Exhibit 158

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA

IN RE:	)	Case No.:
CAMP LEJEUNE WATER	)	7:23-cv-00897
LITIGATION	)	
	)	
This Document Relates to:	)	
ALL CASES	)	

The video-recorded and videoconferenced deposition of BENJAMIN WALTER HATTEN, M.D., M.P.H., taken pursuant to the Federal Rules of Civil Procedure of the United States District Courts pertaining to the taking of depositions, reported by Pauline Vargo, Certified Shorthand Reporter, Registered Professional Reporter and Certified Realtime Reporter, at Suite 100, 26 West Dry Creek Circle, Littleton, Colorado, on May 12, 2025, commencing at 9:02 a.m. Mountain Time.

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I N D E X

Monday, May 12, 2025

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THE VIDEOGRAPHER: Good morning. We are now on the record. My name is Julie Butcher. I am a videographer for Golkow Litigation Services.

Today's date is Monday, May 12th, 2025, and the time on the record is 9:02 a.m. Mountain Time.

This video deposition is being held in Littleton, Colorado, in the matter of Camp Lejeune Water Litigation, No. 723-cv-897, versus the United States of America, being heard before the United States District Court of the Eastern District of North Carolina.

The deponent is Benjamin Hatten, M.D.

Counsel's appearances will be noted on the stenographic record.

Our court reporter is Pauline Vargo, and she will now swear in the witness.

THE REPORTER: Would you raise your right hand to be sworn, please.

(The witness was duly sworn.)

BENJAMIN WALTER HATTEN, M.D., M.P.H., called as a witness herein, having been first duly sworn, was examined and testified as follows:

EXAMINATION

BY MS. SILVERSTEIN:

Q. Hi, Dr. Hatten. I know we've met a few minutes ago, but my name is Kailey Silverstein. I'm here with my colleague, Haroon Anwar. We represent the United States in the Camp Lejeune litigation.

Could you please state your full name for the record.

A. It's Benjamin Walter Hatten.

Q. And what is your current address?

A. My office address or...

Q. Your office address is fine.

A. 26 West Dry Creek Circle, Suite 815, Littleton, Colorado, 80120.

Q. And that's the location of Toxicology Associates?

A. Correct.

Q. Do you understand that this deposition is proceeding -- is a court proceeding even though we are not in a courtroom?

A. Yes.

Q. And do you understand that you are under oath?

A. Yes.

Q. And by being under oath, do you understand that that means you are obligated to tell the truth?

A. Yes.

Q. And you have been deposed before, right?

A. Yes.

Q. I'm going to go over kind of a couple what I call rules of the road. I'm sure they are familiar to you, but I just want to make sure we are on the same page.

We have a lovely court reporter here taking down everything that we say, so it's important that you answer the questions that I ask verbally. So that means no nodding your head or going "uh-huh." That's hard to get accurately on the record. Does that make sense?

A. Yes.

Q. It's also important that you and I both talk at a reasonable pace. I know sometimes I tend to talk really fast, and that can be hard to get down on the record. Does that make sense?

A. Yes.

Q. And you and I should also try our best not to interrupt each other. There may be times where you know exactly what question I'm about to

ask, and you are probably right, but I ask that you let me finish asking the question first, and I will do my best to not accidentally interrupt any of your answers. Does that make sense?

A. Yes.

Q. Once the deposition is complete, you will have the opportunity to read a transcript of it, and you can make any corrections to the transcripts in an errata, and then you will be asked to sign the transcript. Does that make sense?

A. Yes.

Q. During this deposition if I ask a question and you don't understand what I'm asking, it's a bad question, it's confusing, whatever, I will ask that you please let me know and I can clarify what I'm asking. If you answer the question, I'm going to assume that you understood -- you understood it. Does that make sense?

A. Yes.

Q. During the deposition you may hear your attorney say "objection" and object to something about the question that I asked. Unless he instructs you not to answer the question, please

answer the question after the objection has been made. Does that make sense?

A. Yes.

Q. Is there any reason why you are not able to give your most truthful and accurate testimony today?

A. No.

Q. Is there any reason your memory might be impaired today?

A. No.

Q. During this deposition you can ask for a break at any time. I try to take breaks every hour-ish, but if you need a break before that, please let me know. I will ask that you answer whatever question is pending if I've already asked one, but we can take a break at any time that you need. Does that make sense?

A. Yes.

Q. I'm handing you what I will mark as Exhibit 1. This is the Notice of Deposition and Subpoena for your deposition today.

(Exhibit 1 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. Have you seen this document before?
A. Yes, an electronic version.
Q. Did you review the request for production of documents that is listed as Attachment A on the last page?
A. Yes.
Q. And I know that we received invoices from you pursuant to Number 4. This attachment also asks for certain letters or other correspondence with a bunch of individuals that are listed here. Do you have any correspondence with any of these individuals?
A. No, not with any individual listed here.
Q. And do you have any correspondence with any individual who has filed a claim related to the Camp Lejeune Justice Act?
A. Not that I'm aware of, but I don't have personal knowledge of anyone who has filed a claim.
Q. Sure, sure. But nothing that you are aware of?
A. Correct.
Q. You can go ahead and set that aside.
What did you do to prepare for your deposition today?
A. I reread my reports, some of the studies

that I reviewed in forming my opinions, and I reviewed deposition transcripts of some of the experts that have been taken in this case.

Q. You mentioned you reviewed your reports. Are you referring to the bladder cancer report and the kidney cancer report?

A. Yes, the general causation report for bladder and kidney cancer that I produced I think in December of 2024.

Q. And I think you said you also reviewed some of the studies you relied on. Do you recall which studies you reviewed?

A. It was a number of studies. I don't have a comprehensive list off the top of my head, so...

Q. Are there any studies that you reviewed that you can recall right now?

A. Yeah, a number of studies.

Q. And what are those studies?

A. I reviewed the Bove, two Bove studies from 2014; the ATSDR 2018; the two Bove studies from 2024; and then a number of individual studies that are included in my report. Like I said, I don't have a comprehensive list of all the studies I reviewed.

Q. Okay. Did you review any studies that you hadn't previously reviewed for your report?

A. Yes. There were a couple studies that I didn't reference in my report, but I reviewed prior to the deposition particularly LeMasters 2008; Goodman 2018; and there is a preprint of Yu 2025 that I reviewed.

Q. I'm handing you a supplemental materials considered list, and we will mark the supplemental materials considered list as Exhibit 2.

THE REPORTER: Do you want me to mark them as we go along?

MS. SILVERSTEIN: Yes. Thank you.

(Exhibit 2 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. This materials considered list I will represent was produced to us on May 6th, 2025. It lists two studies by Julie Goodman from 2018 and a LeMasters study from 2006. Are those studies that you reviewed while preparing for your deposition that you hadn't previously reviewed?

A. Yes. I believe I misstated the LeMasters article. I said 2008, but it was 2006,

at least based on this.

Q. But this is the same article?

A. Yeah, this is the same article. I just don't recall if this publication date is correct or -- or what, but...

Q. Okay. That's fine.

How did you become aware of these three studies?

A. I think in conversation with the attorneys and after reviewing Dr. Goodman's deposition I pulled a couple articles that were relevant.

Q. Were you aware of any of these three studies when you finalized your kidney cancer or bladder cancer general causation report in December of 2024?

A. I don't recall if I was aware of them or not. I think I included all studies that I used to formulate my opinion and developing that, but I don't recall if I was aware of these at that time or not.

Q. Did reviewing these three studies change any of your opinions in your kidney cancer or bladder cancer general causation reports?

A. No. Just to clarify, and then I will

answer your question, these are just two studies. The second entry is just the supplemental materials to the Goodman 2018 article, so these are two studies. This didn't change my opinions that I expressed in the report.

Like, I said there, is also a preprint study I reviewed that has not been published in the peer-reviewed literature yet. It also did not change my opinions.

Q. I am handing you what we will mark as Exhibit 3 through the court reporter.

(Exhibit 3 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you and marked as Exhibit 3 what is titled Dr. Benjamin Hatten Additional Materials Considered, and I will represent that this was provided to us on April 24th, 2025.

The study here is you, and it says published online April 2025. Is that the preprint study you are referred to?

A. Correct. I haven't seen a final version; I've only seen the preprint version.

Q. It says at the top in brackets "kidney

cancer." Does that mean that your review of the study was just for your kidney cancer causation report?

A. No. I reviewed it for both kidney and bladder.

Q. Okay. So it should be -- it should say both kidney and bladder at the top?

A. I presume so, but --

Q. Okay.

A. -- I'm just letting you know I reviewed it both for kidney and bladder.

Q. Okay, and I appreciate the clarification.

Did reviewing the Yu study change your opinions in either the kidney cancer report or bladder cancer report for general causation?

A. I think it helped me strengthen the opinions with respect to benzene in both reports.

Q. I'm handing you what we will mark as Exhibit 4.

(Exhibit 4 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you what's marked as Exhibit 4. It says "Dr. Benjamin Hatten, Second Supplemental

Materials Considered List," and it lists the transcripts of four individuals. I will represent that this was produced to us on May 8th, 2025.

When did you review these transcripts?

A. I don't recall the exact dates. In early May, but I don't recall the exact date.

Q. Okay. So sometime in the last two-ish weeks, roughly.

A. Sometime.

Q. And why did you review these four transcripts?

A. I think I reviewed them because these were other experts that were being deposed in this litigation to try and get a sense of potential questions that might be asked in my deposition, if there were similarities.

Q. Did your review of any these four transcripts change your opinions in any way for your kidney cancer or bladder cancer general causation reports?

A. No.

Q. Did you meet with anybody to prepare for your deposition today?

A. I met with some attorneys from the team I had been working with to -- during deposition

preparation.

Q. Do you remember who you met with?

A. I met with Ted, who is here today, and Zach Mandell.

Q. Was there anybody else present at any of these meetings?

A. At least one meeting, I think, Patrick Wallace, who is another attorney on the team, was also at one of -- one of the meetings.

Q. Aside from Ted and Zach Mandell and Patrick Wallace was anybody present?

A. Not that I recall. They were done virtually, so I can't -- but I don't recall anybody else on the Zoom sessions.

Q. Okay. You said they were done virtually. Is that true for all of the meetings?

A. For deposition preparation?

Q. Yes.

A. Yes.

Q. And how many times did you meet with the attorneys for deposition preparation?

A. It was a few times. I don't recall the exact number.

Q. Do you remember if it was, like, more or less than five times?

A. Roughly five, but I don't recall the exact number.

Q. Okay. And about how long were these calls?

A. I think they varied from 30 minutes to a couple hours.

Q. And you have testified as a deposition -- in deposition before, correct?

A. Correct.

Q. About how many times have you had your deposition taken?

A. I don't know the exact number. I would have to estimate, if that's something you would like me to do.

Q. Could you estimate? And I will make sure to note that it is not a precise number.

A. I would estimate somewhere between 10 and 20 times, so something in the teens, but I don't know exactly how many.

Q. Okay. Have all those depositions been related to expert work?

A. Yes. I can't recall a deposition that was not related to expert work.

Q. You don't recall any depositions that were related to you in your personal capacity?

A. I've never had a deposition taken in a personal capacity. I was just trying to recall whether I have ever been deposed as a fact witness, as a treating physician or something like that. I think all of the depositions have always been as an expert witness.

Q. Okay. Have any of those depositions been related to TCE or PCE?

A. Not that I recall.

Q. Were any of those depositions related to benzene?

A. Not that I recall.

Q. Were any of those depositions related to vinyl chloride?

A. Not that I recall.

Q. Have you ever testified in trial -- at trial?

A. Yes.

Q. How many times?

A. Again, I don't have an exact number, and I would have to estimate.

Q. Do you recall if it is more or less than ten times?

A. I would estimate it's similar to the number of deposition times, so roughly 10, maybe a

little more, maybe a little less.

Q. Okay. When were you first retained for the Camp Lejeune litigation?

A. I don't recall the exact date that -- when I was retained.

Q. Do you recall if it was in 2024?

A. I don't recall with certainty, although I believe it was prior to 2024, but I don't recall an exact date, so...

Q. Do you recall who retained you?

A. I was originally contacted by Pat Telan from Bell. I don't know what the full name of the firm is, but it's Bell Legal Group or Bell Law Firm, something like that.

Q. What were you asked to do?

A. Are you speaking about when he originally asked me?

Q. When you were first retained, what were you asked to do?

MR. RUZICKA: Objection. Prior to him being retained or after him being retained?

MS. SILVERSTEIN: I'm asking about the scope of what was asked of him.

BY THE WITNESS:

A. My -- if I recall correctly, and again,

this was at least a year ago and probably more than that, I was initially asked to review the literature surrounding Camp Lejeune water exposures and possible health effects in a general sense and to provide some insight as a toxicologist as to what that body of literature showed.

Q. Was the scope of your work, were you only asked to look at the toxicology related to kidney cancer and bladder cancer?

MR. RUZICKA: Objection to the extent that you are asking about communications between counsel and a retained expert. He gave you the scope of what he was asked to review. You are now going into what specific communications we have had since then.

BY MS. SILVERSTEIN:

Q. Did you at any point look into literature related to TCE, PCE, benzene or vinyl chloride on any disease other than kidney or bladder cancer?

A. I've reviewed some of that literature. I wasn't -- however, I was not asked to form an opinion on those and have not formed an opinion on any outcomes other than kidney and bladder cancer.

Q. Were you -- did you do research into any

chemicals other than TCE, PCE, benzene and vinyl chloride?

A. I may have read some articles on other compounds, but the focus of my literature search was on those four compounds.

Q. I'm handing you what we have marked as Exhibit 5.

(Exhibit 5 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you a series of invoices on the bottom marked as CL_PLG-expert_Hatten_000000001 through 26, and these are invoices billed to Bell Legal Group for the matter Camp Lejeune. Have you seen these invoices before?

A. I believe I have seen them. I typically don't review the finished invoice that my assistant sends out. I sent a list of billing entries, and she produces these to send to the attorney firms, but I believe I've looked at these before.

Q. Okay. On the first page ending with the Bates number 01, the first day on that page is November 5th, 2023. Does that sound like it would be around when you started working on the Camp

Lejeune litigation?

A. That sounds like a -- like it is probably appropriate. I wouldn't have -- I don't think I would have done work on this prior to billing for it, though. That's not a typical practice, so I presume this is the first date.

Q. Okay. And to the best of your recollection, you didn't start working on the Camp Lejeune litigation several months before that, right?

A. Not that I recall.

Q. Okay. If you'd turn to the page ending in Bates stamp 023. Are you on the page ending 023?

A. Yes.

Q. The last date there is listed as February 27th, 2025. There are no invoices for March or April 2025. Did you do any work on the Camp Lejeune litigation in March or April of 2025?

A. Yes.

Q. And have you billed for that work that you did yet?

A. I don't recall if I did any work in March. I know I have some billings from April. I just don't know if they have gone out yet to the

attorney firms.

MS. SILVERSTEIN: We will note that we are requesting the remaining invoices since February 2025.

MR. RUZICKA: That's fine., and just for the record, Exhibit 5 contains Bates label Hatten 24 and 25, which we emailed about which were inadvertent production.

MS. SILVERSTEIN: Yep.

BY MS. SILVERSTEIN:

Q. Do you have Exhibit 1 next to you still?

A. Yes.

Q. Actually, you can go ahead and put that aside. Do you know who Nicklaus Brandehoff is?

A. He is one of the -- my colleagues in Toxicology Associates that's listed at the top of the billing sheets here.

Q. And did you work with him at all on the Camp Lejeune litigation?

A. No.

Q. Did you work with anybody other than Nicklaus Brandehoff on the Camp Lejeune litigation?

MR. RUZICKA: Object to form.

A. I didn't work with Nicklaus Brandehoff on this litigation.

Q. Sure. Did you work with anybody else in preparing the reports?

A. I had conversations with the attorneys who retained me, but outside of that, no.

Q. So you didn't have a research assistant or a secretary help you with any of your work?

A. No. I do my own literature search and write my own reports.

Q. Okay. I am handing you what we will mark as Exhibit 6.

(Exhibit 6 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I have handed you Exhibit 6 which is titled Camp Lejeune: Kidney Cancer Expert Report of Benjamin Hatten, M.D., M.P.H. Is this the report that you prepared for this -- one of the reports that you prepared for this litigation?

A. Yes, it appears to be.

Q. It is dated December 8, 2024. Do you see that date?

A. Yes.

Q. And below the date, is that your signature?

A. Yes.
Q. If you could turn to Appendix II of this report, which is labeled as Dr. Hatten's CV.
A. Yes, I have it.
Q. Is this your current CV?
A. I believe so. I typically update my CV about twice a year, so it's probably due for an update soon, but I think this is the most recent version available.
Q. Is there -- you said it is due for an update soon. What would need to be updated on the CV?
A. I presume any publications that have come out since the last -- last time I updated this. And, yeah, I don't think there have been any new presentations since then, so it would just be if there were any publications that have occurred since the last time I updated it.
Q. If you turn to page 11 of this CV. At the top of page 11 it says Publications/Work Products. Do you see that?
A. Yes.
Q. Are there any publications that you have had that are not listed here?
A. I suspect so. I'm on a number of

guideline writing committees, and we produce publications fairly regularly. I believe there have been at least, at a minimum, one; likely a handful of publications that have occurred since December.

Q. We will request an updated list of Dr. Hatten's publications.

Aside from the publications that we were just discussing, is there anything else that you can think of that is missing from your CV?

A. Not as I sit here.

Q. Is your CV a complete representation of your educational and professional background?

A. It's a sketch of my educational and professional background. I don't think you can ever represent somebody's full background on a set of paper, but it lists I think programs that are completed, publications, talks that I have given and positions I've held.

Q. Is there anything that you made the decision to not include on your CV?

A. No. It's comprehensive as far as I'm aware.

Q. So when you say a sketch, you just mean it is a piece of paper and not actually a picture,

not actually your real life; would that be fair to say?

MR. RUZICKA: Objection, form.

A. Correct. I also think something like listing that I have completed a medical toxicology fellowship doesn't really give an explanation for all the training and knowledge and expertise that goes into that, so...

Q. Okay. So would it be fair to say that it lists all of the programs or certifications you have, but it doesn't list all of the coursework or practice that went into obtaining those certifications?

A. Correct, in the sense that it is just a list, so...

Q. Dr. Hatten, have you published any original research on kidney cancer and PCE, TCE, vinyl chloride or benzene?

A. I don't believe I've published any papers that where the primary objective is focused on that. I have done a -- participated in research projects that involved large databases that may have touched upon those either exposures or outcomes, but none where that is the primary hypothesis being or primary exposure-outcome

relationship that's being evaluated.

Q. Do you recall any projects that you can think of right now that may have included the exposure-outcome relationship of kidney cancer and either PCE, TCE, vinyl chloride or benzene?

A. Not that I can recall right now.

Q. Have you published any original research on bladder cancer and PCE, TCE, vinyl chloride or benzene?

A. I think that would be the same answer, where it may have been a component of a project I've worked on, but it was not the primary exposure-outcome relationship being evaluated.

Q. Okay. Can you recall sitting here now any projects where -- that included the exposure-outcome relationship of bladder cancer and PCE, TCE, vinyl chloride or benzene?

A. Not -- I can't recall anything while I'm sitting here.

Q. Okay. And, Dr. Hatten, you are a medical toxicologist and emergency medicine physician, right?

A. Those are the medical specialties that I am -- have been trained in and am board-certified in.

Q. Would it be accurate to say that you are a toxicologist?

A. Yes. A medical toxicologist is a physician who has completed a medical toxicology fellowship and has specific training in toxicology as it relates to human health.

Q. Do you consider yourself an epidemiologist?

A. Yes. I have a master's in public health in epidemiology and biostatistics.

Q. Since receiving your master's in public health, how much of your time has been spent working on epidemiology or epidemiology-related projects?

A. Could you clarify the question? Are you asking, like, what percentage of my time or what roles I've had or...

Q. About what percentage of your time has been spent working on epidemiology as compared to toxicology or emergency medicine?

A. It's a little difficult to completely stratify that because most of the research I do is epidemiology or epidemiologic research oriented with a toxicologic focus, like those are the kind of problems I look at, are toxicology problems in

general. And I also teach principles of epidemiology and causation to our fellowship program, like I am the faculty member who teaches that in the medical toxicology program.

I'm a site director for occupational environmental health programs at the University of Colorado, and so I'm involved in other specialties where epidemiology is a large role and -- or is a focus. And I, like I said before, I sit on a number of guideline writing committees, and those involve evaluating the evidence using epidemiologic principles.

So I don't know that I could give you a specific breakdown of how -- what proportion of my time is spent doing strictly epidemiology because it crosses over into other aspects of my job.

Q. Okay. Fair enough.

Do you consider yourself an exposure scientist?

A. I use principles of exposure science as they pertain to toxicology. However, I don't typically do my own modeling or anything for exposure assessments.

Q. Okay.

A. So in some aspects, yes, but not as a

stand-alone exposure scientist.

Q. Okay. Do you consider yourself a risk assessor?

A. That answer is similar in the sense that I discuss risk and risk evaluation in the context of primarily toxicology. However, I typically don't produce, like, isolated reports on risk assessment and I'm not typically engaged to do a risk assessment as an -- as an isolated topic. It's only in the context of patient care or in evaluating the literature on another product -- or another problem.

Q. If you turn to page 7 of your CV, it lists -- it says service and then organizations. Is this a complete list of the organizations that you are a member of?

A. To the best of my knowledge, I believe it is.

Q. Okay. And so I want to go back to the body of the kidney cancer report, which is Exhibit 6. This is the report on -- for general causation that you wrote about kidney cancer for this case, right?

A. Correct.

Q. Are there any changes that you need or

want to make to your opinions as they relate to kidney cancer?

A. No.

Q. Does this report contain all of the opinions on kidney cancer that you intend to offer in the Camp Lejeune litigation?

A. Yes, with respect to general causation. I guess I reserve the right to provide specific opinions if that happens at a later date.

Q. Okay. But you haven't provided any specific opinions related to kidney cancer at this time, correct?

A. Not at this time.

Q. And sitting here right now, there aren't any opinions that you have formulated that you have not offered in a written report?

MR. RUZICKA: Object to form.

A. I currently don't have any additional opinions on kidney cancer that I formulated or prepared to offer.

(Exhibit 7 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I am handing you Exhibit 7. This is the

bladder cancer report on general causation that you prepared for this case, right?

A. Yes, it appears to be.

Q. And I understand that you also authored reports on bladder cancer for specific causation. So during the course of today's deposition, all of my questions related to bladder cancer will pertain to your general causation report. Does that make sense?

A. Yes.

Q. And this report is dated December 9th, 2024. Do you see that?

A. Yes.

Q. And below that date, is that your signature?

A. Yes.

Q. Are there any changes you need or want to make to your opinions on bladder cancer as they relate to general causation?

A. Not with respect to general causation.

Q. And does this report contain all of the opinions on bladder cancer you intend to offer in this case for general causation?

A. Yes.

Q. Are all of the opinions that you intend

to offer in this case as they relate to general causation contained in either your kidney cancer report or your bladder cancer report?

A. At the current time, based on my review of the literature.

Q. And do you have -- so I guess to be clear, you are not offering any opinions on leukemia, correct?

A. Not at this time.

Q. And you are not offering any opinions on non-Hodgkin's lymphoma, right?

A. Not at this time.

Q. And you are not offering any opinions on Parkinson's, right?

A. Not at this time.

Q. And you said that you performed a literature search when preparing your opinions, right?

A. Yes.

Q. Would it be fair to say that when analyzing the epidemiology and toxicology on the exposure-outcome relationship, a literature search is a key step.

MR. RUZICKA: Objection, form.

A. Yes. I think performing a literature

search is a key step in identifying the body of evidence that surrounds a specific exposure-outcome relationship.

Q. And a literature search should be crafted to produce both positive results and negative results for the exposure-outcome relationship, correct?

A. Yes. Ideally you are not doing the search with the outcomes of the studies in mind. It's only with respect to the exposure and outcome relationship.

Q. And that's to make sure that you are getting a balanced understanding of the literature?

A. I don't know if it's necessarily balanced, but it's to have a comprehensive review of the literature so you know the full body of science surrounding the question.

Q. And would it be right to say that that's to make sure you are not missing any relevant studies in that search?

MR. RUZICKA: Objection, form.

A. I think that is part of it. Part of it is also -- part of it is also to ensure that you have -- you understand the entire breadth of the body of literature. So it's not as if two

scientists will perform the exact same search and find the exact same number of articles, but the scope for a well-crafted literature search should be similar.

Q. Where did you perform your search? And by that I mean, like, what search, what databases did you use?

A. I typically use PubMed and Google Scholar as my primary search instruments. I believe I primarily used PubMed for this search, although I don't -- and I think it's listed in my report, although I don't recall without reviewing the report.

Q. Do you recall what your search criteria was?

A. If we are talking about bladder cancer, if you looked on -- if you look on page 10, I list the search terms.

Q. And the search terms for kidney cancer are likewise listed on page 10 of the kidney cancer report, right?

A. I don't know if the page numbers are the same. I would have to review.

Yes, it appears to be page 10 on my kidney cancer report as well.

Q. Did anybody provide you with any studies for either your kidney cancer report or your bladder cancer report?

A. No one -- there are some articles that I requested, I identified and requested the full manuscript, and I think I had my assistant pull those from some source. I don't know where, where she got the full text from, through some form of interlibrary loan, but I identified all those studies when I requested the manuscripts.

Q. Okay. So there weren't any studies that were provided to you that you didn't request?

A. Not that I recall.

Q. There are a number of studies that are listed in your materials considered list attached to your report that are not discussed or cited in the body of the report. How did you decide which studies to rely on?

MR. RUZICKA: Which report?

MS. SILVERSTEIN: Both reports.

MR. RUZICKA: Object to form.

BY MS. SILVERSTEIN:

Q. Would it be fair to say that you reviewed more studies than you cited and discussed in the body of the report?

A. Yes. I reviewed more studies than are explicitly cited in the body of the report.

Q. And how did you decide which studies to discuss in the -- or cite in the body of the report from the body of studies you reviewed?

A. I included studies that had an explicit exposure of either Camp Lejeune or the compounds we have been discussing, TCE, PCE, benzene and vinyl chloride, or had a proxy exposure that -- exposure definition that was clearly correlated to one of those compounds and with an outcome of either kidney cancer or bladder cancer respectively.

So there are a number of studies that don't have clear exposure outcome relationships or definitions that I reviewed but did not discuss in the body of the report.

Q. In the study of epidemiology, an association isn't the same thing as causation, right?

MR. RUZICKA: Objection, form.

A. There is -- sometimes the term "causal association" is used, which is -- implies that the association is actually causal. An association is a finding in a study or an evaluation of a population that may or may not be causal if you are

using a generic term of association.

Q. And that's because while epidemiologists use the term "association" to report quantifiable findings when discussing a dataset derived from a specific population, this term doesn't imply a general association in the population at large or provide direct evidence of causation; right?

MR. RUZICKA: Object to the form.

A. Sorry. I was -- I kind of lost what the question was there. If you could rephrase or ask again.

Q. Sure. If you turn to page 4 of the kidney cancer report, do you see the heading for causation?

A. Yes.

Q. And the second-to-last sentence of that first paragraph says, "Of note, while epidemiologists use the term 'association' to report quantifiable findings when analyzing a dataset derived from a specific population, this term does not imply either a general association in the population at large or provide direct evidence of causation," correct?

A. You read that correctly, and I believe I'm referring to the term "association" that's in

quotes in that sentence.

Q. Okay. And, Dr. Hatten, would it be fair to say that this statement in your report is a statement you agree with?

A. I wrote this statement, and I've already said that this expresses my opinion, so I don't have a reason to change that.

Q. And you wouldn't typically draw a conclusion about causation from a single study, right?

A. I think it would depend on the specific circumstances, although in general most times a single study is -- it is difficult to find causation with only a single study if that's the only body of evidence that's evaluated.

Q. You would want to see if the results of that study are replicated in other studies before determining whether there is causation, right?

A. In general, yes. As I said, we would have to talk about a specific example if there was a situation where somebody drew a or identified a causal association based on a single study, but I don't know that that's the case in anything in my reports.

Q. Epidemiology studies often use relative

risk to indicate the level of association observed in a study, right?

MR. RUZICKA: Objection, form.

A. Relative risk is one measure of association that is used in epidemiologic studies. It is not the only one. It depends on how you design the study as to what your measure of association -- what reported measure of association you would use for that study.

Q. A relative risk of 1.0 or lower generally indicates no association, right?

MR. RUZICKA: Objection, form. Go ahead.

A. It generally indicates no association in the population study, as studied in that report.

Q. At what level of relative risk do you consider there to be evidence of an association?

A. I don't think or I'm not aware of a specific cutoff for a single number. They all report what the association is in the data that was analyzed in that study, so it's not as if there is a single number you can point to and say greater or less than this is an association. Even a number less than 1 is still a reported association in the study. It is just a negative association.

Q. Sure. Maybe I should reframe that.

When you are analyzing studies to determine whether or not a positive association exists, what relative risk do you generally look for?

A. I don't have a specific number that I look for, and I'm not aware of any consensus or scientific consensus on what a specific number that represents a positive association is other than the factual report of greater than 1 is positive, less than 1 is negative when you are discussing a measure such as relative risk.

Q. Are you familiar with Dr. David Savitz?

A. I'm familiar based on some questions that were in the deposition transcripts related to -- related to his publications.

Q. Before reviewing those transcripts, were you familiar with Dr. David Savitz?

A. Not personally. I don't recall whether I've reviewed any of his work or not in the past.

MS. SILVERSTEIN: Okay. We have been going for about an hour. I think now would be a good time to take a five- to ten-minute break.

MR. RUZICKA: If you would like to.

I'm fine.

THE WITNESS: I can keep going.

MS. SILVERSTEIN: I would like to take a short five- to ten-minute break.

THE VIDEOGRAPHER: The time is 10:00 a.m. We are now off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 10:08 a.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, one way to analyze -- do you consider it important to analyze the precision of a study's risk estimate?

A. I think it's informative to review the precision of a study's risk estimate.

Q. Would it be fair to say that the wider -- or I guess one of the ways that you can analyze the precision of a risk estimate is by looking at the study's -- the study results' confidence intervals?

A. That's one way to eval- -- or to -- the precision is reported or one aspect of precision that's reported frequently in studies, and I just want to make clear when you are using "precision," you are using the statistical term "precision," not

a lay term, correct? So a statistical term "precision" is how closely grouped a particular set of results are.

Q. And do you agree that the wider the confidence interval, the less confidence in the point estimate?

MR. RUZICKA: Objection, form.

A. No, that's not the case. The point estimate that is reported is the actual measured value that the investigator found. The confidence interval may describe something different than how confident the investigator is in the point estimate they found.

Q. I am handing you Exhibit 8.

(Exhibit 8 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you, if you look on the first page, it says Reference Manual on Scientific Evidence: Third Edition (2011). Do you see that?

A. Yes.

Q. And in the top left-hand corner it says National Academies, Sciences, Engineering and Medicine. Do you see that?

A. Yes.
Q. And are you familiar with the National Academies of Sciences, Engineering and Medicine?
A. Yes, in a general sense that I'm aware of what it is.
Q. And in a general sense you would agree that the national Academies of Sciences, Engineering and Medicine is a reputable body, right?
MR. RUZICKA: Objection, form.
A. I think you always have to evaluate a individual work product based on what its -- based on its own merits. However, in general, this is considered a reputable scientific body.
Q. If you turn to page 621. Are you on page 621?
A. Yes.
Q. Do you see the -- one, two, three -- fourth definition down, it has confidence interval?
A. Yes.
Q. And about, it looks like, two sentences in there is a sentence that starts with "the width." Do you see that?
A. Yes.
Q. It says, "The width of the confidential

interval provides an indication of the precision of the point estimate of relative risk found in the study; the narrower the confidential interval, the greater the confidence in relative risk estimate found in the study. Where the confidence interval contains a relative risk of 1.0, the results of the study are not statistically significant."

Do you agree with that statement?

A. The -- there are multiple statements here, so could you ask me specifically about what you are asking me to agree with?

Q. Sure. The first part says, the width of the confidence interval provides an indication of the precision of the point estimate or relative risk found in the study. Do you agree with that statement?

A. I agree that this provides an indication of the precision of the point estimate or relative risk found in the study.

Q. So you do agree with that statement?

A. I think I just answered. I read the part I agree with.

Q. Is there a part of that statement that you don't agree with?

A. No.

Q. Okay. It next --
A. Not as I read it, so...
Q. It next says, "The narrower the confidence interval, the greater the confidence in the relative risk estimate found in the study." Do you agree with that statement?
A. I am not sure how they are intending that statement to come across, so I don't know if I can agree with it or not.
Q. Is there a part of that statement that you disagree with?
A. Again, I think I'm not sure how they are intending that statement to come across, so I don't know how -- whether I can agree with it or not.
Q. So you don't know whether you can agree that the narrower the confidence interval, the greater the confidence in the relative risk estimate? You don't know if you can agree with that statement?
A. I think I've answered this twice, and I can answer again. I don't know what they are intending here. I think there are multiple ways you can read this study, and without having more information, it would be difficult to answer that.
You are also showing me one -- this is,

I think, a thousand-page book or something like that if you look at the whole book, so my guess is there is a much larger section on confidence intervals that is in this book that's beyond this single or, like, definition entry that you are pointing out; and I think we would have to review that entire section to know what they are intending or what can reasonably be believed is intended with that statement.

Q. Okay. So generally speaking you -- would you agree that a narrower confidence interval indicates a greater confidence in the relative risk estimate than a wide confidence interval?

A. Could you explain what you mean by confidence in a relative risk estimate?

Q. Would you agree that a narrower confidence interval indicates that the relative risk is more likely to be representative of the population than a wide confidence interval?

A. I think it is more likely that you have a -- that the true value in the population falls within the range that's expressed by the confidence interval. That doesn't necessarily mean that the relative risk it expressed, you have more or less confidence in that, the relative risk that's

expressed; it's just the relative risk that's expressed.

Q. Would you agree that where relative risk includes 1.0, that result is not statistically significant?

A. Presuming a -- I would agree in a study that utilizes a statistical test that produces -- where the study authors produce a 95% confidence interval, when it includes one that is by convention assuming the authors set their methodology up that way, that is not considered statistically significant.

Q. Another way that you can look at statistical significance is by considering the p value, right?

A. That is a way to evaluate statistical significance.

Q. A p value of less than 0.05 is generally considered to be statistically significant, right?

A. Again, if the study authors set up their study and identify a p value of .05 as statistically significant, then that is statistically significant for that study. However, there are a number of statistical methodologies that can be employed that don't use a .05 p value

as statistical significance.

Q. What statistical methodologies are you referring to?

A. Do you want an example or an exhaustive list?

Q. Provide an example, please.

A. So, for example, something like a Bonferroni correction is used. Oftentimes it's not a .05. There are also studies where people will use .01 or they will use .1. The authors typically identify what they consider statistically significant in a specific study, and it's dependent on how the hypothesis that's being studied is -- what methods the authors think are most appropriate in analyzing the exposure-outcome relationship if we are talking about an epidemiologic study.

Q. So it sounds like you are saying that generally speaking there is not an accepted p value in the epidemiology community. Is that right?

MR. RUZICKA: Objection, form.

A. I don't think that's what I said. I think I'm saying that it's dependent on the methodology of the individual study and how you are using statistical testing within the methodology of the study. Historically, by convention, .05 was

used to indicate statistical significance, but that's not a methodologic -- there is not a methodologic rationale for using .05.

Q. If you could go ahead and turn back to your kidney cancer report to page 7.

On page 7 you have the heading "Exposures of Interest." Do you see that?

A. Yes.

Q. Right above that you have a two-sentence paragraph. Do you see where I'm looking?

A. I see the section just above the heading Exposures of Interest.

Q. And it says, "Of note, the ATSDR states that we did not use confidence intervals to determine whether a finding was statistically significant, nor did we use significance testing to assess the evidence of causality."

Do you see that?

A. Yes.

Q. In forming your opinion as it relates to kidney cancer and bladder cancer on general causation in the Camp Lejeune litigation, did you consider confidence intervals when determining whether a study was statistically significant?

A. As identified by the authors in each

individual study with respect to their study methodology, I considered confidence intervals as to whether that was statistically significant in the study.

Q. And so did you make your determination based on whether or not the authors said that their results were statistically significant?

A. Are you asking if they used the term "statistically significant"? Is that how I identified it?

Q. No. Did you -- when you were determining whether a study supported causality, did you use the authors' parameters as set out in their studies, or did you have your own criteria for statistical significance?

MR. RUZICKA: Objection, form.

A. Could you clarify the question because I think --

Q. Sure. I will go ahead and give you an example. For example, hypothetically if in a study an author said a confidence interval of 0.1 to 2.5 is what we would consider statistically significant, did you rely on their determ- -- or is what we call evidence of causality. Did you rely on what they said the parameter would be, or did

you have your own criteria for determining when a confidence interval was too wide to support causation?

MR. RUZICKA: Objection, form.

A. I did not rely on the authors' assessment of whether statistical significance as expressed by a confidence interval in their study was supportive or not supportive of causality, but I'm not aware of authors that -- I can't recall authors that made a statement to that effect saying that based on this confidence interval it does or does not support causality.

Q. So if there is no statement about -- in the studies about whether the confidence interval was narrow enough to support causality, how did you determine when a confidence interval was too wide to be considered in your analysis?

MR. RUZICKA: Objection, form.

A. I'm not aware that I restricted my analysis to a specific confidence interval, if that is the question you are asking. I'm just not sure that I under- -- if I misunderstood the question. If you could rephrase it. But I'm not aware of any studies where I excluded them based on the width of a confidence interval.

Q. Are you aware of any studies where you excluded them based on the p value?

A. I'm not aware of any studies that excluded based on a p value alone.

Q. Do you agree that statistical significance is an important factor to consider?

A. I would agree that it is a factor to consider in the context of evaluating a specific study. Again, it's dependent on how the study authors developed their methodology and how they are testing a hypothesis as to how -- how statistical significance is expressed at any -- at any point in a study.

Q. Dr. Hatten, I am handing you Exhibit 9.

(Exhibit 9 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. Dr. Hatten, you submitted a report in the Zantac litigation; is that right?

A. Yes.

Q. And that was in 2022?

A. I don't recall the year, but this is dated March 7th, 2022.

Q. Does that sound accurate as to when you

submitted your report in the Zantac litigation?
A. That -- that sounds accurate. And I don't have a reason to doubt that this date is correct.
Q. The first page of this document is Exhibit 7. If you turn to the next page, it says at the top, "United States District Court for the Southern District of Florida." Do you see that?
A. Yes.
Q. And it says, "Rule 26 expert report of Benjamin Hatten, M.D., M.P.H." Is that right?
A. Yes.
Q. And that means this is your report?
A. Yes.
Q. And --
A. I didn't produce this myself, so I'm trusting that you have an accurate version of this.
Q. If you look below that on the signature line, that's your signature, correct?
A. Correct.
Q. And this is your report, but if you flip through it quickly, does it appear to be a complete and accurate copy of your report in the Zantac litigation?
A. As far as I am aware, this is complete

and accurate as of March 7, 2022.

Q. Did you change this report after March 7, 2022?

A. I have -- not for this specific action. However, there have been a number of additional Zantac matters where I have submitted reports and have updated aspects of my report since 2022.

Q. So as to the in Re Zantac Products Liability Litigation, MDL No. 2924, this appears to be a complete and accurate copy of your report, right?

A. I believe so.

Q. If you go to page 5 -- excuse me, sorry -- page 6, the first sentence says, "Along with a robust analysis of bias, the possibility that the association of interest occurred by chance rather than truly representing the underlying population must be considered. Proper consideration typically takes the form of an examination of the study methodology in concert with the statistical significance testing to examine this possibility."

Do you agree with that statement?

A. Yes. I wrote this statement.

Q. And it is a statement that you still

agree with today, correct?

A. Could you -- sorry. I may have missed it. Which sentence did -- or how far down did you -- were you reading?

Q. The first sentence says, "Along with a robust analysis of bias, the possibility that the association of interest occurred by chance rather than truly representing the underlying population must be considered."

Today do you still agree with that statement?

A. Yes.

Q. The next sentence says, "Proper consideration typically takes the form of an examination of study methodology in concert with statistical significance testing to examine this possibility."

Sitting here today, do you agree with that statement?

A. I agree with that statement, and I don't think that's any different than what I've been -- we have been discussing so far.

Q. Directing you to page 7, in the second full paragraph there -- one, two -- the third sentence and beginning with "however," do you see

that?

A. Yes.

Q. It says, "However, when effect sizes are consistently weak (e.g., relative risk of less than 2.0), the likelihood that measured confounders have not been fully accounted for or that the association (if one exists) is only causal in specific subpopulations becomes more likely, necessitating additional scrutiny of any general causation claim."

Do you agree with that statement?

A. I agree that it -- yes, I agree with that statement as written.

Q. Okay. You can go ahead and set that aside. In your reports for bladder cancer and kidney cancer, you evaluated whether there was a causal association for the chemicals TCE, PCE, vinyl chloride and benzene individually, right?

A. Yes, correct.

Q. You also included a section in both of those reports discussing the Camp Lejeune water. Is that right?

A. I would say the entire report discusses the Camp Lejeune water in the sense that that's the exposure of interest that prompted this evaluation.

Q. Directing you to page 12 of the kidney cancer report, on page 12 of your kidney cancer report you have a section header that says, "Exposure: Camp Lejeune Water," right?

A. Yes, you read that correct.

Q. And if you turn to page 16 of your kidney cancer report, you have a section that says, "Exposure: TCE." Do you see that?

A. Yes.

Q. So would it be fair to say that you conducted an analysis, including a Bradford Hill analysis, for Camp Lejeune water as well as for TCE, PCE, vinyl chloride and benzene?

A. My report is structured evaluating the Camp Lejeune water as a direct exposure, and then the compounds of concern that were contained in that, I evaluated each of those individually, and that's how I set up the report.

Q. In the section that says "Exposure: Camp Lejeune Water," were you evaluating the -- were you evaluating the Camp Lejeune water as a mixture of the substances identified?

A. I was evaluating the evidence that examined Camp Lejeune water as the exposure at a specific study. So it is whatever mixture of

compounds that was present or that was being evaluated in the water system at Camp Lejeune is what I was evaluating here.

Q. You offer an opinion that there is a causal relationship between the Camp Lejeune water and kidney or bladder cancer, correct?

A. Yes.

Q. For what years does that opinion apply?

A. I think I was --

MR. RUZICKA: Object to form.

A. I think I listed that in the...

Q. In other words, does that opinion that there is a causal relationship between the Camp Lejeune water and kidney or bladder cancer, does that apply for the entire period of 1953 to 1985 -- 1987? Excuse me.

MR. RUZICKA: Objection, form.

A. My opinion applies to any water consumed at Camp Lejeune that was contaminated with these compounds at a -- or that was contaminated with PCE, TCE, benzene and/or vinyl chloride during that period from 1953 to 1987. So does that answer your question?

Q. You are familiar with ATSDR's Camp Lejeune water model, right?

A. I've reviewed the documentation surrounding that.

Q. And so then you are aware that the levels of the individual contaminants are estimated to vary over the time period 1953 to 1987, right?

A. Correct. My understanding is based on the modeling it is the individual contaminants varied when modeled through that time period.

Q. Does your opinion that the Camp Lejeune water has a causal relationship with kidney cancer or bladder cancer take into account the varying levels of individual contaminants from 1953 to 1987?

A. Are you asking -- if I can clarify, are you asking for a specific individual who was exposed or in general as a general causation evaluation does the variability play a role?

Q. Is it your opinion that the levels of contaminants that are estimated to have been present at Camp Lejeune from 1953 to 1987 are all sufficient to cause -- sufficiently high enough to cause either kidney cancer or bladder cancer?

MR. RUZICKA: I object. You are bordering on the specific causation component of his report. He identified levels that were

hazardous to human health generally in this report, and you are kind of asking him to go a step further in the specific models at different times and years.

MS. SILVERSTEIN: I am not, but I will ask that you limit your objections to form and foundation pursuant to the deposition protocol.

MR. RUZICKA: Well, I'm just --

MS. SILVERSTEIN: Dr. Hatten -- I will rephrase my question, that's fine, but please limit the speaking objection.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, would you agree that the dose makes the poison? Have you heard that statement before?

A. I've heard that statement before.

Q. Is it a statement that you agree with?

A. In general. The degree of toxicity is, for a toxic exposure, for a specific outcome often or almost always is dependent on a dose that -- or a amount or however you want to characterize the exposure, the degree of exposure impacts the outcome.

Q. So would you agree that the

concentration of TCE, for example, in the water, matters in your determination as to whether TCE is capable of causing kidney cancer or bladder cancer?

A. I would agree that evaluating the -- using the example you provided, evaluating the degree of exposure, and if you're limiting specifically to TCE, the degree of TCE exposure, would impact the outcomes that are seen.

Again, this is -- for any specific individual, though, there is -- an individualized assessment would be necessary.

Q. And to be clear, I'm not asking about specific individuals. Is it your opinion that any amount of PCE is capable of causing kidney cancer or bladder cancer? Is that your opinion?

A. I don't think that's a opinion that's expressed in this report, and I don't hold that opinion.

Q. Okay. And so then it would be fair to say that the amount of PCE in the water plays a role in determining whether that PCE is enough to be hazardous to human health, right?

A. I would agree --

MR. RUZICKA: Objection, form. Go ahead.

A. I would agree that the degree of exposure plays a role in the expected outcome following or the potential outcome following an exposure.

Q. And when you say you were reviewing the Camp Lejeune water, were you considering the amounts of TCE, PCE, vinyl chloride and benzene in the water at the same time as part of your analysis, or were you looking at these as four separate constituents?

MR. RUZICKA: Objection, form.

A. The section -- the way I organized my report, the section on Camp Lejeune expresses the or identifies the evidence that where either the water system as a whole is evaluated, so sometimes that is or I think most often it was identified as a duration, so a time of exposure or as a combination of compounds.

If that water system had a analysis or if the analysis of the water system was analyzed by an individual compound, I placed that in the individual compound section when I was performing a causation analysis.

Q. When you were looking at the Camp Lejeune water as the Camp Lejeune water systems,

did you examine any -- whether any of the chemicals compete with each other for the same metabolic pathways?

A. Yes. That was part of my evaluation.

Q. And do you discuss that in your report?

A. I think I discuss how metabolism is similar between TCE and PCE and it utilizes some of the same enzymes -- enzymes.

Q. Did you discuss whether TCE competes with vinyl chloride or benzene?

A. I don't recall discussing that.

Q. And you would agree that the exact relationship between the interactions of TCE, benzene, PCE and vinyl chloride isn't known, correct?

MR. RUZICKA: Object to form.

A. I just don't want to misrepresent the opinion I expressed in the report. However -- and so if you will give me a second, I just want to find the section in the report where I discuss this.

Q. Dr. Hatten, you said a minute ago that you don't think that you discussed whether TCE competes with benzene or vinyl chloride for the same metabolic pathways, correct?

A. I don't believe I discussed that in the report.

Q. Okay. So you didn't discuss whether the exact relationship between TCE and benzene or vinyl chloride is known, correct?

MR. RUZICKA: Objection, form.

A. I believe -- so I state in -- there are a few instances where I discuss how multiple compounds are present and that the exact relationship is not known. I don't recall if there is additional discussion in the report of other aspects of that, though.

Q. Dr. Hatten, did you review ATSDR's 2022 publication, the public health assessment for Camp Lejeune drinking water?

A. Yes.

Q. I am handing you Exhibit 10.

(Exhibit 10 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. This is the ATSDR's public health assessment for Camp Lejeune, correct?

A. Yes, or it appears to be.

Q. And this is a document that you reviewed

when forming your opinions, right?

A. I reviewed the 2017 public health assessment produced by ATSDR.

Q. And does this appear to be the same document that you reviewed?

A. I believe it is.

Q. If you could turn to page 33, do you see at the bottom of the page the heading "PCE-TCE Interaction"?

A. Yes.

Q. So three sentences in it says, "TCE is generally metabolized at a higher rate than PCE." Do you see that?

A. I see where it states that.

Q. And do you agree with that statement?

A. I think based on metabolic studies that's correct.

Q. And then it says, "As a result, TCE is primarily eliminated from the body in the urine whereas PCE is eliminated primarily by exhalation." Do you see that?

A. I see -- I see where it states that. They are describing the parent compound, the TCE or PCE, like the compound themselves, the elimination of the compound themselves.

Q. Right. And so you see the sentence that I just read out loud, right?

A. Correct. I just answered that.

Q. So then it says, "Evidence in animal studies suggest that PCE will inhibit the metabolism of TCE." Is that right?

A. I see that sentence and the next sentence that says, "However, that effect may only occur at exposure doses that are much higher than could have been experienced by individuals contacting water from the Camp Lejeune systems."

Q. Okay. And then it says, "There does not appear to be evidence of synergistic effects resulting, i.e., greater than additive, resulting from combined exposures to PCE and TCE." Do you see that?

A. I see where that sentence is written.

Q. And do you agree with that sentence?

A. I agree in the sense that it says there does not appear to be evidence. I don't think there is evidence either way. Like, there is just a lack of evidence to indicate or to be able to determine whether the effects are synergistic or additive.

Q. Then a couple sentences down it says,

"The results of the binary weight of evidence," parentheses, "BINWOE, analysis from the Interaction Toxicological Profile, ATSDR 2004, shown in Appendix D, shows that the effects of TCE and PCE" -- or "TCE on PCE," excuse me, "are considered to be additive and the effect of PCE on TCE toxicity are additive for neurological effects and slightly inhibitive" -- "inhibitory for effects on the liver and kidney," parentheses, "likely due to the effects on TCE metabolism."

Do you see that?

A. I see where you have read that sentence.

Q. And do you agree with that sentence?

A. I agree that they wrote this sentence correctly based on the analysis. I don't think this is discussing kidney cancer, though, if that is the implication, so --

Q. Dr. Hatten, do you agree with the sentence?

MR. RUZICKA: He was answering his question. You can finish.

BY THE WITNESS:

A. Like I said, I agree that they are representing their analysis correctly. However, I don't believe that the outcome that's being

analyzed is kidney cancer. I don't think there is information available to let -- to tell us how -- how that interaction or potential interaction has a -- has been defined with respect to kidney cancer an outcome.

BY MS. SILVERSTEIN:

Q. So that wouldn't be something that you considered in your report?

A. What is the -- what are you asking about? What is the something I considered?

Q. You said there is not evidence discussing the interaction between PCE and TCE and whether or not it is additive or inhibitory for kidney cancer; is that right?

A. I'm not aware of a sufficient body of evidence to determine whether it is additive or synergistic or inhibitory for kidney cancer.

Q. So you didn't consider then whether the relationship between PCE and TCE was additive, synergistic or inhibitory in your analysis of the Camp Lejeune water; is that correct?

A. I did consider it and do not believe there is sufficient evidence for us to determine based on what we know about the mechanisms of kidney cancer development.

I don't -- I don't believe there is a reasonable way to think it is inhibitory, and I think that's in the public health assessment, they say it is -- they are presuming it is additive given there is a lack of information about synergism to support a synergistic effect. I just don't think there is enough information available to make that determination.

Q. So in your analysis, would it be fair to say that you didn't evaluate PCE and TCE as additive or synergistic?

A. I don't entirely understand the question you are asking, so if you can rephrase it.

Q. Sure. When you were looking at the Camp Lejeune water, you didn't consider whether the interactions between TCE, PCE, vinyl chloride or benzene had a synergistic effect on each other, correct?

A. I considered it in the sense that there is -- there are multiple studies that evaluate the Camp Lejeune water as a whole which contains a combination of these compounds, and I evaluated the literature surrounding the interaction between these chemicals, but it was not sufficient to provide an answer as to whether it is additive or

synergistic.

Q. You reviewed the literature and then applied the Bradford Hill viewpoints, correct?

A. I reviewed the literature, and I organized my discussion according to the aspects of causation as expressed by Bradford Hill.

Q. Before applying the Bradford Hill viewpoints, an association must be more than just observed; it needs to be clear-cut, correct?

MR. RUZICKA: Objection, form.

A. As a epidemiologist and toxicologist, I'm not sure what you mean by that question, so...

Q. Do you agree that an explicit exposure-outcome relationship must be defined before you do any analysis?

A. Yes. That is step 1 in any causation analysis.

Q. Do you agree that the exposure definition needs to involve distinguishing factors beyond simply the name of the substance of interest?

A. Yes. It -- yes. There -- it is ideal to be as specific as possible with the exposure definition.

Q. Defining the outcome of interest

requires sufficient detail with respect to the organ, tissue or metabolic processes affected, correct?

A. In general, yes. It is also true, though, that in epidemiologic literature it is frequent that investigators will define an outcome differently, like there will be individual definitions depending on how the study is conducted; and it's a -- kind of in the judgment of the person evaluating the literature as to whether those can be pulled together in a causation analysis or not.

Q. If you have distinct causal pathways, would you describe each pathway as a separate general causation question?

A. I think it depends on the specific question you are analyzing and how distinct the individual causal pathways are and how -- how they might interact with each other, so I think it depends on the individual analysis.

Q. If you could go to Exhibit 9 and turn to page 4. Do you see the second full paragraph there?

A. Yes.

Q. Beginning at the second sentence it

says, "In the context of medical toxicology, the exposure definition needs to involve distinguishing factors beyond simply the name of the substance of interest, including but not limited to timing, chronicity and route of exposure, dosing range and chemical formulation in order to analyze proposed causal associations."

Is that correct?

A. Correct. Those are all factors that need to be considered when performing a causation analysis.

Q. And then it says, "Likewise, defining the outcome of interest requires sufficient detail with respect to organ, tissue or metabolic processes affected as well as whether the proposed causal pathway is related to subpopulations or occurs in all humans."

Is that correct?

A. Yes. Those are all aspects of defining the outcome of interest that are important.

Q. One of the Bradford Hill viewpoints that you considered is strength of association, right?

A. Yes.

Q. Strength of association refers to whether the risk estimate is clinically meaningful

and plausible, right?

A. It refers to the measured effect size in populations who have been exposed to the exposure of interest with respect to the outcome of interest.

Q. You would agree that the higher the relative risk, the greater the likelihood the relationship is causal, right?

A. I would say all else being equal in a hypothetical situation where the only difference was the strength of association that was found, it is -- it adds weight to a causation discussion to have a higher strength of association. However, in the real world, it's almost never or essentially never the case that all else is equal, so...

Q. But assuming all else is equal, you would agree that a lower relative risk means that it is less likely the relationship is causal, right?

MR. RUZICKA: Objection, form.

A. If you are only discussing that specific Bradford Hill point, which is strength of association and not evaluating the other aspects of causation, there is less -- the strength of a association, a lower strength of -- measured effect

size is relatively less supportive. But again, the causation discussion doesn't happen only looking at one viewpoint or criteria, and it's never -- all else is never equal in the real world.

Q. It's possible for a relative risk to be elevated due to bias or other confounding factors, correct?

A. It is possible for the magnitude of effect to be elevated or lowered due to bias. Then separately confounding is a separate factor to consider, but either can affect the measurement of association.

Q. Another Bradford Hill viewpoint is consistency, right?

A. Yes.

Q. You would agree that it is important that a study be replicated in different populations and by different investigators before a causal relationship is accepted, right?

A. As a general statement, that is correct. Again, you are never evaluating the body of evidence in isolation to only look at consistency; and however, I think it provides much -- it provides additional evidence of strength to have consistent findings.

Q. It's important that different studies that examine the same exposure-disease relationship generally should yield similar results, right?

A. I don't think there is an expectation that doing or examining the same exposure-response evalu- -- relationship in different populations with different designs would yield the same results. However, I think you could have more confidence in the findings if they are -- if they are similar across -- that the finding -- that the finding of an exposure-response relationship is consistent. If it is consistent across multiple populations and multiple investigators, you can have more confidence that that applies to humans generally and not a subpopulation.

Q. Exposure response is another Bradford Hill viewpoint, right?

A. Yes. That's one of the aspects that's considered in causation.

Q. And generally speaking, a dose-response relationship means that the greater the exposure, the greater the risk of the outcome, right?

A. Generally speaking, yes. There are various ways to analyze that, but generally speaking.

Q. And you would agree that, generally speaking, higher exposures should increase the incidence or severity of the disease, correct?

A. I would agree that that is the case in, for example, laboratory studies. Unless there is a ceiling effect or sometimes you will see this in animals where if they get too much of a compound they die from it or they have another process that develops. That means you don't find the outcome at high doses.

In the real world it is evaluating people who have been exposed. There are other factors that may lead to a dose-response assessment not being strictly increasing at higher doses.

Q. One of the Bradford Hill viewpoints you considered is biological plausibility, right?

A. Yes.

Q. And biological plausibility depends on the existing knowledge about the mechanism by which the disease develops, right?

A. As a very general statement, that's correct. It is evaluating whether there is a potential mechanism for the disease to occur.

Q. The Bradford Hill viewpoints consider specificity, right?

A. Correct.

Q. Generally speaking, an association exhibits specificity if the exposure is associated with a single disease or type of diseases, right?

A. Yes, in the sense that specific subtypes of disease or a specific -- if there is a unique sort of outcome that is associated with a specific exposure, that adds -- and there aren't competing causes, that is -- add strength to a causation discussion.

However, I think throughout the literature on causation discussions the absence of a specific exposure-response relationship or a absence of specificity as traditionally defined is not necessarily a argument against causation.

Q. The vast majority of agents do not cause a wide variety of health effects, correct?

A. I think it's difficult without knowing exactly what you mean by "vast majority" and "a wide variety." So if you have a specific example, then I might be able to answer it more clearly.

Q. You would agree that a study that finds that a specific agent is associated with many different diseases should be looked at skeptically, right?

MR. RUZICKA: Object to form.

A. I think you should look at every study skeptically in the sense that that's part of your job as a scientist, is to critically evaluate the literature. In general, finding multiple associations may make -- lead one to look at the findings critically. That doesn't necessarily mean they are wrong or right. It just requires evaluation.

Q. Did you weigh the Bradford Hill considerations relative to each other?

A. Could you clarify the question?

Q. Were there some Bradford Hill considerations that you gave more weight to than others?

A. A discussion of causation employing a Bradford Hill framework is a qualitative discussion in the sense that you are evaluating it. It's not as if like it's a checklist or a point system where you add up a number of points and say yes, this is causal or no, this is not.

In general in toxicology, consistency and dose-response are oftentimes the first things that we evaluate. That doesn't necessarily mean that -- and when present a well worked-out

biologically plausible mechanism are important factors that I would look at first, but those are not -- it's not to imply that the other factors are not important.

MS. SILVERSTEIN: Okay. I think I would like to take a short break. We have been going for over an hour.

THE VIDEOGRAPHER: The time is 11:13 a.m. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 11:22 a.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, did you discuss with anybody the substance of your testimony during the break?

A. Not the substance, no.

Q. For your kidney cancer and bladder cancer general causation reports, you reviewed two Bove studies from 2014?

A. Correct.

Q. You reviewed two Bove studies from 2024, correct?

A. Yes.

Q. And you reviewed an ATSDR study from 2018, right?

A. Correct, as Camp Lejeune -- as evaluations of the Camp Lejeune or exposures, direct evaluations of the Camp Lejeune water system exposures.

Q. You also reviewed the National Research Council's 2009 report, Contaminated Water Supplies at Camp Lejeune: Assessing Potential Health Effects, correct?

A. I believe I reviewed that. It should be on my materials considered list, though.

Q. Do you consider the National Research Council to be a reputable organization?

MR. RUZICKA: Objection, form.

A. In general they are well recognized as a scientific body.

(Exhibit 11 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I am handing Dr. Hatten Exhibit 11.

It's a lot of exhibits.

And I'm handing you the chapter that I will be asking about rather than the entire document.

Dr. Hatten, this is the NRC report on

Camp Lejeune that you reviewed in forming your opinions on general causation as it relates to kidney cancer and bladder cancer, correct?

A. I reviewed this when I was formulating the my opinions. I don't know how much it informed my opinions.

Q. And if you would turn to page 12 of the document. You are on page 12?

A. Yes, I'm on page 12.

Q. The last full paragraph at the bottom starts with the sentence, "The available scientific information does not provide a sufficient basis for determining whether the population at Camp Lejeune has in fact suffered adverse health effects as a result of exposure to contaminants in the water supplies."

Did I read that correctly?

A. I believe you read that correctly.

Q. If you turn to page 8, on page 8 there is Box 2 that says the "Categorization of health outcomes reviewed in relation to TCE, PCE or solvent mixtures." Do you see where I'm looking?

A. I see where you are looking.

Q. And do you see "Limited/Suggestive Evidence of Association." Do you see that heading?

A. Yes.
Q. NRC classified kidney cancer as having limited/suggestive evidence of an association, correct?
A. Are you asking if that's what written? Is that correct?
Q. Is that how NRC classified kidney cancer in this 2009 report?
A. That's what it states on page 8 of this 2009 report.
Q. And it states that NRC classified bladder cancer as having limited/suggestive evidence of an association as to PCE, correct?
A. That's what this -- that's what I believe this is stating on page 8 in this report.
Q. You didn't discuss NRC's findings for kidney cancer or bladder cancer in the Camp Lejeune water section of your reports, did you?
A. I don't believe I discussed that and wouldn't have had a reason to. This is not -- these aren't original studies that would provide evidence for or against a causal relationship.
Q. Okay. So in other words, you didn't consider NRC's findings as relevant to your conclusions regarding Camp Lejeune water, correct?

MR. RUZICKA: Objection, form.

A. This publication may be relevant in the sense of providing a picture of one body's assessment of the scientific evidence as published in 2009. However, that's not what I would use ever for my basis of forming a causation opinion.

Q. You did consider conclusions from bodies like IARC in informing your opinions today, correct?

A. I reviewed those bodies, but the determination of -- my causation determination is based upon my evaluation of the literature.

Q. So your review of agency determinations as discussed in your report, that wasn't a contributor to your conclusions, right?

MR. RUZICKA: Objection, form.

A. Again, I think I described my methodology in my report for determining causation.

The agency evaluations of the evidence may be helpful in assessing or in evaluating what other scientists' opinions are with respect to a causal relationship, but they are not -- but my evaluation of the evidence is independent of any of those organizations.

Q. Okay. So I guess to be clear, you

didn't consider the NRC report in forming your opinion about kidney cancer or bladder cancer, that's correct?

MR. RUZICKA: Objection, form.

A. I reviewed it and considered it, but it is not the -- it doesn't provide new evidence that would or doesn't provide any original evidence of -- with respect to causation.

Q. You can set that aside.

I am handing you Exhibit 12, I believe.

(Exhibit 12 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you Exhibit 12, which is titled Evaluation of mortality among marines and navy personnel exposed to contaminated drinking water at USMC base Camp Lejeune: a retrospective cohort study. Do you see that?

A. I see this title. This is not the complete publication. There are four supplemental files.

Q. Sure. This is the body of the report, correct?

MR. RUZICKA: Objection to form.

BY MS. SILVERSTEIN:

Q. This is the written report, correct?

A. This is an incomplete version of the report.

Q. So earlier you said that -- we looked at a materials considered list that you said you looked at that listed a study by Goodman separately from the supplemental materials from Goodman, correct?

MR. RUZICKA: Objection, form.

A. I think, as I said before, that those are part of the same study and I listed --

Q. Yeah. You listed the supplemental materials separate, as a separate entry, correct?

A. I didn't generate the list that was sent to you. I told the attorneys what I reviewed and...

Q. Okay. So I will acknowledge this doesn't include the supplemental materials. Does this appear to be the full text of the body minus the supplemental materials?

A. It appears to be the body of the -- or it appears to be the report or the study in incomplete form without the supplemental materials.

Q. So if you turn to page 48 of your report

on kidney cancer. Are you on page 48?

A. This, somehow it's not -- it got mixed up somehow.

Yes, I'm on page 48.

Q. And this is part of your materials considered list, correct?

A. Correct.

Q. And you list the Bove studies, right?

A. Correct.

Q. You don't list the supplemental materials, do you?

A. They are part of the publication.

Q. So if they are part of the publication, how come in Exhibit 2 you listed the supplemental materials separately?

MR. RUZICKA: Objection, form.

A. I think I just told you, I didn't generate that list of supplemental materials. I told my attorneys what materials I had reviewed, and they sent something to -- in response to the notice of the deposition, but I didn't physically write that. I would include supplemental materials for any study as part of the study itself.

Q. Okay. Well, let's talk about the body of this study in what I handed you as Exhibit 12.

MR. RUZICKA: Objection, form.
BY MS. SILVERSTEIN:
Q. This is Dr. Bove's 2014 study, correct?
MR. RUZICKA: Objection, form. Do you have the supplemental materials?
MS. SILVERSTEIN: No, as they are not listed in the materials considered list. It's noted on the record that the supplemental materials are not here, and I won't ask any questions about supplemental materials.
BY THE WITNESS:
A. This is a 2014 study, the first author of Bove.
BY MS. SILVERSTEIN:
Q. Are you aware that Bove testified in a deposition that this study suffered from an exposure misclassification issue?
A. I've reviewed Dr. Bove's deposition, I believe. I don't recall the details of his testimony. I would have to review it to be able to explicitly --
Q. So sitting here today you aren't aware of whether or not Dr. Bove said that this study had a misclassification issue, correct?
MR. RUZICKA: Objection, form.

A. I don't think that's true. I think I would prefer to review his deposition testimony and see exactly how it was he phrased things.

Q. Did you consider whether there was a misclassification issue when analyzing this study?

A. Yes.

Q. And did you believe that there was a misclassification issue?

A. I think my understanding is that there was a possible but not confirmed misclassification issue.

Q. Are you aware that Dr. Bove had very little information on where marines were barracked?

A. I don't know how to define "very little." I think he -- my understanding is he and his team at the ATSDR utilized the records that were available and recollections from individuals in classifying them into various groups.

Q. I'm handing you Exhibit 13.

(Exhibit 13 was marked for identification and is attached to the transcript.)

THE WITNESS: If I could add to my last answer, it's discussed explicitly in this on page 12, and Dr. Bove also notes that it's

likely to be non-differential, that any exposure misclassification would be non-differential.

BY MS. SILVERSTEIN:

Q. I handed you what is described on the first page as the videotaped and videoconferenced deposition of Dr. Frank J. Bove dated Thursday, October 17th, 2024. Is that correct?

A. That's what it states.

Q. And you reviewed this deposition in forming your conclusions?

A. I reviewed a deposition of Dr. Bove. I don't recall if it was -- if he has been deposed multiple times, I'm not aware, but I reviewed a deposition.

Q. Directing you to your materials considered list in your kidney cancer report, which is on page 48. And you see there -- one, two, three -- four up from the bottom, it says, "Bove, FJ, deposition on October 17th through 18th, 2024, correct?

A. Yes.

Q. So you reviewed this October 17th, 2024 transcript?

A. I believe so.

Q. If you turn to page 207. Are you on page 207?
A. Yes.
Q. Beginning at line 25 it says:
"Answer: This is -- okay. And then the second analysis takes into account where we thought the units were barracked. Again, we had very little information on that, and the information we did have was from the CAP members and people who had -- other Marines who had recollections. The Marine Corps couldn't help us. So where the barracks were and the family housing records, and all that were used with the modeling results.
"As you know, there were some things we didn't know and learned maybe later from the Marine Corps, for example, where women were, were they with their unit, were they at Camp Johnson. We never got a clear answer on that, which added more problems with that exposure-response analysis, using the modeling and the residential exposure."
Did I read that correctly?
A. I believe you read that correctly.
Q. And if you turn to page 13 of

Exhibit 12. You are on page 13?

A. Yes.

Q. Do you see where it says "Conclusion"?

A. Yes.

Q. And if you look at the second sentence under "Conclusion" it says, "However, the precision of many hazard ratio measurements was low as indicated by wide confidence intervals."

Did I read that correctly?

A. Yes, you read that correctly.

Q. If you could turn to page 7. Page 7 has Table 4, which is Standardized Mortality Ratios, SMRs, Underlying Cause of Death. Do you see that?

A. Yes.

Q. And do you see where it says kidney cancer: In Table 4?

A. Yes.

Q. For Camp Lejeune the standardized mortality ratio is 1.16, correct?

A. That's what's reported in this table.

Q. The confidence interval for that is 0.84 to 1.57, correct?

A. That's what's reported in this table.

Q. You agree that that means that confidence interval includes 1?

A. This confidence interval includes 1, yes, that's correct.

Q. The next line is bladder cancer. Do you see that?

A. Yes.

Q. The standardized mortality ratio for bladder cancer at Camp Lejeune is 0.84, correct?

A. That's what's reported in this table.

Q. Which means that the study did not observe an increased risk, right?

MR. RUZICKA: Objection, form.

A. This, this result, doesn't reflect an increased risk or an elevated measure of association.

Q. On page 12 of your kidney cancer report...

Are you on page 12?

A. Yes.

Q. In the last paragraph on page 12 the second sentence says, "In an adjusted analysis with a 10-year lag, the hazard ratio for kidney cancer in Camp Lejeune personnel was 1.35," correct?

A. Yes, you read that correctly.

Q. If you turn to page 12 of Exhibit 12 -- oh, I'm sorry. I just gave you the wrong page.

Page 8. Excuse me. Do you see Table 5 on page 8?

A. Yes.

Q. Is this the result that you were referring to when you said in an adjusted analysis with a 10-year lag the hazard ratio for kidney cancer in Camp Lejeune personnel was 1.35?

A. This is a hazard ratio of 1.35. I believe this is the one I'm referring to, but without reviewing the supplemental materials, I can't tell you for sure that there is not a different analysis that I was referring to.

Q. Okay. Well, in Table 5 the hazard ratio is 1.35, correct?

A. Correct.

Q. And the confidential interval is 0.84 to 2.16, right?

A. Correct, as listed in this table.

Q. That means that the confidence interval includes 1, right?

A. In this table.

Q. In this table the confidence interval includes 1, correct?

A. In this table the confidence interval includes 1.

Q. And the p value is 0.19, correct?

A. Correct, the p value is 0.19.
Q. And you would agree that 0.19 is greater than 0.05, right?
A. Yes, I would agree that 0.19 is greater than 0.05.
Q. The next line down is bladder cancer. Do you see that?
A. Yes.
Q. The hazard ratio reported is 0.76, correct?
A. Correct, the hazard ratio is 0.76 in Table 5.
Q. Which does not indicate a positive association, correct?
MR. RUZICKA: Objection, form.
A. There is not an elevated measure of association identified for bladder cancer in this analysis.
Q. If you could turn to your bladder cancer report. Are you on page 7? Oh, sorry. Turn to page 12 in your bladder cancer report.
Under "Exposure: Camp Lejeune Water," in the second paragraph you acknowledge that the primary measure of association for bladder cancer was not elevated, correct?

A. Correct, or I state although the primary measure of association was not elevated.

Q. If you could turn back to Exhibit 12, and please turn to page 10. Do you see Table 7, Hazard ratios, 95% confidence interval, for categorical cumulative exposure and coefficients, 95% confidence interval, for continuous cumulative exposure? Do you see that table?

A. Yes.

Q. The hazard ratio for kidney cancer is only shown for PCE and total volatile organic compounds in this table, correct?

A. Correct. In the -- in Table 7 it's for kidney cancer, and only PCE and total volatile organic compounds or chemicals is listed.

Q. You would agree that the high exposure category for total volatile organic compounds for kidney cancer shows a hazard ratio of 1.54, correct?

A. Correct. In Table 7 the high exposure is 1.54.

Q. And you would agree that the confidence interval for high exposure in Table 7 for kidney cancer is 0.63 to 3.75, correct?

A. Correct. The confidence interval is

0.63 to 3.75 in Table 7.

Q. And that means that the confidence interval for total volatile organic compounds high exposure for kidney cancer includes 1, right?

A. Yes. 1 is between 0.63 and 3.75.

Q. I'm handing you what we will mark as Exhibit 14.

(Exhibit 14 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you the text of the study titled Mortality study of civilian employees exposed to contaminated drinking water at U.S. Marine Corps Base Camp Lejeune: a retrospective cohort study, correct?

A. That's the correct title.

Q. This is a 2014 study, right?

A. Yes, this is 2014. And do you have the supplemental files for this study?

Q. This study does not include the supplemental files that I handed you, correct?

A. The printout you gave me does not include the supplemental files. The study has four supplemental files.

Q. Do you agree that this study has a limitation and misclassification bias?

MR. RUZICKA: Objection, form.

A. It is subject to there is possible misclassification. I don't know if -- how substantial the limitation that is.

Q. But you agree that there is potential misclassification in this study, right?

A. I -- as I just said, I agree that there is potential misclassification in this study.

Q. And you agree that this study lacked data on workers' water use, right?

A. Could you rephrase the question or clarify?

Q. If you go to Exhibit 13, please, and turn to page 246.

A. I'm on page 246.

Q. Starting at line 20 on page 246, do you see that?

A. Yes.

Q. It says:

"Question: The last full paragraph, which starts with 'Another serious limitation." Do you see that?

"Answer: Yes.

"Question: You state, 'Another serious limitation of the study was exposure misclassification bias.'

"Answer: Uh-huh.

"Question: This is because you assumed that all the Camp Lejeune workers spent considerable time during the workday at the Mainside area of the base --

"Answer: Right.

"Question: -- served by Hadnot Point even though, undoubtedly, some did not work at Mainside, right?

"Answer: Yes.

"Question: And additionally, you didn't have information on the workers' water usage, and some may have been unexposed because they didn't use the drinking water?

"Answer: Yes.

"Question: You also assumed that all the workers resided off base and were not served by contaminated water at their residences?

"Answer: Right. And I subsequently learned that there may have been some teachers that lived on base.

"Okay.

"Answer: You know, but -- you know, we didn't distinguish teachers from the rest of the workers."

Did I read that correctly?

A. Yes.

Q. If you could turn back to Exhibit 14, and please turn to page 7.

THE VIDEOGRAPHER: I'm sorry, counsel. Could we go off the record for a minute? I'm having an audio issue.

MS. SILVERSTEIN: Sure.

THE VIDEOGRAPHER: The time is 11:57. We are off the record.

(A short interruption.)

THE VIDEOGRAPHER: The time is 11:58 a.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Page 7 has Table 3, which is Standardized Mortality Ratios, SMRs, Underlying Cause of Death, correct?

A. Yes, that's the title of the table.

Q. And it is comparing Camp Pendleton to Camp Lejeune, right?

A. Yes.

Q. You would agree that the standardized mortality ratio for kidney cancer at Camp Lejeune is 1.30, right?

A. That's what is stated in Table 3.

Q. And you would agree that the confidence interval in Table 3 is 0.52 to 2.67, right?

A. Yes, that's what's dated in Table 3.

Q. And you would agree that the confidence interval in Table 3 includes 1, right?

A. 1 is between 0.52 and 2.67.

Q. The standardized mortality ratio for bladder cancer reported in Table 3 for Camp Lejeune is 0.53, right?

A. Yes, that's what's stated in Table 3.

Q. And you would agree that that does not indicate a positive association, right?

A. That's not an elevated measure of association.

Q. The standardized mortality ratio for bladder cancer at Camp Pendleton was 0.69, right?

A. That's what's stated in Table 3.

Q. And you would agree that Table 3 is reporting a standardized mortality ratio for Camp Lejeune -- for Camp Pendleton, excuse me, as higher than the standardized mortality ratio at Camp

Lejeune, right?

A. 0.69 is greater than 0.53.

Q. If you could turn to page 8. Page 8 shows Table 4, Camp Lejeune versus Camp Pendleton: Hazard ratios and 95% confidence intervals, adjusted by sex, race, occupation (blue collar versus white collar) and education, 10-year lag. Do you see that?

A. Yes, I see that as the title of Table 4.

Q. And you would agree that the hazard ratio for kidney cancer is 1.92, correct?

A. In Table 4 it's listed as 1.92.

Q. And you would agree that the confidence interval is 0.58 to 6.34, correct?

A. The confidence interval for kidney cancer in Table 4 is 0.58 to 6.34.

Q. You would agree that the confidence interval for kidney cancer reported in Table 4 includes 1, right?

A. 1 is between 0.58 and 6.34.

Q. So that means it includes 1, right?

A. Yes. That's what I just stated.

Q. Would you agree that a hazard ratio of 0.58 to 6.34 is -- excuse me -- a confidence interval of 0.58 to 6.34 is a wide confidence

interval?

MR. RUZICKA: Objection, form.

A. I think there is -- I think it depends on the context of how you are evaluating whether it's a wide confidence interval or not.

Q. When you evaluated Table 4, did you consider 0.58 to 6.34 to be a wide confidence interval?

A. I don't think I evaluated it in terms of whether it was -- I would consider it wide or not.

Q. Did you consider the confidence interval?

A. Yes.

Q. Did you determine that it shows a precise point estimate?

MR. RUZICKA: Objection, form.

A. I'm not aware of a standard definition for defining precision based on the confidence interval, so I use it in part to evaluate the precision of the point estimate.

Q. Sitting here today, do you agree that the confidence interval 0.58 to 6.34 is a wide confidence interval?

MR. RUZICKA: Objection, form, asked and answered.

A. I don't think my opinion has changed from the time I wrote the report, so I just answered it with respect to my report, and I don't think that opinion has changed.

Q. Sure. I think you said that you didn't look at whether it was a wide confidence interval for your report. Is that right?

A. I think I said I didn't evaluate it in terms of whether it was wide or note.

Q. So what I'm asking here is, right now, sitting here in this deposition, do you consider the confidence interval 0.58 to 6.34 to be a wide confidence interval?

MR. RUZICKA: Objection, form.

A. Again, I think as I said before, I don't -- I think you have to evaluate it in the context of what's being studied, and I don't know if that -- I would consider that wide or not.

Q. So you have no opinion as to whether in Dr. Bove's Camp Lejeune civilian mortality study whether that confidence interval is a wide confidence interval?

MR. RUZICKA: Objection, form.

A. I think the confidence interval is what it is, like it's reported based on the number of --

the point estimate that is found in the number of subjects in the distribution of the -- of the population. So it's not as if it is a judgment over whether it's wide or not. It's the confidence interval that is associated with the data and the dataset.

Q. Dr. Hatten, do you think there can ever be a wide confidence interval for a study?

MR. RUZICKA: Objection, form.

A. I think it depends on how you are using the term "wide." It's -- that's a subjective term or a term that doesn't have a standard definition with respect to biostatistics. It's -- generally you would describe it as wider or less or narrower in comparison to another evaluation of the data, so...

Q. So there is not a range that you would go from this is a narrow confidence interval to this is a wide confidence interval; you don't have a standard that you look at for that?

A. No, I don't have a numerical standard that I apply to determine whether a confidence interval is wide or narrow.

Q. The hazard ratio for bladder cancer in Table 4 is 0.65, correct?

A. Correct. It's listed as 0.65 in Table 4.

Q. And that does not indicate a positive association, right?

MR. RUZICKA: Objection to form.

A. That's not -- that is not an elevated measure of association.

Q. Dr. Hatten, are you aware that Camp Pendleton is a Superfund site?

A. I don't -- I don't recall if I'm aware, if I've ever -- if I have been aware of it or not, so as I sit here I don't know if I'm aware of that.

Q. But sitting here right now do you -- you don't recall knowing that Camp Pendleton was a Superfund site, right?

A. No, although a Superfund is based on a specific compound of concern, that it's a environmental contamination mitigation program, and it's typically based on a specific compound of concern, so it would depend on what compound; or defining it as a Superfund site would also necessitate defining what the compound of concern is at that site.

Q. Are you aware that EPA has stated that the chemicals of concern at Camp Pendleton includes

TCE?

A. I don't recall if I'm -- if that's been identified or not.

Q. Are you aware of that? Do you know?

A. I'm not aware one way or another whether I have ever read that or not.

Q. And you are not aware of the levels of contamination identified at Camp Pendleton, correct?

A. I am not aware of quantitative levels of contamination that -- if you are specifically talking about TCE at Camp Pendleton that have been identified.

I would point out again, you had a long line of questioning about misclassification bias, and again, Camp Pendleton, were there TCE there, that would only serve to lower the point estimates in a comparison with Camp Lejeune rather than raise them if we accept that TCE is a cause of kidney cancer.

Q. Would it be fair to say that in writing your general causation reports on kidney cancer and bladder cancer you did not consider the levels or chemicals of contamination at Camp Pendleton?

A. I --

MR. RUZICKA: Objection, form. Go ahead.

A. I reviewed them in the context of the reporting in the studies out that compared Camp Pendleton and Camp Lejeune. I do not -- I don't recall looking specifically at any measured levels of TCE at Camp Pendleton outside of what's reported in these studies.

Q. Can you turn to page 13.

Oh, I'm sorry. Table 6, which is page 10. Are you on Page 10?

A. Yes.

Q. Page 10 has Table 6, which is Hazard ratios, 95% confidence interval, for categorized, less than median, more than or equal to median, maximum cumulative exposure and coefficients, 95% confidence interval, for continuous cumulative exposure in micrograms per liter year, correct?

A. Correct. That's the title of Table 6.

Q. And under a kidney cancer, you would agree that the greater than or equal to median exposure for a total volatile organic compounds is 4.44, correct?

A. That's what's reported in Table 6.

Q. And you would agree that the confidence

interval is 0.52 to 38.19, correct?

A. Correct. The confidence intervals in this table is 0.52 to 38.19.

Q. Dr. Hatten, do you consider 0.52 to 38.19 to be a wide confidence interval?

MR. RUZICKA: Objection, form.

A. Again, I don't know how much different or I don't think this answer would be any different than the previous question about confidence intervals. This is the confidence interval that is the result of the data. It is wider than the last confidence interval we discussed, and as I said, it's very hard to define something that's wide or not wide unless you are talking about in relation to another confidence interval that's reported. So I would say this is wider than the previous confidence interval we discussed.

Q. Would you agree that a confidence interval of 0.52 to 38.19 indicates a lower level of confidence?

MR. RUZICKA: Objection, form.

A. It indicates a lesser confidence in the precision of the point estimate or a lower degree of -- I will retract that. I think the answer as I stated it should just stand.

Q. You can set that aside.

THE WITNESS: Do you know how much longer you will go until a break, because I think we do have lunch soon available soon, so...

MS. SILVERSTEIN: We can take a break here.

THE WITNESS: I will just check and see if the food is here.

MS. SILVERSTEIN: Let's go ahead and go off the record.

THE VIDEOGRAPHER: The time is 12:12 p.m. We are going off the record.

(Lunch recess taken.)

THE VIDEOGRAPHER: The time is 1:04 p.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, during the lunch break did you talk to anybody about the substance of your testimony today?

A. No.

Q. I am handing you Exhibit 15, I think, if my counting is correct.

THE REPORTER: Yes.

MS. SILVERSTEIN: Thank you.

(Exhibit 15 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. Dr. Hatten, I just handed you what is titled Morbidity Study of Former Marines, Employees, and Dependents Potentially Exposed to Contaminated Drinking Water at U.S. Marine Corps Base Camp Lejeune, correct?

A. Yes.

Q. And this is dated April 2018?

A. Correct.

Q. And you reviewed this study, ATSDR 2018, as part of preparing your reports on kidney cancer and bladder cancer, right?

A. Yes, that's correct.

Q. You would agree that the case finding methodology in this 2018 report utilized a survey with a limited response rate, right?

A. It was a -- the case finding was a survey methodology. If I recall correctly, I think the response rate was approximately 30 percent at least for some components of the people.

Q. And you would agree that that's a limited response rate?

A. It is the response rate that was reported here.

Q. Dr. Hatten, if you could turn to page 13 of your kidney cancer report. Are you on page 13?

A. Yes.

Q. In the second paragraph -- the second -- so the second paragraph says, "Following these mortality studies, the ATSDR conducted a morbidity study focusing on kidney cancer diagnoses in former marines, their families, and former base employees compared to former Camp Pendleton residents."

Do you see where it says that?

A. Yes.

Q. The next sentence is, "Case finding methodology utilized a survey with limited response rate, making it difficult to fully exclude bias in the primary, unlagged analysis." Correct?

A. Yes, that's correct.

Q. If -- turning back to morbidity, the 2018 morbidity study, if you could turn to page 54. Are you on page 54?

A. Yes.

Q. Do you see the bolded heading that says "Limitations"?

A. Yes.

Q. The first sentence under "Limitations" says, "The study has several major limitations. Surveys could not be sent to 20% of the cohort due to lack of complete and accurate addresses for mailing a survey. Additionally, some of the surveys coded as 'not returned' likely did not reach the intended recipient."

Is that correct?

A. You read that correctly.

Q. If you turn to the next page, page 55, in that first paragraph as a continuation from page 54, the last sentence says, "Nevertheless, selection biases are still a concern because of the low participation rate and past media coverage that increased awareness among former Marines, civilian employees, and dependents from Camp Lejeune of the drinking water contamination issue and of possible health problems from the exposure."

Is that correct?

A. You read that correctly.

Q. Looking at the next paragraph, the second sentence says, "However, about 50 percent of Marines and 40 percent of civilian employees did not complete a HIPAA form to allow for medical confirmation which reduced the precision of the

odds ratio estimate."

Is that correct?

A. You read that correctly.

Q. The next paragraph says, "In the categorical analyses, there were small numbers of cases for some of the diseases in the exposure categories especially for civilian employees. Therefore, confidence intervals were wide and these results need to be interpreted cautiously."

Correct?

A. You read that correctly.

Q. The next paragraph starts, "There were several sources of exposure misclassification for the analysis of exposure-response trends for specific contaminants, correct?

A. You read that correctly.

Q. At the top of page 56 it says that they needed to rely to some extent on the recollection of knowledgeable former Marines and current base staff. Correct?

A. You read that correctly.

Q. And are you aware that ATSDR 2018 wasn't peer reviewed?

A. My understanding is that there was an internal review or an agency-level review, but it

was not submitted to a journal for peer review in a journal.

Q. You can go ahead and set that aside. I'm handing you what we will mark as Exhibit 16.

(Exhibit 16 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. This is titled Cancer Incidence among Marines and Navy personnel and Civilian Workers Exposed to Industrial Solvents in Drinking Water at U.S. Marine Corps Base Camp Lejeune: A cohort Study. Correct?

A. You read that title correctly.

Just a question. Do you have the supplemental material for this publication as well?

Q. I did not hand you the supplemental material, correct?

A. I don't see it attached here. I'm asking if it's available.

Q. No. I'm limiting my questions to the text of the report.

The primary author on this report is Bove, correct?

A. Correct.

Q. And this is a 2014 publication?
A. Correct, it was published in 2014.
Q. You are aware that the cancer incidence study did not perform any statistical significance testing, right?
A. My understanding is that not in a -- not in the form that we have talked about previously.
Q. Are you referring to Dr. Bove's use of confidence interval ratios?
A. Correct. Well, he calculated confidence intervals for various findings, which is a form of statistical significance testing, but I don't believe he used p values or explicitly -- or explicitly performed any statistical significance tests.
Q. If you look in the results section on page -- on the first page, this study discusses CIRs or confidence interval ratios, correct?
A. Correct.
Q. Are you aware of any other scientific literature that uses confidence interval ratios?
A. I am not able to provide you another example at the moment, but I'm not sure if there are or aren't other good examples.
Q. You can't think of any sitting here

today, correct?

A. Yes. I just said I'm not able to provide you one, an example here while I'm sitting here.

Q. In your experience, is a confidence interval ratio a standard evaluation tool in epidemiology studies?

A. I don't -- I don't know if it's standard or not. As I said, I don't have another example to provide you. However, confidence intervals were reported in this, and that's where he derived the confidence intervals ratios from.

Q. To the best of your knowledge, are confidence interval ratios a widely-used analysis tool in the scientific community?

A. To the best of my knowledge, no, they are not widely used.

Q. And you are aware that no individualized exposure assessments were performed for this study, correct?

A. Could you clarify exactly what you are asking?

Q. Did Dr. Bove perform an individualized exposure assessment on any of the study participants for this study?

A. I don't believe he performed a individualized exposure assessment for the individuals --

Q. And you --

A. -- in the form of -- in the form of him modeling exposure for each individual person.

Q. Dr. Hatten, did you review the preprint version of the cancer incidence study?

A. I have reviewed the preprint version.

(Exhibit 17 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I'm handing you Exhibit 17. This is titled Evaluation of Cancer incidence among Marines and Navy personnel and civilian workers exposed to contaminated drinking water at U.S. Marine Corps Base Camp Lejeune: a cohort study, correct?

A. Yes, you read that correctly.

Q. And at the bottom of the first page it says, "Note: This preprint reports new research that has not been certified by peer review and should not be used to guide clinical practice," correct?

A. I see that note. Yes, you read it

correctly.

Q. And did you review this publication in forming your opinions as to general causation for kidney cancer or bladder cancer?

A. I reviewed this publication, but I also reviewed the final published version and used the information contained in the final published version in developing my opinions.

Q. So you did review this preprint version then?

A. I've reviewed both versions.

Q. If you could turn to table -- I ask first, do you see the Bates stamps on the bottom, CLJA_ATSDR_BOVE-0000060601?

A. Yes.

Q. Please turn to the Bates stamp ending in 60148. This is Table 2. Do you see Table 2?

A. Yes.

Q. Table 2 says, "Standardized Incidence Rates and Poisson" -- I'm not sure if I am pronouncing that correctly -- "regression results: Marines/Navy personnel subgroup." Do you see that?

A. Yes.

Q. To the best of your recollection, this table wasn't included in the final version of the

cancer incidence study, correct?

A. I can compare the two if you want just to confirm. I just -- I would have to compare the two.

Q. Sure, go ahead and take a look.

A. I do not see that same table. I will note that I don't have access to the supplemental files associated with this, with the final publication to verify that it's not contained in one of those.

Q. So you didn't see it in what is marked as Exhibit 16, correct?

A. Not in the Exhibit 16 that you provided me.

Q. Table 2 shows the standard incident rate at Camp Lejeune for urinary bladder cancer. Do you see that row?

A. Yes.

Q. The standardized incidence rate for bladder cancer at Camp Lejeune is 0.90, correct?

A. Yes.

Q. Do you agree that 0.9 -- a standard incidence rate of 0.90 doesn't show an elevated association, correct?

A. That is not an elevated measure of

association when compared to the general population.

Q. And you would agree that as compared to Camp Pendleton, the standardized incident rate is 1.08, correct?

A. This is a relative rate.

Q. The relative risk is 1.08?

A. It's a -- sorry. It's a risk ratio is what's -- the RR in this table is reported as a risk ratio, and it's reported at 1.08.

Q. The next row shows kidney and renal pelvis cancer. Do you see that?

A. Yes.

Q. You would agree that the standard incident rate for Camp Lejeune shown in this table is 1.03, correct?

A. It's reported as 1.03 in this table.

Q. Would you typically consider 1.03 to show an elevated measure of association?

A. It is a positive in the sense that it's greater than 1 measure of association that I typically would not consider 1.03 to be elevated.

Q. I want to go back to Exhibit 16. If you could turn to page 7. Page 7 shows Table 3, which is titled Comparison of cancer outcomes at Camp

Lejeune versus Camp Pendleton among the Marines/Navy personnel subgroup who began active duty and were stationed at either base between 1975 and 1985. Correct?

A. Yes, you read that correctly.

Q. If you scroll down -- not scroll down -- go down on the cancer outcomes, you see kidney and renal pelvis cancer. Do you see that?

A. Yes.

Q. The adjusted hazard ratio, confidence interval ratio is 1.06. Or, excuse me, the adjusted hazard ratio is 1.06, correct?

A. Yes, it's listed as 1.06 in Table 3.

Q. Would you typically consider 1.06 to be evidence of an increased measure of association?

MR. RUZICKA: Objection, form.

A. I think it would depend on the way the study was designed, although most times I would not consider 1.06 to be evidence of an elevated measure of association.

Q. If you see a few lines up from that, it says urinary bladder. Do you see that?

A. Yes.

Q. The adjusted hazard ratio for urinary bladder cancer is 1.09, correct?

A. Yes, that's what's listed in Table 3.
Q. Would you typically consider a hazard ratio of 1.09 to be evidence of an increased measure of association?
MR. RUZICKA: Objection, form.
A. It is a positive measure of association. However, I typically have not and would not consider 1.09 to be an elevated measure of association.
Q. You can go ahead and set that document aside. I am handing you Exhibit 18.
(Exhibit 18 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I handed you Exhibit 18. This is titled Evaluation of mortality among Marines, Navy personnel and civilian workers exposed to contaminated drinking water at U.S. Marine Corps Base Camp Lejeune: a cohort study, correct?
A. Yes, you read that correctly.
Q. The primary author on this study is Bove?
A. Yes, that's correct.
Q. And this is a 2024 publication, right?

A. Yes, it was published in 2024.
Q. You would agree that for this study no individualized exposure assessment was performed, correct?
A. I don't believe Dr. Bove calculated an individual exposure or did an individual exposure calculation for each person.
Q. You would agree that myelodysplastic syndrome was the only reported result with a monotonic trend for exposure response, correct?
I'm handing you Exhibit 19.
(Exhibit 19 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I just handed you Exhibit 19, which on the front says "Deposition of Frank J. Bove" and is dated October 18th, 2024, correct?
A. Yes, I think you read that correctly.
Q. And this is the second day of deposition testimony that you listed in your materials considered as something you reviewed, correct?
A. I believe so.
Q. Please turn to page 25.
A. Yes.

Q. On page 25 beginning at line 7 it says:
"Question: So in this article the only results that you report for the exposure-response analysis are for the monotonic trends that were observed for myelodysplastic syndrome, correct?
"Answer: Myelodysplastic syndrome.
"Question: Yes. Thanks for that correction -- in the Marine/Navy cohort and kidney cancer and the civilian worker cohort, correct?
"Answer: No. I reported all the findings?
"Question: Okay, but as far as in the text of the report?
"Answer: Oh, yes, in the text, yes.
"Question: The findings themselves are included in the tables, right?
"Answer: Yes."
And so looking at Dr. Bove's report, are you aware of any monotonic trends other than myelodysplastic syndrome that showed a monotonic trend for exposure-response?
MR. RUZICKA: Objection, form.

A. Could you clarify the question?
Q. We can go to a different question.
Please turn to exhibit -- back to Exhibit 19. Turn to supplemental Table 6.
A. Is it 18 or 19? 18 is the study and 19 is the deposition Day 2.
Q. Excuse me. Turn to Exhibit 18.
Are you at Table S6?
A. Yes.
Q. Table S6 is, "Hazard Ratios and 95 percent lower and upper confidence intervals for the Marines/Navy personnel subgroup analysis of base duration between 1975 and 1985 at Camp Lejeune with Camp Pendleton as reference: Underlying cause of death." Correct?
A. Yes, you read that correctly.
Q. Would you agree that Table S6 shows an inverse exposure-response relationship for kidney cancer?
A. It shows a inverse or it shows a monotonically decreasing exposure-response relationship using duration on base as the metric of exposure.
Q. And if you can turn to Table S8.
Are you at Table S8?

A. Yes.

Q. Table S8 shows the hazard ratios and 95% lower and upper confidential intervals for the analysis of civilian employees' employment duration at Camp Lejeune between October 1972 and October 1985 with Camp Pendleton as reference: Underlying the cause of death. Correct?

A. Correct.

Q. And do you see urinary bladder listed under "Outcome"?

A. Yes.

Q. Table S8 shows an inverse exposure-response relationship for bladder cancer, correct?

A. It shows a decreasing exposure-response relationship using duration on base for civilian employees as the metric of exposure.

Q. You can go ahead and set that document aside. If you can turn back to your kidney cancer report. I know it's a lot of jumping around between documents.

Do all of the opinions contained in your kidney cancer report apply to both clear cell renal cell carcinoma and papillary cell renal cell carcinoma?

A. In the majority of cases that I -- or majority of studies that I base my -- that I evaluated, those were not separated into separate conditions. There are some that are separated. However, I don't know that there is a large enough body of evidence to separate out individualized assessments for each subtype of kidney cancer.

Q. So would it be fair to say that your opinions apply to -- in this kidney cancer report apply to both clear cell renal cell carcinoma and papillary cell renal cell carcinoma?

A. Yes, unless noted explicitly that there is an exception. I don't believe I put that in the report, but I can't state that for sure without reviewing the entire report again.

Q. Do your opinions regarding clear cell and papillary cell renal cell carcinoma -- let me rephrase that.

Do the opinions contained in your kidney cancer report apply to upper tract urothelial cancer?

A. I believe I explicitly addressed that on page 10 under Outcome of Interest where I state, "Although more similar histologically to bladder tumors, most authors that do not separately analyze

urothelial tumors include them with kidney cancers. The measures of association in studies that include urothelial/renal pelvis cancers are similar to studies that do not include urothelial cancers. See Appendix 1: table.

"Furthermore, in studies that directly compare urothelial/renal pelvis cancers to other kidney cancers, the measures of associations" -- "measure of association there are similar."

I reference Lynge 1997; Raaschou, R-a-a-s-c-h-o-u, dash, Nielsen 2003.

"Urothelial/renal pelvis cancers occur in the kidney, and the kidney cancer epidemiological studies apply for purposes of this causation analysis. All four of the toxins at issue cause upper tract urothelial carcinoma."

Q. So going back to my question, the answer is yes, the opinions that you provide in your kidney cancer report you maintain do apply to upper tract urothelial cancer, correct?

A. Yes, as I just read from my report.

Q. I want to turn to the TCE section of your kidney cancer report which begins on page 16. Do you see that?

A. Yes.

Q. And then if you turn to page 22 and 23, you do a Bradford Hill analysis, correct?

A. I organized the considerations using a Bradford Hill framework.

Q. So I noticed that I asked you if did a Bradford Hill analysis and you reframed it as you organized it using the framework. Did you apply the Bradford Hill criteria to the literature that you reviewed as part of forming your conclusions?

MR. RUZICKA: Objection, form.

A. Yes. I don't really see a difference between the two. I'm just being very clear because -- or trying to be very explicit that the purpose of a Bradford Hill analysis -- I'm using air quotes which aren't evident in a deposition transcript, but is that it is not a formulaic -- it's not a formula. You apply it as a way of organizing a discussion of causation and developing a causation determination. It's not a -- there is not a way to just plug the data in and just get a result from a Bradford Hill analysis.

Q. Sure. You used the Bradford Hill framework to go through the literature and see what the weight of the evidence was, correct?

A. Correct.

Q. So on page 22, do you see the heading "Strength of Association"?
A. Yes.
Q. And so this is where you are discussing studies that you believe show an elevated measure of association for TCE and kidney cancer, correct?
A. Correct.
Q. One of the studies you cited is Axelson 1994, right?
A. Yes.
Q. I'm handing you Exhibit 20.
(Exhibit 20 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I have handed you a document titled Updated and Expanded Swedish Cohort Study on Trichloroethylene and Cancer Risk, right?
A. Yes, that's the title.
Q. And this is Axelson 1994?
A. I will just confirm. Yes.
Q. Since you cited Axelson in your kidney cancer report, would it be fair to say that you consider it a reliable study?
A. I consider it reliable in the sense that

it is informative and a methodologically sound study.

Q. If you could turn to page 560, see Table 3. Are you at Table 3?

A. Yes.

Q. This is overall cancer morbidity 1958 to 1987 in trichloroethylene-exposed men less than 79 years, right?

A. Less than or equal to 79 years.

Q. Thank you. Less than or equal to 79 years.

A. Yes, you read the rest of it correctly.

Q. If you go down, do you see kidney cancer?

A. Yes.

Q. And the standardized incident rate is 1.16, correct?

A. Yes.

Q. The confidence interval is 0.42 to 2.52, correct?

A. Yes, you read that correctly.

Q. And that means that the confidence interval for kidney cancer includes 1, right?

A. Yes. The 1 is between 0.42 and 2.52.

Q. You will see the next line says "bladder

cancer." Do you see that?
A. Yes.
Q. And the standardized incident rate for bladder cancer is 1.02, correct?
A. Yes.
Q. And 1.02 is a standardized incident rate that you observe as a positive but not an elevated measure of association, correct?
A. Yes, that's how I would characterize 1.02.
Q. If you could turn back to the first page of the study, page 556, do you see italicized paragraph on the left?
A. Yes.
Q. The last sentence says, "It is concluded that this study provides no evidence that trichloroethylene is a human carcinogen, i.e., when the exposure is as low as for this study population." Correct?
A. You read those words correctly.
Q. And based off of that statement, the authors in Axelson 1994 concluded that their study did not show that trichloroethylene was a human carcinogen, right?
MR. RUZICKA: Objection, form.

A. I don't know that they made a conclusion with respect to whether or not based on their study trichloroethylene could be assessed as a human carcinogen. I think they are stating that they don't feel like it provides additional evidence.

Q. They state that the study provides no evidence that trichloroethylene is a human carcinogen, right?

MR. RUZICKA: Object to form.

A. I don't see a difference between that and the answer I just provided you.

Q. Okay. Did I -- is that what the authors say, that their study provides no evidence that trichloroethylene is a human carcinogen, right?

MR. RUZICKA: Objection to form.

A. That is what the authors state in that sentence.

Q. But you relied on Axelson 1994 to show strength of association for kidney cancer, correct?

A. This is one of the studies that I pointed out that demonstrated an elevated measure of association.

Q. Another study that you relied on to show strength of association is Blair 1998, correct?

A. Yes.

Q. I am handing you Exhibit 21.

(Exhibit 21 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I just handed you a document titled Mortality and cancer incidence of aircraft maintenance workers exposed to trichloroethylene and other organic solvents and chemicals: extended followup, correct?

A. Yes.

Q. This is Blair 1998 as cited in your report?

A. I believe so.

Q. So I want you to look on the left-hand side of the page in that first long paragraph. Do you see where I'm looking?

A. I'm not. You will have to --

Q. Do you see the bolded paragraph on the left-hand side of the page under "Abstract"?

A. Yes, although I don't think it's a single paragraph. It's a single column with a number of subheadings.

Q. Do you see where it says "Results"?

A. Yes.

Q. And then do you see about halfway down that section it says, "Workers exposed to trichloroethylene showed non-significant excess cases" -- "non-significant excess for..."

Do you see that?

A. Yes.

Q. One of the diseases that they list is kidney cancer, correct?

A. Correct, with a relative risk of 1.6 or a risk ratio, I think. I don't know which they are reporting. I will have to look through it.

Q. You see where they say workers exposed to trichloroethylene showed non-significant excesses for kidney cancer, correct?

A. Sorry. I'm finishing the prior question you asked. The "RR" stands for rate ratios in this study.

Q. And my question was if after the statement "workers exposed to trichloroethylene showed non-significant excesses for" and they listed kidney cancer. Is that correct?

A. Correct, with a rate ratio of 1.6.

Q. Do you see where it says "Conclusion"?

A. Yes.

Q. The first sentence after "Conclusion"

is, "These findings do not strongly support a causal link with trichloroethylene because the associations were not significant, not clearly dose-related, and inconsistent between men and women."

Do you see where it says that?

A. You read that correctly.

Q. I'm going back to results. The second-to-the-last paragraph under "Results" says, "None of these cancers showed an exposure-response gradient and other risk ratios among workers exposed to other chemicals but not trichloroethylene often had risk ratios as large as workers exposed to trichloroethylene."

Did I read that correctly?

A. No, you didn't.

Q. Is "RR" relative risk?

A. No.

Q. What is "R," since you just looked?

A. It was rate ratio.

Q. Risk ratio, correct?

A. It was rate ratio. Is that what I just said?

Q. Okay. Well, I will go ahead and read it as RR then?

A. Rate ratios.

Q. "None of these cancers showed an exposure-response gradient and rate ratios among workers exposed to other chemicals but not trichloroethylene often had rate ratios as large as workers exposed to trichloroethylene." Correct?

A. You read that correctly.

Q. In your kidney cancer report, do you state what exposure level of trichloroethylene can cause kidney cancer?

MR. RUZICKA: Objection, form.

A. I report the levels that have been associated with kidney cancer in studies of humans.

Q. And where do you report that?

A. So beginning on page 36 there is a entire section of entitled Levels of Toxic Exposure that are Hazardous to Humans Generally are Known to Cause Kidney Cancer."

Q. Looking at this section, the only number in terms of exposure that I see is on page 37. You say, "This is the low exposure group of more than 1 to 4,600 micrograms per liter a month in the Bove 2014a study."

Is there anywhere else in this section that you quantify what level of TCE exposure can

cause kidney cancer?

MR. RUZICKA: Objection, form.

A. Yes. There are multiple other instances where I list a level that has been associated with kidney cancer in a study in humans or has been demonstrated to be associated with kidney cancer in humans.

Q. And do you have an opinion as to -- if someone were to say to you, "Dr. Hatten, what level of TCE exposure does a person have to have for it to be possible that that TCE causes kidney cancer," what amount of exposure would you tell them?

A. I would tell them --

MR. RUZICKA: Objection, form.

A. I would tell them what I stated in my report, that these have been identified in studies as being associated with kidney cancer in people.

I don't think we have a defined lower bound for what level of exposure can cause kidney cancer, but it is measured all the way down to a group that is very, very low, such as greater than 1 microgram per liter month to 3100 micrograms per liter month in the Bove 2014a study.

Q. You just said we don't have a lower bound of exposure, correct?

MR. RUZICKA: Objection, form.

A. I'm saying we don't know what the lower bound is, but it's been reported down to the group that is greater than 1 to 3100.

Q. Are you aware of any study by an author other than Bove that concluded that?

MR. RUZICKA: Objection, form.

A. That concluded, that identified this level?

Q. Correct.

A. Not that identified this level, I'm not aware of another study.

I just want to clarify I gave you a dosing range that Bove reported. There is also, for example, on page 40 Andrew reported a exposure group with an associated -- association with kidney cancer in a contaminated water supply with a metric that is even lower than that. It's greater than zero to 27.6 micrograms per liter. So that exposure group is also associated. They are not exactly the same, but they are similar orders of magnitude.

Q. I'm handing you Exhibit 22 which, I apologize, is very large, and I am handing counsel a copy of the chapter that I will be asking about.

(Exhibit 22 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you a document titled Toxicological Review of Trichloroethylene, correct?

A. Correct. You read the title correctly.

Q. And this is dated September 2011?

A. Yes.

Q. And the bottom of the page it says, "U.S. Environmental Protection Agency in Washington, D.C.," correct?

A. Yes, that's correct.

Q. Are you familiar with this document?

A. I've reviewed this document.

Q. And you listed it in your materials considered list for your reports, correct?

A. I believe so.

Q. If you could turn to page 5-139. I am also happy to hand you the chapter instead of the whole document, if you would prefer that.

A. That's okay. I will find it.

5-139, is that correct?

Q. Yeah, correct.

A. I am on 5-139.

Q. And you see the section at the top, 5.2.2, Dose-Response Analysis: Human Epidemiological Data?

A. Yes, I see that.

Q. About halfway through the paragraph there is a sentence that starts, "While the detailed approach." Do you see that?

A. Yes.

Q. It says, "While the detailed approach used by Moore, et al., 2010 should be fairly reliable for general rankings, the resulting estimates are not expected to be as quantitatively accurate as those in the Charbotel, et al., 2006 study, which relied on a task-exposure matrix based on decades of measurements from the Arve-Valley workshops, Fevotte, et al., 2006. See also Section 4.4 for more discussion of the exposure assessments."

Did I read that correctly?

A. I believe so.

Q. Looking at the next sentence, EPA, quote, thus determined, quote, "Thus, the Charbotel, et al., 2006 study was selected as the sole basis for the derivation of an inhalation unit risk estimate for kidney cancer." Is that correct?

A. You read that correctly.
Q. You can go ahead and set aside that very large document.
I'm handing you Exhibit 23, fortunately not as large as the last one.
(Exhibit 23 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I just handed you a document titled Case-Control Study on Renal Cell Cancer and Occupational Exposure to Trichloroethylene Part II: Epidemiological Aspects, correct?
A. Yes, that's correct.
Q. This is dated 2006?
A. Yes.
Q. And the main author on this is Barbara Charbotel, correct?
A. Yes, or that's the first author.
Q. Would you agree that Charbotel 2006 only found a statistically significant increase where the exposure was 335 parts per million year or more?
A. I would have to review the study to --
Q. Did you consider this study in your

kidney cancer report?

A. Yes.

Q. Go ahead and turn to page 782. Do you see Table 6?

A. Yes.

Q. Table 6 is the relation between exposure to TCE and renal cell carcinoma as a function of the three indicators, conditional logistic regression matching on sex and age, correct?

A. Yes, you read that correctly.

Q. And do you see the column to the far right, adjusted odds ratio?

A. Yes.

Q. And do you see where it says "cumulative dose"?

A. Yes.

Q. And you would agree that the low cumulative dose is 1.62, correct?

A. That's what's reported in this table, you read that correctly.

Q. And you would agree that the confidence interval for the low cumulative dose is 0.75 to 3.47, correct?

A. Yes, you read that correctly.

Q. That includes the -- that confidence

interval includes 1, right?

A. Yes. 1 is between 0.75 and 3.47.

Q. The median cumulative dose adjusted odds ratio is 1.15?

A. Yes. You read that correctly.

Q. And the confidence interval there also includes 1, right?

A. Yes. 1 is between 0.47 and 2.77.

Q. So that means that according to this table for cumulative dose, the only adjusted odds ratio that did not include 1 is for high cumulative dose, correct?

MR. RUZICKA: Objection, form.

A. That's the only entry under adjusted odds ratio under cumulative -- for cumulative dose where the confidence interval does not include 1.

Q. You can go ahead and set that document aside.

In your kidney cancer report, if you'd look at page 22. Are you on page 22?

A. Yes.

Q. Do you see the exposure-response section?

A. Yes.

Q. One of the studies that you cite there

is Kelsh, correct?

A. Yes.

Q. And you say multiple studies have demonstrated monotonic exposure-response for increased intensity of TCE exposure with increased kidney cancer before citing Kelsh 2010?

A. Yes.

Q. I'm handing you Exhibit 24.

(Exhibit 24 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I just handed you a document entitled Occupational Trichloroethylene Exposure and Kidney Cancer, A Meta-Analysis, correct?

A. Yes.

Q. This is Kelsh 2010, right?

A. Yes, Kelsh 2010.

Q. I want to direct you to in the right -- in the left-hand column, excuse me, the section that says "Conclusions." Do you see that?

A. Yes.

Q. It says, "Positive associations were observed across various study groups. However, considerations of unmeasured potential confounding,

lack of quantitative exposure assessment and lack of exposure-response patterns limit epidemiologic insight into the role of trichloroethylene exposure and its potential causal association with kidney cancer."

Did I read that correctly?

A. You have read those words correctly.

Q. In your kidney cancer report on page 23 -- do you see page 23?

A. Yes.

Q. Under "Analogy" you agree that the analogous evidence you identified for TCE and kidney cancer was PCE exposure, right?

A. Correct.

Q. In your section on TCE and kidney cancer you didn't cite Michalek 2019, correct?

A. I don't recall citing that.

MS. SILVERSTEIN: We have been going for about an hour. It is a good time to take a short break.

THE VIDEOGRAPHER: The time is 2:05 p.m. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 2:11 p.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, did you discuss the substance of your testimony with anybody on the break?

A. No.

Q. I want to turn to your analysis of PCE and kidney cancer. It begins on page 24 of your kidney cancer report. In that section beginning on page 27 you have a section titled "Bradford Hill: PCE," correct?

A. Yes.

Q. Under Strength of Association one of the studies that you cited is a Vlaanderen 2013?

A. Yes.

(Exhibit 25 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you a -- I handed you Vlaanderen 2013, correct?

A. Yes.

Q. And this is a study that you relied on in your report, right?

A. This is one of the studies I evaluated in my report.

Q. And one of the studies that you cited as supporting strength of association, correct?
A. Yes.
Q. I want to direct your attention to the left-hand column on the first page that says "Results." Do you see that?
A. Yes.
Q. Under "Results" the author wrote, "Hazard ratios for liver cancer, NHL and MM but not kidney cancer were slightly elevated in groups with high exposure to perchloroethylene compared to occupationally exposed subjects," correct?
A. You read that correctly.
Q. For strength of association you also cited a study Aschengrau 1993, correct?
A. Correct.
Q. And you cited Aschengrau as a study that supports strength of association for PCE and kidney cancer, right?
A. Yes.
Q. I'm handing you Exhibit 26.
(Exhibit 26 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:

Q. This document is titled Cancer Risk and Tetrachloroethylene-Contaminated Drinking Water in Massachusetts, correct?

A. Yes.

Q. And you'd agree that tetrachloroethylene and perchloroethylene are the same substance, right?

A. Yes.

Q. So that means that tetrachloroethylene, when I refer to PCE, I'm referring to the same thing, right?

A. Yes, that's my understanding.

Q. If you could turn to page 289. Do you see Table 4?

A. Yes.

Q. Table 4 is titled History of PCE Exposure among Cases and Controls, With and Without Considering Latency, Crude Odds Ratio and 95% Confidence Intervals. Is that correct?

A. Yes, that's correct.

Q. Table 4 reports no results for PCE and kidney cancer with latency, correct?

A. Correct. My understanding is that the number of cases were too low to do any analysis.

Q. And Table 4 with latency -- excuse me.

Table 4 without latency reports the crude odds ratio for kidney cancer as 1.23, correct?

A. For any exposure to PCE, the crude odds ratio is 1.23 in Table 4.

Q. And for any exposure for kidney cancer without latency, the confidence interval is 0.40 to 3.11, correct?

A. Yes, you read that correctly.

Q. Table 4 reports no results for high TCE exposure without latency, correct?

A. Yes. My understanding is the number of cases were too low to perform any analysis.

Q. You can go ahead and set that document aside. Another study that you cited for strength of association for PCE and kidney cancer is Anttila 1995, right?

A. Yes.

Q. I'm handing you Exhibit 26.

THE REPORTER: 27.

MS. SILVERSTEIN: 27, excuse me.

(Exhibit 27 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. This document is titled Cancer Incidence

among Finnish Workers Exposed to Halogenated Hydrocarbons, correct?

A. Yes. It's halogenated. The pronunciation is wrong, but the words are correct.

Q. My poor pronunciation aside, this is Anttila 1995 that you reviewed for your kidney cancer report, correct?

A. Yes.

Q. If you could turn to page 802, do you see Table 3?

A. Yes.

Q. Table 3 is the observed numbers of cancer cases in standardized incidence rates in 1967 to 1992 for selected primary sites with 95 percent confidence intervals with workers exposed to trichloroethylene, both genders combined by years since the first measurement. Correct?

A. Yes.

Q. Do you see the column Whole Period?

A. Yes.

Q. The standardized incident rate for kidney cancer for the whole period is 0.87, correct?

A. You read that correctly on this tabl3e.

Q. And for bladder cancer, bladder, ureter

and urethra cancer for the whole period, the standardized incident rate is 0.82, correct?

A. You read that correctly.

Q. You can go ahead and set that document aside. If you could turn to page 27 of your kidney cancer report.

THE VIDEOGRAPHER: Counsel, I have a Pat Wallace trying to join Zoom. Is that all right?

MR. RUZICKA: That's fine.

BY MS. SILVERSTEIN:

Q. On page 27, this is your discussion of the Bradford Hill framework for PCE kidney cancer, correct?

A. Yes, that's correct.

Q. And do you see the heading that says "Exposure-Response"?

A. Yes.

Q. Under "Exposure-Response" you said: "Multiple studies have demonstrated monotonic exposure-response relationships for increased intensity of PCE exposure with increased Kidney cancer. ATSDR 2018, Callahan 2019. Additional evidence of exposure-response occurs with other measures of intensity of exposure. Aschengrau

1993, Bove 2014a, Christensen 2013, Purdue 2017, Vlaanderen 2013. Similar results despite varied methods of assessing exposure provide compelling evidence of causation given the exposure-response relationship demonstrated in multiple studies."

Did I read that correctly?

A. Yes.

Q. If we could go back to Exhibit 26 with Aschengrau 1993. If you turn to page 289, back to Table 4. You would agree that Table 4 without latency for kidney cancer shows an -- a crude odds ratio of 1.36 and no result for high exposure, correct?

A. Correct. The crude odds ratio in this table for kidney cancer is 1.36 in the low-exposure group, and there were not enough cases in the high-exposure group to analyze.

Q. The data reported in Table 4 does not show a monotonic dose-response for kidney cancer, correct?

A. Correct, it does not.

Q. And can you go back to Exhibit 25 and turn to page 4, which has Table 2. Do you see Table 2?

A. Just a moment. Yes, I see Table 2.

Q. Do you see the column that says "Kidney"?
A. Yes.
Q. For kidney cancer and perchloroethylene, the first tier of exposure is 1.11, correct?
A. Yes, that's correct.
Q. The second tier of exposure is 0.96?
A. Yes, that's correct.
Q. And the third tier of exposure is 0.94, correct?
A. Yes, that's correct.
Q. Is this showing a monotonic exposure dose -- sorry -- exposure-response ratio?
A. No, it's not.
Q. Did you review the ATSDR assessment of the evidence for drinking water contaminants at Camp Lejeune?
A. Yes.
Q. I am handing you Exhibit 27.
THE REPORTER: 28.
MS. SILVERSTEIN: 28. Thank you.
(Exhibit 28 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you a document titled ATSDR Assessment of the Evidence for the Drinking Water Contaminants at Camp Lejeune and Specific Cancers and Other Diseases, correct?

A. Yes, that's correct.

Q. This is dated January 13th, 2017?

A. Yes, that's correct.

Q. And this is the ATSDR assessment of the evidence that you reviewed in forming your opinions, correct?

A. Yes, I reviewed that in forming my opinions in developing my report.

Q. And you cited it in the -- as support for your opinion that there was an exposure-response relationship but, rather, the discussion of the exposure-response relationship for PCE and kidney cancer, right?

MR. RUZICKA: Objection, form.

A. I don't believe that's correct, but can you show me where you --

Q. That's fine. You reviewed this in forming your opinion as to PCE and kidney cancer, right?

A. I reviewed this as one of the materials

I reviewed, yeah.

Q. Can you go ahead and turn to page 22.

MR. RUZICKA: On Exhibit 28?

MS. SILVERSTEIN: Yes.

BY MS. SILVERSTEIN:

Q. Are you on page 22?

A. Yes.

Q. Do you see the heading "PCE"?

A. Yes.

Q. And do you see where it says "Conclusion"?

A. Yes.

Q. Under "Conclusion" it states, "ATSDR concludes that there is below equipoise evidence for causation for PCE and kidney cancer due to the lack of consistency in the findings from the epidemiological studies," correct?

A. You read that correctly.

Q. I'm going to turn to page 28 of your kidney cancer report. Are you on page 28?

A. Yes.

Q. Do you see where it says "Summary: PCE"?

A. Yes.

Q. And do you see where you said "Additionally, the 2017 ATSDR framework is also

clearly met: Equipoise and above evidence for causation" and you describe the equipoise and above evidence for causation?

A. Yes, I see that.

Q. Is it your opinion that there is equipoise and above evidence for causation for PCE and kidney cancer?

A. Yes, that's my opinion.

Q. And is that true even though ATSDR 2017 concluded there was below equipoise evidence for causation?

A. Yes, based on my evaluation of the studies themselves.

Q. So you disagree with ATSDR's application of their standard?

MR. RUZICKA: Objection to form.

A. I don't have an opinion on their application. They didn't have access to all the studies that I've reviewed. Their evaluation was done at the beginning of 2017. I've reviewed additional studies since then.

Q. So I wanted to take a look at the studies that you reviewed in your Bradford Hill framework for PCE. The studies that I see that are 2017 or later that you discuss in your Bradford

Hill analysis are Purdue 2017 and Callahan 2019. Is that correct?

A. And the ATSDR 2018 study.

Q. The public health assessment?

A. No.

Q. Which 2018 study?

A. The Exhibit 15.

Q. The morbidity study from Camp Lejeune?

A. Yes.

Q. And those are the only three studies that you cite that are 2017 or later, correct?

A. Let me just confirm, but I believe so.

Q. And based on those three studies, is it your opinion that PCE -- that those three studies are not for PCE and kidney cancer's relationship to move from below equipoise to equipoise and above?

MR. RUZICKA: Object to the form.

A. I don't think that's a fair characterization of my opinion. I evaluated the evidence independently and came to that conclusion based on my evaluation of the evidence.

Q. But you agree that your conclusion differs from ATSDR's 2017's conclusion, correct?

A. It differs from the ATSDR conclusion that's published in the January 2017 assessment of

the evidence.

Q. In your section on PCE and kidney cancer, you didn't cite GJI 2005, correct?

A. Not that I recall.

Q. In your analysis of PCE and kidney cancer, you didn't cite Pukkala, P-u-k-k-a-l-a 2009, correct?

A. I don't recall. I would have to review to confirm that.

Q. It's not cited in your report in your discussion of PCE and kidney cancer, correct?

A. I don't believe so. As I sit here, I don't recall that, but I would have to review everything to confirm, so...

Q. In your section on PCE and kidney cancer, you didn't cite Selden and Olburg, Jr., 2011, correct?

A. Not that I recall.

Q. And in your section on PCE and kidney cancer you didn't cite Asal, A-s-a-l, 1988, correct?

A. Not that I recall.

Q. I want to turn now to page 29 of your kidney cancer report where it says exposure on benzene. Do you see that?

A. Yes.
Q. And this is where you discuss your discussion of the relationship between kidney cancer and benzene, right?
A. Yes.
Q. You would agree that there is a lack of analogous evidence to support benzene as a cause of kidney cancer, right?
MR. RUZICKA: Objection, form.
A. I think I state that explicitly on page 32.
Q. Which means that you'd agree that currently there is lack of analogous evidence to support benzene as a cause of kidney cancer, right?
A. Yes. I'm not sure how to answer that differently because I just confirmed the statement you stated --
Q. Sure.
A. -- and said I wrote it on page 32.
Q. Right. Do you agree with the statement that you made? Is that still your opinion?
A. Yes. As I think -- I think as I stated earlier in the deposition, I haven't changed my opinions.
Q. And if you look to page 32 under

"Biological Plausibility," do you see that?

A. Yes.

Q. You wrote, "Research is lacking to elucidate the full pathway for exposure to benzene in development of kidney cancer." Did I read that correctly?

A. Yes.

Q. You then say, "However, given that benzene is a known human carcinogen and that benzene is characterized as a known human carcinogen for all routes of exposure based upon convincing human evidence as well as supporting evidence from animal studies, it is scientifically reasonable to conclude that there is a biologically plausible mechanistic pathway for benzene to cause kidney cancer."

Did I read that correctly?

A. Yes.

Q. Is it your opinion that if a chemical, it can cause cancer in one target organ, that means that there is a biological pathway for any target organ?

MR. RUZICKA: Objection to form.

A. No, not necessarily.

Q. And you don't have any information about

a biologically plausible mechanistic pathway specific to benzene and kidney cancer, do you?

A. I don't think there has been evidence for or against a pathway for benzene to cause kidney cancer. I think there is just a hole in the scientific knowledge where we don't -- we haven't worked out any -- where we haven't evaluated, using "we" as scientists, have not evaluated a possible mechanism for that to occur.

Q. So that means that you agree that the scientific evidence can't tell us what the possible -- the plausible biological mechanism for benzene to cause kidney cancer is, correct?

MR. RUZICKA: Objection to form.

A. I think we how benzene potentially damages DNA, but we do not know how it specifically would -- the full -- we have not elucidated the full set of steps that would lead to kidney cancer.

Q. One of the studies that you -- excuse me. One of the studies that you discuss as supporting an association between benzene and kidney cancer is Gerin 1998, right?

A. Yes.

Q. And you cite that under strength of association, consistency and exposure response,

right?
A. Yes. I cite it in all three sections.
Q. I am handing you Exhibit 29, I believe.
(Exhibit 29 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. The document I just handed you is titled Associations Between Several Sites of Cancer and Occupational Exposure to Benzene, Toluene, Xylene, and Styrene: Results of a Case-Control study in Montreal, correct?
A. Aside from it's toluene, the pronunciation of toluene, but you read the words correctly.
Q. So aside from my poor pronunciation skills, that's the title of this article, right?
A. Yes, that's correct.
Q. And this is Gerin 1998 that you cite in your kidney cancer report, correct?
A. Yes.
Q. So I want to turn to page 155 of this study. In the right-hand column, the paragraph above "Acknowledgments," do you see that?
A. Yes.

Q. It says, "In conclusion, for 15 common cancer types, not including leukemia, our study does not provide persuasive evidence of an increased risk that could be related directly to occupational exposure to benzene, toluene, xylene or styrene, correct?

A. Yes, you read that correctly.

Q. In your kidney cancer report -- you can set that document aside.

On page 8 of your kidney cancer report --

A. Yes, I'm on page 8.

Q. Do you see where it says "Hadnot Point" and then it has a series of the bullet points?

A. Yes.

Q. On the third point is benzene, correct?

A. Yes.

Q. It says, "Benzene contamination of at least 0.1 parts per billion was estimated beginning in the 1950s with a peak concentration of 12 parts per billion in 1984. A measure of 2500 parts per billion was reported in 1985. The median exposure to benzene from April 1973 to January 1985 was 4.1 micrograms per liter a month and from 1975 to 1985 was 4.6 micrograms per liter a month."

Did I read that correctly?

A. Yes, you read that correctly.

Q. Is it your opinion that exposure to the 4.1 or 4.6 micrograms per liter a month that you identify here as the median exposure is sufficiently hazardous to human health to cause kidney cancer?

MR. RUZICKA: Objection, form.

A. I think I identify on page 39 levels of benzene at Camp Lejeune that have been directly associated with kidney cancer. These are people who were exposed at Camp Lejeune to levels of benzene in the low-exposure group of 2 to 45 micrograms per liter a month and had an elevated measure of association with kidney cancer, and that median exposure falls within that range. In addition, exposures of at least the median were also associated with kidney cancer.

Q. So is it your opinion then that the low exposure group that you discuss on page 39 of 2 to 40 gram -- excuse me -- 2 to 45 micrograms per liter a month is sufficiently hazardous to human health so to cause kidney cancer?

MR. RUZICKA: Objection, form.

A. I think I have just stated that in

people who were at Camp Lejeune and were exposed to that amount of benzene, they had elevated rates of kidney cancer. I don't know how more direct evidence you can get than evaluating the people who were actually exposed.

Q. I am handing you Exhibit 30, I think, and this is the chapter.

(Exhibit 30 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I just handed you the 2007 toxicological profile for benzene, correct?

A. Yes.

Q. And this is an ATSDR tox profile, correct?

A. Yes, that's correct.

Q. Are you familiar with ATSDR's toxicological profiles for -- are you familiar with ATSDR's toxicological profile for benzene?

A. I don't recall if I cited this in my report.

Q. Sure. I think my question was a little broader. Are you familiar with this document, whether or not you cited it in your report?

A. I have reviewed it at some point. I don't recall whether I reviewed it specifically in developing my report or not, though.

Q. Okay. But you have reviewed it at some point?

A. At some point, yes.

Q. If you turn to page 272, do you see Table 6-3 titled Benzene in Food?

A. Yes, I see that.

Q. And one, two, three, four -- five lines down do you see "banana," comma, "raw"?

A. Yes, I see that.

Q. And so this table shows that a concentration minimum to maximum in parts per billion in raw bananas was between 11 parts per billion and 132 parts per billion, right?

MR. RUZICKA: Objection, form.

A. That's what this table states, yes credit.

Q. And do you see about midway down the table where it says, "Cola, carbonated"?

A. Yes, I see that.

Q. And do you see that it shows that the concentration minimum, maximum for cola carbonated was between 1 and 138 parts per billion?

A. Yes, you read that correctly.
Q. And then two lines down from that do you see coleslaw with dressing?
A. Yes, I see that.
Q. And do you see where it shows that the concentration minimum, maximum for coleslaw with dressing is 11 to 102 parts per billion?
A. Yes, I see that.
Q. Go ahead and turn back one page to page 271. Are you on page 271?
A. Yes.
Q. Do you see the Section 6.4.4, Other Environmental Media?
A. Yes.
Q. Do you see where in the first line it says, "Eggs had the highest concentrations, 2,100 parts per billion uncooked and 500 to 1,000 parts per billion hard boiled"?
A. Yes, I see that.
Q. Should we be concerned about the level of benzene in these foods, meaning bananas, carbonated cola, coleslaw with dressing or eggs?
MR. RUZICKA: Objection, form. It is not within the purview of his -- you are asking an improper question for an expert

witness.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, I will ask the question again and you can answer it. Should we be concerned about the level of benzene in food, specifically in raw bananas, carbonated cola, coleslaw with dressing or eggs?

MR. RUZICKA: Objection to form. It is not within the purview of his general causation report. It's not offering opinions on the opinion you just asked him to offer.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, you can answer the question.

A. Is there a specific concern you are asking about?

Q. Should we be worried that we are going to get kidney cancer or bladder cancer from the benzene in hard-boiled eggs?

MR. RUZICKA: Objection, form.

A. I don't know. I haven't evaluated the evidence surrounding diet and benzene. I will say none of these foods are things that people drink all day or bathe in or shower in or anything like that, so the exposures are very, very different.

I haven't evaluated this body of

evidence enough to form an opinion with respect to diet and kidney or bladder cancer in the general public.

Q. So looking at the concentrations of benzene, you can't tell us whether you have an opinion that any of these foods, that we should be concerned about the level of benzene in these foods?

MR. RUZICKA: Objection to form.

A. With respect to kidney and bladder cancer, I don't have an opinion at the moment. I would have to review the literature and provide an informed opinion.

Q. In your kidney cancer report on page 31 -- are you on page 31?

A. Yes, I am.

Q. And there you are discussing strength of association on page 31, correct?

A. Yes.

Q. And in that section you say these range up to an odds ratio of 4.29 and cite Greenland 1994. Correct?

A. Correct.

Q. I'm handing you Exhibit 31.

(Exhibit 31 was marked for

identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. Would it be fair to say that since you cite Greenland in your kidney cancer report, you generally find it to be a reliable study?

A. I would consider it an informative study that is methodologically sound.

Q. Would you turn to page 52. The odds ratio that you cited in your kidney cancer report of 4.29, does that come from Table 3?

A. Yes, that's correct.

Q. And you would agree that in Table 3 the odds ratio reported for benzene and bladder cancer is 1.02, correct?

A. Yes, that's correct.

Q. And you wouldn't generally consider that to be an elevated measure of association, correct?

A. No. I think, as I've stated a few times previously, it's a positive measure of association, but I would not typically consider it an elevated measure of association.

Q. And I want to look at Table 4. Table 4 reports the odds ratio for TCE, correct?

A. Correct, using -- it's a slightly

different analysis, but it is for TCE.

Q. And for a kidney cancer the reported odds ratio for kidney cancer and TCE is 0.99, correct?

A. Using this analysis in Table 4, this presented in Table 4.

Q. And for bladder cancer the reported odds ratio in Table 4 for TCE is 0.85, correct?

A. In Table 4 it is reported as 0.85.

Q. You can go ahead and set that document aside.

In your section on kidney cancer and benzene, you don't cite the study Dagg, D-a-g-g, 1992, correct?

A. Not that I recall.

Q. And you don't cite Honda 1995?

A. Not that I recall.

Q. I don't cite Collingwood 1996, correct?

A. I believe so.

Q. You don't cite in the section on PCE and kidney cancer Divine 1999, right?

A. I don't believe so.

Q. In your section of benzene and kidney cancer you don't cite Wong 2001, correct?

A. I don't believe I cite Wong 2001.

Q. And in your section on benzene and kidney cancer you don't cite Tsai, T-s-a-i 2007, correct?

A. I don't believe I cite Tsai 2007.

Q. I want to next turn to your section on vinyl chloride and kidney cancer, which starts on page 33.

A. Okay.

Q. You would agree that there is a lot of analogous evidence to support vinyl chloride as a cause of kidney cancer, right?

A. I think as I state on page 35 under "Analogy," currently there is a lack of analogous evidence to support vinyl chloride as a cause of kidney cancer.

Q. And you agree that research is lacking to elucidate the full pathway for exposure to vinyl chloride right and development of kidney cancer, correct?

A. Correct, and I think you were reading directly from my report. Those opinions haven't changed.

Q. In that section on biological plausibility for vinyl chloride and kidney cancer, you refer to an IARC statement, correct?

A. Yes.
Q. I apologize again for the large document. This one is in a binder, but if it is easier for you to review it out of the binder, that's, of course, fine.
I believe this is Exhibit 32, and I'm handing you the chapter.
(Exhibit 32 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I handed you the IARC profile for vinyl chloride and a couple other constituents from 2008, correct?
A. Yes.
Q. And have you reviewed this document before?
A. Yes.
Q. If you could turn to page 425. Are you on page 425?
A. Yes.
Q. Here it says Section 6.1, Carcinogenicity in Humans. Do you see where I'm looking?
A. Yes.

Q. And it says, "There is sufficient evidence in humans for the carcinogenicity of vinyl chloride. Vinyl chloride causes angiosarcomas of the liver and hepatocellular carcinoma." Excuse me.

Did I read that correctly?

A. The pronunciation is not correct, but it is hepatocellular carcinomas, but you read the words correctly.

Q. And if you then turn to page 31, on page 31 there is a section titled "6. Evaluation and Rationale." Do you see that?

A. Yes.

Q. And under Section (a), Carcinogenicity in Humans, there is a subheading, Sufficient Evidence of Carcinogenicity, correct?

A. Yes.

Q. The last sentence in -- under "Sufficient Evidence of Carcinogenicity" states, "A statement that there is sufficient evidence is followed by a separate sentence that identifies the target organs or tissues where an increased risk of cancer was observed in humans. Identification of a specific target organ or tissue does not preclude the possibility that the agent may cause cancer at other sites."

Did I read that correctly?

A. Yes, you read it correctly.

Q. And the target organ or tissue identified for vinyl chloride does not include the kidney or bladder, correct?

A. In -- I guess there are two answers. One is in this IARC Monograph the tissues that were sufficient evidence of carcinogenicity as identified by IARC are hepatocellular carcinomas and angiosarcomas.

In addition, there are cases that the specific types of bladder tumors that have been associated with vinyl chloride, it's a very rare and specific subtype. When we talked about specificity earlier, it's a vascular-type tumor that is similar to angiosarcomas in the liver, but they are very rare, and so only limited reports have been performed about those. But those have been found in association with vinyl chloride as kind of a separate type of tumor that's not renal cell carcinoma or clear cell or papillary cell that we have typically been discussing -- or, sorry, in the context of kidney cancer or in the context of bladder cancer with squamous cell carcinoma of the bladder, so...

Q. Okay. So you said a couple of things I want to make sure I'm understanding correctly.

The first is that you agree that the -- in this IARC Monograph the cancer identified as having sufficient evidence of carcinogenicity, that doesn't include renal cell carcinoma or bladder cancer, correct?

A. Not in this IARC Monograph.

Q. And then you said that there -- vinyl chloride has been associated with a very specific rare type of bladder cancer, right?

A. Correct.

Q. What type of bladder cancer is that?

A. It's an angio -- I don't recall the specific name, but it is a vascular tumor of the bladder that's similar to angiosarcomas in the liver. It's very rare and there are very limited reports of those, but that has been explicitly identified where the only real exposure has been to vinyl chloride and it shows up in people with high exposures or with confirmed exposures of vinyl chloride.

Q. Okay. Did you analyze that specific type of cancer separately in your bladder cancer report?

A. I reviewed some of the literature on it, but it was limited to -- it was very limited literature and did not feel like it was -- even though it was clearly linked to vinyl chloride, it was primarily case series and couldn't provide epidemiologic evidence with respect to vinyl chloride as a cause of that. So I did not analyze that separately in my report.

Q. In your section on vinyl chloride and kidney cancer, you didn't cite Carreon, C-a-r-r-e-o-n, 2013, correct?

A. Not that I'm aware of.

MS. SILVERSTEIN: And you can set that binder aside.

And I want to turn to -- I think before we move to the bladder cancer report we should take a short break.

MR. RUZICKA: Okay.

THE VIDEOGRAPHER: The time is 3:07 p.m. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 3:15 p.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, did you discuss the

substance of your testimony with anybody on the break?

A. No.

Q. I want to turn and talk about your bladder cancer report that's Exhibit 7. Do you have Exhibit 7?

A. Yes.

Q. And could you turn to page 38.

A. Could you repeat that?

Q. Could you turn to page 38.

Are you on page 38?

A. Yes.

Q. Do you see the heading "Animal Studies"?

A. Yes.

Q. Do you agree that there are no published animal studies that identify excess cases of bladder cancer, correct?

A. Correct. That's what I state in the first sentence on page 38.

Q. Can you turn to Exhibit 28, and can you turn to page 95, please.

Are you on page 95?

A. Yes.

Q. Do you see the heading "TCE"?

A. Yes.

Q. ATSDR's conclusion is that there is below equipoise evidence for causation for TCE and bladder cancer, correct?

A. Yes, and I see that, and you read -- or you read that correctly.

Q. And you disagree with ATSDR's conclusion?

MR. RUZICKA: Objection to form.

A. I think as we talked about earlier with kidney cancer, I have evaluated the evidence independently and came to my own conclusion, but I believe there is sufficient evidence to identify TCE as a cause of bladder cancer.

Q. Okay. So to make sure I'm understanding correctly, I understand that you did your own independent analysis, and the results of your independent analysis of TCE and bladder cancer are different than the ATSDR's results, correct?

A. The results they published in 2017, correct.

Q. And if you'll turn to page 25 of your bladder cancer report.

Are you on page 25?

A. Yes.

Q. And do you see at the bottom where you

say, "Additionally, the 2017 ATSDR framework is also clearly met"?

A. Yes.

Q. And in that section you are applying the ATSDR framework that is discussed in Exhibit 28, correct?

A. Correct. I'm utilizing the same framework the ATSDR used in the 2017 report.

Q. Your section on TCE and bladder cancer goes from pages 21 to 26, right?

A. Correct.

Q. And in that section on TCE and bladder cancer, you didn't cite Shannon 1988, correct?

A. I would have to look to confirm, but I don't believe so.

Q. And in that section on TCE and bladder cancer, you didn't cite Sung 2007, correct?

A. I would have to review my report again to confirm, but I don't believe so.

Q. In that section on TCE and bladder cancer, you didn't cite Pukkala, P-u-k-k-a-l-a, 2009, correct?

MR. RUZICKA: What was the year?

MS. SILVERSTEIN: 2009.

A. I don't believe so.

Q. In your section on TCE and bladder cancer you didn't cite Pesch, P-e-s-c-h, 2000, correct?

A. I don't believe so.

Q. I want to turn to your discussion of PCE and kidney cancer.

A. Are we coming back to this, or should I leave it out?

Q. Yeah, you can go ahead and leave that section out.

Your discussion of PCE and bladder cancer begins on your report page 15, correct?

A. Yes, that's correct.

Q. Turning to page 18 of your bladder cancer report, you cite Vlaanderen 2014, correct?

A. Yes.

Q. And that's the only meta-analysis you cite, right?

A. Yes, that's correct.

Q. And Vlaanderen 2014 used dry cleaners as a proxy for PCE exposure, correct?

A. That was one of the analyses.

Q. If you look at page 19 you -- page 19 includes your discussion of the Bradford Hill framework for PCE and bladder cancer, correct?

A. Yes, that's correct.
Q. And at the bottom of page 19 you are discussing biological plausibility, right?
A. Yes.
Q. And you say it is plausible that bladder cancer follows a similar causal pathway given that urine formed in the kidney travels to the bladder where it dwells until urination. Correct?
A. Yes, that's correct.
Q. And you say that it's plausible. Is that the correct language?
A. Yes. I use that specific language in my report on page 19.
Q. In the next sentence you say this provides clear support for a biologically plausible pathway. Is that correct?
A. Correct, that's the language I used.
Q. Was it your opinion that plausibility -- that if something is plausible that's clear support?
MR. RUZICKA: Objection to form.
A. No. What I think I am pointing out is that there is a clear mechanism for causation of kidney cancer following PCE metabolism. There is not -- there a lack of evidence determining whether

that same mechanism occurs for bladder cancer and but it is physiologically correct that urine is produced in the kidney and then dwells in your bladder.

There is also a large body of evidence suggesting that, for example, infrequent urination with exposure to toxins is associated with increased risks of bladder cancer and that longer dwell times potential -- or have been associated with bladder cancer.

All of those steps have not clearly been linked with respect to bladder cancer at this point, though. So we have a clear pathway through kidney cancer and we know what metabolites. Physiologically it is plausible for that to occur in the bladder, but there is just a lack of evidence confirming or refuting that.

Q. Does that mean that there is a lack of evidence showing whether or not that pathway is a biologically plausible mechanism to cause bladder cancer, correct?

MR. RUZICKA: Objection, form.

A. There is a lack of confirmation, I think, in the science. It's a plausible pathway. It has just not been fully studied in science. So

that last step, the kidney-to-bladder exposure pathway has not been fully evaluated in science.

Q. On page 17 at the bottom, the last paragraph, you say, "A population matched case-control study examining occupational exposures and bladder cancer demonstrated a statistically significant elevated measure of association hazard ratio 1.12 with medium PCE exposure and a 10-year latency. Hadkhale 2017." Correct?

A. Yes, you read that correctly.

Q. I'm handing you what I think is Exhibit 33.

(Exhibit 33 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you Exhibit 33, which is titled Occupational exposure to solvents and bladder cancer: A population-based case control study in Nordic countries. Do you see that?

A. Yes.

Q. And this is the study that you are referring to when discussing Hadkhale 2017, correct?

A. Yes.

Q. In your report when you talk about the hazard ratio of 1.12 for medium exposure with a 10-year latency, are you referring to Table 3?

A. I believe that is the correct table. I would have to review the entire paper to ensure that there is not another place that I might have been referring to.

Q. You would agree that in Table 3 under perchloroethylene the hazard ratio for exposure, 13.60 to 87.55 parts per million years, has a hazard ratio of 1.12, correct?

A. Correct. It's a hazard ratio of 1.12 on Table 3.

Q. You would agree that Table 3 for an exposure of 13 -- less than 13.60 parts per million years, the hazard ratio is 1.00, correct?

A. Yes, in Table 3, that is correct.

Q. And that doesn't show a positive association, correct?

A. Yes, you are correct, that that does not demonstrate a positive association.

Q. And it also doesn't demonstrate an elevated measure of association, right?

A. Yes, that is correct.

Q. In Table 3 under perchloroethylene for

the more than 87.55 parts per million years, it shows a hazard ratio of 0.94 correct?

A. Yes, that's correct.

Q. You would agree that that doesn't show a positive measure of association, right?

A. Correct, that does not demonstrate a positive measure of association.

Q. And you would agree that Table 3 also doesn't show a monotonic dose-response trend, correct?

A. Correct. Table 3 does not show a monotonic dose-response for PCE in Table 3 of this study.

Q. In your section on PCE and bladder cancer, you rely on an NTP 2021 monograph, correct?

A. I reviewed that monograph when I was developing my opinions.

Q. I am handing you Exhibit 34.

(Exhibit 34 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. This is an NTP monograph on trichloroethylene, correct?

A. Correct.

Q. You would agree that this NTP monograph doesn't discuss bladder cancer, right?

A. I would have to review the entire thing to tell you whether there is any mention of bladder cancer in here. I don't believe it's the focus of this monograph, though.

Q. This monograph focuses on kidney cancer, non-Hodgkin's lymphoma and liver cancer, correct?

MR. RUZICKA: Objection, form.

A. Those are the primary outcomes that are evaluated in this monograph.

Q. You can go ahead and set that document aside.

In your section on PCE and bladder cancer you didn't cite the study Travier, T-r-a-v-i-e-r, 2002, correct?

A. I don't believe so, but I would have to review the entire report to confirm.

Q. Your section on PCE and bladder cancer is pages 15 through the top of 21, correct?

A. Yes, that's correct.

Q. For PCE and bladder cancer, you didn't cite Chang 2003, correct?

A. I don't believe so, but I would have to review the entire report to be certain.

Q. For PCE and bladder cancer you didn't cite Sung 2007, right?
A. I don't believe so, but again, I would have to review the entire thing to confirm.
Q. For PCE and bladder cancer you didn't cite Pukkala, P-u-k-k-a-l-a, 2009, correct?
A. I don't believe so, but again, I would have to review the entire report to confirm.
Q. For PCE and bladder cancer you didn't cite Selden and Olburg, Jr., 2011, right?
A. Again, I don't believe so, but I would have to review the entire report to confirm.
Q. And for PCE and bladder cancer you didn't cite Burns and Swanson 1991, correct?
A. Again, I don't believe so, but I would have to review the entire report to confirm.
Q. For PCE and bladder cancer you didn't cite the study Colt 2011, right?
A. I don't believe so, but I would have to review the entire report to confirm.
Q. Your section on benzene and bladder cancer begins on page 26, correct?
A. Yes, that's correct.
Q. You agree that there is a lack of analogous evidence to support benzene as a cause of

bladder cancer, correct?

A. I think on page 30 I state currently there is a lack of analogous evidence to support benzene as a cause of bladder cancer, and I haven't changed that opinion.

Q. I want to go back to Exhibit 28. ATSDR 2017. Do you still have that document?

If you could turn to page 95.

Are you on page 95?

A. Yes.

Q. In the bottom section do you see "Vinyl Chloride and Benzene"?

A. Yes.

Q. That section says, "Two studies evaluated benzene exposure and bladder cancer with mixed results. One study evaluated vinyl chloride exposure and bladder cancer. Given the paucity of epidemiological studies, there is insufficient information to determine whether an association exists for either vinyl chloride or benzene and bladder cancer. Therefore, ATSDR concludes that for vinyl chloride and benzene there is below equipoise evidence for causation for bladder cancer," correct?

A. You read that paragraph correctly.

Q. In your report on page 30, your bladder cancer report, you state that additionally, the 2017 ATSDR framework is also clearly met and then provide the definition for equipoise and above evidence for causation, correct?

A. Yes, at the bottom of page 30 and the top of page 31.

Q. So in applying the same 2017 ATSDR framework that's applied in Exhibit 28, you came to a different conclusion than ATSDR, right?

A. ATSDR's opinion or analysis was published in 2017. My current analysis reached a different conclusion when I performed it independently.

Q. In your section on benzene and bladder cancer, you cite Sciannameao 2019 -- I apologize if I pronounced that incorrectly -- on page 28, right?

A. Yes.

Q. And you agree that Sciannameao 2019 found no elevated measure of association with ever exposed to benzene, correct?

A. Correct that I state no elevated measure of association, odds ratio 0.99, with ever exposure to benzene was identified.

Q. You also cite Xie, X-i-e, 2024, correct?

A. On page 28 I cite that study.
Q. I'm handing you Exhibit 35.
(Exhibit 35 was marked for identification and is attached to the transcript.)
BY MS. SILVERSTEIN:
Q. I handed you a study titled Occupational exposure to organic solvents and risk of bladder cancer, correct?
A. Yes.
Q. This is Xie 2024, correct?
A. Yes, that's correct.
Q. Can you turn to page 548 of that study.
A. Which page?
Q. Turn to Table 2, which is 553.
You agree that Table 2 is where the ever-exposed odds ratio for benzene and bladder cancer is 1.63, correct?
A. In Table 2 there is a analysis that identifies an odds ratio of 1.63 for ever exposure to benzene.
Q. You would agree that Table 2 also reports results for ever-exposed odd ratios for bladder cancer and perchloroethylene, right?
A. Yes, it reports that as well at 0.36.

Q. And that reported odds ratio of 0.36, that's not an elevated level of association, correct?

A. Correct, that is not an elevated measure of association.

Q. And you would agree that the left-hand column in Table 2 has a row for trichloroethylene, right?

A. Yes, it has a row for trichloroethylene.

Q. You agree that no -- that Table 2 reports no results for trichloroethylene, correct?

A. Correct. There is a lack of cases or controls that were exposed to trichloroethylene.

Q. And you don't cite Xie 2024 in your discussion for TCE exposures, do you?

A. I can look, but I doubt if there were no cases or controls analyzed.

Let me confirm that.

I don't believe I cite that in my CTE section of my bladder cancer report.

Q. Okay. And in your section on bladder cancer and benzene you don't cite Dagg 1992, correct?

A. I don't believe so, but I would have to review the entire report to confirm.

Q. In your section on bladder cancer and benzene, you don't cite Honda 1995, correct?
A. I don't believe so, but I would have to review the entire report to confirm.
Q. In your section on benzene and bladder cancer, you don't cite Collingwood 1996, correct?
A. I don't believe so, but I would have to review the entire report to confirm.
Q. In your section on benzene and bladder cancer you don't cite Satin 1996, correct?
A. I don't believe so, but I would have to review the entire report to confirm.
Q. In your section on benzene and bladder cancer you don't cite Consonni, C-o-n-s-o-n-n-i, 1999, correct?
A. Again, I don't believe so, but I would have to review the entire report to confirm.
Q. You also don't cite Wong 2001 in your section on benzene and bladder cancer, right?
A. I don't believe I cite Wong 2001, but again, I would have to review the entire report to confirm.
Q. You also don't cite Tsai 2003, so T-s-a-i?
A. I don't believe so, but I would have to

review the entire report to confirm that.

Q. In your section on benzene and bladder cancer you don't cite Heubner 2004, right?

A. I don't believe so, but I would have to review the entire report to confirm.

Q. And in your section on benzene and bladder cancer you also don't cite Tsai, T-s-a-i, 2007, right?

A. I don't believe so, but I would have to review the entire report to confirm.

Q. If you could turn to page 31, please.

You are on page 31?

A. Yes.

Q. Do you see the section Exposure: Vinyl Chloride?

A. Yes.

Q. This is where you begin your discussion on vinyl chloride and bladder cancer, right?

A. Yes, that's correct.

Q. There is a subheading, Cohort Studies. Do you see that?

A. Yes.

Q. And here you identify, it looks like, three cohort studies: Mundt 2000, Mundt 2017 and Bove 2014a?

A. That's correct.
Q. You didn't identify Teta, T-e-t-a, 1990, correct?
A. I did not report that or analyze that in my report.
Q. You didn't identify any case-control studies, right?
A. I did not in my report.
Q. Did you identify case-control studies that you didn't discuss in your report?
A. Not that I'm aware of.
Q. You didn't identify any meta-analyses, right?
A. Correct, I did not identify any meta-analyses.
Q. Go ahead and turn to page 32. Do you see the bolded heading "Consistency"?
A. Yes.
Q. You said, "Multiple cohort studies in different populations demonstrate elevated measures of association, Bove 2014a, Mundt, 2017. This provides limited but consistent evidence that vinyl chloride is a cause of bladder cancer."
Did I read that correctly?
A. Yes.

Q. So you agree this is limited evidence?
A. I think I stated this provides limited but consistent evidence that vinyl chloride is a cause of bladder cancer, and I haven't changed my opinion since I wrote this report.
Q. You agree that Bove 2014a didn't show an overall association with bladder cancer deaths in a 10-year lagged analysis, correct?
A. Correct, and there was not a -- or as I stated on page 31, there's no overall association with bladder cancer deaths that was identified in a 10-year lagged analysis of military personnel stationed at Camp Lejeune compared to Camp Pendleton with at least low exposure to vinyl chloride.
Q. You would agree that a over -- a finding of no overall association conflicts with consistency, correct?
MR. RUZICKA: Objection, form. You can answer.
A. I think it depends on how you -- how you analyze or how you evaluate the data. It's also important to recognize particularly for military personnel, they're overwhelmingly very, very young, and it's unlikely for a disease that occurs most

often in older people that you are going to see a large effect size when you do an analysis after a relatively short period of time after an exposure.

So I wouldn't say that it conflicts; it's just not providing additional supportive evidence of -- the overall analysis doesn't provide additional supportive evidence.

Q. So you would agree that the overall association of 0.88 does not provide supportive evidence of consistency for vinyl chloride and bladder cancer, correct?

MR. RUZICKA: Objection, form.

A. The overall association does not provide additional supportive evidence.

Q. You would agree that Mundt 2000 also shows no elevated measure of association, correct?

A. Correct. If you look on or if you look on page 31, your statement is correct. However, that same cohort was re-analyzed 15 -- approximately 15 years later, and at that point an elevated measure of association was identified.

This in part highlights what I was just speaking about, that bladder cancer predominantly occurs as people age; and if you have time for additional followup, what may initially reveal no

association will then reveal an association.

It's not possible to definitively say whether that's going to happen without doing a subsequent analysis, but the absence of evidence on an initial analysis is not evidence against causation.

Q. I want to direct you back to my question. My question, I specified Mundt 2000. You would agree that Mundt 2000 does not show an elevated measure of association, correct?

MR. RUZICKA: Objection, form.

A. I've already answered that, and I don't think you can separate that from the initial analysis when a subsequent analysis has been performed by the same cohort.

It's not scientifically or methodologically reasonable to ignore a followup analysis if it's being performed by the same cohort with the same exposure and outcome relationship. The subsequent followup almost always provides additional information.

Q. Would you agree that age is a risk factor for bladder cancer?

MR. RUZICKA: Objection, form. Or, sorry, strike my objection. You can answer.

A. Age is a -- bladder cancer is more frequently seen as people age, and you are more likely to develop bladder cancer as an older adult.

People use risk factors in different ways, and so from a statistical or demographic perspective, age is a risk factor from a -- oftentimes, though, that's conflated with what is a modifiable risk factor or something that you could do to prevent developing bladder cancer, and it's not possible to do that with age. Everybody ages, so...

Q. Hopefully.

A. Yeah.

Q. But you would agree that you are more likely to see -- or that a person is more likely to develop bladder cancer the older they are?

MR. RUZICKA: Objection, form, foundation.

A. Yes. It's more likely to identify bladder cancer in older adults.

Q. Is it your opinion that the Mundt and Bove 2014a studies are sufficient to show consistency for vinyl chloride and bladder cancer?

A. They provide, I think as I state, limited evidence of consistent -- limited but

consistent evidence. These are different investigators analyzing different cohorts.

Q. Under "Exposure-Response" on page 32, do you see that section?

A. Yes.

Q. You identified one study that demonstrates a non-monotonic exposure response?

A. Correct.

Q. And that study is Bove 2014, right?

A. Correct.

Q. Aside from Bove 2014, you didn't identify any studies that demonstrate evidence of a non-monotonic exposure response between vinyl chloride and bladder cancer, correct?

A. I didn't identify any other studies that evaluated dose with respect to vinyl chloride and bladder cancer, so it's not possible to identify another study that has an exposure-response relationship.

Q. And that means you didn't identify any studies that demonstrate evidence of a monotonic exposure-response between vinyl chloride and bladder cancer, correct?

A. That is -- that is correct and I don't think I've stated that anywhere, that opinion

anywhere, that there is a monotonic exposure-response relationship identified in the literature.

Q. Bove 2014a is the Marine/Navy mortality study, right? When you refer to 2014a, is that what you are referring to?

A. Oh, you are asking which study it is?

Q. Yes.

A. That is a military personnel mortality study, the military personnel mortality study.

Q. If you go ahead and take a look at Exhibit 12. Is this the study that you are referring to?

A. I believe so, yes.

Q. You would agree with me that there is a lack of analogous evidence to support vinyl chloride as a cause of bladder cancer, correct?

A. I think I state on page 32 currently there is a lack of analogous evidence to support vinyl chloride as a cause of bladder cancer and --

Q. And do you agree with that statement?

A. Yeah. My position has not changed or my opinion has not changed.

Q. You can set that report aside. Actually, I apologize, I'm going to retract that

last statement.

Can you turn to page 37 -- or, excuse me, 39 of the bladder cancer report.

A. Yes.

Q. And do you see where it says "Mechanistic Studies"?

A. Yes.

Q. You have a statement in there, "Although untransformed TCE is not particularly toxic, DCGV and DCVC both demonstrate mutagenicity, correct?

A. Yes, you read that correctly.

Q. You would agree that mutagenic changes don't always result in cancer, correct?

A. That is correct, they do not always result in cancer.

Q. And you conducted a literature search for animal studies for both kidney cancer and bladder cancer, correct?

A. Correct.

Q. And you didn't --

A. Although that was not the primary focus of my literature search, the primary focus was on human evidence, I included relevant animal studies. And I don't think I've suggested that I have a comprehensive search on specifically animal

studies, although I believe I have pulled the key studies.

Q. So you can't say sitting here today whether or not you've reviewed all of the relevant animal studies?

A. I think I've reviewed all relevant key, informative animal studies. There may be additional studies, but I don't know that they provide contributory evidence that would influence my opinion.

Q. You would agree that animal studies that do not reflect realistic doses for humans are unreliable, correct?

A. I don't think that is a correct statement. Reliability refers to how a study -- how a study is designed and whether the methodology is followed and whether it's appropriate methodology.

It may be -- a study may be reliable even if they are exposing animals to not realistic doses of or doses that would not be realistically encountered by humans if the purpose is to test exceedingly high doses and see if there is any effect at even doses that well exceed what a human might be exposed to. So they can be informative

even if the doses are not doses that humans would potentially be exposed to.

Q. Can you please take out Exhibit 9.

A. Yes.

Q. And please turn to page 8. Are you on page 8?

A. Yes.

Q. In the first paragraph about two-thirds of the way through there is a sentence that starts with "However, the most salient." Do you see that?

A. Yes.

Q. It says, "However, the most salient question related to animal data is how reliable is animal carcinogenicity data as a predictor of cancer in humans? The answer is that demonstration of tumor formation in animals is not a reliable predictor of cancer in humans." Correct?

A. Are you asking if you read that correctly?

Q. Yes.

A. Yes, you read that correctly.

Q. And do you agree with that statement?

A. Yes. I wrote that statement and agree with it. That's different than the question you asked me just immediately preceding, though.

Q. Do you agree that tumor formation in animals is not a reliable predictor of cancer in humans?

A. Depending on the -- depending on the model that is used, it may be. However, it is not a -- it's not the case that cancer formation in animals reliably predicts cancer formation in humans if you look at the total body of evidence.

If you are looking at a specific mechanistic pathway that is shared between humans and animals, it may be a reliable predictor, and as you look at species that are closer to humans, it may be more reliable; but it is very individual depending on the compound being analyzed and the mechanism of cancer causation that's theorized or being studied in the individual study.

Q. Dr. Hatten, when you wrote in your 2022 report for the Zantac litigation the demonstration of tumor formation in animals is not a reliable predictor of cancer in humans, do you agree with that statement today?

MR. RUZICKA: Objection, form.

A. Yeah, I think I've answered that already a couple times. I'm saying if there is a specific pathway that is shared between humans and animals,

it may be a reliable predictor. But I think, as I also said, overall, just looking at the total landscape of animal studies and saying that these predict human studies, that is not a reliable predictor. So it again depends very much on the specific hypothesis being tested and the studies being performed.

Q. Dr. Hatten, in your 2022 report for the Zantac litigation, you don't say that there are circumstances where animal studies may be reliable predictors of carcinogenicity in humans, do you?

A. I think the last sentence in that paragraph says animal models are useful as a screen for potential carcinogenicity and that negative testing, so not seeing cancers in animals, is actually helpful because it's unlikely for humans to develop that.

I didn't go in the landscape of the Zantac literature. There is not a -- and this is veering into litigation that is off topic, but there is not a strong body of animal evidence to support cancer causation in animals that would translate to humans.

Q. You would agree that the evidence of benzene as a cause of kidney cancer in animal

studies is limited, correct?

A. Yes. I think I stated that in my report.

Q. And you only identified one study that was relevant to that analysis, correct?

A. Correct, and I think I state currently the literature base is too limited to define a precise pathway or mechanism of injury for benzene exposure leading to the development of bladder cancer.

Q. Dr. Hatten, I'm asking about your conclusions regarding benzene and kidney cancer.

A. Sorry. I thought you were asking about bladder cancer.

Q. You had only one study related to -- one animal study related to benzene as a cause of kidney cancer, correct?

A. I think the sentence I just read, I applied the same sentence in my kidney cancer report, saying that the literature base is too limited to define a precise pathway or mechanism of injury for benzene exposure leading to development of kidney cancer.

MS. SILVERSTEIN: We have been going for about an hour. I think this is a good

time for a short break.

THE VIDEOGRAPHER: The time is 4:11. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 4:18 p.m. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, do you have your kidney cancer report by you?

A. Yes.

Q. Could you please turn to page 33.

Are you on page 33?

A. Yes.

Q. On page 33 when discussing benzene and kidney cancer, you say, "Given the weight of evidence presented in the Bradford Hill analysis the 'as likely as' standard is satisfied," correct?

A. Correct. You read that correctly.

Q. And a little bit further down on the page you say, "The weight of the evidence indicates that benzene is at least as likely as not a cause of kidney cancer," right?

A. Yes.

Q. What does "as likely as not" mean in these?

A. It -- my understanding is that it is -- that there is some evidence or sufficient -- there is evidence that supports a causal link between the exposure and outcome of concern. However, it does not rise to the level of -- a level to fully establish that as a confirmed or accepted causal association.

That framework is the one that was utilized by the government, the U.S. Government in the ATSDR 2017 analysis of the evidence and is even, at least in my opinion, I think as I state in the report, is even more conservative than what the plain language of the causal burden is in the statute, at least the way I would read it as a scientist.

Q. When you say it's more conservative than the plain language of the statute, what do you mean?

A. "As likely as" is essentially -- it's -- at least the way I would read it as a scientist is that there is -- the evidence for and against it is approximately balanced; and I think the way the ATSDR framework is set up is requiring a higher burden for defining "as likely as" compared to that, a complete balance between the evidence.

Q. Where did you get the "as likely as not" language?

A. I don't know if I understand your question, so could you --

Q. How did you decide to use the language "as likely as not" in your report?

A. I mean, if I recall, it is statutorily defined and then was employed by -- that or similar language was employed by the Institute of Medicine in their 2008 report and again by the ATSDR in their 2017 assessment of the evidence that pertained directly to this -- this issue of Camp Lejeune water contamination. We have reviewed that already, that document already today.

Q. Did you make the decision -- how did you decide that the language "as likely as not" was relevant to your general causation opinions as an expert witness in litigation?

A. Because my understanding is that that is part of a specific circumstance that's applied to this cohort of potentially exposed individuals based on an act of Congress.

Q. Did you review the Camp Lejeune Justice Act?

A. I've reviewed parts of it. I don't know

if I read the entire thing or not. I just can't recall if I read all pages that were contained in it.

Q. Do you consider yourself an expert in statutory interpretation?

A. I do not.

Q. And would it be fair to say that you don't generally use the "as likely as not" standard in your expert reports outside of the Camp Lejeune litigation?

MR. RUZICKA: Objection, form.

A. I have not used that framework outside of Camp Lejeune, but I'm also not aware that other than specific circumstances, when it is the weight of -- the standard for weighing evidence has been altered by -- by the legislature, that that is not typically something I would use outside of that unless there is a specific directive to use a different -- that standard.

Q. When you say "a specific directive," a directive from who?

A. From the legislature based on the reading of that statute and then how it's been applied by the U.S. Government itself and the ATSDR assessment of the evidence.

Q. Dr. Hatten, you are aware that the Camp Lejeune Justice Act was passed in 2022, correct?

A. I don't recall what year it was passed.

Q. If I represent to you that it -- I guess, did you consider when this statute was passed before deciding to apply the framework in that statute?

A. I did not consider one way or another. It had been passed by the time I was evaluating the evidence in this case.

Q. And in other cases where you have been an expert report, have you reviewed the statutory text of -- relevant to those litigations?

A. I'm not aware that I have been involved in any litigation that includes a statutory text related to it.

Q. Do you normally review the applicable case law or legal standards when you serve as an expert witness?

A. I do if it is -- if it -- if it varies from the usual way that evidence is weighed.

For example, there are times I have been involved in disability proceedings that have different definitions for what -- how to weigh evidence or what factors to take into account, and

in those cases I review the relevant guidelines. It's not always statutes. Sometimes it's administrative guidelines that apply to it.

So if it is -- if it is something unique -- or not unique but something that is specifically relevant to the evaluation of evidence at hand, then I do review it in those cases.

Q. Did you review the Federal Tort Claims Act for this case?

A. I do not recall if I -- I don't recall if I specifically reviewed it for this act -- or for this case.

Q. Would you agree with me that -- well, I guess, scratch that.

Is it your understanding that the "as likely as not" standard requires less evidence than the causation standard you applied in the Zantac litigation?

MR. RUZICKA: Object to form.

A. My understanding is that it's a different way of evaluating the evidence with a different -- different lens for evaluating the total body of evidence, not that it's less, necessarily less, but it is a different framework for eval- -- or I don't want to say framework, but

a different, as I said, lens for evaluating the evidence.

Q. And by "lens," you mean it is a different standard for evaluating the evidence, right?

MR. RUZICKA: Objection, form.

A. It is -- my understanding is -- is it is stat- -- at least based on my reading of this -- as I said, I'm not a legal expert, but it explicitly identifies a -- an alternative way -- or not an alternative but a additional pathway for identifying causation in addition to the way weight of evidence is applied in the majority of cases.

Q. You would agree that "as likely as not" is a legal term, right?

MR. RUZICKA: Object to form.

A. It -- the specific language "as likely as not" may be a legal term, but it is used every day in medical practice. When we evaluate somebody, we are often evaluating based on limited evidence or evidence that is conflicting; and we don't wait for a -- or we don't have a requirement of a specific causation burden to proceed with treating a patient or evaluating a patient based on the amount of evidence that's available and --

Q. Dr. Hatten, you'd agree --
A. I'm still --
MR. RUZICKA: No, no. You are not interrupting him during his statement.
MS. SILVERSTEIN: Okay. He can continue. That's fine.
MR. RUZICKA: You have done it three times today. Please let him finish his responses.
BY THE WITNESS:
A. I would say it's something that is used, a way of evaluating evidence that is used routinely in medical practice, and it's something that I'm familiar with and very comfortable with. It is not something I routinely apply in evaluating evidence in the midst of a legal proceeding.
BY MS. SILVERSTEIN:
Q. Okay. Well, you would agree with me that in this case, the Camp Lejeune litigation, you got the language "as likely as not" from the Camp Lejeune Justice Act, which is a statute, correct?
MR. RUZICKA: Object to form.
A. In that I identified it both in the Camp Lejeune Justice Act as well as in various other similar applications of that language such as the

Institute of Medicine 2008 report, the Government's own 2017 ATSDR assessment of the evidence, I had thought it would be somewhat farcical and ridiculous that the Government would suggest that their own framework for assessing evidence is wrong; and so I did not even consider whether you would be attacking the Government's own assessment of the evidence, which it seems like you are doing here.

Q. Dr. Hatten, is it your understanding that the assessment of the evidence is sufficient to meet the legal standard in a court of law for general causation?

MR. RUZICKA: Objection, form.

A. My understanding is that as it's applied in the specific situation of people exposed to Camp Lejeune water, that is an acceptable framework for using that, and it's not as if it's unique to that. It's used in other venues, in medicine for determining -- in the medical legal system for determining whether the weight of the evidence supports a specific outcome, and there are multiple examples of that. But again, they are cases where -- or not cases, but situations where that has been explicitly defined as a avenue for assessing

causation.

Q. Dr. Hatten, please provide a list of all peer-reviewed articles that you have reviewed that use the "as likely as not" standard.

MR. RUZICKA: Objection to form.

A. Are you asking for that at the moment or --

Q. Yes. Please list to me all peer-reviewed publications that you can think of that use the "as likely as not" standard.

A. I don't think that's a reasonable question to ask. It's not something that was included in my report, and I don't have that available off the top of my head.

Q. So sitting here today you can't think of a single peer-reviewed publication that uses the "as likely as not" standard; is that correct?

MR. RUZICKA: Object to form.

A. No, that's not the case. As I said earlier, I reviewed the Government's witness, Dr. Goodman, her deposition transcript, and there was a question about an article that she had published that's also on my supplemental materials; and she employs the "as likely as not" standard in that peer-reviewed publication. This is the

witness the Government provided to assess causation and has used that in the scientific literature.

That is one example. I can likely provide additional ones, but I had not prepared a list of that for the deposition today.

Q. You weren't aware of Dr. Goodman's article before writing your reports on kidney cancer or bladder cancer for general causation, correct?

A. I don't know if I'd reviewed it or not at some point. I review literature on air pollution and respiratory outcomes intermittently, and I may have reviewed that article at some point in the past, but I did not pull it specifically for the purposes of writing my reports.

Q. And you didn't consider it in writing your reports, correct?

A. I didn't --

Q. Dr. Hatten, surely if it was --

MR. RUZICKA: No, no, please.

MS. SILVERSTEIN: I'm changing my question.

MR. RUZICKA: You can't. He is answering the question.

THE WITNESS: But I started answering.

BY MS. SILVERSTEIN:

Q. Okay, all right. Go ahead. You didn't consider it when preparing your reports, correct?

A. I did not consider whether there was a reason to do a literature search on the standard that was stated in the statute and was delineated in the U.S. Government agency who was tasked with evaluating this question and utilized that same language.

It did not cross my mind that this would be a contentious issue, so I did not conduct an independent literature search looking for all instances of when that might have been used in the medical literature.

Q. Okay. Thank you for that answer, Dr. Hatten. That wasn't quite what I asked.

I understand that you didn't conduct a literature search pertaining to the "as likely as not" standard, but what my question is, is you did not consider the article by Dr. Goodman that you are now stating uses the "as likely as not" standard when writing your reports for the Camp Lejeune litigation, correct?

MR. RUZICKA: Objection, form, asked and answered.

A. I did not explicitly consider that article when writing my reports. As I said, I didn't think it would be a -- it didn't cross my mind that this would be a issue of contention, and until I started reading deposition transcripts from other experts and realized that -- and the Plaintiff -- or, I mean, the Defendant expert reports and realized that this was potentially something, an issue that would be raised.

It just seemed nonsensical to me that the Government would both produce a scientific report that utilized the standard and then at a later date, when faced with potentially paying out benefits, would try to change their assessment of what is an acceptable method of evaluating the evidence.

Q. You would agree -- well, in your reports you identified the equipoise and above standard as equivalent to as likely as not, correct?

A. I believe that is how it was operationalized in the 2017 ATSDR. They made those approximately equivalent.

Q. And, Dr. Hatten, you keep referencing the ATSDR 2017 assessment of the evidence. You would agree that your conclusions as to whether

there was equipoise or equipoise or above evidence different than the conclusions that the ATSDR found, correct?

MR. RUZICKA: Objection, form.

A. I think we've discussed this a few times. Number one, their assessment was done in 2017. Number two, it's an independent evaluation of the evidence. That doesn't mean that the framework for evaluating the evidence that's available in the case was different.

Q. Okay. I want to direct you back to the question I asked. Your conclusions are different than the ATSDR's conclusions in 2017, correct?

MR. RUZICKA: Objection, form, asked and answered.

A. I had answered that question already, but I can answer it again.

My conclusions are not all the same as what was in the 2017 assessment of the evidence. However, that is also at a -- eight years before today, and that was conducted at least eight years before today, and there is additional evidence that's available.

In addition, I independently reviewed the evidence and made my own assessment, but I

utilized a -- the same structure for analyzing it as the U.S. Government did in their publication.

Q. I am handing you Exhibit 36.

(Exhibit 36 was marked for identification and is attached to the transcript.)

BY MS. SILVERSTEIN:

Q. I handed you the National Academy of Science -- National Academies of Science document reviewing the VA presumptive -- presumption process, correct?

A. You handed this to me, correct.

Q. And did you review this before writing your report?

A. I don't recall if I did or not.

Q. If you reviewed it in your report, you would have cited it in your materials considered list, right?

A. I don't know if I would have cited it if I reviewed it while writing my report. I'm not sure if I would have or wouldn't have. I just can't recall whether I reviewed this.

Q. Dr. Hatten, are there documents that you reviewed while writing your report that you did not list in your materials considered list?

A. I review hundreds and hundreds of articles every year for various context. I explained what the specific literature search was and cited pertinent literature, the pertinent literature in my report. I didn't cite everything that is not directly relevant to my report.

Q. Do you think that an analysis of the equipoise framework that you relied on is pertinent to your conclusion -- to your conclusions?

MR. RUZICKA: Objection, form.

A. Are you --

Q. Would you like me to rephrase?

A. Sure, if you can rephrase.

Q. If there is an opinion out there that said the equipoise standard is terrible and nobody should ever use it, would that have been something that you would have wanted to know --

MR. RUZICKA: Objection.

Q. -- before writing your reports?

MR. RUZICKA: Objection, form.

A. I think I would be interested to read an assessment that says the equipoise standard is terrible it should not be used. I'm not certain that this document states that.

Q. You haven't reviewed it, right?

A. That is not what I said. I said I may or may not have reviewed this. I don't recall whether I have or have not reviewed this.

Q. So you have no idea whether you reviewed the document?

A. I don't recall whether I have or have not.

Q. Go ahead and go to page 104.

A. Are you asking me to review this document?

Q. I'm asking you to turn to page 104.

A. I'm not comfortable providing any commentary on a document I've not -- I can't confidently say I've reviewed or not reviewed before. And if you want to give me time to read the entire document I'm happy to do that, and then I will answer questions on it, but I'm not comfortable answering questions on a document I have not reviewed.

MS. SILVERSTEIN: I'm happy to go off the record and let you review the document.

THE VIDEOGRAPHER: Did you want to go off the record, counsel?

MS. SILVERSTEIN: Yes, please.

THE VIDEOGRAPHER: The time is

4:44 p.m. We are going off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 4:58. We are back on the record.

BY MS. SILVERSTEIN:

Q. Dr. Hatten, I handed you a moment ago Exhibit 36, the NAS review of the VA presumption process. Do you have that document?

A. Yes.

Q. And can you turn to page 104, please.

Are you on page 104?

A. Yes.

Q. Do you see about three-quarters of the way down the page there is an indented quote or an indented and italicized paragraph?

A. Yes.

Q. And do you see where it says, "The committee concludes that the term 'equipoise' denotes a lack of consensus across the medical community and that the term as required by law to be used in the presumption decision process is inconsistent with the current scientific use."

Did I read that correctly?

A. You read that sentence correctly, yes.

Q. I read that correctly?

A. Yes.
Q. We can go ahead and set that aside.
A. So you handed me a document that I had never looked at before. Immediately above that it describes how equipoise is actually used in science.
I don't think it's a fair characterization of anything in the document. This is a new document I've read, to read this one paragraph and suggest, because I think the implication is that this is potentially an unscientific way to use -- or an unscientific word. It is used in science, and they explain that immediately above.
Q. Dr. Hatten, my question was simply whether I read the sentences correctly, sentence correctly. Did I read the sentence correctly?
A. You read it correctly, but this is my deposition, and you were asking me a question about this document. I have additional opinions about this document based on exceedingly limited evaluation of it. You handed it to me just before. I don't think the way your question was asked characterizes what is stated in the document.
Q. Okay. Your counsel is welcome to

redirect you on a document that you say you haven't reviewed.

Dr. Hatten, is it your opinion that "as likely as not" and "a reasonable degree of scientific certainty" have the same meaning?

MR. RUZICKA: Object to form.

A. No. This -- that is not my opinion.

Q. Is it your opinion that "as likely as not" has a different meaning than "a reasonable degree of scientific certainty"?

A. It's my opinion that those are describing two different points and how you express your evaluation of the evidence, how an expert would express their evaluation of the evidence.

Q. Sitting here today, have you formed an opinion as to whether the Camp Lejeune water to a reasonable degree of scientific certainty causes bladder cancer or kidney cancer?

A. Yes.

Q. And is that detailed in your report?

A. Yes.

Q. Do you use the standard "a reasonable degree of scientific certainty"?

A. I don't recall if I used those specific words in here or not.

Q. Do you have --
A. I -- I state my conclusions on page 45 in the kidney cancer report --
Q. Are your opinions on page --
A. -- and on page 41 in my bladder cancer report. I say I hold the following opinions to a reasonable degree of scientific certainty.
Q. Earlier in your report you offer the opinion exposure to vinyl chloride is at least as like as not a cause of bladder cancer on page 33. Is that correct?
A. Yes, you read that correctly.
Q. And is that an accurate description of your opinion of vinyl chloride and bladder cancer?
A. Yes, that's the opinion I express in my report; and as I have stated multiple times today, I haven't changed the opinions I expressed in my report.
Q. What is your understanding of the difference between the standard as likely as not versus a reasonable degree of scientific certainty?
MR. RUZICKA: Objection, form.
A. The -- I think as I had just stated before, the reasonable degree of scientific certainty has to do with how as a scientist you

evaluate the evidence. As likely as not is the means of framing and evaluating that evidence with respect to a specifics exposure-response relationship.

So one is the degree of certainty I have in that opinion based on scientific principles. The second is the way how the evidence is weighed in considering the specific causal relationship.

Q. Okay. So in the Camp Lejeune reports that you have offered for kidney cancer and bladder cancer, are you saying that the weight of the evidence shows that it's as likely as not that vinyl chloride, for example, causes bladder cancer?

MR. RUZICKA: Objection, form.

A. Yes. I believe that's what I have stated and what is written in my report.

Q. Okay. And then --

A. Can I -- sorry. Assuming I understand your question correctly, because I still don't know that I fully understand the questions you are asking, but the way I am interpreting it and the way I've explained I believe are all consistent with what is written in the report.

Q. And so when you use a reasonable degree of scientific certainty, are you saying that to a reasonable degree of scientific certainty it is as

likely as not that vinyl chloride causes bladder cancer?

A. Yes. Those are the words that I've said and the -- if not the exact phrasing, the essence of the phrasing that is in my report.

Q. And does that mean that based on the available scientific literature you feel fairly confident that -- reasonably confident that vinyl chloride is as likely as not to cause bladder cancer?

MR. RUZICKA: Objection, form.

A. Correct, and I think for a concrete example, if I were seeing a patient who -- in my toxicology clinic upstairs who had a vinyl chloride exposure and was asking about the -- whether they were potentially going to develop bladder cancer, I would say based on the evidence now, the big-picture question of can this exposure cause bladder cancer would be it's at least as likely as not that that can occur; and that is a specific causation opinion for a hypothetical patient in my toxicology clinic applying the weight of the evidence that I've evaluated in this report.

Q. Dr. Hatten, you would agree that even in an instance where you believe the scientific

evidence shows that a health outcome is possible, that doesn't mean that the health outcome is guaranteed, right?

MR. RUZICKA: Objection, form.

A. Yes. That is always the case except for somebody who has been dead for a long time. That outcome is pretty final, so...

Q. Is your understanding of what a reasonable degree of scientific certainty means is the same in every case you have been an expert for?

MR. RUZICKA: Objection, form.

A. Yes. My understanding is that it has to do with the methodology that's applied and how -- as a scientist how you utilize your scientific expertise in forming your opinion.

Q. In -- do you have one of your reports in front of you?

A. Yes.

Q. Which report do you have?

A. I have bladder and kidney next to each other.

Q. If you want to look at your bladder cancer report on page 9. Are you on page 9?

A. Yes.

Q. The first paragraph that isn't a bullet

point starts with "I have reviewed." Do you see where I am?

A. Yes.

Q. It says, "I have reviewed the ATSDR water modeling, the exhibits to Plaintiff's expert Morris Maslia, and his published reports which are consistent. ATSDR PHA 2017, Maslia 2008, Maslia 2013, Maslia expert report 2024. The levels of these chemicals in the water at Camp Lejeune are hazardous to humans generally and also known to cause bladder cancer."

Did I read that correctly?

A. Yes, you read that correctly.

Q. I will represent that you have substantially the same statement in your kidney cancer report. Does that sound correct?

A. I believe it's substantially the same.

Q. Is it your opinion that the levels of chemicals in the water in any given month from 1953 to 1987 are hazardous to humans generally and known to cause bladder or kidney cancer?

MR. RUZICKA: Objection, form.

A. Not -- not necessarily. I think it depends on the specific modeling for the month that someone, an individual, was potentially exposed.

I think I had set forward the levels that had been identified as hazardous and we have discussed some of those earlier, but they are set out in my report.

Q. When you say it depends on the specific modeling for the month, do you mean it depends on what the specific estimated concentrations are in any given month?

MR. RUZICKA: Objection, form.

A. In the context of assessing whether someone may have had an exposure sufficient to be causal, yes.

Q. And do you agree that there are some months where the Camp Lejeune water modeling between 1953 and 1987, the exposure isn't enough to be hazardous to humans generally?

MR. RUZICKA: Objection to form. I'm going to direct him not to answer at this point. Let's go off the record and discuss this.

THE VIDEOGRAPHER: The time is 5:13 p.m. We are off the record.

(Discussion was had off the record.)

THE VIDEOGRAPHER: The time is

5:19 p.m. We are back on the record.
BY MS. SILVERSTEIN:
Q. Dr. Hatten, I'm directing you to page 8 of your bladder cancer report.
A. Okay.
Q. On page 8 you say under the heading "Hadnot Point," PCE contamination of at least 0.1 parts per billion was estimated beginning in the 1970s. Do you see that?
A. Yes.
Q. Is it your opinion that based on the epidemiologic and toxicologic evidence a concentration of 0.1 parts per billion of PCE is capable of causing bladder cancer?
MR. RUZICKA: Objection, form.
A. I think if we look at the -- if we look on page 35 of my report, I identify that the low contamination group, which is some contamination. So greater than zero to 36, that group has been identified as an elevated, has been identified with a association with bladder cancer. I'm not able to tease that down any further, though. That is a group of exposures that all go into that.
There is additional evidence that I lay out following that, and that is in the -- like in

the Aschengrau study they provide some estimates that are also in similar orders of magnitude that are associated with development of bladder cancer. That doesn't necessarily mean that .1 parts per billion is associated with bladder cancer, but those groups have been identified to be associated with bladder cancer. I think it would require an individual assessment of a patient to know.

Q. Dr. Hatten, would it be fair to say that you don't have an opinion as to what the lowest possible concentration of PCE that can cause bladder cancer is?

MR. RUZICKA: Objection to form.

A. I have not developed that opinion or expressed that opinion aside from identifying the levels that have been associated in the epidemiologic literature.

Q. And would it be fair to say that you have no opinion as to what the lowest possible concentration of TCE that can cause bladder cancer is?

A. I think the answer would be essentially the same, recognizing that all of these are exposures that are associated with those diseases, bladder cancer and kidney cancer, in people who are

actually exposed on base.

The true level that is potentially able to cause or that is a cause of bladder or kidney cancer would almost certainly be lower than that, but it has not been evaluated in the epidemiologic literature. If there is a lower bound in these groups, it's almost certainly below that because these are ones where an actual association has been identified in the population of interest with the exposure of interest.

Q. If you were asked to identify a lower bound concentration for PCE, TCE, vinyl chloride or benzene that can cause kidney cancer or bladder cancer would you be able to provide a lower bound estimate?

MR. RUZICKA: Objection, form.

A. I think I've already stated I provided the lower bounds, both the upper and lower bounds for the groups that have been associated in the epidemiological literature; and it gets particularly important that these are -- we have data from the actual cohort of concern.

Oftentimes in toxicology or medicine we are dealing with a different population, where a different population is studied. In this case the

actual population of interest or of concern is the one that has actually been studied. So we have real data from these people that demonstrates a -- the outcomes of concern, kidney cancer and bladder cancer, in these people.

Q. Dr. Hatten, we discussed this earlier, but through your review of the Bove studies and ATSDR 2018, you are aware that Dr. Bove wasn't able to -- he didn't do any kind of exposure assessment on the individual participants in the study, correct?

MR. RUZICKA: Objection, form.

A. He had individual outcome data and utilized or assigned exposures to individuals based on the dates they were present and the modeling, the ATSDR modeling. That is my understanding. He didn't de novo create a model for each individual person. He used these -- this pre-exist -- or this dataset that was developed by the U.S. Government in the ATSDR and applied it on an individual basis to the individuals that were being studied.

Q. You are aware that Dr. Bove said that he didn't know where on base specific people in his study lived, correct?

A. Not -- my understanding is he didn't

know with certainty for every person and used the best estimates available based on the data he had available.

Q. And Dr. Hatten, are you aware that only three of the nine water systems at Camp Lejeune were modeled as having contamination?

A. I think I listed in my report what the water systems that were identified as potentially being contaminated.

Q. So sitting here today, are you aware that there are other water systems that were operational at Camp Lejeune from 1953 to 1987 that were not contaminated?

A. My understanding is that the other water systems have not been identified as being contaminated. I don't recall the exact number, if it was six more or if there was any sharing of water systems between the two or water sources between the two. But my understanding is these, the ones I list in my report, are the ones that were identified as being contaminated.

Q. Are you aware that ATSDR said their water modeling represented a conservative estimate?

A. I would have to see the context of that statement to understand what you are asking about.

Q. So sitting here today, you are not aware of whether or not ATSDR said that their water modeling provided a conservative estimate, correct?

A. I don't recall the specific language they used.

Q. Are you aware that the ATSDR water modeling was not used for the 2024 Bove health studies?

A. My understanding is that alternate exposure metrics were employed in those, but I would have to review the methodology to confirm that.

Q. You would agree that for the constituents we are talking about today, even if we don't know it exactly, there is some threshold level of exposure that represents when the contaminant is hazardous to human health, right?

MR. RUZICKA: Objection, form.

A. Again, I think as I've answered before, it depends on an individual assessment. There may be an individual person who is genetically extremely susceptible to exposure to one of these compounds, and that individual person's threshold for developing cancer may be different.

These are population evaluations that

I've reported in my -- that I've identified in my report that identify population-level concerns or hazard levels that have been identified as hazardous on a population level.

Q. Can you please turn to document 9.

Do you have document 9?

A. Yes.

Q. Can you please turn to page 59.

In the second full paragraph about two-thirds down the page you wrote, "The assumption of no threshold level has not been demonstrated to be an accurate representation of human biology." Correct?

A. Correct.

Q. And then you wrote, "The existence of a threshold even for many genotoxic carcinogens is supported by multiple studies and is now widely accepted by toxicologists," correct?

A. Correct.

MS. SILVERSTEIN: Can we just take a quick two- or three-minute break?

MR. RUZICKA: Yeah.

THE VIDEOGRAPHER: The time is 5:31 p.m. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 5:36 p.m. We are back on the record.

MS. SILVERSTEIN: Dr. Hatten, I don't have any further questions for you right now. Thank you for your time all day today.

THE WITNESS: Thank you.

MR. RUZICKA: Give me ten minutes real quick, please. We can go off the record.

THE VIDEOGRAPHER: The time is 5:36 p.m. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 5:40 p.m. We are back on the record.

EXAMINATION

BY MR. RUZICKA:

Q. Doctor, thanks for all your time today. I just have a couple questions to clarify some things.

In your kidney report are all the opinions that you put forth, are they held to a reasonable degree of scientific certainty?

A. Yes.

Q. Even though it's not explicitly stated like it was in the bladder cancer report, you still hold that same opinion for -- that same belief for

all the opinions you hold in your kidney report?

MS. SILVERSTEIN: Object to form.

A. Correct.

Q. And counsel earlier today asked you about a monotonic response in a couple different studies. Going to your kidney report, page 27 --

A. Okay.

Q. -- counsel previously indicated that you cited Aschengrau and Vlaanderen for support of a monotonic response. Do you recall that question?

A. I had questions about around that. I don't recall the exact wording though.

Q. But in -- on page 27 of your kidney report you didn't cite those two studies for a monotonic exposure response, did you?

MS. SILVERSTEIN: Object to form.

A. Correct. I only identified them as providing evidence of an exposure or a magnitude of exposure.

Q. And looking at those studies, if you could pull up Exhibit 25. Actually, strike that.

In your additional materials considered list that you provided, you cited the preprint for the Yu study?

A. Yes.

Q. What significance does that study provide in your opinions of this case?

A. Although it hasn't been published in its final form, so I would reserve the right to revise any considerations depending on if it's changed when it's fully undergone peer review and publication. It provides evidence of an association with low-dose benzene exposures in both kidney and bladder cancer as outcomes.

Q. And is that a instance of where science has developed that may change your opinion or maybe an agency's opinion over time?

MS. SILVERSTEIN: Object to form.

A. It potentially could. I think it is just additional information that would bolster my opinions for both bladder and kidney cancer.

Q. Okay. And you were also asked about, if you could look at 27, the Anttila study?

A. Yes.

Q. You were asked some questions about that as it pertained to TCE and kidney cancer, and you were asked about the whole period exposure metric on page 803, Table 3. Do you recall those questions?

A. Yes. On page 802, Table 3, correct.

Q. Okay. And you cited the SIR level of -- the S-I-R level of .87, correct?
A. That's what was reported in Table 3.
Q. For kidney cancer?
A. Correct.
Q. And if you look at the -- and you were asked about the year since the first measurement section, right, that's right beside it in Table 3?
MS. SILVERSTEIN: Object to form.
A. There are additional columns of years since first measurement.
Q. In the years since first measurement, on the first column it's zero to nine years since the first measurement, and what was the SIR in that instance?
A. 0.53.
Q. And then in the years since first measurement column 2, 10 to 19 years, what was that measurement?
A. 1.39.
Q. And in the years 20 plus, what was that measurement?
A. It's expected to be 1.48. There were no observed cases, so there is not a true value there. So at a maximum you could use information from it's

at least ten years of exposures.

Q. And does that support your opinions?

MS. SILVERSTEIN: Object to form.

A. It is an elevated measure of association that I identified in my report.

Q. You were asked about additional data for PCE and kidney cancer since the 2017 ATSDR assessment of the evidence. Do you recall that?

MS. SILVERSTEIN: Object to form.

A. I recall questions about that, yes.

Q. Were you asked about the EPA ban of PCE just in this last year?

MS. SILVERSTEIN: Object to form.

A. I was not asked questions about that.

Q. Does the EPA ban say anything about the relationship between PCE and kidney cancer?

MS. SILVERSTEIN: Object to form and foundation.

A. It identifies concerns about PCE as a cause of kidney cancer as partial justification or one of the justifications for the ban of the U.S. Government banning PCE in the U.S.

Q. And were you asked about the 2024 Bove data?

A. We had discussions of the 2024 Bove

studies.

Q. And any positive associations between time on Camp Lejeune and kidney cancer in those studies?

MS. SILVERSTEIN: Object to form.

A. I would have to review, but I believe -- I believe I identified in my report that in the cancer incidence study there was an elevated measure of association in association with civilian personnel and a monotonic exposure response with a high duration of exposure associated with the hazard ratio of 1.70.

In addition, in the mortality study, in a model that used a 10-year lag, the adjusted hazard ratio for kidney cancer deaths was 1.44 in civilian personnel and 1.21 in military personnel.

There was also a monotonic exposure response for duration in civilian personnel with a hazard ratio of 1.68. That was with a high duration of exposure.

Q. And so are those all three different additional data points that helped your opinion regarding PCE and kidney cancer since the 2017 ATSDR assessment of the evidence?

MS. SILVERSTEIN: Object to form.

A. It's less PCE specific and more Camp Lejeune water exposure in general as the exposure because these are all duration-based rather than identifying specific compounds that people were exposed to.

Q. And when you were asked about benzene and kidney cancer and whether you didn't cite certain studies, do you recall those studies that you were asked about?

MS. SILVERSTEIN: Object to form.

A. I recall being asked a series of questions about studies I didn't cite.

Q. And did you cite the meta-analysis for -- on page 31 of your kidney cancer report from 2024, Seyyedsalehi?

A. Yes, I cited that.

Q. And do you know if Wong 20- -- or 2001 is cited in that meta-analysis?

A. I would have to review the list of articles evaluated, although I believe a number of the ones that were -- where questions were asked about are cited in that, are included in that meta-analysis.

Q. Do you recall if Honda 1995 was cited in that meta-analysis?

A. I just don't recall. I would have to review the list of studies that were included.

Q. Sure.

A. And it's in my report, but that meta-analysis had an elevated meta relative risk of 1.20.

MR. RUZICKA: I don't think I have any other questions. Thank you for your time.

MS. SILVERSTEIN: Can you give me just five minutes?

MR. RUZICKA: Yep.

THE VIDEOGRAPHER: The time is 5:50. We are off the record.

(Recess taken.)

THE VIDEOGRAPHER: The time is 5:55 p.m. We are back on the record.

FURTHER EXAMINATION

BY MS. SILVERSTEIN:

Q. Dr. Hatten, a few moments ago in response to questioning by your counsel, you answered some questions about the EPA's ban of TCE, correct?

A. Yes.

Q. And to be clear, you don't offer any opinions about the EPA's TCE ban in either your

kidney cancer report or your bladder cancer report, correct?

A. I believe the final language was released after my reports were submitted so I didn't have those available.

Q. So that means that you don't include any opinions about the TCE ban in either your kidney cancer report or your bladder cancer report, right?

A. Correct. I did not include opinions on either of those in those reports.

Q. And you have not as of right now provided a supplemental report discussing the TCE ban, correct?

A. Correct, I have not.

Q. You also didn't list the TCE ban in your materials considered list, correct?

A. That's correct. I have reviewed the language of both the TCE and PCE ban, but I don't have specific opinions on those as regulatory documents.

Q. Just to clarify what you just said, you don't have any opinions on the TCE ban; is that correct?

MR. RUZICKA: Objection, form.

A. Not with respect to the -- their

function as regulatory documents. I've reviewed the literature that was cited in the ban to ensure I didn't miss anything or there was nothing that would change my opinion, and I didn't identify anything that would change my opinions with respect to causation. But I don't -- I haven't expressed any opinions or formed any opinions as a regulatory document, and I never held myself out as a regulatory expert.

Q. Dr. Hatten, to be clear, I'm asking about the TCE ban as it relates to your kidney cancer or bladder cancer opinions. Do you have any opinions about the TCE ban as it relates to your kidney cancer or bladder cancer opinions?

A. Not with respect to the opinions. As I said, I reviewed them to ensure I hadn't missed a key article or a -- or there was something in those documents that would lead me to reinterpret a study or reconsider the findings in a study. I didn't identify anything in those documents that would alter my opinions, so I don't -- I don't know if that answers your question, but I used them as a resource like I would any other or compilation of the evidence that I reviewed in my report.

Q. And Dr. Hatten, you provided three

supplemental materials considered lists, correct?

A. Correct.

Q. And the TCE ban wasn't listed on any of those three supplemental materials considered lists, correct?

A. Correct, it was not on those materials considered.

MS. SILVERSTEIN: To the extent Dr. Hatten relies on the TCE ban to change or support any of his opinions, we reserve the right to reopen this deposition as that was undisclosed prior to your questioning.

MR. RUZICKA: I disagree. It's in his report, page 9, that he looked at the proposed total ban.

MS. SILVERSTEIN: Dr. Hatten testified that the ban was not available and could not be considered for his report. We can argue about this later, but to the extent Dr. Hatten offers any opinions about the TCE ban that are not explicitly stated in his report, we reserve the right to reopen this deposition. Otherwise, I have no additional questions at this time.

FURTHER EXAMINATION

BY MR. RUZICKA:

Q. Doctor, I have just one question.

On page 9 of your kidney cancer report, the second-to-the-last sentence says, "Of note, TCE is almost unanimously recognized as a cause of kidney cancer in the scientific community, and the EPA has proposed a total ban on the compound as well as on PCE."

Did I read that correctly?

A. Yes, you read that correctly.

Q. So when you authored your kidney cancer report on December 8th, 2024, was there a proposed total ban of the compound by the EPA?

A. Yes. The final language had not been -- or the final document had not been released, but a proposed rule had already been released, and I reviewed and cited that in my report.

MR. RUZICKA: No other questions. Thank you.

THE VIDEOGRAPHER: I'm assuming nothing on the Zoom, from anybody on the Zoom?

MR. RUZICKA: No.

THE VIDEOGRAPHER: Okay. This will conclude the deposition of Benjamin Hatten, M.D. The time is 6:01 p.m. Mountain Time. We

are off the record.

(At 6:01 p.m. Mountain Time, the deposition was concluded.)

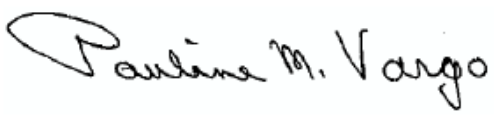
- CERTIFICATE OF CERTIFIED SHORTHAND REPORTER -

I, PAULINE VARGO, Certified Shorthand Reporter, Certified Realtime Reporter and Registered Professional Reporter, do hereby certify that prior to the commencement of the examination, BENJAMIN WALTER HATTEN, M.D., M.P.H., was duly sworn by me to testify to the truth, the whole truth and nothing but the truth.

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 hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that a review of the transcript was requested.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested :



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Dated: May 21, 2025

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Please read your deposition over carefully and make any necessary corrections. You should state the reason in the appropriate space on the errata sheet for any corrections that are made.

After doing so, please sign the errata sheet and date it. It will be attached to your deposition.

It is imperative that you return the original errata sheet to the deposing attorney within thirty (30) days of receipt of the deposition transcript by you. If you fail to do so, the deposition transcript may be deemed to be accurate and may be used in court.

E R R A T A

CASE NAME: IN RE: CAMP LEJEUNE WATER LITIGATION

DEPOSITION OF: BENJAMIN WALTER HATTEN, M.D., M.P.H.

DATE TAKEN: May 12, 2025

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CASE NAME: CAMP LEJEUNE WATER LITIGATION
USDC, EASTERN DISTRICT OF
NORTH CAROLINA, No. 7:23-cv-00897

I hereby certify that I have read the foregoing transcript of my deposition, given on May 12, 2025, at the place aforesaid, and I do again subscribe and make oath that the same is a true, correct, and complete transcript of my deposition so given as aforesaid, as it now appears.

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BENJAMIN WALTER HATTEN, M.D., M.P.H. DATE

SUBSCRIBED AND SWORN TO
before me this day
of , A.D. 20___.

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Notary Public

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