Exhibit 177

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
SOUTHERN DIVISION
No. 7:23-CV-00897

IN RE:
CAMP LEJEUNE WATER LITIGATION

This Document Relates to:
ALL CASES

EXPERT VIDEO-RECORDED DEPOSITION OF MICHAEL J. McCABE, JR., PHD

Friday, May 9, 2025
9:32 Eastern Time

Reported by: Denise Dobner Vickery, CRR, RMR
JOB NO.: 7305935

Friday, May 9, 2025

9:32 Eastern Time

Video-Recorded Deposition of MICHAEL J. McCABE, JR., PHD, held at the offices of:

U.S. DEPARTMENT OF JUSTICE
1100 L Street NW
Washington, DC 20005

Pursuant to notice, before Denise Dobner Vickery, Certified Realtime Reporter, Registered Merit Reporter, and Notary Public in and for the District of Columbia.

APPEARANCES:

Representing the Plaintiffs Leadership Group:

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APPEARANCES: (CONTINUED)

ALSO PRESENT:

Bradley Loy, Videographer

Eron Miller, Paralegal, DOJ

ALSO PRESENT VIA ZOOM:

Zina Bash, Esq. - Keller Postman

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McCABE DEPOSITION EXHIBITS

(Attached to transcript.)

P R O C E E D I N G S

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THE VIDEOGRAPHER: We are now on the record.

My name is Bradley Loy. I am a videographer for Golkow, a Veritext division. Today's date is May 9, 2025. The time is 9:32.

This video deposition is being held at 1100 L Street, Northwest, Washington, DC in the matter of Camp Lejeune Water Litigation for the United States District Court for the Eastern District of North Carolina, Southern Division.

The deponent is Dr. Michael J. McCabe, Jr.

Will counsel please identify themselves.

MS. GJONAJ: Diana Gjonaj on behalf of Plaintiffs Leadership Group.

MS. GREENWALD: Robin Greenwald also Plaintiffs Leadership Group.

MS. McKEEVER: Traci McKeever for the United States.

MR. CROMWELL: Michael Cromwell for the United States.

MR. MILLER: Eron Miller for the United States.

THE VIDEOGRAPHER: The court reporter is Denise Vickery and will now swear in the witness.

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MICHAEL J. McCABE, JR., PHD

called for examination, and, after having been duly sworn, was examined and testified as follows:

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EXAMINATION

- - -

BY MS. GJONAJ:

Q. Good morning, Dr. McCabe. I just introduced myself off the record, but my name is Diana Gjonaj. I'm with Weitz & Luxenberg and representing Plaintiffs Leadership Group.

Can you state your full name for the record, please.

A. Michael Joseph McCabe, Jr.
Q. Okay. Dr. McCabe did you bring any documents with you today?
A. I did not.
Q. You did not? Okay.
Have you ever been deposed before?
A. Yes.
Q. Okay. So I'm assuming you know the drill, but if I ask any question that is unclear, you'll seek clarification; right?
A. Yes.
Q. Okay. And if you answer the question, I'll assume that you understood it, that question; correct? Fair?
A. Fair, yes.
Q. If at any point you need a break, just let me know. I just ask that if a question is pending, you answer the question, and then we can take a break anytime you need.
A. Understood.
Q. Okay. And you understand, of course, that you're under oath today just as if you were sitting before a judge and a jury?
A. I do.

Q. And is there any reason, sitting here today, that you would not be able to testify truthfully, accurately, and completely?

A. None.

MS. GJONAJ: All right. Marked Exhibit 1, which would be the plaintiffs' notice of deposition.

(Document marked for identification as McCabe Exhibit 1.)

BY MS. GJONAJ:

Q. And if you move -- flip to Attachment A -- or, first, have you seen this document before?

A. (Reviews document.)

I think so, yes.

Q. Have you seen Attachment A that's requesting specific documents that you bring to the deposition?

A. I think so, yes.

Q. Okay. And have you provided everything responsive to those documents requested?

A. I think so.

Q. And you -- and what you produced are

a set of invoices; is that right?
A. A set of invoices were -- were produced for you on my behalf, yes.
Q. Okay. Great.
Did you prepare for today's deposition?
A. Of course.
Q. And what did you do to prepare for the deposition?
A. Reflected on my opinions, read my reports, read some of the papers, reread -- re-reviewed some of the papers in my report, reread some of Dr. Gilbert's reports, for example. By and large, that's what I did in preparation.
Q. Okay. Did you meet with any of the lawyers at the DOJ to prepare for today's deposition?
A. Yes.
Q. When did you meet with them?
A. This morning for a brief period of time. Yesterday for about four hours. Over the last week and a half prior to yesterday, I estimate three or four times by Zoom, a couple hours each time.

Q. Okay. Have you met with any other lawyers about this case besides the lawyers at the DOJ?

A. No.

Q. Okay. And other than meeting with the lawyers and reviewing the documents that you stated, you didn't -- did you do anything else to prepare for today's deposition?

A. Nothing really relevant that comes to mind.

Q. Okay. Did you --

A. Got a goodnight's sleep, had breakfast, but yeah, those types of things.

Q. Did you speak to any of the other experts in this case?

A. Prior to my deposition? No.

Q. To prepare for your -- okay.

A. No.

MS. GJONAJ: All right. I'm going to mark as Exhibit 2. This is what I believe is your expert report in this case on non-Hodgkin’s lymphoma and leukemia.

(Document marked for

identification as McCabe Exhibit 2.)

THE WITNESS:

(Reviews document.)

BY MS. GJONAJ:

Q. If you turn to, I believe it's page 71 or 72 of your statement, fair to say this is an accurate representation of the most up-to-date CV -- your most up-to-date CV?

A. Yes.

Q. All right. And it says that you received a PhD in biomedical studies with a focus on microbiology and immunology at Albany Medical College in 1991; is that correct?

A. Yes.

Q. And you obtained your master's degree in biomedical social studies from Albany Medical College in what year? I think I --

A. 1990. But it's not social studies, right, medical studies. Did you say social studies or did you misspeak?

Q. I thought I said biomedical studies but...

A. Yeah, got it.

Q. And are you currently affiliated

with any academic institutions?
A. Temple University.
Q. Okay. And how long have you been affiliated with Temple University?
A. Since approximately 2017.
Q. Okay. Are you currently board-certified in any scientific discipline?
A. No.
Q. And in your CV, I believe you list a number of publications; correct?
A. Yes.
Q. Are any of those publications specifically related to the water contamination at Camp Lejeune?
A. No.
Q. Have you ever presented at a conference or otherwise regarding contamination in the water at Camp Lejeune?
A. No.
Q. And from what I can tell, your research has primarily revolved around metal toxicology; is that correct?
A. Metal immunotoxicology, but yes.
Q. And it particularly focused on

elements like lead, mercury, and arsenic; is that accurate?

A. Correct.

Q. Okay. Have any of your published work pertained to TCE, PCE, benzene, or vinyl chloride?

A. Not directly.

MS. McKEEVER: Object to the form.

BY MS. GJONAJ:

Q. Pardon?

A. Not directly.

Q. Okay. So when you say "not directly," what do you mean by that?

A. I wasn't studying or my laboratory wasn't using TCE as a tool to promote changes in the immune system, but many of the changes in the immune system that are provoked by other toxic agents, like metals, are in some ways in some circumstances relevant to the same issues with TCE provocation of the immune system.

You're hearing me okay? Yeah.

Q. All right. And can you turn to page 87, please.

Is this the most -- so this seems to be a list of your expert testimony; is that correct?

A. Yes.

Q. And this list accurate as of today?

A. No.

Q. You've testified since producing this document?

A. Yes.

Q. Okay. In what case?

A. Two cases. Both of them, to the best of my recollection, in the end of February. So two separate cases at the end of February. Both of them just happened to be in state court in South Carolina. Again, two separate cases, but both of them were dram shop cases where I testified on behalf of the defense in depositions.

Q. Okay. And who is the defendant in that case?

A. That I don't remember. I don't recall.

Q. Was it --

A. ABAR.

Q. Oh, it was ABAR?

A. ABAR, yes.
Q. Okay. And who retained you in that case?
A. The defense attorneys in both cases, and I don't remember the names. Well, let's see. One attorney was by the name of Alex Joyner. That was in one case. The other case, the attorney that retained me, I believe his last name was Ethridge. Mike, Michael Ethridge.
Q. Okay. And following this deposition, will you be able to get us the date of that testimony along with the case names?
A. Yes.
Q. Yes? Okay.
All right. By my count, I think there are approximately 40 or 45 cases that you've testified in in the last four years.
Does that sound about right?
A. Yes.
Q. Have you ever testified before Congress?
A. No.
Q. Okay. Have you ever testified in a toxic tort case?

A. Yes.
Q. Which case?
A. So one that comes to mind would be on page. (Pause).
Okay. So, first of all, as I understand toxic tort cases, a toxic court case is an injury to a party or parties involved with toxic exposure. So a lot of my cases involve that, but I don't know if they're exactly toxic tort case.
The one that comes to mind that I think is most responsive to the question you're asking me about toxic tort case is on page 90, third case down. 1, 2, 3, 4. Deborah Monnahan, et al., plaintiffs versus Modine Manufacturing Company, et al., defendants. There are two dates there for deposition that was taken in that case. So this is a case in state court in Missouri and the trial for that case is on page 93, August 22, 2023.
Q. Okay. Have you ever been involved in any cases -- or I'm sorry.
Have you ever testified in any cases involving TCE?

A. That case. Yes. (Laugh).
Q. Okay. How about PCE?
A. I don't think PCE was involved. No.
Q. Benzene?
A. I don't recall, but I don't think so.
Q. Okay. And have you ever been excluded as an expert witness?
A. So I'll tell you about one. My understanding is that in 2012 -- and I didn't find out about it until years later. But in 2012, I wrote a report in a case federal court in Louisiana.

I had -- in my report, I had provided three opinions, and my understanding is that the judge limited the court or struck, I guess, the third opinion because -- and, again, my understanding was that was done because the attorneys who had hired me didn't argue that opinion as part of their case in chief. So it was determined to be -- my opinion was determined to be irrelevant.
Q. Okay. And what case was that?
A. Hmm. One of the parties was Turner.

I think that was the plaintiff in the case. I don't remember much else about it, other than what I told you. It was in federal court in Louisiana. It involved a wrongful termination issue for an individual, Mr. Turner, who was in a safety sensitive job function, prescribed and misusing opioids.

Q. Okay. Can you please describe your current role and responsibilities as principal scientist at Intertox?

A. Yes. I serve as a consultant expert in disciplines relevant to my expertise in immunology, toxicology, immunotoxicology, related disciplines, in providing really consulting and expert witness services to plaintiff and defense attorneys.

Q. Okay. And how long have you held that position?

A. Since April 1st of 2024.

Q. And before that, you were with Exigent; is that right?

A. Exigent.

Q. Exigent.

A. E-x-i-g-e-n-t.

Q. And how long were you there?
A. Oh, probably four -- approximately a little over four years.
Q. So around 2020?
A. December of 2019 --
Q. Okay.
A. -- was the start.
Q. Okay. And were your roles and responsibilities there similar to what you're doing at Intertox?
A. Yes, except that at Exigent I also served as the executive director of a small group of -- of experts. So I had oversight of -- oversight of the work that all other experts were doing in the company.
Q. What is your current salary at Intertox?
[redacted]
Q. And is that salary fixed or is it varied or -- well, strike that.
Can you tell me approximately what percentage of your total annual income comes from your salary at Intertox?
A. 75 percent.

Q. And where does the other 25 percent come from?

A. Non-salaried compensation at Intertox and my compensation from Temple University.

Q. And when you say "non-salaried compensation," you mean bonuses?

A. Yes.

Q. Okay. What was the amount of the last bonus that you received from Intertox?

[redacted]

Q. And are your bonuses in any way tied to the financial performance of Intertox?

A. I don't know.

Q. Do you have any idea how your bonuses are calculated?

A. No.

MS. GJONAJ: I'm going to go ahead and mark your reports, your kidney cancer and bladder cancer reports.

(Document marked for identification as McCabe Exhibit 3.)

MS. GJONAJ: Here's Exhibit 3. It's the kidney cancer report dated

February 7, 2025.

(Document marked for identification as McCabe Exhibit 4.)

BY MS. GJONAJ:

Q. And then marked as Exhibit 4 is your bladder cancer report dated, again, February 7, 2025.

A. Thank you.

MS. GJONAJ: And then I also have an errata sheet. It's marked as Exhibit 5.

(Document marked for identification as McCabe Exhibit 5.)

THE WITNESS: Okay.

BY MS. GJONAJ:

Q. Are those the expert reports that you've submitted in this litigation?

A. Yes.

Q. Okay. And each has a signature on it.

Is that your signature?

A. Yes.

Q. Okay. Did you personally write this report?

A. I did.
Q. Or these reports?
A. Yes.
Q. Did anyone assist you in writing the reports?
A. Yes.
Q. Who helped?
A. The main person who helped was Dr. Heidi O'Neill.
Q. And who is Heidi O'Neill?
A. Heidi O'Neill is another PhD scientist toxicologist who works at Intertox.
Q. And when you say she helped, how did she help?
A. She helped in performing some research and in writing some sections of the report.
Q. Which sections of the report did she write?
A. So when I was -- in early January, I guess, when I was focused on writing the immunological, what I consider the immunology and immunotoxicology portions of the report, you know, at the time there was a January 23rd deadline. So

I pulled Heidi in to start doing some of the research and work that I thought would balance the report in terms of non-immunotoxic mechanisms of TCE, benzene, and PCE. So she -- so she assisted in writing and doing research for -- for those sections of the reports.

Q. Okay. And did she write those sections of the reports?

A. In part, yes, but ultimately all of the words are -- are essentially mine.

Q. Did anyone else at Intertox help you with these reports?

A. Again, early on. So the answer to that is yes.

Q. Who would that be?

A. So -- so what I consider early on, so early January I had two -- two other scientists at Intertox, Dr. Jerry -- Jerry -- sorry -- Dr. Jeremy McMahon and Gretchen Bruce read drafts of the reports that I had going to see, you know, is this -- is this clear? Is it -- am I too much in the weeds? Am I just right? Give me some feedback.

So basically they were peer

reviewing my reports.

Q. Okay.

A. One other person -- and all these people, I believe, appear on the invoices. One other person, Kelly Hackney, master's level scientist at Intertox. I had her work on some graphics for me because she's talented in that way, and she was able to do something in a few hours that would have taken me weeks.

Q. Was there anyone else that helped draft these reports outside of Intertox?

A. No.

Q. Okay. And do these reports contain a complete and accurate statement of all the opinions you intend to offer in this case?

A. I think so, yes.

Q. And does -- do these reports fully detail the bases and reasons for each of your opinions?

MS. McKEEVER: Objection to form.

THE WITNESS: Again, yes, I think so.

BY MS. GJONAJ:

Q. And other than the corrections identified in the errata sheet, have you identified any other changes that you wish to make to these reports?

MS. McKEEVER: Objection to form.

THE WITNESS: Not -- to date, no, and not at this time.

BY MS. GJONAJ:

Q. All right. And you produced a list of materials that you have considered in reaching your opinions expressed in this in each of these reports; is that correct?

A. In each of my reports, yes, and if I'm understanding you, you're referring to page, for example --

Q. 57?

A. -- 63 in my bladder cancer report.

Q. Okay. Do all of the materials that you list there contain -- I'm sorry. Strike that.

Does the list that you contain in the back of each of these reports contain all the materials you considered in reaching the opinions that you expressed in your report?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

Can I hear the question again? Sorry.

BY MS. GJONAJ:

Q. You're on page? What page are you on in the bladder report?

A. In the bladder cancer report, I'm on page 67. No, I'm not on page 67. Apologize. Sorry. I'm on page 63.

Q. On page 63 and on 67.

So on 63, you have Case-Specific Documents Reviewed; correct?

A. Yes. Yes.

Q. And then on page 67, you have Literature Resources Reviewed, Considered, and Relied Upon; correct?

A. Yes.

Q. Between those two lists, do they contain all the materials you considered in reaching the opinions in your bladder cancer report?

A. No. There's nothing I'm necessarily hiding, but 35 years of, you know, research and experience in this area that there's things I have reviewed in the past, but these are documents that I specifically reviewed for this case that I thought were representative in supporting the opinions or the factual basis of -- of issues in this case that I thought were relevant.

Q. Okay. Have you read all of the documents on these lists?

A. I think so. At least once.

Q. And same question for the kidney cancer report and --

A. Let me -- let me go back to that previous question.

When I answered -- when I answered yes, I particularly was thinking in terms of what's on page 67 in the bladder cancer or starts on 67, which is the literature cited.

Q. So you've read ever -- you believe you've read all the materials --

A. Sure.

Q. -- listed on --

A. Yes.

Q. -- the list starting on page 67?
A. Yes. Yes.
Q. Okay. Same question for the list on page 63.
A. I think read many of them. Some of them were background that I skimmed that really were. They were provided to me that I did review sections of them, but I can't attest that I've read, for example, every word of the water quality reports.
Q. Okay. And you list a number of videotaped and videoconferenced depositions starting at 51.
Did you watch those video depositions?
A. Did not watch the videos. Read sections of the transcripts.
Q. Okay. And just to confirm, for the NHL and leukemia report, which I'll refer to as the blood cancer report, if that's okay with you?
A. The blood cancer report? Yes. Yes.
Bless you.
Q. And the kidney cancer report?
A. Yes.

Q. Have you -- is that the same answer?
A. Same answer, yes.
Q. Thank you.
Have you reviewed the expert reports for the general causation -- have you reviewed the general -- strike that.
Have you reviewed the general causation expert reports of the plaintiffs' experts in this case?
MS. McKEEVER: Objection to form.
THE WITNESS: Some. The ones that I listed in my report, yes.
BY MS. GJONAJ:
Q. Okay. And have you reviewed any of the DOJ expert reports in this case besides your own, of course?
A. Yes.
Q. Which ones?
A. Dr. Goodman's report. Dr. Shields' reports. Dr. Lipscomb's report. Those are the ones that come to mind. I don't -- I don't recall if I looked at any others.
Q. Okay.

A. I may have looked at some of DOJ's water quality reports but, again, that's something I would have skimmed on balance.

Q. And for Dr. Goodman, did you review her blood cancer report, kidney cancer report, and bladder cancer report?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes, I believe I did.

BY MS. GJONAJ:

Q. When did you review those reports?

A. I don't remember if it was late January, early February, as I sit here, but in that time frame.

Q. So as you were drafting your report?

A. Yes.

Q. And did you review Dr. Goodman's report before finalizing your report?

A. Yes.

Q. How much time did you spend reviewing Dr. Goodman's reports?

A. I don't remember that. I can't answer that question. I don't have -- I don't

have a recall of how much time I spent doing that.

Q. Approximately?

A. Yeah. Thing is, there was so much to review that I just -- I can't -- I can't parse that out in my mind. I don't -- I honestly don't know the answer to the question.

Q. More than an hour?

A. Sure. I think that's fair.

Q. More than three hours?

A. That I don't know. That I don't recall. I'm not saying it was more than three hours or less than hours. I just don't -- don't know.

Q. Could have been 10 hours?

A. No, I don't think I spent 30 hours looking at each one of her reports. So I don't -- so less than 10 hours I think is fair.

Q. Less than five hours?

A. I just don't know.

Q. And Dr. Shields. You mentioned that you reviewed Dr. Shields' reports; correct?

A. Right. Well, he had just one report --

Q. Right.

A. -- as I recall.
Q. And when did you review Dr. Shields' report?
A. Same time frame.
Q. Okay. Of the general causation experts for plaintiffs, have you ever worked with any of these experts before?
MS. McKEEVER: Objection to form.
THE WITNESS: Tell me what you mean by have I worked with them.
BY MS. GJONAJ:
Q. Have you ever worked with them in any litigation before?
A. I don't think so.
Q. Okay.
A. I don't think so, no.
Q. Have you ever been a plaintiffs -- or strike that.
Have you ever been an expert in a case where Dr. Goodman also served as an expert?
A. I don't know. I don't remember if I did or didn't.
Q. Okay. Have you ever met

Dr. Goodman?

A. Yes.

Q. When was the first time you met Dr. Goodman?

A. (Pause). Sometime before COVID. So before 2000. Sorry. Before 2020. Probably in a five-year period. My recollection is somewhere during a five-year period between 2013 and 2018, I met her at an SOT meeting, the Society of Toxicology meeting, at one of her posters.

That I met -- I took your question to mean met her physically in-person --

Q. Right.

A. -- not on Zoom.

Q. Did you meet her on Zoom before that?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, nobody -- nobody met on Zoom before that but --

BY MS. GJONAJ:

Q. Oh, right. Good point. Good point.

A. So no. (Laugh).

Q. Have you ever spoken to Dr. Goodman

regarding Camp Lejeune?

A. I talked to Dr. Goodman about her work on the Camp Lejeune case, yes.

Q. When did you first speak to her?

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Strike that.

When did you first speak to her regarding Camp Lejeune?

A. My recollection is sometime between November of 2024 and January of 2025, but I can't parse it out any better than that.

Q. And how many times have you spoken to Dr. Goodman regarding Camp Lejeune?

MS. McKEEVER: Objection to form.

THE WITNESS: Two for sure, maybe three.

BY MS. GJONAJ:

Q. How long were each of those conversations?

MS. McKEEVER: Objection to form.

THE WITNESS: Again, I'm guess -- I'm not guessing -- I'm not guessing. I'm estimating for you that those conversations were probably on the order of an hour.

BY MS. GJONAJ:

Q. So you've spoken to Dr. Goodman regarding the Camp Lejeune litigation two or three times for about an hour each time; is that correct?

A. Yes.

MS. McKEEVER: Objection to form.

THE WITNESS: To my recollection, yes.

BY MS. GJONAJ:

Q. Have you ever spoken to Dr. Shields regarding the Camp Lejeune litigation?

A. Yes.

Q. And how many times have you spoken --

A. I'm going to -- hold on. Hold on. I'm going to improve my answer for you.

When I said two or three, it was

definitely at least three for Dr. Goodman.
Q. Two to three times and you said --
A. Oh, no.
Q. I'm sorry. Three times.
A. Three. That's the point I'm making now.
Q. Got it.
And those conversations were in late 2024?
A. November --
MS. McKEEVER: Objection to form.
THE WITNESS: Time frame of November 2024 to January 2025. My best recollection of when those took place.
BY MS. GJONAJ:
Q. Was anyone else part of those meetings?
A. Yes.
Q. Who?
A. DOJ attorneys.
Q. There were DOJ attorneys on each of those meetings?
A. Yes.

Q. Which DOJ attorneys?
A. Traci McKeever, Nancy Tinch, and others that I don't recall.
Q. And what was discussed at those meetings?
MS. McKEEVER: Objection. I'm going to instruct you not to answer. That's privileged information.
BY MS. GJONAJ:
Q. Are you taking counsel's instruction not to answer?
A. Yes.
Q. Have you ever spoken to any of Julie Goodman's colleagues at Gradient regarding this litigation?
MS. McKEEVER: Objection to form.
THE WITNESS: No.
BY MS. GJONAJ:
Q. Looking at your NHL report for the blood cancer report. You mention in this report that Dr. Gilbert had made "important contributions to the literature in this area."
Is that correct?

A. Let's refer me to where. I think that's correct, but I'd like to see where. I'd just like -- would like to revisit where I said it in the report. I know what you're talking about.

Q. Well, instead of flipping through, would you agree that Dr. Gilbert has made important contributions to the literature in the area of TCE?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, again, I think the report would speak for itself as to what I said there.

And what I recall, without flipping through and without you guiding me through where it is in the report, is that I think I said that Dr. Goodman has made important contributions to the scientific literature concerning the effects of TCE on the immune system, particularly in autoimmune diseased-prone mice.

BY MS. GJONAJ:

Q. Okay. And you said Dr. Goodman.

Did you mean Dr. Gilbert?

A. I certainly did. (Laugh).

Q. Fair. I may mix the two of up today as well.

What contributions has she made?

MS. McKEEVER: Objection to form.

THE WITNESS: Let me give you the preamble here is that I met Dr. Gilbert at a conference on environmental contributions to autoimmune disease at a conference in 2003.

And one of the things that came out of that conference was discussing that or acting on the reality that autoimmune diseases are complex multifactorial diseases. Meaning that there's both extrinsic and intrinsic factors that contribute to the etiology of the disease.

Extrinsic meaning things like environmental agents like TCE or mercury. That I was working on mercury. Dr. Goodman -- sorry -- Gilbert. I'll

get it right. Dr. Gilbert was working on TCE and her colleague Sarah Blossom too.

So there's extrinsic factors like environmental chemicals. There's intrinsic factors like genetic background for certain genes that are tied, some of which we know, some of which we don't know, to the etiology of autoimmune disease complex diseases.

And scientists in toxicology and environmental medicine were very interested at the time, and still are, at gene-environment interactions in disease processes.

From the timing of that conference, maybe a little bit before, but certainly from the timing of that conference, Dr. Gilbert, in my view, picked up the mantel, if you will, and really started studying gene-environment interactions by virtue of studying TCE inducing, provoking frank autoimmunity in an autoimmune-prone mice.

So these are mice that are

genetically prone, but don't have the disease yet, and through her research, she was able to show that you can turn the disease on.

So it's become a very interesting model to study disease processes. That's the area that Kathleen Gilbert made important contributions to over the next decades.

BY MS. GJONAJ:

Q. So you would agree that Dr. Gilbert has made important contributions to the literature on TCE; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: She's made important contributions to the literature on what I just said. The role of -- the intersection between TCE, the immune system, and autoimmune disease, particularly in autoimmune-prone mice.

BY MS. GJONAJ:

Q. And that would include literature on TCE; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, by virtue that it contains one of those three things, sure.

BY MS. GJONAJ:

Q. Okay. Do you agree that Dr. Gilbert is a leading expert on the human health effects of TCE?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, depends on what you mean by that. What -- what do you mean by that? Give me -- maybe you can rephrase it in a way that I'd be able to answer it better.

BY MS. GJONAJ:

Q. In your opinion --

A. Uh-huh.

Q. -- is Dr. Gilbert a leading expert on the human health effects of TCE?

MS. McKEEVER: Same objection.

THE WITNESS: Dr. Gilbert -- well, I mean, you didn't really restate

your question. You just said it again. So I guess I will just run with what I understand your question to be.

Dr. Gilbert - I consider her to be a leading expert in the areas that I've already described. She's a leading expert in understanding how an environmental chemical like TCE can provoke changes in the immune system that may be relevant -- changes in the immune system that lead -- lead to autoimmune disease in an autoimmune-prone mouse that may be relevant to human health effects.

BY MS. GJONAJ:

Q. Okay.

A. May be relevant to human health effects for human autoimmune disease.

Q. Okay. Dr. McCabe, are you aware that Dr. Gilbert has been repeatedly asked by federal agencies, including the National Research Council, National Academy of Sciences, National Toxicology Program, the Department of Defense, and the USEPA, to review the risk documents and regulatory assessments concerning TCE?

MS. McKEEVER: Objection to form and foundation. Go ahead.

THE WITNESS: I am aware of that by virtue of I think she states that in her reports.

BY MS. GJONAJ:

Q. Would you agree that being selected by multiple U.S. federal agencies to provide expert scientific review on TCE health effects is a strong indication that Dr. Gilbert is regarded as a leading authority on TCE?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't have an answer to that. I don't know the answer to that.

BY MS. GJONAJ:

Q. Okay.

A. I don't know why -- I don't know why she was selected by those agencies to serve on -- on those panels.

Q. And you're aware that Dr. Gilbert was an editor of a textbook on TCE published by Springer Humana Press?

MS. McKEEVER: Objection. Objection to form and foundation.

You may answer.

THE WITNESS: I am aware of that. I'm aware -- I'm aware of the book. I'm aware of -- yes, I'm aware of that.

BY MS. GJONAJ:

Q. And she published countless studies on TCE; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Dr. Gilbert has published countless studies on the intersection between TCE, the immune system, and provocation of autoimmune disease in autoimmune-diseased prone mice.

BY MS. GJONAJ:

Q. Did you know that Dr. Gilbert served on the EPA scientific advisory -- advisory committee on chemicals from 2017 to 2021?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't -- I think -- my -- my knowledge of that, I think you're correct based on what she wrote in her reports. That's my only knowledge of that, and what she said in her reports in that regard from my perspective would speak for itself. I don't have any independent knowledge of that.

BY MS. GJONAJ:

Q. Okay. Did you review Dr. Gilbert's CV?

A. Yes.

Q. What credentials would you require someone to have to be considered a leading expert on TCE that Dr. Gilbert does not have?

MS. McKEEVER: Objection to form.

THE WITNESS: None.

BY MS. GJONAJ:

Q. Can you tell me what contributions you have made on the literature on TCE?

A. None.

Q. Okay. Would you consider yourself a

leading expert on TCE?

MS. McKEEVER: Objection to form.

THE WITNESS: My expertise that's relevant to this case is my knowledge of -- well, short answer to your question is yes.

That I have expertise in TCE and the immune system. That my expertise lies in my deep understanding of the mechanisms of perturbation of the immune system by various chemicals, including TCE, for which, as documented in my own CV and in my expert report, demonstrates my expertise in the area.

BY MS. GJONAJ:

Q. You've never published a peer-reviewed study on TCE; correct?

A. No.

Q. Would you agree your primary role was to evaluate whether the immune system effects are a plausible mechanism by which these chemicals could cause cancer?

MS. McKEEVER: Objection to

form.

THE WITNESS:

(Reviews document.)

My role in this case -- my primary role in the case was the following:

The purpose of my investigation was to perform a complete independent and unbiased analysis to evaluate the immunotoxic effects of the VOCs, volatile organic chemicals, at issue in this case to determine whether modulation of the immune system is a relevant mechanism by which these chemicals can cause various cancers at issue.

BY MS. GJONAJ:

Q. And you're offering an opinion on whether TCE, PCE, benzene, or vinyl chloride do cause bladder cancer, kidney cancer, leukemia or NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Correct. I

think that's fair.

Or do not cause those diseases. Either -- either way.

BY MS. GJONAJ:

Q. Correct?

A. Right.

Q. Okay. Fair.

So fair to say you're not offering your own opinion -- independent opinion as to the association of PCE, TCE, benzene, vinyl chloride, and the four cancers -- NHL, leukemia, bladder cancer, and kidney cancer -- generally?

MS. McKEEVER: Objection to form.

THE WITNESS: Correct. Correct, and I don't see that I indicated that in my report as a purpose nor did I provide those opinions or basis to same.

BY MS. GJONAJ:

Q. Understood.

And you mentioned that Dr. Goodman asserts in her report that the evidence does not support a causal association between NHL, leukemia, bladder cancer, kidney cancer, and the

four VOCs; correct?

MS. McKEEVER: Objection to the form.

THE WITNESS: That is correct. That is in my reports.

BY MS. GJONAJ:

Q. Okay.

A. Or --

Q. And --

A. Hang on. Sorry.

Language essentially similar to that is in each of my independent reports.

Q. Okay. And then you say that your "jumping in" point is to address whether it's biologically plausible that immunotoxicity caused TCE, PCE, benzene, or vinyl chloride in each of these cancers; is that right?

MS. McKEEVER: Objection to the form.

THE WITNESS: Can you tell me where on my report? I do want to read that for my own report. I can certainly --

BY MS. GJONAJ:

Q. Do you recall saying that you had a "jumping in" point?
A. I do.
Q. What is that?
A. I don't remember -- well, let me find it in my report.
(Reviews document.)
Q. Do you not recall what you meant by the "jumping in" point?
A. Well --
MS. McKEEVER: Objection to form.
THE WITNESS: -- I'm trying to find it in my report because -- you want to go off the record for a minute or take a break? Because I want to find it --
BY MS. GJONAJ:
Q. Sure.
A. -- in my report.
THE VIDEOGRAPHER: Stand by. We are off the record at 10:28.
(A recess was taken.)
THE VIDEOGRAPHER: We are on

the record at 10:30.

BY MS. GJONAJ:

Q. All right. Dr. McCabe, before we went off the record, I had asked you what you meant by the "jumping in point."

A. Right.

Q. Can you explain that?

A. Yeah, but before you asked me that, you asked me if I would agree with the statement that you said about what I said in my report about "jumping in."

So let me make the record clear that what I said in my report is that the "jumping in" place for me -- and this was in the context of indicating that both experts on plaintiff experts as well as defense experts were addressing the issues -- the epidemiological issues about causation between the exposure to the chemicals and the various diseases.

And what I indicated was the "jumping in" place for me starts with addressing the question: How can TCE, PCE, benzene, and vinyl chloride alone or in combination either with one another cause NHL or leukemia or bladder

cancer or kidney cancer? Right?

So the "jumping in" place for me is on mechanism, how, and there's only two reasons -- well, I guess there's more than two reasons, but at least two reasons. Let me give you the first two reasons that come to mind as to why a scientist like me would address mechanism.

One would be if one endorses that the chemicals cause the disease, then you want to know how. That seems like a rationale follow-up question. Right?

But since I'm not endorsing that one way or another, right, consideration of how mechanism is also important because sometimes understanding mechanism of disease, as you probably know in the weight-of-the-evidence analysis, would inform whether a disease, in fact, occurs or not, right, aside from the epidemiological link.

The other reason for studying how in mechanism of the disease is based on things that I alluded to earlier is that you can learn a lot about the disease process, whatever the disease endpoint is itself, by tweaking it with various

chemicals, drugs, other biological -- biologically reactive comments.

That's what I meant by the "jumping in" place for me.

Q. Okay. Are you familiar with how EPA, IARC, and ATSDR define weight-of-the-evidence remarks?

MS. McKEEVER: Objection to form.

THE WITNESS: You know, vaguely. It's not -- it's not something that I -- I mean, it's not something that I do. Because my understanding of what regulatory agencies like IARC, EPA are doing is they're evaluating the science and the weight of the evidence of that science to set policies, which is different than what I'm doing -- it's different than what I do and different than what I do -- did in this case.

BY MS. GJONAJ:

Q. Okay. Would you agree that those agencies integrate multiple lines of evidence, including epidemiology, animal studies, and

mechanistic studies, to determine causation?

MS. McKEEVER: Objection to form.

THE WITNESS: To determine? Yeah, I'm not so sure they do it to determine causation, as much as they do it, as I said, to establish regulatory policies and -- and -- and protecting human health.

BY MS. GJONAJ:

Q. Okay. Is it okay with you if I refer to TCE, PCE, benzene, and vinyl chloride as the four VOCs?

A. Sure.

Q. Okay. Rather than repeating it?

A. Sure.

Q. Great.

Would you agree that to credibly opine that these four VOCs could not have caused leukemia, non-Hodgkin’s lymphoma, kidney cancer or bladder cancer, you would need to evaluate all relevant lines of evidence?

MS. McKEEVER: Objection to form.

THE WITNESS: (Pause).
BY MS. GJONAJ:
Q. I'm going to strike that question.
Would you agree that to credibly opine that these four VOCs could not have caused leukemia, NHL, kidney cancer, bladder cancer, you would need to evaluate all relevant lines of evidence, including human, animal, and mechanistic?
MS. McKEEVER: Objection to form.
THE WITNESS: Sorry. I want to hear it again.
BY MS. GJONAJ:
Q. In order to -- okay. Let me break it down by disease. Maybe that it will make it easier.
Would you agree to credibly opine that these four VOCs could have caused leukemia, you would need to evaluate human, animal, and mechanistic data?
MS. McKEEVER: Same objection.
THE WITNESS: I don't know the answer to that or I can't answer it

because that's not what I did in this case. Right?

BY MS. GJONAJ:

Q. Okay.

A. I mean, I think we already established that I didn't offer that opinion.

So inasmuch as what you're saying, you know, my first watch, sounds good. Just hadn't really thought about it. So I don't know that I'd want to go on the record and say, oh, I agree with that, without -- without thinking about it more. Because it's not --

Q. Fair --

A. -- something I did in this case.

Q. You reviewed Dr. Goodman's reports; correct?

A. Yes.

Q. Is that what she did in her reports?

MS. McKEEVER: Objection to form.

THE WITNESS: Seemingly, yes. Yeah. Seemingly, yes.

I mean, I think you asked me before questions about, yeah, I've known

about Dr. Gilbert and her work for a long time. As I indicated to you, I don't -- I don't know of her. To me she's not, but I don't know of her, for example, as being an epidemiologist. Right? So -- so --

BY MS. GJONAJ:

Q. But my -- let me stop you there. My question was regarding Dr. Goodman.

Did Dr. Goodman --

A. Oh, I keep getting Gilbert and Goodman.

Q. I'll ask it again.

A. So let's make sure that --

Q. Okay. Yeah. All right.

A. -- I'm getting it straight. I'm sorry.

Q. And -- okay.

A. Sorry.

Q. You mentioned that you reviewed Dr. Goodman's reports; correct?

A. Yes.

Q. And did Dr. Goodman review all human -- strike that.

Did Dr. Goodman review human, animal, and mechanistic data before coming to her opinions --

MS. McKEEVER: Objection.

BY MS. GJONAJ:

Q. -- in her report?

A. Gotcha. Sorry. I was --

MS. McKEEVER: Objection to form.

THE WITNESS: I was going in a completely different direction than that. I apologize for that.

I don't know the answer to that. I think what Dr. Goodman did or didn't do in -- in -- in her reports and in her analysis will speak for itself. I don't have -- I don't know one way or another.

I didn't focus on -- on that aspect of what Dr. Goodman was doing in my analysis of her -- in my review of her reports.

And I guess the other thing to say about that in answering your root

question is that the determination of whether these -- or the evaluation of these chemicals, whether or not they cause the various disease endpoints, could come from the collective.

BY MS. GJONAJ:

Q. Okay.

A. The collective. The collective scientists working on the -- the analysis and on the issues.

Q. Okay. I'm going to go back and ask the same question regarding NHL.

Okay. Would you agree that to credibly opine that these four VOCs could have caused NHL, you would need to evaluate human, animal, and mechanistic data?

MS. McKEEVER: Objection to form.

THE WITNESS: So, again, I don't -- I don't -- I don't have an opinion on that. It's not something I did in this case and I don't -- I don't know.

BY MS. GJONAJ:

Q. Same question regarding kidney cancer. Same answer?
A. Yes.
MS. McKEEVER: Same objection.
BY MS. GJONAJ:
Q. And regarding bladder cancer?
MS. McKEEVER: Same objection.
THE WITNESS: Yes.
BY MS. GJONAJ:
Q. And in Dr. Goodman's kidney cancer report, did she review epidemiological studies?
MS. McKEEVER: Objection to form.
THE WITNESS: I believe she did, yes.
BY MS. GJONAJ:
Q. So do you know if Dr. Goodman reviewed human, animal, and mechanistic studies in her opinion cancer report?
MS. McKEEVER: Objection to form.
THE WITNESS: As I sit here, I don't. I don't -- I don't know any -- I don't know the details of what she did

in that regard.

And as I indicated in my report, particularly on -- on my blood cancer report, particularly on page 6, prior to the "jumping in" sentence, I told you about what I -- what I was relying on from Dr. Goodman and others.

BY MS. GJONAJ:

Q. Dr. Goodman was retained by the DOJ in this litigation; correct?

A. That's my --

MS. McKEEVER: Objection to form and foundation.

THE WITNESS: That's my -- I don't -- I guess. I assume so.

BY MS. GJONAJ:

Q. And the reports that we are reviewing -- we are referring to regarding the Goodman reports are not peer reviewed or published in any scientific journal; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't know the answer to that.

BY MS. GJONAJ:

Q. We're talking about the reports that she and her team prepared for this case.

MS. McKEEVER: Same objection.

BY MS. GJONAJ:

Q. Would you agree?

A. So I don't know the answer to that.

Q. Okay. The reports that you reviewed --

A. Uh-huh.

Q. -- are reports that Dr. Gilbert and her team have prepared for this litigation --

MS. McKEEVER: Objection.

BY MS. GJONAJ:

Q. -- is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: That's my understanding. Correct.

MR. CROMWELL: You're saying Dr. Gilbert.

MS. McKEEVER: You're saying Gilbert.

MS. GJONAJ: Oh, I did? Thank

you. (Laugh). I appreciate it.

(Laugh).

MR. CROMWELL: Without that, form.

MS. GJONAJ: I appreciate that.

BY MS. GJONAJ:

Q. All right. I'll try not to make that mistake.

A. You know -- you know the worst thing is that I still heard Goodman. Right?

(Laugh).

Q. Yeah. Yeah. Yeah.

MR. CROMWELL: Acknowledge your answer.

THE WITNESS: Yeah. Yeah, yeah. All right. Okay.

MS. GJONAJ: Okay. We can move on. Thank you. I can't say I won't do that again.

THE WITNESS: Yeah, me either.

BY MS. GJONAJ:

Q. All right. And you did not independently evaluate the epidemiological studies

Dr. Goodman cites in her reports; is that correct?
MS. McKEEVER: Objection to form.
THE WITNESS: Or that any of the experts, plaintiff side or -- or DOJ side, were -- were -- were reviewing and opining on in their respective reports.
BY MS. GJONAJ:
Q. Do you agree that Dr. Goodman in her report ultimately reaches a finding that the scientific evidence as a whole does not support a causal association between TCE and NHL?
MS. McKEEVER: Objection to form.
THE WITNESS: Are you referring to -- specifically to a finding or opinion that she stated in her report? And if so, I think I would like to see that before I agree with you that that's what she said. Otherwise, my answer is that document will speak for itself.
MS. GJONAJ: I'm marking as Exhibit 6 a report titled "Trichloroethylene, Perchloroethylene

Benzene, Vinyl Chloride, and trans-1-2-DCE Exposure and NHL Risk" prepared by Julie Goodman dated February 7, 2025.

(Document marked for identification as McCabe Exhibit 6.)

THE WITNESS:

(Reviews document.)

BY MS. GJONAJ:

Q. If you flip to page 64. Can you read the last sentence on page 64, please?

A. I -- out loud? Onto the record?

Q. Please.

A. Here you go.

"I conclude that while there is some evidence for a positive association in epidemiology studies, scientific evidence as a whole does not support a causal association between TCE and NHL."

Q. And do you recall if Dr. Shields agreed with those opinions?

MS. McKEEVER: Objection.

I'm going to instruct you not to answer to the extent it covers any

privileged conversations.

THE WITNESS: I'll follow her lead.

BY MS. GJONAJ:

Q. You reviewed Dr. Shields' reports; correct?

A. Yes.

Q. Did Dr. Shields find there to be a causal association between TCE and NHL?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't believe that he did. I believe he did not.

BY MS. GJONAJ:

Q. Okay.

A. I believe he gave an opinion to that effect.

MS. GJONAJ: Okay. We'll come back to that.

(Document marked for identification as McCabe Exhibit 7.)

BY MS. GJONAJ:

Q. Okay. I just marked as Exhibit 6 or -- I'm sorry -- that's Exhibit 7; correct?

A. Yes.
Q. And I will represent that these are a compilation of excerpts from several different agency publications relating to TCE, PCE, benzene and NHL, and any highlighting in the documents were not in the original documents. Those were added by me.
A. (Reviews document.)
Q. And on that first page is the ATSDR Assessment of Evidence for the Drinking Water Contaminants at Camp Lejeune and Specific Cancers and Other Diseases dated January 2017.
Have you seen this document before? Or is that correct?
A. Yes.
Q. Have you seen this document before?
A. Yes.
Q. Okay. And they were looking at the drinking water and the associated -- drinking water at Camp Lejeune and the association with cancers; is that correct?
A. Yes.
MS. McKEEVER: Objection to form.

THE WITNESS: My understanding of what it was, yes.

BY MS. GJONAJ:

Q. On the next page, I have excerpted page 34. Can you please read the conclusion that I have highlighted there?

A. Based on the meta --

"Conclusion: Based on the meta-analyses, the study of NHL subtypes (Cocco et al. 2013), and the mechanistic evidence that TCE causes immunosuppression which is a risk factor for NHL, ATSDR concludes that there is sufficient evidence for causation for TCE and NHL."

Q. Did you review the Cocco study referenced here?

A. Not that I recall as I'm -- I don't remember the Cocco study by -- the answer is I don't know. I'm not remembering. Cocco et al. 2013 is not triggering my memory. There you go. (Laugh).

Q. And the ATSDR here also mentioned that "TCE causes immunosuppression which is a risk factor for NHL"; correct?

A. It's correct that the document says

that, yes.

Q. Do you agree with that?

MS. McKEEVER: Objection to form.

THE WITNESS: I agree -- so there's three components that which I can readily agree to two of them, but not the third.

So the first one is that TCE causes immunosuppression, yes, that's true under certain circumstances.

The second part of that, immunosuppression is a risk factor for NHL, and the answer to that is yes, under certain circumstances.

The part that I don't agree to, and I think I described in my report why I wouldn't agree with it, is the summation that, therefore, there's sufficient evidence for causation for TCE and NHL.

There may have been for the purposes of ATSDR in this document to tie those three things together, but from my

work in this case, I don't -- I don't agree with that.

BY MS. GJONAJ:

Q. If you flip to the next page, it's the Toxicological Profile for Trichloroethylene in June 2019; is that right?

A. Sorry. Cheater. Reading glasses. June 2019 ATSDR tox profile for trichloroethylene. That's what I'm looking at, yes.

Q. And if you flip, the page we've excerpted page 4. Can you read the highlighted text there?

A. (Reviews document.) Yeah. Context is that there the rest of the paragraph is addressing the findings and the positions of regulatory agents like IARC and the EPA, USEPA, and the sentence is, is that: "There is also some evidence of an association between trichloroethylene exposure and non-Hodgkin’s lymphoma in humans."

Q. Okay. You flip to the next page, please. It's the Toxicological Review of

Trichloroethylene dated August 2011 by the EPA --

A. Yep.

Q. -- is that correct?

A. Correct.

Q. And now we've excerpted page 4-676.

A. Okay.

Q. Can you please read the highlighted text under the Characterization of Carcinogenicity?

A. (Reviews document.)

Q. Can you please read it aloud?

A. I wanted to read it first, and so then I'll read it out loud so I understand what I'm reading into the record.

So two highlighted sections of this document on page 4676 under section 4.11.12 Characterization of Carcinogenicity and the first highlighted sentence is as follows:

"Following EPA (reference 2005b) Guidelines for Carcinogen Risk Assessment, TCE is characterized as carcinogenic to humans by all routes of exposure."

And then there's a couple of sentences and the following highlighted sentence:

"The human evidence of carcinogenicity from epidemiologic studies of TCE exposure is strong for NHL but less convincing than for kidney cancer and more limited for liver and bill -- biliary tract cancer."

Q. So the Toxicological Review of TCE in August 2011 found that epidemiological studies of TCE exposure is strong for NHL?

MS. McKEEVER: Objection.

BY MS. GJONAJ:

Q. Do you agree with that?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, I think it speaks for itself. It says what they found and what I read into the record: That it's strong, but less convincing than that of kidney cancer.

BY MS. GJONAJ:

Q. The next page is the Risk Evaluation for TCE dated November 2020 from the EPA?

A. Yes.

Q. Have you seen this document before?

A. Yes.

Q. And if you could please read the summary at the top of the page.

A. (Reviews document.)

Okay. It's on page 252 of 803, top of the page. Starts as following or says as following:

"In summary, meta-analyses accounting for between study heterogeneity, influential observations, and data quality consistently indicate positive associations of NHL, kidney cancer and liver cancer with exposure to TCE. This conclusion generally agrees with that of other governmental and international organizations. The International Agency for Research on Cancer (IARC) (IARC, 2014) found sufficient evidence for the carcinogenicity of TCE in humans. IARC definitively stated that TCE causes kidney cancer and determined that a positive association -- that a positive associated" -- probably should be association -- "has been identified for NHL and liver cancer. Based on the weight of evidence when accounting for both these authoritative assessments and the results of EPA's meta-analyses

and in accordance with EPA Guidelines for Cancer Risk Assessment (USEPA, 2005), EPA determines that TCE is 'Carcinogenic to Humans.'"

Q. So the EPA in the 2020 Risk Evaluation on TCE acknowledged that there's a positive association between TCE and NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, again, they -- they -- the document speaks for itself, as I just read into the record, as to the basis for that they're determining that there is a positive association between TCE exposure and NHL, yes.

BY MS. GJONAJ:

Q. All right. The next document excerpted is the IARC Monograph on Trichloroethylene and Tetrachloroethylene and Other Chlorinated Agents.

Would you agree with that?

A. Yeah, I believe this is the 2014 IARC Monograph that was referenced earlier in the

EPA --

Q. Okay. And is that --

A. -- the EPA blurb that I read.

Q. Right.

And it says this publication represents the views and expert opinions on an IARC working group on evaluations of the carcinogenic risks to humans which met in Lion, October 2012; correct?

A. Leone, yeah.

Q. Leone.

A. They met in 2012, yes.

Q. Okay. And flipping to page 189 under the section that says "Cancer in Humans."

A. Oh.

Q. They say:

"A positive association has been observed between exposure to trichloroethylene and non-Hodgkin's lymphoma and liver cancer."

Did I read that right?

A. You did.

Q. Okay. Okay. I'm going to skip to: Dr. Goodman found that there was no causal association between PCE and NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Offhand I don't know that. Again, sounds -- sounds right, but Dr. -- what Dr. Goodman did and the opinions that she gave in her report would speak for itself.

BY MS. GJONAJ:

Q. Okay. Do you recall if Dr. Goodman found a causal association between any of the VOCs at Camp Lejeune and NHL?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't think she did.

BY MS. GJONAJ:

Q. Okay. Back to this Exhibit 7 and, again, we're at the ATSDR Assessment of Evidence for the Drinking Water Contaminants at Camp Lejeune and Specific Cancers and Other Diseases.

A. Right. We're on the front -- the front page of the document again? Yeah, got it.

Q. I'm just referencing what page I'm excerpting next, and I've excerpted page 35 and it

says:
"Based on the" --
A. Sorry.
Q. Are you there?
A. I'm not -- I'm not with you.
Q. No problem.
A. And it's falling apart. If anybody has a stapler on a break, that would be super.
Q. I brought it.
MS. McKEEVER: In preparation?
MS. GJONAJ: For all of it.
THE WITNESS: Page you're -- so just where I'm with you, you're back to the ATSDR Assessment of the Evidence for Drinking Water Contaminants at Camp Lejeune, and you're referencing page 35, which I don't have.
BY MS. GJONAJ:
Q. If you flip about eight pages or so in.
A. Gotcha. All right. Ah. Now I'm with you.
Q. Thank you.
And I'm reading from page 35, the

Conclusion. It says:

"Based on the epidemiological evidence, ATSDR concludes that there is equipoise and above evidence for causation for PCE and NHL."

Did I read that correctly?

A. You did.

Q. Okay. The next page is the Toxicological Profile for PCE June 2019 from the ATSDR.

We've seen this document already; correct?

A. Yes. Yes.

No. I have seen this before, but we haven't talked about it here. I may have misunderstood your question.

Q. Okay.

A. Ask me again.

Q. Okay.

A. So we have --

Q. Have you seen this document before?

A. Yes.

Q. Thank you.

Could you please read what I have highlighted on pages 3 and 4?

A. (Reviews document.)

"Exposure to tetrachloroethylene for a long time (years) may lead to a higher risk of getting cancer, but the type of cancer that may occur is not well-understood. Studies in humans suggest that exposure to tetrachloroethylene may lead to a higher risk of getting bladder cancer, multiple myeloma, or non-Hodgkin's lymphoma."

Q. So, again, the ATSDR in 2019 has said that PCE can lead to a higher risk of getting NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes.

BY MS. GJONAJ:

Q. Next page is the Toxicological Review of PCE dated February 12th from the EPA, and this is in Support of the Summary of Information on the Integrated Risk Information System; is that right?

A. IRIS, yes.

Q. Have you seen this document before?

A. Yes.

Q. And could you skipping -- skipping

to that second highlighted section there, could you please read that for me on page 6-13?

A. So you want me to read the second one. Right? Is that what I understood you?

Q. Correct.

A. Yep.

"The available epidemiologic studies provide a pattern of evidence associating tetrachloroethylene exposure and several types of cancer, specifically bladder cancer, non-Hodgkin's lymphoma, and multiple myeloma."

Q. So, again, the EPA back in 2012 confirmed that there was evidence associating PCE exposure and NHL; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes, that's what the document says. In essence, that's what the document says.

BY MS. GJONAJ:

Q. Okay. Now, the 2020 EPA Risk Evaluation for TCE, looking at page 329 of 714, the EPA states:

"There is a pattern of

epidemiological evidence associating PCE exposure with NHL."

Did I read that correctly?

A. You did.

Q. And Dr. Goodman also did not find a causal association between benzene exposure and NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Again, what she did and what she opined on will speak -- what she did, she'll speak for herself, and I think her reports will speak for themselves, but I believe you're correct that that's what her opinion was.

BY MS. GJONAJ:

Q. Okay.

A. That's my recollection.

Q. And I'm reading from page 36 of the ATSDR Assessment of Evidence for the Drinking Water Contaminants at Camp Lejeune. The Conclusion states:

"Although IARC concluded that human evidence for causation for benzene and NHL was

limited, three recent large cohort studies have found positive associations. Based on the recent epidemiological evidence and the supporting evidence for mechanistic animal studies, ATSDR concludes that there is sufficient evidence for causation for benzene and NHL."

Did I read that correctly?

A. Yes.

Q. The next document is a document from the National Academy of Sciences.

Have you seen this document before?

A. I may have. I just don't recall, as I sit here, if I've seen this one before.

Q. And this is a 2003 document, and if you turn to page 289.

A. Got it.

Q. I'm reading:

"The committee concludes from its assessment of the epidemiologic literature that there is limited/suggested evidence of an association between chronic exposure to benzene and non-Hodgkin’s lymphoma."

Did I read that correctly?

A. You did.

Q. And now I'm looking at the IARC Monograph in 2012.

You've seen this document before; correct?

A. (Reviews document.)

Yes.

Q. Reading from page 285.

"There is sufficient evidence in humans for the carcinogenicity of benzene. Benzene causes acute myeloid leukemia and acute nonlymphocytic leukemia. Also a positive association has been observed between exposure to benzene and acute lymphocytic leukemia, chronic lymphocytic leukemia, multiple myeloma, and non-Hodgkin's lymphoma."

Is that correct?

A. That's what it says.

MS. McKEEVER: Objection to form.

THE WITNESS: That's -- you've read --

BY MS. GJONAJ:

Q. Did I read that correctly?

A. Yes.

Q. Thank you.
And is chronic lymphocytic leukemia considered a NHL subtype?
A. Yes. Sorry. Chronic lymphocytic leukemia is a form of non-Hodgkin’s lymphoma, yes.
Q. And I'm turning to the IARC Monograph Benzene Volume 120. 2018.
A. Page 297?
Q. Correct.
A. All right.
Q. Have you seen this document before?
MS. McKEEVER: Do you need to staple it?
THE WITNESS: Yeah, I'm going to get there.
Yes.
BY MS. GJONAJ:
Q. Okay. Reading from page 297.
There is sufficient evidence in humans for the carcinogenicity of benzene. Benzene causes acute myeloid leukemia in humans. Positive associations have been observed for non-Hodgkin’s lymphoma, chronic lymphoid leukemia, multiple myeloma, chronic myeloid leukemia, acute

myeloid leukemia in children and cancer of the lung. A small minority of the working group considered that benzene also causes non-Hodgkin's lymphoma."

Did I read that correctly?

A. Close. In the second sentence you said it said "benzene causes acute myeloid leukemia in humans." It says "in adults."

Q. Fair. Thank you.

A. Just so you know I'm paying attention.

Q. (Laugh). Appreciate it. All right.

A. Give me a second to put this back together, if you would be so kind.

MS. McKEEVER: We've been going about an hour and 45. Would you like to take a break?

MS. GJONAJ: You want to break?

MS. McKEEVER: Yeah, let's take a short break.

THE WITNESS: You want to go two or you want to go another 15 minutes? Is this a good time to break? It's up to

you. It's your show. It's my show.

MS. GJONAJ: Let's take a break.

THE WITNESS: Let's take a break.

THE VIDEOGRAPHER: Stand by. We are off the record at 11:11.

(A recess was taken.)

THE VIDEOGRAPHER: We are on the record at 11:29.

BY MS. GJONAJ:

Q. Okay. Dr. McCabe, I'm going to mark this as Exhibit 8.

(Document marked for identification as McCabe Exhibit 8.)

BY MS. GJONAJ:

Q. Do you recall what Dr. Goodman's opinion was regarding the association between benzene and leukemia?

A. Well, again, Dr. Goodman's opinion concerning that, as she's probably testified to and as detailed in her reports, which speak to -- for itself, my recollection of her opinion

concerning that is that there is an association between benzene exposure, high dose benzene exposure -- I think she said 40 to 75 ppm years -- and acute myelogenous leukemia.

Q. That was Exhibit 8; right?

Okay. On page -- first page of Exhibit 8, you see it says "Toxicological Profile of Benzene" and this is -- then it says the "U.S. Department of Health and Human Services, August 2007"; is that right?

A. Correct.

Q. And then it says:

"Long-term exposure to benzene can cause cancer of the blood-forming organs. This condition is called leukemia. Exposure to benzene has been associated with the development of a particular type of leukemia called acute myeloid leukemia (AML)."

Did I read that correctly?

A. Yes. Let me stop you there, Joe, just because I think I said that in the previous answer but -- and the record will speak for itself, but if I said myelogenous instead of myeloid, I meant myeloid.

Q. Understood.

The next page again is the ATSDR Assessment of Evidence for the Drinking Water at Camp Lejeune and, again, they're assessing the water -- drinking water at Camp Lejeune and whether it caused cancers; correct?

Is that your -- is that your recollection of this document?

A. Yes.

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Then on this page they say:

"Based on the results of the meta-analysis, the recent cohort studies, and the findings that occupational benzene exposure is associated with reductions in both lymphoid and myeloid cell types, ATSDR concludes that there is sufficient evidence for causation for benzene in all leukemia types, i.e., ALL, CLL, AML, and CML."

Did I read that correctly?

A. Yes.

Q. Next page is the Toxicological Profiles For Benzene. It says the "Draft For

Public Comment October 2024."

Have you reviewed this document before?

A. I cannot attest to that. I can tell you that I have looked at ATSDR tox profiles for benzene before, but I don't remember if I looked at the October 2024 one. I just don't recall. I may have.

Q. Okay. And are you aware if there's a final version of this document?

A. I'm not, as I sit here.

Q. Okay. And under section 1.2 Summary of Health Effects, can you read the highlighted text there?

A. "Hematotoxicity, immunotoxicity, and hematopoietic cancer (acute myelogenous leukemia or AML) are well-established health effects of benzene."

Q. Do you agree with that statement?

MS. McKEEVER: Objection to form.

THE WITNESS: I agree with this in general. I agree with the statement that under certain

circumstances, benzene is hematotoxic, hematotoxic, and has been associated with AML and that that is well-established science, yes.

BY MS. GJONAJ:

Q. Okay.

A. Well-established meaning and I mean I know about benzene hematotoxicity back to the time frame that I was in graduate school. So, yes.

Q. Okay. And then skipping to the section below that says -- I'm still on page 2, but the section that says "Hematological." Starts in bold there. Can you read that section for me?

A. The bold in the word? The bolding of the word "hematological"? That bullet?

Q. Please. Yeah, that first bullet.

A. Sure. This is basically what I just alluded to.

"The primary effect of benzene on the hemato -- hematological system is disruption of hematopoiesis (the production of blood cells). The following hematological effects have been observed in humans and laboratory animals in

association with exposure to benzene.

"Number (1) decreased numbers of peripheral blood cells (erythrocytes, thrombocytes, leukocytes); number (2) decreased numbers of hematopoietic stem cells and progenitor cells in hematopoietic tissues (bone marrow, spleen); (3) decreased cellularity of hematological tissues (bone marrow, spleen, thymus); and (4) histological changes due to hematopoietic tissues (bone marrow, spleen, thymus)."

Q. Thank you.

And that next bullet point, could you please read that as well?

A. "So immunological benzene may disrupt the immune system by decreasing the number of peripheral lymphocytes through the disruption of hemopoiesis which contributes to immunosuppression. Studies conducted in laboratory animals have shown that exposure to benzene can alter immune responses to antigens, function of peripheral lymphocytes, and levels of circulating antibodies."

Q. Thank you.

Do you have any reason to disagree with any of the statements from the ATSDR that you just read into the record?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't disagree with the generalizations that are being made by -- by the statements that were made, or that I just read into the record.

BY MS. GJONAJ:

Q. Okay.

A. Which another way of saying that -- which another way of saying that is that, yes, benzene is hemotoxic and immunotoxic under certain circumstances.

Q. Okay. Flipping the page, we're on the National Academy of Sciences document that we reviewed before in 2003. At this time, I'm looking at the excerpts on page 320.

A. Got you. And what --

Q. And then --

A. Sorry. What document? This is Gulf War document again?

Q. Yes.
A. Did we establish that? Okay.
Q. Thank you.
And I'm reading from page 320.
"The committee concludes from its assessment of the epidemiologic and experimental literature that there is sufficient evidence of a causal relationship between chronic exposure to benzene and acute leukemia."
Did I read that correctly?
A. Yes.
Q. And then flipping to the -- out of order but it's page 314.
A. Yes.
Q. "The committee concludes from its assessment of the epidemiologic literature that there is sufficient evidence of an association between chronic exposure to benzene and adult leukemia."
Did I read that correctly?
A. You did.
Q. The next page is an excerpt from the Carcinogenic Effects of Benzene: An Update, which is dated April 1998. It's a USEPA document;

correct?

A. Okay. Yes.

Q. And I'm reading from page 4.

"It has been clearly established and accepted that exposure to benzene causes acute nonlymphocytic myelogenous leukemia (ANLL) and a variety of other blood-related disorders in humans."

Did I read that correctly?

I may have mispronounced it but...

A. Yes, but you got the parenthetic.

Q. Yeah.

A. But it's citing ATSDR EPA at the time.

And I guess so, yes, you read it correctly, and I think my understanding -- my understanding given that this is document from 1998 that the ANLL is the -- that's a designation at the time of the same disease processes AML now.

Q. That was going to be my next question.

A. Well, there you go.

Q. So you would agree that EPA recognized an association between benzene and this

type of leukemia back in 1998 --

MS. McKEEVER: Objection.

BY MS. GJONAJ:

Q. -- right?

MS. McKEEVER: Objection to form.

THE WITNESS: Yeah, I agree that they -- I agree that -- so the answer to your question is yes, by virtue of their documents are indicating so as far back as 1998.

BY MS. GJONAJ:

Q. Okay. Okay. Now, I'm looking at the IARC Monograph Volume 100F again from 2012, and I'm reading from page 285.

"There is sufficient evidence in humans for carcinogenicity of benzene. Benzene causes acute myeloid leukemia, acute nonlymphocytic leukemia. Also a positive association has been observed between exposure to benzene and acute lymphocytic leukemia, chronic lymphocytic leukemia, multiple myeloma, and non-Hodgkin’s lymphoma."

First, did I read that correctly?

A. Yeah. I just was looking at it. I thought we already covered this, but yes, you did read it correctly.

Q. But just confirming, this was not only specific to non-Hodgkin's lymphoma. They also reference leukemia in this document; correct?

A. (Reviews documents).

Q. I believe we reviewed this before --

A. Yes.

Q. -- for non-Hodgkin's lymphoma?

A. Yes.

Q. Okay. Now, looking at the IARC Monograph on Benzene Volume 120, we've looked at this document before as well; correct?

A. I think so, yes.

Q. All right. And just confirming, they found they note the positive association has been observed for non-Hodgkin's lymphoma and CLL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: That -- yes, in sum and -- in sum and substance, yes, that's what it says.

BY MS. GJONAJ:

Q. Okay. It says "Positive associations have been observed for non-Hodgkin's lymphoma and chronic lymphoid leukemia."

Did I read that correctly?

A. Yes.

Q. Did Dr. Goodman opine that there was no causal association between TCE and leukemia?

MS. McKEEVER: Objection to form.

THE WITNESS: What Dr. Goodman -- you said Goodman.

What Dr. Goodman opined about in her reports and testimony will speak for itself.

My recollection is that indeed she did give the opinion that there was no association between TCE and leukemia.

BY MS. GJONAJ:

Q. Okay. And now I'm reading from, again, the ATSDR Assessment of Evidence for the Drinking Water Contaminants at Camp Lejeune 2017. It says, reading from page 55:

"Based on the epidemiological

evidence, the link between TCE-associated immune disorders and leukemias, including myeloid as well as lymphoid leukemias, and the evidence that TCE affects lymphoid cell types, ATSDR concludes that there is equipoise and above for causation for TCE and all adult leukemias, including AML, ALL, CML, and CML."

Did I read that correctly?

A. I think so, just but for the record, I don't know if you -- so the last sentence, I didn't hear you the say the word "evidence." So we have a clear record. Right.

Q. Thank you.

In case I didn't read that correctly, it says:

"ATSDR concludes that there is equipoise and above evidence for causation for TCE and all adult leukemias, including AML, ALL, CML, and CLL."

A. There you go. Yes.

MS. GJONAJ: Thank you. Okay. You can put that aside.

(Document marked for identification as McCabe Exhibit 9.)

BY MS. GJONAJ:

Q. Okay. Dr. McCabe, I've handed you what I have marked as Exhibit 9, which is, again, I'll represent to you are excerpts from different agency publications.

Do you recall whether Dr. Goodman found a causal association between TCE and bladder cancer?

MS. McKEEVER: Objection to form.

THE WITNESS: So Dr. Goodman's opinion, as she stated in her report and she testified, will speak for itself. My recollection, though, is you are correct that she gave an opinion that there was no association between TCE and bladder cancer.

BY MS. GJONAJ:

Q. Okay. Reading from the Toxicological Review of TCE August 2011 from the EPA:

"In addition to the body of evidence pertaining to between kidney cancer, NHL, and liver cancer, the available epidemiological

studies also provide more limited evidence of an association between TCE exposures and other types of cancer, including bladder."

And then they go on to state that there are other cancers.

Did I read that correctly?

A. Yes, and you're reading from page 4-676.

Q. Thank you.

And now on to the 2020 EPA Risk Evaluation on TCE. I'm reading from the bottom of page 245 of 803.

"There is some evidence of association for bladder and urothelial cancer and high cumulative TCE exposure, however the reasonably available studies examine multiple sites and do not completely account for the confounders."

Did I read that correctly?

A. No. You want me to read it? I'll read it.

Q. Okay.

A. "There is some evidence of association for bladder or urothelial cancer and

high cumulative TCE exposure, however the reasonably available studies examined multiple sites and do not completely account for potential confounding factors."

Q. Okay. I'm turning to the ATSDR Assessment of Evidence for Drinking Water Contaminants at Camp Lejeune.

Do you recall Dr. Goodman's opinion on the association between PCE exposure and bladder cancer?

A. As I sit here, no, and, again, her -- her opinions and the basis of her opinions as she detailed in her report -- reports and testimony will speak for themselves.

Q. Okay. Do you reference her opinion in your bladder cancer report?

A. I don't believe I did, no. I did not.

Q. Can you read the highlighted text on page 95?

A. "Therefore, ATSDR has decided to adopt a different position from that currently held by EPA and IARC and conclude that there is sufficient evidence for causation for PCE and

bladder cancer."

Q. Is that consistent with Dr. Goodman's opinions in the report that you reviewed?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

I'm sorry. What was your question?

BY MS. GJONAJ:

Q. Is that statement consistent with the opinions in Dr. Goodman's bladder cancer report?

MS. McKEEVER: Same objection.

THE WITNESS:

(Reviews document.)

It is not.

BY MS. GJONAJ:

Q. Okay. Can you to flip a couple of pages. We're back on the National Academy of Sciences 2003. I'm reading from page 253.

"The committee concludes, from its assessment of the epidemiologic literature, that

there is limited/suggestive evidence of an association between chronic exposure to tetrachloroethylene and dry-cleaning solvents and bladder cancer."

Did I read that correctly?

A. You did, yes.

Q. Now I'm going to flip a couple pages to the EPA Risk Evaluation on PCE from December of 2020, and I'm looking at page 329 of 714.

A. Got it.

Q. Reading from the top there, it says: "There is some evidence for bladder" --

A. I'm sorry. I'm not with you. Sorry. What document? What page are we on?

Q. Page 329.

A. And you're saying reading from the top. Section 6.1 is on the bottom, 6.3.

Q. I think we're on -- I think you're on a different one.

A. Got you. That's what I'm thinking. This, I'm on page 329, but I'm probably --

Q. Is there that one? That's the risk assessment.

A. December 2020? Is that what that is? Sorry.

Q. December 2020, correct.

A. So flip a page to page 328. 329. Got it. Thank you.

Q. Okay.

There is some -- I'm reading from 329.

There is some pattern -- strike that.

Reading from page 329:

"There is some evidence for bladder cancer and multiple myeloma (MM) but results are mixed."

Did I read that correctly?

A. You did.

Q. And now I'm turning to the IARC Monograph Volume 106, and can you read what it states under "Cancer in humans" on page 329?

A. "There is limited evidence in humans for the carcinogenicity of tetrachloroethylene. Positive associations have been observed for cancer of the bladder."

MS. GJONAJ: Okay. You can

put that aside.

(Document marked for identification as McCabe Exhibit 10.)

BY MS. GJONAJ:

Q. Dr. McCabe, I have now marked as Exhibit 10 again a compilation of agency publications and excerpts from those publications, which I have highlighted and marked as Exhibit 10.

Do you recall Dr. Goodman's opinions on the association between kidney cancer and TCE?

A. (Reviews document.)

Dr. Goodman's opinions and bases of her opinions, as she details in her reports, will speak for themselves.

But as I indicated in my report on page 5 is that, as discussed in Dr. Julie Goodman's general causation report for kidney cancer: "Epidemiology evidence does not support a causal association between TCE and kidney cancer, except at very high occupational exposures, that is -- (that is greater than 335 ppm years)."

Q. Okay. Looking at Exhibit 10, the ATSDR Assessment of Evidence for the Drinking Water Contamination at Camp Lejeune, again 2017,

can you read the highlighted Conclusion on page 22, please?

A. "Conclusion: ATSDR concurs with the evaluations made by IARC, EPA and NTP. Based on the overall consistent findings of increased risks of kidney cancer from exposures to TCE and the supporting mechanistic information, there is sufficient evidence for causation for TCE and kidney cancer."

Q. And this report was specifically looking at the water contaminants at Camp Lejeune; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: My understanding is that this report was specifically looking at water contaminants believed to be relevant to Camp Lejeune contamination of the water.

BY MS. GJONAJ:

Q. I'm not sure I understood that answer. Can you explain? How was that -- was -- let me ask that again.

So the ATSDR Assessment of Evidence

for the Drinking Water at Camp Lejeune and Specific Cancers, this 2017 report was looking at the association between the water at Camp Lejeune and these specific cancers; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: So my understanding is incorrect.

They're looking at the associations -- they're relying on studies that looked at associations, if any, between chemicals believed to be or found to be in the water at Camp Lejeune.

They weren't -- they weren't basing their assessment solely on studies done at Camp Lejeune.

BY MS. GJONAJ:

Q. In reaching their conclusions, did the ATSDR consider the contamination levels in the water at Camp Lejeune?

MS. McKEEVER: Objection to form.

THE WITNESS: And the answer to that is I think so. I -- but I -- but

that's not something that I looked at in this -- in this case or something.

BY MS. GJONAJ:

Q. All right.

A. But I think the answer to that is yes, I think so.

Q. Okay. And they reviewed the -- strike that.

Are you aware that the ATSDR did their own water modeling on the water -- in the water at Camp Lejeune?

Let me ask that a different way. That was a poor question. Strike that.

You listed the ATSDR water modeling in your Materials Considered List; is that correct?

A. I think so. Let me look.

Q. Page 62 of your blood cancer report.

A. (Reviews document.)

That's not what I have on page 62 of my blood cancer. Are you sure you're looking at blood cancer and not kidney?

Q. You are correct. It is kidney and not blood cancer.

A. There you go. All right. You're trying to trip me up. Page 62 of kidney.

(Reviews document.)

Item number 50 -- items probably 55, 56. Right?

Q. Uh-huh.

A. Yes.

Q. In drafting this report, did the ATSDR consider items 55 through 58 that you list in your Materials Considered List?

MS. McKEEVER: Objection to form.

THE WITNESS: By "this report" you mean this one? (Indicates).

BY MS. GJONAJ:

Q. Correct. The ATSDR Assessment of Evidence.

Did they consider the ATSDR water modeling?

MS. McKEEVER: Objection to form.

THE WITNESS: It's not something I looked at in my evaluation of this case. I suspect they did, yes.

BY MS. GJONAJ:

Q. You reviewed this document; correct?

A. I did.

Q. Okay. Do they cite to specific contamination levels in the water at Camp Lejeune?

A. I think they do. It's not something that was the focus of my work. So honestly answering your question is I think you're right. I think it seems reasonable that that's something they would have done, and I think you're right.

Q. Okay. And then on page 22 they say.

"ATSDR concurs with the evaluations of IARC, EPA and NTP. Based on the overall consistent findings of increased risks of kidney cancer from exposures to TCE and the supporting mechanistic information, there is sufficient evidence for causation for TCE and kidney cancer."

Did I read that correctly?

A. Yeah, but I think I already did. So yes.

Q. I know.

A. Okay.

Q. Okay. If you could please flip to the EPA Toxicological Review of Trichloroethylene

dated 2011 on page 4-676.

Okay. I am reading from the second sentence of that second full paragraph. This -- okay. I'm going to read from the top.

"Following EPA (2005b) 'Guidelines for Carcinogen Risk Assessment,' TCE is characterized as 'carcinogenic to humans' by all routes of exposure. This conclusion is based on convincing evidence of a causal association between TCE exposure in humans and kidney cancer."

Did I read that correctly?

A. Yes.

Q. Okay. They don't make any reference to specific levels here; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: They don't make any reference to --

BY MS. GJONAJ:

Q. All right. They don't -- they don't make any reference to TCE exposure levels in this paragraph, do they?

MS. McKEEVER: Objection to form.

THE WITNESS: You are correct.

BY MS. GJONAJ:

Q. We've looked at this a few times already, but the Risk Evaluation on TCE 2011, page 252 of 80 -- of 803.

A. Let me get there because you're skipping over. Right?

Q. It should be the next page.

A. Okay. Sorry. Let's see.

The National Academy of Sciences document?

Q. Nope. The EPA Risk Evaluation for TCE.

A. August of 2011?

Q. November 2020.

A. Got it.

Q. All right. And we've gone through this paragraph already but again -- strike that.

Did the -- strike that.

Did the EPA and the Risk Evaluation of TCE find there to be a positive association between kidney cancer and exposure to TCE?

MS. McKEEVER: Objection to

form.

THE WITNESS:

(Reviews document.)

Let me hear the question again. Please.

BY MS. GJONAJ:

Q. Did the EPA indicate positive associations between kidney cancer and exposure to TCE in this document?

A. (Reviews document.)

Well, again, this -- this was not the focus of the work I did in this case. So I'm reacting to the question that you're asking me based on the document that you put in front of me.

It seems that the language in the highlighted paragraph at the top of page 252 of 803 in this document -- this document being the Risk Evaluation for Trichloroethylene November 2022 -- indicates that a positive association between kidney cancer and exposure to TCE is being concluded.

Q. Okay. If you skip to the next page, I'm looking at the IARC Monograph Volume 106, page 189, and it says.

"There is -- there is sufficient evidence in humans for the carcinogenicity of trichloroethylene. Trichloroethylene causes cancer of the kidney."

Did I read that correctly?

A. You did.

Q. Okay. You can put that aside.

Are you aware of any instance where Dr. Goodman has opined that any chemical definitively caused a disease?

MS. McKEEVER: Objection to form.

THE WITNESS: No, as I sit here, I don't -- I don't know that. I don't know one way or the other.

MS. GJONAJ: Okay.

Okay. I am marking as Exhibit 11.

(Document marked for identification as McCabe Exhibit 11.)

BY MS. GJONAJ:

Q. Have you seen this document before?

A. (Reviews document.)

Well, first, it's not a complete

document, but I have not -- I don't think -- this -- this is not a document that is familiar to me.

Q. You see that it's a December 2020 Statement from the International Network for Epidemiology and Policy on the conflict of interest in EPI studies; is that correct?

A. That's what it says, yes.

Q. Okay. And if you turn to pages 6 and 7, you'll see the list of authors and coauthors; is that right?

A. Yes.

Q. Okay. Some of them are formerly from the EPA I see looking at Jane C. Caldwell; is that right?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't know that she's formerly of the EPA --

BY MS. GJONAJ:

Q. Okay.

A. -- but she's --

Q. It says Jane C. Caldwell. Okay.

A. -- from the EPA.

Q. Okay. It says Jane C. Caldwell, U.S. Environmental Protection Agency, retired, from Durham, North Carolina?

A. I see that.

Q. Okay. And there are several other authors listed as well; correct?

A. There are --

Q. Okay.

A. There are eight -- there are eight coauthors and a lead author, yes.

Q. Thank you.

And then on page 7, they list many of the member organizations of the INEP; is that correct?

A. I'm sorry. You're asking me what -- what's listed here? What are you asking me is listed here?

Q. So if you're looking at the bullet points there?

A. Yep.

Q. Would you agree that reading right above, actually, it says:

"INEP currently includes twenty-four member associations across five continents"?

A. Got it. Okay. Yes.
Q. Okay. And those include the American College of Epidemiology and the International Society for Environmental Epidemiology.
Do you see that?
A. Yeah, those two amongst probably looks like a dozen or more listed here on this. Well, actually, it says right there --
Q. Right. 24?
A. -- 24. Yeah.
Q. And if you flip the page, you'll see page 21 excerpted there?
A. 21. Okay.
Q. And under the section titled "Recent Epidemiology-specific Examples of COI."
Do you see that?
A. I do.
Q. Okay. If you look at the first example of conflict of interest they have there, it discusses an exposé by the Center of Public Integrity.
Do you see that?
A. Under section A. Right?

Q. Under section A?
A. Yeah. Yes.
Q. Can you please read a few sentences starting with "The exposé includes." It's about three lines down there.
A. "The exposé included a video link." That sentence?
Q. Yep. The next three sentences.
A. Got it.
Q. Please.
A. "The exposé included a video link to Dr. Julie Goodman giving expert testimony that cited junk science. As a member of the American College of Epidemiology (ACE) Board, she attempted to obstruct the ACE endorsement of the 2012 IJPC-SE Position Statement on Asbestos. CPI exposed Dr. Goodman's COI as financially benefiting from vested interests; her employer (Gradient) had been associated with a number of scientists employed to manufacture doubt and foment uncertainty about scientific evidence."
Keep going?
Q. Yep. Were you aware that this group of epidemiologists publicly accused her of

promoting junk science?

MS. McKEEVER: Objection to form and foundation.

THE WITNESS: I don't know.

MS. GJONAJ: I asked -- I asked if he was aware.

MS. McKEEVER: Go ahead.

THE WITNESS: No. No.

BY MS. GJONAJ:

Q. (Laugh).

A. (Laugh).

Q. Do you consider Dr. Goodman's opinions more reliable than those of the EPA?

MS. McKEEVER: Objection to form.

THE WITNESS: I did not -- I did not assess the opinions of any of the experts in this case on either side, plaintiff or defense or DOJ, in terms of the strengths of their opinions relative to what EPA and other regulatory agencies have said about these topics.

BY MS. GJONAJ:

Q. Okay. So you don't have an opinion

one way or the other?
A. I do --
MS. McKEEVER: Objection to form.
THE WITNESS: I don't.
BY MS. GJONAJ:
Q. Okay. Did -- if --
A. Well, let me back up.
I don't have an opinion because it's not something that I evaluated. So of course I don't have an opinion on something I haven't evaluated.
Q. Have you evaluated the opinions of the 2020 or of the EPA 2020 Risk Assessment on TCE?
MS. McKEEVER: Objection to form.
THE WITNESS: Generally speaking, no. But which opinions are you talking about? But, I mean, I guess the answer to that is no, that's not something that I undertook in my work on this case, and I didn't state anything to that effect in any of my reports that

that was part of what I was doing.

So I guess the answer -- the answer to your question as I understand it is no, but I don't -- also I don't know what opinions you're talking about.

BY MS. GJONAJ:

Q. Okay. Did you consider any opinions from the 2020 EPA Risk Assessment for TCE in forming your opinions in this case?

MS. McKEEVER: Objection to form.

THE WITNESS: Nothing that I can think of, as I sit here, that would be relevant. So the answer is no.

BY MS. GJONAJ:

Q. Okay. Do you consider Dr. Goodman's opinions to be more reliable than those of IARC?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't have any opinion about that.

BY MS. GJONAJ:

Q. Okay. Do you consider Dr. Goodman's opinions to be more reliable than those of the

ATSDR?

MS. McKEEVER: Objection to form.

THE WITNESS: I also don't have any opinion about that.

BY MS. GJONAJ:

Q. Okay. Is it your opinion that industry -- is it your -- strike that.

Is it your opinion that industry consultants views should override the consensus of federal and international public health interest agencies?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't have any opinion about that. I don't have context. I just -- I just -- this is not something that I looked into or addressed and so, therefore, I don't -- I can't give you an answer.

Well, I certainly can't give you an answer that I have an expert opinion concerning that issue.

BY MS. GJONAJ:

Q. Did you review the general causation opinion of Dr. Howard Hu that was submitted by Plaintiffs Leadership in this litigation?

A. I don't know Hu's -- I guess -- yeah, I guess -- I reviewed as I indicated in my reports -- in my reports that I reviewed Dr. Hu's report on NHL. I guess I only -- well, I guess I listed it on all my reports. Let me back up.

I reviewed Dr. Hu's report on NHL --

Q. Okay.

A. -- as I indicated in my report.

Q. And you've cited to studies done by Dr. Howard Hu in literature that you have published; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: If there's a specific example of that you would like to call to my attention, I'd be happy to look at it.

It seems reasonable that I would have done that given my past interactions and knowledge of Dr. Hu's

work concerning bone lead.

BY MS. GJONAJ:

Q. Okay.

A. So, you know, as I sit here, I don't -- I don't remember that, but I'm not denying that I did that. I seemingly -- seems like that's reasonable that I would have done that.

Q. And did you consider his review of the epidemiological studies in this case before forming your opinions?

MS. McKEEVER: Objection to form.

THE WITNESS: I did not.

Other than in the way that I said in my report in the -- in the paragraph that precedes the statement where I said my "jumping in" or "jumping off." Whatever I said, I jumped. (Laugh). That. Other than that, no.

BY MS. GJONAJ:

Q. Okay. All right. You can put that exhibit aside.

Do you agree that TCE is metabolized

in the body through two distinct pathways?

A. Generally, yes, that's true.

Q. Okay. And one of those is the oxidative pathway primarily via CYP2E1. I may be pronouncing that wrong.

A. You got it. So it's CYP. C-Y-P2 capital E1.

The answer to that question is yes, cytochrome CYP2E1 is the primary P4 enzyme -- P450 enzyme involved in the oxidative metabolism of TCE.

Q. And that produces metabolites like TCA, DCA, chlorohydrate, and trichloroethanol; is that correct?

A. Yes, that's correct.

Q. And the second pathway is the glutathione conjugation where TCE is first conjugated with the glutathione in the liver; is that correct?

A. Correct, for the most part in the liver. Other tissues, but predominantly in the liver.

Q. Okay. And it forms DCVG; is that correct?

A. Correct.
Q. Then it further metabolized in the kidneys to form DCVC; is that right?
MS. McKEEVER: Objection to form.
THE WITNESS: I think it's metabolized both in the liver and the kidney, but then active in the kidney.
BY MS. GJONAJ:
Q. Okay. Is DCVC a metabolite known to be toxic to kidney cells?
MS. McKEEVER: Objection to form.
THE WITNESS: Under certain circumstances, yes.
BY MS. GJONAJ:
Q. Okay. Is DCVC a metabolite known to be toxic to hematopoietic systems?
MS. McKEEVER: Objection to form.
THE WITNESS: (Pause). I don't think so. You know, I don't -- I can't recall if there's any studies that would have looked at it in vitro or

something like that, but otherwise, no, I don't think that DCVC -- did you say toxic? Genotoxic? What did you ask me? Sorry. Let me hear the question again so I'm not.

BY MS. GJONAJ:

Q. The question was: Is DCVC known to be toxic to the hematopoietic system?

MS. McKEEVER: Same objection.

THE WITNESS: That's not my understanding that it is.

BY MS. GJONAJ:

Q. Can you turn to page -- I'm in the kidney report.

A. Okay.

Q. Three lines from the bottom.

MS. McKEEVER: Sorry. What page?

THE WITNESS: Page?

MS. GJONAJ: Page 19. I'm sorry.

BY MS. GJONAJ:

Q. You state that:

"DCVC metabolite is associated with

toxicity for the kidney reproductive systems, hematopoietic system, and possibly others."

Did I read that correctly?

A. You did.

Q. Do you disagree with that statement?

A. (Reviews document.)

Q. Strike that.

Is that still your opinion, sitting here today?

A. Well, I'm not expressing it as an opinion in my report. Right? I'm capturing, I'm recounting, or I'm stating in that paragraph it is related to what's in Figure 1 of my report, which comes from a Larry Lash, Dr. Lash 2025 study where, you know, starts with my original thought which was that DCVC is known to be toxic. That's right. So toxic to the kidney but also hematopoietic system.

So I'd have to go back and review the Lash study and possibly others to be able to give you context about DCVC in the hematopoietic system and toxicity in the hematopoietic system.

Q. Have you cited to any papers in your report that state that DCVC is not associated with

toxicity for the hematopoietic system?

A. (Reviews document.)

Not that I recall.

And also, the context here is that this is a report on kidney cancer where in a section under Mechanisms of VOC Toxicity concerning a mechanism of DCVC metabolite being associated with toxicity to the kidney.

So I can't think of nor did I -- nor did I indicate, nor did I see anyone else indicate, as -- as I sit here, that DCVC metabolite toxicity to the hematopoietic system was relevant in any way to a mechanism of kidney cancer causation.

Q. I'm going to strike that as nonresponsive. I don't think that you answered my question.

My question was: Have you cited to any studies that state that DCVC metabolite is not associated with toxicity for the hematopoietic system?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't think I

made any statements to that effect that I recall in my blood -- in the kidney cancer report that we're talking about here.

BY MS. GJONAJ:

Q. Okay. How about in your blood cancer report? Did you make any statements in your blood cancer report that are inconsistent with the statement in your kidney cancer report?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

BY MS. GJONAJ:

Q. I'm going to strike that question. Is there any reason you would have made this statement in your kidney cancer report if it were not accurate?

MS. McKEEVER: Objection to form.

THE WITNESS: No, and it is accurate by virtue that I have a citation for it coming from a figure coming from at least one article from 2025 that I

cited in my report.

BY MS. GJONAJ:

Q. Okay. So that figure states that DCVC metabolite is associated with toxicity for the hematopoietic system?

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Is that correct?

A. It does.

Q. Okay. So is TCA an oxidative metabolite?

A. Yes.

Q. Okay. Is DCVC an oxidative metabolite?

A. Yes and no.

Q. Is it accurate to say it could be an oxidative metabolite?

A. Well, you need --

MS. McKEEVER: Objection to form.

THE WITNESS: You need to have the oxidative metabolite of TCE to produce the precursor that then through a

Phase 2 reaction, glutathione conjugation, right, would become DCVG followed by DCVC.

BY MS. GJONAJ:

Q. Okay. And oxidative metabolites of TCE can produce oxidative stress; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Under -- under certain circumstances, yes.

BY MS. GJONAJ:

Q. Okay. Dr. Gilbert references the concept of immune surveillance in her report.

Did you see -- read that?

A. Yes.

Q. Okay. And is immune surveillance an idea that the immune system identifies and eliminates emerging tumor cells?

A. Generally, yes.

Q. Okay. And you agree that it's a well-established principle in cancer biology?

MS. McKEEVER: Objection to form.

THE WITNESS: Well --

well-established principle. Yes, in cancer -- in cancer immunobiology, yes.

BY MS. GJONAJ:

Q. Okay. And Dr. Gilbert also notes that the loss of immune surveillance can allow cancer cells to grow unchecked.

Did you read that in her report?

A. Sure.

Q. Okay.

A. I mean, that's something that, yes, I read that many places --

Q. Okay.

A. -- and I know that from other places --

Q. Right.

A. -- including Dr. Gilbert's reports.

Q. Okay. Correct.

And I believe you cite to that in your report as well; correct? All right.

A. I do.

Q. And do you agree that immune suppression increases cancer risk?

MS. McKEEVER: Objection to form.

THE WITNESS: Under certain circumstances, yes.

BY MS. GJONAJ:

Q. So in some circumstances, immune suppression can increase cancer risk?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes. It's just not -- it's just not -- it's not -- it's not a generalization that can be made, but yes, the loss of immune surveillance and immunosuppressive mechanisms can contribute to, can be protumorigenic but also could be antitumorigenetic. Could lead to progression of a kidney -- of a cancer as well as under different circumstances lead to regression of a tumor.

BY MS. GJONAJ:

Q. Okay. We'll get to that.

Turning to your blood cancer report on page 31.

A. Yes.

Q. You state under section -- under the

section on Human Studies:

"Federal and international agencies have concluded that the immune system is a potential target of TCE toxicity."

Did I read that correctly?

A. You did.

Q. And you put "potential" in italics; is that right?

A. Is that italics and bold or looks like it's both. Yes.

Q. Okay. Why did you frame this as potential rather than acknowledging that agencies like the EPA have definitively concluded that TCE is immunotoxic?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

Well, my recollection is -- well, first of all, this morning and into this afternoon now, I don't think any of the -- or don't remember any of the federal or international agency documents that you've put in front of me and asked

me about dealt with the immune system. That's one.

Two is that I believe some of those -- and I'm thinking of the EPA perhaps -- actually says that the immune system is a potential target for TCE toxicity.

Yeah. So I think in the context of the sentence, I think what I'm saying is that -- federal because that's what the federal and international agencies or certain federal and international agencies have concluded, that the immune system is a potential target --

BY MS. GJONAJ:

Q. Okay.

A. -- of TCE toxicity.

MS. GJONAJ: I'm going to mark as Exhibit 12. In an effort to save paper, I excerpted this one as well.

(Document marked for identification as McCabe Exhibit 12.)

BY MS. GJONAJ:

Q. This, again, are excerpts from the EPA 2020 Risk Assessment on TCE, and if you look at I believe it's page 246, the last -- the last paragraph on page 246. It says:

"Both animal and human studies demonstrate that TCE exposure can result in either autoimmune/immune enhancement responses or immunosuppression."

Did I read that correctly?

A. You did.

Q. Okay. And then skipping to page 247, the second line, it says:

"Overall, immunotoxicity in the form of both autoimmunity and immunosuppression following TCE exposure are supported by the weight of the evidence."

Did I read that correctly?

A. You did.

Q. Do you disagree with that conclusion?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

I don't disagree with the conclusion in the context by which the EPA is making that determination, or at least in the understanding of or my understanding of the EPA making that determination.

BY MS. GJONAJ:

Q. What is your understanding?

MS. McKEEVER: Objection to form.

THE WITNESS: My understanding is that the EPA is evaluating chemicals for the purposes of establishing for risk assessment and regulatory policy.

BY MS. GJONAJ:

Q. Okay. The EPA's 2020 Risk Assessment went through peer review by federal and nonfederal scientists; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't recall. It seems -- seems that's commonly done. So yes, I think that's probably true.

Possibly true.
BY MS. GJONAJ:
Q. You're not --
A. Possibly true --
Q. Okay.
A. -- I guess is a better answer.
Q. Are you aware of any agency risk assessment that reversed the conclusions of the EPA?
MS. McKEEVER: Objection to form.
BY MS. GJONAJ:
Q. In this document.
A. I don't -- yeah, I don't -- I don't know that I --
Q. Okay.
A. Well, actually, I don't know that I understand what you're asking me.
Q. Since November 2020, have any -- strike that.
Since 2020, has any regulatory agency stated that TCE is not immunotoxic?
MS. McKEEVER: Objection to form.

THE WITNESS: I don't know.
BY MS. GJONAJ:
Q. I see that you reference the EPA Risk Evaluation on TCE on -- I believe it's -- let me check -- page 50 of your blood cancer report.
A. (Reviews document.)
Q. Did you reference the EPA's Risk Evaluation on TCE anywhere else in your report?
MS. McKEEVER: Objection to form.
THE WITNESS: I probably listed it for one and two. Not that I recall.
BY MS. GJONAJ:
Q. Okay. Did you consider the findings of the 2020 EPA risk assessment when reaching your opinions in this case?
A. Yes, in the context of what I'm saying in -- on page 50 in Footnote 50 feet -- 55, I believe a similar footnote appears in the other two reports as well.
Q. In the footnote you're referencing you say where it states:
"Dr. Gilberts cite to the USEPA Risk

Evaluation of Trichloroethylene (2020), wherein it states that 'overall, immunotoxicity in the form of both autoimmunity and immunosuppression following TCE exposure are supported by the weight of evidence.'"

That's a quote.

A. From Gilbert NHL leukemia --

Q. Correct.

A. -- report, page 2 of 29.

Q. And then you go on -- yes, that was a quote from Dr. Gilbert's blood cancer report on page 29.

Then you go on to say:

"However, this document did not conclude that the weight of the evidence linked these mechanisms causatively to lymphoma or leukemia."

Did I read that correctly?

A. Yes.

Q. Are you aware that Dr. Gilbert was invited to review the EPA's 2020 Risk Evaluation on TCE?

A. It sounds like something that she -- that you already asked me and something that she

indicated in her report. So from that perspective, I'm aware of it.

MS. GJONAJ: Okay.

(Document marked for identification as McCabe Exhibit 13.)

BY MS. GJONAJ:

Q. I have marked as Exhibit 13 the 2020 publication by Germolec and colleagues titled "Consensus on the Key Characteristics of Immunotoxic Agents as a Basis for Hazard Identification."

You see that?

A. I do.

Q. Okay. This document does not appear on your Materials Considered List; is that correct?

A. It does not.

Q. Okay. And it seems that this is a consortium of international scientists that have reviewed and reached a consensus regarding the key characteristics of agents that should be labeled immunotoxic.

Would you agree with that?

MS. McKEEVER: Objection to

form and foundation.

THE WITNESS: I haven't reviewed the document. I'm reacting to what you've put in front of me and what I see as the title of a paper published in "Environmental Health Perspectives" by a group of immunotoxicologists. Many of whom I know very well.

BY MS. GJONAJ:

Q. Okay. And if you flip through, you'll see that there is a section discussing each of the 10 characteristics.

See on that third page it starts with KC1. You see that?

A. (Reviews document.)

Got it. So KC1 is a key characteristic. Got it. Yes.

Q. Okay. And turning to page -- what I believe is page 6, you'll see KC5?

A. (Reviews document.)

KC5 on page 6, yes.

Q. And the Key Characteristic 5 is labeled as "Modifies Cellular Differentiation."

Do you agree with that?

A. I agree that modification of cellular differentiation would be a key characteristic to consider in labeling a particular compound or chemical to be immunotoxic.

Q. Okay. Is cellular differentiation a fundamental part of how the immune system maintains and activates different immune cells?

MS. McKEEVER: Objection to form.

THE WITNESS: Let me -- let me hear you. Let me hear that again, please.

BY MS. GJONAJ:

Q. So the key characteristic is "Modifies Cellular Differentiation"?

A. That part -- that part I understood --

Q. Okay. And then --

A. -- but I wanted to hear your question.

Q. Okay. And is cellular differentiation is a fundamental part -- would -- strike that.

Would you say that cellular

differentiation is a fundamental part of how the immune system maintains and activates different immune cells?

MS. McKEEVER: Objection. Same objection.

THE WITNESS: Yeah, I can go -- I guess I can go along with that, yes.

BY MS. GJONAJ:

Q. Okay.

A. So cellular differentiation -- let me say it back to you in a way that is more palatable to me scientifically, which is that cellular differentiation of different lymphocyte and myocyte -- myelyte cells.

Cellular differentiation of lymphoid myeloid cells is important in establishing, developing, generating an immune response as well as its control.

Q. Okay. Can you skip to the last five lines of that section. You'll see a sentence that says "Although molecular targets."

A. Sorry. I was -- where do you want me to go to? Where do you want me?

Q. We're still on Key Characteristic 5.
A. Okay.
Q. And then just above -- just above Key Characteristic 6, you'll see a sentence five lines up that says "Although molecular targets"?
A. Yes.
Q. Okay. And it says -- can you read that sentence for me, please?
A. Sure.
"Although molecular targets and mechanisms likely vary, emerging evidence from AhR ligands" -- so capital H -- sorry. Capital A small H capital R.
Let me start over.
"Although molecular targets and mechanisms likely vary, emerging evidence from AhR ligands, as well as pollutants such as trichloroethylene and mercury, indicates that some exposures can modify epigenetic regulatory mechanisms in immune systems -- in immune cells, which can also skew differentiation."
Q. Okay. So are they -- are they citing TCE -- based on your reading -- strike that.

Based on your reading of this, are they citing TCE as an example of a chemical that meets the Key Characteristic Number 5?

MS. McKEEVER: Objection to form and foundation.

THE WITNESS: Yes, they are citing or -- well, I think it speaks for itself, but I think they are -- they are citing and they are calling into play, into awareness studies that under certain circumstances TCE can modify cellular differentiation under certain experimental contrivances.

TCE can modify immune cells in a manner that demonstrates -- through experimental studies demonstrates modifications of cellular differentiation.

BY MS. GJONAJ:

Q. Okay. And turning to the next page, I am now looking at Key Characteristic 7 --

A. Okay.

Q. -- on page 7, and it says "Alters Effector Function of Specific Cell Types."

Do you see that?

A. I do.

Q. Okay. And then scrolling, going down to the last line in that same column, it starts with "Environmental agents."

It says:

"Environmental agents have also been associated with alterations in helper T-cell functions including" and then it goes on to say "volatile organics, such as trichloroethylene."

Do you see that?

A. Just orient me to the paragraph again. Which paragraph under 7?

Q. The end.

A. 1, 2, 3.

Q. The very last line on the first column. It starts with "Environmental agents have also been associated."

The very bottom line on that page.

A. Got it.

Q. Okay.

A. (Reviews document.)

Q. They appear to be citing to TCE as an example of a volatile organic compound that

meets the key characteristic listed in KC7; is that correct?

A. Yes.

MS. McKEEVER: Objection to form and foundation.

MS. GJONAJ: What time -- what time do you want to take lunch?

MS. McKEEVER: Are you ready for lunch?

THE WITNESS: You want to go another -- you want to go another 15 minutes or so? Go to 1:15. Unless this is natural breakpoint.

MS. GJONAJ: This is probably a natural breakpoint.

THE WITNESS: I can -- okay. Let's do it.

THE VIDEOGRAPHER: Stand by. We are off the record at 12:52.

(Whereupon, at 12:52 p.m., a luncheon recess was taken.)

AFTERNOON SESSION

(2:04 PM)

MICHAEL J. McCABE, JR., PHD

called for continued examination and, having been previously duly sworn, was examined and testified further as follows:

EXAMINATION (CONTINUED).

THE VIDEOGRAPHER: We are on the record at 14:04.

MS. GJONAJ: Dr. McCabe, hand this to you.

I have marked as Exhibit 14 the proposed rule relegating TCE published at 88 Fed Reg 74712 on October 31, 2003.

(Document marked for identification as McCabe Exhibit 14.)

BY MS. GJONAJ:

Q. Have you seen that document before?

A. Yeah. Just correction for the record, though, 2023.

Q. Was that not what I said? Okay. Thank you.

And this document includes the EPA's

rationale and calculations for setting a proposed ECEL for occupational exposures to TCE; correct?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

I'm not sure what this document is that you've put in front of me. So let me hear your question again, please.

BY MS. GJONAJ:

Q. You said you reviewed this document before; correct?

A. As I sit here right now, I'm not sure if I did or didn't.

Q. Okay. Are you aware that the EPA relied on the 2020 risk evaluation to determine the exposure limits it proposed for occupational exposure to TCE?

MS. McKEEVER: Objection to form.

THE WITNESS: I'm not. That's not something that I -- that's not something I undertook in the work that I

did on this case.
BY MS. GJONAJ:
Q. Okay. Do you know what endpoint the EPA determined to be the most sensitive in adults for proposing -- for the purposes of deriving the ECEL on TCE?
MS. McKEEVER: Objection to form.
THE WITNESS: No. Again, that's not something that I evaluated or considered in the conduct of the work that I did on this case.
BY MS. GJONAJ:
Q. Okay. Can you please turn to page 74731.
A. (Reviews document.)
Q. Do you see heading B where it says "ECEL Value of .0040 ppm Based on Immunotoxicity"?
A. Yes, I do.
Q. Okay. And if you scroll or look down towards the bottom of that same column, it says:
"If ambient exposures are kept at or below a minimum of the 8-hour ECEL of .0040 ppm,

EPA expects that workers and ONUs would be protected against not only the chronic non-cancer effects for autoimmunity described in this unit, but also effects resulting from acute non-cancer exposure (immunosuppression) and cancer."

Did I read that correctly?

A. For the most part, yes.

Q. Okay. Looking at this, would you agree that the -- that this document proposed that the ECEL value for occupational exposure to TCE be set at .0040 parts per million?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, I haven't studied and reviewed and considered the entire document in the work that I've done in this case.

I agree with you that the sections of this document that are highlighted we just read -- you just read into the record seem to indicate that, but I don't have a context for the rest of the document.

BY MS. GJONAJ:

Q. Okay. I'll represent to you that in this document they proposed that the -- that the ECEL value of .0040 parts per million be set as the primary -- strike that.

So I'll represent to you that immunotoxicity was listed as the most sensitive endpoint in adults and the EPA used it to derive a proposed ECEL of .0040 parts per million. Okay?

A. Okay.

Q. Do you have any reason to recommend a higher workplace exposure limit than what the EPA proposed based on immunotoxicity?

MS. McKEEVER: Objection to form and foundation.

THE WITNESS: I don't. It's not -- it's not something that I did in context of this case or in other work that I've done.

MS. GJONAJ: Okay.

(Document marked for identification as McCabe Exhibit 15.)

BY MS. GJONAJ:

Q. I'm marking as Exhibit 15 the Iavicoli 2005 paper.

You've cited this paper in each of your reports; correct?

A. I have, yes.

Q. Okay. And this paper looked into the associations between TCE exposure and serum levels of three cytokines, including interleukin-2, interleukin 4, and interferon-gamma; is that right?

A. Yes.

Q. And they saw statistically significant increase in interleukin-2; is that right?

A. Yes.

Q. And a statistically significant increase in interon gamma; correct?

A. Interferon-gamma, yes.

Q. Interferon gamma?

A. Yes. Yes.

Q. And a significantly significant decrease in interleukin 4; is that correct?

A. Yes, and I detailed that in my reports. For example, in the blood cancer report on page 33.

Q. Okay. And turning to the first

page, the abstract, can you please read the conclusion that's the last four lines there?

A. "Conclusions: This study provides the first report on quantitative immune changes induced by occupational exposure to low levels of trichloroethylene and strongly suggests that exposure to this substance alters immunohomeostasis in humans with possible effects on health."

And then it gives the citation.

Q. Okay. And does immunohomeostasis refer to the balance and proper functioning of the immune system?

A. In part, yes.

Q. Okay.

A. And that's the context of it.

Q. Okay.

A. Sorry. Let me hear you. I'm sorry. In part, yes, but let me hear your question again. I apologize.

Q. Sure.

So my question was: Does immunohomeostasis refer to the balance and proper functioning of the immune system generally?

A. Generally, yes. Yes.
Q. Okay. So what they're saying here is TCE altered the balance and proper functioning of the immune system; is that correct?
MS. McKEEVER: Objection to form.
THE WITNESS: Well, again, I think it speaks for itself.
That's exactly what it says, yes.
BY MS. GJONAJ:
Q. Okay. Okay. And in your report, you state that the increased levels of interferon-gamma observed in TCE-exposed workers suggests that rather than -- rather than promoting tumor progression, exposure to TCE could foster a protective immune response; is that correct?
A. A protective antitumor tumor regression as opposed to aligning with the idea where the concept of TCE through the mechanism of changes in the balances of the cytokines would promote tumor progression. I mean, I can -- I can demonstrate to from my report, you know, a further explanation of the, you know, what that means.

Q. Okay.
A. But you --
Q. I'm going to stop you there. Yep. I'm just asking if that is what you wrote in your report.
And then I believe the answer was yes?
A. Yes.
Q. Okay. Can you point me to where in that Iavicoli paper the authors suggest that TCE exposure may project -- protect against tumor progression?
A. I don't think the authors say that in that report, so I can't.
Q. If the statement does not appear in the study, you would agree that your interpretation goes beyond what the authors concluded?
MS. McKEEVER: Objection to form.
THE WITNESS: Yes, in the context of the work that I was doing in this case and my application or my -- yeah, my consideration of this

study and other studies in addressing the purpose that I undertook in this case.

BY MS. GJONAJ:

Q. Okay. And are you aware of peer-reviewed research showing that interferon-gamma can have both pro- and antitumorigenic effects?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes.

BY MS. GJONAJ:

Q. Would you agree that the immune system and tumor development involve nonmonotonic responses meaning --

MS. McKEEVER: Objection. Sorry.

THE WITNESS: Sorry.

MS. McKEEVER: (Laugh).

THE WITNESS: Did you get your question finished?

BY MS. GJONAJ:

Q. Okay. I did not.

Would you agree that the immune system and tumor development involve nonmonotonic

responses? By that I mean the same cytokines like interferon-gamma can have opposite effects depending on dose and timing?

MS. McKEEVER: Objection to form.

THE WITNESS: If that's what you mean by nonmonotonic in the context of the role of the immune system and imbalance -- imbalances in the control of the immune system through CD4+ T-cells, for example, producing cytokines like gamma-interferon, yes.

BY MS. GJONAJ:

Q. And would you agree that drawing conclusions about the potential protective effects of TCE exposure on tumor progression based solely on elevated interferon-gamma levels is an oversimplification of current immunological science?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, yes, but that's not -- that's not what I did here. So -- so yes, I think -- so are you

asking me if I -- if -- if anyone, including myself, was to make a determination based on a single finding, would that be an oversimplification?

Yes.

BY MS. GJONAJ:

Q. So my question was a finding based solely on interferon-gamma levels?

A. Yes.

Q. Okay. If TCE were protective against cancer, would we not expect to see lower rates of cancer among TCE-exposed workers?

MS. McKEEVER: Objection to form.

THE WITNESS: It would depend on a lot of factors.

BY MS. GJONAJ:

Q. What factors would it depend on?

A. Dose of TCE exposure, timing of TCE exposure or modulation of -- of interferon-gamma by TCE exposure, if indeed that's relevant, and during the clinical course of the cancer.

Q. Okay. In your opinion, would the EPA have banned TCE if it were protective against

cancer?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, no, but that's not what I'm saying there. I'm not -- I'm not saying that TCE is protective against. I'm not saying that we should all be taking TCE to protect ourselves from cancer. Right?

BY MS. GJONAJ:

Q. Okay.

A. What I'm saying is if, you know, from a single study and then there's multiple studies that I went through this type of analysis. If we look at the effects of, as Iavicoli did, on gamma-interferon, that -- that's counterintuitive or it does not support the hypothesis, as stated by Dr. Gilbert, that this -- that these types of studies support an immunological mechanism for TCE causing -- which one are we on? NHL? -- NHL, kidney cancer, or bladder cancer.

Q. Okay. And Dr. Gilbert did not cite Iavicoli in her report; correct?

A. She did not.

Q. Okay. I'm going to turn to your blood cancer report.

Page 15. If you could look to the last paragraph about four lines, down there is a sentence starting with "As an example."

Can you read those next two sentences, please?

A. "As an example, the reactive metabolites derived from the glutathione conjugation pathway of TCE and PCE have been shown to elicit downstream biochemical reactions as well as cellular disruption such as mitochondrial dysfunction and oxidative stress, and a myriad of other -- other effects that have been shown in animal in vivo and in vitro studies to be capable of causing genotoxic and nongenotoxic outcomes."

Q. And the next sentence?

A. "These findings provide a conceptual framework supporting the plausibility that such adverse toxic effects could be operant mechanistically in the carcinogenic process, generally."

Q. Okay. So when you say this pathway provides a conceptual framework supporting

plausibility, you're saying it's biologically possible; right?

MS. McKEEVER: Objection to form.

THE WITNESS: Sure, I can -- sure, I mean, cellular biochemical reactions would be a component of biology. So it's biologically possible.

BY MS. GJONAJ:

Q. Now turning to page 54.

In the very first line you say: "There is little -- little doubt that the tumor microenvironment in NHL or leukemia can be shaped by immune and inflammatory processes, which under various circumstances can either have a positive effect (i.e., anti-tumor) or, conversely, an unfavorable outcome (i.e., tumor progression leading to clinical disease)."

Did I read that correctly?

A. You did.

Q. Okay. So you agree under some circumstances immune dysfunction can promote tumor development; correct?

A. Under certain circumstances, the

immune system -- and I guess that includes immune dysfunction -- can promote tumor progression, yes.

Q. Okay. And then jumping to the next paragraph starting with "At best," you say:

"At best, the existing literature concerning TCE immunotoxicity provides a conceptual framework (i.e., background) for formulating a hypothesis that TCE causes NHL or leukemia through mechanisms that involve perturbations of the immune of the immune response or inflammatory processes."

Did I read that correctly?

A. You did.

Q. Okay. So you agree that immune dysfunction can -- I'm sorry. Strike that.

You're saying that it's scientifically plausible; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: I'm saying it's a scientifically -- based on the background information that's known, some -- much -- much of which is in my report and some of which we already

discussed here, that the background information that would serve as the framework for proposing the hypothesis, that's sound and that's plausible.

It's just we don't -- we -- the available science doesn't adequately test the hypothesis to prove one way or another whether the effects of TCE cause up-regulation or down-regulation of immune processes that lead to tumor progression versus tumor regression.

BY MS. GJONAJ:

Q. Okay.

A. And the reason for that is because the effects of TCE haven't been studied directly in the context of NHL or leukemia in terms of immune perturbations.

Q. So, in your view, unless there's direct experimental proof, the mechanism should not be considered?

MS. McKEEVER: Objection to form.

THE WITNESS: No, I'm not saying that.

That would -- that would certainly help, but -- but no, that's -- my -- what I'm saying is not limited to that.

BY MS. GJONAJ:

Q. Okay. So am I -- I just want to make sure I understand.

You're saying that immunotoxicity caused by TCE is a biologic -- is biologically a -- strike that.

You're saying that immune disruption and oxidative stress caused by TCE are plausible mechanisms which can promote cancer, just not specific cancers?

MS. McKEEVER: Objection to form.

THE WITNESS: So -- so just -- just so we are on the same page. Right? So that we're using the words the same way.

Anytime you add "plausible" to the question, in my -- in my view, you're teeing up a hypothesis. Right? Is it a plausible hypothesis?

It's a plausible hypothesis. I don't have any problem with the plausibility of the hypothesis. It's that the hypothesis, when next thing we do after you formulate a plausible hypothesis, based on the background information that we have, for which we all know here that there's a lot. Right?

That once -- once that plausible hypothesis is posed, it has to be tested, and in my analysis, the testing of that plausible hypothesis doesn't lead to a conclusion that through these perturbations of the immune system, TCE is causing NHL, bladder cancer, kidney cancer. That that's a -- that that's a -- that's an operative -- operant -- operant mechanism.

BY MS. GJONAJ:

Q. But you're not saying that it's impossible that it causes these cancers?

A. Of course not.

Q. Okay.

A. It's a plausible hypothesis that

needs to be tested.

MS. GJONAJ: Okay. Marking as Exhibit 16.

(Document marked for identification as McCabe Exhibit 16.)

BY MS. GJONAJ:

Q. This is the Sir Bradford Hill's 1965 lecture; is that correct?

A. Yes.

Q. And you cite to this in your report; correct?

A. Yes.

Q. Okay. If you look at page 298 under Plausibility, first column about two-thirds of the way down.

A. Yes.

Q. He says:

"It will be helpful if the causation we suspect is biologically plausible. But this is a feature I am convinced we cannot demand. What is biologically plausible depends upon the biological knowledge of the day."

Did I read that correctly?

A. You did.

Q. Okay. So do you agree that Hill expressly said that plausibility is not something we should require before making a causal inference?

MS. McKEEVER: Objection to form.

THE WITNESS: You just read it. So, yes, I agree with that.

BY MS. GJONAJ:

Q. Okay.

A. I think -- I think Hill said that about each of the attribution elements under the Hill criteria.

Q. Correct. Okay.

So would you also agree that by Hill's standard, plausible means a mechanism is possible, reasonable, or consistent --

MS. McKEEVER: Object.

BY MS. GJONAJ:

Q. -- with the current scientific understanding, not that it has to be proven?

MS. McKEEVER: Objection to form.

THE WITNESS: I -- yeah, I

don't -- you know, I know that this -- this aspect of Hill criteria and the word "plausibility" has been -- has been debated and has evolved over time, which is consistent with also what Hill is saying here, which is what is biologically plausible depends on he biological knowledge of the day. Right?

So I think in -- in my understanding and in my practice and the work that I do, as much as I'm aware of Hill criteria and plausibility and very much aware of what he's saying and what was said in this 1965 document, you know, I think the concept of plausibility has evolved more to be in aligning with what I said earlier.

That plausibility means that it's a hypothesis that -- that, you know, that is possible, but with the -- certainly since 1965, the advances that have been made in molecular and cellular biology and the contributions of that to molecular epidemiology has really changed

what scientists, like myself and others who are working in this litigation, think about plausibility.

MS. GJONAJ: Okay. Marking as Exhibit 17.

(Document marked for identification as McCabe Exhibit 17.)

BY MS. GJONAJ:

Q. This is the Fedak 2015 paper that I believe you cited to in your report regarding the modified Bradford Hill criteria --

A. Yes.

Q. -- is that correct?

Can you turn to page 5.

A. I'm there.

Q. I'm reading from under Criteria 6, about four lines down it says:

"Plausibility has historically been judged based on the presence of existing biological or social models that explain the association of interest. Hill's criterion of plausibility is satisfied if the relationship is consistent with the current body of knowledge regarding the etiology and mechanism of disease."

And then he goes on to say:
"Hill admitted that this interpretation of biological plausibility was dependent on the current knowledge of the day."
Do you see that?
A. I do.
Q. Okay. So if a proposed mechanism is consistent with what we know about immunotoxicity in carcinogenesis, even though not proven, it would still meet the plausibility criterion under Hill?
A. No.
MS. McKEEVER: Objection to form.
THE WITNESS: No, that's not what that means.
BY MS. GJONAJ:
Q. What --
A. That's not even close to what that means.
Q. What does it mean?
A. It means just what it says there. Is that --
Q. Okay.

A. -- is what we -- I think the section Hill criterion -- "Hill's criterion of plausibility is satisfied if the relationship is consistent with the current body of knowledge regarding the etiology and mechanism of disease."

So in that -- in that series of words "etiology and mechanism of disease" lies a lot of interpretative consideration about, well, what are the true mechanisms that cause the disease? What do we know about -- it's not -- it's not is it consistent with it? Is it plausible? Is it possible? Is it, you know. Does the -- does the state of the science support that the etiology, the cause of the disease is -- is due to a specific mechanism.

Q. Okay.

A. Not a possible mechanism but a specific mechanism and not --

Q. So?

A. Sorry.

And not a generalizable mechanism.

Q. So have you cited to any papers that are inconsistent with the current body of knowledge regarding the etiology and mechanism of

disease in your report?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't think so, no.

You know, let's hear that. Let me -- maybe you can ask me that question so -- so that -- yeah, I want -- can you rephrase that question?

BY MS. GJONAJ:

Q. Well, I'm reading directly from the Fedak paper.

A. Okay.

Q. And he says:

"Hill's criterion of plausibility is satisfied if the relationship is consistent with the current body of knowledge regarding the etiology and mechanism of disease."

And I am asking if you cited to any studies that are inconsistent.

MS. McKEEVER: Objection to form.

THE WITNESS: Oh, right.

So I think I studied -- I

cited some many studies where the mechanism -- the mechanisms gleaned -- the mechanisms of immune perturbation gleaned from those studies are inconsistent with the etiology of the disease.

So I guess I turn my answer around. It wasn't no. It's a yes. The answer is yes.

BY MS. GJONAJ:

Q. Okay.

A. That's the whole -- that's the whole crux of my argument and my opinions in this case.

Q. Can you explain how that's inconsistent? I'm not sure I understand.

A. We know -- we scientists, right, we all of us if you want it.

Q. Uh-huh.

A. Humans, who have spent the time to try to understand, know that the immune system plays a role in the etiology of non-Hodgkin's lymphomas. Right? So -- so that's -- that's known. That's well-established.

We know that it's very complex, and

we know that in that complexity in our attempts to simplify it, right, there are protumorigenic and antitumorigenic events that occur.

We also know that when you bring TCE into the analysis that TCE -- the intersection between TCE immune perturbation, whether it be up or down, has not been studied directly in the contexture of non-Hodgkin's lymphoma. Right?

So, therefore, we have to assess mechanistic studies from other context to see if they apply to the etiology of non-Hodgkin's lymphoma, and my analysis and my reports demonstrate that they don't.

Q. So you've said that we know that immune suppression can increase the risk of NHL --

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. -- correct?

A. I haven't said that. Right? That's my -- that's the jumping -- that's the "jumping in" point for me. Right? To -- that is -- that is a consideration. That other -- that other scientists and regulatory -- other scientists on

both sides are tasked in this case and regulatory agencies, as we have gone over here in detail today --

Q. Okay.

A. -- have indicated.

Q. Do you have reason to believe that immunosuppression does not increase the risk for NHL?

MS. McKEEVER: Objection to form.

THE WITNESS:

That's -- that's -- that's such a open-ended vague statement that -- so it depends. Right? It depends.

We know -- scientists know that people who are -- and I indicated this in my report. We know that people who have congenital deficiencies in their immune system are, you know, have higher frequency -- frequency of development of non-Hodgkin's lymphoma.

We don't know that the immune suppression, if indeed it is immune suppression (indicates) caused by TCE,

causes non-Hodgkin's lymphoma.

We know that there are some data under some circumstances that one could lead to the conclusion that TCE is immunosuppressive, but we just don't know that that is -- that that context in those studies is relevant to non-Hodgkin's lymphoma, for example.

BY MS. GJONAJ:

Q. Okay. So do you agree that TCE is immunotoxic?

MS. McKEEVER: Objection to form.

THE WITNESS: It depends. Under certain circumstances it is, but -- but there, you know, as -- right, potentially it is under certain circumstances.

BY MS. GJONAJ:

Q. All right. And the --

A. The question is -- the critical question, whether it's yours or not, -- I'm going to get it on the record -- is, is that immunotoxicity relevant to the etiology of

non-Hodgkin's lymphoma.

Q. Okay. I understand. I'm trying to break it down to make sure that I -- I see where you're going, but I want to try to break it down to make sure that I understand and that we get it on the record clearly.

So if you could just answer the question: Does TCE cause immunotoxicity?

A. It depends.

Q. Okay. And it depends on what?

A. Circumstances. What -- what immunological, you know, response, outcome we're looking at, what doses are. A variety of things.

Q. Okay. So the EPA found TCE to be immunotoxic and so much so that it was the most sensitive endpoint, according to the Federal Register that we looked at earlier today; right?

A. Right.

Q. Do you have any studies or any reason to disagree with the EPA?

A. I don't.

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Okay.
A. I don't and I don't have any reason to. The EPA is entirely different focus, as I understand it, than what I'm doing in this case.
Q. Okay. So sitting here today, you cannot say that TCE is immunotoxic?
MS. McKEEVER: Objection to form.
THE WITNESS: It depends.
BY MS. GJONAJ:
Q. Okay. At some level it is immunotoxic?
A. At some level --
Q. Okay.
A. -- and in some circumstances it is immunotoxic, and so the EPA, as I understand what the EPA does, they act on that in establishing regulatory policies. They use that science as a mechanism of or as a -- as a piece of information, right, to -- for what they do in terms of setting regulatory policy.
Q. Okay. And are you aware that the EPA used that Federal Register's proposed ECEL of .0040 parts per million based on immunotoxicity to

ban -- ban TCE entirely?

MS. McKEEVER: Objection to form.

THE WITNESS: It's a regulatory policy. Yes, I'm aware of it.

BY MS. GJONAJ:

Q. Okay. Are you aware of the EPA banning any other chemicals?

MS. McKEEVER: Objection to form.

THE WITNESS: I'm sure the EPA has banned lots of chemicals. As I sit here --

BY MS. GJONAJ:

Q. Can you say one?

MS. McKEEVER: Objection to form.

THE WITNESS: I can't as I sit here. I'm not -- I'm not evaluating what the EPA is doing in banning chemicals. It's not part -- it's not part of what I've done in this case. It's not part of what I do.

Hasn't EPA banned DDT? I

don't know. I just -- I don't know the answer to that.

BY MS. GJONAJ:

Q. You think that the EPA has banned DDT?

A. I don't. I'm telling you I don't know what the answer is.

Q. Okay.

A. What I'm telling you is the purpose of the work that the EPA does is different than the work that I do.

Q. Okay. So would you agree that TCE at some level is immunotoxic?

MS. McKEEVER: Objection to form.

THE WITNESS: And it still depends on what's -- immunotoxic in what way? In what immune endpoints? In what?

BY MS. GJONAJ:

Q. At what point does it become immunotoxic?

MS. McKEEVER: Objection to form.

THE WITNESS: Under -- under

circumstances where, you know, experimentally it's been shown to be immunotoxic. That it has a toxic effect on an immune endpoint.

BY MS. GJONAJ:

Q. And you don't know what that is?

MS. McKEEVER: Objection to form.

THE WITNESS: I think I -- I think I detailed a lot of them in my -- my report.

BY MS. GJONAJ:

Q. Does immunosuppression lead to an increased risk of leukemia?

MS. McKEEVER: Objection to form.

THE WITNESS: I think you already asked me that.

My answer to that was, it's an extremely open-ended vague question that, yes, under -- it depends. Under certain circumstances, immunosuppression has been tied as a cause -- causative link or risk factor for NHL.

BY MS. GJONAJ:

Q. In your report, I believe you say that there's -- strike that.

In your report, you criticize Dr. Gilbert for not citing to an on point study regarding TCE immunotoxicity causing each of the four cancers that we're discussing today; right? Is that right?

A. Sounds --

Q. Okay.

A. Sounds right.

Q. So help me walk through what would actually be required to prove what you're asking for.

Here's my understanding.

So first you would need a group of humans exposed to TCE; correct?

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. And then -- let me finish my question, please?

MS. McKEEVER: Sure. I thought you were finished.

BY MS. GJONAJ:

Q. So first you would need a group of humans exposed to TCE. Then we would need to identify what immune changes have been in those people. Then to prove causation, we would actually need to block those immune effects from one of those groups; right?

MS. McKEEVER: Objection to form.

THE WITNESS: (Pause).

BY MS. GJONAJ:

Q. Well, let's stop there.

To your knowledge, is there a way to selectively block TCE's immunotoxic effects?

MS. McKEEVER: Same objection.

THE WITNESS: In certain circumstances it depends and yes.

BY MS. GJONAJ:

Q. There is a way to selectively block TCE's immunotoxic effects?

A. There is an experimental way that has been shown that an immunotoxic effect of TCE can be blocked, can be prevented.

Q. And would that require either

genetic manipulation or some sort of immune modulating therapy to do that, or how is that done?

A. You're --

MS. McKEEVER: Objection to form.

THE WITNESS: You're asking me about experiments that Dr. Gilbert herself did or Dr. Gilbert and Sarah Blossom together did. Right?

They showed that if they used CYP1A1 knockout mice that they exposed to TCE that they didn't get autoimmune disease in the autoimmune-prone mice. Right? They showed. So that's a way of blocking TCE metabolism and the outcome.

They showed that.

BY MS. GJONAJ:

Q. They -- they -- let me stop you there.

They blocked TCE's immunotoxic effects, or they exposed some to TCE and compared them to the others, to the other mice?

A. Well, I mean, sound -- sound

experimental design would have comparison numbers. Right?

Q. Right.

A. So the question is -- so what Blossom and Gilbert and others have shown in animal models of disease of autoimmune disease, right, not in animal models of cancers, but that's a different thing. Right?

But what they've shown in animal models of or mouse models of autoimmune-prone mice that if they expose them to TCE that they get an autoimmune disease outcome and can and they have measured that that effect of TCE on exacerbating or initiating -- what's the word I want to use? Inducing -- inducing the autoimmune disease is through immune-mediated mechanisms.

Q. Okay.

A. And they also showed -- wait. I'm not done.

And they also showed, to your question is, can you specifically interfere with that? Yes, by interfering with the metabolism of TCE.

Q. Okay. I'm going to strike all of

that as nonresponsive.

MS. McKEEVER: I'm going to object to that. You asked a very broad open-ended questions, and he was trying to explain.

BY MS. GJONAJ:

Q. My question was: Is there a way to selectively block TCE's immunotoxic effects?

A. Yes, and I just gave you an example of a way.

Q. Okay. So in the mice studies, you are saying that she blocked the immunotoxic effects -- she -- strike that.

You're saying in the Gilbert studies, she exposed a group of mice to TCE?

A. Yes.

Q. And then blocked those immunotoxic effects?

MS. McKEEVER: Objection to form.

THE WITNESS: In -- so she has four groups. Right?

BY MS. GJONAJ:

Q. Right.

A. She has four groups. So there's two variables that are changing. TCE or not and CYP1A -- CYP1E1 expression or not.

Q. Okay. You're not aware of any way to block TCE's immuno -- strike that.

To your knowledge, is there any way to block TCE's immunotoxic effects in humans?

A. Which --

MS. McKEEVER: Objection to form.

THE WITNESS: Which immunotoxic effects on humans?

So the answer to your question is no, and I can't think of an immunotoxic effect in humans to -- to block.

BY MS. GJONAJ:

Q. So if there were a hypothetical drug that could block immunotoxic effects, we would -- you would then be able to track both groups for a decade or so and compare cancers; right?

MS. McKEEVER: Objection to form.

THE WITNESS: Actually, let

me. So --

BY MS. GJONAJ:

Q. Okay.

A. So sure. I mean, would -- so. Hang on.

Whether you'd be able to do it for -- you know, what the period of time you'd be able to do it. I mean, these are all details that it's a hypothetical. So I can't -- I can't answer this.

So this is -- this goes back to -- what you're asking me about goes back to circa 1905 with Koch's postulates -- Koch, K-o-c-h -- right, which the way you show that in a sequence of A causes B causes C, that you come up with experimental approaches or therapies that show that if -- if you think that A causes B causes C, then you either interfere with A causing B or overexpress B.

I mean, these are all -- there's lots of clever experimental ways and clinical ways to do it, but it all comes down to that very simple concept.

Q. Okay. In humans, there is no --

using your example, in humans, there is no way to stop A being TCE from causing B immunosuppression?

MS. McKEEVER: Objection to form.

THE WITNESS: Sure, there is. Don't -- don't have people exposed to TCE.

BY MS. GJONAJ:

Q. Okay.

A. Or don't have people exposed to harmful levels of TCE. Right?

Q. But if you're trying to figure out if it's the immunotoxic effect that is the mechanism; right?

A. Right.

Q. You would have to expose the group to TCE and then somehow block that immunotoxic effect?

A. Well, we can't -- we can't do that.

MS. McKEEVER: Objection to form.

THE WITNESS: Sorry. We can't do that right.

BY MS. GJONAJ:

Q. Right.
A. Because that's unethical.
Q. Okay.
A. So we rely on experiments of, I guess I would say, of convenience that people are exposed occupationally and what have you to environmental -- either occupational or environmental sources of TCE.
Q. But that's been done; correct?
MS. McKEEVER: Objection to form.
THE WITNESS: Well, that happens.
BY MS. GJONAJ:
Q. Right.
But you're saying that's not on point?
MS. McKEEVER: Objection to form.
BY MS. GJONAJ:
Q. Is that right?
A. I'm saying that's step -- I'm saying that's A.
Q. Okay. So there are EPI studies of

workers exposed to TCE that have shown an increased risk of NHL, is there not?

MS. McKEEVER: Objection to form.

THE WITNESS: I accept that that's a debatable issue that scientists on both sides of this case are charged with assessing that, whether or not the strength of that statement, not me.

BY MS. GJONAJ:

Q. Okay. So are you accepting the opinions of Dr. Shields and Dr. Goodman in stating that TCE is not causally associated with NHL?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

We're back to the "jumping in."

BY MS. GJONAJ:

Q. Yes. Okay.

A. We're back to the "jumping in" statement, page -- page 6.

Page 6 of my NHL report where I

acknowledge that there are a string of plaintiff experts -- Gilbert, Gondek, Bird, Mallon, Felsher and Hu -- who have asserted that epidemiological studies support an association between NHL or leukemia and various Camp Lejeune VOCs alone or in combination with other, and that others -- Dr. Julie Goodman and Dr. Peter Shields -- are rebutting this assertion.

My "jumping in" place starts for me addressing the question how.

Q. Okay. You mentioned studies of TCE-exposed workers and then following to see if there is an increased risk of NHL in those TCE-exposed workers.

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Correct? We just spoke about that.

A. I mean, I'm -- I'm aware that such studies exist.

Q. Okay.

A. Yes.

Q. But you --

A. I'm aware -- I'm aware that there

are studies that suggest that that's not true.

Q. Okay. Okay. Fair.

But in your example that you used before, wouldn't that be jumping from A to C --

MS. McKEEVER: Objection.

BY MS. GJONAJ:

Q. -- right?

And skipping B regarding the mechanistic testing the actual mechanism?

MS. McKEEVER: Objection to form.

THE WITNESS: So yes, but we only got to A. So right. So there could be -- so you got it. Where I think we're going to -- let me see if this clarifies things so we're on the same page. Right?

So A is the exposure. C is the disease. The disease could be Z because there could be multiple steps in between. But just to make it the simplest, right, is that you've got an exposure and you have a disease. A and B and there's some mechanism -- sorry. A and C and there's some mechanism between

B. Right?

BY MS. GJONAJ:

Q. Uh-huh.

A. So -- so -- so you can -- you can -- it's harder to study that and control it in human populations. Right? So what do you do? You study it in -- you do a lot of things and that's the point. There's multiple ways that you -- that I can think of as a scientist to do it, which haven't been done. Right?

So you do it in an animal model. You do it in an animal model of NHL. You do it in animal model of kidney disease. Not in an animal model of autoimmune disease. Right? You do it in an animal model of kidney disease, for example, and say, hey, can I get -- just like Dr. Gilbert with the autoimmune-prone mice. Right?

We know that autoimmune diseases are complex multifactorial diseases. Multifactorial meaning that there are extrinsic factors and intrinsic factors. Right?

The autoimmune-prone mice are genetically programmed in some way that we don't necessarily have to understand, but we know that

they are genetically programmed that as they age, they're going to get the disease. But if you give them A, if you expose them to TCE, you could accelerate that through immunological mechanisms.

None of that type of research has been done with cancers. So we don't have -- we don't have the animal disease component to get a causation through that. Right?

So now we come back to the humans and we say, well, what are believed to be the relevant steps in causing A to C in humans. Right? And are any -- are any of those informed by work that's been done in mice? Or are any of them on point and relevant if we borrow from other circumstances because it hasn't been studied in the context of the cancer. Are -- do they align with the mechanisms, the known mechanisms of the disease through the immune system?

And as I've indicated in my reports, they don't.

Q. You're -- okay.

But we went over quite a few examples in your report earlier where you say that it's -- I'm paraphrasing, you didn't use these

words -- but that it's possible, right, that the --

A. That it's a plausible hypothesis.

Q. Okay. And you're saying that this has not been tested in humans; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Hasn't been tested anywhere. Hasn't been tested in animals.

BY MS. GJONAJ:

Q. Okay. But whether --

A. Adequately.

Q. Whether TCE is immunotoxic has been tested in humans and in animals; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Yes.

BY MS. GJONAJ:

Q. Okay.

A. It's just the issue is it -- it depends. Is that -- is the immunotoxicity (indicates) that's been revealed from other studies outside the context of NHL, bladder

cancer, kidney cancer, is it relevant in the etiology or the findings of those immunotoxic effects of TCE. Are they relevant mechanistically to kidney cancer, bladder cancer, and NHL or leukemia, and the answer is they are not.

In part the answer that it's not is, these are very complex issues. It's not a matter of just, well, is it immunotoxic? Well, you know, sure, under some circumstances, but is the -- is the immunotoxic mechanism, any of the 9 KCs that came from the Dori Germolec paper. Right? Have they been shown to be relevant to the findings, the outcome to align with what's known about the mechanism of disease in humans, and the answer is no.

Q. Okay. There have been studies or are you aware of any studies that have looked at whether immunosuppression causes NHL?

A. Yes, and I cite them in my report.

Q. Okay. So there are studies that look -- both animal and human -- that look at whether TCE causes immune suppression; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Let me hear the question again. Sorry.

BY MS. GJONAJ:

Q. There are studies, both human and animal studies, that have looked at the association between TCE and immunotoxicity and found a positive association; is that correct?

MS. McKEEVER: Same objection.

THE WITNESS: The -- the answer to that question is yes.

BY MS. GJONAJ:

Q. Okay. And there are studies that have found that immune suppression can lead to an increased risk of NHL; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: Under certain circumstances, yes.

BY MS. GJONAJ:

Q. Okay. So we have studies that link A and B?

MS. McKEEVER: Objection to form.

THE WITNESS: We don't.

BY MS. GJONAJ:

Q. TCE immunotoxicity?

A. That's not. So -- so but -- but it's not T -- B isn't -- B isn't broadly immunotoxicity. Right? B is some mechanism. Right? Immunotoxicity is this broad thing. Right? That can lead to immune stimulation, immunosuppression, no effect. Can have effects on immune events that we may characterize as immunotoxic that don't have anything to do with B. Right?

Yeah, it's immunotoxic, but the immunotoxicity doesn't inform A to B to C. Just means it's immunotoxic in a different context.

Q. Is it -- okay. That's -- I think we're -- okay.

There are studies that show A to B that it's immunotoxic. I'm not talking about a disease but there are --

A. Might be your B -- your B is immunotoxic. My B is not immunotoxic.

Q. What is your B?

A. Mechanism of disease. Some biochemical cellular event tied to the disease.

Q. Is it the same mechanism that's tied to immunosuppression?

MS. McKEEVER: Objection to form.

THE WITNESS: Doesn't have -- doesn't have to be. It could be lots of things. Can it be? Yes. But it hasn't been shown to be. It hasn't been shown to occur in the context of A to B to C.

BY MS. GJONAJ:

Q. Okay. In your report, you state that benzene exposure at high levels may cause AML in part through immune mechanisms; is that right?

A. Yes.

Q. Okay. What was the basis for that opinion?

A. Benzene is known to be toxic to the bone marrow to the hematopoietic system. It's known through that mechanism to cause MDS, myelodysplasia syndrome, at high levels, and through those toxic events happening in the immune -- in the bone marrow and in the hematopoietic system has been tied to genotoxic

events leading to AML.

Q. Was there a single study --

A. So sorry.

So there we have A to B to C. Or we have A to B to C to D to disease. Right? That we have. It's a very specific. That's the point. We have a very specific series of events that can be tracked to link A to AML.

Q. Have similar studies not been done on testing that same association between TCE immunotoxicity or immunosuppression and CLL?

MS. McKEEVER: Objection to form.

THE WITNESS: My understanding of those experiments is either (A) they haven't been done or, if they have been done, they haven't provided the clear-cut interpretation and explanation that we have with benzene and AML or high dose benzene and AML.

BY MS. GJONAJ:

Q. Okay.

MS. McKEEVER: Take a break?

THE WITNESS: I'm good right

now.

MS. GJONAJ: You need a break?

MS. McKEEVER: I was just checking.

BY MS. GJONAJ:

Q. Okay. Dr. McCabe, would you agree that genotoxic means something can damage our DNA -- something that can damage our DNA or chromosomes?

MS. McKEEVER: Objection to form.

THE WITNESS: No.

BY MS. GJONAJ:

Q. What does genotoxic mean?

A. Genotoxic means that it's not that it can but that it did.

Q. Okay. And is mutagenicity -- mutagenicity a more narrow concept that refers to permanent changes in a DNA sequence?

MS. McKEEVER: Objection to form.

THE WITNESS: As I understand it, yes.

BY MS. GJONAJ:

Q. Okay.
A. So not -- so another way of saying that, in my mind, is not all genotoxic events lead to mutations.
Q. Okay. So a chemical doesn't need to be mutagenic to be considered a carcinogen; correct?
A. I believe that's correct.
Q. Okay.
A. Or to contribute to the carcinogenic process.
Q. Okay. And do you agree that nongenotoxic substances do not direct -- that do not directly damage -- strike that.
Nongenotoxic substances that do not directly damage the DNA do not damage the -- I'm going to get it.
Nongenotoxic substances that do not directly damage the DNA can also influence cellular processes; is that right?
MS. McKEEVER: Objection to form.
THE WITNESS: Yes.
BY MS. GJONAJ:

Q. Okay.
A. Yes. I'm loud enough.
Q. (Laugh).
And a nongenotoxic substance can also be a carcinogen; is that correct?
MS. McKEEVER: Objection to form.
THE WITNESS: Or -- or contribute to the carcinogenic process. I don't want to get into a semantic thing for how some folks define carcinogen versus others.
BY MS. GJONAJ:
Q. Okay. Have you ever treated a patient with cancer?
A. No. I'm not a physician.
Q. Okay. Would you agree that immunotherapy is used to treat cancers?
MS. McKEEVER: Objection to form.
THE WITNESS: In some circumstances, yes.
BY MS. GJONAJ:
Q. Kidney cancer?

A. In late-stage, metastatic advanced renal cell kidney cancer, yes.
Q. Bladder cancer?
A. Yes.
Q. Leukemia?
A. Yes.
Q. Non-Hodgkin’s lymphoma?
A. Yes.
Q. Okay.
A. Generally speaking, yes --
Q. Okay.
A. -- to all of those.
Q. So those therapies work by restoring the function of the immune system; is that right?
MS. McKEEVER: Objection to form.
THE WITNESS: That's -- that's one mechanism at least that comes to mind that I would agree with you on. Sure.
BY MS. GJONAJ:
Q. Okay. So does --
A. Hold on. Yeah, so there's -- but that's not the only mechanism, but that is one

mechanism by which immunotherapies work in combating or as treatments as, yeah, as therapy modalities for cancer treatment, yes.

Q. All right. So doesn't that support the conclusion that the immune system -- that when the immune system is dysfunctional or suppressed, cancer is more likely to develop or persist?

MS. McKEEVER: Objection to form.

THE WITNESS: It supports what I think I kind of alluded to here particularly, for example, in kidney cancer, that progression to advanced metastatic disease progresses -- progresses through immune dysfunction -- dysfunctions that can be targeted by immunotherapies and are targeted by immunotherapies.

BY MS. GJONAJ:

Q. Okay. So would you agree that if restoring immune function helps eliminate cancer, then that implies immune suppression would play a role in promoting cancer?

MS. McKEEVER: Objection to

form.

THE WITNESS: No, that's not what that means.

BY MS. GJONAJ:

Q. Okay. Okay. I'm going to turn to your kidney cancer report.

So in your report, in your kidney cancer report, you state that there is some evidence that TCE causes kidney cancer in rodents through a genotoxic mechanism; is that right?

A. I believe that is right and I believe that is in my report, yes.

Q. Okay. But then you say there's uncertainty as to whether that applies to humans; is that right?

A. Yes.

Q. Okay. Can we go back to Exhibit 12.

Is that the EPA 2020?

A. Okay.

Q. Okay. If you could flip to page 252.

A. Got it.

Q. Can you read the first line under Genotoxicity, please?

A. "The predominant mode of action (MOA) for kidney carcinogenicity involves a genotoxic mechanism through formation of reactive of GSH metabolites (for example, DCVC, DCVG)."

Keep going?

Q. Then it goes on to say "MOA is well-supported"; is that correct?

A. Yes.

Q. Do you disagree with the EPA statement?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't. I believe it's -- I don't disagree with that that's what it says.

BY MS. GJONAJ:

Q. Can you read the EPA's statement immediately following that where it says "As toxicokinetic"?

A. This mech -- mechinable -- sorry.

"This MOA is well-supported, as toxicokinetic data indicates that these metabolites are present in both human blood and urine, and these metabolites have been shown to be

genotoxic both in vitro and in animal models -- sorry -- in animal studies demonstrating kidney-specific genotoxicity."

And then it goes on to --

Q. You can stop.

A. -- cite the USEPA 2011 as well as the Cichocki study, which is part of Larry Lash's lab.

Q. Okay. Would you agree that the metabolites DCVC and DCVG have been detected in blood and urine?

A. In humans exposed to TCE, yes.

Q. And you're not claiming that these metabolites are not genotoxic, are you?

MS. McKEEVER: Objection to form.

THE WITNESS: I am -- I am -- I am aware that there are studies that show under certain circumstances, as it indicates here, these are genotoxic substances. They are genotoxic metabolites of TCE.

BY MS. GJONAJ:

Q. And if you look at the bottom under

Conclusion, they say:

"There is clear evidence of a genotoxic MOA for kidney cancer."

Did I read that correctly?

A. You did.

Q. That does not seem like an ambiguous statement, does it?

MS. McKEEVER: Objection to form.

THE WITNESS: It does not seem like an ambiguous statement made in this document for the purposes of what the EPA was doing in the context of what they did in November of 2020 for their Risk Evaluation for Trichloroethylene.

BY MS. GJONAJ:

Q. Dr. McCabe, do you believe that a reliable epidemiological study is required in order to conclude that a chemical causes a particular disease?

MS. McKEEVER: Objection to form.

THE WITNESS: A hundred percent, no.

BY MS. GJONAJ:

Q. And are you familiar with the IARC guidelines for evaluating carcinogenic hazards?

A. Are you asking me about the guidelines that ultimately yield IARC's determination that something is Group 1, Group 2A, Group B?

Q. Correct.

A. Yes, I'm familiar with that.

Q. And --

A. Yes. Yes, I'm familiar with that.

Q. Thank you.

Are you aware that IARC can classify a chemical as a carcinogen based on mechanistic data even in the absence of sufficient human or animal data?

MS. McKEEVER: Objection to form.

THE WITNESS: Sorry. Let me hear that again, please.

BY MS. GJONAJ:

Q. Are you aware that IARC can classify a chemical as a carcinogen based on mechanistic data even in the absence of sufficient human or

animal data?

MS. McKEEVER: Same objection.

THE WITNESS: Without revisiting the guidelines myself, as I sit here, I think if IARC does that, it's uncommon that they do that. I'm not so sure that they do it to begin with.

BY MS. GJONAJ:

Q. Dr. McCabe, do you use the term "equipoise" in your everyday practice as a scientist?

A. I do not.

Q. Have you ever seen it in a published or peer-reviewed study?

A. I'm not sure about an peer-reviewed study like a peer-reviewed paper from a journal. My familiarity with the term comes from the ATSDR document, which I think you told me earlier was peer reviewed, or you represented to me earlier it was peer reviewed.

MS. GJONAJ: Okay. I'm handing you Exhibit 18.

(Document marked for identification as McCabe Exhibit 18.)

BY MS. GJONAJ:

Q. This is a 2017 study by Julie Goodman and some of her colleagues titled "Short-term ozone exposure and asthma severity: Weight-of-evidence analysis."

Have you seen that document before?

A. Well, first of all, it's a 2018 -- 2018 study.

Q. Whoops.

A. And...

(Reviews document.)

I'm not sure if I've seen it before or not.

Q. Could you read the last sentence of the abstract, please, starting with "Taken together"?

A. "Taken together, the weight of evidence indicates that there is at least an equal likelihood that either explanation is true, that is, the strength of the evidence for a causal relationship between short-term exposure to ambient ozone concentrations and asthma severity is 'equipoise and above.'"

Q. Okay. Do you know what the legal

standard is in this case?

MS. McKEEVER: Objection to form.

THE WITNESS: I don't know. Yeah, I'm not -- I'm not certain about legal standards. I don't use legal standards in what I do. So the answer to your question is no, I'm not.

BY MS. GJONAJ:

Q. Okay.

A. I don't have any relevant expertise about the legal standard in this case.

Q. No one has ever told you what the legal standard is in this case?

MS. McKEEVER: Objection to form.

THE WITNESS: I think I read in Dr. Gilbert's reports some information about what may be the legal standard, but I really -- I didn't really pay too much attention to that because it doesn't mean anything to me.

BY MS. GJONAJ:

Q. Okay. And I assume you've never

seen the statute relating to the Camp Lejeune Justice Act; is that right?

A. I may have seen it, but, again, it's just that's the guiding statute for the case, not the work that I did in the case, as I understand.

MS. GJONAJ: Okay. Put that aside.

(Document marked for identification as McCabe Exhibit 19.)

BY MS. GJONAJ:

Q. Okay. I handed you what has been marked as Exhibit 19 and it's a copy of the Lan study published in "Carcinogens" in 2010?

A. Correct.

Q. And it's titled "Occupational exposures to trichloroethylene is associated with a decline in lymphocyte subsets and soluble CD27 and CD30 markers"; is that right?

A. That's the title, yes.

Q. Have you reviewed this study before?

A. As I -- yes, and I indicated that in each of my reports.

Q. Okay. And this was a study with 80 TCE-exposed workers and 96 controls; is that

right?

A. (Reviews document.)

Q. I think it's four or five lines down in the Abstract.

A. I don't know. I'm looking in the methods.

So, yeah, I mean, I think they have two phases of the study. One was greater than 40 and then you're right. A cross-sectional study of 80 workers currently exposed to TCE compared to 96 unexposed controls.

Q. Okay. In your report, you describe the lymphocyte reductions observed in Lan 2010 as modest.

Can you explain what you mean by that?

A. Not remarkable, not biologically -- not evidencing biological or functional relevance.

Q. All right. Can you turn to the last page of that exhibit, which is Table 2 of the supplemental data.

A. Table 2 of the supplemental data. Yes.

Q. Okay. So the average NK, natural killer cell count, in the control group was 467; is that correct?
A. Yes.
Q. And then in the less -- less than 12 parts per million group, it dropped to 370; is that correct?
A. Well, it was 370, yes.
Q. That's a drop; correct?
A. That's a drop in the number. We don't know --
Q. Okay.
A. -- that the NK cells are dropping.
Q. And then in the equal to or over 12 parts per million, it's 282; is that correct?
A. Yes.
Q. Okay. So that's about a 20 percent increase would you say between the controls in the 12 parts per million?
MS. McKEEVER: Objection to form.
BY MS. GJONAJ:
Q. Approximately.
A. (Reviews document.)

20, 25 percent decrease in the low exposure group less than 12 relative to the control in the number.

Q. Okay. And you would characterize that as modest, a modest decrease?

A. Yes, for the reasons that I stated here --

Q. Okay.

A. -- and in my report.

Q. You would agree that natural killer cells are part of the body's first line of defense in the immune system; correct?

A. Yes, and I indicated that in my report.

Q. Okay. And --

A. In my reports.

Q. Okay. And they -- so they play a critical role in detecting and destroying cells that have become cancerous; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: They can.

BY MS. GJONAJ:

Q. Okay.

A. They are -- they are one cell type that has been shown. They're one cell type that's part of the innate immune system that have been shown to have a function in the early stages of immunosurveillance.

Q. So is it your testimony that losing 20-plus percent of your natural killer cells -- strike that.

Is it your testimony that losing 20 percent of your natural killer cells has no potential consequences on immune function?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, we don't know that the NK cells are lost.

BY MS. GJONAJ:

Q. What is this telling us?

A. Telling us that they're -- telling us the data, as I indicated in my report, in for all of these lymphocyte subsets and NK cells are normal, are within normal limits. So we don't know that -- we don't know that the TCE treatment caused the cells to be lost. We don't know the reason why.

For example, lost in my -- in my mind when I hear you say "lost" it conjures up that the TCE caused NK cells to die.

Q. Okay.

A. Right?

Q. Let me ask that.

A. We don't know that.

Q. Let me ask that differently.

Is it your testimony that a 20 percent decrease in natural killer cell counts has no potential consequences on immune function?

MS. McKEEVER: Objection to form.

THE WITNESS: That we know about. Right? That we know.

And as I explained in my reports, there are no scientific studies that I'm aware of or that any plaintiff experts cited, including Dr. Gilbert, that people at the low end of normal NK cell, CD4+ cell, T-cell numbers, B-cell numbers are immunodeficient relative to people who are at a higher level that's within normal range.

BY MS. GJONAJ:

Q. Okay.

A. The normal ranges for these cell types vary dramatically within the human population.

Q. So you're saying that because they still fall within the normal range --

A. Tells me that they're normal.

Q. -- that?

A. Tells me these people aren't immunosuppressed. They're normal.

Q. And a 20 percent decrease between the exposed and unexposed population doesn't tell you anything --

A. That there's something --

Q. -- is misaligned?

MS. McKEEVER: Objection to form.

THE WITNESS: Tells -- tells -- tells me something I don't -- I don't -- tells me that there's potentially something going on that's statistically relevant but doesn't mean that it's biologically or functionally

relevant, which is essentially the same thing that Dr. Mattigan was saying in his supplement, or one of his reports, that things that are -- that just because something is statistically significant doesn't mean that it's practically relevant.

That's exactly the same thing I'm saying here.

BY MS. GJONAJ:

Q. Okay. And to that point, the decrease in T-cells was statistically significant?

A. Statistic --

MS. McKEEVER: Objection to form.

THE WITNESS: Statistically significant --

BY MS. GJONAJ:

Q. Okay.

A. -- but not -- but not -- but not biologically -- unknown -- unknown biologic relevance.

Q. Okay. The same was true for the NK cells; is that correct?

MS. McKEEVER: Objection to form.

THE WITNESS: As I indicated in my report, the same for T-cells, CD4+ B-cells, CD8+ T-cells, and NK cells.

BY MS. GJONAJ:

Q. Thank you.

And then looking to the Plasma Concentration section at the bottom of that table there?

A. Yes.

Q. SCD27 is a marker for lymphocyte activation; correct?

A. So soluble CD27 and soluble CD30 are markers of lymphocyte immune function in ways that, as I sit here right now, I'm not remembering what those are.

Well here. It's going to be here. Nope. It's going to be here.

(Reviews document.)

Yeah, that part.

Right. So both CD27 and CD30 are what are known as co-stimulation molecules on B and T-cells and, yes, the shedding of those

co-stimulator molecules is involved in lymphocyte activation.

Q. Okay. And for soluble CD27, the controls show 148.79; is that correct?

A. Yes.

Q. And in the less than 12 part per million group, it's 55.30; is that correct?

A. Yes.

Q. And that's a statistically significant decrease?

A. Yes.

Q. And would you say that's a more than 60 percent reduction in soluble CD27?

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Approximately.

A. (Reviews document.)

Well, half of 148 would be what, 70 something. So it's more than half.

Q. Okay. And are there any studies that you are aware of that would state a drop in more than half of soluble CD27 is considered modest?

MS. McKEEVER: Objection to form.

THE WITNESS: No, but to the contrary, I'm not aware of any studies that would say that it's biologically significant or biologically relevant or that what these findings on these particular markers in serum have anything to do with kidney cancer, bladder cancer, or NHL.

BY MS. GJONAJ:

Q. So the authors in this case describe that decline as striking and you call it modest.

So what is your basis for disagreeing with the authors?

MS. McKEEVER: Objection to form.

THE WITNESS: Statistical significance versus biological and functional relevance.

In other words, so what?

BY MS. GJONAJ:

Q. The authors state in the last line of the Abstract:

"Given that altered immunity is an established risk factor for NHL, these results add to the biological plausibility that TCE is a possible lymphomagen."

Do you see that?

A. I do. I commented on it in my report.

Q. Okay. And you disagree with that?

A. I do. I think it's -- I think it's a gross overstatement of the significance, not the statistical significance, but the significance of the findings of this paragraph.

Q. And just so I understand what part of that you disagree with, do you specifically take issue with the idea that immune suppression is a risk factor for NHL?

A. Course not.

Q. Okay.

A. Or that it can be a risk factor for NHL.

Q. Okay. Are you aware of any study or regulatory agency that says immune biomarkers must fall outside of normal clinical ranges to indicate toxicity?

MS. McKEEVER: Objection to form.

THE WITNESS: Sorry. Let me hear it again.

BY MS. GJONAJ:

Q. Are you aware of any study or regulatory agency that says immune biomarkers must fall outside of normal clinical ranges to indicate toxicity?

MS. McKEEVER: Same objection.

THE WITNESS: Yes, I don't think that's something a regulatory agency necessarily would do to begin with because they're really focused on these types of statistical associations in the work that they do and the determinations that they're doing. So -- so, no.

And then as far as any, you know, non-peer-reviewed studies that are not geared towards regulatory science, regulatory assessment, regulatory decision-making, I'm not aware of any that say that.

BY MS. GJONAJ:

Q. Okay.
A. Or don't say that.
Q. Okay.
A. What I can tell you is that, you know, from -- from my experience, these data support that the immune systems of all the individuals in across these studies. I can't say all the individuals because there's -- because we just don't know about all the individuals. We can't say any differences exist between the controls and the exposed.

But across -- and I think I said it probably more artfully in my report because I was careful in what I was saying for that reason, which is that because we don't have the raw data. That's what I'm getting at.

But -- but across the exposure groups, the data in the Lan paper tell me that these people, their immune systems are normal for -- for -- not just because of the data and the different lymphocyte subtypes being within normal ranges and the lack of any other experimental design here to look and see if these people are immunosuppressed.

Q. Okay.
A. But hold on. Let me --
Q. Oh, sorry.
A. Let me capture my -- my thought with where I was going there.
That -- oh, because, you know, from my experience working alongside clinical immunology labs, if we got these type of results in T-cell or B-cell or NK-cell number, we would be interpreting that as these are normal. These -- these people are not immunosuppressed. They are immuno -- there's no evidence that they're not immunocompetent.
Q. So even still within normal limits, a 23 percent drop, which is what they indicate here, in lymphocyte count in a healthy population is not biologically meaningful, in your view?
MS. McKEEVER: Objection to form.
THE WITNESS: If you could keep saying drop, I'm going to have to correct you. Right?
BY MS. GJONAJ:
Q. Okay.

A. We don't know that it's a drop. We know -- we know that the lymphocyte numbers and the different types of lymphocytes were measured in these people, in these different groups, and the results were obtained. They were tabulated, statistics were done on them, and we know that there's a difference. There's a lower number that is statistically significant between the two treatment groups.

Q. Okay.

A. That doesn't mean that they dropped.

Q. And that is not biologically meaningful; correct?

MS. McKEEVER: Objection to form.

THE WITNESS: From -- from what I know because this is not a particularly sophisticated study. Right? We're not -- we're measuring lymphocyte numbers in the periphery in blood. Right?

Most of them weren't activated to begin with under most circumstances and they're not -- has nothing to do with

what's happening in tissues in terms of the immune response. What may be happening in the kidney in the context of kidney cancer, for example. It's just not a very sensitive marker to begin with. That's why it ranges so in the human population.

BY MS. GJONAJ:

Q. I'm sorry. Can we take a short break?

A. Sure.

THE VIDEOGRAPHER: Stand by. We are off the record at 15:45.

(A recess was taken.)

THE VIDEOGRAPHER: We are on the record at 16:21.

BY MS. GJONAJ:

Q. Okay. Dr. McCabe, the EPA 2020 Risk Evaluation for TCE states that the urinary half-life of TCE is just over 50 hours in humans.

Do you agree with that assessment?

A. It's not something I've evaluated that I can agree with you or disagree with you.

(Document marked for identification as McCabe Exhibit 20.)

BY MS. GJONAJ:

Q. And I just handed you what I've marked as Exhibit 20; is that correct?

A. Yes.

Q. The Risk Evaluation on TCE from the ATSDR dated December 2020. If you flip.

A. So just so we have a clean record, it's from the EPA not from the ATSDR.

Q. Thank you. I appreciate it.

If you look to the section Elimination, three lines down it states:

"The half-life of PCE from blood-rich tissues, muscles, and adipose tissue is 12 to 16 hours, 30 to 40 hours, and 55 to 65 hours, respectively."

Did I read that correctly?

A. Yes, I think so.

Q. Okay. So do you agree that all metabolites of PCE, TCE, benzene, and vinyl chloride are eventually excreted in urine?

MS. McKEEVER: Objection to form.

THE WITNESS: No.
BY MS. GJONAJ:
Q. I think I asked that question wrong. Do you agree that some metabolites of PCE, TCE, benzene, and vinyl chloride are eventually excreted in urine?
A. Yes.
Q. Thank you.
So if an individual were drinking and showering daily for six months using water contaminated with TCE and PCE, do you agree that the person would continuously retain TCE and PCE metabolites in their body over that entire exposure period?
MS. McKEEVER: Objection to form.
THE WITNESS: That's not something that I evaluated in this case. So I don't have an opinion on that that would allow me to agree or disagree with you.
BY MS. GJONAJ:
Q. You state that harmful chemicals in metabolites can accumulate in the urine and damage

the bladder lining triggering carcinogenic initiating events; is that correct?

A. (Reviews document.)

I stated that in my bladder cancer report, for example, in the context of the following:

"The mode of action underlying smoking risk and bladder cancer appears to be the accumulation of harmful chemicals and metabolites in the urine, which may damage the lining of the bladder, resulting in carcinogenic initiating events."

So I stated that in my report in the context of what's known about metabolites and chemicals associated with cigarette smoking.

Q. Correct.

And well -- strike that.

Can you point to any specific study supporting this accumulation mode of action for smoking?

MS. McKEEVER: Objection to form.

THE WITNESS: Not as I sit here, no.

BY MS. GJONAJ:

Q. Okay. Would you agree that the opinion that TCE and PCE metabolites excreted in urine could sit in the bladder and initiate a carcinogenic event conceptually similar to the -- your smoking hypothesis here?

MS. McKEEVER: Objection to form.

THE WITNESS: Well, I don't think it's a hypothesis here. I think it's a statement.

And I think it's really an apples and oranges comparison, as I -- as I -- as I hear what you're asking me but -- yeah, that's -- that's my answer.

BY MS. GJONAJ:

Q. Would a fat soluble solvent like PCE persist in the bladder lining?

MS. McKEEVER: Objection to form.

THE WITNESS: No, my understanding is that that does not happen appreciably.

BY MS. GJONAJ:

Q. Your understanding is that PCE cannot persist in the tissues of the bladder lining; is that right?

A. It's not that it cannot. I just don't think it does so appreciably.

Q. But again --

A. And I'm not -- I'm not -- I'm not aware of any studies that say that it can or cannot. I just, based on the chemistry of PCE and the toxicokinetics of PCE, I don't -- I don't -- I don't see that being something that happens.

Q. Okay. So sitting here today, you can't say for sure one way or the other?

MS. McKEEVER: Objection to form.

THE WITNESS: I would -- I would err more on that I'm pretty sure that I'm right that that doesn't occur and would want to see documents that convince me that I'm not.

BY MS. GJONAJ:

Q. And you have not cited any studies one way or the other in your report?

MS. McKEEVER: Objection to

form.

THE WITNESS: No, because that wasn't -- that wasn't a focus of what I was doing in my work.

MS. GJONAJ: Okay.

(Document marked for identification as McCabe Exhibit 21.)

BY MS. GJONAJ:

Q. I'm handing you what I have marked as Exhibit 21.

This is the Jubber 2023 study that you cite in your report; is that correct?

A. Yes.

Q. And Jubber identified certain exposures like dry cleaning, automotive work, and metal workings as associated with the increased risk of bladder cancer; is that right?

A. (Reviews document.)

Can I hear the question again, please?

Q. This study identified certain occupational exposures like dry cleaning, automotive work, and metalworking as associated with an increased risk in bladder cancer; is that

correct?

A. I think that's correct, yes.

Q. Okay. Are you aware whether any of those occupations involve exposure to chemicals such as PCE?

MS. McKEEVER: Objection to form.

THE WITNESS:

(Reviews document.)

Which occupations are you asking me about?

BY MS. GJONAJ:

Q. You're referring to dry cleaning, automotive work --

A. Got you. Yes.

Q. -- and metalworking.

A. Certainly dry cleaning.

Q. Are you aware of whether any of these industries have also been associated with TCE exposure?

MS. McKEEVER: Objection to form.

THE WITNESS: Let me hear the -- let me see. Let me hear the jobs

again.

BY MS. GJONAJ:

Q. Dry cleaning, automotive work, and metalworking.

A. So dry cleaning, yes. Automotive, maybe. Metalworking, yes.

Q. Okay. And this article also identified printing processes as an occupational risk factor --

A. Yes.

Q. -- correct?

Okay. And do you know what chemicals have been implicated in printing occupation?

MS. McKEEVER: Objection to form.

BY MS. GJONAJ:

Q. Let me ask that differently.

A. Yeah.

Q. Are you aware that TCE has historically been used in printing and associated with printing processes?

MS. McKEEVER: Objection to form.

THE WITNESS: Yeah, I don't think that -- that's not readily available in my -- in my brain as something I was aware of, no.

BY MS. GJONAJ:

Q. Okay. Do you believe that obesity is an established risk factor for bladder cancer?

A. My understanding is that -- and I think I reference it in my report, but American Cancer Society, other entities like that, Mayo Clinic is one that I rely on frequently in this type of work -- list obesity as a risk cancer for bladder cancer. Ah. Obesity as a risk factor for bladder cancer, yes.

Q. Are you aware that Jubber described the evidence linking obesity to bladder cancer as inconsistent?

MS. McKEEVER: Objection to form.

THE WITNESS: I mean, if he says that in the report, it will speak for itself. Right.

BY MS. GJONAJ:

Q. And do you believe diesel exhaust is

an accepted risk factor for bladder cancer?
A. It's not --
MS. McKEEVER: Objection to form.
THE WITNESS: It's not something I evaluated in the work that I did --
BY MS. GJONAJ:
Q. Okay.
A. -- and I didn't see that diesel exhaust particles was part of the Camp Lejeune litigation.
Q. Okay. And do you believe that exposure to PFOS is a risk factor for bladder cancer?
A. Again --
MS. McKEEVER: Objection to form.
THE WITNESS: -- it's not -- it's not something that I've evaluated in the work that I've been doing.
BY MS. GJONAJ:
Q. Okay. I'm going to turn to your kidney cancer report.

A. Okay. Did you say kidney cancer?
Q. Yes.
A. Got it.
Q. And turning to page 5.
A. Okay.
Q. About halfway down the section on Purpose Statement, you say.
"As is discussed in Dr. Julie Goodman's general causation report for kidney cancer, epidemiology evidence does not support a causal association between TCE and kidney cancer except at very high occupational exposures over 335 -- (i.e. over 335 part per million years) and does not support a causal association between the remaining VOCs and kidney cancer."
Do you see that?
A. I do.
Q. You don't offer an independent epidemiological opinion here; correct?
A. I do not.
Q. Okay. You're relying entirely on Dr. Goodman?
MS. McKEEVER: Objection to form.

THE WITNESS: I'm not relying on Dr. -- I guess I could be relying on Dr. Goodman, but I think, as I stated earlier and also as appears elsewhere in my kidney cancer report, it would be on page -- now since I'm so crafty at remembering where it is. It's on -- I don't now see the term special.

Page 9 that, you know, that -- that I am -- I am aware that plaintiff experts -- Gilbert, Mallon, Hatten, Freeman, Bird -- assert that there are epidemiologic studies that support an association between kidney cancer, TCE, PCE, benzene, and vinyl chloride alone.

Gilbert asserts that TCE causes it based on epidemiological studies, but also I've considered Dr. Goodman and Dr. Shields' report in the work that I did in "jumping in" to address the questions that I did in this litigation.

BY MS. GJONAJ:

Q. Okay. So my question was: You

didn't reach that conclusion independently. That was just citing to Dr. Julie Goodman's report?

A. I didn't --

MS. McKEEVER: Objection to form.

THE WITNESS: I didn't reach the conclusion independently or dependently. It's not a conclusion that I reached one way or another.

BY MS. GJONAJ:

Q. Fair.

Turning to page 34, about four lines down, you say:

"Risks for developing kidney cancer include genetic/hereditary factors as well as environmental/lifestyle factors."

Did I read that correctly?

A. Yes.

Q. What environmental factors do you believe increase the risk for developing kidney cancer?

A. (Reviews document.)

Alcohol. That's also -- I guess that would be a lifestyle factor as well.

Q. Uh-huh.

A. TCE, solvents. And I think I explain that in my report that there are some entities that do list TCE as an environmental factor, risk factor associated with kidney cancer.

Oh. What others? Smoking, environmental factor also, lifestyle factor. Those are ones that come -- that's what comes to mind, as I sit here.

Q. Okay.

A. I may have stated that in more detail elsewhere in my report. I just don't remember, as I sit here.

Q. All right. Turning to page 35, can you please read the paragraph starting with "The vast majority of patients"?

A. Sure.

"The vast majority of patients with kidney cancer are not known to have experienced appreciable exposure to TCE, alone, or in combination or -- alone, or in combination with PCE, benzene, or vinyl chloride. The vast majority of people have been exposed to TCE, even at high levels, are not known to have developed

kidney cancer. Moreover, the vast majority of people who have been exposed to TCE, even at high levels that may occur in occupational settings, have not been shown to display clinically apparent immune dysfunction. Hence, the characteristic polarization of the immune response that is characteristic of kidney cancer progression occurs independent of TCE exposure or exposure to other VOCs found at Camp Lejeune."

Q. Am I understanding correctly that -- strike that.

Are you saying that unless the majority of people exposed to TCE get a cancer, are you suggesting that you can't prove causation?

A. No.

MS. McKEEVER: Objection to form.

THE WITNESS: Sorry.

No.

BY MS. GJONAJ:

Q. Okay. Explain -- explain what the purpose of that statement was.

A. That -- that -- I think -- I think I've stated this in my report and I think I've

testified about this already today.

That kidney cancer is an example of a disease that is multifactorial, multiple extrinsic factors and intrinsic factors continue -- contribute to the etiology of the disease, and together with that nugget of information, we know that the immune system and immune imbalances in the immune system play a role either in tumor progression or tumor regression.

So unpacking how TCE or any chemical or any risk factor singularly contributes to the disease mechanistically is -- is highly complicated. Conceptually complicated and complicated in our ability to be able to measure and understand it.

Q. Okay. You would agree that the vast majority of people who smoke cigarettes don't get lung cancer; correct?

A. Yes. Ah. I don't know that I -- well, let me think about that. Sorry.

The vast majority of people that smoke. Yeah, I think that's true. Yes. Sorry.

Q. Okay.

A. Yeah.

(Document marked for identification as McCabe Exhibit 22.)

BY MS. GJONAJ:

Q. All right. Dr. McCabe, for the record, I've marked the bills and invoices that you've produced, I believe, in response to our deposition notice and the attached document request, and those are marked as 22, Exhibit 22.

Do those bills and invoices reflect all of your time that you have billed the DOJ for your work related to Camp Lejeune?

A. (Reviews document.)

Through March 23rd.

Q. Okay. So there were additional invoices since March 23rd?

A. I don't know.

Q. Okay. If there were, can you provide those following the deposition?

A. Yes.

MS. GJONAJ: Okay. I don't have any more questions.

MS. McKEEVER: Okay. Let's just take a short -- hopefully very short break.

THE WITNESS: All right.
THE VIDEOGRAPHER: Stand by. We are off the record at 16:44.
(A recess was taken.)
THE VIDEOGRAPHER: We are on the record at 16:51.

EXAMINATION

BY MS. McKEEVER:

Q. Dr. McCabe, you were asked whether the invoices in Exhibit 22 reflect the time you billed to DOJ.

To be accurate, this is the amount of time Intertox has billed on your behalf, as is reflected in the invoices; is that right?

A. Yes.

MS. McKEEVER: No further questions.

MS. GJONAJ: No questions. Thank you for your time, Dr. McCabe.

THE WITNESS: Thank you. Nice meeting you both.

MS. McKEEVER: Thank you.

THE WITNESS: Thank you for

putting up with me.

MS. McKEEVER: Have a nice weekend. Got you out of here before 5:00.

THE WITNESS: I'm staying here.

THE VIDEOGRAPHER: All right. We are off the record at 16:52.

(Signature not waived, the deposition concluded at 4:52 PM.)

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ERRATA SHEET

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DECLARATION UNDER PENALTY OF PERJURY

I declare under penalty of perjury that I have read the entire transcript of my Deposition taken in the captioned matter or the same has been read to me, and the same is true and accurate, save and except for changes and/or corrections, if any, as indicated by me on the DEPOSITION ERRATA SHEET hereof, with the understanding that I offer these changes as if still under oath.

Signed on the _____ day of _____, 2025.

_____

MICHAEL J. McCABE, JR., PHD

CERTIFICATE OF REPORTER

DISTRICT OF COLUMBIA)

I, Denise Dobner Vickery, a Registered Court Reporter and Notary Public of the District of Columbia, do hereby certify that the witness was first duly sworn by me.

I do further certify that the foregoing is a verbatim transcript of the testimony as taken stenographically by me at the time, place and on the date herein set forth, to the best of my ability.

I do further certify that I am neither a relative nor employee nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such counsel, and that I am not financially interested in the outcome of this action.

Denise D. Vickery

DENISE DOBNER VICKERY, CRR,RMR
Notary Public in and for the
District of Columbia

My Commission expires: March 14, 2028

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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