again.
3 BY MR. JAIRAM:
4 Q. Putting aside whatever you think the
5 patent owner said, is it your opinion, as the
6 technical expert --
7 MR. JAIRAM: We have to take a short
8 break here because my laptop computer died.
9 So can we please go off the record for a
10 minute and deal with this logistical issue.
11 THE REPORTER: We're off the record.
12 (Pause from the record.)
13 THE REPORTER: We're back on the
14 record.
15 BY MR. JAIRAM:
16 Q. Apart from anything you are relying on
17 patent owner's alleged statements about, is it your
18 view, Dr. Blalock, as the technical expert, that
19 Kawagoe discloses the phrase "aid carrier movement"
20 recited in Limitation 1.5 of the '222 patent?
21 MR. SPEEGLE: Same objections,
22 [inaudible] as well.

1 THE WITNESS: My opinion is that
2 Kawagoe satisfies this element. I said that
3 in paragraphs 96 for Elements 21 through 42
4 and that group. And so -- so the claim
5 element as a whole, I believe, is
6 satisfying -- Kawagoe is satisfying this
7 claim element.
8 I didn't get into the word -- rather
9 than define the word "aid," I'm simply using
10 the patent owner's definition of the word
11 "aid." And given that, it moves it -- it
12 meets it. And as I said in 96, yes, it's my
13 opinion that Kawagoe satisfies this element.
14 BY MR. JAIRAM:
15 Q. Well, it looks like paragraph 96 is
16 not talking about the "aid carrier movement"
17 specifically because it looks like you address that
18 in paragraph 97; right?
19 A. Well, in 97, I point out that if we
20 look at every one of these, 1, 21, 39, 41, 42, it is
21 met under -- because the patent owner says that if
22 there's a gradient, then it will move the carriers.

1 And Kawagoe shows the same concentration, and so it
2 also meets those claim elements.
3 Q. It looks like you're relying on patent
4 owner's statement or patent owner's logic. I'm
5 asking you, what is your view about what happens in
6 Kawagoe? Can you tell me how the claim element "aid
7 carrier movement" is met by Kawagoe without
8 resorting to what patent owner said?
9 MR. SPEEGLE: Objection, unclear.
10 THE WITNESS: I'm just looking at the
11 claims.
12 (Document review.)
13 THE WITNESS: This is [inaudible];
14 right? Yeah.
15 Well -- well, "aid carrier
16 movement" -- I don't know if it will help,
17 but "aid carrier movement" is in Elements 21,
18 39, 41 and 42. And I'm agreeing that the
19 elements -- those elements that include the
20 term "aid carrier movement" are met by
21 Kawagoe.
22 MR. JAIRAM: Let's take a break here.

1 We can go off the record.
2 THE REPORTER: We're off the record.
3 (Recess from the record.)
4 THE REPORTER: We're back on the
5 record.
6 BY MR. JAIRAM:
7 Q. Dr. Blalock, in the 1244 proceeding,
8 you relied on the Payne reference, which we talked
9 about earlier. Can you please turn back to the
10 portion of your 1244 declaration where you're
11 talking about the Payne reference for "graded dopant
12 concentration." That's at paragraph 85.
13 A. Okay.
14 Q. So the Limitation 44.4, you pointed to
15 Exhibit 11 of Payne, which I know we discussed a
16 little bit earlier. And now I want to talk about
17 how you mapped that figure to the "aid carrier
18 movement" feature in the following claim element.
19 Do you see Element 44.5 at
20 paragraph 90?
21 A. Yes.
22 Q. And you see that the limitation is in

1 part stating, "to aid the movement of carriers from
2 the surface layer to an area of the substrate where
3 there are no active regions"?
4 A. I see that.
5 Q. And here you show Figure 11 of Payne,
6 but without the concentration values annotated;
7 right?
8 A. I'm sorry. Where?
9 Q. In your discussion of Element 44.5.
10 A. Well, I've got some annotations on the
11 left-hand side.
12 Q. Yes, but I'm talking about the
13 annotations of the concentration values.
14 A. Oh, yes. That's not annotated.
15 Q. Because you didn't need to know the
16 concentration values in order to determine if the
17 phrase "aid the movement of carriers" is met by
18 Payne?
19 MR. SPEEGLE: Object to form.
20 THE WITNESS: I -- I don't remember
21 specifically why I didn't annotate. I mean,
22 we see shape of the graded concentration.

1 BY MR. JAIRAM:
2 Q. Is the shape of the graded
3 concentration alone enough to tell you that the
4 phrase "aid the carrier" -- I'm sorry -- "aid the
5 movement of carriers" is satisfied by Payne?
6 A. So again -- wow. You know, rather
7 than try to ascribe a specific definition to this
8 "aid the movement," I point out that -- well, first
9 off, it has the gradients. The gradients create the
10 forces. The forces act on the carriers to move the
11 substrate, as before. Right.
12 Then again, as before, I point out
13 that -- in paragraph 95, "Payne's downward-sloping
14 graded dopant concentration aids the movement of
15 minority carriers from the surface layer to the
16 substrate — more precisely, to an area of the
17 substrate where there are no active regions, as
18 discussed above...."
19 In other words, down below -- down the
20 body of the substrate, down below everything, there
21 clearly aren't any active regions. So it is aiding
22 the movement of minority carriers to an area where

1 there are no active regions.
2 "...to the same extent to which
3 Applicant relied on the prior art and admitted to
4 the Patent Office that such carrier movement would
5 occur under the same scenario."
6 Q. Are you saying that you're looking at
7 what applicant said, and that's your basis for why
8 Payne meets the limitations?
9 MR. SPEEGLE: Objection,
10 mischaracterizes testimony.
11 THE WITNESS: Wait a minute. Would
12 you ask that one more time.
13 BY MR. JAIRAM:
14 Q. You're looking at what the applicant
15 said, and that's your basis for why Payne meets the
16 "aid the movement of carriers" phrase?
17 MR. SPEEGLE: Same objections.
18 THE WITNESS: Well, I've gone through
19 a lot of discussion, and I have said that
20 the -- let me make sure.
21 So I'm not forming -- I don't need to
22 form a specific definition because the

1 applicant has given us this language already.
2 And the applicant -- so I'm saying "Payne's
3 downward-sloping graded dopant concentration
4 aids the movement of minority carriers...to
5 the same extent to which Applicant relied on
6 the prior art and admitted to the Patent
7 Office that such carrier movement would occur
8 under the same scenario."
9 So, in other words, patent owner's
10 already told us if you have this graded
11 carrier concentration, this claim element is
12 going to be met.
13 BY MR. JAIRAM:
14 Q. If patent owner hadn't allegedly said
15 that, then would you reach the same conclusion that
16 the claim element is met?
17 MR. SPEEGLE: Objection to form.
18 THE WITNESS: Well, I would have
19 written this report differently.
20 BY MR. JAIRAM:
21 Q. What do you mean --
22 A. I suppose. Well, I couldn't refer --

1 I obviously couldn't refer to the applicant.
2 Q. What would you have written
3 differently?
4 A. I don't know. I'd have to go back and
5 work through that. But that's not the situation.
6 My opinion is that the applicant has told us these
7 things. The applicant represented, in 96, "a
8 unidirectional drift field necessarily affects all
9 the present minority carriers in the same
10 way...depending on the particular slope of the
11 graded concentration of dopant, all minority
12 carriers are either swept 'down' or 'up."
13 And so, you know, my goal here is to
14 decide does Payne disclose or render obvious the
15 '222 and '842. And I'm allowed to take advantage of
16 the information -- included information, the file
17 history. And once I've found that Payne meets the
18 definition and meets the language that the applicant
19 gave us, then I don't need to do anything else.
20 Q. Assuming for the sake of argument that
21 your understanding of the patent owner's statements
22 during prosecution history is incorrect, would you

1 agree that then you have not provided any analysis
2 about Payne meeting that limitation?
3 MR. SPEEGLE: Objection, form.
4 THE WITNESS: Well, as I point out,
5 Jastrzebski -- do I need to spell that?
6 BY MR. JAIRAM:
7 Q. Yes.
8 A. J-A-S-T-R-Z-E-B-S-K-I.
9 And that was cited. And we can
10 certainly use that as well. But "Jastrzebski
11 teaches that this downward-sloping graded dopant
12 concentration creates electric drift field that
13 'force[s] most of the charge carriers deep into the
14 substrate'. ('This is done by creating a field,
15 such as a drift field...to sweep minority charge
16 carriers...into the bulk'."
17 And then there's the same kind of
18 admission with respect to Kamins. Kamins taught us
19 that this gradient creates an electric field. See
20 the -- well, in 106 -- anyway, I just go on to say
21 "Payne satisfies Element 44.5 to the same extent the
22 '222 patent's Figure 5B meets it."

1 Q. Okay. And I hear you saying things
2 about Jastrzebski and Kamins, the prosecution
3 history. I'm asking, apart from the prosecution
4 history, does Payne itself say that the graded
5 concentration that you have pointed to for Figure 11
6 aids the movement of carriers?
7 MR. SPEEGLE: Object to form.
8 THE WITNESS: As I said, the graded
9 concentration creates an electric field. The
10 electric field puts a force on the carriers
11 and tends to move them deeper into the
12 substrate.
13 BY MR. JAIRAM:
14 Q. You mentioned a short while ago that
15 the applicants during prosecution allegedly made
16 some statements about carriers being moved depending
17 on the particular slope of the graded concentration
18 of dopants.
19 Do you recall that testimony?
20 A. Yeah, I believe so. There's also -- I
21 think I cited it here also. Let me find it.
22 Maybe I didn't cite it right here.

1 Yeah, the patent owner said that the field strength
2 was dependent on the slope of the gradient.
3 Q. And where did you analyze the slope of
4 Payne's gradient in your declaration?
5 MR. SPEEGLE: Object, scope.
6 THE WITNESS: This is why I'm citing
7 to the patent. I don't -- if there's a
8 gradient, the applicant has said -- oh, yes,
9 here it is. Depends solely on the slope.
10 The patent owner has said, if there's
11 a gradient, that's enough. You know, if
12 there's -- if there's a gradient of this
13 trend, high or low, as you go deeper into the
14 substrate, then that is sufficient. The
15 carriers will move.
16 BY MR. JAIRAM:
17 Q. And you relied on that logic, if
18 carriers -- I'm sorry. If slope is downward, then
19 carriers will move; is that basically the logic that
20 you applied?
21 MR. SPEEGLE: Objection, form.
22 THE WITNESS: No. As I've said, if

1 the -- if the -- if you have a
2 downward-sloping graded dopant concentration,
3 we know from the basic physics that that will
4 lead to an electric field and that will
5 create a force, which tends to move the
6 carriers.
7 The patent owner agrees with that, but
8 I'm trying to decide if this discloses or
9 makes obvious the '222 and '842. And so I
10 have cites to indicate that if you have that
11 sloped gradient, the carriers will move as
12 specified in the claims of the '222.
13 BY MR. JAIRAM:
14 Q. And where did you analyze the slope of
15 Payne?
16 MR. SPEEGLE: Objection, form.
17 THE WITNESS: What do you mean by
18 "analyze"?
19 BY MR. JAIRAM:
20 Q. Did you discuss where to apply? Or do
21 you say anything about the slope of Payne for
22 Limitation 44.5 of the '222 patent?

1 A. Well, I already -- in paragraph 86, I
2 point out "Figure 11 (below right) illustrates the
3 dopant concentration...which starts at the bottom of
4 the surface layer (blue) and extends to the
5 substrate.... As shown below, Payne discloses a
6 downward-sloping graded dopant concentration in the
7 single drift layer associated with Payne's PMOS
8 transistor."
9 Q. So you're relying just on the property
10 of it being downward sloping and not the particular
11 slope; right?
12 A. There's no teaching in the patent
13 about a necessary particular slope.
14 Q. I'm asking what you relied on --
15 A. And so Payne shows us that there is a
16 downward-sloping gradient. We have multiple
17 admissions from the patent owner that that's
18 sufficient. And so it's met.
19 Q. The particular slope that you
20 mentioned in your earlier response, you did not
21 analyze any particular slope of Payne, did you?
22 MR. SPEEGLE: Object to form.

1 THE WITNESS: I did not measure the
2 slope and do a set of calculations. However,
3 it's already been disclosed that downward --
4 a downward-sloping gradient is sufficient.
5 And I've looked at this figure and I see that
6 it's a downward-sloping gradient, and so it
7 meets it.
8 BY MR. JAIRAM:
9 Q. So you are sticking to the position
10 that any downward-sloping gradient will cause that
11 limitation of a movement of carriers to be met?
12 MR. SPEEGLE: Object to form.
13 THE WITNESS: As I've got, you know,
14 in the report, "Payne's downward-sloping
15 graded dopant concentration aids the minority
16 carriers...[at least] to the same extent to
17 which Applicant relied on the prior art and
18 admitted to the Patent Office that such
19 carrier movement would occur under the same
20 scenario."
21 BY MR. JAIRAM:
22 Q. Apart from that, there's no other

1 place in your declaration where you analyze the
2 particular slope of the gradient of Payne?
3 A. I have, you know, several pages of
4 analysis. And I depend on -- I make several cites
5 that show that when you have a downward-sloping
6 gradient, you will create the force that tends to
7 move the carriers.
8 Q. Can you point me to a specific
9 paragraph, by paragraph number, where you mention a
10 particular slope of Payne's gradient?
11 A. You mean a particular value of the
12 slope?
13 Q. Yes.
14 A. I didn't calculate the actual slopes.
15 Q. Let's take a look at your 1242
16 declaration. This is also regarding the '222
17 patent. At around paragraph 90. Tell me when
18 you're there, please.
19 A. Could we go off the record a second?
20 Q. After this response, we can go off the
21 record.
22 A. Okay.

1 Q. Well, I guess there's no question
2 right this second.
3 MR. JAIRAM: That's fine, we can go
4 off the record.
5 THE REPORTER: We're off the record.
6 (Discussion off the record.)
7 THE REPORTER: We're back on the
8 record.
9 BY MR. JAIRAM:
10 Q. So in your analysis of Limitation 1.5
11 of the '222 patent, you relied on Kawagoe for the
12 entire limitation, including the phrase "aid carrier
13 movement"; right?
14 MR. SPEEGLE: Objection, form.
15 THE WITNESS: As I said in
16 paragraph 97, "In light of [the teachings of
17 Kawagoe], under Patent Owner's plain meaning
18 construction of the "to aid carrier movement"
19 term," Kawagoe satisfies all of these
20 elements.
21 BY MR. JAIRAM:
22 Q. Kawagoe alone satisfies or discloses

1 all of Limitation 1.5; is that right?
2 A. In 97, I said, "Under [the] Patent
3 Owner's plain meaning construction," and how they've
4 explained it. And I also pointed out that in the --
5 Intel's alternative proposed construction, that
6 Kawagoe illustrates a downward-sloping gradient
7 dopant concentration. And since the applicant
8 represented to the Patent Office that a
9 downward-sloping graded dopant concentration was
10 known in the prior art to create an inherent
11 built-in field, that field would, therefore, sweep
12 carriers down into the substrate.
13 Q. I'm just asking -- you're saying
14 Kawagoe alone discloses all of 1.5; right?
15 MR. SPEEGLE: Object to form.
16 THE WITNESS: Under these definitions,
17 sure.
18 BY MR. JAIRAM:
19 Q. You did not rely on obviousness for
20 Limitation 1.5; is that correct?
21 A. Well, yeah, I see where you're --
22 we -- yeah, I went through piece by piece. Let's

1 see.
2 (Document review.)
3 THE WITNESS: No dispute on this.
4 92, I said Kawagoe discloses a
5 downward-sloping graded concentration.
6 BY MR. JAIRAM:
7 Q. Just a reminder, please speak clearly
8 so the reporter can transcribe everything.
9 A. And in -- in paragraph 94, I explain
10 that this downward-sloping graded dopant
11 concentration aids the movement of carriers and, of
12 course, this is in -- from the first and second
13 active regions towards or to the bottom where there
14 are no active regions.
15 My formal opinion was that it
16 discloses or at least makes obvious.
17 Q. What do you mean "discloses or at
18 least makes obvious"?
19 A. Or at a minimum, renders obvious.
20 Sorry.
21 Q. What do you mean by saying "at a
22 minimum, renders obvious"?

1 A. Well, I'm -- for this aiding, I'm --
2 as you pointed out, I'm depending on these -- the
3 patent owner's definition. And also, as I said in
4 94, Kawagoe explains that that downward-sloping
5 graded -- so I guess what I'm just saying is that
6 if -- if there's argument about some little tiny
7 detail, then it's -- it's at least rendered obvious
8 because everything is -- all the different pieces
9 are there, and it would, at the very least, be
10 obvious to a POSITA.
11 Q. What tiny little detail?
12 A. I'm not saying there is. I'm just
13 saying in the course of these proceedings -- I mean,
14 you know, I did this -- this is a form that's used
15 for basically all these elements. I mean, it
16 discloses or, at a minimum, renders obvious.
17 So if in the course of all this,
18 someone finds something where there's some little
19 piece of an element not completely disclosed, I'm
20 saying it, therefore, makes it -- it's still obvious
21 because it would be such a trivial change.
22 And I don't know what that is. I'm

1 not pointing out what that thing is. I don't know
2 that it even exists. I'm just saying that if -- in
3 the course of these proceedings, my opinion is it
4 discloses or, at a minimum, it renders obvious these
5 elements.
6 Q. You did not provide any obviousness
7 analysis for Limitation 1.5; correct?
8 MR. SPEEGLE: Objection to form.
9 (Discussion off the record.)
10 THE WITNESS: No, not at all. I'm
11 pointing out -- I'm mapping all of these
12 pieces from the prior art onto the patents.
13 And so, as I said, it discloses or at least
14 renders -- or, at a minimum, renders it
15 obvious because I'm mapping all these things.
16 BY THE WITNESS:
17 Q. Can you tell me which paragraph
18 contains your obviousness analysis for
19 Limitation 1.5?
20 MR. SPEEGLE: Objection, unclear as to
21 "obviousness analysis."
22 THE WITNESS: I mean, as I said, I am

1 describing -- the whole analysis is
2 describing how Kawagoe has all of the --
3 everything that's -- has the claim element
4 and all these key features. And so if it has
5 all these key features, then it's disclosing.
6 Or if somewhere along the way, it's found
7 that it isn't quite perfect disclosure, then
8 I'm saying, well, it's -- at the very least,
9 it's obvious. It's just inherent in the
10 analysis.
11 BY MR. JAIRAM:
12 Q. Do you believe that you have done a
13 thorough obviousness analysis for Claim 1 of the
14 '444 patent [sic]?
15 MR. SPEEGLE: Same objection.
16 THE WITNESS: I've done an analysis
17 that shows the -- Kawagoe -- all of the
18 elements -- all of these elements in this
19 1.5, they're disclosed, but I'm simply saying
20 if someone somehow finds exception to
21 disclosing, then it would be such a trivial
22 difference, that it's going to render it

1 obvious.
2 BY MR. JAIRAM:
3 Q. Please turn to paragraph 24 of your
4 1242 declaration. Do you see that paragraph 24 is
5 part of your section called "Obviousness"?
6 A. Yes.
7 Q. Can you please read the third
8 sub-bullet of paragraph 24 out loud.
9 A. "What differences, if any, existed
10 between the claimed invention and the prior art."
11 I'm not pointing out differences.
12 Q. So you did not provide obviousness
13 analysis for Limitation 1.5; is that correct?
14 MR. SPEEGLE: Objection,
15 mischaracterizes testimony.
16 THE WITNESS: I provided analysis
17 showing how it's all disclosed. And I'm
18 simply pointing out that if somehow it's
19 found not to be obvious, I think things are
20 so close and this prior art is such a good
21 disclosure of what's in the '222, that the
22 difference -- if a difference is revealed, it

1 will be so subtle, that it will remain
2 obvious.
3 BY MR. JAIRAM:
4 Q. You have not identified any
5 differences that existed between Limitation 1.5 and
6 Kawagoe; is that correct?
7 MR. SPEEGLE: Objection,
8 mischaracterizes testimony.
9 THE WITNESS: Would you repeat the
10 question. Sorry.
11 BY MR. JAIRAM:
12 Q. You have not identified any
13 differences that existed between Limitation 1.5 and
14 Kawagoe; correct?
15 MR. SPEEGLE: Same objections.
16 THE WITNESS: I'm simply mapping
17 the -- what's disclosed in Kawagoe to the
18 claim element in the '222, and I think that
19 mapping is complete.
20 BY MR. JAIRAM:
21 Q. Are you able to provide a yes or a no
22 answer to whether you identified any differences

1 between Limitation 1.5 and Kawagoe?
2 MR. SPEEGLE: Objection, form, scope,
3 asked and answered.
4 THE WITNESS: As I said, I described
5 how Kawagoe maps to the '222. And I said
6 that in light of this, in light of the patent
7 owner's distinction -- and Kawagoe certainly
8 discloses all of this in -- of course, I went
9 on to talk about the other construction --
10 but I would have to be -- if someone presents
11 me with an argument as to why this is not
12 disclosed, then I'll be happy to analyze that
13 in more detail with respect to the
14 obviousness constraints.
15 BY MR. JAIRAM:
16 Q. Simply asking you, Dr. Blalock,
17 whether you identified any differences between
18 Kawagoe and Limitation 1.5. Can you please answer
19 with a yes or a no.
20 MR. SPEEGLE: Objection. He doesn't
21 have to answer yes or no. And asked and
22 answered, mischaracterizes testimony.

1 MR. JAIRAM: Mark, he hasn't answered
2 the question. I'm asking a specific question
3 he hasn't answered.
4 MR. SPEEGLE: This is a pretty
5 unserious line of questioning. You can
6 answer if you want.
7 THE WITNESS: Yeah, as I've said, I've
8 gone through and mapped it and didn't find
9 differences in this section, but if I -- my
10 opinion is if -- if someone wanted to show me
11 analysis with some important differences, I
12 believe these are so close that it would
13 still be obvious.
14 BY MR. JAIRAM:
15 Q. So you did not provide any differences
16 between Kawagoe and Limitation 1.5; correct?
17 MR. SPEEGLE: Same objections.
18 THE WITNESS: I just answered you.
19 BY MR. JAIRAM:
20 Q. And your answer said that you didn't
21 find any differences in Limitation 1.5?
22 A. I'm just trying to be sure of that.

1 I'll make sure that -- I can't remember every
2 sentence.
3 (Document review.)
4 THE WITNESS: Anyway, to the best of
5 my recollection and as I'm looking here, I
6 don't see that I identified any differences.
7 I mapped Kawagoe to the '222 patent and found
8 that's the element.
9 BY MR. JAIRAM:
10 Q. Likewise for Limitation 1.6, you did
11 not identify any differences between that limitation
12 and Kawagoe either, did you?
13 A. So, yeah, I'm not -- correct, I'm not
14 pointing out differences. I'm showing the
15 similarities.
16 Q. You did not provide any differences
17 between Kawagoe and any part of Claim 1 of the '222
18 patent; correct?
19 MR. SPEEGLE: Objection to form.
20 THE WITNESS: I -- the problem with
21 the question is defining "differences." I
22 mean, we are talking about two different

1 pieces of art. There are -- I mean, clearly,
2 if you look at the figures in the different
3 pieces of art, it's not exactly the same
4 figures and whatnot. I don't know what you
5 mean by "differences."
6 I'm saying with respect to the claim
7 element, Kawagoe discloses it. And I reserve
8 the opinion that if a significant and
9 important difference is pointed out, these
10 are so very similar, that I believe it will
11 at least be obvious.
12 BY MR. JAIRAM:
13 Q. For what reason?
14 A. What I just said, because they're so
15 similar. They're doing these gradients for the same
16 reason. Kawagoe's got the same teachings.
17 Q. In your analysis of the Limitation 1.5
18 of the '222 patent, you did not analyze any
19 particular slope of Kawagoe; correct?
20 MR. SPEEGLE: Objection, form.
21 THE WITNESS: I did not do a
22 calculation of the slope because that was not

1 needed. There's nothing in the language of
2 the patent, in the disclosure or in the
3 elements that define that we have -- that
4 requires a particular slope.
5 BY MR. JAIRAM:
6 Q. And in the 1242 declaration, you also
7 analyzed the Wieczorek reference; correct?
8 I'll spell that out for the court
9 reporter. That's W-I-E-C-Z-O-R-E-K.
10 You analyzed that reference; correct?
11 A. Yes.
12 Q. And Wieczorek is Exhibit 1006 in, I
13 believe, all three IPRs. And you have a copy of it
14 electronically, and I'm also giving you a hard copy
15 of it.
16 A. Okay.
17 Q. Does that look to be the Wieczorek
18 reference that you analyzed?
19 A. Yes.
20 MR. SPEEGLE: For the record, there's
21 a different 1006, 1244.
22 MR. JAIRAM: Okay. You are correct,

1 Mark.

2 (Exhibit 1006, Previously marked.)

3 BY MR. JAIRAM:

4 Q. So, Dr. Blalock, in the 1242 and 1243

5 proceedings, Wieczorek is Exhibit 1006; right?

6 A. Yes.

7 Q. And in the 1244 proceeding, there's a

8 different reference that has that exhibit number.

9 A. Okay.

10 Q. Okay. So in the 1242 proceeding, when

11 you analyzed Limitation 1.5 of the '222 patent --

12 A. Which paragraph?

13 Q. Around paragraph 156.

14 At those paragraphs, you did not

15 analyze any particular slope of a concentration

16 curve of Wieczorek; correct?

17 A. I didn't -- I didn't do like a

18 calculation of the slope. I certainly analyzed to

19 ensure that it is downward sloping, and I think

20 there may be some other claims about the nature of

21 that slope, Element 21.7, for instance.

22 Q. You wouldn't have known how to find

1 the slope; correct?
2 MR. SPEEGLE: Objection, form.
3 THE WITNESS: No, of course I would.
4 BY MR. JAIRAM:
5 Q. How would you have found the slope?
6 A. If you have a -- if Wieczorek provided
7 the numbers of the various doping levels, as we saw
8 earlier, then you could -- you know, there's some
9 simple calculations. I don't -- I don't think --
10 I'm trying to remember if Wieczorek gave us any
11 specific numbers. Certainly the figure does not
12 have specific numbers.
13 So I don't remember if we had specific
14 numbers of the final doping levels, but -- I'm not
15 seeing them here. I don't remember every single
16 line. But at least in the figures, if we had a
17 figure with concentrations and dimensions, we could
18 do a calculation -- a specific calculation of the
19 slope.
20 I didn't do a specific calculation
21 because there's no need to. The '222 patent
22 certainly doesn't give us any requirements of

1 specific slopes, so there was no need to analyze
2 that.
3 Q. So you saw a downward slope and
4 concluded that, therefore, it must also meet the
5 limitation of "aid carrier movement"?
6 A. According to the patent owner, yes.
7 But, of course, in 21.7, on several -- in several
8 places for Element 21.7, there is a constraint on
9 the linear, quasilinear, error function or
10 complementary error function or any combination,
11 so --
12 Q. What is 21.7? I don't know --
13 A. Element 21.7, it says, "wherein the
14 graded dopant concentration is linear, quasilinear,
15 error function, complementary error function, or any
16 combination thereof."
17 That's on -- before 169, page 94.
18 Q. Okay. I'm just asking about
19 Limitation 1.5, sticking in Claim 1 for now.
20 A. Right. I thought you were asserting
21 that I only cared about the fact that it's downward
22 sloping.

1 Q. I'm asking for Limitation 1.5.
2 A. Okay.
3 Q. It sounds like you looked at it being
4 downward sloping, but you did not look at specific
5 slope of any concentration plot in the reference;
6 correct?
7 MR. SPEEGLE: Objection, form.
8 THE WITNESS: I analyzed -- well,
9 ensured that it was -- it did have a
10 downward-sloping graded dopant concentration,
11 and that's in the end of 157.
12 BY MR. JAIRAM:
13 Q. And you've said today that if there
14 was downward-sloping graded dopant concentration,
15 that that makes it move carriers; right?
16 MR. SPEEGLE: Objection,
17 mischaracterizes testimony.
18 THE WITNESS: The patent owner said
19 that. And I used that statement by the
20 patent owner to reach certain conclusions.
21 BY MR. JAIRAM:
22 Q. Do you agree with that statement by

1 the patent owner?
2 MR. SPEEGLE: Object to form.
3 THE WITNESS: As I have said, if you
4 have a downward-sloping gradient, there will
5 be a field. It will exert a force on the
6 carriers.
7 BY MR. JAIRAM:
8 Q. Will it move the carriers?
9 A. The force will act in the direction to
10 move the carriers.
11 Q. And you said that there could be some
12 additional force.
13 Do you recall that testimony?
14 MR. SPEEGLE: Objection,
15 mischaracterizes.
16 THE WITNESS: I said they would move
17 if you didn't have some other external force
18 acting. I also pointed out that the movement
19 is a statistical process. So it's not like
20 you can reach in and say that carrier will
21 move in this direction. Because it's a
22 stochastic process where the carriers have

1 energy, but the force is acting to move and
2 there will be some movement -- there will be
3 movement in that direction into the
4 substrate.
5 BY MR. JAIRAM:
6 Q. Suppose there are two forces pushing
7 on the carrier in opposite directions. Do both of
8 those forces aid the movement of the carrier?
9 MR. SPEEGLE: Object to form.
10 THE WITNESS: The net field will exert
11 a force which -- it will have some direction
12 depending on what the field directions were,
13 but we can calculate the net force. And it
14 will have -- it will act to move the carrier.
15 BY MR. JAIRAM:
16 Q. When you talk about "the net force,"
17 are you saying even if there's a first force and
18 then some second additional force, the net effect is
19 that movement of the carrier will still be aided?
20 MR. SPEEGLE: Objection, incomplete
21 hypothetical.
22 THE WITNESS: I said the net force --

1 you know, if there is some other imaginary
2 second force, which is not what we're talking
3 about here, but if somehow someone created
4 some second force, those two forces -- those
5 two fields -- at the location of the carrier,
6 there would be some summation of those
7 fields.
8 And the net summation of those fields
9 and their directions will create a force that
10 tends to move the carrier unless the force
11 is -- I suppose if this hypothetical field
12 somehow exactly canceled out the other, maybe
13 there would be no movement; but, otherwise,
14 as long as there's some net force, it will
15 tend to move the carrier in the direction of
16 the force.
17 BY MR. JAIRAM:
18 Q. Okay. So for all three of the
19 references – Kawagoe, Wieczorek and Payne – in these
20 various IPRs, you look at the presence of a
21 downward-sloping dopant concentration gradient;
22 right?

1 A. Let's make sure which reference --
2 which reference is this?
3 Q. The Kawagoe, Payne and Wieczorek
4 references that we've been talking about, in all
5 three of those, you looked at the existence of a
6 downward-sloping graded dopant concentration; right?
7 A. That's one of the things I looked for,
8 yeah.
9 Q. And in none of those three references
10 did you analyze the particular slope of that
11 gradient; correct?
12 MR. SPEEGLE: Objection, form.
13 THE WITNESS: I did the analysis
14 necessary to show that Kawagoe, Wieczorek or
15 Payne disclosed and gave the information --
16 or combinations thereof -- gave the
17 information necessary to satisfy all the
18 elements of the '222 or '842, whichever the
19 particular case was.
20 BY MR. JAIRAM:
21 Q. And is that analysis that you say is
22 all the analysis necessary, is that the same

1 analysis in each of those three instances?
2 MR. SPEEGLE: Objection, form.
3 THE WITNESS: Well, they're all
4 different references so you have to analyze
5 them differently.
6 BY MR. JAIRAM:
7 Q. Is there anything specific to any of
8 those references that you analyzed in a different
9 way than any of the other instances?
10 MR. SPEEGLE: Same objection.
11 THE WITNESS: Well, overall, I'm
12 taking the elements of the '222 or '842 and
13 looking into the prior art, either the
14 single -- the single reference or
15 combinations, as in the report, and seeing if
16 I can map and find all of those elements.
17 So from that perspective, the analysis
18 is -- is the same, but -- I mean, that's the
19 process and it's the same for all of them.
20 BY MR. JAIRAM:
21 Q. So apart from the fact that you found
22 a downward-sloping concentration gradient in all

1 three of those references - Kawagoe, Wieczorek and
2 Payne - is there some other attribute of the
3 concentration gradient of those references that you
4 relied on that's specific to the reference?
5 MR. SPEEGLE: Objection, form.
6 THE WITNESS: I'm trying to understand
7 your question. But in those references,
8 yeah, I'm looking for the gradient that would
9 lead to a field that would tend to move the
10 carriers deeper into the substrate.
11 BY MR. JAIRAM:
12 Q. So you found that all three of them
13 have downward slope; right?
14 A. Yes.
15 Q. Did you find something else about any
16 one of those three that's individual to that and not
17 the situation in the other two? Is there any aspect
18 of the concentration profile that's particular to
19 one of those references?
20 A. Well, I mean, you can look at the
21 images, you can look at the figures. The shapes are
22 a little different, but they're all downward

1 sloping.
2 Q. Is there anything about the shapes
3 being different that you analyzed?
4 MR. SPEEGLE: Objection, form.
5 THE WITNESS: I -- as we've discussed
6 at length, I looked at the admissions from
7 the patent owner and made sure that all these
8 references satisfied them and, of course, the
9 text of the '222 and the '842 as well to the
10 extent there is text.
11 So, yeah, I did that for all of these
12 and I -- several pages for all of these. You
13 know, can read it all again, but it's all
14 there.
15 BY MR. JAIRAM:
16 Q. And apart from the alleged patent
17 owner admissions and the text of the '842 and '222
18 patents themselves, is there any other factor
19 regarding the concentration curves of these three
20 references that you analyzed other than the property
21 of being downward sloping?
22 A. No. I just said a few minutes ago

1 that in 21.7, there's discussion of the shapes, the
2 specific shapes. And so for that element, I made
3 sure that these shapes were satisfied based on the
4 figure.
5 Q. I'm asking about Limitation 1.5 and
6 just sticking with the independent claim, Claim 1.
7 A. Okay.
8 Q. For the claim that has the phrase "aid
9 the movement of carriers," are there any factors
10 regarding the concentration curves of these three
11 references or regarding anything else in those three
12 references that you relied upon other than the
13 property of being downward sloped?
14 MR. SPEEGLE: Objection, form.
15 THE WITNESS: Are you referring only
16 to the gradient?
17 BY MR. JAIRAM:
18 Q. What you relied on.
19 A. Well, I mean, you know, there's a very
20 long report. And for all these elements, I looked
21 at the structure, I looked at where the gradient
22 was, I looked at the location, I looked at the

1 elements and the surfaces and the active regions and
2 all of those things.
3 Q. I'll ask just about the gradient.
4 So for each of those three references,
5 you pointed to something for a graded dopant
6 concentration or a concentration gradient; right?
7 A. Yes.
8 Q. And regarding any of these three
9 references, for the mapping of the claim phrase "aid
10 carrier movement," have you looked at any aspect of
11 the gradient other than its being downward sloping?
12 MR. SPEEGLE: Objection, form.
13 THE WITNESS: As I've said, the patent
14 owner tells us that that's sufficient, so
15 that's what I did. I have not done
16 calculations of the slope per se.
17 BY MR. JAIRAM:
18 Q. You have not done calculations of the
19 slope. Have you looked at any other factors? I
20 understand you're saying patent owner said
21 something. I'm just trying to understand what you
22 did or did not do.

1 MR. SPEEGLE: Same objection.
2 THE WITNESS: Pardon?
3 MR. SPEEGLE: Same objections.
4 BY MR. JAIRAM:
5 Q. The objection shouldn't affect your
6 answers.
7 A. Oh, so --
8 Q. Let me ask the question again to make
9 a clean record.
10 Apart from calculation of slope, which
11 you said you didn't do, apart from sloping being
12 downward, which you said you have observed, is there
13 anything else about the concentration gradients of
14 Kawagoe, Wieczorek or Payne that you analyzed for
15 your opinion regarding the phrase "aid carrier
16 movement" of the independent claim?
17 A. I mean, I'm -- also, of course,
18 depending on the -- I mean, my own understanding
19 that a gradient -- a downward-sloping gradient will
20 create a field that will create a force that will
21 act on the carrier, as I've said many times today.
22 Q. That's, again, the property of being

1 downward sloping. I'm asking if there's anything
2 else at all about the concentration curve that's
3 relevant to your analysis, either that you did in
4 your analysis or that you think maybe you didn't do
5 it, but would still be relevant.
6 A. As long as we're -- I mean, I
7 certainly analyzed where the gradient was, the
8 structure, all that stuff. Right. I understand --
9 in other words, I don't want to be left being
10 interpreted as all that matters is the gradient.
11 What also matters is the structure and the location
12 of active regions and all of those things as well.
13 Q. Okay. And about the graded
14 concentration dopant curve, is the fact that it's
15 sloping downwards in those three references the only
16 fact that you relied upon for the phrase "aid
17 carrier movement" of the independent claims?
18 A. I relied --
19 MR. SPEEGLE: Objection.
20 THE WITNESS: The claims only refer to
21 a graded concentration. And they don't
22 specify any specific thresholds, so I didn't

1 do that analysis because it wasn't necessary.
2 But I -- as I've said before, the -- I
3 understand those forces act. That's just
4 from basic physics of how these things
5 operate. And the fact that that force is
6 there is apparently, according to the patent
7 owner, sufficient. So that was adequate to
8 map the claim.
9 BY MR. JAIRAM:
10 Q. And you did not look at anything else
11 besides the downward slope because you saw the
12 alleged statement by the patent owner, combined with
13 the downward slope would get you to the claim
14 limitation being met; is that right?
15 MR. SPEEGLE: Objection, form.
16 THE WITNESS: That plus the basic
17 physics.
18 BY MR. JAIRAM:
19 Q. And where did you describe the basic
20 physics in your analysis of Limitation 1.5 of the
21 '222 patent?
22 A. Oh, I may not have entered it in that

1 specific section, but -- let me find --
2 (Document review.)
3 THE WITNESS: I mean, there's -- so as
4 we discussed earlier, I cited several other
5 references that also point out that the
6 downward slope -- I don't remember
7 specifically if I -- yeah, I can't remember
8 all the text of this specification, but I
9 believe I talked about the fact that the
10 electric field was created. That's first
11 principles.
12 But there are -- I also quoted Kamins.
13 And we looked at the Jasper reference and
14 others that indicate that the
15 downward-sloping gradient will create a field
16 that acts to move the carriers.
17 BY MR. JAIRAM:
18 Q. And where did you do that for your
19 analysis of 1.5 -- Limitation 1.5 of the '222
20 patent?
21 A. Oh, I didn't -- in 1.5 -- well, 160
22 I'm pointing out that Jastrzebski and Kamins --

1 Q. 160? Do you mean paragraph 160?
2 A. Yes, paragraph 160.
3 Q. I'm asking about Ground 1,
4 Dr. Blalock, your Kawagoe-based ground.
5 A. Oh, I'm sorry. Apologize.
6 Q. No, it's totally understandable.
7 There's multiple grounds.
8 A. Yes.
9 Q. In your analysis, let's say at
10 paragraph 90 through --
11 A. Yes.
12 Q. -- 98, which is your analysis of
13 Limitation 1.5 in the Kawagoe ground, where did you
14 include any of this discussion of basic physics or
15 Kamins or Jastrzebski that you just now alluded to?
16 MR. SPEEGLE: Object to form.
17 THE WITNESS: It is in paragraph 98, I
18 point to Section X.A.1.g, and that includes
19 cites to Kamins and Jastrzebski, as well, as
20 backgrounds.
21 BY MR. JAIRAM:
22 Q. Cite X.A.1.g, what paragraph number

1 would that be?
2 A. 99. It's right below.
3 In the discussion of 1.6, I talked
4 about how Kamins and Jastrzebski are cited and how
5 they show that the graded dopant, the downward
6 sloping, moves these carriers into the substrate.
7 So rather than put that text repeated over and over,
8 I just referenced that section.
9 Q. So for Element 1.5, you are relying on
10 whatever happened in the prosecution history?
11 Because I believe you're saying that you're citing
12 the prosecution history for that limitation; is that
13 right?
14 MR. SPEEGLE: Objection,
15 mischaracterizes the document.
16 THE WITNESS: Yeah, it's the -- I'm
17 pointing out that the applicant used Kamins.
18 And then I'm showing what Kamins showed us.
19 And that's analysis that tells us that this
20 downward-sloping graded concentration creates
21 forces that move the carriers into the
22 substrate.

1 BY MR. JAIRAM:
2 Q. If your understanding of that
3 prosecution history happens to be incorrect, did you
4 provide any analysis of your own to meet the
5 limitation "aid carrier movement" of Limitation 1.5?
6 MR. SPEEGLE: Objection,
7 mischaracterizes the document.
8 THE WITNESS: I did this numerous
9 times. Let's see.
10 I'm having a little trouble
11 understanding the distinction you're making.
12 Because my opinion is based on -- I mean, I
13 could just say, in my opinion, X is true, but
14 it's much more robust to cite to other
15 references. And so while I -- so in this
16 section, I'm primarily citing to other
17 references. But I'm trying to look here to
18 see if I'm missing --
19 BY MR. JAIRAM:
20 Q. Well, let me ask the question a
21 different way.
22 A. Uh-huh.

1 Q. Apart from Kamins, Jastrzebski and
2 whatever applicant said in the prosecution history,
3 are you relying on anything else for your mapping of
4 Kawagoe to the phrase "aid carrier movement" in
5 Limitation 1.5?
6 MR. SPEEGLE: Object to form.
7 THE WITNESS: As I expressed at the
8 end of 105, "Kawagoe" -- I said I agreed --
9 or stated that "Kawagoe satisfies elements,
10 in my opinion, under Patent Owner's plain
11 meaning [of the] construction of 'to aid
12 carrier movement' term."
13 BY MR. JAIRAM:
14 Q. That's for Limitation 1.6. I'm asking
15 about Limitation 1.5. I'm just trying to find out
16 what the universe of things that you relied upon are
17 so I can understand your analysis.
18 I hear you saying you relied on
19 something in Kamins, something in Jastrzebski,
20 something applicant may have said.
21 Is there anything else that you relied
22 on for Limitation 1.5, specifically the phrase "aid

1 carrier movement"?
2 MR. SPEEGLE: Objection,
3 mischaracterizes the cross-reference in the
4 document.
5 THE WITNESS: Yeah, I mean, I'm -- I'm
6 just confused. Because I point these things
7 out to you and then we go back, and you're no
8 longer taking that into account. I keep
9 pointing to these things.
10 BY MR. JAIRAM:
11 Q. Is there anything else that you
12 pointed to besides the references that you say --
13 THE REPORTER: I can't hear you.
14 MR. JAIRAM: I'll speak up louder.
15 BY MR. JAIRAM:
16 Q. For Limitation 1.5, did you rely on
17 any references for understanding different from
18 Kamins, Jastrzebski and applicant's statements?
19 A. Paragraph 94, "Kawagoe further
20 explains that such downward-sloping graded dopant
21 concentration aids the movement of carriers from the
22 first and second active regions towards/to the

1 bottom of the substrate where there are no active
2 regions."
3 And I have the cite. We discussed
4 this at lengths. And this citation supports -- this
5 discussion that I cite supports that the
6 downward-sloping graded dopant concentration aids
7 the movement of carriers from the first and second
8 active regions towards/to the bottom.
9 Q. Is there anything else besides that
10 quoted passage of paragraph 94?
11 MR. SPEEGLE: Objection.
12 THE WITNESS: We --
13 BY MR. JAIRAM:
14 Q. I'm just trying to understand what
15 all --
16 A. I mean, look --
17 (Cross talk.)
18 A. -- they're in the document -- my
19 opinions are in the document. I apologize.
20 Q. I'm allowed to ask you about your
21 opinions, Dr. Blalock. And if there's any other
22 opinions that I may be missing, I'm simply asking

1 you to catalog them so I can go through them one by
2 one.
3 So, please, I'm asking you, apart from
4 the passage of Kawagoe that you quoted at
5 paragraph 94 and apart from the prosecution history
6 statements and references, is there anything else
7 that you relied upon for the phrase "aid carrier
8 movement" of Limitation 1.5?
9 A. Within this section, with respect to
10 the things that we've already pointed out, at this
11 moment, my recollection is I believe I've pointed
12 all these things out. I -- you know, there's --
13 this was done a long time ago and there are a lot of
14 words. And if I miss something that I stated here,
15 I apologize. But I -- I'm not treating this as a
16 memory test so I can just give you an exhaustive
17 list.
18 Q. I'm not asking for a memory test.
19 Certainly you've got your document in front of you.
20 I'm asking --
21 A. Yes.
22 Q. -- if you relied upon certain things

1 or if you relied upon certain additional things.
2 And you can certainly consult your declaration. You
3 don't have to rely upon your memory.
4 A. Sure.
5 MR. JAIRAM: Let's take a break.
6 THE WITNESS: Okay. Sounds good.
7 MR. JAIRAM: Let's go off the record.
8 THE REPORTER: We're off the record.
9 (Recess from the record.)
10 THE REPORTER: We're back on the
11 record.
12 MR. JAIRAM: I don't have any further
13 questions for the witness. I'll pass the
14 witness.
15 MR. SPEEGLE: Okay. Let's take a
16 short break and then we'll do redirect.
17 THE REPORTER: We're off the record.
18 (Recess from the record.)
19 THE REPORTER: We're back on the
20 record.
21
22

1 REDIRECT EXAMINATION
2 BY MR. SPEEGLE:
3 Q. Dr. Blalock, you were asked some
4 questions about your background.
5 Do you remember that?
6 A. Yes.
7 Q. Do you have specialized knowledge that
8 will help the finder of fact resolve questions
9 related to these IPRs?
10 A. Yes.
11 Q. Can you explain what that specialized
12 knowledge is?
13 A. Well, these patents have to do with
14 semiconductors and wells and CMOS transistors and
15 the shape and characteristics of those structures.
16 And as a designer, I have often had to take into
17 account those structures to account for behavior
18 that we observe in the circuits.
19 And I've also taught, out of my
20 textbook and other textbooks, about these parts of
21 the CMOS process. I've also educational training
22 relating to these structures as well.

1 Q. And there have been several prior art
2 references referenced in your declarations and
3 throughout this deposition.
4 Do those references relate to your
5 field of expertise?
6 A. Yes, I'm comfortable with these
7 references.
8 MR. SPEEGLE: I want to introduce -- I
9 don't have a paper copy of it, but I want to
10 introduce electronically what's been marked
11 in the deposition -- or in the 1242 IPR
12 previously as Exhibit 1040.
13 Let's see if I can get this into the
14 chat.
15 (Exhibit 1040, Previously marked.)
16 MR. SPEEGLE: Eileen, can you see
17 Exhibit 1040 that's uploaded in the chat?
18 THE REPORTER: No, I don't -- oh,
19 there it is.
20 BY MR. SPEEGLE:
21 Q. Dr. Blalock, can you see Exhibit 1040
22 in the chat?

1 A. Yes. Oh, I know what that is.
2 Q. If you can go ahead and open it and
3 let me know when you have it open.
4 MR. SPEEGLE: Arvind, I assume you
5 too.
6 THE WITNESS: Oh, it's taking a while.
7 BY MR. SPEEGLE:
8 Q. The dialog box.
9 A. I told it to -- yeah, it looks
10 familiar.
11 Q. Do you recognize Exhibit 1040?
12 A. This is the first edition of my
13 textbook.
14 Q. Is this --
15 A. No -- go ahead.
16 Q. When you say your "textbook," are you
17 referring to the Circuit Design textbook that you
18 were asked about earlier in your deposition?
19 A. Yes. This is the first edition
20 written by Richard Jaeger. He asked me to join the
21 textbook and become a coauthor from the second
22 edition on. And so I wasn't a coauthor on this one,

1 but I was a coauthor on all the follow-up. And,
2 obviously, the follow-up editions are very heavily
3 based on this one, as well as new material.
4 Q. And if you look at page 5 of
5 Exhibit 1040. Let me know when you're there.
6 A. Yes.
7 Q. Do you see the section that refers to
8 "Structure of the NMOS transistor"?
9 A. Yes.
10 Q. Is this an NMOS transistor similar to
11 the types of transistors that we've been -- that
12 you've been discussing in your deposition today?
13 A. Yes, it is.
14 Q. Do you believe that there's
15 similarities between the textbook you were invited
16 to be an author on and the subject matter of these
17 IPRs?
18 A. Yes.
19 Q. Dr. Blalock, you were also asked about
20 the definition of a POSITA, person of ordinary skill
21 in the art, in your declarations.
22 Do you remember those questions?

1 A. Yes.
2 Q. And would it change your opinions
3 about the claims being obvious or disclosed in the
4 prior art if a different definition of POSITA had
5 been used with fewer years of experience required?
6 A. No, not really. Because in this
7 particular case, the -- as I discuss in the report,
8 the prior art is so very close to the challenged
9 patents, that it's not terribly difficult to map
10 to -- to map all of these elements. So one with
11 less experience could probably do it as well.
12 Q. Okay. Can you -- well, do you
13 remember being asked questions about -- about a
14 recombination rate? Do you remember that phrase?
15 A. Yes.
16 Q. And can you explain how -- what a
17 recombination rate refers to?
18 A. Well, when there are free carriers --
19 I don't want to get into energy band diagrams.
20 Basically atoms have electrons. And sometimes those
21 electrons are tightly bound to atoms and sometimes
22 they're free, which means they have excess energy

1 and they're free to move around. And once those
2 electrons are -- have enough energy to move, there
3 will be some rate at which free electrons recombine
4 with atoms in the material, and that rate is the
5 recombination rate.
6 Q. So if you had an electric field that
7 applied a force to an electron moving in material,
8 how would a recombination rate impact the travel of
9 that electron?
10 A. As the recombination rate gets higher
11 and higher, it will travel -- on average, it will
12 travel a shorter distance before it recombines
13 and -- but that's a statistical process. And so
14 some will travel much farther, a few will travel
15 very far, and some will travel a shorter distance.
16 Q. You were asked questions about the
17 recombination rate in connection with the gradient
18 dopant curve in Kawagoe?
19 A. Yes.
20 Q. And can you explain how the
21 statistical recombination rate would potentially
22 impact the extent to which carriers would move in

1 response to an electric field resulting from the
2 gradient dopant concentration in Kawagoe?
3 A. Well, the strength of the field will
4 accelerate carriers and move them in a particular
5 direction, in this case deeper into the substrate.
6 And the steeper the slope, the stronger that field
7 so the faster they would move.
8 However, if you have a recombination
9 rate, the lower the recombination rate, the more
10 time they can travel before they recombine. If I
11 have a higher recombination rate, the less time
12 they'll have before they recombine -- less time to
13 travel.
14 So as the recombination rate goes up,
15 the distance -- sort of the ensemble of the average
16 distance, because it's all a very statistical
17 process, but that average distance will go down.
18 Q. So given -- let me restart that.
19 You mentioned that it's a statistical
20 process. Can you explain how that relates to
21 whether carriers would, in fact, reach the second
22 surface of the substrate in Kawagoe?

1 A. Well, it will -- because it's a
2 statistical process, it has some curve, sort of --
3 probably a Gaussian curve. And as the recombination
4 rate goes up, more and more of the carriers will
5 recombine before they get to the bottom of the
6 substrate. But, you know, these curves have very
7 broad tails, and some carriers will likely make it
8 all the way, some won't. But how many make it will
9 be affected by the recombination rate.
10 Q. If you had -- is there a sufficiently
11 large sample size where you would always get
12 statistically carriers through to the second
13 surface?
14 A. Yes, if you wait long enough, you'll
15 get through.
16 Q. You were asked about -- a discussion
17 about alpha rays in Kawagoe.
18 Do you remember that?
19 A. Yes.
20 Q. I think you were specifically asked
21 about whether you had considered where alpha rays
22 could be -- could occur in Kawagoe.

1 Do you remember that?
2 A. Yes.
3 Q. Can you look at paragraph 95 in your
4 1242 declaration.
5 A. There it is.
6 Q. What does paragraph 95 of your
7 declaration say about the potential locations of
8 alpha rays?
9 A. Basically that during one of these
10 alpha ray interactions, they generate millions of
11 carriers and -- some of which are going to be
12 produced in or near the active region at the surface
13 of the substrate. Then I cite to a quote that a
14 particle "can induce single-event upset when it
15 strikes at the channel region of an off transistor."
16 Q. If you look at -- let's turn to your
17 '843 declaration, please, 1243. I'm looking at
18 paragraph 92 from that declaration.
19 A. Yes, I've got it.
20 Q. Is that the same -- is there similar
21 discussion in paragraph 92 as we saw in paragraph 95
22 of the 1242 declaration?

A. Yes.

MR. SPEEGLE: I pass the witness.

MR. JAIRAM: Let's take a short break.

MR. SPEEGLE: Okay.

MR. JAIRAM: Off the record.

MR. SPEEGLE: Off the record.

THE REPORTER: We're off the record.

(Recess from the record.)

THE REPORTER: We're back on the record.

MR. JAIRAM: I have no further questions. This deposition is over.

Off the record.

THE REPORTER: We're off the record.

(The examination concluded at 4:14 p.m.)

STATE OF NEW YORK)
ss:
COUNTY OF WESTCHESTER)

I, EILEEN MULVENNA, CSR/RMR/CRR, a Certified Court Reporter, Registered Merit Reporter, Certified Realtime Reporter, and Notary Public in and for the State of New York, do hereby certify:

That I reported the taking of the deposition of the witness, DR. TRAVIS BLALOCK, commencing on the 2nd day of May 2nd , 2024, at the hour of 8:58 a.m.

That prior to being examined, the witness was duly sworn by me to testify to the truth, the whole truth, and nothing but the truth.

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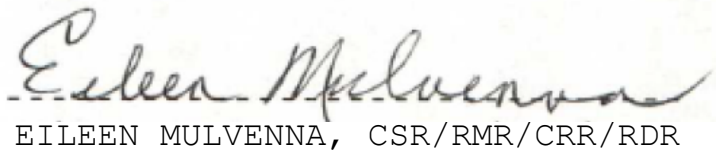

EILEEN MULVENNA, CSR/RMR/CRR/RDR

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3
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Deponent: Dr. Travis Blalock
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