Exhibit 581

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

Case No. 7:23-cv-00897

IN RE:
CAMP LEJEUNE WATER LITIGATION
This Document Relates to:
ALL CASES

DEPOSITION OF: STEVEN BIRD, M.D.

The video deposition of Steven Bird, M.D. was taken before Janine N. Leroux, Stenographic Court Reporter and Notary Public, commencing on July 18th, 2025, at the Law Office of Mandell, Boisclair & Mandell, Ltd., One Park Row, Providence, Rhode Island at the approximate hour of 9:12 a.m. Said deposition was taken pursuant to notice Rule 30 of the Federal Rules of Civil Procedure.

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THE VIDEOGRAPHER: We are now on the record. My name is David Woodford a videographer from Golkow.

Today's date is July 18th, 2025 and the time is 9:12 a.m.

This is the video deposition being held at the office of Mandell, Boisclair & Mandell, at One Park Row, Providence, Rhode Island.

It's being heard in the matter of In Re: Camp Lejeune Water Litigation, being heard before the United States District Court for the Eastern District of North Carolina, Civil Action No. is 7:23-cv-00897.

The deponent is Steven Bird, M.D.

Will counsel present please introduce yourselves and your affiliations.

MR. RUZICKA: Ted Ruzicka with the PLG.

MR. ANWAR: Haroon Anwar and Jennifer Adams for the Department of Justice.

THE VIDEOGRAPHER: The court reporter is Janine Leroux and she will now swear the witness.

THE COURT REPORTER: Raise your right hand, please, Dr. Bird. Do you swear or

affirm to tell the truth, the whole truth, nothing but the truth?

THE WITNESS: Yes, I do.

THE COURT REPORTER: Thank you.

THEREUPON:

STEVEN BIRD, M.D.,

the witness, after being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. ANWAR:

Q. Good morning, Dr. Bird.

A. Good morning.

Q. My name is Haroon Anwar. I'm a -- I'm here with my colleague, Jennifer Adams. We met at your deposition in May. Do you recall that?

A. I thought it was in June, but I do recall it.

Q. Oh, in June. Okay, yeah. You do recall that?

A. Yes.

Q. Okay. It's nice to see you again.

Could I start by having you state your -- your full name and your address on the record?

A. Sure. It's Steven, with a V, Bird, B-I-R-D. My home address is Six Laurel Ridge Lane

in Shrewsbury, Mass.

Q. Great. You probably remember sort of the rules from the last deposition. You may have discussed them with -- with Ted, but I'm just going to go over them quickly again today just so we have a smooth deposition, as smooth a deposition as possible.

So first and most important rule is you are under oath as if you were sitting in an actual court of law. Do you understand that?

A. Yes.

Q. Okay. And is there any reason today that you would be unable to testify truthfully?

A. No.

Q. From time to time today I may ask a bad question, I may ask an unclear question. If you don't understand my question, could you please let me know?

A. Of course.

Q. Otherwise I'll assume you understood my question, is that fair?

A. That's fair.

Q. Okay. We'll try to take breaks every hour or so, but if you need to take a break for any other reason, just let me know. I'm happy to

accommodate you. And it's not intended to be punishment at this deposition. The only stipulation I'd put on that is if there's a pending question, if you could answer that question and then we can go on break, that would be great. Can we agree to that?

A. Sure.

Q. Okay. As you know, and I'm sure you recall from the last time around, we have a court reporter here virtually this time typing everything down. In order for her to be able to type everything and get everything on the record, and have the best record possible, it's important for us not to speak over each other.

So can we try our best -- I know it's human sometimes not to speak in this manner, but we can try our best to -- to -- can you try your best to let me finish your question, pause for a second so your counsel can object if he wants and then to answer my question?

A. I'll try.

Q. Okay. Thank you. Did you bring anything with you to today's deposition?

A. I did not.

(Exhibit 1 was marked.)

BY MR. ANWAR:

Q. I'm going to hand you what I'm marking as Exhibit 1. I'll represent to you this is the initial subpoena that we issued and initial deposition notice. The date of your deposition got changed, so the date on this -- this copy is not accurate. But I wanted to direct your attention to Attachment A in the back. Have you seen this document before?

A. I believe so.

Q. And did you search your records and produce any documents you had that were responsive to the requests in these subpoenas or in the -- to the -- to the document request attached to the subpoena?

A. Yeah. I don't think there's anything responsive to this.

Q. Okay. We did receive invoices produced from you. Do you recall providing those to your lawyers?

A. Maybe.

(Exhibit 2 was marked.)

BY MR. ANWAR:

Q. Okay. And I'll hand you Exhibit 2 just so you have it. These are the responses, like the

formal written responses we received from the lawyers. Have you seen these before?

A. I recall reading something. I don't know that it was this long.

Q. Okay. Fair enough. We will talk about your invoices. I just wanted to ask you a few questions about the initial requests.

Request No. 1 in the subpoena, which is also reflected in the responses -- you can look at either -- either one, Exhibit 1. Why don't you look at the subpoena. It might be easier for you in Exhibit 1.

It asks for communications with a number of people about Camp Lejeune, including the plaintiffs, the five bladder cancer plaintiffs in -- in this case, in the Track 1 case that you're offering opinions about.

Do you have any communications with any of these people?

A. No.

Q. Okay. Have you communicated with any of the plaintiffs in the litigation?

A. I don't believe so.

Q. And so it would then stand to reason you've not communicated with any of the five

bladder cancer plaintiffs that you've offered opinions about, correct?

A. That's right.

Q. Have you communicated with any of the -- any plaintiff treating physicians in the case?

A. Not knowingly.

Q. If you did you communicate with them, it wasn't about the litigation, correct?

A. Yes, that's right.

Q. And it wasn't about any care or treatment that the plaintiffs received related to their injuries at issue in the litigation, correct?

A. That's right.

Q. Okay. Have you communicated with any other experts in the litigation?

A. No.

Q. Requests 2 and 3 are also primarily about communications. Request 4 is about notes and memos and calculations and charts related to the -- the report that you pro -- you've provided. And when I say "the report," we'll talk about them. But specifically now focusing on your Phase III reports about the individual plaintiffs,

I understand that you -- you submitted a general causation report as well, correct?

A. I did but don't know what Phase III means.

Q. Okay. We're talking -- so you -- do you recall submitting a report that was focused -- like a more general report focused on general causation?

A. Yes.

Q. Okay. And then do you recall submitting five reports that relate to individual plaintiffs?

A. And bladder cancer, yes.

Q. Okay. Yeah. So we're not talking about the general report now. But as it relates to the five bladder cancer plaintiffs, do you have any materials, aside from drafts of your report, notes, memos, calculations, tables that are sort of other information that relate to your opinions that -- that is not reflected in the reports that you provided?

A. I don't have anything.

Q. Okay. Have you -- have you published or lectured at all related to Camp Lejeune water?

A. I don't believe so.

Q. Okay. You can set that aside for a moment. Thank you.

(Exhibit 3 was marked.)

BY MR. ANWAR:

Q. I'm going to hand you now what I'm marking as Exhibit 3. These are invoices that we received in response to the document subpoena that we served. Do you recall these?

A. Yes.

Q. Okay. Are these the invoices reflecting the work you've done in the Camp Lejeune litigation?

A. Yes.

Q. And it looks like to me there are really two separate invoices. There's one dated January 1, 2024 and it reflects work that you did during the period of August 2024 to December 2024 for a total amount billed of 177,900, is that right?

A. That's right.

Q. And does this -- does this invoice relate to your general causation report?

A. Yes.

Q. And then there's a second invoice. It's dated February 29 it says 2024, but I believe

that should be 2025, is that correct?
A. Oh, yeah, that's right.
Q. And then it reflects a number of charges or entries for work that you performed between January 2025 to February 7, 2025, is that right?
A. Yes.
Q. And it reflects a total amount of 37,658, is that right?
A. That's right.
Q. Okay. Do you have any -- have you performed any additional work since then or do you have any other invoices that -- or charges that aren't reflected on these invoices?
A. I don't have another invoice, but I did spend time preparing for today's deposition.
Q. Understood. Do you intend to, at some point, issue an invoice for the time spent preparing for the deposition?
A. Yes.
Q. And when you invoice -- when you issue that invoice, do you have any -- would you -- would you be able to provide that to your counsel to provide to us?
A. Of course.

Q. Okay. Thank you. You'll obviously provide it to your counsel today.

And so just adding these two invoices up, it looks like today, not including the time spent preparing for your deposition, you've been paid about $215,558, that's what I've calculated. Does that, give or take, seem about right to you?

A. I think so.

Q. What percentage of your income comes from expert witness work?

A. It varies over time.

Q. Could you provide a ballpark, anything like a range over time as a high and low?

A. Five to 25 percent perhaps.

Q. Okay.

(Exhibits 4-8 were marked.)

BY MR. ANWAR

Q. I'm going to hand you five documents. Mark Exhibit 4 is your report for Criswell, Exhibit 5 is your report for Edward Raymond, Exhibit 6 is your report for -- related to Mark Cagiano, Exhibit 7 is your report related to Jimmy Laramore, and then Exhibit 8 is your report related to Terry Dyer.

Do you recognize these documents to be

the five reports you issued related to the five bladder cancer patients that we discussed?

A. Yes.

Q. And you prepared and signed all five of these reports, correct?

A. That's right.

Q. All of them are dated February 7, 2025, correct?

A. That's right.

Q. And then you submitted -- I believe these are -- are corrected versions of these reports on June 11, 2025, correct?

A. That's right.

Q. Do you -- do you recall what corrections were made or why?

A. I actually can't remember now if a correction was in each one. But, for instance, with Edward Raymond, he was not -- he was not at Camp Lejeune in the time period of 1972 to '85, so some of the calculations I thought would be different.

I also recall that either part of my general causation report -- I think that's what it was. Part of my general causation report and exposure kind of assessment got copied into -- or

inadvertently copied or pasted into my specific causation reports, and I felt to be correct that that should be corrected.

Q. Understood. And you just referred to your five bladder cancer plaintiff reports as your specific causation reports. If I refer to them as your specific causation reports, will you -- will you understand what I mean?

A. Yes, these five.

Q. Okay.

(Exhibit 9 was marked.)

BY MR. ANWAR:

Q. I'm going to hand you what I'm marking as Exhibit 9. Do you recall this document?

A. Yes. This looks to be the corrected Appendix 3 from the report of Dr. Reynolds.

Q. And this is for Terry Dyer, your report -- your specific causation report for Terry Dyer, correct?

A. That's right.

Q. Do you recall why you made this correction?

MR. RUZICKA: Objection, form.

A. Well, I think Dr. Reynolds made the correction.

Q. Okay.

A. And I can't remember now. I think it had to do with the summed variable totals which is on the penultimate page, or maybe it's the last page, of this corrected version. I think there were some -- I don't remember the details now.

Q. Okay. So -- so Dr. Reynolds made the corrections. And because your report relies on Dr. Reynolds' calculations, you -- you updated the -- the appendix that you had attached to Ms. Dyer's report, is that right?

A. Yes. Although my recollection is that I actually had the same tables from Dr. Reynolds' report in my original report. I don't think my table changed.

Q. Okay.

A. I believe that's correct.

Q. Okay.

(Exhibit 10 was marked.)

BY MR. ANWAR:

Q. I'm going to hand you what I'm marking as Exhibit 10. I'll just represent to you Exhibit 10 is a letter that we received from the lawyers in -- in the case summarizing the correct -- the June 11, 2025 corrections that were

made to your specific causation reports. Do you -- have you ever seen this letter?

A. I don't believe so.

Q. Okay. Does this letter, to the best of your knowledge and recollection, accurately reflect the corrections that were made between your original specific causation reports that were provided on February 7th and the corrected versions that were provided on June 11th?

A. Yes.

Q. Okay. Did anyone help you prepare your specific causation reports?

A. What do you mean?

Q. Did you have any assistants help you prepare your specific causation reports?

A. The words are all mine. There was certainly discussions with counsel.

Q. But the words are all yours and you stand by the opinions in the report?

A. Yes.

Q. Does each of your specific causation reports contain a complete statement of your opinions in the case about the -- the five bladder cancer patients or plaintiffs?

A. I believe that's correct.

Q. And each of the five specific causation reports contains the bases and the reasons for your opinions in the five bladder cancer cases?

A. Well, there was also -- there's more information in my general causation report, so I think given those two things, that's the basis for my opinions.

Q. Okay. Would it -- would it be fair to say you have no opinions in this litigation other than those that were disclosed in your general causation report and your specific causation reports?

A. I think that's fair. If there were new scientific evidence that would come out, I would perhaps amend or add to my opinions. But as of now, that's it.

Q. Understood.

A. I just realized Exhibit 8 is not marked. Can we -- do you mind just scribbling an 8 on there?

Q. Sure. I think I gave you the wrong one. I took the marked one out. 8 is Dyer, right?

A. Yes.

Q. Okay. And at the beginning of our

conversation today, I think you -- you mentioned your recollection being that you were deposed about your general causation report in June. My records indicate it was May 14, 2025. Does that -- do you have any reason to dispute that?

A. No, none.

Q. Okay.

(Exhibit 11 was marked.)

BY MR. ANWAR:

Q. I'm handing you what -- and sorry for the badges -- what is being marked as 11, Exhibit 11. Do you recognize this document to be your materials considered list for your five specific causation reports for the bladder cancer plaintiffs?

A. Yes.

Q. Okay. Had you seen this document before, prior to today?

A. Not in this form at least.

Q. But as you sit here today, to the -- having had an opportunity to review this document, does this reflect all of the materials you considered in forming your opinions for the five specific causation reports?

A. I believe so.

Q. I notice some of the plaintiff-specific records include military records, housing records, NARA records, those sort of things. Do you have any particular training or experience in reviewing military records?

A. Sure. I was in active duty military for four years.

Q. Okay. And did that -- did that experience sort of inform how you reviewed those records?

A. I don't know.

Q. Did you review all the records, the materials considered on your Materials Considered List personally?

A. Yes.

(Exhibit 12 was marked.)

BY MR. ANWAR:

Q. And I'm going to hand you what is being marked as Exhibit 12, and I'll represent to you that I think this week were we provided with this Supplemental Materials Considered -- Considered. Do you recognize this document?

A. Yes. It's also attached at the end of Exhibit 11.

Q. Oh, is it? Okay. No, maybe it got

stapled. It should be separate, but it's fine.

And this -- this document reflects the rough deposition transcript of Benjamin Hatten, correct?

A. That's right.

Q. Okay.

MR. RUZICKA: Do we want to remove that last page?

MR. ANWAR: Yeah, we can do that.

A. It's actually there I think four copies.

Q. Yeah. You can just rip that it off. Thank you. I can take those.

Between your -- between Exhibit is it 10 and 11 and your materials considered list and your supplemental materials considered list, do those two documents contain all of the materials, data, facts that you considered in forming your opinions in the five -- for the bladder cancer plaintiffs?

A. I believe so, yes.

Q. Okay. Thank you. On page I believe it's 5 of your Materials Considered List -- wait, it may be Page 4 -- it looks like you reviewed the expert reports of Kyle Longley, Morris Maslia, and

I know in your report you reviewed I think the expert report of Dr. Kelly Reynolds, is that right?

A. That's right.

Q. Did you find any errors or anything you disagree with in their reports?

A. Nothing that stood out.

Q. Did you review any reports authored by other plaintiffs' experts?

A. I don't believe so.

Q. If during the course of our conversation something pops up and, you know, you remember reviewing something else, can you let me know?

A. Absolutely.

Q. Now, in your Supplemental Materials Considered List, it identifies the rough deposition transcript of Benjamin Hatten, correct?

A. That's right.

Q. Aside from Dr. Hatten's transcript, deposition transcript, have you reviewed deposition transcripts of any other plaintiffs' experts in the case?

A. Did you say "plaintiffs' experts"?

Q. Correct.

A. I also reviewed the deposition of Dr. Bove and Dr. Maslia, but I don't know if those are fact witnesses or what they would be called.

Q. Understood. Aside from their -- their depositions, have you reviewed any other deposition transcripts of any -- any experts in the case?

A. I read the deposition transcript of Dr. Goodman, and I think that's it.

Q. Understood. And if I remember correctly from your -- your last deposition, did you also review the expert report of Dr. Goodman?

A. Reports plural.

Q. Correct. The -- the five reports I believe she issued?

A. However many it was, yes.

Q. Okay. Did you review the reports of Dr. John Lipscomb?

A. The name sounds familiar, but I don't recall reading a report.

Q. Okay. What about Dr. Michael McCabe?

A. Again, the name sounds familiar, but I don't recall a report.

Q. Do you recall reviewing the report of Dr. Peter Shields?

A. Oh, yes. Yes, I do recall that.
Q. How about the reports of Dr. Judy LaKind and Dr. Lisa Bailey?
A. I don't recall.
Q. Did you review any of the reports from the United States bladder cancer expert Dr. Max Kates?
A. No.
Q. Did you review any of the reports from the United States Phase I -- and when I say Phase I, I guess, water modeling experts?
A. I did not.
Q. Sitting here as we're talking now, are there any other expert reports that you recall reviewing in the case?
A. No.
Q. Now, to your -- attached to your general causation report, there was a copy of your curriculum vitae and your prior testimony. Do you recall that?
A. Yes.
Q. And that CV was dated November 2024. Do you recall that?
A. I think so.
Q. Okay. Is that CV still a complete

representation of your educational and employment background?

A. Yes.

Q. Is there anything to add since November of 2024?

A. There's been I think one publication, maybe two. I think we talked about one of them in my -- my general causation deposition.

Q. Okay. Can -- can you remind me what the one or two publications are or were?

A. Yes. One was looking at -- at the use of antipsychotics and the increase in prolactin and increased risk of breast cancer.

Q. Okay.

A. I think that may be the only one that was published since then.

Q. Okay. And aside from that one publication, your CV is complete and up-to-date?

A. More or less.

Q. When you say more or less, what do you mean?

A. Well, I -- I've been a full professor now for nine years, so I don't add lectures or when I'm asked to give a presentation somewhere, I largely don't include those anymore.

Q. Understood. With the exception of your general causation deposition, the one in this case back in May, have you testified at trial or in a deposition since then?

A. Yes.

Q. Can you tell me about that?

A. Not in trial but a deposition in a med mal case.

Q. Okay. Well, can you -- what were the circumstances of the med mal case?

A. It had to do with failure to tell a patient that there was a mass in her lung.

Q. Is that -- is that case ongoing?

A. I have no idea.

Q. Did you testify or did you offer opinions about the standard of care in that?

A. Yes.

Q. Were you retained by the plaintiff or the defendant?

A. The plaintiff. And I have testified, sorry, in a Zantac trial since May 14th.

Q. When did -- to the best of your knowledge, I'm not holding you precisely to the date, when did that trial take place?

A. Two or three weeks ago.

Q. Where did it take place?
A. Chicago.
Q. And were you offering opinions on general causation in that case?
A. I'm not sure.
Q. Okay. What types of opinions were you offering in that case?
A. Well, it was specifically -- it was a -- a plaintiff with cancer.
Q. Were you testifying on behalf of the plaintiff or the defendant?
A. Plaintiff.
Q. And high level, what was the thrust of your opinion in that case?
A. That the amount of NDMA in Zantac was a substantial causative factor for the person's cancer.
Q. Do you have any knowledge about what the result of that trial was?
A. Yes. It was a defense verdict.
Q. Did that trial take place, do you know, in Federal or State Court in Chicago?
A. I believe it's State.
Q. So like Cook County Court?
A. Yes.

Q. Do you have a copy of your trial transcript from that case?

A. No.

Q. So there was the med mal deposition and the Zantac trial testimony. Aside from those two instances, have you testified at all between your -- your prior deposition in this case and today?

A. No.

Q. Do you -- do you recall the name of the plaintiff in the Zantac trial?

A. It was Caston.

Q. Can you spell that?

A. C-A-S-T-O-N.

Q. Thank you. I've had an opportunity to review your -- your CV and obviously was here for your -- your deposition last time. As I understand it, you're not an attorney, correct?

A. I am not an attorney.

Q. Okay. And you don't have any sort of Juris Doctor degree, correct?

A. That's right.

Q. I saw some case law listed in your materials considered. Do you recall that? Do you know what I'm talking about?

A. Yes.

Q. Okay. Why did you review case law in forming your opinions?

A. Well, it's been a while since I reviewed that. My recollection is it was in an effort to understand the -- some of the standards that have been applied in other cases.

Q. Do you remember -- do you have any recollection about any of the specific cases that you reviewed?

A. I remember the word Atorvastatin in one and either Dix or Nix, N-I-X or D-I-X. Maybe there was DuPont. That's about all I remember.

Q. And I think you said you reviewed those to sort of inform your opinions about -- or inform yourself about the standards in -- in the case. How did those cases inform you about the standards in the case, or how did they inform your opinions?

A. I'm not sure that they did.

Q. Now, you're not an epidemiologist, correct?

A. I use epidemiology all the time, but I'm not a certified epidemiologist.

Q. Okay. And you don't have a certification in epidemiology, right?

A. That's correct.
Q. You've never been a Principal Investigator for an epidemiological study, correct?
A. I agree with that.
Q. You've never published peer-reviewed literature on epidemiology, right?
A. I believe that's correct.
Q. You've never taught any courses on epidemiology, correct?
A. Not full courses, no.
Q. Have you taught partial courses on epidemiology?
A. I don't know about -- well, I have participated in one at the Harvard School of Public Health, but I also as part of my job as a residency director and the division chief of toxicology, discuss epidemiologic principles as part of the curriculum for those trainings.
Q. Understood. What -- what was the course at Harvard?
A. I can't remember the name of the course, but it's MP -- it's a course -- it's part of MPH at the school of public health.
Q. What was your role with that course?

A. Discussing various exposures with the MPH students.

Q. Were you brought in as a guest or were you a lecturer in that course?

A. I guess I was a guest lecturer.

Q. Okay. Were you a guest lecturer for one class or for multiple classes?

A. For one class several times.

Q. I see. So it was the same lecture several times?

A. I'm not sure it was the same. It might have been similar.

Q. Okay. Do you recall what the lectures were about?

A. It had to do with exposures, and I don't even recall now.

Q. When you say "exposures," do you mean environmental exposures?

A. Yes.

Q. Do you recall anything about the type of environmental exposures you were discussing in that class?

A. I don't.

Q. I assume it had nothing to do with Camp Lejeune water?

A. I assume that's correct.
Q. Do you recall approximately when you -- you were a guest lecturer for that Harvard course?
A. The last time would have been before COVID.
Q. Now, as I understand it, you're a board certified -- you're board certified as a medical toxicologist, correct?
A. In emergency medicine.
Q. Okay. In emergency medicine, correct.
And so -- just so the record is clear, you're board certified as a medical toxicologist and as an emergency physician, correct?
A. That's right.
Q. And medical toxicology is a subspecialty of emergency medicine, correct?
A. That's right.
Q. Medical toxicology and sort of more broadly, toxicology are distinct fields, correct?
A. I'm sorry, I don't understand.
Q. Yeah. Are -- what's the difference between the field of medical toxicology and the field of toxicology?
A. Well, the biggest difference is medical toxicology are physicians. Toxicologists usually

are not or usually Ph.D.s, and they both involve -- well, physicians involve patient-related care but also assessments and data interpretation. Often toxicologists may run a lab, have expertise in determining concentrations of substances, et cetera, but there's certainly overlap.

Q. According to the American Board of Emergency Medicine, and I'm quoting now, they say that medical -- quote, medical toxicologists are physicians who specialize in the prevention, evaluation, treatment and monitoring of injury and illness from exposures to drugs and chemicals as well as biological and radiological agents.

Would you agree with that?

A. Largely. I don't know that we do a lot in prevention necessarily.

Q. And then they go on to say, and I'll quote, this is the American Board of Emergency Medicine, quote, medical toxicologists care for people in clinical, academic, governmental and public health settings and provide poison control, center leadership. And important areas of medical toxicology include acute drug poising, adverse drug events, drug abuse, addiction and withdrawal,

chemicals and hazardous materials, terrorism preparedness, venomous bites and stings and environmental and workplace exposures.

Would -- would you agree with that?

A. Generally

Q. Okay. Would you agree that medical toxicology is a clinical focus field?

A. Part of it is. Part of it may not be. It depends on personal circumstances.

Q. To the extent it's not a clinically-focused field, what would it be focused on?

A. Well, medical toxicologists who run labs and principally do research, clinical or basic research, and may not do a lot of patient-focused work.

Q. Would you agree that more broadly speaking toxicology as a field is a -- is a research focus field?

A. It may. There may be people who are research focus and there are others who have -- medical toxicologists who have no research focus, and it's all clinically related.

Q. Are you aware of any sort of -- I think earlier the distinction you made was medical

toxicologists typically are medical doctors and toxicologists are typically like masters or Ph.D.s, is that right?

A. I agree with that.

Q. Are you aware of any Ph.D. toxicologists that have a clinical aspect to their -- their focus?

A. There certainly are some with their practice being at a poison center.

Q. What is your focus in medical toxicology either on the clinical side or the research side?

A. Well, I'm our division chief of medical toxicology, so I am the chief of the largest or second largest group in the country of toxicologists. We have 10 toxicologists, four fellows.

So I oversee kind of all the enterprise within that including our consultation service, our medical toxicology clinic, our research enterprise, our on-call service, pretty much all of it.

Q. Do you have a particular focus -- focus -- let me start on the research side. To the extent that you do research within your -- the

scope of your profession as a medical toxicologist, do you have a focus in terms of your research?

A. No.

Q. And then on the -- on the clinical side, do you have a focus in terms of sort of the types of patients you treat or the types of clinical care you're involved with?

A. No.

Q. Do you have a certification in toxicology?

A. I don't even know what that is.

Q. I think I saw you're obviously board certified in medical toxicology, correct?

A. Right.

Q. Okay. Have you ever been a Principal Investigator for a toxicological study?

A. Sure.

Q. Can you tell me about that?

A. Well, with my former lab as the PI for a lab, I've been involved in a number of publications with toxicology. I helped set up the toxic database, which is a nationwide database. So I think in those, that's my experience.

Q. Well, for the lab where you were the

PI, what was the focus of that lab? Like what was the research interest?

A. Organophosphorus pesticides.

Q. And what was your -- your interest in those types of pesticides?

A. They're intellectually very interesting. They are also very similar to the military nerve agents, so that was also of interest.

Q. Were you comparing them to other pesticides or chemicals, or were you looking at how those pesticides interact with humans?

A. Mostly looking at the effects and looking for countermeasures against exposures or poisonings.

Q. Effects in humans?

A. Yes.

Q. Have you published any peer-reviewed literature on toxicology?

A. Sure.

Q. All right. And that would be -- would those -- would that be reflected in your CV?

A. Yes.

Q. Have you taught any courses on toxicology?

A. Well, I mean, I'm the division chief of toxicology, and we have four fellows. It's a 24-month training program. I don't know if program is the right word, but it's a 20-month -- 24 month training. And so every week we have at least two hours of direct face-to-face teaching for the curriculum of the medical toxicology.

Q. Okay. And I was going to say is that -- is that the medical toxicology program at UMass?

A. Yes.

Q. Are you based out of Boston?

A. No.

Q. Are you based out of Providence?

A. No.

Q. Where are you headquartered or based out of?

A. Worcester, Mass.

Q. I got you. Okay.

Your CV says, the version of your CV that we have, that you're currently Chief of Medical Toxicology at UMass Memorial Health, is that right?

A. Yes.

Q. Okay. On the website it says -- on the

UMass website it says you're Chief Experience Officer in the Division of Medical Toxicology at UMass. What's a chief experience officer?

A. Well, what you read there doesn't make any sense. I was formerly the clinician experience officer, the CXO, but I don't know what site you're getting that from, but what you read doesn't make any sense.

Q. Okay. So you're not familiar with that term chief -- chief experience officer?

A. No. Particularly when you -- it said Chief Experience Officer of Division of Medical Toxicology?

Q. Yeah.

A. Yeah, that doesn't make any sense.

Q. Okay. So you're not familiar with that.

A. That doesn't exist.

Q. Okay. I will just represent to you, and we can look at it at a break, there's a UMass website that has -- has that out there, like a picture of you with that title, but you're not -- it sounds like you're not familiar with that at all.

A. That title doesn't exist.

Q. Okay. In looking at your CV, is it correct to say that you don't have any degrees in environmental health?

A. I agree with that.

Q. And you don't have any degrees in occupational medicine?

A. Correct.

Q. You don't have any degrees in industrial hygiene?

A. Correct.

Q. And I think we may have asked you these at your last deposition, but I just want to be sure. You've never published peer-review literature regarding whether TCE causes bladder cancer, correct?

A. That's right.

Q. And you've never published peer-reviewed literature regarding whether PCE causes bladder cancer, right?

A. That's right.

Q. You've never published peer-review literature regarding whether vinyl chloride causes bladder cancer, right?

A. That's right.

Q. And then you've never published

peer-reviewed literature regarding whether benzene causes bladder cancer, correct?

A. That's right.

Q. Okay. We -- we've touched on this a little bit already. As a -- as an emergency physician, an emergency room physician, what percentage of your work is spent treating patients versus research?

A. Well, all my time is clinical now other than as the administrator, as the Division Chief of Medical Toxicology.

Q. And when you say "clinical," does that consist entirely of treating patients or are you including within that definition the training you do of other physicians?

A. Yeah. So those are separate. So I guess a quarter of my time is devoted to administration of medical toxicology, which is seeing patients, teaching residents and fellows, and then the rest of my time is clinical seeing patients.

Q. And are you seeing patients in -- and this is -- forgive me because I know it might be my own ignorance about sort of emergency room physicians. Are you exclusively working out of

the emergency room then?

A. As an emergency physician, yes. In medical toxicology, no.

Q. Can you break down your time between serving as an emergency room physician versus a medical toxicologist?

A. I can't.

Q. You can't. Do you think it's 50/50?

A. I -- I don't want to say it's impossible, but I can't imagine a way to be able to divide it up.

Q. Is that because the medical toxicology aspect comes into play as you're treating patients in the emergency room?

A. It does. In addition when we're on-call for toxicology, we're on for 24 hours at a time whether I'm working in the ER or not that day. And so how -- it's kind of hard to -- I don't know how it's possible to divide it up.

Q. Are you seeing anyone that's coming into the ER essentially?

A. As an emergency physician, yes.

Q. Can you -- just so I have an understanding of the flavor of issues you encounter in your day-to-day, what are sort of the

ranges of issues you see as an emergency room physician?

A. Everything, name it.

Q. You tell me.

A. Everything.

Q. Okay. Have you treated a patient with bladder cancer?

A. Yes. I told someone last month that she had bladder cancer.

Q. Were you the diagnosing physician?

A. Yes.

Q. And then did you refer that patient to a urologist?

A. Yes.

Q. As the diagnosing physician, were you the physician -- how did you diagnose the bladder cancer in that patient?

A. Actually to be absolutely accurate, I didn't tell the patient. I told her daughter because the patient said if you tell me I have cancer, I will kill myself.

Q. Oh, no.

A. So I told the daughter that she had bladder cancer. The patient had gross hematuria. It didn't clear with continuous bladder

irrigation. Ultrasound looked like there was a mass, CT scan demonstrated a mass.

Q. Do you have any ballpark on how many patients you have diagnosed with bladder cancer?

A. In 30 years, I have no idea.

Q. Of the patients you see on a day-to-day basis, let's just say -- even say for, you know, the past month, do you have any idea of sort of the percentage of the patients that you've -- your patients that consist of patients that were diagnosed with bladder cancer?

A. In the last month, I only diagnosed one patient with bladder cancer. I don't know if there were others who had it who had been treated or who were undergoing treatment, I just don't recall.

Q. The -- the patient that you saw last month where you diagnosed her with bladder cancer, were you able to determine a cause of her bladder cancer?

A. No.

Q. Did you perform a differential diagnosis or etiology on that patient?

A. No.

Q. When you're treating patients that come

into the emergency room, do you typically perform a differential diagnosis or etiology?

A. Yeah. So -- well, we virtually always do a differential diagnosis so -- as opposed -- in that patient I did do a differential diagnosis. That is what's the differential diagnosis of gross hematuria? We sometimes do a differential etiology -- we -- we do that more in toxicology I suspect than emergency medicine. So sometimes we do, sometimes we don't.

Q. Out of all the patients that you've treated -- well, strike that. Let me ask it this way.

During the course of your career, have you diagnosed more than one patient with bladder cancer?

A. Sure.

Q. And out of all of the patients that you've diagnosed with bladder cancer throughout the course of your career, how many of them were you able to identify a cause?

A. I don't know that I did a differential etiology for any of them.

Q. How come?

A. Because I've got the patient right

there in front of me with bloody urine and a tumor.

Q. Do you -- do you typically take a physical and history of the patient?

A. Sure.

Q. And can you walk me through the types of questions you ask when taking a history, a patient's history?

A. Well, it certainly depends on what the patient is there for and how sick they are. And if -- so oftentimes all of the questions that -- or the detailed questions I may ask for a toxicology patient wouldn't be relevant for a patient with a broken toe for instance.

Q. What types of questions would you ask for a toxicology patient?

A. So medical history, medications, past surgical history, allergies, social history, family history, occupational history and then questions specifically related to why they are there, the reason I'm seeing them.

(Interruption by one of the Zoom participants.)

MR. RUZICKA: Janine, are you okay? Can you hear us?

THE COURT REPORTER: I'm fine. People just keep coming in and out of the room.

MR. RUZICKA: Okay.

THE COURT REPORTER: Like a lot. So that's what's happening.

MR. RUZICKA: Okay. Everyone please mute if you're on Zoom.

THE COURT REPORTER: All right. We're good.

BY MR. ANWAR:

Q. Okay. You mentioned social history. Does that include -- is that like drinking and smoking?

A. Drinking, smoking and other drug use, yes.

Q. And did you also say occupational history?

A. Yes.

Q. What types of questions do you ask about occupational history?

A. Are you working? If no, did you formerly work? What did you do? That kind of stuff.

Q. Are there any particular types of questions you ask patients that come in with

symptoms like hematuria or that you may suspect of having bladder cancer or urologic issues?

A. Not usually because I'm there to figure out what's wrong with them, so more of a differential diagnosis than the etiology.

Q. Understood. For that -- that bladder cancer patient last month, did you do any other -- did you do any other testing like a cystoscopy or cytology or anything like that?

A. No. I referred her or actually transferred her to -- to be admitted for it because her urine wouldn't clear with continuous bladder irrigation.

Q. Okay. To the best of your knowledge, have you ever treated any patient that -- that spent time at Camp Lejeune?

A. I know one for sure, and I'm sure there have been others in my 30 years.

Q. Who is the one that you know for sure? Not the name but what did the patient -- the one that you know for sure, what did that patient come in for?

A. A transient ischemic attack.

Q. And what is a transient ischemic attack?

A. TIA, some people refer to them as ministrokes.

Q. How did you -- if you recall, how did you learn that that patient had -- had spent time at Camp Lejeune?

A. Because he told me.

Q. Did you identify a cause of his transient ischemic attack?

A. I don't -- I did not. And I note he was admitted to observation for a number of tests, and I don't know that a cause was identified.

Q. I understand. Aside from that specific patient, do you recall any other specific patients that have told you they served at Camp Lejeune or they spent time at Camp Lejeune?

A. No.

Q. Has any patient ever asked you if their bladder cancer was caused exposure to water at Camp Lejeune?

A. No.

Q. And earlier I think you said you've -- in the patients that you've seen that were diagnosed with bladder cancer, that you diagnosed with bladder cancer, you did not determine a cause, correct?

A. I didn't endeavor to determine a cause.
Q. So would it be fair to say in those cases there was -- the discussion or topics of exposure to -- to chemicals like TCE, PCE, vinyl chloride, benzene didn't come up?
A. That's correct.
Q. Is it fair to say your practice doesn't require you to be familiar with TCE, PCE, vinyl chloride, benzene?
MR. RUZICKA: Objection, form.
A. I don't understand the question.
Q. Have you ever had a conversation with a patient that you're treating about exposure to TCE, PCE, vinyl chloride or benzene?
A. I'm not sure. I don't recall.
Q. And I'm sorry if I already asked you this question, but aside from your work in this litigation, have you ever given a presentation or spoken publicly about Camp Lejeune?
A. I don't think so. I am trying to remember if I've talked at all about the chemicals of interest in Camp Lejeune as part of our toxicology teaching. I'm not sure.
Q. Nothing that you can recall as you sit here today?

A. Correct.

Q. Do you consider yourself an expert in risk assessment?

A. I may. It depends on the -- the topic of interest.

Q. What -- what topics would you consider yourself an expert on in risk assessment?

A. Well, it depends on, I mean, lots of things some of which I see, you know, every day or every week as a toxicologist, so some exposures, typically drug exposures.

In this case, I've read a lot of literature and a lot of government reports and other things regarding TCE, PCE, benzene, vinyl chloride and the water concentrations at Camp Lejeune, so I consider myself an expert.

Q. Okay. Prior to your involvement in this litigation, would you have considered yourself an expert on risk assessment regarding the chemicals at issue in the case, TCE, PCE, benzene, vinyl chloride?

A. Probably not.

Q. Have you taken any college or graduate-level courses related to risk assessment?

A. No.
Q. Have you taken the Mid-America Toxicology Course?
A. Mid-America Toxicology, never heard of it.
Q. Have you taken any courses in environmental risk assessment?
A. Nothing outside of my toxicology training at UMass.
Q. In your toxicology training at UMass, was there a component focused on environmental risk assessment.
A. I suspect. It's been 20 some years, so I don't recall what the curriculum exactly was 20 years ago.
Q. Okay. Understood. Have you taught any courses on risk assessment?
A. No.
Q. Have you conducted any human health environmental risk assessments?
A. I don't believe so.
Q. Have you read EPA's Risk Assessment Guidance for Superfund?
A. I likely read at least part of it.
Q. Do you recall which part?

A. I don't recall.
Q. Do you recall when you likely would have read it?
A. I don't know specifically, but likely around the time that I had to take my board exam in medical toxicology and recertify.
Q. When would -- when would that have been?
A. 2014 and then I recertified again in December of '24. So I do remember looking at some CERCLA, C-E-R-C-L-A, information.
Q. Have you read EPA's guidelines for carcinogen risk assessment?
A. I've read a lot of things. I don't recall.
Q. Have you ever read EPA's exposure Factors Handbook?
A. I don't recall a handbook. I seem to recall something. I don't remember the details.
Q. Have you read any textbooks related to risk assessment?
A. Not that I recall.
Q. Have you ever run ATSDR's PFAS model? Are you familiar with that?
A. I'm not.

Q. Are you familiar with ATSDR?
A. Yes.
Q. Okay. And when I say ATSDR, you understand it as the Agency for Toxic Substance Disease Registry, correct?
A. Yes.
Q. Have you ever run ATSDR's shower model?
A. No.
Q. Have you ever run a Monte Carlo simulation as part of a risk assessment?
A. I'm certainly familiar with Monte Carlo simulations, but I don't think with regards to risk assessment I have.
Q. How -- in what -- how are you familiar with Monte Carlo simulations?
A. I've known about them for a long time. I -- I don't know if I can be any more specific than that.
Q. Okay. I was going to say what is your understanding of what a Monte Carlo simulation is?
A. I think they're mostly used in financial planning now. So looking -- a way to look at lots of different assumptions within simulations to derive an answer to something.
Q. Have you ever run any other risk

assessment models?
A. Not that I can think of.
Q. Are you a member of any professional societies that include a focus on risk assessment?
A. No.
Q. Have you ever published any papers on risk assessment in peer-reviewed literature?
A. I don't believe so.
Q. Have you served on any editorial boards of journals that focus on risk assessment?
A. No.
Q. Have you ever been asked by a journal to peer review manuscripts on risk assessment?
A. I don't know.
Q. Have you ever been invited to talk on risk assessment?
A. I don't think so but I don't -- I'm not fully sure.
Q. Okay. Have you ever been asked by EPA or any other agency to peer review their risk assessment guidance documents?
A. No.
MR. ANWAR: So I'm at a good spot to take a break if you want or we can keep going, but we can take a five-minute break if

you'd like. We've been going about an hour.

THE WITNESS: Yeah, let's take five minutes.

MR. ANWAR: Sure.

THE VIDEOGRAPHER: This is the end of Media 1. Off the record, 10:22 a.m.

(Thereupon, a break was taken.)

THE VIDEOGRAPHER: This is the beginning of Media 2. On the record, 10:33 a.m.

BY MR. ANWAR:

Q. We are back on the record from a short break. Dr. Bird, are you okay to continue?

A. I am.

Q. Okay. Did you speak with anyone about the substance of your testimony?

A. No.

Q. Okay. Do you consider yourself an expert in modeling environmental exposures?

A. I typically don't do modeling. I use modeling that had been done by others to -- to reach conclusions and times.

Q. Okay. So you're not the expert in modeling environmental exposures, correct?

A. I would largely agree with that.

Q. You've never published in a peer-reviewed journal on modeling exposures, correct?

A. That's true.

Q. Have you ever taught any courses on modeling exposures, environmental exposures?

A. No.

Q. Have you -- do you train any of your physician -- emergency room physicians, fellows and residents on modeling environmental exposures?

A. Well, it depends on the degree to which you mean modeling. So considering risks, considering exposures, that kind of thing, sure. But creating a water model, for instance, no.

Q. Understood. Are you a member of any professional organizations focused on environmental exposure modeling?

A. No.

Q. I want to shift gears a little bit and focus on your specific causation reports, Exhibits 4 through 8, and I wanted to start by asking you what your -- what your assignment for these reports was or what your understanding of your role --

MR. RUZICKA: I'm going to --

Q. -- was.

MR. RUZICKA: I'm going to object just to the extent that it calls for any communications that we've had with you, Dr. Bird. And to the extent you're able to answer, you can.

A. To the extent I can without discussing conversations with counsel would be to examine the exposures of the plaintiffs, considering their time on base, and to give an opinion about the -- the risk of bladder cancer with their exposures.

Q. Understood. Earlier we talked a little bit about differential etiology versus differential diagnosis. Can you explain for me your understanding of the difference between the two?

A. Yes. For me differential diagnosis is a medical concept whereby you have a symptom, for instance, or a disease process, and you're trying to figure out -- you're trying to figure out what the specific disease process is.

Differential etiology is -- my understanding is more of a legal term whereas finding out what is the cause of someone's symptoms rather than what the diagnosis is.

Q. Do you understand differential etiology to be a legal term?

A. That's my understanding.

Q. Have you ever used the term differential etiology in your practice emergency room physician?

A. No, not that term.

Q. Okay. And you've never used the phrase or the term differential etiology in your practice as a medical toxicologist?

A. I don't think so.

Q. And you've never encountered it outside of the legal or litigation context?

A. I would agree with that. Now, we may do a differential etiology, but I don't know of any physician who calls it that.

Q. Okay. For your specific causation reports, Exhibits 4 through I believe 8, you -- you don't perform a differential etiology or diagnosis, correct?

A. That's correct.

Q. And you did not review the five Track 1 bladder cancer plaintiffs' medical records, correct?

A. Just so we're clear, what's a Track 1?

Q. We -- we -- that's a terminology -- that's a terminology in this case. I can reask the question without using that.

Why don't we say this. When I refer to bladder cancer plaintiffs, is it your understanding that I'm referring to Mr. Cagiano, Mr. Raymond, Mr. Laramore, Ms. Dyer and Mr. Criswell?

A. Yes.

Q. Okay. And those are the five bladder cancer plaintiffs in this case that you're offering specific causation opinions, correct?

A. That's right.

Q. Okay. And for those five plaintiffs, you did not review their medical records in forming your opinions in your specific causation report, correct?

A. That's right.

Q. Okay. And you do not opine in any of your specific causation reports for those five plaintiffs that their alleged exposures to water at Camp Lejeune, in fact, did cause their bladder cancer, correct?

A. Oh, you lost me there. Can you repeat it?

Q. Sure. You're not offering the opinion for any of these five plaintiffs in your specific causation reports that exposure to Camp Lejeune water caused their bladder cancer.

A. I just want to see exactly how I phrased it in my report. Correct, I did not use the word "caused."

For instance, in Mr. Criswell's report, Paragraph 57, I say: My opinion is that Mr. Criswell was exposed to levels of carcinogens that are known to be hazardous to human health, including bladder cancer, and as a result, developed an increased risk of developing bladder cancer.

Q. Okay. So you're not offering the opinion for any of these five plaintiffs that Camp Lejeune water caused their bladder cancer, correct?

A. I have not expressed that opinion.

Q. Okay. And when we're talking about Camp Lejeune water, would you agree that the chemicals that were -- or can we agree when we're talking about Camp Lejeune water, the -- the chemicals at issue in the water are the TCE, PCE, vinyl chloride and benzene?

A. Yes.
Q. Okay. I want to talk a little bit about your methodology on those -- your -- your five specific causation reports. As I understand it, you -- from your reports, you reviewed the expert report of Dr. Kyle Longley, correct?
A. I did.
Q. Who is Dr. Longley?
A. Is he a historian? I actually don't know what his educational background is.
Q. Well, why did you review Dr. Longley's report?
A. Well, to have a sense of what kind of life was like generally on Camp Lejeune, and -- and his report kind of comported with my own ideas or ideas about what it was like.
Q. And you haven't done any -- you're not a historian, correct?
A. I'm not a professional historian.
Q. And you haven't performed any sort of expert historian work related to Camp Lejeune, correct?
A. That's correct.
Q. And you're relying on Dr. Longley's opinions in forming your own opinions in the

specific causation reports, correct?

MR. RUZICKA: Objection, form.

A. Well, as I just said, his report comported with my understanding of what life is like on a military base.

Q. What was your understanding of what life is like on a military base or at Camp Lejeune specifically?

A. Well, I've lived on a military base, so people shower and eat and PCE on base. Sometimes people live off base and they come on base for their work.

What I reviewed in Dr. Longley's report comported with my remembrance and understanding of life on base.

Q. If you don't mind me asking, what military base did you live on?

A. Camp Lester.

Q. What branch of the military did you serve in?

A. I served in the Navy and wore a Marine Corps uniform.

Q. Okay. And did you say earlier that you served for four years, is that right?

A. Active duty for four years and reserves

for five.

Q. Okay. Thank you for your service.

Can you -- just because I don't know where it's located, just for the record, where is Camp Lester located?

A. Well, it was located in Okinawa. I don't know that it exists any longer.

Q. Okay. Aside from informing sort of some of your ideas about what life on a military base is like, has your -- has your experience serving in the military informed your opinions in any other way?

A. No.

Q. Did you ever meet with Dr. Longley?

A. No.

Q. Would you agree that if Dr. Longley's opinions are incorrect or inaccurate that -- that that would impact your opinions, too?

A. I don't think so because his report comported with my recollection of what life is like on a military base.

Q. Okay. Did you live on base while you served?

A. So I've -- at times, yes. I've been on a number of bases over -- during my four years of

active duty.

Q. What -- what's the longest period of time that you can remember living on a military base?

A. I don't recall.

Q. Do you think it was more than a week, more than a month?

A. Oh, certainly more than a week and more than a month.

Q. Okay. Do you recall where you lived on base?

A. At Naval Air Station Pensacola and Camp Lester.

Q. Do you recall whether you lived in officer housing, barracks, what type of housing you lived in?

A. So I lived in officer's quarters in Camp Lester, and I don't know what I was living in in Pensacola.

Q. And as I understand your testimony, the opinions that Dr. Longley has offered in; the case are consistent with your recollection of what it's like to serve in the military or what your experience was in the military?

A. Well, to be clear, I'm not sure what

Dr. Longley's opinions all were, so I don't know that I can answer that.

Q. Oh, the ones that you've cited in your -- strike that.

You have cited some of his opinions in your specific causation reports, correct?

A. I don't know that I actually cited an opinion of his.

Q. Okay. Well, we'll take a look at it when we get there.

Now, you also reviewed and are relying on the expert report of Dr. Kelly Reynolds for the five plaintiffs, right?

A. That's right.

Q. And what is your understanding of Dr. Reynolds' role in the case?

A. Acknowledging I may not know all of her -- her entire role in the case was to calculate the exposure of the five plaintiffs to each of the chemicals of question.

Q. Okay. Do you -- do you know how she -- generally speaking, do you know how she did that?

A. I think so.

Q. Can you tell me about it?

A. My understanding or recollection is

that she used the monthly averages of the chemicals from water sources, relevant to a particular person, so Hadnot Point versus Tarawa Terrace, for instance, and calculated and used their time on base to then derive a cumulative exposure.

Q. Do you have any understanding of where she obtained the -- the monthly contaminant concentrations?

A. My recollection is it was from the -- I don't know if it was a report or a publication of Dr. Maslia. I guess, is that technically ATSDR? I'll say Dr. Maslia.

Q. Okay. Did you ever meet with Dr. Reynolds?

A. No.

Q. Now, I think a moment ago you stated that, and I'm probably going to state it differently -- well, strike that.

So would you agree Dr. Reynolds calculated exposure doses, cumulative exposure doses of TCE, PCE, vinyl chloride and benzene for each of -- based on -- for each of the five bladder cancer plaintiffs that you're offering opinions on?

MR. RUZICKA: Objection, form.
A. I believe that's what she did.
Q. Okay. Related to Camp Lejeune water, correct?
A. Correct.
Q. And in doing so, she used a unit of micrograms per liter per month and a unit of total mass and total micrograms, correct?
A. No.
Q. Okay. What is -- what is incorrect about the statement?
A. She used microgram per liter months.
Q. Okay.
A. And then I actually can't remember what the rest of your question was because I was focused on that error.
Q. Okay. She -- she used micrograms per liter months -- per liter months?
A. Correct.
Q. And she used a total mass in total micrograms, correct?
A. Correct.
Q. Okay. What is an exposure dose?
A. Could you be more specific?
Q. How does an exposure dose -- well,

strike that.

What is your understanding of an exposure dose in the context of Camp Lejeune and what Dr. Reynolds did?

A. It would be what is the amount of the chemical that the person was exposed to.

Q. Would you agree that an exposure dose is different from an absorbed dose?

A. It may at times.

Q. How -- how would it be different?

A. Well, it depends on the specific substance that we're talking about. I think in general for these chemicals, the exposure and absorbed amounts are likely the same or very, very close to each other.

Q. Why do you say that?

A. Because we know that these chemicals are absorbed from the GI tract. We also know that they are absorbed with inhalation, and they are also absorbed from dermal exposure.

Q. Do you -- can you direct me to any sort of literature or peer-reviewed studies that would support that?

A. They are cited in my general causation report.

Q. Do you recall offhand, sitting here, which ones?

A. So with regards to inhaled absorption, there's McKone, Weisel and Jo, and Andeman (sic) or Ald -- Andeman I think is the other author. Those are three manuscripts describing inhaled absorption of the chemicals.

Q. What about ingested absorption?

A. Oh, I can't -- there's a whole section in my report about that.

Q. Okay. How -- how would you define absorbed dose?

A. The percentage, if you will, of an exposed dose that is -- enters the body, enters circulation, something like that.

Q. In your practice as an ER physician and a medical toxicologist, do you focus more on exposure dose or absorbed dose in trying to understand the possible health effects of an agent on one of your patients?

A. It depends on the agent, but probably focus more on the exposure dose.

Q. How come?

A. Because that's the information generally we have.

Q. Is absorbed dose unavailable? Is it --
A. It may be unavailable. It may be irrelevant because we have an exposure and we have an outcome. Yeah, I think that's my answer.
Q. Is it your understanding that Dr. Reynolds estimated doses accounted for all routes of exposure?
A. My understanding is she did only ingestion or oral exposure.
Q. And earlier you discussed -- you mentioned Mr. Maslia, but Dr. Reynolds relied on ATSDRs and Mr. Maslia's water modeling for Hadnot Point, Holcomb Boulevard and Tarawa Terrace, correct?
A. That's my understanding.
Q. Okay. And you understand that Hadnot Point, Holcomb Boulevard and Tarawa Terrace are three locations within Camp Lejeune, correct, three water distribution systems within Camp Lejeune?
A. Yes.
Q. And you understand that there were more than three water distribution systems at Camp Lejeune, correct?
A. That's my understanding.

Q. Okay. And you understand that there are no other water distribution systems at Camp Lejeune that are at issue in the litigation, correct?

A. That's right.

Q. So if a plaintiff -- if any of the five bladder cancer plaintiffs spent time at a part of base that wasn't Hadnot Point, Holcomb Boulevard, or Tarawa Terrace, for instance Camp Geiger or Camp Johnson, you did not include the time -- that time in your exposure calculations, correct?

MR. RUZICKA: Objection, form.

A. I believe Dr. Reynolds accounted for that largely.

Q. Okay. Are you aware there's no contaminant sampling data available for Hadnot Point, Tarawa Terrace, Holcomb Boulevard prior to the early 1980s?

A. Yes, that's my understanding.

Q. Okay. And that's -- it's your understanding that's why ATSDR and Mr. Maslia conducted the water modeling, correct?

A. In large part.

Q. We discussed that ATSDR modeled mean monthly concentrations of the contaminants at

issue for -- for Hadnot Point and Tarawa Terrace, correct?

A. Yes.

Q. And those were measured by ATSDR in units of micrograms per liter, correct?

A. That's right.

Q. Would you agree in water one microgram per liter equals one parts per -- one part per billion?

A. Yes.

Q. And those are both units describing a concentration, correct?

A. That's right.

Q. Would you agree that if ATSDR's water models are inaccurate, that Dr. Reynolds' exposure dose calculations would also be inaccurate?

MR. RUZICKA: Objection, form, foundation.

A. Sure. To the degree that it's off from the actual, her calculations will also be off from the actual by that same amount.

Q. Okay. And if Dr. Reynolds' calculations are inaccurate, the exposure dose numbers in your specific causation reports would also be inaccurate, correct?

MR. RUZICKA: Objection, form, foundation.

A. They would be off by the same amount.

Q. In other words, your -- the numbers in your report -- in your opinions, in your specific causation reports ultimately depend on the accuracy of ATSDR's water models and Dr. Reynolds' opinions, correct?

MR. RUZICKA: Objection, form.

A. Sure. I also did some of my own calculations that comported with Dr. Reynolds, but I also was relying upon the data from Dr. Maslia or ATSDR.

Q. What -- what calculations did you do?

A. I don't remember specifically. There's lots of calculations here. But I wanted to understand exactly how they were done to see if I got the same numbers.

Q. Okay. Are your calculations at all reflected in your specific causation reports?

A. Well, insofar as they were the same as Dr. Reynolds, yes.

Q. And so it sounds like you attempted to check her calculations, is that right?

A. I just wanted to make sure I understood

exactly how they were done instead of just solely relying on her, so I did some of my own and they -- they were the same.

Q. Can you describe for me like the specific calculations you performed?

A. So using the chemical concentrations per month and adding those up depending on how many days there were, et cetera, in a month for how long someone was there exposed, seeing if those final numbers matched.

Q. Did you do any other calculations?

A. Nothing meaningful.

Q. When you -- when you say "nothing meaningful," was there something that you did that was not meaningful or insignificant?

A. Sure.

Q. Can you tell me about that?

A. Converting micrograms to milligrams.

Q. And to convert a milligram to a microgram, you multiply by 1,000, right?

A. Yes.

Q. And then to convert a microgram to a milligram, you divide by 1,000, correct?

A. You got it.

Q. Okay. Any other calculations that you

recall?

A. I don't think so.

Q. Did you do those calculations on paper somewhere?

A. Just with my phone calculator.

Q. Do you have any notes or written records of the calculations you performed?

A. No.

Q. Have you ever relied on an environmental contaminant model in your practice as a medical toxicologist and emergency physician?

A. Sure.

Q. Can you tell me about that?

A. Well, for instance, arsenic exposure in drinking water comes up on occasion in some of the litigation work relying on exposure modeling of diesel exhaust, for instance.

Q. Any other examples you can think of?

A. That's what I'm thinking. Nothing that comes to mind.

Q. What -- what type of model or models have you -- have you relied on as it relates to arsenic in drinking water?

A. Well, not much different than here. What's the concentration? What was the

concentration over time? How much did someone ingest? How much water did they ingest? And then what was their total exposure to arsenic? What was their urine and/or blood arsenic concentrations?

Q. Who -- who developed that model?

A. I'm not sure.

Q. Did you rely on that model in the context of litigation?

A. I --

Q. And this is focusing on arsenic.

A. No.

Q. In what context did you encounter the model related to arsenic in drinking water?

A. Well, arsenic in drinking water is a concern for some people, generally those who have private wells, and so it's a question of is the arsenic in the water at a level which would be hazardous to human health.

Q. You -- you didn't perform that model related to arsenic in drinking water, correct?

A. Correct.

Q. Where did that model come from?

A. Oh, I don't recall.

Q. Was it -- where did you get the results

from that model? Was it in a -- like a peer-reviewed article or was it in a report of some kind?

A. I don't -- maybe both. I don't recall.

Q. Do you recall what -- what timeframe this would have been when you considered the model related on arsenic in drinking water?

A. Oh, I mean, it's going back as far as probably 15 years.

Q. Do you recall anything about the modeling software that was used or how the arsenic in the drinking water was modeled?

A. I don't.

Q. Do you recall whether that model was attempting to predict model arsenic concentrations into the future or into the past?

A. I can't remember.

Q. What did you use the -- that particular model for, the model on arsenic in drinking water?

A. I don't remember all the details when I've done this. I don't want to misstate. My -- my recollection is to look to estimate a person's total cumulative exposure to arsenic.

Q. Was that in the context of your practice as a physician?

A. Medical toxicology.
Q. And did you use the results of that model to publish literature or to treat a patient?
A. We didn't publish anything, but it would be as a means to reassure someone about their exposure or to provide them data about how to remediate the arsenic in their water.
Q. Do you recall whether it was to provide them information about their exposure versus to remediating their water?
A. Well, I think those are very similar things.
Q. Well, I guess, why do you think they're similar?
A. Well, if -- if someone's exposure is negligible, then there's no need to remediate a reverse osmosis system then, for instance. But if the exposure is significant, then that may be a reason for a person to put in a remediation system.
Q. Would you agree that it's possible someone's, I guess, water supply could be contaminated but their exposure limited because they weren't exposed to the contaminated water?
A. Sure. Or the contaminant level was so

low as to -- to not pose a health risk.

Q. Okay. And then you mentioned a model relating to diesel exhaust, correct?

A. Yes.

Q. Can you tell me about that model?

A. Well, it just relied on modeling of others or results of others to determine diesel exhaust exposure.

Q. Do you know who performed the -- the diesel exhaust model?

A. No.

Q. Do you recall what timeframe this would have been that you -- you considered the diesel exhaust model?

A. Oh, in the last -- since COVID.

Q. So in the last five years probably?

A. Yes.

Q. What were you using the diesel exhaust model for?

A. To determine the exposure of a person to diesel exhaust.

Q. Was it in the -- was this in the context of your practice as a physician and medical toxicologist, or was it in the context of litigation?

A. In litigation.

Q. And so were you -- you considering the diesel exhaust model or were you relying on that to -- to offer opinions in litigation?

A. Yes.

Q. Do you remember the name of the litigation?

A. Well, it's been a few -- I think we talked about it last time. I think it was Hartmann, H-A-R-T-M-A-N-N, maybe.

Q. Do you know who developed the diesel exhaust model?

A. No.

Q. Was it -- do you know if it was a government agency or another expert in a litigation?

A. No idea.

Q. Okay. Do you recall the outcome of that litigation?

A. I think it settled.

Q. Okay. Do you recall whether that model was trying to predict, I guess, diesel exhaust levels into the future or into the past?

A. I don't know. Well, I could guess. I shouldn't guess. I don't know.

Q. You used it to -- to evaluate an individual's exposure, is that right?

A. That's right.

Q. And was it your opinion that individual was exposed to diesel exhaust?

A. Yes.

Q. Have you reviewed any of the ATSDR's water modeling reports?

A. For Camp Lejeune?

Q. Correct.

A. I have seen them and reviewed them to some degree.

Q. And it looks like as part of the opinions you're offering in your specific causation reports, you compared Dr. Reynolds' exposure dose calculations for each of the five plaintiffs to some epidemiological studies to see if plaintiffs were exposed to sufficient levels of TCE, PCE, benzene, vinyl chloride to increase their risk of bladder cancer, is that right?

A. That's right.

Q. Okay. So have -- based on your reports, my understanding is the studies that you reviewed included Aschengrau 1993. Does that sound right?

A. Yes.
Q. ATSDR 2018 the Morbidity Study?
A. Yes.
Q. And then ATSDR Bove 2024 the Cancer Incidence Study, correct?
A. Yes. I think that -- I just want to be clear. It sounded like your question like those are the only things I've reviewed or relied upon. I've reviewed and relied on a lot, but specifically for the calculations or determination in these specific causation reports, it's those three.
Q. Okay.
A. Does that make sense?
Q. Yes. Those were the three that I saw cited in your reports when you were comparing Dr. Reynolds' calculations of exposure for an individual plaintiff to exposure levels in the epidemiology, is that right?
A. Correct.
Q. Okay. And for that purpose you did not cite any other studies in your specific causation reports, correct?
A. Correct.
Q. How did you land on these specific

three studies to use in your specific causation reports?

A. Well, they have epidemiologic data about outcomes. That's largely the reason why. There are also some outcomes in one of the Bove 2014 studies, but I use the ATSDR 2018 because their concentrations showing increased risk of bladder cancer was a little bit lower.

Q. You didn't use the -- the 2024, the Bove ATSDR Mortality Study, correct?

A. Correct.

Q. Have you reviewed that study?

A. Surely.

Q. Do you recall that study, the Mortality Study in 2024 showing a decreasing exposure response relationship using duration on base for civilian employees as a metric for exposure?

A. I don't recall.

Q. Do you recall the 2024 Mortality Study showing that when adjusted for sex, race and age, there was -- there were 3% fewer deaths from bladder cancer in Camp Lejeune, the Camp Lejeune cohort, than the general population?

A. I recall something like that.

Q. And the 2024 Mortality Study does not

reflect an association between exposure to contaminants in Camp Lejeune and death from bladder cancer in comparison to the general population, right?

A. Oh, I don't recall the details.

Q. Do you know why you didn't rely on the 2024 Mortality Study?

A. Well, we have other data. And mortality study in order to be counted, you have to die of something.

And so here when the Camp Lejeune military cohort is young, that I felt that generally morbidity studies would be better than mortality studies.

Q. Is there any reason you chose not to use occupational studies to identify levels of exposure with possible toxicological significance?

A. Well, I've considered those but, importantly, the plaintiffs were a part of those studies that were done, the Bove ATSDR studies. It's the -- the group we're talking about are the exact same ones that were in the publications, so that's the most meaningful.

Q. Okay. Is it -- would you agree that, generally speaking, occupational studies -- the

doses in occupational studies are much higher than the doses we're talking about in the water at Camp Lejeune?

MR. RUZICKA: Objection, form, foundation.

A. They may be. Or I should say they may be higher. I don't know about qualifying it as much higher.

Q. A moment ago you made a -- I think in explaining why you didn't use the mortality study, you described the -- the Camp Lejeune population as young, is that right?

A. Yes. They were certainly younger than the civilian population at the time that they were at Camp Lejeune.

Q. So you're saying the civilian population in that study was older than the population that was being studied at Camp Lejeune --

MR. RUZICKA: Objection.

Q. -- in that study?

MR. RUZICKA: Objection, form.

A. My recollection is the civilians, the average age of the civilians, was older than the average age of the Navy and Marine Corps

personnel.

Q. Okay. So based on your -- your evaluation of sort of reliance on Dr. Reynolds' calculations in comparison to the three studies that we mentioned for each of these five bladder cancer patients or plaintiffs, you opine about whether each plaintiff was exposed to levels, quote, recognized to be hazardous to humans, correct?

A. Yes.

Q. Where did the language -- where did you get the language "recognized to be hazardous to humans"?

A. No idea.

Q. What does that language, I guess, mean to you?

A. That there is evidence, scientific evidence that those concentrations have adverse effects.

Q. And then for each of these five plaintiffs, based on your reliance on Dr. Reynolds' calculations and your comparison to the three studies that we -- we discussed, you offer opinions about each of these plaintiffs that their exposure was, quote, substantial and, quote,

de minimis, correct?

A. Yes.

Q. What is a substantial exposure?

A. So in this context, one, I would say it's more qualitative, but it involves around-the-clock exposure for these people.

Q. When you say it's more qualitative, what -- what do you mean by that? What goes into your qualitative evaluation?

A. The concentration of the substance, how often they were exposed and for how long they were exposed.

And here, because we know that these chemicals remain in the body for more than 24 hours, these people living on base and exposed were effectively exposed around-the-clock to these chemicals.

Q. That's assuming Dr. Reynolds' numbers are correct, right?

MR. RUZICKA: Objection, form.

A. Well, the concentration is part of that.

Q. But if her numbers are incorrect, the exposures may be substantial or may not be substantial, correct?

MR. RUZICKA: Objection, form, foundation.

A. Well, these exposures were large. They were substantial. Even if her calculations were off by a bit, I -- I can't imagine, I don't know if that's the right word, that they would be de minimis even if her calculations were off a bit.

Q. You're not -- as far as I could tell in the reports, your five specific causation reports, you're not offering an opinion about the quantitative threshold for a substantial exposure, is that right?

MR. RUZICKA: Objection, form.

A. That's correct.

Q. Do you have an opinion about, quantitatively, what the threshold is to have a -- to have a substantial exposure?

A. I don't.

Q. Is that something you considered?

A. Well, using the scientific data that we have, I don't think that exists.

Q. How would you define a de minimis exposure?

A. Well, I think it comes from the Latin

for the law does not consider itself with trifles. So a trifle exposure, clinically insignificant.

Q. And I -- as far as I could tell in your report, you did not offer any opinion on the sort of a quantitative threshold or number where a exposure is considered de minimis, is that right?

A. Correct.

Q. Why not?

A. Well, we don't have that data about what a safe exposure concentration is.

Q. Hypothetically, if you had a plaintiff or a patient who was exposed below an MCL level for 10 years, would you consider that substantial or de minimis?

MR. RUZICKA: Objection, form, foundation.

A. Yeah. I would -- I would have to consider all of the details about a case in order for me to answer that.

Q. What about hypothetically if it was an exposure to contaminants in the water that were just above the MCL, but let's say it took place, you know, over the course of six months.

MR. RUZICKA: Objection, form, foundation.

A. Yeah. Without -- you'd have to consider all the details about an exposure, et cetera, for me to give an opinion.

Q. Did this language -- do you recall, did this language substantial exposure and recognized to be hazardous to humans, did that come from any of the case law that you reviewed?

A. I don't recall.

Q. Did -- did anyone provide you with that language substantial exposure and hazardous to human health?

MR. RUZICKA: Objection, to the extent that that would require you to disclose any conversations that you had with your attorneys, please don't respond. But if you're able to with that caveat, go ahead and answer.

A. I don't recall where the language came from.

Q. Now, in offering your opinions in your five specific causation reports for the five bladder cancer plaintiffs, would it be fair to say that you assumed that Dr. Longley's history report was correct and accurate?

A. Not -- no, I don't think so. I mean,

what I read of his report comports with my understanding of life on base. So unless -- I would have to be wrong, too, about my own impressions about life on base for that to be true.

Q. So rather than assuming, you believe based on your life impressions, you were able to confirm that his -- his report is accurate, is that what you're saying?

A. Well, I don't -- his description comported with my recollection of my time on active duty.

Q. Would you agree that you -- you had to assume that ATSDR's water modeling for Hadnot Point and Tarawa Terrace were reasonable estimates of mean monthly concentrations for the chemicals at issue?

MR. RUZICKA: Objection, form.

A. Yeah, insofar as it's part of the calculations, I agree with that.

Q. Would you agree that you lack expertise to evaluate ATSDR's water models?

A. I think I would agree with that.

Q. Because you're not an engineer, correct?

A. I am not.
Q. And you're not a groundwater or hydrologist, correct?
A. I am not.
Q. I think we discussed you're not an environmental modeling expert, correct?
A. Correct.
Q. You -- earlier I think you confirmed you did review Morris Maslia's expert report, correct?
A. Yes.
Q. What do you -- what do you recall about his report?
A. I don't recall a single thing.
Q. Okay. Is there anything in particular about Mr. Maslia's report that gave you confidence in relying on ATSDR's water models?
A. I don't recall anything from his report.
Q. Did you review the expert report of the United States historian expert?
A. What was the name?
Q. That's a good question. Do you recall?
MS. ADAMS: Dr. Brigham.
Q. Dr. Brigham?

A. No.
Q. Do you recall reviewing the expert report of the United States water modeling experts?
A. No.
Q. Is there any reason you didn't review those reports?
A. I -- I didn't ask for them. I didn't feel like I needed to review them.
Q. Wouldn't you want like sort of complete information in forming your opinions?
MR. RUZICKA: Objection, form.
A. Well, I think we have complete information. We have a peer-reviewed study that was paid for by the Government and performed by ATSDR. I think that's the answer.
Q. Do you have any understanding of what ATSDR's models were developed for, what purpose?
A. Well, my understanding is it was to determine, at least in part, the historical chemical concentrations at Camp Lejeune.
Q. Do you know how ATSDR used those historical chemical concentrations?
A. No.
Q. Do you have any understanding of the

precision or accuracy required by ATSDR in its use of the water models?

A. No.

Q. Did you -- when you said you didn't think it was necessary or -- and I'm -- I'm paraphrasing, so if I -- if I misquote you, feel free to correct me.

But as I understood your testimony, I think you testified something along the lines of you didn't think it was necessary to review the United States expert reports because you -- you had complete information. Were you -- were you not curious about the -- the defense perspective in the case?

MR. RUZICKA: Objection, form.

A. Oh, maybe I have a bit of -- did you say curious?

Q. Yeah.

A. Curiosity about it. But we had peer-reviewed, published water models and data about the chemical concentrations paid for by the Government, published by the Government, so I didn't feel like I needed to see another water model.

Q. Do you understand, Dr. Bird, what it

means for a chemical to volatilize?
A. Yes.
Q. What does that mean?
A. So that's another term for evaporate, to go from the liquid phase to the gas phase.
Q. As a medical toxicologist, would you agree that TCE, PCE, benzene and vinyl chloride readily volatile -- volatilize?
A. Yeah. They're characterized as volatile organic compounds or VOCs.
Q. Are you aware that ATSDR's water models did not take account of volatilization of the contaminants?
A. That's my recollection.
Q. Where did that recollection come from?
A. I have no idea.
Q. And what is your understanding about the impact of -- on the results of ATSDR's water models in not taking account volatilization?
MR. RUZICKA: Objection, form.
A. Well, it could be that it actually decreases the amount of exposure that people had. Yeah, I don't know if I can say much. I'd just be speculating.
Q. And when you say it would decrease, it

could be that it decreases the amount of exposure, it's because it -- by taking into account volatilization, the -- the estimated contaminant concentrations necessarily would -- would have to go down, right?

A. Oh, no, I said increase.

Q. You said increase. Why would it -- why would volatilization increase exposures of individuals?

A. Well, because the -- Dr. Reynolds only included oral ingestion, but with volatilization, there would be increased inhalation. And we already discussed three studies, McKone, Andelman and I think Weisel and Jo, where inhalation could be as much or up to six times greater than the oral ingestion amount.

So with volatilization, I can see how there would actually be increase in exposure.

Q. Well, I guess the question I'm asking you is a little different. I'm not disputing that volatilization in the real world actually took place in the -- did occur on the base. I'm just suggesting that ATSDR's water models did not account for volatilization in estimating monthly contaminant concentrations.

And so wouldn't you agree that accounting for volatilization, the models that the -- the -- the estimated contaminant concentrations that those models produced necessarily would have to go down?

MR. RUZICKA: Objection, form, foundation.

A. I don't know that it would necessarily have to. Maybe it's -- maybe -- yeah, I don't know that it's necessarily would have to.

Q. You agree they could go down, right?

MR. RUZICKA: Objection, form, foundation.

A. I don't know that I have an opinion on that.

Q. Would you agree that you assumed that the deposition testimony of plaintiffs that you reviewed and available records accurately reflect the times and locations on base for each Plaintiff?

A. I agree with that.

Q. Would you agree that a -- a plaintiff's time and location on base are important factors or variables in considering the degree of a plaintiff's exposure?

A. It may. It may have no bearing.
Q. Why would it have no bearing?
A. Well, they may have had the same exposure, whether they were placed at Point A or Point B, depending on circumstances.
Q. Would you agree that the -- the levels of contaminants at Camp Lejeune varied over time?
A. To some degree, yes.
Q. And then I think -- would you -- we've talked about this a little bit, but would you agree that you assumed Dr. Reynolds' exposure dose calculations were sufficiently reliable for purposes of your analysis for the five bladder cancer plaintiffs?
A. Well, I did insofar as I relied on them. But as I said before, I did some of the calculations myself and they were the same.
Q. Did you do anything else to -- to verify either her methodology or the actual performance of the calculations?
A. I don't think so.
Q. Aside from the calculations to make sure the -- the numbers add up correctly, did you do anything else to verify or investigate the accuracy of her methodology?

A. I don't think so.
Q. Did you review the deposition transcript of Dr. Reynolds?
A. I -- I don't recall. If it's not in my materials considered, then I haven't.
Q. I can't remember. I apologize if I already asked you this, but did you review the reports of the United States expert, Drs. Judy LaKind and Dr. Lisa Bailey?
A. No.
Q. Now, in relying on Dr. Reynolds' calculations for each plaintiff's cumulative exposure, would you agree there were four categories of her calculations?
MR. RUZICKA: Objection, form.
A. Sorry, I don't understand.
Q. Sure. Let me -- so as -- as -- and we'll get into this as we look at each of the reports.
My understanding is one category of her calculations, I guess, consisted of cumulative micrograms per liter a month. Does that sound right?
A. Yes.
Q. Okay. And then another category

consisted of cumulative consumption and total micrograms. Does that sound right?

A. Let me just look at the report from --

Q. Sure.

A. -- Jefferson or Mike Criswell.

Q. Sure.

A. I'm sorry, I don't remember that last question.

Q. No problem. Let me see if I can get on the same page.

Okay. So another category you considered -- so like why don't we just -- why don't we just go through and talk through this chart on Page 9 and 10 of the Exhibit 4 which is the Criswell report.

Oh, I might be -- let me -- I'm sorry. On the Criswell report let's talk through -- it's Page 15 and 16, I'm sorry, Exhibit 4.

A. Okay.

Q. So there -- there's a chart there at the bottom and there are four categories of calculations identified, correct?

A. Yes.

Q. Okay. And one is cumulative micrograms per liter per month, right? A month.

A. No.
Q. Okay. Correct me.
A. Cumulative micrograms per liter month.
Q. Per liter month, okay.
So the first category is cumulative micrograms per liter month, correct?
A. Yes.
Q. Okay. The second category is cumulative consumption in total micrograms, correct?
A. That's right.
Q. And the third category is the same but based on ATSDR's exposure assumptions, correct?
A. That's right.
Q. Do you know what's being referred to there when it says ATSDR exposure assumptions?
A. Yeah. Let me go back because Column 2, that cumulative consumption, assumes I believe it's one liter per day. So then for the third category, they used the water consumption data that is in some ATSDR documents. I can't remember which ones.
Q. Okay. And then that -- for that fourth category, that's cumulative consumption in total micrograms but based on, quote, deposition/FM

exposure assumptions, is that right?

A. That's right.

Q. What is your understanding of what that means?

A. Looking at what they stated in the deposition in context of the field manual.

Q. Would you agree that the first category there, cumulative micrograms per liter month, that is a unit describing concentration?

A. Yes.

Q. And these other three, second, third and fourth categories, are describing total mass, correct?

A. That's right.

Q. When -- earlier when you said you did calculations to confirm Dr. Reynolds' numbers, was that just for cumulative micrograms per liter a month?

A. Yes.

Q. And what did that consist of, adding up the totals here and making sure the totals were correct?

A. Yes, largely.

Q. Okay.

A. Well, when you said -- you said adding

up the totals here.

Q. Sure.

A. What I'm talking about are the totals listed, for instance, on Page 11, 12, 13, and 14, the monthly concentrations.

Q. And you did it for the micrograms per liter month category, correct?

A. That's right.

Q. Did you add up the totals for the second, third and -- these other categories?

A. I did.

Q. Well, actually, these are all micrograms per liter month, so I apologize, yeah.

So you -- you added up these totals on -- in the charts on Page 12 and 13 and going on to 14, correct?

A. Yes.

Q. Do you know where the numbers came from in the chart starting on Page 12?

A. Well, the numbers are concentrations multiplied by days on base.

Q. And you -- you got these numbers directly from Dr. Reynolds' reports, correct?

A. Yes.

Q. Do you know how she -- aside from

the -- the performing of the calculation itself, do you know where she obtained the concentration levels for TCE, PCE, vinyl chloride and benzene?

A. She got -- my understanding is she got those numbers from ATSDR.

Q. Okay. Is it your opinion that relying on total mass exposure dose is a reliable way to represent an individual's exposure to a chemical?

A. Sure. It can be.

Q. What, I guess, scientific literature support do you rely on to support that opinion?

A. Well, that's exactly what we have in Aschengrau, for instance. But we -- often that's the number that we have in medicine. When we're considering exposures, we know -- or we have an estimate of what someone was exposed to, so that's -- that would -- in this instance, that -- that would be equivalent to the -- the mass in micrograms.

Q. So the methodology that's being used in Dr. Reynolds' report and the methodology that you use here to offer your opinions about the degree of the five bladder cancer plaintiffs' exposures, have you ever used that methodology in your clinical practice as a medical toxicologist and ER

physician?

A. Sure. Evaluating a patient's exposure, whether it's in -- well, it would typically be in micrograms or milligrams or grams, so a mass, and then giving an opinion about their -- the effect from that exposure, sure.

Q. For a patient that comes in and sees you in the emergency room, where do you get the -- the quantitative exposure amount for that patient?

A. You may get it from the patient. You may get it from a family member. There may be a pill bottle, for instance. There may be other collateral information to get that information.

Q. And so you mentioned a pill bottle. So one example would be a patient involving use of a -- like a prescription drug, correct?

A. Sure.

Q. What about patients that come in with environmental or occupational exposures?

A. So we may have information, for instance, of carbon monoxide concentration or hydrogen sulfide concentration. So in that case we would have -- technically there it's a concentration and not a mass.

Other times if someone has had

hydrofluoric acid exposure, for instance, in a semiconductor industry, we may have a total mass or we may have a concentration and a volume.

Q. In your practice as a -- an ER doc and a medical toxicologist, how -- how does the analysis change when you have a concentration versus a total mass for an environmental exposure or occupational exposure?

A. I don't know that answer -- I don't know that that question is answerable. I -- largely, I think there may not be a difference. You have an exposure, you have a patient, and so I don't know that there's much difference.

Q. In your practice as a -- a medical toxicologist and ER physician, have you ever evaluated a patient in terms of, quote, substantial or, quote, de minimis exposure?

A. I'm sorry, I don't understand.

Q. You're using the terms substantial exposure and de minimis exposure in your specific causation reports, correct?

A. That's right.

Q. Have you ever used those terms in your practice as an ER physician or a medical toxicologist?

A. I absolutely use the word substantial. I don't know if I've used de minimis. I've probably used minimal or, I don't know, maybe trivial.

Q. Sure. And this is in the context of treating patients?

A. Absolutely.

Q. Do you have any estimate of how often you calculate someone's cumulative exposure to chemicals in your clinical practice?

A. It would depend on the exposure.

Q. Would you agree that in the real world most of the time that that data is not available?

MR. RUZICKA: Objection, form.

A. It depends on the circumstance.

Q. I guess let's -- let's hone in on environmental or occupational exposures. Would you agree that in the real world someone's cumulative exposure is typically not available?

MR. RUZICKA: Objection, form.

A. I don't know that that's true.

Q. How often do you calculate someone's cumulative exposure to chemicals in an environmental or occupational exposure context?

A. Yeah, it's not common probably, but

it's -- it's part of the equation. It's part of the information that we try to elicit or determine.

Q. Would you agree Dr. Reynolds used ATSDR's water models to calculate daily exposures for plaintiffs?

A. I don't know that she calculated daily exposures.

Q. Well, I guess like looking at the example on the Criswell report on Page 12, Exhibit 4, there at the top of Page 12, it says, total days -- like the first entry for July 29, 1975 to July 31, 1975, doesn't it identify three days there?

A. Well, it does but she didn't calculate the exposure per day.

Q. How did she -- how did she -- well, let me say -- wouldn't you -- would you agree that Dr. Reynolds used ATSDR's water models to estimate daily exposures for plaintiffs?

A. No. That's not my interpretation of what she did at all.

Q. Why not?

A. Because that's what the data looked like. It doesn't look like there's any daily

exposure estimate.

Q. I guess how -- what is your understanding of her exposure estimate?

A. They're largely by month.

Q. How are -- how do you estimate a month when you have three days of an exposure?

A. Well, you take a proportionate.

Q. And isn't that essentially attempting to extrapolate daily estimates from a monthly metric?

A. I don't think so.

Q. Are you aware that ATSDR stated that its water modeling isn't specific enough to accurately estimate daily levels of the VOCs?

A. Right. Yeah, they gave it by month and that's what Dr. Reynolds did in my opinion.

Q. Are you aware ATSDR's water models weren't intended for use in litigation or -- or to determine exposure levels for individuals?

MR. RUZICKA: Objection, form.

A. I seem to recall reading that or hearing that some -- reading that somewhere.

Q. Well, where -- where do you recall reading that from?

A. I think a deposition transcript.

Q. Do you remember whose deposition transcript?
A. No.
Q. Was it Mr. Maslia?
A. I don't recall.
Q. Are you aware that the purpose of ATSDR's water models was to provide relative levels of exposure for epi studies?
A. I don't recall.
Q. Are you aware that ATSDR stated that it shows conservative health protective assumptions and data interpretation methods?
A. That sounds vaguely familiar.
Q. Where would you have obtained that understanding from?
A. Well, I don't recall specifically. Reading it somewhere, I suspect.
Q. In your practice as a -- as a medical toxicologist and ER physician, do you typically express dose as the weight of a chemical per unit of body weight?
MR. RUZICKA: Objection, form.
A. Usually not.
Q. How come?
A. Because it's often not -- it's just not

what we know or what we use. We usually use -- in my experience, with the exception of things like acetaminophen or aspirin exposures, we typically use mass instead of mass per kilogram of body weight.

Q. And again, the literature that you believe supports using total mass in evaluating exposure, that -- that's cited in your general causation report?

A. Well, I don't think I said that.

Q. Okay. I may have misunderstood you, so if I -- if I did, I apologize.

Is there any literature that you're aware of that supports using total mass when evaluating an environmental or occupational exposure?

A. There may be. I don't know.

Q. Are you aware of any textbooks or other authorities that support using total mass when evaluating an environmental or occupational exposure?

A. Not that I'm aware of. I suspect there are, but none that I can name off the top of my head.

Q. Would you agree that use of total mass

does not account for a person's body weight?

A. Sure.

Q. And as a medical toxicologist and ER physician, would you agree that a person's body weight is important to accurately determine that person's exposure dose to a chemical?

A. No, I don't think so.

Q. I guess in a -- like a simple example, would you expect a single beer to have a different effect on a person who weighs 100 pounds versus a person who weighs 200 pounds?

A. Well, it depends on the individuals, particularly their tolerance, and maybe other -- other factors as well.

Q. All other factors being equal, wouldn't you agree that you would -- you would expect a -- a different or a more intense effect of one beer on a person that weighs 100 pounds versus a person that weighs 200 pounds?

MR. RUZICKA: Objection, form.

A. You would expect different blood -- or serum concentrations of the alcohol. The clinical effects would be determined primarily by tolerance, so a 100 pound person -- I think you said pound or kilos. But a 100 pound person may

have no effect if they're a chronic user, and a 200 pound person who is naive to alcohol may have significant effects.

Q. What if their tolerances were the same?

A. Just to be clear, there is no objective measure of tolerance. So I don't know if I can answer that. But all things being equal, there will be different blood or serum concentrations, but the clinical effects can vary or not vary.

Q. Has that been your experience as an ER physician?

A. It all depends on the substance and the person.

Q. Like Dr. Reynolds, the numbers that you rely on from her do not account for the body weight of any of these five plaintiffs, correct?

A. Correct.

Q. In your -- in your clinical practice, do you ever prescribe dose medications without taking into account things like body weight?

A. Sure. Particularly with adults, all the time.

Q. Would you agree that determining the duration of an exposure to a given concentration is relevant to whether that exposure can cause

health effects, including cancer?

A. I would agree with that.

MR. ANWAR: Okay. Let's -- well, we -- we have two options. We can either take a lunch break now if you'd like, or we can keep going for a bit and then take a break a little later. I'm at a good spot and --

MR. RUZICKA: Let's take a break now and we'll come back. We can go off the record.

THE VIDEOGRAPHER: This is the end of Media 2. Off the record, 11:56 a.m.

(Thereupon, a break was taken.)

THE VIDEOGRAPHER: This is the beginning of Media 3. On the record, 12:50 p.m.

BY MR. ANWAR:

Q. We are back on the record from lunch a break. Dr. Bird, are you okay to continue?

A. I am.

Q. Did you speak with anyone about the substance of your testimony during the break?

A. No.

Q. Okay. I think the last question I asked you before the break, you agreed that

exposure to a given concentration is relevant to whether that exposure can cause health effects. Do you recall that?

A. I don't.

Q. Okay. Would you agree that determining the duration of an exposure to a given concentration is relevant to whether that exposure can cause health effects including cancer?

A. That's part of the equation, sure.

Q. Okay. And the follow-up question I wanted to ask you is, why is it relevant?

A. Well, that gets you to the total exposed dose, a time and a concentration. That gets you to the mass exposure like we have here with Aschengrau.

Q. Okay. Let's talk about Exhibit 4 a little bit more. That is your specific causation report for Mr. Criswell, right?

A. Yes.

Q. Okay. So feel free to reference, you know, anywhere in the report you need to as I'm asking you questions, and I'll -- I'll try to direct you from time to time as well.

Mr. Criswell was at Camp Lejeune between January 1975 and March 1975 -- or 1977,

correct?

A. Yes.

Q. Are you aware --

A. Did you say January '75?

Q. I said January '75 to it looks like here you have April '77, is that right?

A. Yes.

Q. Okay. Are you aware that he would have had some departures for leave or deployments?

A. That's my understanding.

Q. Okay. Are you aware that Mr. Criswell lived at Camp Geiger until July 1975?

A. I remember seeing Camp Geiger in relation to Mr. Criswell at some point, but I don't remember the details.

Q. Did you assume that he lived at Hadnot Point from January 1975 onwards for purposes of the exposure numbers that you used?

A. Well, there's -- I used the exposure assessment from Dr. Reynolds. There's -- there's exposure at your place of living. There's also then exposure to the chemicals in the water as part of Marine life, so it's not just where someone lived.

Q. Okay. And he lived at Tarawa Terrace

but worked at Hadnot Point, right?

A. That is my recollection, right, he lived at Tarawa Terrace after July '75.

Q. Okay. Now, earlier in the deposition, you -- I think you agreed that you were aware that there is no contaminant sampling data prior to the 19 -- early 1980s. Do you recall that?

A. Yes.

Q. Okay. And so you'd agree there's no contaminant sampling data for Tarawa Terrace or Hadnot Point for the time period that Mr. Criswell was at Camp Lejeune, correct?

A. That's right.

Q. Which is why Dr. Reynolds is providing her exposure numbers based on ATSDR's models, correct?

A. That's right.

Q. And which is why you're relying on Dr. Reynolds' exposure numbers, correct?

A. Correct.

Q. If you turn -- so Page 10 there of the report and Page 11, it looks like you have pulled appendices from ATSDR's water modeling report, correct?

A. That's right.

Q. And these are for the time periods that you understand Mr. Criswell to have been at Camp Lejeune, correct?

A. That's right.

Q. Okay. On Page 12 there -- I believe on Page 12 is a chart that you pulled or you took from Dr. Reynolds' expert report, correct?

A. That's right.

Q. And this chart contains micrograms per liter a month for each of the contaminants, TCE, PCE, vinyl chloride, benzene from Dr. Reynolds' report, correct?

A. That's right.

Q. And so on 12 the chart starts for Tarawa Terrace, and if you go to 13 in the middle it starts at Hadnot Point and it ends Tarawa Terrace.

I was just wondering at the bottom there for both the Hadnot Point chart on 13 and 14 and the Tarawa Terrace chart on 12 and 13, if these are micrograms per liter month, which is a concentration as opposed to a total mass number, why were they -- why were they added up as opposed to averaged?

MR. RUZICKA: Objection, form.

A. Because that's how you would do it.
Q. You would add up the concentration level for a month to get a total -- a total -- a total mass concentrate -- total mass there?
A. Well, it's microgram per liter month so it's got concentration and time in it.
Q. But doesn't each one of these -- and I just want to make sure I understand this correctly. Doesn't each of these represent the concentration per month or is it -- or do you understand it to be the mass per month, mass for each of the time steps?
A. It is a concentration by month, so that should represent the average concentration during that month.
Q. For each time step, correct?
A. Correct.
Q. And if it represents the average concentration per month or time step, it's your testimony that it's appropriate to -- to add all of these up to get total mass?
A. Well, this isn't the total mass. This is the mass per liter month.
Q. That I understand. I guess I -- it's -- it's not clear to me if you were trying to

get sort of the mass per liter month during this timeframe, you wouldn't average those figures as opposed to adding them all up.

A. Well, I mean you could divide them by the months, or you can present it this way, which is consistent with how ATSDR reported their -- the chemical exposures.

Q. The ATSDR reports don't tabulate the total micrograms per liter month though, do they?

A. No, not in those figures, for instance, on Page 10 and 11. But that's how it was reported in, for instance, ATSDR April 2018 and the Bove studies.

Q. Is that they -- they totaled the -- the monthly microgram per liter month concentrations?

A. No, they didn't total them up, but that's how they reported the risks.

Q. Okay. Okay. So according to -- on Page 14 there, according to your report which is relying on Dr. Reynolds' report, it looks like Mr. Criswell was at Camp Lejeune for 804 days, is that right?

A. Correct.

Q. And that's at least what Dr. Reynolds tabulated and that's where you're pulling this

information from, correct?

A. That's right. I remember seeing his service records that had time for leave, maybe there was some deployment or something like that, and it looks like she considered that in her days on base as well.

Q. Okay. And you should feel free to do the math. I tried to do the math, and I calculated 804 days, excuse me, to be about 26 months. Does that sound right to you, a little over two years?

A. I'll use my calculator.

Q. Sure.

A. Yeah, 26 and a half or so months.

Q. And then based on the information from Dr. Reynolds' report in Paragraph 29 there, you state -- you state: Using this exposure assessment, Mr. Criswell met or exceeded the levels that I discussed in my prior report on general causation as being hazardous to human health and generally capable of causing cancer, including bladder cancer, in exposed individuals. See in this regard, my prior expert reports and its citations to publications including but not limited to ATSDR 2018, which is a morbidity study,

and Bove 2024b, which I think you're citing the Cancer Incidence Study there, correct?

A. That's right.

Q. Okay. Can we grab the studies? Thank you.

(Exhibit 13 was marked.)

BY MR. ANWAR:

Q. Okay. I'm going to hand you a few exhibits. Exhibit 13 is the 2024 Dr. Bove Cancer Incidence Study, correct?

A. Yes.

(Conferring regarding exhibits.)

(Exhibit 14 was marked.)

BY MR. ANWAR:

Q. Then I'm going to hand you Exhibit 14, which is the 2018 ATSDR Morbidity Study, correct?

A. Yes.

MR. ANWAR: Okay. Do you have a copy of the morbidity?

MR. RUZICKA: Not on me.

(Counsel conferring about exhibits.)

(Exhibit 15 was marked.)

BY MR. ANWAR:

Q. And then I'm handing you Exhibit 15, which is a copy of the 1993 Aschengrau Study,

correct?

A. Yes.

Q. Okay. So these are -- in that paragraph, in Paragraph 29, these three studies include two of the studies that you cited in Paragraph 29, correct?

A. That's right.

Q. Okay. And so then in Paragraph 30, you go on to state: Subject to the qualifications included in my general causation report for bladder cancer, the lower amounts of the Camp Lejeune water contaminants that have been shown to cause bladder cancer, it is my opinion to a reasonable degree of medical and scientific and toxicological certainty, that any individual with exposure to any one of these chemicals at the level or higher than the levels identified below, as likely as not, was at an increased risk of bladder cancer. The exposure quantities, to reiterate, should not be interpreted as floors below, which cancer does not occur.

And then you cite to the three articles I just gave you, and you identify cumulative exposure levels, is that right?

A. Yes.

Q. Okay. I wanted to walk through the cumulative exposure levels that you identify there. So for the Aschengrau Study, I -- I know where that is located in the study, but I was having a little trouble finding, like, B, C, these cumulative exposure amounts in the Morbidity Study, the 2018 ATSDR Study and the Cancer Incidence Study, the 2024, and I was hoping maybe you could help clarify that for me.

So if we start with -- we could maybe just go down the list and work through with B. It says: Cumulative exposure to less than 110 parts per billion months of TCE. And you identify that as a level at which -- which is hazardous to human health for the purposes of increased risk of bladder cancer, correct?

A. Correct.

Q. Okay. I was just wondering if you could point me to where in the -- the report you got the 110 parts per billion months.

A. That comes from, I think it's an appendix, or maybe it's just Table 2 --

Q. Okay.

A. -- page 66 in the ATSDR 2018 article you gave me.

Q. Let's take a look. And so your -- if I'm understanding this table correctly, there's a -- there's a section of the table that is focused on just Camp Lejeune Marines, and it says internal analyses, and it looks like medium exposure is defined as greater than 110 parts per billion, is that right?

A. For that. They also said that the low exposure is less than 110 parts per billion months.

Q. Okay. And so is it your testimony that less than 110 parts per billion months presents a risk of -- increased risk of bladder cancer?

A. Yes.

Q. Okay. So these numbers (sic), B, C, D, E --

A. And F

Q. -- F, G come from the table on Page 66, is that right?

A. Yes.

Q. Okay. That's helpful. And then H, I, J and K cite to the 2024 Cancer Incidence Study, correct?

A. As does L.

Q. As does L. Excuse me, yeah.

Can you direct me to where you were looking at in the cancer incidence studies for that information?

A. For -- beginning with H, and working way down, it's on Page 1 of the Cancer Incidence Study from 2024.

Q. Okay.

A. Right-hand column, last partial paragraph, they gave, four lines up from the bottom, median levels of 366, 15 and 22 micrograms per liter, respectively, so that's for TCE, PCE and vinyl chloride. That's per month.

And so to make a quarter, one quarter of a calendar year, I multiplied these averages, monthly averages, by three to get the average in a quarter. So 366 times 3 equals H, 1,098 parts per billion months.

Q. Why -- and I'm sorry, these might be very obvious questions, but why did you -- why were you looking to get the -- the value for a quarter?

A. Because that was the duration of exposure, one to six quarters on base for the Marines.

Q. Okay. One quarter being three months,

correct?

A. Correct.

Q. Okay. Okay. And so that is helpful.

H, I, J, K and L come from this first page, bottom right-hand side of the Cancer Incidence Study, is that right?

A. Yes, except for J, benzene. They actually didn't mention the median benzene concentration in this paragraph, and so the median concentration for benzene came from another Bove Study. I -- I don't -- maybe it's somewhere buried in here, but it's not in that paragraph.

Q. Okay. If it was another Bove Study, do you -- do you recall which one?

A. I don't. I think it may be elsewhere in here. They just didn't put it with the other three chemicals. So I think it's in this one, but I may have taken it from another Bove Study.

Q. Okay. And then on Page 16 of your Criswell Report, Exhibit 4, you go on to say in Paragraph 32: Mr. Criswell was exposed to an amount of VOC exposure that is considered substantial since it is known to be hazardous to human health. Moreover, this only addresses chemicals in isolation and does not consider the

additive and perhaps synergistic effect of combining ingestion of TCE, PCE, vinyl chloride and benzene.

And then as I stated in my general causation report, while it is frequently assumed that the toxic effects of solvents are additive, the chemicals may also interact synergistically or -- and antagonistically.

And then you cite Bruckner from -- which looks like it's a textbook. Did I read that correctly?

A. Yes.

Q. Okay. So the source you cited there indicated that the chemicals could interact antagonistically as well. What -- what does that mean?

A. So antagonistically, an example would be that, for example, 2 plus 2 equals 3 rather than 4.

Q. Is it your testimony that when chemicals, I guess, interact antagonistically, they interact in a way that increases their intensity, is that what you're saying or their intensity of exposure?

A. Well, it could be decreased intensity

of exposure antagonistically.

Q. Okay. As -- as I was -- as I read that sentence, I interpreted antagonistically, so I interpreted additive or synergistically as potentially increasing exposure or intensifying exposure and antagonistically as decreasing exposure, is that correct? Is that your understanding as well?

A. At a basic level, yes.

Q. Okay. And then in Paragraph 33, you go on, on Page 16: Regarding Mr. Criswell's cumulative ingestion exposure to PCE, his range of exposure of 119,008 -- or is at 119.809 to 183.584 milligrams is in excess of the 90th percentile exposure group in the Aschengrau Study, correct?

A. That's right.

Q. Okay. I wanted to ask you, where did the 119.809 to 183.584 milligram number come from?

A. From up above in the table that's labeled PCE TechFlowMP model.

Q. Okay.

A. If you look in the third column, that's the 119.809, and the fourth column is the 183.584.

Q. Okay. I see where you're looking at.

So you are -- you're taking Categories

3 and 4 from Dr. Reynolds' chart, which is -- Category 3 is cumulative consumption total per ATSDR with the ATSDR exposure assumptions, and then Category 4 is cumulative assumption with the deposition and field manual exposure assumptions that we discussed earlier, correct?

A. That's right.

Q. Why did you choose to use Categories 3 and 4 there as opposed to Categories 1 or 2?

A. Well, because it takes into consideration their total consumption. Clearly, he did not consume one liter -- one liter of water a day. And using the ATSDR exposure assumptions as well as the field manual, I felt that those were more representative to use for what an active-duty Marine is ingesting.

Q. And then you took those numbers from the table on Page 16, and they're presented there as micrograms, and you converted them into milligrams, is that right?

A. That's right.

Q. And you did that because the Aschengrau Study presents its results in milligrams?

A. Exactly.

Q. Okay. Let's -- let's take a look at

that Cancer Incidence Study again, which is Bove 13 -- or which is Exhibit 13.

I think you agreed earlier that the -- the low to no exposure category in this study was one to seven -- or one to seven quarters, is that right?

A. One to six quarters.

Q. One to six quarters.

And so the low to no exposure category is approximately 3 to 18 months, correct?

A. Correct.

Q. Okay. And then the medium duration exposure category in this study is seven to ten quarters, correct?

A. Right.

Q. And so that's approximately 21 to 30 months, correct?

A. That's right.

Q. And so based on this study, I think earlier you agreed that Mr. Criswell was at Camp Lejeune about 26 months, correct?

A. A little over 26 months, right.

Q. Okay. So based on this study, he would fall into the medium duration group, correct?

A. That's right.

Q. So if we turn to Table 5 on Page 10.
A. Yes.
Q. So this is a table showing cancer outcomes duration stationed at Camp Lejeune compared with Camp Pendleton between '75 and '85, correct?
A. That's right.
Q. And if you go down to urinary bladder, it's in the middle of the page. Do you see it?
A. Yes.
Q. Under the median exposure group, the hazard ratio for urinary bladder is 1.18 with a confidence interval of 0.95 on the lower end and 1.46 on the -- the upper end. Did I read that correctly?
A. Yes.
Q. The 1.18 hazard ratio is a statistically insignificant finding, correct?
MR. RUZICKA: Objection, form.
A. The point estimate demonstrates an 18% increased risk. Under classic confidence interval interpretation, it would not be statistically significant.
Q. And then if we turn to -- if we turn a couple pages over to Table 6.

A. Yes.

Q. So this -- this Table 6 is cancer outcomes by duration employed at Camp Lejeune compared with Camp Pendleton October 1972 to December 1975 among civilian workers, correct?

A. That's right.

Q. And here low and medium duration are combined in terms of category and then there's a high duration column, correct?

A. Yes.

Q. And if you go down to urinary bladder, there under low or medium duration, the adjusted hazard ratio is 1.18 and the confidence interval on the low end is 0.80 and the upper end is 1.75. Did I read that correctly?

A. Yes.

Q. And similar to the other table, that's a statistically insignificant finding, correct?

MR. RUZICKA: Objection, form.

A. Well, I don't think anyone uses the term "statistically insignificant." The point estimate is 18% increase in bladder cancer, but with historical or classical statistical significance, it would not be considered statistically significant.

Q. Okay. Understood.

Would you agree that civilian personnel may have had less intense exposures to chemicals at Camp Lejeune than Marine or Navy personnel?

A. Some may, some may not.

Q. Now, in your report you didn't cite these hazard ratios and confidence intervals, correct?

A. Correct. I believe they're in my general causation report.

Q. Okay. Would you agree that the Cancer Incidence Study used duration stationed or employed for -- I guess, Marines and civilians stationed or employed at Camp Lejeune as a proxy for cumulative exposure based on the assumption that monthly contamination levels did not fluctuate?

A. Well, they certainly used duration. I don't know about not fluctuating concentrations.

Q. Okay.

A. That doesn't -- that doesn't make sense to me.

Q. It looks like on the first page, they used the concentrations, monthly concentrations from ATSDR's water model for the period between

'75 and '85, correct?

A. That's right.

Q. Okay. Do you agree that 1.18 is not a strong positive association?

MR. RUZICKA: Objection, form.

A. I would say it represents an 18% increased risk. I don't know that I'd put an adjective to it.

Q. Okay. Let's take a look at Exhibit 14, which is the Morbidity Study that you cited from ATSDR. And I think a moment ago we agreed that at least based on the Cancer Incidence Study, Mr. Criswell fell into the medium exposure group, is that right?

A. Yes.

Q. And so if you turn to -- well, let me back up. Into the median -- medium exposure group based on time on base from Bove 2024b.

A. Understood. And that -- that was the Bove Cancer Incidence Study, correct?

Q. That's right.

A. Okay.

Q. If you turn to Page 76 of the 2018 Morbidity Study, on Page 76 is a table, Table 7, titled: Odds Ratio for Cumulative TCE Exposure in

Marines at Camp Lejeune Compared With Those at Camp Pendleton, correct?

A. Yes.

Q. And then if we -- we go down to urinary system bladder, do you see that?

A. Yes.

Q. There are -- there are numbers there for three exposure groups, low, medium and high, correct?

A. That's right.

Q. And under the -- the low exposure group, the odds ratio is 1.28 with a lower confidence interval of 76 and a upper confidence interval of 2.15, did I -- is that correct?

A. Just to make the record clear, the lower limit was .76.

Q. I'm sorry, if I said 76, yeah. We -- I can ask that again.

So on Table 7 under urinary bladder for low exposure, the odds ratio is 1.28 with a lower confidence interval of .76 and an upper confidence interval of 2.15, correct?

A. That's right.

Q. And you would agree that is -- that represents a not statistical significant finding,

correct?

MR. RUZICKA: Objection, form.

A. The point estimate of 1.28 represents a 28% increased odds of bladder cancer. That's how I would answer it.

Q. But you would agree that it is not statistically significant.

A. And under historical or classical interpretations, it would not be statistically significant.

Q. Okay. And then the medium exposure group there has an odds ratio of 1.68 with a lower confidence interval of 1.0 and an upper confidence interval limit of 2.82. Did I read that correctly?

A. Yes.

Q. And same question, that represents a finding that is not statistically significant, correct?

A. Well, that point estimate represents a 68% increased odds of bladder cancer, and I think there is debate -- because the lower bound of the confidence interval does not go below 1.00, I think there is debate whether that is under historical or classical considerations

statistically significant or not.

Q. Okay. And then if you go to the high exposure group there, the odds ratio is .93 and the lower confidence interval limit is .43 with the upper confidence interval limit at 2.01, is that right?

A. That's correct.

Q. And so under the high exposure group there for TCE exposure, in your words, under traditional statistical methods, that is not a statistically significant finding, correct?

A. I agree with that.

Q. Okay. So the high -- the high exposure group is a -- I'm trying to think of the best way to characterize this -- is a decreased risk than the medium exposure, is that right?

A. I don't think anyone would interpret it that way. There's no evidence that exposure decreases a risk. It has to do with the -- just the way the statistics fell out on this case.

Q. So for TCE exposure here in bladder cancer, for low exposure and high exposure, you would agree under traditional statistical methods neither of the findings are statistically significant, correct?

MR. RUZICKA: Objection, form.

A. Yeah. As I've already said, what the point estimates, which is the important metric, show the increased risk. But under kind of historical methodology, it wouldn't be considered clinically significant -- statistically significant.

Q. And based on this study, would it be fair to characterize Mr. Criswell and the medium exposure group consistent with the -- the Bove Study?

A. I believe that's correct.

Q. Okay. And so if you turn to -- a page over to Page 78, Table -- there's a table on Page 78, Table A, titled Odds Ratios for Cumulative PCE Exposure in Marines at Camp Lejeune Compared With Those at Camp Pendleton, correct?

A. Yes.

Q. And then just like the table we just looked at, further down in the middle of the table, there is a -- there are rows for urinary system bladder, correct?

A. That's right.

Q. And for medium exposure, which I believe you agreed Mr. Criswell falls into...

A. Well, standby.
Q. Sure.
A. I don't think that's right. That's not right. For PCE, Mr. Criswell is in the high exposure group.
Q. And why do you say that?
A. Because if we go to Table 2, you'll notice that we talked about before on Page 66, the high exposure is greater than 711 parts per billion months for PCE. Oh, I misspoke.
Q. That's okay.
A. Yes, he's in the medium exposure for PCE as well.
Q. No worries. It's a lot of paper to flip back and forth on.
So for PCE there, the hazard ratio -- the odds ratio, excuse me, for urinary system bladder on Table 8 is 1.30 with lower confidence intervals of 0.76 and upper confidence intervals of 2.23, correct?
A. That's right.
Q. Okay. And as I asked you before, under traditional statistical methods, that is not a statistically significant finding, correct?
A. I agree with that.

Q. Okay. Would you agree that the -- would you agree that the 2018 Morbidity Study from ATSDR had major significant limitations?

MR. RUZICKA: Objection, form.

A. You know, before I answer that, I -- I need to back up and answer the way I did initially, that Mr. Criswell was in the high exposure group for PCE based upon my chart on Page 15 and 16 of my Criswell report, that his total PCE exposure was 1,852 microgram per liter months, which put him in the high exposure for PCE.

Q. Can you show me or remind me where you're looking at on your Criswell report?

A. Sure. So Page 15 and 16, if you look in the first column, which is cumulative micrograms per liter months, which is the same as parts per billion months --

Q. Sure.

A. -- the total, which is on Page 16, left-hand column, it says totals for HP and TT for PCE, I said with the TechFlow model he was at 1,405. I think I read the other one just a minute ago. So he was 1,405 microgram per liter months or parts per billion months.

And that -- if you go to Table 2 of the Morbidity Study, that puts him in the high exposure for PCE, which was greater than or equal to 711 parts per billion months, so he's in the high exposure.

Q. Okay. And so when we were talking about Table 8, we were talking about the wrong exposure.

A. He's high exposure, not medium.

Q. Okay. Would you agree the 2018 Morbidity Study had major limitations?

A. Every study has some limitations, and they discuss them in their report. And just -- just for the record, so the high exposure on Table 8 for PCE would place him with an odds ratio of 2.07 with a 95% confidence interval of 1.12 to 3.82.

Q. Okay. And what were some of the limitations of the 2018 Morbidity Study?

A. They discuss it on Page 54. Because it was a survey and apparently 20% of people couldn't get the survey. They -- they didn't confirm every cancer diagnosis is my impression. Although I think they looked in cancer registries to help with that.

There was some uncertainty about exactly where, what barracks people were located, but they go through their painstaking method of trying to determine that.

Q. Would you agree that the results from the 2018 Morbidity Study should be interpreted with caution?

A. Oh, I don't know. I don't -- none of my opinions am I providing with caution here, so I don't really know how else to answer that.

Q. Could you restate that? None of your opinions what?

A. I'm not offering them with caution.

Q. Okay.

A. So maybe some of the things they say should be interpreted with caution, but that's not my interpretation in my opinion.

Q. Okay. Could you turn to Page 10? And at the bottom of Page 10 the paragraph starting at the very end states: Study results add to the scientific literature and suggest possible associations between the chemicals in the drinking water at Camp Lejeune and these diseases. However, results of this study need to be interpreted with caution for several reasons.

Did I read that correctly?

A. You did.

Q. Okay. And so ATSDR here is stating that the results of the study need to be interpreted with caution, correct?

A. That's what this says.

Q. And then they go through a couple reasons. First, the low response rate in small numbers for some of the diseases of interest resulted in wide confidence intervals.

Second, selection bias could have impacted analyses comparing Camp Lejeune to Camp Pendleton, like biasing results away from the null, potentially overestimating the effect of the exposures because those at Camp Lejeune with health problems may have been more likely to participate than those at Camp Lejeune with health problems. The Camp Lejeune participants with health problems may have been more likely to participate because they were aware of the contaminated drinking water and believed they were affected by their exposures.

Did I read that correctly?

A. Yes.

Q. Okay. And do you disagree with that at

all?

A. Largely, no.

Q. And then on Page 12 at the top, at that last paragraph there, ATSDR characterizes the limitations as major limitations of this study. Given the major limitations of the study, ATSDR is conducting additional research at Camp Lejeune cohorts to further evaluate the incidence of cancer in this population, correct?

A. That's right.

Q. Okay. So let's turn to the Aschengrau Study. Okay. Well, last, quickly going back to the 2018 Morbidity Study, were you aware that the 2018 Morbidity Study was never submitted to a peer-reviewed journal?

A. Correct. My understanding it was peer-reviewed both internally at ATSDR and I think externally peer-reviewed but not for external publication.

Q. Would you agree that peer-review is a key part of determining whether a study is scientifically reliable?

A. Sure.

Q. Okay. Now let's turn to the Aschengrau Study, Exhibit 15. Do you recognize Exhibit 15 to

be a true copy of the Aschengrau Study?

A. Yes.

Q. Okay. I'm going to jump back and forth between your Criswell report, Exhibit 4, and the Aschengrau Study.

You state in Paragraph 33: Regarding Mr. Criswell's cumulative ingestion exposure to PCE, his range of exposure of 119.809 to 183.584 milligrams is a -- is an exceedance of the 90th percentile exposure group in Dr. Aschengrau's Cape Cod PCE-contaminated Water Epidemiology Study which showed 27.1 to 44.1 milligram of cumulative PCE exposure and identified a 303% increase.

Did I read that correctly?

A. Yes.

Q. Okay. If you turn to Page 289, Table 4 there...

MR. RUZICKA: Exhibit 15, right?

MR. ANWAR: Correct.

Q. You'd agree that Aschengrau 1993 only considered a single bladder cancer case to be exposed when considering latency?

A. Yes.

Q. And because there was only a single exposed bladder cancer case when considering

latency, Aschengrau 1993 did not calculate an odds ratio for -- for bladder cancer when considering latency, correct?

A. That's right.

Q. And isn't considering latency one way that a study might account for the possibility of a confounding variable or bias?

MR. RUZICKA: Objection, form.

A. It may.

Q. And in your report, you're relying entirely on the data in Aschengrau 1993 that does not consider latency, correct?

A. That's right.

Q. And you put Mr. Criswell in the 90th percentile or high exposure group, correct?

A. That's right.

Q. Based on Dr. Reynolds' calculations, correct?

A. Yes.

Q. And if we look at Table 4 with the crude odds ratio for the cases without latency, the odds ratio there is 6.04, correct?

A. That's right.

Q. Okay. And then the confidence interval is 1.32 to 21.84, correct?

A. That's right.
Q. Okay. How would you characterize that confidence interval?
A. I wouldn't other than that represents a statistically significant finding. It's a 504% increase odds of bladder cancer.
Q. Would you agree that's a wide confidence interval?
MR. RUZICKA: Objection, form.
A. I wouldn't use an adjective.
Q. If we look at the low exposure group for bladder cancer there, the finding is the odds ratio is 1.16, and the confidence interval is 0.48 for the lower limit to 2.48 for the upper limit, correct?
A. That's right.
Q. And then the column over any, the odds ratio is 1.55, and the lower limit confidence interval, lower limit is 0.74, and the upper limit is 3.01, correct?
A. That's right.
Q. How would you characterize the -- the confidence interval for the high category relative to the low and the any categories?
A. Well, the high one was statistically

significant under historical interpretations and the lower ones were not.

Q. You would agree that the -- the confidence interval for the high -- the high category is wider than the low and any category, correct?

MR. RUZICKA: Objection, form.

A. I would agree with that.

Q. Would you agree the wider the confidence interval, the more uncertainty in the result?

A. No. The point estimate is what the data show.

Q. How does uncertainty in your mind fit into a confidence interval?

A. It's -- well, this confidence interval is representative of -- of less power than if the confidence interval were different, but the point estimate is the point estimate, six times greater odds of bladder cancer.

Q. What do you mean by less power?

A. Meaning that there's -- given numbers, there's less ability to detect the change.

Q. Right.

A. Less ability to detect a true

difference.

Q. You would agree that the high category, based on Table 4, is based on four cases, correct?

A. That's right.

Q. What does the number of cases tell you about the confidence, or how does that relate to sort of your confidence in the results?

A. Well, it doesn't. The results show a point estimate of 6.04. You have less power because there are four cases, and that's reflected in the confidence interval, but the point estimate is 6.04, six times odds of bladder cancer.

Q. And based on Dr. Reynolds' numbers and based on these three studies, you opine that Mr. Criswell experienced exposures at levels recognized to be hazardous to humans for time on base at Camp Lejeune to TCE, PCE, vinyl chloride and benzene, is that right?

A. Yes. Where were you reading from?

Q. That was just my question.

A. I think the answer is, yes.

Q. I mean, we can read Paragraph 36 if you'd like. It says: Based on the above, which is Mr. -- or which is Dr. Reynolds' numbers and the three studies we just discussed, as well as

the totality of my prior reports and reviewed materials, it is my opinion to a reasonable degree of medical, sci -- medical, scientific and toxicological certainty that Mr. Criswell was exposed to the relevant chemicals at Camp Lejeune at levels individually or collectively known to be hazardous to human health that were capable of causing humans to develop cancer in general and bladder cancer in particular that placed Plaintiff, Mike Criswell, at an increased risk of developing bladder cancer, is that correct?

A. That's right.

Q. Okay. And that -- the exposure and risk estimate is based on Dr. Reynolds' numbers and the three studies we just discussed, correct?

A. Correct.

Q. Okay. Do you have any other opinions in Mr. Criswell's case that we haven't discussed?

A. Standby.

MR. RUZICKA: I'm going to just object to the form of the question.

A. I would say my opinions are in my report. There are opinions, things I state regarding other aspects of the case, so my opinions are contained in my report.

Q. Okay. I had a couple other questions about this report I want to just ask you about.

On Page 7, Paragraph 16, Sub-bullet 5, it says: Additionally, even when the barracks had functioning air conditioning units, the military would at times not turn on the air conditioning units to stop energy waste. According to a 1982 utilities and management plan, the AC could only run when temperatures exceeded 85 degrees Fahrenheit.

Did I read that correctly?

A. You did.

Q. And that's a sub-bullet in support of 16(a), which is inhalation exposures through barracks housing, is that right?

A. Yes.

Q. And Paragraph 16 states that Dr. Longley noted the following historical observations relevant to the likelihood of increased inhalation of contaminated water for a military service member at Camp Lejeune.

Did I read that correctly?

A. Yes.

Q. So specifically as it relates to 16(a)(5), if no air conditioning is used, isn't it

possible the windows would have been left open?
MR. RUZICKA: Objection, form.
A. Sure. To let hot, humid air in, sure.
Q. And letting air in, wouldn't that increase ventilation in the room?
A. It may.
Q. And increased ventilation likely would decrease exposures, right?
MR. RUZICKA: Objection, form.
A. It depends on a lot of circumstances, so it may.
Q. If we stay on Paragraph 16 but on Page 8, it's 16, Paragraph 16(c)(i), inhalation exposures at mess halls is para -- is Sub-paragraph C and then Sub-paragraph I states: The amount of water used daily within the mess halls was significant. The Marine Corps estimated that the mess halls utilized 116,000 gallons of water per day. Contemporaneous reports and requests from the U.S. Marine Corps acknowledge that the inadequate ventilation of steam within the mess halls. Historical documents show the lack of ventilation hoods on the mess hall dishwashers until approximately 1976 or 1980 -- or excuse me, 1986 or 1987. Dr. Longley noted HVAC

issues and poor ventilation in the mess hall, which would provide a setting to increase the quantity of inhalation exposure settings in which there was VOC inhalation exposure included but were not limited to eating in the mess halls where steam tables with pans of hot water were used to keep food warm, cooking with water in mess hall -- mess hall kitchens and using large dishwashers in mess halls.

Did I read that correctly?

A. Yes.

Q. Now, you reference the mess halls utilizing 116,000 gallons of water per day, correct?

A. Yes.

Q. That would include -- that number includes all the mess halls at Camp Lejeune, correct?

A. Yes.

Q. It's not just limited to mess halls at Hadnot Point.

A. I recall seeing the documents about this 116,000, and I can't remember specifically which mess halls it was, mess halls it were, was.

Q. Just looking a little beneath that to

16(c)(i) -- 16(d)(i)(1), D -- Subparagraph D says: Inhalation exposures throughout military duties.

Subparagraph I, says: VOC inhalation exposure settings that existed in the course and scope of military duties included but were not limited to.

And then 1, base-wide high-pressure steam cleaning of all vehicles with steam from a portable Steam Jenny mixed with water to remove accumulations of oils, grease and dirt.

Did I read that correctly?

A. Yes.

Q. Do you know whether the steam cleaning took place indoor or outdoors?

A. I don't recall seeing that. My own experience in the military was that it would be outdoors. And if outdoors, wouldn't the chemicals dilute as they enter the atmosphere?

MR. RUZICKA: Objection, form.

A. They could.

Q. And then 16(d)(3) there -- (d)(i)(3), excuse me, says: Laundry with or without the use of Steam Jennies. Do you see that?

A. Yes.

Q. What is a Steam Jenny, do you know?

A. So a Steam Jenny, my recollection, is that it's a portable unit that creates steam, and it can also be under pressure.

Q. Do you recall any of the five bladder cancer plaintiffs mentioning the use of a Steam Jenny?

A. I recall one of them mentioning cleaning the howitzers, but I don't know specifically if a Steam Jenny was mentioned.

Q. Okay. If you want to turn to Page 9, Paragraph 20, it states: Studies have shown that damaged skin, a frequent -- a frequent hallmark of Marine training and life at Camp Lejeune, according to Dr. Longley's research, exhibits increased absorption rates for both hydrophilic and lipophilic compounds.

Did I read that correctly?

A. Yes.

Q. And then you cite, I think, Chang and Tsai, is that right?

A. And Nielsen.

Q. And Nielsen, I'm sorry, yes. Do you remember what the Tsai paper was about?

THE WITNESS: Just for the court reporter, Tsai is T-S-A-I.

THE COURT REPORTER: Thank you.

A. I can't remember.

Q. If I told you that study involved the use of acetone-disrupted hairless mouse skin as a model, does that ring any bells?

A. It doesn't.

Q. Okay. Do you understand what I'm referencing when I say acetone-disrupted hairless mouse skin as a model?

A. Well, I know what that would mean.

Q. What would it mean?

A. It would mean applying acetone to either a living hairless mouse or the skin of a hairless mouse and looking at absorption or transmission through it of various compounds.

Q. Is that an appropriate comparison for water at Camp Lejeune?

A. It's one of three citations to demonstrate how skin absorbs various compounds.

Q. Okay. But at least as to just that citation, recognizing you also cite two other articles, do you believe Tsai is an appropriate citation, a hairless mouse model, as it relates to water at Camp Lejeune?

A. Sure, if I didn't think it was

appropriate, I wouldn't have included it. It demonstrates increased skin absorption when it's damaged.

Q. And so you mentioned you also cite the Nielsen paper, right?

A. Yes.

Q. Do you recall anything about that paper sitting here today?

A. No.

Q. I'll represent to you that the name of the paper is Percutaneous Penetration Through Slightly Damaged Skin. Does that ring any bells?

A. No.

Q. Okay. As you sit here today, can you identify any plaintiff that had compromised skin while at Camp Lejeune?

A. Of these five bladder cancer patients, I can't remember. I remember reading something about it, but it may not have been one of these five plaintiffs.

Q. Okay. Now, with respect to the other four -- so we've just been talking about the Criswell report. With respect to the other four plaintiffs, part of the reason I'm asking you is I think this might just speed things up, is for the

Raymond, Cagiano, Dyer and Laramore report, would you agree that the numbers from Dr. Reynolds are different, which impacts sort of the number -- the numbers portion of the analysis, but much of the rest of the report -- reports contain the same or similar language?

A. That was a long one so...

Q. Yeah. I can try to clarify it if you don't understand it.

A. The calculations of exposure from Dr. Reynolds in my five reports differ because the people lived and worked at Camp Lejeune at different times and may have lived or worked in different areas.

So the numbers are the numbers, and then my interpretation of those numbers are based upon the three articles, the 2018 Morbidity Study, Aschengrau and the Bove 2024b Incidence Study.

The interpretation is plaintiff-specific, so based on their numbers, that is what my opinions are based upon.

Q. Fair enough. And thank you for that clarification.

Would you agree, for instance, that the portions where you're discussing Dr. Longley's

report and some of the paragraphs we just went through, those are identical across reports?

A. Identical or similar, very similar. I grant -- I grant you that.

Q. Okay. And ultimately for all five of the bladder cancer plaintiffs, you concluded that there was substantial exposure and not de minimis exposure leading to increased risk of bladder cancer, correct?

A. Yes. With each plaintiff meeting that substantial exposure based on different chemicals and at different levels.

Q. Okay. Let's take a look at the Raymond report, which is Exhibit 5, and I want to compare it to the Cancer Incidence Study, the 2023 study, so you might keep that handy with you, which is Exhibit 13, so Exhibit 5 and 13.

If we turn to Page 8 of your report for Mr. Raymond, there at -- in Paragraph 25, you have the dates that Mr. --

A. Page 9?

Q. Page 8.

A. Paragraph 25 is on Page 9.

Q. Oh, I'm sorry, Paragraph 24, sorry. I might be losing it, long day.

So Raymond report, Page 8, Paragraph 24, you state there that Mr. Raymond was at Camp Lejeune, resided and worked at Hadnot Point from roughly November 1963 to December 1, 1965, correct?

A. That's right.

Q. So Mr. Raymond was there for about two years or 24 months?

A. Correct.

Q. Okay. And based on our discussion before of the Cancer Incidence Study for medium exposure in this study being classified as 7 to 10 quarters, which would be 21 to 30 months, correct?

A. That's right.

Q. And so Mr. Raymond fell into the medium exposure group, correct?

A. For duration, correct.

Q. Okay. And so if we turn to Table 5 again.

A. Yes.

Q. In the middle of the page, urinary bladder, medium duration at Camp Lejeune, the adjusted hazard ratio is 1.18 with a lower confidence interval limit of .95 and an upper confidence interval limit of 1.46, correct?

A. That's right.
Q. Okay. And I -- we talked about the meaning of that, the significance of a 1.18 hazard ratio in the context of Mr. Criswell, correct?
A. That's right.
Q. Okay. And would your opinion be the same as it relates to Mr. Raymond?
A. Yes.
Q. Okay. And then if you turn over to Table 6, urinary bladder, the adjusted hazard ratio is 1.18 and the lower confidence interval limit is .80 and the upper confidence interval limit is 1.75, correct?
A. That's right.
Q. Okay. And then even just to break it down a little further, I don't think we talked about this, but to the extent that Mr. Raymond's and/or Mr. Criswell's bladder cancer could be considered urothelial, here for Mr. Raymond if he falls into the low and medium duration at -- group, for civilian workers, for urothelial the hazard ratio, adjusted hazard ratio, is 1.23 and the lower confidence limit is .83 and the upper confidence limit is 1.84, correct?
A. That's right.

Q. And would you hold the same opinion that we discussed earlier in the context of Mr. Criswell about the significance of -- statistical significance of the findings?

A. Yes.

Q. Okay. In other words, for his time in the Marines and either for -- based on the Cancer Incidence Study, Table 4, Table 5 for service members and Table 6 for civilians, under traditional statistics the findings for the medium duration group were not statistically significant, correct?

MR. RUZICKA: Objection, form.

A. Yeah, I've said that a few times. The point estimate is 1.18 with an 18% increased odds of bladder cancer, but under historical interpretations they would not be statistically significant.

Q. Okay. And we talked about the 2018 ATSDR morbidity study and we talked about Aschengrau in the context of Mr. Criswell, correct?

A. That's right.

Q. Okay. And the same discussion would apply to Mr. Raymond, correct?

A. Yes.

Q. In other words, the same limitations would apply, but the -- the same opinions you expressed about Mr. Criswell would also apply, correct?

A. Correct.

Q. Okay.

A. Well, I mean, my opinions are specific to each plaintiff, so I gave you my opinions about Mr. Criswell.

So my opinions about Mr. Criswell are not directly applicable to Mr. Raymond because they're different individuals with different exposure.

Q. Okay. The same issues that I -- that we discussed, the limitations of the Aschengrau Study and the 2018 Morbidity Study, those remain unchanged, correct?

A. I agree with that.

Q. Okay. Let's take a look at Exhibit 6, which is Mr. Cagiano's report.

THE WITNESS: Can we take five minutes, get a cup of coffee and use the head?

MR. ANWAR: Sure. Yeah, absolutely. Let's go off the record.

THE VIDEOGRAPHER: This is the end of Media 3. Off the record, 2:13 p.m.

(Thereupon, a break was taken.)

THE VIDEOGRAPHER: This is the beginning of Media 4. On the record at 2:20 p.m.

BY MR. ANWAR:

Q. We are back on the record from a short break. Dr. Bird, are you okay to continue?

A. I am.

Q. Okay. I'm going to try to shortcut this as much as possible so we don't have to go through all five reports individually, given the overlap of each of the reports, understanding that you're making -- offering independent opinions based on Dr. Reynolds' evaluation or exposure numbers for each plaintiff, fair?

A. Fair.

Q. Okay. Could you turn back to exhibit -- the Cancer Incidence Study? I think that's 14. Table -- Cancer Incidence -- I'm sorry, not 14, then it would be 13. Sorry about that.

If you go back to Table 5.

A. I'm there.

Q. And Table 5 is the table we've been discussing -- we've discussed with respect to Mr. Criswell and Mr. Raymond already. It is the results of the study as it relates to service members' cancer outcomes by duration stationed at Camp Lejeune compared with Camp Pendleton between 1975 and 1985, correct?

A. That's right.

Q. Okay. You would agree that for all five of the bladder cancer plaintiffs in which you're offering specific causation reports, they all either fall into low, medium or high duration, correct?

A. Correct.

Q. And if we look at urinary bladder and urothelial bladder in the middle of the page there, would you agree that the numbers there listed for urinary bladder, so the adjusted hazard ratios listed for urinary bladder across the low, medium and high duration and then the urothelial category across the low, medium and high duration, under traditional statistical methods, those adjusted hazard ratios are not statistically significant?

A. I would agree with that.

Q. Okay. Then if you turn to Table 6, this is the table that focuses on cancer outcomes by duration at Camp Lejeune compared to Camp Pendleton for civilian workers between October 1972 to December 1975, correct?

A. That's right.

Q. Okay. And you would agree -- again, so this table has two columns, one that is low/medium duration at Camp Lejeune and one is high duration at Camp Lejeune, correct?

A. That's right.

Q. And you would agree that all five of the bladder plaintiffs that you are offering opinions about fall into one of these categories, either the low/medium or the high duration category, correct?

A. That's right.

Q. Okay. And so if you, again, look at the table under urinary bladder for the adjusted hazard ratio for the low/medium duration at Camp Lejeune and the high duration at Camp Lejeune, under traditional statistical methods those hazard ratios are not statistically significant, correct?

A. That --

MR. RUZICKA: Objection, form.

A. That's right.
Q. Okay. And then under urothelial bladder, just underneath that, the same is also true?
A. Correct.
Q. Okay. You can set that aside.
And then we -- we already talked about the 2018 Morbidity Study and the 1993 Aschengrau Study, and we talked about those studies in the context of your Criswell report, but any limitations of those studies would also apply to the other four bladder plaintiffs you're offering opinions about, correct?
A. Correct.
Q. Okay. Dr. Bird, would you agree that everyone is exposed to some carcinogens daily?
A. I would agree with that.
Q. What is your understanding of being exposed to carcinogens on a daily basis? Why do you say that?
A. Well, there are very low concentrations of carcinogens in the air, such as NDMA. There are some carcinogens, typically at very low concentrations, in some of the food we eat or the water we drink, so it's a part of life to have

very low exposures, background exposures, of carcinogens.

Q. Would you agree that people are exposed or have background exposures to TCE in everyday life?

MR. RUZICKA: Objection, form.

A. There's probably a little TCE. There's not a lot of background exposure to TCE, likely.

Q. Are you aware that ATSDR in their tox profile for TCE assumes that the average daily air intake of TCE is 11 to 33 micrograms per day?

A. That sounds about right.

Q. And if you multiply that over a year, that would mean the average air intake of TCE could range in a year from 4,015 to 12,045 micrograms in a year, would you agree with that?

A. That math sounds about right, so that would be everyone's background exposure.

Q. Yeah. Likewise, are you aware that people are exposed to benzene in everyday life?

A. Sure. There's background exposure to benzene.

Q. Are you aware that raw bananas have been found to have as much as 132 parts per billion or micrograms per liter of benzene?

MR. RUZICKA: Objection, form.
A. No, I've never seen that study.
Q. Okay. If it's -- if that's in the ATSDR benzene tox profile in 2007, do you have any -- would you have any disagreement with that?
A. Well, I don't know. I'd ideally like to see the source document for that.
Q. Okay. Cigarettes have benzene in them, right?
A. Sure, there's low levels of benzene.
Q. Have you ever calculated someone's exposure to benzene from cigarettes?
A. No. I wasn't asked to do that here.
Q. Have you ever done it in your career?
A. I don't believe so.
Q. You'd agree that smoking is a major risk factor for bladder cancer, correct?
A. It's probably the number one modifiable risk factor for bladder cancer.
Q. Okay. And studies show that it's estimated that smoking causes approximately 40 to 50% of bladder cancer cases, right?
A. Sounds about right.
Q. Are you aware that several of the plaintiffs had significant smoking histories?

MR. RUZICKA: Objection, form.

A. I'm aware that two of them had -- I think two had smoking histories. I don't -- I don't know about the adjective.

Q. Were you aware Mr. Raymond had a 50 pack-year smoking history?

A. I think that seems about right.

Q. And were you aware that Mr. Laramore had anywhere from a 30 to 60 pack-year smoking history?

A. That's my understanding.

Q. And for this case, you didn't calculate Mr. Raymond's or Mr. Laramore's cumulative exposures to benzene from cigarettes, correct?

A. That's right.

Q. And you didn't -- putting aside calculating, you didn't take into account their cumulative exposure to benzene from cigarettes, correct?

MR. RUZICKA: Objection, form.

A. I don't know what you mean by take into account accumulative exposure to benzene.

Q. When offering your opinion about substantial exposure to Camp Lejeune water being -- increasing the risk of bladder cancer for

Mr. Raymond and Mr. Laramore, did you consider their respective smoking histories as part of that opinion?

A. Sure.

Q. How so?

A. The chemicals from Camp Lejeune have been shown to increase the risk of bladder cancer, and I present that data. The risk -- any risk they had from smoking is separate from the risk from the Camp Lejeune chemicals, so any other exposure they have is generally irrelevant to my opinion about the chemicals from Camp Lejeune.

Q. Okay. And I think you agreed you did an attempt to calculate their exposures from cigarette smoking, correct, their benzene exposures?

A. Correct.

Q. Were you aware that Mr. Criswell had a smoking history as well?

MR. RUZICKA: Objection, form, foundation.

A. I may be misremembering. I think he had a low or infrequent smoking history. I can't remember the details right now.

Q. Okay. His -- his smoking history was

about two to three cigarettes per day for approximately two years. Does that sound right?

MR. RUZICKA: Objection, form and foundation.

A. Sounds about right.

Q. Okay. And you -- would you agree that two cigarettes per day for about two years would be approximately 1,460 cigarettes?

A. If that's what that math is, right.

Q. Okay. And then three cigarettes per day for two years is approximately 2,190 cigarettes. Do you have any reason to disagree with that?

A. No.

Q. Are you aware of the CDC definition of a nonsmoker being an adult that has smoked less than 100 cigarettes in their lifetime?

A. I have read that.

Q. Okay. Do you agree with it?

A. That's the definition they use. See, to me it seems low, but that's the definition they use.

Q. So that would -- that would put Mr. Criswell above the CDC threshold for being a nonsmoker, right?

MR. RUZICKA: Objection, form and foundation.

A. Assuming all those numbers are correct, yes.

Q. Even smoking one cigarette per day for two years would put Mr. Criswell above the threshold for being a nonsmoker based on the CDC's definition, correct?

MR. RUZICKA: Objection, form.

A. That's my understanding.

Q. Were you aware that Ms. Dyer smoked less than a pack per day for approximately two years?

MR. RUZICKA: Objection, form and foundation.

A. I recall something about some very infrequent use. I don't remember the details.

Q. Even like Mr. Criswell, even one cigarette per day for two years would put her above the CDC's definition of a nonsmoker, correct?

MR. RUZICKA: Objection, form.

A. It would. Were that -- were that true.

Q. Were you aware that Ms. -- one of Mrs. -- Ms. Dyer's treating physicians testified

about higher rates of urological cancer in the area where she lived in North Carolina near the Cape Fear River?

A. No.

Q. If that's what her treating physician in that area testified, would you agree that her environmental exposure in Southeast North Carolina could have been the cause of her bladder cancer?

MR. RUZICKA: Objection, form, foundation.

A. Well, there's a lot of potential ex -- maybe the -- first of all, I don't know where Cape Fear is relative to Camp Lejeune. Maybe people who are in the Marine Corps at Camp Lejeune all live around Cape Fear, so they're getting bladder cancer from their Camp Lejeune water contamination. Those -- those are two explanations.

Q. As a general matter, you didn't calculate for any of the five bladder cancer plaintiffs cumulative exposures to TCE, PCE, benzene, vinyl chloride from any other source other than Camp Lejeune water, correct?

A. Correct.

Q. And you didn't compare the cumulative

exposure doses for each of these five plaintiffs to any data concerning background exposures to TCE, PCE, benzene or vinyl chloride, correct?

A. I'm sorry, what was the first -- can you say that again? I'm sorry.

Q. Sure, no problem.

You didn't compare the cumulative exposure doses for each of these five plaintiffs to any data comparing background exposures to TCE, PCE, benzene or vinyl chloride, correct?

A. Well, I mean the exposure they had at Camp Lejeune was certainly greater than the background exposure.

Q. How do you know that?

A. Well, you referenced I think ATSDR saying the background of 11 micrograms in the air per day, and we can see that the concentrations at Camp Lejeune were generally far higher than that.

Q. And your understanding of the levels at Camp Lejeune are based solely on Dr. Reynolds' numbers and ATSDR's water models, correct?

MR. RUZICKA: Objection, form.

A. And when you say ATSDR water model, that's the Maslia, right?

Q. Correct.

A. So my calculations rely on those two sources.

Q. What did you do to prepare for today's deposition?

A. I reviewed my general causation report. I reviewed my five specific causation reports. I reviewed the deposition of Dr. Hatten. I reviewed my previous deposition, I guess my general causation deposition here, re-reviewed literature, some of which we've talked about today and also met with counsel.

Q. Is there -- strike that.

You mentioned you reviewed literature, some of which we talked about today. Do you recall the literature that you reviewed that we haven't talked about today?

A. No.

Q. How many times did you meet with counsel in preparing for your deposition today?

A. Once by Zoom and two phonecalls.

Q. Roughly, when did -- when did those meetings take place?

A. Phonecalls in the last couple of days, including today, and the Zoom I think it was last week, it may have been at the beginning of the

week.

Q. Okay. Was there any -- who was present at those meetings?

A. Most people had their camera off, so I'm not entirely sure. I know Whitney Wallace was on as well, Patrick Wallace. There may have been a couple others.

Q. To the best of your knowledge is there anyone that was on those calls or in those meetings that was not part of the Plaintiffs' legal team?

A. I can't imagine how or why that would have been.

Q. Okay. Do you think it's possible that someone could have been at Hadnot Point or Tarawa Terrace between 1953 and 1987 without reaching levels of exposure that are hazardous to humans or are substantial for at least one or more of the chemicals at issue?

A. Yes.

Q. Under what circumstances do you see that as possible?

A. Depending on where they were, where they worked and/or where they lived, depending on the time that they were there and depending on

their duration on base, would be the principal factors.

MR. ANWAR: I think I'm just about finished. Let's take a quick break. I'd like to confer with my colleague --

THE WITNESS: Sure.

MR. ANWAR: -- and then we can...

THE WITNESS: If you want to stay here, I'm happy to step out.

THE VIDEOGRAPHER: This is the end of Media 4. Off the record at 2:41 p.m.

(Thereupon, a break was taken.)

THE VIDEOGRAPHER: This is the beginning of Media 5. On the record at 2:48 p.m.

MR. ANWAR: We are back on the record from a short break. Dr. Bird, I do not have any other questions for you. Thank you for your time today, and nice seeing you again.

THE WITNESS: Yeah, thank you, likewise.

MR. RUZICKA: And I have no questions and you can read and sign, and that will be it for today. Thank you for your time.

THE WITNESS: Thank you, everyone.

THE VIDEOGRAPHER: This the end of Media 5. This concludes the videotaped deposition of Steven Bird. Off the record at 2:48 p.m.

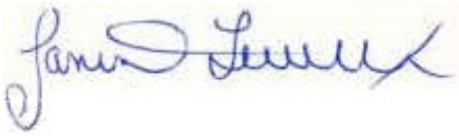
(Thereupon, the deposition concluded at 2:48 p.m.)

STATE OF KENTUCKY)
)
COUNTY OF MONTGOMERY)

I, JANINE N. LEROUX, Court Reporter and Notary Public in and for the State of Kentucky at Large, certify that the facts stated in the caption hereto are true, and that at the time and place stated in said caption the witness named in the caption hereto remotely appeared before me.

I further certify that after being duly sworn by me the witness was examined by counsel for the parties, and that said testimony was taken in stenotype by me and later reduced to computer-aided transcription, and that the foregoing is a true record of the testimony given by said witness.

The foregoing deposition has been submitted to the witness for reading and signing.



JANINE LEROUX - COURT REPORTER
NOTARY PUBLIC STATE-AT-LARGE
MY COMMISSION EXPIRES: NOVEMBER 26, 2027
NOTARY ID KYNP1406

I, _____, state that I have read the foregoing deposition and that it is a true and complete transcript of the testimony given by me on July 18th, 2025 together with corrections, if any, on the attached errata sheet.

_____

Steven Bird, M.D.

STATE OF _____

COUNTY OF _____

Signed before me on this the _____ day of _____, 2025

My commission expires:

_____

NOTARY PUBLIC

ERRATA SHEET

STEVEN BIRD, M.D.

Page/Line	Correction

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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