

Exhibit 179

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NORTH CAROLINA
SOUTHERN DIVISION
No. 7:23-CV-897

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

Deposition of PETER GARY SHIELDS, M.D., a
witness herein, held at U.S. Attorney's Office, 303
Marconi Boulevard, Suite 200, Columbus, Ohio 43215,
beginning at 9:29 a.m. EDT, on Monday, May 12, 2025,
before Susan M. Gee, Registered Merit Reporter and
Certified Realtime Reporter and Notary Public in and
for the State of Ohio.

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WITNESS: PETER SHIELDS, M.D.

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1 VIDEOGRAPHER: We are now on the
 2 record. My name is Jeff Sindiong. I am a
 3 videographer for Golkow, a Veritext division.
 4 Today's date is May 12th, 2025, and the time
 5 on the screen is 9:29 a.m. This video
 6 deposition is being held in the offices of the
 7 DOJ, Columbus, Ohio, In Re: Camp Lejeune
 8 Water Litigation for the United States
 9 District Court for the Eastern District of
 10 North Carolina, Southern Division.

11 Our deponent is Dr. Peter Shields.
 12 Counsel will be noted on stenographic record.
 13 Our court reporter is Sue Gee, who will swear
 14 in the witness, and we may continue.

15 PETER GARY SHIELDS, M.D.
 16 of lawful age, a witness herein, being first duly
 17 sworn as hereinafter certified, was examined and
 18 deposed as follows:

19 BY MR. TELAN:

20 Q. Good morning, Dr. Shields.

21 MR. TELAN: Before we get started, I
 22 just wanted to put something on the record
 23 related to a hearing we had before Judge Jones
 24 on Friday and Dr. Shields' use of a laptop
 25 computer. I understand the Court's ruling was

1 that he was going to be allowed to utilize the
2 computer and that the Department of Justice
3 was going to send their hyperlinks and
4 materials to us. That hearing took place
5 Friday afternoon. And at about 9:50 p.m. on
6 Saturday, after a couple of email requests
7 were made, we received an email sending the
8 links.

9 However, and unfortunately, those links
10 did not work, and at 10:50 p.m. last night,
11 which is Sunday night, we received a second
12 email from Miss Sprayregen advising that the
13 initial links that were sent over were not
14 working and to use the new link. That new
15 link, however, is also not working. So as of
16 this morning, we have been unable to vet the
17 materials or review the materials that are
18 contained on Dr. Shield's computer.

19 And rather than spend the time this
20 morning doing that, we're just going to
21 proceed forward with the deposition. I wanted
22 to put that on the record.

23 Miss Sprayregen, if you wanted to make
24 a comment in response to that -- Marcus. I
25 apologize.

1 MR. TUBIN: That's fine.

2 MR. TELAN: If you want to make a
3 response to that.

4 MR. TUBIN: So my understanding is
5 after the 9:50 DOJ email, there was no further
6 communication to the DOJ that the links did
7 not work, and there are only a few links that
8 are broken, and none of the links are to
9 materials that have not been available since
10 Dr. Shields' report was issued in this case.
11 There's no new materials. It's all
12 information that has been out and known.

13 MR. TELAN: We won't spend a lot of
14 time belaboring this, but we were told at the
15 hearing that we would have the materials
16 quickly. It took more than 24 hours to get
17 those, and they did not work. There were
18 communications, albeit late Sunday, about
19 that, and the links that we were provided
20 Sunday evening still don't work.

21 So as of this morning, we don't have
22 the ability to vet the materials, which we
23 should have, and we'll hold the deposition
24 open to be able to review those with
25 Dr. Shields at some later point.

1 MS. SPRAYREGEN: I'm just going to
2 respond to that, because I was the person at
3 the hearing, and what we had said is that you
4 would have the links before the deposition,
5 and we provided them before the deposition, on
6 Saturday night, in fact. I'll leave it to
7 Marcus to respond to everything else.

8 MR. TUBIN: Yeah. I think we also
9 offered to try and fix any problems with the
10 links this morning, and the files had no issue
11 working and opening on our end.

12 MR. TELAN: Understood. We're still
13 unable to open those. I haven't checked
14 within the last 10 minutes, but as of this
15 morning, as we arrived, we were still unable
16 to open those.

17 CROSS-EXAMINATION

18 BY MR. TELAN:

19 Q. So with that, Dr. Shields, you have in
20 front of you -- first of all, good morning.

21 A. Good morning.

22 Q. Would you tell us your full name?

23 A. Sure. Peter Gary Shields.

24 Q. And you have a Department of Justice
25 computer with you this morning at the deposition?

1 A. Correct.

2 Q. Would you tell us what is on that
3 computer exactly? What are the file folders that are
4 on that computer, and what information is contained in
5 those file folders, please?

6 A. So there's three folders. One is the
7 article file that you received that is searchable
8 easily, which is the Control F. All the articles are
9 set up by author and in the first order, too, of the
10 article, so it's pretty obvious.

11 Q. How many articles are on that?

12 A. 1,742.

13 Q. Is that the exact number that was on
14 your report, your materials-considered list in your
15 report?

16 A. It probably isn't, because some of the
17 articles in the report were not found easily, and
18 those are identifiable in the documents you have,
19 because there's no box, and they're in orange. So
20 they're somewhat -- there's some missing but probably
21 less than 40 or 50 of the 1,700 plus.

22 The next folder says older version of
23 the linked report. That's the one you probably got
24 Saturday night, which was fully working, if it's set
25 up correctly. I assume the instructions were sent to

1 you on how to set it up. Simply, you just put the
2 linked PDF in the same folder as the articles, not the
3 linked PDF in the articles folder but next to it.

4 The third and final folder is something
5 called "PLG Reports," which are the plaintiffs'
6 reports, plaintiff expert reports, and there's two
7 other files. There's the Word document of my report,
8 and then there's the linked PDF of my report.

9 Q. The PLG reports, what reports are
10 contained in that file?

11 A. Sure. Bladder cancer, GC expert
12 report, Benjamin Hatten; bladder cancer, GC expert
13 report, Kathleen Gilbert; bladder cancer, GC report,
14 Laura Plunkett; bladder cancer, GC expert report,
15 Stephen Culp; bladder cancer, GC expert report, Steven
16 Bird.

17 Kidney cancer, GC expert report,
18 Benjamin Hatten; kidney cancer, GC expert report,
19 Kathleen Gilbert; kidney cancer, GC report, Michael
20 Freeman; kidney cancer, GC report, Steven Bird; kidney
21 cancer, GC expert report, Timothy Mallon; leukemia GC
22 expert report, Lukasz Gondek; leukemia GC expert
23 report, Timothy Mallon.

24 Leukemia NHL, GC expert report, Dean
25 Felsher; leukemia NHL, GC expert report, Katherine

1 Gilbert; leukemia NHL, GC expert report, Stephen Bird.
2 NHL, GC expert report, Howard Hu; NHL
3 supplemental GC expert report, Howard Hu. Phase 1
4 rebuttal expert report of David Madigan; Phase 1
5 rebuttal expert report of David Savitz; supplemental
6 GC expert report, Stephen Bird. That's it.

7 Q. Thank you. And you mentioned there was
8 a Word doc you had as well? Is that your report?

9 A. Yes. Exactly.

10 Q. And then what was the last one, a
11 linked file?

12 A. Yeah, the PDF of the report that you
13 received first Saturday and then again Sunday, when I
14 noticed that there was a couple of links that were not
15 working.

16 Q. What were the links that were not
17 working?

18 A. I don't remember offhand. They were --
19 when you open it up, it opens up to the wrong article.
20 The articles were correctly cited. Plus a link was
21 missing for the 2017 PHA water ATSDR report.

22 Q. This is a DOJ computer you're using?

23 A. Correct.

24 Q. And when were you provided that
25 computer?

1 A. I looked at it yesterday evening, but
2 I've never been provided to it -- provided to me until
3 now.

4 Q. Did you meet with counsel in the past
5 few days in preparation for your deposition?

6 A. Yes, by Zoom and then last night for
7 dinner.

8 Q. And when by Zoom?

9 A. Saturday, Thursday and a few other
10 times.

11 Q. Last Thursday and then two days later,
12 Saturday?

13 A. Yes.

14 Q. So two days ago?

15 A. Yes.

16 Q. So you would have received the DOJ
17 computer that you have on Sunday when you met with
18 them in person last night?

19 A. I opened it up to make sure it worked,
20 and then I gave it back to them. I did nothing more
21 than that.

22 Q. So you didn't download any of the
23 documents. Those were downloaded for you?

24 A. Correct.

25 Q. Okay. And then when you opened it up

1 last night, what time was that?

2 A. 6:30, 7:00.

3 Q. And is that when you noticed that there
4 were problems with some of the links?

5 A. No.

6 Q. When was it that you noticed there were
7 problems with the links?

8 A. Probably Sunday during the day. And,
9 again, links is really like two to three links. The
10 document itself worked fine for us and the DOJ folks.

11 Q. And which links did you say were
12 problematic, other than the lacking of the 2017 ATSDR?

13 A. I don't remember offhand, but I started
14 looking at the ones that my research assistant
15 couldn't find, and then I decided not to continue
16 that, because they were not important or critical
17 articles.

18 Q. Who is your research assistant?

19 A. Kelly Wolfe.

20 Q. And she's an employee of yours?

21 A. I would say more like she's a
22 consultant as a part-time sort of person that does
23 works for me as I ask.

24 Q. Is she a W-9?

25 A. Gee, you'd think I know that. I think

1 she's a W-9 or she is a 1099.

2 Q. Okay. Do you have an LLC that you run
3 your medical-legal work through?

4 A. No. Just me.

5 Q. You've done this before, so, obviously,
6 you know the rules. I think probably the most
7 important thing this morning for our court reporter's
8 sake is that we don't talk over each other, which
9 sometimes tends to happen, usually after lunch after
10 we're a little tired, but if you need to take a break,
11 just let me know and we'll do that.

12 A. I tend to target about every hour.

13 Q. You just have to ask. Otherwise, I'm
14 probably just going to keep rolling unless you ask.

15 A. Okay.

16 Q. Are you still currently employed by
17 Ohio State?

18 A. Yes.

19 Q. As I understand it, you went to
20 emeritus status?

21 A. Correct.

22 Q. When did that happen?

23 A. July 1st of, I think, 2023. Yes.

24 Q. Is that the same day that you stepped
25 down from your role as deputy director of The James?

1 A. No, because I stepped down the day
2 before, so I was 24 hours unemployed.

3 Q. What was the reason for stepping down
4 from The James?

5 A. Multi -- it's multifactorial. One of
6 them was I was the classic burn-out post COVID. Life
7 was extremely intense, and as typical for a lot of
8 universities, maybe corporate America, too, our
9 workload did not decrease, and so I was looking for
10 ways to sort of decrease my workload overall. I was
11 in charge of basically running the cancer center,
12 which is \$150 million budget and hundreds of millions
13 of dollars of research. The only way I can do it was
14 actually surgically resect it out, and so I decided to
15 go to the emeritus status.

16 So I officially retired. Then I
17 returned as a returning retiree. The emeritus title
18 was also an honorific title. I could have just
19 returned as a professor, and that's a 50 percent
20 appointment. So I continued all of my research, all
21 of my patient care without interruption. The only
22 thing I stopped was the administrative oversight.

23 Q. And in terms of the administrative
24 oversight as deputy director, what percentage of your
25 professional time did that take up?

1 A. Probably -- it's really hard to
2 estimate. I'll give you a number to understand. All
3 of it's intermixed with both the research and patient
4 care. So I was easily doing a 50 to 70 hour workweek
5 every week for all of those three activities, which
6 you can understand why I decided to start cutting some
7 of that out.

8 Q. What I'm trying to gauge from you is,
9 as the deputy director of the cancer center, you would
10 be involved in administration of the actual center
11 itself, the day-to-day operations of the center and
12 the folks around you, whether it's cancer physicians,
13 researchers and/or administrative staff, correct?

14 MR. TUBIN: Objection to form.

15 A. Right. So let me, let me define for
16 you what "administration" means in that context. I
17 was responsible for both developing and implementing
18 our strategic plan, recruitment, and we were
19 recruiting more than a hundred people per year, so I
20 would meet with each and every one of them, including
21 the ones that were not successful.

22 We have shared resources in other
23 infrastructure, and the way I describe my job was just
24 figuring out which researchers should work with whom,
25 what resources they need in terms of technology or

1 infrastructure and how to enable them to do a better
2 work product, if you will.

3 BY MR. TELAN:

4 Q. So setting -- and I'm going to kind of
5 see if we can do this in buckets -- administrative
6 tasks, clinical tasks and research tasks, I'm guessing
7 that's kind of the three big buckets that you would
8 put your professional time into, given your workweek
9 that you described for us, correct?

10 A. Correct.

11 Q. So how much of your professional time
12 was in each of those buckets percentagewise?

13 MR. TUBIN: Objection to form.

14 A. The easiest would be the clinical care,
15 and that would be about 20 percent. That's -- I have
16 clinic one day a week. The research would probably be
17 30 to 40 percent, and then the rest would be the
18 administration.

19 BY MR. TELAN:

20 Q. So administration would be somewhere in
21 the 40 to 50 percent range?

22 A. I'd say probably 30 to 50, but this is
23 really approximate, because all of it was happening,
24 and emails fly in, and all of a sudden, you're doing
25 one thing and the next thing. So it's not really

1 trackable by a timetable.

2 Q. And I'm not going to have access to,
3 like, your work records, so you don't have to worry
4 about me --

5 A. They don't exist anyway. So...

6 Q. Okay. When I looked at the website for
7 The James, you're not listed as a research scientist
8 under the oncology division. Do you know why?

9 A. I definitely am.

10 Q. Do you know which section you're listed
11 in?

12 A. Medical oncology. I mean, there's
13 several websites for me. One is Find the Physician,
14 you know, which is for patients. And then there's a
15 separate research website that describes my research
16 activities and labs. There's another website that is
17 at least two for the two major brands that I'm
18 running.

19 Q. And I misspoke. I apologize for that.
20 What I meant to say is that outside of lung cancer, I
21 didn't find you on any of the other research teams
22 that exist at The James.

23 A. Okay. So I think I understand what
24 you're seeing, but you're not -- we have clinical
25 teams like lung cancer and breast cancer and

1 pancreatic cancer. Many of those folks, if not most
2 of them, are researchers, but they're not research
3 teams. So I think what you're looking at is the
4 clinical teams. And at The James, like in many major
5 cancer centers in Florida, you would have Moffat,
6 University of Miami.

7 A lot of us are these superspecialists,
8 so I only currently, since coming to The James, only
9 do lung cancer, so that's why I'm not on the other
10 teams. And we have people who only do breast cancer
11 and people who only do prostate cancer.

12 Q. I did see that. So since 2011, your
13 clinical team has been the lung cancer team?

14 A. Right. And that was different when I
15 was at Georgetown for the prior 10 to 15 years.

16 Q. So The James is a bit more specialized
17 than where you came from?

18 MR. TUBIN: Objection to form.

19 A. No. Sorry. No. It's just I've sort
20 of changed my clinical focus from blood disorders,
21 blood cancers to the lung cancer, and there are
22 various reasons for that.

23 BY MR. TELAN:

24 Q. I saw that there was a hematological
25 research team under the hematology division. Are you

1 aware of that?

2 A. At The James?

3 Q. Yes.

4 A. Yes.

5 Q. Are you part of that hematological
6 research team?

7 A. So I guess I'm trying to figure out
8 which website you're looking at. We have research
9 programs. We had a leukemia research program, which
10 is now leukemia and hematologic malignancies. We have
11 a cancer control program. We have a translational
12 therapeutics program. We have a molecular
13 carcinogenesis and chemoprevention program, and we
14 have a cancer biology program. All of us have primary
15 assignments to each of those. I'm in the cancer
16 control, but the nature of these cancer centers is
17 this to be very fluid and fluster collaborations
18 across all those programs. So I regularly work with
19 the heme people, but I'm not listed in their research
20 program.

21 Q. You don't hold yourself out at The
22 James as a specialist in leukemia diagnosis and
23 treatment, do you?

24 A. So I did that at Georgetown University,
25 but at The James, no. We have other people who are

1 doing that clinical work.

2 Q. And you've been here for 14 years,
3 right?

4 A. Since 2011, so that's roughly 14 years.

5 Q. You don't hold yourself out as a
6 specialist in the treatment of non-Hodgkin's lymphoma
7 here at The James, correct?

8 A. Here, I have a lot of expertise and
9 have treated a lot of lymphoma patients, especially at
10 Georgetown and at George Washington University before
11 that but not at The James.

12 Q. And the same goes for bladder and
13 kidney. You don't hold yourself out as an expert in
14 the field of genitourinary oncology as it relates to
15 the clinical diagnosis and treatment of patients who
16 may be suffering from either kidney or bladder cancer
17 here at The James, correct?

18 MR. TUBIN: Objection to form.

19 A. That's correct. I'm trained and have
20 seen a lot of those patients over the years but not
21 since coming to The James.

22 BY MR. TELAN:

23 Q. In your career at its highest point,
24 what was the percentage of clinical time you spent
25 treating patients with kidney cancer?

1 A. Kidney cancer would be primarily at
2 George Washington University, and honestly, I don't
3 even think I can even estimate that, because there's
4 both outpatient and three to four months inpatient,
5 and all the patients were mixed, so I don't really
6 feel I could estimate that.

7 Q. What about bladder cancer?

8 A. It'd be the same answer. I just don't
9 know how to track that.

10 Q. What about leukemia?

11 A. Again, I don't know how to track that.
12 I mean, I certainly took care of leukemia patients,
13 both in the hospital and in the clinic, some of those
14 patients with acute myeloid leukemia, for example,
15 where some of the aggressive lymphomas would be in the
16 hospital for, you know, a month or two. We'd have a
17 service of 15 to 20 patients typically, so there could
18 be two to three of those, but one day, there could be
19 a bladder cancer patient. The next day, not. I mean,
20 it's all just mixed, so I don't know how I could
21 estimate that for you.

22 Q. When you were at -- and what was the
23 facility? Was it Georgetown?

24 A. Georgetown University. Before that,
25 while I was at the National Cancer Institute, I

1 continued my clinical work at George Washington
2 University.

3 Q. When you were at Georgetown, did you
4 also serve as the deputy director of the cancer center
5 there?

6 A. At some point. I mean, I went in
7 initially as a program leader and became an associate
8 director and then a deputy director.

9 Q. How long did you hold the
10 administrative position of associate director?

11 A. So the associate directors are not per
12 se administrative. It's not like we were dealing with
13 budgets or anything. Our job, which is typical for
14 these comprehensive cancer centers, is to figure out
15 how to foster the research program overall. So it
16 could be anything from mentoring more junior folks and
17 writing grants and papers to helping set up some
18 shared resource. So I don't know that I would call
19 them administrative per se. They were really there as
20 senior leadership to foster research programs.

21 Q. Would you agree that when you were at
22 Georgetown, while you can't estimate for me with any
23 degree of precision the percentage of patients that
24 you would have seen with kidney cancer, that would
25 have been a very small minority of your practice?

1 MR. TUBIN: Objection to form.

2 A. So I think I may be confusing you. So
3 George Washington University, before Georgetown, was
4 my clinical practice when I was at the National Cancer
5 Institute. That was all hematology oncology. We
6 didn't distinguish ourselves. When I moved, my
7 research program and my clinical practice to
8 Georgetown --

9 BY MR. TELAN:

10 Q. What year was that?

11 A. Around 2000. So my CV, so I may be off
12 by a year or two. Then I focused on hematologic
13 diseases, bloods cancers, lymphomas, blood disorders,
14 clotting disorders. And so at that point, if I saw a
15 kidney patient, it would be because they had a blood
16 problem or something like that.

17 Q. You would never have been primarily
18 responsible for providing oncologic care at either
19 George Washington, Georgetown or The James to a kidney
20 cancer patient. True?

21 A. No. So, again, I'm probably confusing
22 you. At George Washington University, it was more
23 like a general hematology-oncology practice, and we
24 did everything from kidney and bladder cancer, breast
25 cancer, acute leukemia, chronic leukemia, CML. George

1 Washington, it was the full practice that you can do
2 as a hematologist/oncologist.

3 Then I move to Georgetown and then it
4 became focused to hematologic diseases, including
5 acute myeloid leukemias, CML, multiple myeloma,
6 hemophilia, iron deficiency anemia. It was the full
7 spectrum.

8 Then when I moved to Columbus here at
9 The James Ohio State University Comprehensive Cancer
10 Center, I changed that clinical focus to really better
11 align with my research focus, which was more breast
12 cancer and lung cancer. So I aligned with the lung
13 cancer team to treat lung cancer patients and
14 mesothelioma patients as well.

15 Q. So are you telling me, though, that in
16 your career, there are times where you would have been
17 the primary oncologist responsible for providing care
18 to a patient being treated for kidney cancer?

19 A. Yes.

20 Q. And when was the last time that would
21 have occurred?

22 A. That would be at George Washington
23 University, which would be sometime around 2000.

24 Q. So fair statement that in the past 25
25 years, you would not have been primarily responsible

1 for providing oncologic care as the primary oncologist
2 for a patient suffering from either kidney cancer or
3 bladder cancer?

4 MR. TUBIN: Objection to form.

5 A. That's correct. I would not be, for
6 example, making their chemotherapy decisions,
7 recommending surgery, radiation therapy, but I would
8 often work, and still do, with those physicians who
9 are super specialists for the kidney cancer and
10 bladder cancer and breast cancer and everything else.

11 BY MR. TELAN:

12 Q. Did your bio at Georgetown mention that
13 you treated patients with kidney and bladder cancer?

14 A. Probably not, because I was focused on
15 the heme malignancies.

16 Q. Have you ever published in the field of
17 kidney and bladder cancer?

18 A. I'd have to go back and look at the CV.
19 I don't recall any as a clinical paper. For example,
20 this drug works better than that drug or something
21 like that. I have on causes of those cancers but not
22 as primary treatment of those cancers.

23 Q. We'll get to that in a bit, but your
24 testimony is you have published on the research side
25 of kidney and bladder cancer?

1 MR. TUBIN: Objection to form.

2 A. In terms of the causes of cancer,
3 susceptibilities, that sort of thing, but not as a
4 clinical therapeutics paper that I can recall. I
5 might be on a paper or two, but it wasn't, certainly
6 not the principal focus of the work that I've done.

7 BY MR. TELAN:

8 Q. And is it a fair statement in the last
9 14 years, while at The James, you have not held
10 yourself out to the Columbus community at large as a
11 physician who specializes in the treatment of blood
12 cancers, correct?

13 MR. TUBIN: Objection to form.

14 A. That's correct.

15 BY MR. TELAN:

16 Q. In terms of you had mentioned you're
17 still employed by Ohio State, you're still salaried as
18 an emeritus professor?

19 A. Yes.

20 Q. Okay. Do you -- did you go back to
21 school to get, like, training as an EMT?

22 A. Yes. I am now a licensed paramedic.

23 Q. When did you do that?

24 A. I pretty much started after I stepped
25 down as deputy director. Their accelerated programs

1 for physicians, which I think are not good, because
2 physicians are not paramedics, they're not paramedics
3 and not just physicians who drive at 80 miles an hour.
4 The -- but it's an accelerated program that I
5 prolonged for, like, probably a year, a year and a
6 half, mostly because I was getting a lot of great
7 clinical training riding in both my hometown as well
8 as some pretty tough areas in Columbus.

9 Q. Do you work for or with a company that
10 provides emergency medical services to residents of
11 the area?

12 A. Yes. So I have a part-time position
13 with the Madison County -- emergency Madison --
14 Emergency Management District.

15 Q. And how many shifts do you do with that
16 county?

17 A. Typically, I'll do a 24-hour shift
18 about once a week.

19 Q. So does that represent about 20 percent
20 of your professional time currently?

21 A. About 30 percent.

22 Q. Do you still -- you still hold clinical
23 privileges at The James?

24 A. And I still see patients.

25 Q. Okay. And you see patients as a

1 physician who treats breast cancer and lung cancer or
2 just lung cancer?

3 MR. TUBIN: Objection.

4 A. Just lung cancer. Sorry.

5 BY MR. TELAN:

6 Q. And is lung cancer under the division
7 of medical oncology?

8 A. That's correct.

9 Q. At The James, when you apply for
10 privileges, do you apply to divisions like if you
11 wanted privileges to see patients who had kidney
12 cancer, would you apply to the division of
13 genitourinary oncology?

14 A. I don't think so. I don't think they
15 distinguish that. They're more -- it's more things
16 about are you an oncologist and what procedures are
17 you able to do that you should be credentialed in. I
18 don't think they distinguish it based on type of
19 cancer.

20 Q. Is there a board certification
21 requirement for treatment at The James?

22 A. Boy. It's actually a complicated
23 question. So there's not a requirement. I am board
24 certified, but we have a few docs who aren't, and the
25 deal is that they're just not allowed to do any

1 education, but they have full clinical privileges, and
2 they're great doctors, which is why there are
3 exceptions for that. But, generally, if you're
4 boarded, you know, that helps a lot.

5 Q. Are you board certified in hematology?

6 A. So I was board certified in hematology,
7 and I let those go. They expire after 10 years, so I
8 let those go around 2000. I didn't need them for my
9 hematology practice at Georgetown. It wasn't a
10 requirement, so I just let them expire.

11 Q. But you kept up your board
12 certification in oncology?

13 A. So it turns out at the time I was
14 finishing my fellowship, they changed the rules to
15 require the 10-year renewal, but oncology, I
16 grandfathered in, and the next year, that 10-year rule
17 happened for the hematology when I took those boards.
18 So I am indefinitely boarded for internal medicine as
19 well as medical oncology.

20 Q. No plans on ever becoming recertified
21 in hematology?

22 A. I don't have any plans, no.

23 Q. Are your current plans to increase your
24 work as an EMS provider in the county?

25 A. I could. They'd love me to. But, no,

1 I'm pretty happy with my life balance right now.

2 Q. Do you still do research?

3 A. Yes.

4 Q. And where do you do that?

5 A. At Ohio State.

6 Q. In what lab?

7 A. So I have my own lab and my own
8 clinical group.

9 Q. And what is the name of the lab?

10 A. The Shields Lab. I mean, we do have --
11 you know, so we have, you know, a tobacco center of
12 regulatory science that I and another physician
13 co-lead. So that's sort of the label of that, but on
14 the website, you'll see the Shields Lab.

15 Q. Do you need to take that?

16 A. No.

17 Q. Did you, stepping away from your role
18 as deputy director, have anything to do with your role
19 as an expert in legal matters?

20 A. Not really. It made my life a lot
21 easier, because, you know, they always -- well,
22 outside activities are applied for, approved. There's
23 a conflict of interest and a conflict of commitment,
24 and I never had any issues with conflict of interest,
25 but they were always nervous about the conflict of

1 commitment.

2 And every couple years, some compliance
3 lawyer would say something or some dean, and they'd
4 look at what I'm doing and say, well, he certainly has
5 no issues with conflict of commitment given the
6 fulfilling job that I was doing.

7 Q. Ohio State requires you to provide them
8 with information, letting them know what activities
9 you hold outside of your work as a doctor here at The
10 James, correct?

11 MR. TUBIN: Objection to form.

12 A. That is almost entirely correct. As it
13 turns out, when I went to apply for the Department of
14 Justice work, they were like, nope, you don't need to
15 do that, because it's federal government, but if I was
16 working for you, I would have to put it in, give them
17 the nature of what I'm doing. They review it and
18 generally approve it within 24 hours.

19 BY MR. TELAN:

20 Q. But over the years, there were times
21 where your superiors were, came to question you about
22 the amount of time you were putting into legal
23 matters, correct?

24 MR. TUBIN: Objection to form.

25 A. Yeah. That's pretty routine for, you

1 know, for lots of people. Basically what they want to
2 do is just make sure that I'm not getting into a
3 conflict of commitment and not showing up for my job.

4 BY MR. TELAN:

5 Q. What percentage of your current time is
6 spent in the research lab?

7 A. Well, the research and clinical
8 practice, again, we're talking about a 50 percent
9 appointment over time, so 10 percent would be
10 clinical, which is a 20 percent full-time job. So the
11 other 40 percent then would be, you know, the research
12 or research mentoring. So, for example, I have a
13 large grant that trains postdoctoral fellows.

14 Q. And your research exclusively here at
15 The James is on lung cancer, correct?

16 A. No, that's not correct. I've done a
17 lot of work on colon cancer, breast cancer, causes of
18 lung cancer, but a lot of it is smoking and electronic
19 cigarettes and how they affect many different
20 diseases, not just lung cancer.

21 Q. And I mean currently. Is it -- are you
22 doing lung, breast and colon cancer research?

23 A. Correct. I don't think I've published
24 in breast cancer in about a year or so. That would be
25 on my CV. Most of my publications now are around

1 smoking, the harms of smoking that include lung
2 cancer. A lot of it is on lung cancer and stress and
3 depression affecting lung cancer outcomes.

4 A lot of my research is around
5 biomarkers and how toxic exposures like cigarette
6 smoking and electronic cigarettes affect the body,
7 affect the lungs, what you can measure in blood. And
8 then a lot of the colon work is both in terms of
9 causes but, also, genetics and genetic families.

10 Q. You are a proponent of psychedelics,
11 correct?

12 MR. TUBIN: Objection.

13 A. So we're in the process -- I'm not sure
14 what "proponent of psychedelics" means, but I will
15 tell you exactly what we're doing is that we're about
16 to open a trial after we've gone through all the
17 regulatory hurdles of providing psilocybin to lung
18 cancer patients in order to reduce their stress and
19 depression. And it's a pilot study. So we've got to
20 get 10 patients, show that the patients will show up,
21 show that there's no other hurdles or something like
22 that.

23 We have an active program at Ohio State
24 that I'm only indirectly involved with for U.S.
25 veterans with PTSD, and so once we get this pilot

1 study done, we're planning to extend it. For example,
2 we haven't decided yet, but for lung cancer patients
3 entering hospice and their caregivers as, again, a way
4 of reducing their stress and anxiety. The data around
5 psilocybin and other psychedelics for depression,
6 stress, even smoking, alcohol is really quite
7 impressive, but all these studies are pretty small.

8 BY MR. TELAN:

9 Q. So you'd say you are a proponent of
10 psychedelics?

11 A. I am a scientist. I'm not the
12 proponent until I have data.

13 Q. Is your hypothesis that psilocybin will
14 decrease the incidence of PTSD in the affected
15 population?

16 A. Well, this one, to be more specific,
17 it's not PTSD, but it relieves stress and depression,
18 probably smoking as well, but that is the hypothesis.
19 And there's data from other institutions like Johns
20 Hopkins where they've done thousands of patients where
21 they've treated them for a variety of disorders. It
22 looks like exciting data, but can't be a proponent
23 until we have our own data.

24 Q. Steve Wartenberg is somebody you've
25 given interviews with on a podcast at Ohio State,

1 correct?

2 A. Yes.

3 Q. So if you would have said to
4 Mr. Wartenberg that you couldn't go out and practice
5 as a general oncologist right now, because cancer care
6 has gotten so complicated, that would be true,
7 correct?

8 MR. TUBIN: Objection to form.

9 A. That is true. I don't know how private
10 practitioners in a given day will take care of lung
11 cancer, breast cancer, kidney cancer, bladder cancer,
12 and I sort of half joking, I say this to my patients,
13 I don't think I'm smart enough to do that anymore.

14 And the point is is that that's where
15 most cancer care is given. But people should
16 absolutely be getting second opinions. They don't
17 have to be treated by us, but when it's me and 10
18 other people who are -- we know what's going on around
19 the world for lung cancer. You know, you've got lung
20 cancer. You can have a great, brilliant local
21 oncologist who treats all these cancers. At least
22 check with us to make sure that they're getting the
23 best treatment. So that was the context.

24 BY MR. TELAN:

25 Q. And so if somebody came to you and

1 said, hey, Dr. Shields, I was just recently diagnosed
2 with large B cell lymphoma, that's not something that
3 you would treat, correct?

4 MR. TUBIN: Objection to form.

5 A. So I get calls like that all the time.
6 I give free advice. I make it clear that I'm not the
7 treater, but here's what -- like, I'll either hook
8 them up with one of our lymphoma experts and/or say
9 here's the questions you want to ask your doc. What's
10 going on? And I might say to them, that doesn't sound
11 right, but you really need to see one of our, you
12 know, full-time lymphoma experts. That happens all
13 the time.

14 BY MR. TELAN:

15 Q. So in that hypothetical situation, you
16 would refer that patient to a specialized colleague
17 who deals primarily with hematologic oncology issues,
18 correct?

19 A. Yes, depending on where they're
20 located. It could be, you know, someone -- it could
21 be a professional acquaintance, the brother of a
22 professional acquaintance, some friend. They could be
23 out in California. And my question for those folks is
24 always, where are you getting treated, because that's
25 gonna make a big difference in terms of outcomes.

1 Q. Have you reviewed the Camp Lejeune
2 Justice Act?

3 A. I have.

4 Q. It wasn't included in your
5 materials-considered list, was it?

6 A. I'd have to go back and look. I guess
7 there's a couple ways I'm gonna answer that. It might
8 be in there. I certainly have a cite to it, but it's
9 not something that I really consider, because it's not
10 a scientific document that's helpful to my opinion.

11 Q. You didn't consider that in formulating
12 your opinions in this case, correct?

13 A. That's correct.

14 Q. When you signed -- and we'll get into
15 your relationship with the Department of Justice in
16 just a minute, but did you sign a contract with the
17 Department of Justice to do work in this case?

18 A. Yes.

19 Q. When did you sign that document?

20 A. I'm not sure. I assume you have that.
21 I'd say probably sometime last fall, but it might have
22 been earlier than that.

23 Q. When were you first contacted?

24 A. Actually, I don't remember. I don't
25 keep track of that. I don't have notes or anything

1 like that, so whether it was the fall or a year ago
2 January, I just don't remember.

3 Q. You said you don't keep track of that.
4 You have notes. Didn't somebody reach out to you by
5 email or a call to say, hey, Dr. Shields, we'd like to
6 talk to you about this particular case?

7 A. Likely.

8 Q. And you have no idea when that first
9 contact occurred?

10 MR. TUBIN: Objection to form.

11 A. I'm worried about misremembering. I'm
12 thinking that it could be as early as a year ago
13 January, but I really didn't start doing work until
14 the fall.

15 BY MR. TELAN:

16 Q. So your first contact would have come
17 after you stepped down as deputy chair of The James.
18 True?

19 MR. TUBIN: Objection to form.

20 A. Yes. And it's deputy director, but
21 that's a technicality.

22 BY MR. TELAN:

23 Q. Deputy director of The James.
24 So sometime after July 1st of 2023?

25 A. Definitely.

1 Q. And you believe perhaps as late as
2 January 2024?

3 MR. TUBIN: Objection to form.

4 A. That's my recollection, so it could
5 have been earlier, but it was definitely after I
6 stepped down as deputy director.

7 BY MR. TELAN:

8 Q. Had you done work with the Department
9 of Justice before?

10 A. I don't believe so.

11 Q. Do you know how it is they got your
12 name?

13 A. I don't know.

14 Q. Who was your first point of contact?

15 A. I don't -- I don't remember.

16 Q. Was it a lawyer?

17 A. Yes. I'm sorry. It was definitely a
18 lawyer.

19 Q. Okay.

20 A. There's a bunch of them, so I don't
21 remember which one.

22 Q. Male or female?

23 A. I don't remember that.

24 Q. What were you asked to do?

25 MR. TUBIN: I'm going to object on work

1 product here and instruct Dr. Shields not to
2 answer that.

3 MR. TELAN: Just so that I can explore
4 the objection as a work product, as to what he
5 was asked to do when he was contacted?

6 MR. TUBIN: Can we take just a couple
7 minutes?

8 MR. TELAN: Sure.

9 VIDEOGRAPHER: We are now going off
10 record. The time is 10:12.

11 (A recess was taken from 10:12 to
12 10:23.)

13 VIDEOGRAPHER: We are now back on the
14 record. The time is 10:23. You may continue.

15 MR. TELAN: What you said, Marcus.

16 MR. TUBIN: Withdraw the objection as
17 to the contours of the assignment.

18 BY MR. TELAN:

19 Q. So the question was what were you asked
20 to do when you were first contacted?

21 A. I think -- I'm not sure I had a
22 particular task. The focus was on lung cancer and
23 causes of lung cancer, and over time, that morphed
24 into really focusing on the causes of all cancers or
25 all the cancers at issue as we sit here today, and the

1 report that you have is essentially the final
2 representation of what I was asked to do over time.

3 Q. So if I get that correctly, then, your
4 initial discussion spoke about perhaps you looking at
5 lung cancer, and then that morphed into the other
6 cancers that you're here to talk about today as well,
7 correct?

8 A. Yeah. I think what happened is over
9 time, my expertise in understanding cancer causation
10 and carcinogenesis, molecular epidemiology, my work
11 scope expanded to really fit that expertise for the
12 various cancers at issue today and exposures.

13 Q. And I did notice you've done this
14 before, obviously. You hold yourself out as an
15 epidemiologist as well?

16 A. So the short answer is yes. I do not
17 have a Ph.D. in epidemiology, but I am recognized by
18 my peers, including Ph.D. epidemiologists as an
19 epidemiologist.

20 Q. You did your training over a couple of
21 summers at Hopkins, I think?

22 A. Well, it's a lot more than that. I
23 took some formal classes at Hopkins, but, really, it
24 was through, you know, mentorship, post-doctoral
25 fellowship, junior faculty such that, you know, as of

1 today, I'm a fellow of the American College of
2 Epidemiology, which is an honorific title for
3 epidemiologic contributions to the world, if you will,
4 or to the public health community, and I'm also on
5 their board of directors.

6 Q. So then you're familiar with the
7 ethical guidelines that apply, published by the ACE,
8 correct?

9 A. So I'm going to say no. I'm not sure
10 that I've ever seen them or noticed it on the website.

11 Q. When you became a fellow with the
12 American College of Epidemiology, were you provided
13 with a copy of the guidelines?

14 A. I don't think so, but I'll say I don't
15 recall.

16 Q. Do you agree that an epidemiologist
17 should strive to be free from bias?

18 A. Sure. I think all scientists should
19 strive to be free from bias, but the question is what
20 type of bias are you talking about?

21 Q. Personal bias.

22 A. In terms of a conflict of interest?

23 Q. Yes.

24 A. I don't think that's possible. I think
25 that people will have conflicts of interest, and it

1 gets disclosed and managed.

2 Q. Should you strive to be as free from
3 bias as you possibly can be as an epidemiologist?

4 A. I don't know why you would be, because,
5 for example, as I'm sitting here today for this
6 deposition, why shouldn't the court systems have
7 access to people with expertise such as mine.

8 Q. So you disagree with that?

9 MR. TUBIN: Objection to form.

10 A. The way you're asking the question,
11 yes. There's no striving. The question is where can
12 your expertise be offered and be helpful and disclosed
13 so that could be evaluated.

14 BY MR. TELAN:

15 Q. Do you agree that personal bias can
16 frame the way you judge a particular situation?

17 A. As a general broad statement, I
18 wouldn't disagree with it. I don't believe that's the
19 case with me. As I do this litigation consulting
20 work, I try to be as objective and apply accepted
21 scientific standards as best as I can.

22 Q. Do you agree that personal bias can
23 frame the way you speak about a particular situation?

24 A. Again, as a generalization, that can be
25 an issue. As I sit here today, I try to do my best to

1 minimize or not do that.

2 Q. Incidentally, I forgot to ask you this
3 before, but with the computer, I don't know if it has
4 Internet access, but would you agree not to access the
5 Internet during the course of the deposition?

6 A. So I'll say yes with a friendly
7 amendment that some of the links in the PDF are to
8 URLs, and if I open it up, I will let you know.

9 Q. Apparently, we've checked back. We
10 can't, as of 9:30, access the link. Do the links
11 contain anything more than the information that you
12 referenced in its original form?

13 A. No. So if it's Reference 52 to a paper
14 by Morton from 1998, you click the link, and the
15 Morton paper opens up, but the Morton paper is also in
16 the article file that you have.

17 Q. Okay. In other words, there are no
18 notes or summaries or anything like that?

19 A. There's nothing new from the original
20 report that you got.

21 Q. Is the font size -- strange question.
22 Is the font size the same font size that we would have
23 received when we received the report in hard copy
24 form?

25 A. Yes. Nothing, nothing has changed.

1 The only thing is the assistant, when she sees
2 Reference 42, there's a linking thing in Adobe. She
3 does a box, opens up the article file. She finds the
4 article, hits it, and now that link will open up the
5 article file.

6 Q. Can you access page 177 of your report?

7 A. Sure. Okay.

8 Q. Is there a table on that page?

9 A. There's a meta-analysis figure, if
10 that's what you're talking about.

11 Q. Do you mind if I walk around you just
12 to see what it is you're looking at?

13 A. Sure. So here's page 177, and then
14 there's the meta-analysis, which I believe is from
15 IARC.

16 Q. Are you able to read that clearly on
17 your computer?

18 A. Yes. As I blow it up, sure.

19 Q. Without blowing it up?

20 A. So that's relative in terms of PDF,
21 because there's no standard size. You can make it as
22 small or as large as you want to, so but I can read
23 it. If I see the whole page from margin to margin, I
24 can read it.

25 Q. I'm just going to show you a copy of

1 the page 177. We won't mark this separately. This is
2 page 177 of the report.

3 MR. TUBIN: My understanding is the
4 unlinked version of the PDF can be blown up or
5 enhanced, the one you have.

6 MR. TELAN: Both of them can.

7 MR. TUBIN: Both of them can, but
8 especially the online version if you need to
9 enlarge it.

10 MR. TELAN: I'm just asking him a
11 question about the paper form.

12 BY MR. TELAN:

13 Q. Are you able to read that document and
14 the table that you referenced previously?

15 A. It's a figure forest plot, and with my
16 reader glasses, I can.

17 Q. Can you read the first three lines of
18 the names on that table?

19 A. Sure. Bove, 2014a; Bove, 2014b. I
20 feel like I'm at my ophthalmologist's. Lipworth,
21 2011. I'll keep going. Silver, 2014; Vlaanderen,
22 2013. This is a cut and paste from the actual
23 reference.

24 Q. Did you do that, by the way? Did you
25 cut and paste that?

1 A. Yes.

2 Q. So just so that I'm clear, all of the
3 cutting and pasting that would have been done, is that
4 done by you or by your research assistant? Who does
5 that?

6 A. By me.

7 Q. What is your research assistant's
8 function in regards to your report?

9 A. She accesses my large article file, and
10 if there's a paper cited in the report, she'll move it
11 to an article file for the report and then do the
12 linkage.

13 Q. I lost the last bit there. I'm sorry.

14 A. So what she'll do is she'll take,
15 she'll find the file from my article files, move it or
16 copy it to an article file specific to this report and
17 then use the Adobe linking function to link it to the
18 document so that when you click on the reference, the
19 article opens up.

20 Q. Does she bill for her services?

21 A. Yes.

22 Q. Does she bill the DOJ or does she -- do
23 you submit her time through your invoice?

24 A. It's the latter. So she gives me a
25 time sheet. I put that on the DOJ invoice.

1 Q. Does she bill at the same rate you do?

2 A. No.

3 Q. And how does that look on an invoice
4 for her time?

5 A. It'll say research assistant.

6 Q. Do you know if her time appears at all
7 on your invoices?

8 A. It would be research assistant.

9 Q. You have your invoices with you today?

10 A. I don't.

11 Q. I think you said you saw the deposition
12 notice, correct?

13 A. I have seen a deposition notice, yes.

14 Q. Did you bring anything with you today
15 other than the computer that is responsive to what we
16 asked for in the deposition notice?

17 A. No.

18 Q. Have you seen your invoices in
19 preparation for your deposition?

20 A. No.

21 Q. Does your research assistant handle the
22 invoicing for you?

23 A. No.

24 Q. You do that yourself?

25 A. It's all just me.

1 Q. And does that come from your personal
2 computer?

3 A. Yes.

4 Q. When would have been the last invoice
5 you sent the DOJ?

6 A. I think last week or the week before.

7 Q. Do you remember what the amount was
8 for?

9 A. No. I'd like to think it was less than
10 5,000, but I could be wrong.

11 Q. And your current hourly rate is at 890
12 an hour?

13 A. It's either 890 or 895. I just
14 recently realized that in my billing software, there's
15 both numbers, so I don't remember what it was for the
16 DOJ, but it would either be 890 or 895.

17 Q. So if I'm correct, then, in terms of
18 your research assistant and her role, would she have
19 been the one to have pulled the 1,700 references that
20 are contained in your report?

21 A. Yes.

22 Q. Did you have any assistance from any
23 outside, anyone outside of your research assistant?

24 A. No.

25 Q. Nobody in Gradient?

1 A. No. No, no.

2 MR. TELAN: Okay. I mentioned before
3 the Camp Lejeune Justice Act. We'll mark that
4 as Exhibit 1 to the deposition.

5 (Exhibit 1 was marked for
6 identification.)

7 BY MR. TELAN:

8 Q. Is this the document that you testified
9 that you were shown or you saw?

10 MR. TUBIN: Objection to form.

11 A. I saw it online, so it did not have
12 this format, but it looked similar.

13 BY MR. TELAN:

14 Q. Okay. I'll direct you to Section 804.
15 Do you see the section that may be cited as the "Camp
16 Lejeune Justice Act of 2022"? If you go down to
17 subparagraph (c) at the very bottom, where it says,
18 "Burdens and Standard of Proof," do you see that?

19 A. Yes.

20 Q. If you flip to the next page, under
21 number 1, and I'll read it. "In general, the burden
22 of proof shall be on the party filing the action to
23 show one or more of the relationships between the
24 water at Camp Lejeune and the harm."

25 Have I read that correctly so far?

1 A. Yes.

2 Q. Number 2, "Standards. To meet the
3 burden of proof described in paragraph 1, a party
4 shall produce evidence showing that the relationship
5 between exposure to the water at Camp Lejeune and the
6 harm is, (A), sufficient to conclude that a causal
7 relationship exists or (B), sufficient to conclude
8 that a causal relationship is at least as likely as
9 not."

10 Did I read that correctly as well?

11 A. Yes.

12 Q. And you told me before that this is not
13 something you specifically considered in formulating
14 your causation opinions, correct?

15 A. Well, it's a legal document, so that's
16 correct.

17 Q. When you signed your contract with the
18 Department of Justice, do you remember whether that
19 was a Form 522124 form?

20 A. I have no idea.

21 Q. You didn't bring your materials with
22 you, the contracts that you signed, correct?

23 A. Correct.

24 MR. TUBIN: You have the production
25 that we made with the contract and invoices,

1 correct?

2 MR. TELAN: We don't have the original
3 contract. We have the amendment.

4 A. So the amendment builds on the original
5 one, so it's just adding lines to it.

6 BY MR. TELAN:

7 Q. But I don't have the original one. So
8 the question to you, Dr. Shields, is before you signed
9 the amendment to the contract, you signed an original,
10 correct?

11 A. Correct.

12 Q. And you don't know when you signed that
13 original, correct?

14 A. No. We would have to look at it. It
15 might be on that amendment document.

16 Q. Do you know if that contract requires
17 that you comply with federal law?

18 MR. TUBIN: Objection to form.

19 A. I don't -- it was a multipage document.
20 I don't recall what is in that multipage document.

21 BY MR. TELAN:

22 Q. Did you read it before you signed it?

23 A. I did.

24 Q. But you don't remember whether there
25 was a clause that required that you comply with

1 federal, state and local laws as part of your work as
2 a contractor?

3 MR. TUBIN: Objection to form.

4 A. I don't remember either way.

5 BY MR. TELAN:

6 Q. Assuming that that is, in fact, the
7 case, you didn't actually follow the Camp Lejeune
8 Justice Act in this undertaking, correct?

9 MR. TUBIN: Objection to form.

10 A. I'm not even sure what that means.

11 BY MR. TELAN:

12 Q. Would you agree that the Camp Lejeune
13 Justice Act that we just read is applicable to this
14 case?

15 MR. TUBIN: Objection to form.

16 A. For you all lawyers, that act has
17 nothing to do with scientific, medical or public
18 health-accepted practice.

19 BY MR. TELAN:

20 Q. That law does speak to causation, does
21 it not?

22 MR. TUBIN: Objection to form.

23 A. It states a standard that's a legal
24 standard that I've never heard of before I got into
25 this case. I've not been able to see that as a legal

1 standard anywhere else. But, again, that's a legal
2 standard, not something that -- I can understand the
3 words, but I don't understand how that would impact
4 the work that I do, based on accepted scientific,
5 medical and public health practice.

6 BY MR. TELAN:

7 Q. What is the causation standard you
8 typically apply as an expert?

9 MR. TUBIN: Objection to form.

10 A. So it's pretty clear in my report.
11 There's a number of different causation methodologies.
12 The most widely recognized, although not perfect, is
13 Bradford Hill. And then --

14 BY MR. TELAN:

15 Q. I'm not talking about methodology. I
16 meant the standard.

17 A. Then I have no idea what you're talking
18 about, because that -- if you're talking about a
19 medical standard -- if you're talking legal standard,
20 I'm not a lawyer. I can't even begin to help you with
21 those questions. The accepted scientific and medical
22 practice would be something like Bradford Hill.

23 Q. Does the term "more likely than not"
24 come up in your vernacular as an expert ever?

25 A. As an expert?

1 Q. Yes.

2 A. Yes. In the legal setting. In the
3 scientific and medical setting, I'm gonna say never.
4 If you do a PubMed search with "as likely" and not in
5 quotes, you'll not find a single article in the
6 National Library of Medicine 60 million papers that
7 use that phrase in the abstract or a title.

8 Q. You're sure about that?

9 A. Yes. And maybe my search was wrong,
10 but those searches are pretty reproducible.

11 Q. You're here as an expert in a legal
12 matter, correct?

13 A. That's right.

14 Q. So what standard are you used to using
15 as an expert in legal matters?

16 MR. TUBIN: Objection to form.

17 A. You keep using the word "standard." To
18 me, standard implies a legal interpretation that I
19 don't have or have the training to evaluate. In every
20 one of my cases that I'm involved with that involve
21 cancer causation, it's using -- I can't think of an
22 exception, but maybe it has the Bradford Hill
23 methodology and the weight of evidence review for
24 sufficiency.

25 As, for example, as done by IARC, NTP,

1 EPA, those are the methodologies that I've been
2 trained to use, that I apply, and it's consistent
3 across all the cases I'm involved with. When I'm
4 asked to say something like is your opinion more
5 likely than not, my answer is always the same. Yes,
6 it's more likely than not that I've used accepted
7 medical, scientific and public health practice for
8 evaluating causation, and here's my opinion.

9 BY MR. TELAN:

10 Q. Have you testified in a tobacco case
11 that it is more likely than not that smoking caused
12 lung cancer?

13 A. Yes, with the same thing, applying
14 accepted medical, scientific public health practice
15 for something like Bradford Hill or potentially other
16 accepted practices in the public health community.

17 Q. Well, when you use that in the smoking
18 cases, what do you mean when you use the term "more
19 likely than not"?

20 A. That there was a sufficiency of
21 evidence based on Bradford Hill and a
22 weight-of-evidence review.

23 Q. Do you ascribe any percentage degree of
24 quantitative degree of proof to the term "more likely
25 than not"?

1 MR. TUBIN: Objection to form.

2 A. I never have, and I don't know how to
3 do that. That, to me, is a legal thing that you
4 lawyers figure out.

5 BY MR. TELAN:

6 Q. So you've never testified that "more
7 likely than not" means a greater weight of the
8 evidence or greater than 50 percent quantitatively,
9 correct?

10 MR. TUBIN: Objection to form.

11 A. That's correct. As far as I'm sitting
12 here that I recall, I don't recall ever doing that.

13 BY MR. TELAN:

14 Q. You had mentioned or I had asked you
15 about your materials-considered list. Did you say you
16 were able to access that?

17 A. It's in my report.

18 Q. Yes. Can you access that?

19 A. Okay.

20 Q. And just let me know if your
21 materials-considered list includes the Camp Lejeune
22 Justice Act.

23 MR. TUBIN: Are we talking about the
24 documents-reviewed section?

25 MR. TELAN: Yes.

1 BY MR. TELAN:

2 Q. I'm sorry. I said materials-considered
3 list, but either documents reviewed or materials
4 considered. Feel free to look at either one.

5 A. So it's not listed there.

6 Q. Why not?

7 A. Because, as I said, that's a legal
8 document that doesn't help me scientifically provide
9 my opinions in this case.

10 Q. But it is a material, and it is a
11 document, correct? Whether it's scientific or not, it
12 is a document?

13 A. Yes. But it's nothing that I would
14 consider to help me formulating an opinion in this
15 case.

16 Q. I have a copy of your invoices, and I'd
17 like to talk with you a little bit about those. We'll
18 mark those as Exhibit 2 to the deposition.

19 (Exhibit 2 was marked for
20 identification.)

21 BY MR. TELAN:

22 Q. To reference those generally, so do you
23 see at the top left-hand corner, it states, This is
24 amendment of solicitation? This is at Bates stamp
25 page 1 at the bottom, and these are not my Bates

1 stamps. Somebody else must have Bates stamped this.

2 MR. TUBIN: I'm sorry. I do not see a
3 Bates number.

4 MR. TELAN: What's that?

5 MR. TUBIN: I don't see any stamps on
6 here.

7 MR. TELAN: I apologize. Somebody else
8 must have Bates stamped it. Okay. It's not
9 the format that I've got. All right. We'll
10 work off this format.

11 BY MR. TELAN:

12 Q. So let's skip ahead.

13 A. And just looking at this, when you were
14 asking me before about when I first started doing
15 work, this one is dated November 8, 2023, so that's
16 probably when I -- sometime around then was when I
17 actually started working.

18 MR. TUBIN: Are you talking about the
19 stamp in the top right-hand corner?

20 MR. TELAN: No. I've got something
21 different, I think, that you all produced in
22 response to the request for documents, and we
23 may get that on a break.

24 BY MR. TELAN:

25 Q. Do you see in here, Dr. Shields, in

1 Exhibit 2, a copy of your contract that you signed
2 with the Department of Justice?

3 A. Are you talking about the original?

4 Q. Yes. Were you able to find that,
5 Dr. Shields?

6 A. I'm still looking for it. This is a --
7 it looks like a 60-page document.

8 Q. I'll represent to you that it's not in
9 there. I don't want you to have to page through each
10 page.

11 MR. TUBIN: I think he's getting close
12 to it at the end.

13 BY MR. TELAN:

14 Q. You haven't seen it yet, Dr. Shields?

15 A. I'm on page 39, but if you can ask me
16 material questions about it, then I need to keep
17 looking.

18 MR. TELAN: We'll withdraw.

19 BY MR. TELAN:

20 Q. You don't need to keep looking.

21 You -- there is a --

22 A. It actually looks like it's on page 39.

23 Q. The original?

24 A. I think so.

25 Q. Where are you seeing page 39?

1 A. So at the bottom, maybe cut off on some
2 of your things, but it says "Shields USA Contract
3 00000039."

4 Q. Can I see what you're looking at?
5 Because I can't seem to see that.

6 Okay. That's a document that's dated
7 August 22nd, 2023, correct, bottom right?

8 A. That's correct.

9 Q. But it's not signed, correct?

10 A. It's not signed by me, no.

11 Q. Did you sign the original contract that
12 you would have received from the Department of
13 Justice?

14 A. I'm sure I did.

15 Q. Now, the first invoice that I see, if
16 you flip all the way to the front, was November the
17 8th, 2023. Do you see that?

18 A. I'll assume that it is the first -- are
19 you asking me if that's on the first page or is that
20 the very first invoice?

21 Q. The first, the first page.

22 A. Okay. That's correct.

23 Q. Is there an invoice that -- okay. So
24 if I look at that November 8th, 2023, that would have
25 been about three, two and a half months after what you

1 just showed me at page 39, the unsigned solicitation
2 for contract, correct?

3 A. That would be right.

4 Q. And the description is that you were
5 preparing a report in Associated Research and Review;
6 is that correct?

7 A. That's the general description.

8 Q. What report were you preparing on
9 November 8th, 2023?

10 A. So either -- I only really have three
11 or four descriptions. One is report prep in
12 Associated Research Review. One is document review;
13 then there's testimony. So at the time, I was
14 obviously working to help develop questions, whether
15 it was in writing or verbally, but I would consider
16 that a report.

17 Q. You would consider that a report?

18 A. Yes, for my billing purposes.

19 Q. What exactly were you doing then that
20 you billed for on November 8, 2022?

21 A. It was a couple years ago. The
22 question is development. It would have been that I
23 was being asked to offer advice, opinions on, I'm
24 guessing, which I'm not supposed to do, on either an
25 upcoming deposition or for someone asking questions to

1 someone else.

2 Q. What those questions were, you can't
3 remember?

4 A. I don't.

5 MR. TUBIN: Hold on. Are you asking
6 him about a draft of a report or -- I'm just
7 curious where -- I don't want to tread on any
8 work product here.

9 MR. TELAN: I think the question is
10 clear, and I think, Marc, you can object if
11 you like, but if the doctor has a, needs
12 clarification with a question, I think he can
13 ask it.

14 MR. TUBIN: I think I'm going to object
15 and refer to Case Management Order 17, you
16 know, the discussions and communications. At
17 this stage, I believe that order has
18 identified them as privileged or work product.

19 MR. TELAN: So you're instructing him
20 not to answer?

21 MR. TUBIN: Yeah.

22 BY MR. TELAN:

23 Q. So let me ask you so that the question
24 is clear.

25 As far as report prep is concerned,

1 you've mentioned that you considered your report prep
2 to be developing and responding to questions that were
3 asked, correct, Dr. Shields?

4 A. So I'll clarify that. It could be
5 either verbal or something in writing or something in
6 email. I don't recall. But I was helping develop
7 someone who had questions for someone else.

8 Q. And who that someone was, you can't
9 tell me?

10 A. No. I don't track that.

11 Q. And you can't remember what the
12 questions were?

13 MR. TUBIN: Objection. Again, we're
14 getting into, I think, CMO 17, and I'm going
15 to instruct Dr. Shields not to answer.

16 MR. TELAN: The question is simply does
17 he remember what they are, not what were they.
18 Does he remember what they were?

19 MR. TUBIN: Okay.

20 A. I don't recall offhand.

21 BY MR. TELAN:

22 Q. In terms of -- and these, do these
23 represent all of the invoices to date other than the
24 most recent ones that you just mentioned to me that
25 you submitted sometime earlier in the week?

1 A. I will assume that the DOJ turned over
2 all the invoices. I have no way of determining, as I
3 sit here now, that this is a complete list, but I
4 would make the assumption that if I sent it to them,
5 they have turned it over.

6 Q. Does this appear to be a complete list
7 of your invoices other than the one that you just
8 spoke about?

9 A. I think so. As you're giving them to
10 me, they're not in the date order, so it's even hard
11 to track, but it looks like the most recent one you
12 have is dated 4/4/25 -- no. Sorry. 4/20/25, so
13 that's pretty recent.

14 Q. Okay. So if we total up the invoices
15 here generally, you have about 2,000 on the first
16 page, about 14,5 on the second page, 18,000, 35,000,
17 55,000, 11,000 and 26,000. Does that look to be about
18 the sum total that you billed to date?

19 A. You haven't given me a sum, and this is
20 higher math for me. But, again, I have no way of
21 verifying that every invoice is here. But it appears
22 to be, and it is, and the documents will speak for
23 themselves.

24 Q. Approximately about \$165,000?

25 MR. TUBIN: Objection to form.

1 A. I can pull out a calculator and add
2 them up. If you want to represent to me that that's
3 what it is, then I'll accept that.

4 BY MR. TELAN:

5 Q. You can't -- you're not able to quickly
6 just look through and estimate what these invoices
7 are?

8 MR. TUBIN: Objection to form.

9 A. I learned a long time ago that I don't
10 like to do math in my head. It's too inaccurate.

11 BY MR. TELAN:

12 Q. I don't see any time entered from your
13 research assistant, do you? I see one note for
14 article retrieval, one hour on March 23rd, 2025. I
15 take it back. Sorry about that. Withdrawn.

16 The first bill, I see no, no entry from
17 your research assistant on the November 2023 invoice;
18 is that true?

19 A. That's correct.

20 Q. If we go to the second invoice, that's
21 on this page, not chronologically, April of 2025, I
22 see two entries for article retrieval. One is for 69
23 hours, and the other is for an hour and five -- an
24 hour and a half. Do you see that?

25 A. Yes.

1 Q. Presumably, your assistant was pulling
2 in a good number of articles about a month ago; is
3 that correct?

4 MR. TUBIN: Objection to form.

5 A. Yes, the 1,700-some-odd articles linked
6 to the PDF.

7 BY MR. TELAN:

8 Q. And why was she doing that?

9 A. To make it easier for you and I during
10 this deposition to find articles in an efficient way.

11 Q. So she pulled them and did what with
12 them?

13 A. Linked them to the PDF.

14 Q. If we go to the next invoice of
15 December 2024, I don't see any billing from her in
16 that invoice, correct?

17 A. That's right.

18 Q. If we go to the next invoice from
19 November of 2024, I think there's a mistype at the
20 second line, because it says November 11th of 2002.
21 My guess is that should be 2024, but I don't see any
22 bills from her on that invoice either; is that
23 correct?

24 A. I think you might have misspoke. So
25 we'll just be clear this was a December 18, 2024,

1 invoice, and it is correct that there's no billing for
2 her.

3 Q. Okay. Turn the page to the
4 November 2024 invoice. You don't see any entries from
5 her on that invoice, correct?

6 A. I lost track of where you are. What
7 number page is that?

8 Q. On the flip side of the December 2024,
9 you have an invoice date of November 2024.

10 MR. TUBIN: They're both December. Are
11 you referring to the very first page?

12 BY MR. TELAN:

13 Q. Can I see what it is you're looking at?
14 So you were looking at the December 2024. I asked to
15 flip to the next one of November 2024 starting at --

16 A. The invoice date is 12/18/24. That's
17 why I was correcting you.

18 Q. I see. So we're on the 12/18/2024
19 invoice date. Do you see any billing from your
20 assistant on that invoice?

21 A. No.

22 Q. Let's go to the next invoice date,
23 which is March 28th, 2025.

24 A. Okay.

25 Q. Do you see any billing for your

1 assistant on that invoice?

2 A. No.

3 MR. TUBIN: You said March? Did you
4 mean February 28th?

5 MR. TELAN: Mine says 3/28/2025 due
6 date. I'm sorry, yeah. 2/28/2025. Sorry.

7 BY MR. TELAN:

8 Q. No billing from your assistant on the
9 February 28th invoice date?

10 A. That's correct.

11 Q. If we go to the next invoice date is
12 April the 4th. I see one hour of article retrieval on
13 March 23rd, 2025, correct?

14 A. That's right.

15 Q. And if we go to the January invoice
16 date, January 19th, I see no invoicing from your
17 assistant on that date, correct?

18 A. That's correct.

19 Q. So fair statement that your -- the only
20 entries for invoicing that came from your assistant
21 would have been on March 23rd, 2025?

22 MR. TUBIN: Let me just open the
23 document.

24 BY MR. TELAN:

25 Q. For one hour on March 23rd, 2025, six

1 and a half hours on -- I'm sorry. 6.69 hours on
2 April 12th, 2025, correct?

3 A. I'd have to look at the actual pages,
4 but I believe that's correct.

5 Q. You authored your report on what date?

6 A. Well, the final was generated on
7 February 7, 2025.

8 Q. So prior to February 2025, your
9 assistant billed no time on this case, correct?

10 A. That's correct.

11 Q. Who pulled the 1,700 articles?

12 A. I guess I'm not sure. You asked me
13 that before. She did for the purposes of linking the
14 PDF.

15 Q. Who pulled it so that you could rely on
16 them for your report?

17 A. They're in a file. There's no pulling.

18 Q. In a file?

19 A. Correct, on my personal computer. So
20 it's like 20,000 articles in there.

21 Q. Do you update that file?

22 A. All the time.

23 Q. How is it updated?

24 A. When I identify a paper that's relevant
25 to either my research, my clinical care or to the

1 litigation work, it gets dumped in there.

2 Q. And you do that through her? In other
3 words, you identify it, and then you ask her to pull
4 it?

5 A. No. I do it. It's just me.

6 Q. And how often do you do that?

7 A. I was going to say probably more than
8 weekly. If an article comes up, then I put it in.
9 For purposes of this type of litigation, I get weekly
10 feeds from PubMed, so that if there's a paper that's
11 published that mentions the word "benzene," for
12 example, I'll look at that email and say, oh, that's
13 an article that I need to consider for some future or
14 it could be treatment of lung cancer or something, and
15 I'll just put that into the, into the folder.

16 MR. TUBIN: Are you getting close to a
17 breaking point?

18 MR. TELAN: I thought we just had one
19 just about 30 minutes ago.

20 MR. TUBIN: It was a little bit more
21 than that, but how are you feeling,
22 Dr. Shields?

23 THE WITNESS: I'm okay for a few more
24 minutes, yeah.

25 MR. TUBIN: We went back on at 10:26,

1 so, yeah.

2 BY MR. TELAN:

3 Q. We would request a copy of the original
4 signed agreement between Dr. Shields and the
5 Department of Justice, as we don't have that.

6 I do see, Dr. Shields, that there were
7 a couple of amendments made to the, to the contract.
8 Some of those were to give you an increase in your pay
9 scale, correct?

10 A. One of them was, correct.

11 Q. How did that occur?

12 A. I was raising my rates generally for
13 all my litigation. I do that every couple years, and
14 that's what happened here, and we amended the
15 contract.

16 Q. We'll come back to how often you update
17 your materials, but in terms of the actual billing
18 from your assistant, just so that I'm clear, the 69
19 hours that she billed for was to transfer the files
20 that you have on your computer to a link.

21 MR. TUBIN: Objection to form.

22 BY MR. TELAN:

23 Q. Is that right?

24 A. Well, more or less. I mean,
25 periodically, what I do is I send her a link for

1 articles that I've had added. I'll say to her, what's
2 the last date stamp of the articles you have? She'll
3 come back and say, January 1st, you know, 2025. So
4 then I'll send her a link of any article that I
5 dropped in there after January 1st, 2025.

6 Q. And you said you update your research
7 regularly, right?

8 A. All the time.

9 Q. So as an expert in this case, how often
10 would you have been updating that database?

11 A. All the time.

12 Q. Is that every day?

13 A. If an article comes out that's got
14 relevance, then, yeah, it could be every day.

15 Q. How do you do that? In other words, is
16 there, like, a search term that you use to update it
17 or what?

18 A. Well, as in my report, there are
19 certain keywords that I'll get a weekly update. So in
20 the last seven days, if any article gets published
21 about benzene, whether it's relevant -- you know, it
22 could be benzene used for, identify genetic testing
23 for some drug. That will be in there, because there's
24 benzene mentioned as either the title, the keyword or
25 the abstract. That wouldn't go in.

1 But if there's then a paper after that
2 that says benzene exposure and causes of leukemia,
3 then I'll grab that and make sure that -- I'll look at
4 it, and then, for any subsequent report, I'll make
5 sure that it's in there. Not a perfect system,
6 because it's subject to human error, but that's
7 basically the way it goes.

8 Q. And did you do that every day across
9 all four cancers in this case?

10 A. It's not every day. It depends on
11 whether I identify an article or not. So when I
12 generate a report like this -- I think maybe this will
13 help you -- I won't assume that my database of files
14 is up to date and I'll redo the search, so I'm looking
15 at benzene and AML. I will do another search, even
16 though I get the weekly report, just to make sure
17 something hasn't come out in the last year that
18 somehow didn't get captured.

19 Q. Looking at -- do you still have
20 Exhibit 2 in front of you, the invoices?

21 A. Yes.

22 Q. Have you talked with anybody outside of
23 the Department of Justice about this case?

24 MR. TUBIN: Objection. I need clarity
25 on who you're referring to, because that could

1 impact -- I think, again, it could touch on
2 CMO 17.

3 BY MR. TELAN:

4 Q. Anybody outside of your lawyers?

5 MR. TUBIN: Again, I'll allow you to
6 answer who, but as far as the communications
7 go, don't answer that.

8 A. There were a couple meetings we had
9 with other defense experts.

10 BY MR. TELAN:

11 Q. Who's "we"?

12 A. The lawyers, myself.

13 Q. Which lawyers?

14 A. Each time, it seems to vary. There's
15 like 10 or 15 that I'm working with, and so I don't
16 record who's on that call versus the next call.

17 Q. Are they reflected, those meetings
18 reflected on your invoices?

19 A. Yes. It would say, simply, meeting.

20 Q. Can you look at your invoices and tell
21 me when those meetings took place?

22 A. April 1st, 2025; December 12th, 2024;
23 December 26th, 2024; December 6th, 2024; January 20th,
24 2025; February 1, 2025; February 6, 2025; February 4,
25 2025. I'm sorry. Did I just say February? I

1 misspoke.

2 Q. You said February 4 and February 6th
3 and February 1st, 2025.

4 A. Right. So I have February 6th, 2025.
5 The next one is April 2, 2025; April 4, 2025;
6 January 7, 2025, and that's it for these invoices.

7 Q. And all of these meetings would have
8 involved DOJ lawyers and other experts?

9 A. No.

10 Q. Which ones involved other experts?

11 A. I don't record that, so I can't tell
12 you the answer to that.

13 Q. You can't recall -- do you recall
14 meeting with other experts?

15 A. Yes.

16 Q. How many times?

17 A. Probably all totaled, maybe four or
18 five of those meetings.

19 Q. Were any of those in person?

20 A. No.

21 Q. All Zoom?

22 A. Correct.

23 Q. How long did those meetings last, and
24 when did they occur?

25 MR. TUBIN: What was the last, how

1 long?

2 MR. TELAN: When and how long. I know
3 it's compound, but I figured it's easier.

4 A. So, again, I can't tell you when,
5 because I don't record that. I mean, generally, they
6 would be anywhere from a half hour to an hour.

7 BY MR. TELAN:

8 Q. Is it on one of these dates that you
9 gave us before?

10 A. It would be in one of those meetings,
11 correct.

12 Q. Okay. And you're certain there were
13 two?

14 A. Two what?

15 Q. Meetings with other experts.

16 A. I think it was probably four, plus or
17 minus.

18 Q. And who were the other experts?

19 A. Dr. Julie Goodman, Dr. Lipscomb, and I
20 think there was -- I think it was just them, actually.
21 I mean, at one point, I was meeting with someone who
22 was a lawyer who I thought was one of the experts,
23 because that was her expertise.

24 Q. Julie Goodman, Dr. Lipscomb and?

25 A. And I think that's, that's it.

1 Q. And how many lawyers were on the phone,
2 on the Zoom?

3 A. I mean, it could be anywhere from one
4 to eight. It's all those Hollywood Squares, and
5 people would come and go.

6 Q. And you said it was 30 minutes to an
7 hour for each?

8 A. I don't recall meeting for more than an
9 hour.

10 Q. Was there an agenda for the meeting?

11 MR. TUBIN: Now we're getting into, I
12 think --

13 MR. TELAN: And that's what was on it.
14 I said was there an agenda.

15 MR. TUBIN: Okay.

16 A. Each meeting had a particular focus.

17 BY MR. TELAN:

18 Q. And was that published in advance of
19 the meeting?

20 MR. TUBIN: I just want to be clear, so
21 Dr. Shields understands it. We're not talking
22 about any content on anything on this agenda
23 or anything like that, just the facts of
24 whether these things existed or not.

25

1 BY MR. TELAN:

2 Q. That's the question right now.

3 A. Yeah. I don't know what "published"
4 means, but it could be in one meeting. We would say,
5 hey, let's hop on a call with Dr. Goodman and clarify
6 something, or it could be by email saying we want to
7 call about X, Y and Z.

8 Q. When was the most recent of those
9 meetings?

10 A. I don't -- not for at least the last
11 month, but I would say probably they were in May,
12 maybe the beginning of April, more likely March, but
13 March, April-ish.

14 Q. Were these meetings close in time
15 together or were they months apart?

16 A. I don't -- I don't know. I mean, they
17 could be a couple weeks apart or something like that.

18 Q. Do you think, as you sit here today,
19 that all of the meetings took place after your general
20 causation report was finalized or were some before?

21 A. Some were before.

22 Q. Do you think it's evenly balanced?

23 A. I have no idea.

24 Q. Were any of these meetings conducted
25 without lawyers?

1 A. No.

2 Q. Had you ever talked to Julie Goodman
3 outside of the presence of the lawyers about this
4 case?

5 MR. TUBIN: Objection to form. So
6 discussions between the experts again, we're
7 getting into CMO 17, I believe.

8 MR. TELAN: I don't think --

9 MR. TUBIN: We can pull it up if we
10 want, but I believe that those discussions,
11 and all that, have been ordered by the judge
12 to be confidential and privileged. I forget
13 the exact terms, but I'm going to instruct him
14 not to answer that.

15 MR. TELAN: Let me ask the question,
16 and you can make your objection and instruct
17 him not to answer.

18 BY MR. TELAN:

19 Q. Outside of the meetings you've just
20 described, the four to five meetings that you just
21 described by Zoom, have you met with Julie Goodman to
22 talk about this case?

23 MR. TUBIN: Objection. Dr. Shields,
24 don't answer the question.
25

1 BY MR. TELAN:

2 Q. Now, let me ask it to you slightly
3 differently. Outside of the meetings that you just
4 described, have you met with Dr. Goodman before for
5 any reason?

6 A. Not that I recall or even any
7 communications. She did remind me that we trained in
8 the same, she did her fellowship in the same lab that
9 I worked with back in the 1990s, which I had forgotten
10 about. Other than that, I don't recall any time, and
11 I didn't recall that of actually meeting with her.

12 Q. We'll come back to this, but have you
13 met with Dr. Lipscomb before?

14 A. No.

15 Q. And outside of the meetings you just
16 talked about with these two other experts, have you
17 talked to anybody else outside of your lawyers about
18 this case?

19 A. Other than that I was involved in this
20 case nonsubstantively, no.

21 Q. You haven't consulted with anybody at
22 Ohio State about this case?

23 A. No.

24 Q. Have you disclosed to Ohio State that
25 you are, in fact, an expert in this case?

1 A. So I started to, and they told me
2 because it was federal government, I don't need to
3 disclose that.

4 Q. So if you were to look at your Ohio
5 State page, and I don't know if you've done it.
6 There's a list of actual case involvements that you
7 have ongoing. You're aware of that, correct?

8 A. So I'll give you sort of a friendly
9 correction. There is a list, but that's actually not
10 cases I've worked with but people who have paid me
11 over the prior 12 months.

12 Q. And on that list is not the Department
13 of Justice, correct?

14 A. That's correct.

15 Q. Or the U.S. Government or anything that
16 would suggest that you were involved in the Camp
17 Lejeune litigation?

18 MR. TUBIN: Objection to form.

19 A. Correct, per their, per their rules.

20 BY MR. TELAN:

21 Q. And who told you that you didn't need
22 to do that?

23 A. One of the ethics officers.

24 Q. Do you remember the name of that ethics
25 officer?

1 A. No, I don't.

2 Q. Have you visited Camp Lejeune?

3 A. No.

4 Q. Have you treated anyone who, for
5 cancer, who was stationed at Camp Lejeune during the
6 time period at issue?

7 A. I'm going to say sort of, which is a
8 nonanswer. I've had a couple patients who have told
9 me about the litigation. They were particularly not
10 filing claims, but they mentioned in passing that this
11 was a thing.

12 Q. Okay. And is that here at Ohio State?

13 A. Correct.

14 Q. And what were they treating for, what
15 cancers?

16 A. Lung cancer.

17 Q. Are you working on any other matters
18 with the Department of Justice?

19 A. No.

20 Q. Do you consider yourself retired from
21 the practice of clinical medicine at this point or not
22 yet?

23 A. No. I'm still seeing patients. I have
24 an active practice.

25 Q. Is your intention to scale down your

1 clinical practice?

2 A. No.

3 Q. You have no intention of going back
4 into the world of hematologic oncology, do you?

5 MR. TUBIN: Objection to form.

6 A. I have no intention. I doubt that I
7 will do that.

8 BY MR. TELAN:

9 Q. And have you made any notes regarding
10 your review of materials in this case outside of your
11 report?

12 A. There are notes.

13 Q. And where do those notes exist?

14 A. On my computer at home.

15 Q. Have you provided those to your
16 lawyers?

17 A. No.

18 Q. What would those notes be, generally
19 speaking?

20 MR. TUBIN: Objection. To the extent
21 those notes did not make it into the final
22 report in some sense, they're not
23 discoverable, and I'll direct Dr. Shields not
24 to answer.

25 If they reflect anything that -- I had

1 that backwards. If they do not make it into
2 the final report -- let me see exactly where
3 we are. Sorry about that. One second.

4 MR. TELAN: That's okay.

5 MR. TUBIN: This is CMO 17,
6 paragraph -- what's the paragraph? Three.

7 BY MR. TELAN:

8 Q. This might clear it up for you. Let
9 me. Dr. Shields, since you've authored your report,
10 have you made any notes relative to your involvement
11 in this case?

12 A. That's relevant to my involvement? The
13 answer would be no. I have notes, but I guess I'm not
14 sure what you mean by relevant to my involvement. I
15 mean, there's nothing that says my scope has changed
16 or I'm going to do new work or something like that.

17 Q. I meant notes regarding the issues that
18 you're here to talk about. Did you make any of those
19 after your report was authored?

20 A. Yes.

21 Q. And those are on your computer at home?

22 A. Correct.

23 Q. How many pages of notes are we talking
24 about?

25 MR. TUBIN: Objection. Objection. Can

1 you repeat the question?

2 MR. TELAN: I just asked him how many
3 pages.

4 MR. TUBIN: No. I'm asking her to
5 repeat the question as to how many pages of
6 notes.

7 MR. TELAN: I asked him how many pages
8 of notes there were.

9 MR. TUBIN: What's the prior question?

10 MR. TELAN: The prior question before
11 the note --

12 MR. TUBIN: Yeah. How many pages.

13 MR. TELAN: If he made those notes
14 after he authored his report.

15 MR. TUBIN: Okay.

16 BY MR. TELAN:

17 Q. And you said yes, you made them after
18 your report, and there's one page of notes?

19 A. It's one to three, but it's not like,
20 you know, I will have copied an article, the title of
21 the abstract, so that could be, like, half a page. So
22 there's a bunch of random sort of things with
23 different fonts and different things, but it's, I
24 don't know, probably two to three pages.

25 Q. Two to three total pages of notes?

1 A. Correct. Understanding that a half a
2 page may be one note, you know, copied abstract or
3 something like that.

4 Q. Have you provided those to your
5 lawyers?

6 A. No.

7 Q. Did you bring those today to the
8 deposition?

9 A. No.

10 MR. TUBIN: Paul, we're at about an
11 hour since the last break. So is this --

12 MR. TELAN: Almost finishing up.

13 MR. TUBIN: Okay.

14 BY MR. TELAN:

15 Q. When you saw the notice of deposition,
16 did you read that as requiring you to bring with you
17 those notes that you have at home?

18 A. I don't recall that.

19 Q. Did you just make a decision not to
20 bring them after you saw the notice?

21 MR. TUBIN: Objection to form.

22 A. No. My decision of what to bring was
23 guided by what the DOJ attorneys said to put on the
24 laptop, and they put the stuff on the laptop, not me.

25

1 BY MR. TELAN:

2 Q. But they didn't know you had the notes?

3 A. I don't know that.

4 Q. You didn't tell them you had the notes?

5 A. It likely came up in discussions but
6 maybe not.

7 MR. TELAN: I'd like to get a copy of
8 those, those notes, please.

9 MR. TUBIN: We'll evaluate whether
10 they're discoverable, but I understand the
11 request.

12 MR. TELAN: Now is probably a decent
13 time for a five-minute break if you want to
14 take a quick break.

15 VIDEOGRAPHER: We are now going off
16 record. The time is 11:24.

17 (A recess was taken from 11:24 to
18 11:37.)

19 VIDEOGRAPHER: We are now back on
20 record. The time is 11:37. You may continue.

21 A. So I just want to add to an earlier
22 question. I was reminded during the break of two
23 additional meetings that I had. One was with
24 Dr. McCabe, and one was -- there was a group defense
25 expert meeting with the lawyers. The meeting with

1 Dr. McCabe was also with the lawyers.

2 BY MR. TELAN:

3 Q. When was the meeting with Dr. McCabe?

4 A. It would be within the last couple of
5 months. I think it was before my report, but I don't
6 actually recall that.

7 Q. And you said there was one other that
8 you were reminded of?

9 A. Both I was reminded of. The one with
10 McCabe, I hadn't mentioned earlier. I only talked
11 about Lipscomb and Goodman. And there was another one
12 where several of us were on along with the lawyers.

13 Q. Are those reflected on your invoices?

14 A. They would be reflected as meeting.

15 Q. Can you look at your invoices? Do you
16 see a meeting for October 31st of 2024?

17 A. October 31st.

18 Q. Nothing?

19 MR. TUBIN: Is there a specific page he
20 should be looking at?

21 MR. TELAN: No. I just wanted him to
22 look at the exhibit to see if he found a
23 meeting for October 31st.

24 A. I don't see one here.

25

1 BY MR. TELAN:

2 Q. Let me hand you -- I'm going to mark
3 this as the next numbered exhibit to the deposition,
4 which I think is three.

5 (Exhibit 3 was marked for
6 identification.)

7 BY MR. TELAN:

8 Q. If you go three pages in, this is
9 Dr. Goodman's billing. Do you see about halfway down
10 the page, not quite halfway down, an entry for
11 October 31st, 2024, an hour and a half meeting with
12 Dr. Shields, research?

13 A. I do see that.

14 Q. And you just confirmed that your
15 invoice does not reflect that meeting, correct?

16 A. I don't see here any invoice reflecting
17 October, so that is correct.

18 Q. So did the -- was there a meeting that
19 took place on October 31st?

20 A. I'll have to say based on Dr. Goodman's
21 invoice, likely.

22 Q. So was that an omission on your part?

23 MR. TUBIN: Objection to the form.

24 A. It either was an omission, which,
25 again, it's just me, so things like that happen, or

1 there's a missing invoice from this.

2 BY MR. TELAN:

3 Q. There's a what?

4 A. Missing invoice from this. I can't
5 tell you which it is.

6 Q. So we may not have a complete set of
7 invoices?

8 A. It looks complete to me, but based on
9 Dr. Goodman's record, assuming she didn't get it
10 wrong, either I just forgot to bill it or there's a
11 missing invoice.

12 Q. How do you keep track of your time in a
13 case like this?

14 A. Sometimes it's a little yellow sticky
15 note till it gets into QuickBooks. Other times, it
16 goes right into QuickBooks. So if I had the meeting
17 and moved on to something else, it's not uncommon,
18 unfortunately, but I'll just forgot to put it in.

19 Q. So you think you forgot to put it in?

20 A. That's probably more likely, assuming
21 that all the invoices are complete.

22 Q. Who would have been at that meeting?

23 A. All the meetings that I had with
24 Dr. Goodman were with Dr. Goodman and other DOJ
25 lawyers, except for that early meeting that I talked

1 about earlier where there was a number of different
2 experts.

3 Q. Was there ever a meeting between just
4 you and Dr. Goodman?

5 A. Without lawyers?

6 Q. With lawyers, just you and Dr. Goodman.

7 A. Yes, yes.

8 Q. I thought you said before that all of
9 the meetings you'd had previously included multiple
10 experts.

11 A. No, no, no. No, no, no. One meeting
12 had multiple experts. I met with Dr. Goodman
13 independently with the lawyers at least once, I think
14 twice and maybe once with Dr. Lipscomb and her. As I
15 said, I don't record these down, but there's -- and
16 then another individual meeting with Dr. McCabe and
17 the lawyers.

18 Q. And you said there was an agenda for
19 each of those meetings?

20 MR. TUBIN: Objection to form.

21 A. I don't know what you mean by "agenda,"
22 but when I think of "agenda," I'm thinking like, you
23 know, things that are mapped out, meeting agenda, you
24 know, that sort of thing. I don't think it was that
25 formal, but each meeting had a purpose.

1 BY MR. TELAN:

2 Q. And that purpose was made clear to you
3 in advance of the meeting?

4 A. Yes.

5 Q. But whether or not a meeting took place
6 with Dr. Goodman and the lawyers on October 31st,
7 you're unable to say by recall, correct?

8 MR. TUBIN: Objection to form.

9 A. Right. I don't remember the dates for
10 any of these meetings, and I would say there's a high
11 probability that I forgot to record it rather than
12 missing invoice.

13 BY MR. TELAN:

14 Q. Were you in town on October 31st, 2024?

15 A. So the answer is yes, and why I'm
16 triply confused is because we always have a large
17 Halloween party, and so I'm surprised that I even
18 spent time on October 31st on this. We would really
19 more than a hundred people over to our house for the
20 party that I cook, so I'm prepping. So I'm surprised
21 I had a meeting on October 31st, so maybe that's why I
22 forgot to enter it into the invoices, because I was
23 too busy with other stuff.

24 Q. Outside of your publications on
25 smoking, have you published any scientific

1 peer-reviewed literature on any of the chemicals at
2 issue in this case?

3 A. So benzene, yes. So that would be
4 typically in the context of smoking-related exposures.

5 Q. I meant outside of smoking-related
6 exposures.

7 A. Correct. I would have, you know, book
8 chapters and things like that written about these
9 exposures, but I can't recall offhand a peer-reviewed
10 paper about them.

11 Q. You don't consider yourself a chemical
12 expert on any -- strike that -- on TCE, do you?

13 A. I guess I don't know what that means as
14 "a chemical expert."

15 Q. Your degree, was it in chemistry?

16 A. I have an undergraduate degree in
17 biochemistry.

18 Q. Have you spent any time in your lab
19 studying TCE?

20 A. Not that I recall.

21 Q. Have you spent any time in your lab
22 studying PCE?

23 A. Not that I recall.

24 Q. What about DCE?

25 A. No.

1 Q. What about vinyl chloride?

2 A. Not that I recall.

3 Q. What about benzene specifically?

4 A. I guess I don't know what you mean by
5 "benzene specifically." Benzene is a pure compound.
6 The answer is no, but there's a lot of benzene in
7 cigarette spoke, and so we've looked at a lot of
8 damage related to benzene in the lung and the blood.

9 Q. But you testified before that there are
10 dozens of carcinogenic compounds in cigarette smoke,
11 correct?

12 MR. TUBIN: Objection to form.

13 A. Probably hundreds.

14 BY MR. TELAN:

15 Q. But your lab has never done any
16 specific, benzene-specific research, correct?

17 A. Well, we've looked at benzene
18 biomarkers, metabolites of benzene and the effects on
19 the body.

20 Q. Okay. What chapters in books did you
21 say that you had published relative to the compounds
22 in this case outside of smoking?

23 A. So, I mean, I've had a lot of book
24 chapters, but the one that comes to mind is I was
25 always a co-author/lead author on the Davida textbooks

1 of oncology, where I've written a chapter in every
2 edition until, like, 2014, or something like that, on
3 the chemical causes of cancer sometimes disclose
4 chemical etiology. And those chapters, for sure PCE
5 and TCE, as well as benzene, would be discussed and
6 probably vinyl chloride as well.

7 Q. You agree that all of the chemicals in
8 the water at Camp Lejeune are carcinogenic chemicals?

9 MR. TUBIN: Objection to form.

10 A. In what context?

11 BY MR. TELAN:

12 Q. What do you mean "in what context"?

13 A. Are you talking in animals, in people?

14 Q. Either.

15 A. Well, so PCE is not a known human
16 carcinogen for any cancer. TCE, arguably there are
17 people who think that is a known carcinogen for kidney
18 cancer. Benzene is a known carcinogen for AML. Vinyl
19 chloride is a known carcinogen for angiosarcoma of the
20 liver. DCE, I don't think is a -- I don't think. I
21 know it's not been labeled as a carcinogen.

22 Q. You said TCE arguably is a cause of
23 kidney cancer, you said?

24 A. Correct.

25 Q. And you would take the argument that it

1 is or is not a cause of kidney cancer?

2 A. So I don't think that the level of
3 evidence for TCE causing cancer in humans, based on
4 epidemiologic studies, rises to the level of
5 sufficiency. I also recognize that there's a lot of
6 learned, qualified academics in this world that do
7 believe that the level of evidence rises to
8 sufficiency.

9 Q. There are reasonable scientists and
10 medical professionals who would disagree with you,
11 correct?

12 MR. TUBIN: Objection to form.

13 A. In this case, that's correct, and we
14 also know why we disagree in a very transparent and
15 reproducible fashion. In fact, if you look at the
16 IARC monograph for TCE from 2014 where they make the
17 conclusion that TCE is a cause of kidney cancer, they
18 point out that that was based on a majority vote.

19 A minority of the people on the
20 committee did not believe that there was sufficient
21 evidence, and that's all because it depends on how you
22 weight the evidence. But it's clear how we're all
23 weighing the evidence, and some people are weighing
24 the evidence for control studies as being higher in
25 weight than the cohort studies, which is sort of a

1 reverse epidemiology principle. And I understand why
2 that is, but that's still not the more common
3 epidemiologic applications for evaluation of these
4 types of papers.

5 BY MR. TELAN:

6 Q. We'll get into the science of it more
7 later, but since the IARC decision in 2014, the
8 evidence for TCE in kidney cancer has gotten stronger
9 over the last 11 years. True?

10 MR. TUBIN: Objection to form.

11 A. That's in my report. I don't agree
12 with that.

13 BY MR. TELAN:

14 Q. Outside of your work as an expert in
15 tobacco litigation, have you ever testified that a
16 chemical has caused a plaintiff to develop cancer?

17 A. I've testified multiple times that an
18 agent that was alleged to have alleged exposure can
19 cause specific cancers, but other than one trial back
20 in the 1980s, I haven't had had a case where the
21 levels of exposure were sufficient to have caused the
22 cancer in that individual, but I have testified that
23 agents like diesel exhaust can cause lung cancer, and
24 benzene can cause AML. Those are two that I can think
25 of offhand.

1 Q. I'm talking specifically about a
2 particular plaintiff. Have you ever testified in a
3 plaintiff, in a plaintiff's case that a particular
4 exposure to a chemical caused that person to develop
5 cancer?

6 MR. TUBIN: Objection to form.

7 A. So you're saying "chemical." I had an
8 asbestos mesothelioma case, which technically is not a
9 cancer, is not a chemical, where I said that was
10 specific causation. As I just said, in the cases that
11 I can recall that I routinely do, when there is
12 sufficient evidence for the exposure causing a cancer,
13 then the question is whether the level of exposure was
14 sufficient for the individual, and I don't recall
15 anywhere that was the case. The exposures don't rise
16 to levels for sufficiency of causing that cancer.

17 BY MR. TELAN:

18 Q. And the asbestos case, the mesothelioma
19 case that you mentioned, was that in the 1980s?

20 A. I believe it was in the 1980s.

21 Q. How many depositions have you given in
22 your career as an expert?

23 A. I don't even know how to estimate that.
24 Some years, it's a lot. Some years, it was less.
25 Since I really started doing the litigation work in

1 the 2000s, it was increasing over time, so I really
2 don't have an estimate for you. You can't take, for
3 example, the trial list now for the last four years
4 and multiply it by three or four, because in previous
5 years, it would be a lot less than what was there.

6 Q. There are 55 in the last four years,
7 right?

8 A. I don't know the number offhand, but if
9 you want to represent that, I'll accept that.

10 Q. Does that sound about right?

11 A. It sounds high, but it went on to a
12 second page.

13 Q. So you would have started doing expert
14 work in the 1980s, which would have been shortly after
15 you started practicing?

16 MR. TUBIN: Objection to form.

17 A. So there was a year between my
18 residency and fellowship that I was working in an
19 occupational medicine practice, which is a typical
20 occupational medicine practice, but it also included
21 litigation. I did testify in a trial then.

22 I also gave a deposition in a TCE case
23 back then, and then when I went to work for the
24 National Cancer Institute, I stopped all of that type
25 of work, with the exception of helping a guy named

1 Ken Chase with his occupational medicine practice that
2 included litigation. When I came out of the
3 government somewhere just after 2000, this slowly
4 started increasing in terms of my expert witness
5 consulting.

6 BY MR. TELAN:

7 Q. Do you think that you've testified in
8 excess of a hundred times in deposition as an expert?

9 MR. TUBIN: Objection to form.

10 A. Probably.

11 BY MR. TELAN:

12 Q. Do you think it's more than 200?

13 MR. TUBIN: Objection to form.

14 A. That sounds really high. I doubt it,
15 but I guess it's possible.

16 BY MR. TELAN:

17 Q. Outside of your cases as an expert on
18 smoking, what percentage of the time are you working
19 with plaintiffs as opposed to industry?

20 MR. TUBIN: Objection to form.

21 A. Almost all of my plaintiffs' work would
22 be smoking related, including the U.S. Attorneys
23 General in class action suits. I think separate from
24 the smoking-related work, it would be primarily or
25 almost entirely defense.

1 BY MR. TELAN:

2 Q. And over the years, you've worked with
3 a number of railroads, correct?

4 MR. TUBIN: Objection to form.

5 A. Correct.

6 BY MR. TELAN:

7 Q. You've worked with Monsanto?

8 A. Correct.

9 Q. Have you worked with ExxonMobil?

10 A. Yes.

11 Q. How about GE?

12 A. GE, I've had a couple cases for them
13 back in the 2000s.

14 Q. How about Shell?

15 A. I don't recall that, but some of these
16 cases have multiple defendants, and so it's possible,
17 but I don't recall specifically Shell.

18 Q. At its highest, I know you've earned
19 multiples of millions as an expert over your career,
20 correct?

21 MR. TUBIN: Objection.

22 A. Over 25 years, yes.

23 BY MR. TELAN:

24 Q. And at times, it was in excess of
25 \$600,000 a year, correct?

1 A. In some years, correct.

2 Q. When was the last time you gave a
3 deposition?

4 A. I think within the last -- definitely
5 within the last two months.

6 Q. And what was the case?

7 A. I don't -- I don't remember.

8 Q. You don't remember who it was for?

9 MR. TUBIN: Objection to form.

10 A. No, I don't. If it's on my case list,
11 it might help if you want to look at that.

12 BY MR. TELAN:

13 Q. Have you ever testified in a case
14 involving kidney cancer before?

15 A. Yes.

16 Q. When was the last time?

17 A. I can't tell you the last time. In
18 these railroad cases, that's a pretty regular thing.
19 I also have a current benzene case with alleged
20 exposure of benzene from mineral spirits. That's a
21 kidney cancer case, so that's kind of the regular.

22 Q. Is that Safety-Kleen or is that a
23 different company?

24 A. It's a Safety-Kleen case.

25 Q. How many times have you worked with

1 Safety-Kleen?

2 A. Over the 25 years, I'm thinking about a
3 dozen times.

4 Q. Have you -- have you done any cases as
5 an expert involving bladder cancer?

6 A. Yes.

7 Q. And when was the last time?

8 A. That's also --

9 Q. Safety-Kleen?

10 A. Not Safety-Kleen but pretty regular
11 with the railroad.

12 Q. Westinghouse is another company you've
13 done work with?

14 A. I think I've done Westinghouse many,
15 many, many years ago, but not recently.

16 Q. You've published before that Bradford
17 Hill is not to be considered criteria, correct?

18 MR. TUBIN: Objection to form.

19 A. I don't believe that's correct. If you
20 have something to show me, that would be helpful.

21 BY MR. TELAN:

22 Q. Do you remember testifying to that?

23 A. I'm trying to make sure that you're not
24 getting confused. Bradford Hill is widely used. It's
25 not perfect, but it's as good as it gets. There are

1 other methodologies. So if I testified, I would have
2 testified saying exactly that, but I regularly use
3 Bradford Hill, and I have published in the peer-review
4 literature papers that have applied to Bradford Hill.

5 Q. You don't consider them to be criteria.
6 You call them considerations, correct?

7 MR. TUBIN: Objection to form.

8 A. So I actually call them criteria. This
9 is something that's -- I at least found interesting,
10 because it's usually plaintiffs' firms that want to
11 call them factors. Sometimes people call them
12 considerations on both sides. Sometimes they're
13 criteria. Those words are all the same to me. I
14 mean, the Bradford Hill, I would use criteria, are all
15 the same, and those words are not a distinguishing
16 feature.

17 Q. If you've made a distinction, is there
18 a reason why you would have drawn a distinction
19 between criteria and consideration?

20 A. No. And as I said, a lot of times,
21 they want to call them factors. And, to me, it's all
22 the same. If you're applying consistency, you're
23 applying consistency whether it's a consideration, a
24 factor or a criteria.

25 Q. How long have you been serving as an

1 expert for chemical manufacturers?

2 MR. TUBIN: Objection to form.

3 A. Well, so there was the one case in the
4 1980s and then sometime -- I'm sorry. Did you say
5 "chemical manufacturers"?

6 BY MR. TELAN:

7 Q. Yes.

8 A. Okay. So that's a different question.
9 Because I have to understand what the question is, I
10 mean, the only chemical manufacturer that I think I've
11 done work for would be Monsanto. I don't know if
12 you're distinguishing something like that. For
13 example, Safety-Kleen, which is really a supplier, or
14 carburetor cleaners like Berryman, which would be a
15 supplier. So chemical manufacturers, the only one I
16 can think of is really Monsanto.

17 Q. Monsanto is a chemical manufacturer,
18 correct?

19 A. Correct.

20 Q. They manufacture benzene, correct?

21 MR. TUBIN: Objection to form.

22 A. I don't know that either way.

23 (Exhibit 4 was marked for
24 identification.)
25

1 BY MR. TELAN:

2 Q. I'm going to mark the next exhibit,
3 just take a second here to pull this up.

4 In terms of Bradford Hill do you
5 recall -- do you recall -- I'll show it to you in a
6 minute -- publishing a paper titled "Understanding
7 Population and Individual Risk Assessment: The Case
8 of Polychlorinated Biphenyls"?

9 A. Yes.

10 Q. You do recall that paper?

11 A. Correct.

12 Q. Do you recall, under the cancer
13 causation section of that paper, stating, "Published
14 guidelines exist per assessing causality, such as
15 those proposed by Sir Bradford Hill. It should be
16 noted that although Bradford Hill's statements are
17 usually called criteria, Bradford Hill himself called
18 them viewpoints."

19 A. Okay.

20 Q. Do you recall that?

21 A. I don't recall. I can see the paper,
22 but that sounds like something that's correct.

23 Q. So why did you draw a distinction
24 between viewpoints and criteria?

25 A. Well, because Bradford Hill wrote this

1 in the 1960s, and that was 1960s epidemiology and
2 causation. How it's used today in 2025 or, when this
3 was published, as an editorial in 2006, has evolved.

4 Q. And why did Bradford Hill come up with
5 these?

6 MR. TUBIN: Objection to form.

7 A. So that's an interesting story
8 because --

9 BY MR. TELAN:

10 Q. Give me the Cliffs Notes version.

11 A. Yeah. I'm trying to. So a lot of
12 people think he didn't and that he basically was
13 copying that from the first Surgeon General's report
14 about smoking and health showing that lung cancer is
15 caused by smoking in males where they actually used
16 exactly the same framework.

17 And then Bradford Hill at some
18 convention gives a speech that gets recorded this way,
19 and then the end story of the CliffsNotes is that
20 people call Bradford Hill criteria or criterion or
21 factors or viewpoints or considerations when, in fact,
22 it was first done by the Office of Smoking and Health
23 of the CDC.

24 Q. And do you agree that these are not to
25 be considered as rigid criteria in evaluating

1 causality?

2 A. That depends.

3 Q. On what?

4 A. On the robustness of the data that's
5 available.

6 Q. Do you agree that there's no consensus
7 in the scientific community as to how to apply these
8 viewpoints?

9 A. I totally disagree with that.

10 Q. In terms of -- and maybe you answered
11 this already. Let me get back to it, though.

12 Why did you draw a distinction between
13 criteria and consideration --

14 MR. TUBIN: Objection to form.

15 BY MR. TELAN:

16 Q. -- in this article?

17 A. So it's not criteria and consideration.
18 It's criteria and viewpoints.

19 Q. Viewpoints. Okay.

20 A. Because as I just said, back in the
21 1960s, this was an evolving process in cancer
22 causation. As we evolved 35, 40 years later, it's
23 more than just viewpoints. This is well accepted
24 application of cancer causation methodology using a
25 weight-of-evidence process.

1 Q. Didn't you say it's not the only way to
2 evaluate causation?

3 A. There are others.

4 Q. Okay.

5 A. This is the one that virtually all the
6 regulatory and review agencies use is Bradford Hill.
7 I think in my report, there's other frameworks that
8 have been published, just never held. There is, among
9 the risk assessment toxicology people, something
10 called a mode-of-action analysis, which also is used,
11 but that's really a different process for causation.

12 Q. Certainly, over the past 60 years,
13 biological plausibility has grown in importance
14 relative to it was when Bradford Hill announced the
15 Bradford Hill considerations. True?

16 MR. TUBIN: Objection to form.

17 A. Well, we certainly have a lot of
18 research and understandings of the carcinogenic
19 process, so I think that that's true.

20 BY MR. TELAN:

21 Q. Do you consider biological plausibility
22 as a means to inform epidemiological evaluation of
23 causation or do you consider it an independent line of
24 analysis for causation?

25 MR. TUBIN: Objection to form.

1 A. So it depends on the context. When I
2 design an epidemiologic study, as a molecular
3 epidemiologist, I'm thinking about the biological
4 basis for associations, and I try to test that.

5 So, for example, I'm not just looking
6 at exposure causing some effect. I want some
7 biomarker to show that there's a level of exposure and
8 there's a level of effect. So in that case,
9 biological knowledge is informing the epidemiologic
10 research study.

11 In the other context, as we're sitting
12 here today, where causation criteria is there,
13 biological plausibility is an important part of the
14 process if and when you have sufficient human evidence
15 measured by consistency, strength of association, dose
16 response. Even if you have those, they still could
17 have problems with confounding and bias, so you look
18 to biological plausibility as well as the other
19 criteria to help support why you're seeing what you're
20 seeing in the human evidence.

21 BY MR. TELAN:

22 Q. Have you been involved in a research
23 project for where biological evidence has answered the
24 question of causation in advance of human
25 epidemiological evidence?

1 MR. TUBIN: Objection to form.

2 A. I'm not sure I understand the question,
3 but I think the answer is no.

4 BY MR. TELAN:

5 Q. Okay. Getting back to the Camp Lejeune
6 Justice Act, were you provided with a copy of the
7 ATSDR 2017?

8 A. Which ATSDR 2017?

9 Q. The assessment of the evidence.

10 A. So I don't know whether I was -- I
11 don't think I was provided with it. I probably got it
12 on my own.

13 Q. Is that listed in your documents
14 reviewed or materials considered?

15 A. Yes. It's in the reference list.

16 Q. Let me -- and do you know what the
17 Agency for Toxic Substances and Disease Registry does,
18 what their mission is?

19 A. Generally, their focus is on
20 environmental contaminations, more so to track what
21 exposures are and any potential toxic effects.

22 Q. They're an agency of the United States
23 Government. True?

24 A. Yeah. I think the Centers for Disease
25 Control.

1 Q. And you know that Frank Bove, the
2 author of the ATSDR studies that we talked about, at
3 the time was the senior epidemiologist for the ATSDR.
4 True?

5 A. I don't know what his title was, but he
6 was an epidemiologist for the ATSDR.

7 Q. Did you know him before you came to
8 this case?

9 A. No.

10 MR. TUBIN: Objection to form.

11 BY MR. TELAN:

12 Q. Did you know Julie Goodman before you
13 came to this case?

14 MR. TUBIN: Objection to form.

15 A. As I mentioned earlier, Julie actually
16 reminded me that she did her fellowship in the same
17 lab where I was one of the researchers, so she
18 remembered. I actually didn't remember that. I don't
19 think I've ever published with her or did any research
20 projects with her.

21 BY MR. TELAN:

22 Q. Do you consider yourself an expert in
23 Parkinson's disease?

24 A. No. As an internist, I understand
25 Parkinson's disease, but for the purposes that we sit

1 here today, the answer is no in terms of causation and
2 epidemiology.

3 Q. You've never practiced as a general
4 internist, have you?

5 A. I have.

6 Q. When was the last time you practiced as
7 a general internist?

8 A. That would be when I finished my
9 residency and fellowship.

10 Q. What year was that?

11 A. '83, '87.

12 Q. Have you ever diagnosed Parkinson's
13 disease?

14 A. I probably did back then but not since
15 then.

16 Q. What are the elements of Parkinson's
17 disease?

18 A. What do you mean by "elements"?

19 Q. The three characteristics of
20 Parkinson's disease, diagnostic criteria.

21 A. Oh, I have no idea.

22 Q. Why were you sent the Parkinson's
23 disease materials in this case?

24 A. I can't tell you. I haven't really
25 looked at them or relied upon them in any way.

1 Q. Aren't they listed in your
2 materials-considered list?

3 A. Correct.

4 Q. What did you review them for?

5 A. I don't even remember. I probably
6 opened them and looked at them more out of curiosity,
7 but it doesn't really contribute to my opinions in
8 this case.

9 Q. Did you intend at any point on
10 testifying about Parkinson's disease?

11 A. No.

12 Q. Did you ask to receive those materials?

13 A. No.

14 Q. But you reviewed them?

15 A. For the Parkinson's reports, it would
16 literally be opened and closed. What I was providing
17 you was a list of documents that I have received and
18 reviewed in some way.

19 Q. And you received and reviewed a number
20 of documents relative to Parkinson's disease,
21 including reports, correct?

22 MR. TUBIN: Objection to form.

23 A. I think the only one was the one by
24 Julie Goodman.

25

1 BY MR. TELAN:

2 Q. And what benefit was that to you in
3 this case?

4 A. There was no benefit.

5 Q. Is Julie Goodman an expert in
6 Parkinson's disease?

7 MR. TUBIN: Objection to form.

8 A. I don't know that either way.

9 BY MR. TELAN:

10 Q. By the way, Gradient has not made you
11 any job offers, have they?

12 A. No.

13 Q. As professor emeritus at Ohio State, do
14 you still have a responsibility to admit or does that
15 go away once you get the designation of emeritus?

16 A. So I've never had admitting privileges,
17 because I decided I didn't want to care as a major
18 time commitment. It would not have gone away as
19 emeritus had I done that. But when I went to Ohio
20 State, I made the conscious decision that I was not
21 going to be spending one to two months a year full
22 time taking care of hospital patients.

23 Q. The ATSDR assessment of the evidence,
24 it's a long document, but I presume you've seen the
25 section of that document called "Classification of

1 Evidence"?

2 A. Yes.

3 Q. Do you recall it as you sit here today?

4 A. It depends on your level of questions.
5 It's certainly quite extensively reviewed in my
6 report.

7 Q. Give me your understanding, as you sit
8 here today, as to the classifications of evidence
9 outlined in the 2017 ATSDR.

10 A. So they're efficient. Then there's
11 this concept of equipoise and more likely than not,
12 and then there's a lower one, which is neither of
13 those.

14 Q. You've heard the term "sufficient"
15 before, correct?

16 A. Yes.

17 Q. Have you heard the term "more likely
18 than not" in scientific circles before?

19 A. I will tell you that I don't recall
20 ever doing that. I mentioned before, you do a PubMed
21 search, you won't find an article among the national
22 database of probably 60 million papers. Just put it
23 in quotes, and it will say "no results found."

24 I've never seen it in a justification
25 for a grant application. I've never seen it in a

1 publication. That's just not a term that has meaning
2 within the medical and scientific community. In my
3 experience, that's a legal concept that we talked
4 about before.

5 For it to be more likely than not, as
6 you know, sufficient evidence for us to decide how to
7 treat a patient or for causation or for a cancer
8 screening is based on robust studies with 95 percent
9 confidence intervals, not, for example, a 50 percent
10 confidence interval.

11 Q. So when you read the classification of
12 evidence that the ATSDR outlined in its report of
13 2017, is it fair to say that you just disregarded
14 that?

15 MR. TUBIN: Objection to form.

16 A. No. I considered it heavily, and it's
17 also fair to say that that was one person's view at
18 ATSDR. ATSDR had never used it before, and ATSDR has
19 not, as far as I could find, ever used it again. So
20 that was Dr. Bove doing some work under the direction
21 of the Veteran's Administration.

22 BY MR. TELAN:

23 Q. If you were to consider analyzing
24 causality in the framework that the ATSDR proposed,
25 using the terminology at least as likely as not, would

1 your analysis have been any different than the one you
2 performed in this case?

3 MR. TUBIN: Objection to form.

4 A. I guess I don't know how to answer
5 that, because more likely than not, it's just
6 something that doesn't have meaning. That implies
7 some quantitative analysis of the literature that
8 doesn't work. I mean, it's not a concept, as I said,
9 that's ever been used otherwise by ATSDR or EPA or
10 IARC or NTP.

11 Dr. Bove said he got it from an IOM
12 document about presumptive disability for veterans,
13 and then he deviated substantially from that. And
14 then actually, subsequently, the IOM has had documents
15 that not only abandoned that concept but actually said
16 that equipoise is a concept that reflects controversy
17 and lack of consensus, and that's all in my report.

18 MR. TUBIN: We're talking about
19 equipoise, not more likely than not? Is
20 that --

21 MR. TELAN: Marc, please. This is
22 not -- if he has any questions, he can ask me,
23 but that's not even a speaking objection.
24 That's just speaking, and I think that's
25 stepping over.

1 MR. TUBIN: It wasn't clear to me in
2 the question.

3 MR. TELAN: I get it, but if he has any
4 questions, he's an intelligent man. He'll ask
5 me if he doesn't understand something.

6 A. So to be clear, I use those
7 interchangeably, equipoise, or the way Dr. Bove was
8 using it, more likely than not. Some people have,
9 like your plaintiffs' experts, have transitioned that
10 into as likely as not.

11 BY MR. TELAN:

12 Q. The term "equipoise" is a term that you
13 understand, correct?

14 A. I understand it not -- well, I
15 understand it generally. Where it's used in medicine
16 is not for this type of purpose but is an ethical
17 justification to do clinical trials, meaning that
18 there is uncertainty for whether, for example, a
19 medicine works or not, and so that justifies giving a
20 patient the medicine. And that's the way it is used.
21 And whenever I've heard it in that context until this,
22 until this case, I've never heard it used in the
23 context of cancer causation other than by Dr. Bove in
24 his six-week development of the assessment of
25 evidence.

1 Q. When you've heard in clinical trials
2 that the evidence is an equipoise, does that mean to
3 you that the evidence is equally balanced?

4 A. I guess I haven't seen that. My
5 understanding is just that it's uncertain. It lacks
6 consensus. Consensus doesn't always mean equally
7 balanced, but what it does is it gives you the ethical
8 justification to do experiments in people.

9 Q. Is there a consensus among
10 epidemiologists on how to speak about statistical
11 significance?

12 A. I'm trying to figure out how to answer
13 that question, because I'm anticipating the context of
14 where you're going.

15 Q. We'll get there.

16 A. So there's no -- there's an absolute
17 consensus that statistical analysis is critical, and
18 in one way or another, you're assessing for chance
19 findings. Whether you use P values or not, there's
20 some controversy. There is more of a consensus to use
21 things like confidence intervals and understanding the
22 robustness of your statistical significance.

23 Depending on who you are, you may
24 define statistical significance as a P value only, and
25 they say, well, therefore, statistical significance

1 testing should not be done. Other folks like myself,
2 when I call and talk about statistical significance
3 testing, I'm including any analysis that's looking at
4 chance findings. So that could be regression
5 analysis, resulting in confidence intervals or other
6 type of modeling.

7 Q. Do you understand that there is a
8 disagreement between epidemiologists over whether or
9 not statistical significance should be used to
10 dichotomize the results of the study as either
11 statistically significant or not statistically
12 significant?

13 A. So if you're talking about a P value of
14 .05 being statistically significant, it's still widely
15 used.

16 Q. What about a confidence interval?

17 A. Let me finish.

18 MR. TUBIN: He's not done answering.

19 A. It's still -- it's still widely used,
20 but there is some concern about statistical
21 significance or not. If you're using confidence
22 intervals, it still is appropriate to say that if
23 something includes confidence intervals below and
24 above one, that you lack statistical significance. It
25 doesn't support your hypothesis. Ultimately, that

1 still is a dichotomous conclusion, but it's not
2 interpreted as, you know, being pregnant or not
3 pregnant.

4 Q. Do you understand -- and I'm talking
5 about confidence intervals now, not values -- that
6 there is a large group of epidemiologists who believe
7 that it is not appropriate to dichotomize results
8 using confidence intervals that include the null
9 value?

10 MR. TUBIN: Objection. Foundation.

11 A. So I will totally disagree with that,
12 and I will refer to you the sections in my report.
13 High-impact journals, like New England Journal of
14 Medicine, the American Statistical Association still
15 regularly refer to and require confidence interval
16 testing. And, yes, you could say there is a continuum
17 of risk, but at the end of the day, when you don't
18 have statistical significance when that confidence
19 interval at the lower end drops below one, you cannot
20 say that, gee, this is still in support of my
21 hypothesis. It may be, but it also is maybe not.

22 So, conventionally, for all the
23 high-powered journals, grants that I review, grants
24 that I write, that confidence interval, for you to
25 call it statistically significant, has to be

1 statistically either above one or, in some cases,
2 below one, depending on what you're talking about.

3 BY MR. TELAN:

4 Q. Have you read the rebuttal report from
5 David Savitz?

6 A. I have.

7 Q. Do you disagree with his phraseology or
8 his opinions relative to statistical significance?

9 MR. TUBIN: Objection to form.

10 A. No. But I think your understanding and
11 your experts' understanding is not that of what
12 Dr. Savitz is trying to say.

13 BY MR. TELAN:

14 Q. When you testified as an expert for
15 plaintiffs in the tobacco cases, you came to learn
16 about the tobacco industry, did you not?

17 MR. TUBIN: Objection to form.

18 A. I'm trying to understand. I mean, if
19 you're asking me did I not know about the tobacco
20 industry until I was retained, of course, I was well
21 aware of the tobacco industry and their internal
22 documents. So I guess the answer is no. I had a deep
23 understanding prior to being retained in those cases.

24 BY MR. TELAN:

25 Q. But as you became retained in those

1 cases, you became more familiar not only with their
2 internal documents but their attempts to influence
3 science, correct?

4 MR. TUBIN: Objection to form.

5 A. Sure.

6 BY MR. TELAN:

7 Q. And there was a rather noteworthy case,
8 the Giancopolus case that you were involved in with
9 Phillip Morris. Do you recall that?

10 A. That name is not familiar. Was that a
11 state class action?

12 Q. It's out of Boston. It was a case
13 involving the light cigarettes. Do you remember that
14 now?

15 A. Now I do, yeah.

16 Q. Okay. And you testified that there was
17 a consensus at that time that the light cigarettes
18 were not health promoting as the tobacco industry was
19 suggesting, correct?

20 MR. TUBIN: Objection to form.

21 A. The consensus at the time of my
22 testimony?

23 BY MR. TELAN:

24 Q. Yes.

25 A. Yes, that's correct.

1 Q. It was during that case that you came
2 across Dr. Goodman's boss, Peter Valberg, correct?

3 MR. TUBIN: Objection to form.

4 A. I actually think he was in cases
5 earlier than that. He's a regular Phillip Morris
6 expert, and what I just learned was that he was
7 Dr. Goodman's boss. I did not know that before.

8 BY MR. TELAN:

9 Q. You read his deposition testimony in
10 that case, right?

11 A. I'm sure I did.

12 Q. Do you remember him saying that he and
13 Dr. Goodman worked together on the research that
14 formed the basis for his opinions?

15 MR. TUBIN: Objection to form.

16 A. I don't recall that.

17 BY MR. TELAN:

18 Q. You recall his testimony, though,
19 right?

20 A. I recall him being in the case. And I
21 recall generally what he was saying, which was
22 rebutting what I was saying, but I don't really have
23 much more of a recollection than that.

24 Q. And what he said was something that you
25 vehemently disagreed with, correct?

1 MR. TUBIN: Objection to form.

2 A. You'd have to show me what you're
3 talking about.

4 BY MR. TELAN:

5 Q. Do you remember him testifying that the
6 cigarette modifications that were made were health
7 promoting?

8 MR. TUBIN: Objection to form.

9 A. I don't remember that either way.

10 BY MR. TELAN:

11 Q. Do you remember giving any interviews
12 calling Dr. Valberg out as being inconsistent with the
13 consensus of science?

14 A. I don't remember an interview, but my
15 recollection is that his views were inconsistent with
16 what the consensus was and a large amount of data
17 showing that, at best, the filter ventilation
18 modification to cigarettes leading to something that
19 the industry called light cigarettes were certainly
20 not health promoting and, in fact, were more likely to
21 be harmful using a Bradford Hill analysis, which I
22 published in the peer-review literature in the Journal
23 of the National Cancer Institute.

24 Q. And you know that Phillip Morris had
25 actually done their own scientific research and

1 published studies that were contrary to what you
2 testified to, correct?

3 MR. TUBIN: Objection to form.

4 A. So I don't think that's correct. In
5 fact, I use their published studies very much against
6 what they knew and what they didn't publish until, you
7 know, the late 1990s and early 2000s, but they were
8 sitting on data going back to the 1960s that they
9 never published, but I extensively use their papers to
10 show that the addition of filter ventilation provided
11 no health benefit to smokers switching to light
12 cigarettes.

13 BY MR. TELAN:

14 Q. So what you disagree -- you disagree
15 with Dr. Valberg's interpretation of the data,
16 correct? You and he had the same data from Phillip
17 Morris?

18 A. Well, I was agreeing with what Phillip
19 Morris was publishing, and Dr. Valberg had his own
20 opinions.

21 Q. Is that the first time that you had run
22 into anyone from Gradient in that Phillip Morris case?

23 MR. TUBIN: Objection to form.

24 A. I don't know. I mean, I don't even
25 remember Dr. Valberg, if he was at Gradient at the

1 time or not. I don't recall that. I don't generally
2 track or recall when people work for different
3 companies.

4 BY MR. TELAN:

5 Q. You've never been to Gradient?

6 A. No.

7 Q. Did you meet Dr. Goodman in connection
8 with the Phillip Morris case, do you recall now, or
9 no?

10 A. Highly unlikely.

11 Q. Do you recall publishing an article
12 called "Tobacco Industry Abuse of the Substantial
13 Equivalence Pathway, the Case of Changing Cigarette
14 Filter Ventilation"?

15 A. Sounds like something. Who is the
16 first author?

17 Q. Michael Berman -- Mica Berman.

18 A. Yes.

19 Q. And you recall that article,
20 essentially, the way I understand it is using the
21 existing FDA regulations to their advantage so as not
22 to have to comply with more stringent product
23 modification regulations that existed?

24 MR. TUBIN: Objection to form.

25

1 BY MR. TELAN:

2 Q. Correct?

3 A. That doesn't sound correct. If you
4 want, I can explain the paper.

5 Q. We'll get to that in a minute here.
6 He's doing something else.

7 Suffice it to say that the information
8 you gained about the tobacco industry during the
9 course of your work as an expert led you to question
10 the tactics of that industry in its effort to avoid
11 regulations, correct?

12 MR. TUBIN: Objection to form.

13 A. Maybe say the question again, because I
14 didn't follow it.

15 BY MR. TELAN:

16 Q. Sure. The information that you gained
17 as an expert in the tobacco litigation led you to
18 question some of the tactics the tobacco industry took
19 in an effort to avoid regulations, correct?

20 MR. TUBIN: Objection to form.

21 A. I guess -- I've got 30-plus years of
22 research in the tobacco arena. It depends on what
23 you're talking about, and the paper that you're
24 holding that is not correct, that was part of our own
25 research where we realized how at least Phillip Morris

1 was still gaming the system using the substantial
2 equivalence in not needing to get FDA Center for
3 Tobacco Products' approval for marketing products by
4 gaming the substantial equivalence issue, and what we
5 were doing was telling researchers when you go to buy
6 a commercial cigarette, you can't assume it is what it
7 is, because at least Phillip Morris was regularly
8 changing the designs, in some cases we thought to
9 actually mess up one of our large studies funded by
10 the National Cancer Institute.

11 BY MR. TELAN:

12 Q. And that's what you meant when you said
13 "gaming the system"?

14 A. Correct. So under the law, as long as
15 the cigarette is within some parameters of all the
16 products on the market, they can do whatever they
17 want. And so they were sort of moving to get people
18 more addicted by changing the filter ventilation,
19 which they were allowed to do without disclosing that
20 to anyone, although in certain cases online, you would
21 see, you know, reports by smokers saying, hey, these
22 things don't taste the same, and that was one way that
23 we realized that Phillips Morris was changing the
24 products that were within the law, but they were
25 gaming the system to still manipulate smokers and

1 their addiction.

2 Q. I'm going to hand you an article now
3 from Dr. Goodman. The title of it is
4 "Weight-of-evidence evaluation of short-term ozone
5 exposure and cardiovascular effects." And we'll mark
6 this as number 4 to the --

7 MR. TUBIN: It's five.

8 MR. TELAN: Is that number 5? Oh,
9 sorry.

10 MR. TUBIN: Don't worry about it.

11 MR. TELAN: Yeah, I know.

12 (Exhibit 5 was marked for
13 identification.)

14 BY MR. TELAN:

15 Q. Have you ever seen this article before?

16 A. I don't believe so.

17 Q. Okay. If you would, take a look at
18 page -- it's the first page with the abstract.

19 A. Okay.

20 Q. If you go down to the bottom line,
21 "Thus, we categorize the strength of evidence for a
22 causal relationship between short-term exposures to
23 ozone and CV effects as 'below equipoise.'" Do you
24 see that?

25 A. Yes.

1 Q. You've never seen that before in a
2 scientific article?

3 A. I have not. I did not do a PubMed
4 search on the word "equipoise." Just more likely than
5 not, as likely is not.

6 Q. Okay.

7 A. The equipoise thing I can tell you is
8 not something whether or not Dr. Goodman has published
9 it here or whatever context that she and her
10 co-authors were doing. That's not part of, you know,
11 regular causation-accepted practice, analysis never
12 seen in IARC, never seen in EPA, never seen it in NTP.
13 Other than Dr. Bove's assessment, I've never seen it
14 in ATSDR, and as I mentioned, the IOM, who originally
15 proposed this in the context of veterans' presumptive
16 disability, walked away from it and actually said that
17 it was not. It only reflected uncertainty.

18 Q. Understood. So outside of Dr. Bove's
19 article, this is now only the second time you would
20 have seen use of that language, correct?

21 A. That is correct. And I'm not sure. I
22 think it looks like she's referring to something else
23 that might have referred to --

24 Q. Let's go to page 729.

25 MR. TUBIN: Hold on. He's still giving

1 an answer. Were you done, Dr. Shields?

2 A. Yeah. I don't know the context of what
3 is being used. I'd have to review the paper to
4 understand that context.

5 BY MR. TELAN:

6 Q. Okay. I think we'll get that here. If
7 you go to page 729, if you go down to the bottom, last
8 paragraph before the bolded Phase 1 explanation of the
9 causal questions and study selection, starting with in
10 Phase 4. Do you see that? It's on page 729.

11 A. I'm on 729.

12 Q. Bottom left, first full paragraph, "In
13 Phase 4, we used the WoE," weight of evidence,
14 "conclusions from Phase 3 to categorize the potential
15 causal relationship between short-term ozone exposure
16 and CV effects." Do you see that?

17 A. Yes.

18 Q. "We relied on the categories of causal
19 determination proposed in the Institute of Medicine
20 (IOM) report Improving the Presumptive Disability
21 Decision-making Process for Veterans (hereafter, the
22 IOM framework) (IOM 2008), on which the NAAQS causal
23 framework is based."

24 Did I read that correctly?

25 A. Yes.

1 Q. "The IOM framework has four categories
2 of causal determination: 'Sufficient,' 'Equipoise and
3 above,' 'Below equipoise' and 'Against.' Use of this
4 four-level categorization scheme is consistent with
5 WoE best practices." And she cites to another article
6 she wrote in 2013.

7 Do you see that?

8 A. Yes.

9 Q. "We contrasted our conclusions with
10 those from the ISA and assessed how the differences
11 between the NAAQS causal framework and Goodman WoE
12 framework affected the conclusions."

13 Did I read that correctly?

14 A. Yes.

15 Q. Okay. So does that give you a little
16 further insight into the fact that Dr. Goodman was
17 comfortable writing this as a scientific causality
18 evaluation using that framework?

19 A. As of 2014, when this paper was
20 published, again, I'd have to go through the paper to
21 see whether I can agree with you or not, but I note
22 that the IOM in 2015, in 2022, both in my report,
23 walked away from the whole concept of equipoise or
24 equipoise and above.

25 Q. So would you say that Dr. Goodman was,

1 was using a novel scientific approach here in her, her
2 discussion of ozone and its causal effects on
3 cardiovascular effects?

4 A. I don't know. Either way, I'd have to
5 go back to Goodman's 2013. If you have that paper, we
6 can review that to see what she was categorizing there
7 as best practices.

8 THE WITNESS: I don't know if we're
9 getting closer to break time or not.

10 MR. TUBIN: We've been going about an
11 hour since the last break.

12 MR. TELAN: All right. Let's take
13 five, then.

14 MR. TUBIN: When do you want to stop
15 for lunch?

16 MS. SPRAYREGEN: Can we go off the
17 record?

18 VIDEOGRAPHER: We are now going off
19 record. The time is 12:36.

20 (A recess was taken from 12:36 to
21 12:37.)

22 VIDEOGRAPHER: We are now back on the
23 record. The time is 12:37. You may continue.

24 BY MR. TELAN:

25 Q. Dr. Shields, in terms of your view of

1 IARC and its categorization of the evidence of
2 causality as it relates to benzene and leukemia, are
3 you in agreement or disagreement with IARC?

4 A. Well, let's be clear. There's lots of
5 types of leukemias. IARC evaluates the types of
6 leukemias. I am in agreement that benzene, at
7 sufficient levels of exposure, is a cause of acute
8 myeloid leukemia, AML. And I'll note that they also
9 believe there's credible associations, which is the
10 same as insufficient human evidence for several of the
11 other hematologic malignancies.

12 Q. What about as to IHL? What is your
13 understanding as to IARC's classification of the
14 evidence as to benzene and NHL?

15 A. Again, that's what I said, other
16 hematologic malignancies. So they said that there are
17 associations, but it doesn't reach the level of
18 sufficient human evidence, so they would call that
19 limited evidence.

20 Q. And are you in agreement with that?

21 A. I don't have a reason to disagree.
22 There are some decent quality studies that are, have
23 positive statistical associations, but the bulk of the
24 literature, the consistency, the dose response, the
25 strength of associations, assessments don't reach the

1 level of sufficient human evidence.

2 Q. So you agree with their categorization
3 of it as being limited?

4 MR. TUBIN: Objection to form.

5 A. At the most. I mean, one of the
6 problems with that monograph is they don't really
7 specifically state which study they decide is the
8 credible association. All they say is that they can't
9 rule out chance, bias and confounding, and that for
10 sure I agree with.

11 BY MR. TELAN:

12 Q. So where do you stand? Are you in
13 agreement with it or disagreement with it?

14 MR. TUBIN: Objection to form.

15 A. I don't agree or disagree. I don't
16 have a problem with their conclusion.

17 BY MR. TELAN:

18 Q. Okay. What about as to TCE and cancer?

19 MR. TUBIN: Objection to form.

20 A. And any cancer?

21 BY MR. TELAN:

22 Q. Any cancer.

23 A. Well, so IARC has said there is
24 sufficient human evidence for TCE and kidney cancer
25 based on a majority vote of the working group.

1 Q. You're in agreement with that?

2 A. No. In that case, I understand why
3 those people who voted affirmatively, and I understand
4 why others did not vote affirmatively. And I think,
5 based on their analysis, I don't agree that it's a
6 cause of kidney cancer, but I recognize that there's
7 evidence for folks to be able to say that there is.
8 It's transparent. It's clear. They make a very
9 strong statement about why there -- why some of those
10 folks are voting against the sufficient human evidence
11 for kidney cancer.

12 Q. How many people are on the panel who
13 voted in favor of sufficiency in 2014?

14 A. It just says a majority.

15 Q. I'm asking how many were on the panel.

16 A. I'd have to open up the documents.

17 Q. Do you know?

18 A. I definitely do not know how many
19 people were on a working group in 2014.

20 Q. Do you know how many people voted
21 against the categorization of sufficient?

22 A. It says a minority.

23 Q. Do you know numbers-wise how many that
24 was, if it was one or more?

25 A. No. I would look at it as just below

1 50 percent, as I understand that process, but they
2 don't publish that.

3 Q. Have you talked to anybody who is on
4 that panel?

5 MR. TUBIN: Objection to form.

6 A. I'd have to see who's on the panel to
7 be able to answer that question. If you want, I can
8 open it up.

9 BY MR. TELAN:

10 Q. As you sit here today, nothing comes to
11 mind that you've had conversations with one of the
12 IARC members who were on the 2014 panel that evaluated
13 the carcinogenicity of TCE?

14 A. So there's a good chance I know at
15 least some of them. So are you asking me whether I
16 talked to them about the TCE working group?

17 Q. Yes, yes.

18 A. Okay. So I don't recall any.

19 Q. I'm going to hand you another article
20 we'll mark as the next numbered Exhibit 6.

21 (Exhibit 6 was marked for
22 identification.)

23 BY MR. TELAN:

24 Q. This is another article from
25 Dr. Goodman. Do you see that?

1 A. Yes.

2 Q. And this now is 2017, correct?

3 A. It's 2018.

4 Q. 2018. You said that the IOM walked
5 away from its categorization from the prior article we
6 were discussing. Do you recall that?

7 A. Yes.

8 Q. If you take a look at the abstract, the
9 first page, the last sentence, "Taken together, the
10 weight of evidence indicates that there is at least an
11 equal likelihood that either explanation is true,
12 i.e., the strength of the evidence for a causal
13 relationship between short-term exposure to ambient
14 ozone concentrations and asthma severity is equipoise
15 and above."

16 Did I read that correctly?

17 A. Yes.

18 Q. So this is now a second article that
19 Dr. Goodman has published using the language you say
20 you've never seen before other than Bove, correct?

21 A. That's correct.

22 Q. Was she acting contrary to the
23 consensus of science in 2017 when she published this?

24 MR. TUBIN: Objection to form.

25 A. What I said is as of 2015, the IOM

1 walked away from it. She hasn't seen to cite that or
2 discuss that.

3 BY MR. TELAN:

4 Q. So was she acting against the consensus
5 of science when she wrote this two years after the IOM
6 walked away from this?

7 MR. TUBIN: Objection to form.

8 A. You keep talking about consensus of
9 science. There's no consensus of science to be using
10 equipoise or equipoise and above that I know of. What
11 I'm saying is that she's looking at the process for
12 presumptive disability decision-making for veterans,
13 which is a very unique circumstance and very far out
14 of the realm of what we're talking about today. She's
15 not citing the 2015. And so what I could say is she's
16 not citing the 2015 and including that in this paper.

17 BY MR. TELAN:

18 Q. If you look toward the bottom of page
19 392, far-right column, there's a paragraph starting
20 with "We integrated the evidence." Do you see that?

21 A. Yes, I see that now.

22 Q. Second sentence in, she says, "We
23 integrated the evidence across these realms in the
24 context of several of the Bradford Hill aspects,
25 including" -- and she goes on to name the aspects --

1 "as well as confounding, bias and the clinical
2 relevance of effects." Do you see that sentence?

3 A. Yes.

4 Q. She did not use the term "criteria" or
5 "considerations" in that but used the term "aspect,"
6 correct?

7 A. Or viewpoints or factors. That's
8 correct.

9 Q. She then goes on to say, "We did this
10 to determine whether the collective evidence indicates
11 that the short-term exposure to ambient ozone
12 concentrations can affect asthma disease severity.
13 Our causal determination is based on the
14 categorization of the strength of the overall evidence
15 across all realms for or against a causal relationship
16 proposed by the Institute of Medicine 2008." She goes
17 on to list the four categories.

18 MR. TELAN: There is an alarm, I think.
19 Let's go off the record.

20 VIDEOGRAPHER: We're now going off
21 record. The time is 12:46.

22 (Off the record.)

23 VIDEOGRAPHER: We are now back on the
24 record. The time is 12:47.

25

1 BY MR. TELAN:

2 Q. So I think where we left off, I read
3 into the record that last sentence.

4 Did I read that correctly?

5 A. Yes.

6 Q. And you see, just from this article,
7 this is not an article judging military disability.
8 This is an article judging the effects of ozone
9 exposure on asthma, correct?

10 A. Well, she's using a process that was
11 developed for presumptive disability.

12 Q. Yes, but not in the context of judging
13 military veteran disability?

14 A. I don't know if that's true or not, and
15 I would think that if she's using that criteria, then
16 that's what she's doing.

17 Q. Let's say if you look at methods, under
18 "Methods," we addressed the question, "Does short-term
19 exposure to ozone at ambient concentrations affect
20 asthma severity?"

21 Is there anything to indicate that
22 she's addressing a precise population of military
23 veterans?

24 A. I don't think you can say that yes or
25 no. She's using a criteria for presumptive disability

1 from the Institute of Medicine, 2008.

2 Q. Okay. Assume that it's not for the
3 use, that this article is not addressing ozone and
4 asthma severity in the military population
5 specifically. Is she using this framework in a novel
6 fashion?

7 A. I'm going to have to take a few minutes
8 to review this paper to be able to answer your
9 question.

10 Q. I'm asking it hypothetically so that
11 you don't.

12 A. I can't answer that hypothetically.

13 Q. Why can't you answer it hypothetically?

14 A. Because you're asking me to make an
15 opinion about this paper, which I can't read. For all
16 I know, it is entirely about U.S. veterans. She's
17 using a methodology for -- let me finish -- for
18 presumptive disability. There must be a reason why,
19 and I guess you could ask her why.

20 And I note that she's using the 2008
21 criteria for presumptive disability; whereas, 2015,
22 they went to a different presumptive disability
23 process, and you'd have to ask her why she didn't use
24 the 2015 in this paper.

25 But they specifically, in 2015,

1 re-evaluated the process, abandoned this concept of
2 equipoise and went to something that is more
3 conventional in terms of sufficient limited, that sort
4 of thing. So they aligned themselves with EPA and
5 IARC and NTP.

6 Q. So hypothetically, then, if
7 Dr. Goodman's article is considering a broader
8 population than the military population and it's in
9 the causal determination of whether ozone exposure
10 causes asthma severity, you would say that she's using
11 this causal framework in a novel fashion, correct?

12 A. I can't answer that unless --

13 MR. TUBIN: I think he's asked to
14 review the document --

15 MR. TELAN: I get to ask hypotheticals.

16 MR. TUBIN: -- to continue answering
17 the question. So you're not going to let him
18 review the document?

19 MR. TELAN: I'm not going to ask him --
20 no, I'm not going to let him review the
21 document, because I'm asking him a
22 hypothetical, which I'm allowed to do.

23 BY MR. TELAN:

24 Q. So if you accept my hypothetical
25 question that this article encompasses a population

1 broader than the military, would your answer to the
2 question of whether or not this is a novel framework
3 be, yes, it is, or, no, it's not?

4 A. I can't answer that question, because I
5 don't know how real that hypothetical is, but having
6 said that, I don't know that your assumption that this
7 is not applicable to veterans, you'd have to ask
8 Dr. Goodman why she used the 2008 versus the 2015 that
9 revamped entirely the 2008 criteria for presumptive
10 disability.

11 Q. Okay. So why don't we do this? Let's
12 take our lunch break, and you can read this as you
13 like, and then we can come back and discuss whether or
14 not it's a --

15 A. I'm not going to take my lunch break
16 time to read this. We can do it -- give me two
17 minutes, and we can do it on the record, and I'll be
18 able to give you a better answer, not more than two
19 minutes.

20 Q. If your answer is that it doesn't
21 include the military population, will you agree to
22 give me my two minutes back?

23 A. I don't think so. It won't take me
24 long to review this if you want.

25 Q. Go ahead.

1 MR. TELAN: Back on the record.

2 VIDEOGRAPHER: We're still on the
3 record.

4 MR. LEE: We didn't go off.

5 MR. TELAN: Oh, we didn't go off?
6 Okay. Good.

7 A. Okay. So I don't see that this paper
8 has a particular focus on veterans. I don't know why
9 she would use a veteran's presumptive disability as
10 opposed to EPA or IARC or other widely accepted
11 methods for weight of evidence. I can't explain why
12 she would, because that's not in this paper.

13 BY MR. TELAN:

14 Q. It's a peer-reviewed journal, isn't it?

15 A. I believe it is.

16 Q. So would the folks who were doing the
17 per review generally consider whether they believe
18 somebody is acting contrary to the bounds of science
19 before they submit it for publication?

20 A. Not always. We don't know what the
21 reviewer said to Dr. Goodman and how Dr. Goodman
22 responded to the journal. They may have raised the
23 question. They may not have raised the question.

24 Q. So as it stands, would you say that in
25 2018, when this was published, Dr. Goodman was acting

1 in a novel fashion by applying this causal framework?

2 MR. TUBIN: Objection to form.

3 A. I don't know how to answer it in terms
4 of novel. As I said, I've not seen this context
5 before. How she did it and what the justification is
6 is something you have to ask her, but this is -- the
7 concept of equipoise is not something that's widely
8 used in cancer causation assessments. Again, I
9 haven't seen it in EPA, IARC, NTP or ATSDR other than
10 Dr. Bove's 2017 report.

11 BY MR. TELAN:

12 Q. And Dr. Bove's 2017 report was
13 published prior to Dr. Goodman's report, which is
14 marked as Exhibit 6, correct?

15 A. Yes.

16 MR. TELAN: Why don't we take our lunch
17 break now? Do you want to do 45?

18 THE WITNESS: That's more than enough,
19 yeah.

20 VIDEOGRAPHER: We're now going off
21 record. The time is 12:55.

22 (A recess was taken from 12:55 to
23 1:52.)

24 VIDEOGRAPHER: We are now back on the
25 record. The time is 1:52. You may continue.

1 BY MR. TELAN:

2 Q. Dr. Shields, when we left off, we were
3 chatting a little bit about tobacco and the industry.
4 I want to shift gears on you just a little bit.

5 MR. TELAN: We'll have the next exhibit
6 marked. I think we are at 7 now?

7 MR. TUBIN: Yep.

8 (Exhibit 7 was marked for
9 identification.)

10 BY MR. TELAN:

11 Q. Have you ever heard of the benzene task
12 force?

13 A. I think so.

14 Q. What is your understanding as to what
15 that is?

16 A. I don't know. It sounds familiar, but
17 I'm not recalling anything about it.

18 Q. Do you have an understanding that it's
19 a conglomeration of companies formed through the
20 American Petroleum Institute that seek to develop
21 science in favor of industry specifically as it
22 relates to benzene?

23 MR. TUBIN: Objection. Form.

24 A. It's making no -- it's not ringing any
25 bells.

1 Q. Okay.

2 MR. TELAN: Mark this as the next
3 exhibit, one to the deposition.

4 BY MR. TELAN:

5 Q. I am sure that you've not seen this
6 document, but does the name "Mary Paxton" ring a bell
7 to you?

8 A. Yes. But I don't remember from what.

9 Q. You cited to her in your report --

10 A. Okay.

11 Q. -- Dr. Mary Paxton. And is it fair
12 that this is an email that's got American Petroleum
13 Institute at the top, dated January 25, 1993, where
14 Dr. Paxton is talking about a meeting of the benzene
15 task force in Washington?

16 A. That looks right.

17 Q. And I don't know. You looked like you
18 were going to your computer, so maybe you typed in
19 Paxton?

20 A. Exactly, yes. I mean, there's at least
21 three papers I'm seeing now.

22 Q. Understood. By any chance, do any of
23 those have to do with benzene?

24 A. Those three I'm looking at is -- all of
25 them do.

1 Q. Yes. Okay.

2 MR. TELAN: Let's go to the next
3 numbered exhibit.

4 MR. LEE: Number 8?

5 BY MR. TELAN:

6 Q. Oh, I'm sorry. Let's go to page 2 of
7 that exhibit. Do you have a second page of that
8 exhibit?

9 A. Yes.

10 Q. She says at the bottom of the first
11 page that attached is a copy of her proposal
12 "submitted by Lovelace on benzene metabolism and
13 dosimetry on the biomarkers of benzene exposure."

14 You saw that, right?

15 A. Yes.

16 BY MR. TELAN:

17 Q. Are you familiar with Lovelace
18 Biomedical?

19 A. Yes.

20 Q. And what is Lovelace Biomedical?

21 A. It's one of the labs by, run by the
22 Department of Energy.

23 Q. Okay. And this second page of
24 Exhibit 7 is a draft proposal for the study of
25 biomarkers of exposure to benzene submitted to the

1 API, right? At least it's the cover sheet for that,
2 correct?

3 A. It's just for the study of dosimetry of
4 benzene in the bone marrow.

5 Q. Yes. Okay.

6 Let's go to the next exhibit.

7 MR. LEE: Number 8?

8 MR. TELAN: Number 8.

9 (Exhibit 8 was marked for
10 identification.)

11 BY MR. TELAN:

12 Q. I am sure you've not seen this. If you
13 look at the top, does it say "Exxon Biomedical
14 Sciences"?

15 A. Yes.

16 Q. And if you look at the first paragraph,
17 do any of the names Tom Armstrong, Michael Bird,
18 Steven Phillips, Rob Schnatter and I met with members
19 of the National Cancer Institute on February 13th,
20 1995. Any of those names ring a bell with you?

21 A. I know Schnatter is an author. The
22 other names are not ringing bells.

23 Q. Do you know how many times you cited to
24 Dr. Schnatter in your report?

25 A. I don't know offhand. He's had dozens

1 of publications around benzene.

2 Q. Okay. If you wouldn't mind, just read
3 the next sentence of that paragraph.

4 A. Okay. Do you want me to read it out
5 loud?

6 Q. Yeah. Read that, yeah.

7 A. "We are monitoring the NCI studies
8 because of their potential" --

9 Q. I meant the one above that, "The
10 purpose of the meeting."

11 A. Oh. "The purpose of the meeting was to
12 discuss with NCI investigators their studies of
13 workers exposed to benzene in the People's Republic of
14 China and for us to describe some of the work with
15 which Exxon is involved in Canada, the UK and
16 Australia."

17 Q. If you go down to paragraph 2, would
18 you read that paragraph into the record?

19 A. "We are monitoring the NCI studies
20 because of their potential impact concerning health
21 risks at low benzene exposure and their interaction
22 with key activities currently underway within and
23 outside Exxon. These activities include the IP
24 Epidemiology Study, the European Union Benzene Risk
25 Assessment and the IOL Worker Study. The EBSI team

1 summarized our work on benzene using materials
2 previously cleared for release."

3 Q. If you go down to the last paragraph,
4 would you read that paragraph into the record, please,
5 actually, the first two sentences?

6 A. "While their studies are still in early
7 stages, some initial results have been reported from
8 the cohort study. In addition to increases in acute
9 myelogenous leukemia (a known target site), excesses
10 were also noted for several other diseases of the
11 blood-forming system, such as non-Hodgkin's lymphoma,
12 lymphoid leukemia and aplastic anemia."

13 Q. This is dated February 28th, 1995, by
14 Exxon, and you see it's at the top, it says "Limited
15 Distribution," right?

16 A. Correct.

17 Q. You've never seen this before, right?

18 A. No.

19 Q. Does this appear that there's a
20 discussion about an ongoing study in this email?

21 A. Yes.

22 Q. If you turn to the second page -- I'll
23 take some of the load off your back. I'll read this
24 for you.

25 "Although motivated investigators from

1 the NCI, the Chinese Academy of Preventive Medicine
2 and consulting organizations are participating in the
3 research, several important methodological issues
4 could influence study quality and conclusions."

5 Did I read that correctly?

6 A. Yes.

7 Q. And then the number 1 -- I'm just going
8 to read the first entry. "Accuracy of benzene
9 exposure data."

10 Did I read that correctly?

11 A. Yes.

12 Q. "Number 2, assessment of other
13 exposures," correct?

14 A. Yes.

15 Q. "Number 3, case ascertainment and
16 verification," correct?

17 A. Yes.

18 Q. Under "case ascertainment," it says,
19 "At least one incentive exists for more complete
20 reporting or overreporting of leukemia in benzene
21 workers than in other members of the population. If
22 leukemia occurs in benzene-exposed workers,
23 compensation payments are made to the family. Thus, a
24 potential bias exists for leukemia to be reported
25 preferentially for benzene workers compared to the

1 study 'controls.'" Do you see that?

2 A. Yes.

3 Q. And then the last is "Accuracy of
4 diagnoses of solid tumors." Is that correct as well?

5 A. Yes.

6 Q. Now, at the end, last paragraph, it
7 reads, "The NCI studies do not discretely address the
8 low dose exposure region of current regulatory and
9 risk assessment interest. However, because future
10 interpretations or findings could imply lower dose
11 effects and impact policy, it is important that we
12 continue to monitor these studies. NCI will present
13 some of its results in the June benzene conference at
14 Rutgers University and anticipates publications in
15 late 1995 or early 1996."

16 Did I read that correctly?

17 A. Yes.

18 Q. And Dr. Schnatter is one of the people
19 that's cc'd at the bottom of that page as well,
20 correct?

21 A. That's right.

22 Q. Okay. Let's go to the next one.

23 (Exhibit 9 was marked for
24 identification.)
25

1 BY MR. TELAN:

2 Q. So I'm showing you what's been marked
3 now as Exhibit 9. And this is a draft of a document
4 from Robert Drew at the American Petroleum Institute
5 to Jeffrey Foran at the Risk Science Institute,
6 International Science Institute in Washington, D.C.
7 Do you see that?

8 A. Yes.

9 Q. Okay. Without reading this verbatim,
10 I'll let you skim the first, ask you to skim just the
11 first paragraph, if you would. Just tell me when
12 you're finished.

13 A. Okay.

14 Q. Does it appear that the benzene task
15 force of the API wanted to undertake a project to
16 address the genetic toxicology of benzene?

17 MR. TUBIN: Objection to form.

18 A. Yes.

19 BY MR. TELAN:

20 Q. And, then, in the second paragraph, are
21 they discussing funding a workshop on genetic
22 toxicology and risk assessment through the institute?

23 A. That's what it says.

24 Q. And then in the third paragraph, I'll
25 let you take a look at that briefly as well. Just let

1 me know when you're done.

2 A. Okay.

3 Q. Okay. Does it look like there's some
4 concern being expressed that the original intent of
5 the project was evolving away from their original
6 thoughts and now that they're using the case study in
7 an at-risk assessment based on the cancer assessment
8 guidelines?

9 MR. TUBIN: Objection to form.

10 A. That's what I'm taking away from that
11 paragraph.

12 BY MR. TELAN:

13 Q. The sentence in the middle of the
14 paragraph says, "We agree that the proposed guidelines
15 are an important framework for the consideration of
16 human health risk assessment, because they (or an
17 amended force of them) will be what we probably live
18 with for the next decade."

19 Did I read that correctly?

20 A. Yes.

21 Q. "However, API has some serious concerns
22 about some aspects of the charge to the authors of the
23 discussion papers as set forth in the September 27,
24 '96, memo."

25 Did I read that correctly?

1 A. Yes.

2 Q. If you go to the next page over and
3 scan that briefly, I'm not going to read it all into
4 the record, but just had a quick question for you on
5 that.

6 A. Okay.

7 Q. What is your takeaway from that page
8 that you just read?

9 A. So if I'm understanding this, with this
10 quick read, there's ways of assessing benzene's effect
11 in a laboratory using cell culture data. What they're
12 referring to is genetic toxicology data and whether
13 genetic changes in the cell cultures could reflect a
14 dose-response relationship for cancer risk in humans,
15 and they've got concerns over using that or how it's
16 going to be used and that they think it should be
17 taken out of this workshop that's being planned.

18 Q. Is the last paragraph where they're
19 suggesting that if there are any member concerns from
20 the benzene task force, that they respond to
21 Dr. Paxton to indicate how instructions to the authors
22 would be modified?

23 A. I don't know about the benzene task
24 force. This is ILSI, which I think is different.

25 Q. The Life Science Institute?

1 A. Connect.

2 Q. Do you know one way or the other if
3 this is part of the benzene task force?

4 A. I don't, but the letter is addressed to
5 Dr. Foran at the International Sciences Institute.

6 Q. Let's go to the next numbered exhibit,
7 which is in 1999. We are at number 10, I think.

8 MR. TUBIN: Yep.

9 MR. TELAN: Yeah.

10 (Exhibit 10 was marked for
11 identification.)

12 BY MR. TELAN:

13 Q. This is a 1999 summary of a conference
14 call. Do any of the names of the participants on that
15 conference call sound familiar to you other than
16 Dr. Schnatter that we talked about?

17 A. Only Raabe or Raabe as an author in
18 some paper I might have read.

19 Q. If you go down about halfway down the
20 page, it says, "Rob Schnatter indicated that write-ups
21 of two of the proposed studies should be completed by
22 mid-December. (Otto Wong's draft proposal study of
23 NHL has already been prepared.)"

24 Did I read that correctly?

25 A. Yes.

1 Q. And you've cited to Dr. Wong a number
2 of times in your report as well, right?

3 A. That's correct.

4 Q. If you go down one more paragraph, it
5 says, "There was general agreement that API would
6 offer the panelists \$1,000 a day honorarium for two
7 days' effort (one day to review the studies and the
8 second to attend the meeting). It was also agreed
9 that both Otto Wong and Rich Irons should be invited
10 to the meeting of the review team and that the funding
11 for this should come from the API-EBSI contract."

12 Did I read that correctly?

13 A. Yes.

14 Q. And does Richard Irons also sound
15 familiar?

16 A. He's also an author of papers that I
17 have read and cited.

18 Q. Have you come to learn that all of the
19 folks that we've been mentioning so far were actually
20 employed by chemical manufacturers when they wrote or
21 participated in writing the articles that you've
22 cited?

23 MR. TUBIN: Objection to form.

24 A. The only one that I know of is
25 Schnatter. I have to go back and see whether

1 Otto Wong's papers that I cited, who funded those
2 studies or where he was employed. I don't know either
3 way.

4 BY MR. TELAN:

5 Q. Do you agree that the relationship of
6 these authors to these companies would create a risk
7 of bias?

8 MR. TUBIN: Objection to form.

9 A. So when you evaluate a paper, you're
10 looking at the scope, size, quality, presence of
11 confounding and bias. The other thing you look for is
12 conflicts of interest, and that's taken to an account,
13 where they published it. Does the method sound sound?

14 You know, because it comes from a
15 company doesn't disqualify it. Lots of times these
16 companies are criticized because they don't do enough
17 research, and then they get criticized when they do
18 research, but the potential conflict of interest is
19 one of the things that I explicitly consider, and
20 that's in my report.

21 BY MR. TELAN:

22 Q. These are all for-profit companies like
23 ExxonMobil and Shell, right?

24 MR. TUBIN: Objection to form.

25 A. ExxonMobil and Shell is. I don't know

1 whether ILSI is for profit or API is for profit.

2 BY MR. TELAN:

3 Q. Schnatter worked at ExxonMobil, right?

4 A. That's my recollection.

5 Q. And that's a for-profit company?

6 A. ExxonMobil, I assume so.

7 Q. So if you work for a company where the
8 results of a study impact profit, does that create, in
9 your mind, an opportunity for bias in the study
10 itself?

11 MR. TUBIN: Objection to form.

12 A. It's one of the considerations that one
13 takes into account, and no study stands alone, so it
14 depends on how the study methodology, analytic plan
15 and the results compare to other studies that have
16 been published. The discussion I take into account in
17 terms of what their interpretation is, but what's more
18 important to me is methods, the physical analytic plan
19 and the results in how that compares to, for example,
20 the NCI studies that are being discussed in these
21 documents.

22 BY MR. TELAN:

23 Q. Did you in your paper report that any
24 of these authors were, in fact, employed by industry
25 like ExxonMobil?

1 A. Which paper?

2 MR. TUBIN: Objection to form.

3 BY MR. TELAN:

4 Q. I'm sorry. In your report.

5 A. No, I didn't comment about that -- in
6 most -- occasionally, I'll say something like studies
7 from the National Cancer Institute. Otherwise, I have
8 not indicated for any of the studies who were the
9 funders or where they're from.

10 Q. But you've done work for API, have you?

11 A. I don't believe so. I think I've
12 attended one meeting for them, but I haven't done any
13 work for them that I can recall.

14 Q. What do you recall about the meeting
15 you attended for them?

16 A. It was in a little conference room in
17 D.C., a bunch of people in the room, and I don't even
18 remember what the topic was. I don't remember the
19 topic.

20 Q. Was that while you were at Georgetown
21 or at Ohio State?

22 A. Definitely not at Ohio State. I don't
23 recall whether I was working for Georgetown or the
24 National Cancer Institute.

25 Q. If we continue on this, if you go down

1 to the very bottom of that last sentence says, "The
2 next step will be to identify other petrochemical
3 companies as possible coalition members and have a
4 larger meeting with technical and business people.
5 This will take place after the expert panel meeting."

6 Did I read that correctly?

7 A. Yes.

8 MR. TELAN: Okay. Let's go to this
9 next document here. This will be 11, I
10 believe.

11 (Exhibit 11 was marked for
12 identification.)

13 BY MR. TELAN:

14 Q. As a general principle, you agree that
15 when a company, a chemical company like Exxon has to
16 deal with more strict government regulations, that
17 often results in a diminishment of the bottom-line
18 profits. True?

19 MR. TUBIN: Objection to form.

20 A. Can you say that again?

21 BY MR. TELAN:

22 Q. Sure. That when petrochemical
23 companies like ExxonMobil have to deal with stricter
24 environmental and governmental regulations, that that
25 often impacts the bottom line detrimentally?

1 MR. TUBIN: Objection to form.

2 A. I don't know. I'm not an economist or
3 know how regulations may help or hurt them in terms of
4 their profits.

5 BY MR. TELAN:

6 Q. You're a smart man, who's done a lot of
7 schooling. Are you saying that you don't think that
8 more strict regulations of things like pollution
9 control would result in a lower profit for a company
10 that has to deal with less strict pollution controls?

11 MR. TUBIN: Objection to form.

12 A. So it depends on the cost. The first
13 thing that comes to mind is the airline industry
14 fought like heck to keep a ban of smoking in the
15 airplanes, and when they banned the smoking in the
16 airplanes, they realized their profits went up,
17 because they had to do less ventilation. So I
18 understand what you're saying. I'm sure in some
19 cases, regulation ends up costing more, and in other
20 cases, it may not have an impact at all in terms of
21 cost.

22 BY MR. TELAN:

23 Q. If we're looking at number 11, it says,
24 "This document describes a project to investigate the
25 dose response and mechanistic aspects of the

1 hematological effects of benzene exposure in a
2 population of workers in Shanghai China."

3 Do you see that, the first sentence of
4 the first paragraph?

5 A. Thank you. Yes, I see that.

6 Q. And you do, in fact, cite to Shanghai
7 Chinese studies in your paper, correct?

8 A. There's several. There's one that was
9 by Irons, et al., and Wong, et al. They have several
10 publications. And then there's another Shanghai,
11 China, cohort that's out of, initially, Vanderbilt and
12 then went to Pittsburgh, and it's also referred to as
13 the Shanghai Cancer Cohort.

14 Q. Okay. If you go to the first sentence
15 underneath "Background," "An accurate understanding of
16 the true relationship between benzene exposure and the
17 risk of hematopoietic disease such as AML would be of
18 tremendous economic benefit to the petroleum industry
19 and other industries in which benzene occurs at a
20 constituent of products, precursors or waste streams."

21 Did I read that correctly?

22 A. Yes.

23 Q. What do you think they're saying there?

24 MR. TUBIN: Objection to form.

25 A. You know, I can't get into their head.

1 What they're saying -- you know, from where I sit,
2 what they're saying is if they can understand if they
3 can better control benzene exposure with less AML,
4 they're probably less on the hook for compensating
5 people who develop AML, so that would be a tremendous
6 economic benefit.

7 BY MR. TELAN:

8 Q. Take a look at the next sentence, if
9 you would read that into the record.

10 A. "Currently, regulatory bodies rely on
11 health conservative default assumptions that
12 intentionally inflate estimates of risk whenever there
13 is uncertainty about aspects of the risk estimation
14 process."

15 Q. What does that mean to you?

16 A. Well, they are -- they are describing
17 what is well known as the precautionary principle when
18 regulatory bodies are looking to regulate exposures to
19 maximize preventive benefits. When they have
20 uncertainty, they will assume worse situations rather
21 than better situations, so that we don't find out in
22 20, 30 years we got it wrong and there's more cancer,
23 disease, whatever, than was thought about 30 years
24 earlier.

25 Q. If you go down to the last paragraph,

1 it says, "Regulatory standards which set 'acceptable'
2 levels of benzene in environmental media are based on
3 the same default-driven theoretical estimates of
4 leukemogenic risk that have been applied to air toxics
5 legislation. Benzene-based standards frequently drive
6 risk estimates during remediation of former petroleum
7 facilities, which translates into excessive amounts of
8 dirt hauled away as hazardous waste and extensive pump
9 and treat activities for groundwater."

10 Did I read that correctly so far?

11 A. Yes.

12 Q. "Waste streams and by-products of
13 petroleum production activities, although currently
14 exempted by law, can contain levels of benzene that
15 would otherwise result in these materials being
16 regulated as hazardous waste. Loss of the petroleum
17 production waste exemption could lead to massive
18 expenditures for E&P operations in the future."

19 Did I read that correctly?

20 A. You did.

21 Q. Does that appear that they're talking
22 about how these regulations impact their bottom line?

23 MR. TUBIN: Objection to form.

24 A. You know, this is so far out of my
25 expertise as a layperson, I would agree with you, but

1 I don't know that an expert would or would not
2 disagree with you, but this is way out of my
3 expertise.

4 BY MR. TELAN:

5 Q. Let's go to the next page. This may be
6 up the alley here.

7 "Litigation costs due to perceptions
8 about the risks of even very low exposures to benzene
9 cost American industry millions of dollars annually."

10 Have I read that correctly?

11 A. Yes.

12 Q. "Although only acute myeloid leukemias
13 have any strong scientific support for linkage with
14 benzene exposure at any levels, lawsuits are filed
15 alleging causal relationships between benzene exposure
16 and virtually every type of hematopoietic cancer and
17 some non-neoplastic diseases such as myelodysplastic
18 syndrome."

19 Did I read that as well correctly?

20 A. Yes. As you're reading that, I'm
21 actually looking for a date -- or whose document is
22 this? Who's writing this?

23 Q. We'll get there. We'll get there.

24 A. Okay. I guess I kind of want to know
25 that now so that I can understand the context of why

1 this is being written.

2 Q. The next sentence says --

3 A. So you're not gonna give it to me?

4 Q. We're going to keep reading it through.

5 A. Okay.

6 Q. "An epidemiology study conducted in
7 China has reported an association between occupational
8 benzene exposure and non-Hodgkin's lymphoma (NHL).
9 Although this study has been criticized in the
10 peer-reviewed scientific literature for several
11 serious flaws, it has resulted in an increase in
12 NHL-based litigation."

13 So that paragraph that we just read
14 there, does that indicate that the industry is
15 concerned about the litigation costs?

16 MR. TUBIN: Objection to form.

17 BY MR. TELAN:

18 Q. Question mark?

19 A. Yes. I am just reviewing the document
20 so I can understand this.

21 Q. I'll direct you to it. Okay?

22 Go to 44257. If we go toward the
23 bottom of the first -- the second paragraph,
24 "Currently, through Dr. Otto Wong, we have contacts
25 with the departments of public health and hematology

1 of Shanghai Medical University. Through that
2 institution, we have contacts with the Shanghai Tumor
3 Registry and the Shanghai Center for Disease Control,
4 which is the governmental repository for workplace
5 exposure information. Protocols are under current
6 development based upon the results of an in-depth
7 feasibility study conducted in August 1999 by Exxon
8 Biomedical Sciences, Inc. and Dr. Richard Irons of the
9 University of Colorado and funded under the 1999
10 budget."

11 We had previously read the minutes of
12 the 1999 meeting in the benzene task force call, did
13 we not?

14 MR. TUBIN: Objection to form.

15 A. I think that's correct.

16 BY MR. TELAN:

17 Q. And the same authors, Otto Wong and
18 Richard Irons, are mentioned in this document as they
19 were in the previous documents as well, correct?

20 A. That's correct.

21 Q. And there's a feasibility study being
22 conducted by ExxonMobil that they are speaking about,
23 correct?

24 A. Correct.

25 Q. If you go to the next page, top

1 paragraph, second sentence, "The study will be
2 performed by Dr. Richard Irons of the University of
3 Colorado with the collaboration and assistance of
4 investigators from the departments of hematology and
5 public health of Shanghai Medical University."

6 Did I read that correctly?

7 A. Yes.

8 Q. Now, if you go to the last page,
9 "Location: The location for this proposed project is
10 Shanghai, China." Correct?

11 A. That's correct.

12 Q. Halfway down, "A feasibility study
13 group funded by the API Benzene Task Force was shown
14 records of industrial hygiene monitoring of work areas
15 where benzene was routinely used and where airborne
16 benzene concentrations occasionally were in excess of
17 100 parts per million and where a rare data point
18 could exceed 200 parts per million."

19 Did I read that correctly?

20 A. Yes.

21 Q. Does this give you ideas as to what's
22 being discussed here now?

23 A. Yeah. I'm familiar with the study.

24 Q. And they're listed under the
25 investigators Otto Wong, Dr. Schnatter and Dr. Irons.

1 Do you see that, correct?

2 A. Yes.

3 Q. And then finally on the last page,
4 "Project Costs," does it state that they're discussing
5 project costs in excess of \$6.5 million over a period
6 of five years?

7 A. That's what it says.

8 Q. And they were talking about how much it
9 would cost the 10 to 12 members of the benzene task
10 force to fund the study, correct?

11 A. That's right.

12 MR. TELAN: This is 12.

13 (Exhibit 12 was marked for
14 identification.)

15 BY MR. TELAN:

16 Q. When we looked at the prior memos kind
17 of leading up to this, what is your sort of gestalt,
18 if you will, about the tremendous economic benefit
19 that the benzene task force is talking about for their
20 industry as it relates to the study that's being
21 proposed?

22 MR. TUBIN: Objection to form.

23 A. I'm not sure how to answer that.
24 Again, you're way out of my expertise. My
25 understanding of this study was funded by industry to

1 using acceptable methods to answer questions that
2 needed to be answered about risk from benzene. The
3 NCI had a series of studies. The industry had
4 concerns about that and also wanted to fund a study to
5 contribute to the greater scientific knowledge.

6 BY MR. TELAN:

7 Q. And the folks that they were talking
8 about working on the study were all employees of their
9 companies, right?

10 MR. TUBIN: Objection to form.

11 A. You asked me that before. I don't know
12 that either way. I'm going to have to go back to the
13 papers to see whether they were working in industry.
14 For example, I think Irons was not. I think Irons was
15 at the University of Colorado. I don't know where
16 Otto Wong was at the time.

17 BY MR. TELAN:

18 Q. Okay. If you go -- actually, look at
19 page 2. I think this was stapled in a reverse order.
20 This is an email from Robert Schnatter -- or not an
21 email, but maybe it's an email -- from Robert
22 Schnatter to Ralph. Do you see that?

23 A. Yes.

24 MR. TUBIN: Objection.
25

1 BY MR. TELAN:

2 Q. And they're talking about the proposed
3 Shanghai studies?

4 A. That's right.

5 Q. And Robert Schnatter, who's with Exxon,
6 is talking about a document that was presented by
7 Texaco at a meeting the prior month, right?

8 MR. TUBIN: Objection. Foundation.

9 A. Yes.

10 BY MR. TELAN:

11 Q. And the name Gary or Jerry Raabe was a
12 name that you're familiar with as well?

13 A. The name is familiar. Whether it's
14 Jerry or someone else, I don't know offhand.

15 Q. If we go to the actual document itself,
16 under "Background," if you want to read that into the
17 record, please.

18 A. The whole paragraph?

19 Q. Yes.

20 A. Okay. "Benzene is a naturally
21 occurring constituent of crude oil and a contaminant
22 of many petroleum products. Its average concentration
23 in gasoline is on the order of 1 percent. Thus,
24 benzene is emitted from both upstream and downstream
25 sources and impacts air, water and waste issues. This

1 substance has received much attention from regulatory
2 agencies and in tort litigation because benzene has
3 been accepted as causing leukemia and other blood
4 disorders in workers exposed to high concentrations."

5 Q. Let me stop you there for one second.
6 In this memo, the scientist at Texaco, Dr. Schnatter,
7 is talking about benzene causing leukemia and other
8 blood disorders, correct?

9 MR. TUBIN: Objection to form.

10 A. That's what it says.

11 BY MR. TELAN:

12 Q. What other blood disorders in pre-2001
13 was benzene known to cause other than leukemia?

14 A. Other than acute myeloid leukemia and
15 not other leukemias? The only other one would be
16 aplastic anemia.

17 Q. And Dr. Schnatter didn't use AML. He
18 said leukemia, correct?

19 A. That's correct.

20 Q. If you would continue on.

21 A. "It is classified as a known human
22 carcinogen by both national and international agencies
23 that deal with environmental health issues. Recent
24 studies by the National Cancer Institute have raised
25 concerns that another hematopoietic cancer, not

1 previously related to benzene (non-Hodgkin's
2 lymphoma), also may be associated with exposure to
3 benzene."

4 Q. Okay. If you would read the first
5 sentence of the next paragraph.

6 A. "Concern about adverse health risks of
7 benzene, in part, drives calls for the reformulation
8 of gasoline, changes that have massive financial
9 impacts on petroleum refiners."

10 Q. Is there any doubt in your mind now
11 that the industry that is funding these studies is
12 very concerned about profits?

13 MR. TUBIN: Objection to form.

14 A. So we're talking about not studies, one
15 study with several publications from the Shanghai -- I
16 forget what they call this study by Irons and Wong and
17 other ones, but that's what they wrote, and the
18 document speaks for itself.

19 BY MR. TELAN:

20 Q. I know the document does speak for
21 itself. I'm asking you, in your mind, as an educated
22 scientist, is there any doubt that what you're reading
23 here is that the petroleum industry is very concerned
24 about the effect that the recent attention on benzene
25 is going to have on profits?

1 MR. TUBIN: Objection to form.

2 A. That is their concern, so they're doing
3 the study to identify whether that, in fact, will be
4 reality for them.

5 BY MR. TELAN:

6 Q. And they are using -- strike that.
7 Okay.

8 The next sentence says, "The level of
9 benzene contamination is a major determinant of the
10 extent of required cleanup of many
11 petroleum-contaminated media, such as soil and water.
12 Finally, concerns about localized impacts from benzene
13 in ambient air are the basis for initiatives to
14 control emissions from stationary sources for such
15 diverse facilities as E&P, petroleum waste-treatment
16 sites, gas plants and marketing facilities."

17 So in this one paragraph, number one,
18 are they talking about the fact that reformulating
19 gasoline would have a massive financial impact on the
20 industry?

21 MR. TUBIN: Objection to form.

22 A. That is their concern --

23 BY MR. TELAN:

24 Q. The second --

25 MR. TUBIN: Please don't interrupt.

1 A. -- as opposed to that being a reality,
2 so predicting the future.

3 BY MR. TELAN:

4 Q. And the second concern is that it's
5 going to cost them more to clean up the benzene
6 spills, based on the concerns being given to benzene,
7 correct?

8 MR. TUBIN: Objection to form.

9 A. Again, it's concerns about the future.

10 BY MR. TELAN:

11 Q. Okay. And the third concern about the
12 future is that the attention that benzene is getting
13 may result in initiatives to control emissions from
14 stationary sources, like petroleum factories, correct?

15 MR. TUBIN: Objection to from.

16 A. That's right.

17 BY MR. TELAN:

18 Q. If we go to "The Research Approach,"
19 what Dr. Schnatter says here, if you would read that
20 into the record, please.

21 A. "The scientific research program
22 developed over the years by API's Benzene Task Force
23 is designed to protect member company interests by
24 developing strong scientific information on key
25 benzene risk issues. This data, applicable across

1 environmental media, has use in advocacy, risk
2 management, litigation and risk communication."

3 Q. Let me stop you there for a second.
4 What are they saying there?

5 MR. TUBIN: Objection to form.

6 A. That they want to develop data on key
7 benzene risk issues so that they can deal with
8 whatever they need to deal with in terms of risk
9 management litigation, risk communication. It doesn't
10 say that they're predicting or they're designing
11 studies to provide bad science or junk science. It
12 says that they're gonna provide data that's gonna
13 inform key benzene issues that does have applicability
14 across environmental media, advocacy, risk management,
15 litigation and risk communication.

16 BY MR. TELAN:

17 Q. Did you see anywhere in here that the
18 companies were controlled about the safety of the
19 workers or the general public around their facilities?

20 A. For their workers, I would assume
21 probably facilities around, the environment around
22 their facilities would be within the risk management
23 context.

24 Q. They're concerned about the cleanup
25 costs and the costs of the emissions from their

1 factories, not about health care of the folks who
2 might be impacted by benzene?

3 MR. TUBIN: Objection to form.

4 A. I don't agree with that. Again, you're
5 out of my expertise, but when I hear "risk
6 management," I'm talking about or my understanding is
7 that is reducing developing data about the health
8 risks related to exposures.

9 BY MR. TELAN:

10 Q. When they say that this "scientific
11 research program ... is designed to protect member
12 company interests," what is it they're talking about
13 there?

14 MR. TUBIN: Objection to form.

15 A. Well, what it seems to me is that
16 they're not saying we're going to doctor the data so
17 that it helps us in terms of our profits. What it's
18 saying is that they're going to develop the data, and
19 hopefully, it's accurate data, so that someone else
20 doesn't overblow the exposures and the interpretation
21 so that they can have their own company interests
22 protected. So, like, the data will be where the data
23 is, but they want accurate data so they can deal with
24 whatever they need to deal with.

25

1 BY MR. TELAN:

2 Q. You're interested in objectivity and
3 truth when it comes to science, right?

4 A. I would assume that, because I read
5 their papers. That's what I took away.

6 Q. Did you take that away from the smoking
7 industry?

8 A. No. I had seen explicit documents from
9 the smoking industry specifically looking to
10 manipulate, falsify, reinterpret and hide data.
11 That's not what any of these documents are. These
12 documents raise exactly the opposite. They're saying
13 let's go do the studies so we can get data about key
14 benzene risk issues.

15 Q. Didn't smoking do exactly this, that
16 is, develop scientific data to try and get out in
17 front of the science?

18 MR. TUBIN: Objection to form.

19 A. Absolutely not. They develop studies,
20 and any of those studies that would actually hurt
21 them, they buried them as opposed to publishing it.
22 In this case, they published their data.

23 The industry also falsified data. The
24 industry particularly funded certain researchers with
25 predetermined outcomes, and the industry also had

1 lawyers review all the papers before they were
2 published, so that they can make sure that they had a
3 safe spin for the industry. That is not my
4 understanding of what the Irons and Wong Shanghai
5 papers were doing.

6 BY MR. TELAN:

7 Q. How would you know if one of these
8 companies was burying data?

9 A. Because in all the benzene litigation
10 that I have, if those documents existed, I probably
11 would have seen them by now.

12 Q. Have you seen these documents yet?

13 A. I haven't seen these, but these are not
14 what you're talking about. I've seen documents like
15 this. I've read articles about this. What this is
16 saying is we've got to do the studies. We're about to
17 get a massive hit in terms of finances, so we've got
18 to find the data. Let's fund the studies. That's a
19 totally different thing than what you're talking about
20 with the tobacco industry.

21 Q. What articles have you read on this?

22 A. The Irons articles, the Wong articles.
23 I mean, there's three or four, I think, that are cited
24 in my report.

25 Q. They go on to say, "It is anticipated

1 that the results of this research will establish that
2 1), ambient levels of benzene exposure do not pose a
3 risk of leukemia or other blood diseases to the
4 general public."

5 Did I get that right?

6 A. You wrote that -- you read that
7 correctly.

8 Q. So they're predicting or forecasting
9 the results of studies that have not yet been done,
10 correct?

11 MR. TUBIN: Objection to form.

12 A. They're stating their hypothesis, and
13 it may be that the results of the research will or
14 will not establish that.

15 BY MR. TELAN:

16 Q. Well, they were -- they were betting on
17 it not harming the general public by not posing a risk
18 of leukemia and other blood diseases. Isn't that what
19 they say?

20 MR. TUBIN: Objection to form.

21 A. I mean, I can't -- I can't tell you
22 what they were betting on or not betting on. It looks
23 to me like they are saying what they anticipate the
24 results probably based on prior published data that
25 they had, and that was their anticipation of what they

1 thought was a high quality study, that this is what it
2 would find, and if it doesn't, then it doesn't.

3 BY MR. TELAN:

4 Q. And the last sentence in that
5 paragraph, "Such findings would significantly
6 ameliorate further regulatory initiatives in the area
7 of point source emissions and motor gasoline
8 reformulation."

9 Did I read that correctly?

10 A. That's right.

11 Q. Now, this is coming from the head
12 scientist on the project, right?

13 MR. TUBIN: Objection to form.

14 A. I don't know that he was the head
15 scientist or not.

16 BY MR. TELAN:

17 Q. How would the head scientist be able to
18 predict what the results of an untested hypothesis
19 were?

20 MR. TUBIN: Objection to form.

21 A. Based on substantial research from
22 before that by Rinski, for example, and others, this
23 was not the first benzene risk study to be done.

24 Q. So let's go to the first paragraph
25 again. I want you to see how these jibe, and I'll

1 read this into the record.

2 "The substance received much attention
3 from regulatory agencies in tort litigation, because
4 benzene has been accepted as causing leukemia and
5 other blood disorders in workers exposed to high
6 concentrations."

7 And now go down to the paragraph that
8 we just read, the sentence, "It is anticipated that
9 the results of this research will establish that
10 ambient levels of benzene exposure do not pose a risk
11 of leukemia or other blood diseases to the general
12 public. "Such findings" -- and then "that adherence
13 to current occupational limits do not create an
14 unacceptable risk to workers."

15 Did I read that correctly?

16 A. You did.

17 Q. Okay. So Dr. Schnatter is, in fact,
18 forecasting the results of a study yet to be done?

19 A. It's what his anticipation of the study
20 results would be.

21 Q. If we go down to "Specific Research
22 Projects," the first paragraph, they're talking again
23 about the Shanghai, China project.

24 The middle of the paragraph, where it
25 says, "The Benzene Task Force," do you see that?

1 A. Yes.

2 Q. "Has allocated funds to help develop
3 detailed research project protocols." Is it
4 appropriate for these for-profit companies to be
5 collaborating on a project protocol like this?

6 MR. TUBIN: Objection to form.

7 A. Not only is the answer yes, but it's
8 more common that they get faulted for not doing the
9 research. So in this case, these companies are
10 banding together to do research, develop the data and
11 subject it to peer review publication.

12 Q. Okay. Last bullet point on this first
13 page states that the "API-sponsored benzene research
14 continues efforts to resolve the issue of whether ...
15 benzene, or its metabolites, actually chemically binds
16 to DNA."

17 Did I read that correctly?

18 A. I don't think you used the word,
19 "whether or not benzene." I think you just said
20 "whether benzene."

21 Q. "Whether or not benzene." Is there a
22 difference? Whether or not or whether, is there -- is
23 that a distinct difference?

24 A. Well, it emphasizes to me that the
25 data, what they're saying is they're envisioning

1 whether it does or it doesn't is how I interpret that.

2 Q. Okay. The "distinction has important
3 regulatory implications, because these agencies
4 currently assume that benzene alkylates DNA and,
5 therefore, no level of benzene exposure is without
6 some finite degree of carcinogenic risk. Preliminary
7 results of API-sponsored research suggest that,
8 contrary to present assumptions, benzene does not bind
9 to DNA."

10 Did I read that correctly?

11 A. Yes.

12 Q. Is it appropriate for the preliminary
13 results to be released to the sponsor of the studies?

14 MR. TUBIN: Objection to form.

15 A. That's not only appropriate, but that's
16 regularly done.

17 MR. TELAN: Okay. Let's put that away.

18 The next study is the Benzene Shanghai
19 Study Background. I think we're at 13?

20 MR. TUBIN: Yeah.

21 (Exhibit 13 was marked for
22 identification.)

23 BY MR. TELAN:

24 Q. And this is, again, Dr. Schnatter?

25 MR. TUBIN: Do you have a copy for us?

1 MR. TELAN: Oh, I thought I gave it to
2 you. I'm sorry.

3 MR. TUBIN: Thank you.

4 A. It looks like to be a PowerPoint
5 presentation by Dr. Schnatter, or at least his name is
6 on the front.

7 BY MR. TELAN:

8 Q. If you go back to the timeline, it goes
9 back to 1974, correct?

10 A. 1994.

11 Q. I'm sorry. 1994. And we're now in
12 2001 as the date of this PowerPoint right?

13 A. Correct.

14 Q. The first entry on the PowerPoint is
15 that there's "National Cancer Institute Exposure
16 Estimating Report" and writes "Concern" out to the
17 side there, correct?

18 A. That's what it says.

19 Q. And then, in 1996, there's a National
20 Cancer Institute report indicating "7.6 parts per
21 million blood effects"? True?

22 MR. TUBIN: Objection to form.

23 A. That's what's written.

24 BY MR. TELAN:

25 Q. And then in 1997, an "NCI dose-response

1 analysis" with "AML/MDS and NHL effects," correct?

2 A. That's what it says.

3 Q. And MDS is myelodysplastic syndrome,
4 right?

5 A. That's right.

6 Q. Okay. And then in between '97 and '98,
7 there's a little kind of abbreviation there in the
8 middle, "O. Wong trip, exposure assessment feasible. "
9 Do you see that?

10 A. Yes.

11 Q. And that's Otto Wong, the same
12 scientist we've been talking about?

13 A. I assume so.

14 Q. And in 1998, it says "BZ State of the
15 Science Conference." BZ, I'm assuming, is benzene.
16 Fair?

17 A. I would assume that too.

18 Q. And it says, "No more benzene
19 diagnosis," off to the right?

20 A. Dx often is referred to as diagnosis,
21 but I'm not sure that makes sense in this context.

22 Q. Okay.

23 A. Maybe disease.

24 Q. Okay.

25 A. I don't know what that stands for.

1 Q. And in 1999, "Armstrong, Irons,
2 Schnatter trip, benzene-induced disease present" or
3 "diagnosis present."

4 A. Or something else.

5 Q. Right. Okay.

6 And then you see there's consortium
7 building and then a meeting in 2001 that they're
8 talking about, correct?

9 A. Correct.

10 Q. Okay. If you go to the next page --
11 let me ask you this. Is it odd for the scientist
12 who's in charge of a project to be talking about the
13 effect of the results of the project on profits?

14 MR. TUBIN: Objection to form.

15 A. I don't know what happens within
16 industry, so I can't answer that question.

17 BY MR. TELAN:

18 Q. That doesn't strike you, as an
19 epidemiologist, as being odd?

20 MR. TUBIN: Objection to form.

21 A. Can we go back to which document you're
22 talking about, where you were talking about profits?
23 I want to make sure I'm not getting confused between
24 Schnatter or other documents.

25

1 BY MR. TELAN:

2 Q. Sure. The one right before it, I think
3 we're at 12.

4 A. Yes. So you're assuming that the first
5 page is written by Schnatter, which has a different
6 font than the actual second page, which just says,
7 "Attached are some materials regarding proposed
8 Shanghai studies." It doesn't -- it says the document
9 was presented by Mike Redeemer of Texaco. So it was
10 not written by Schnatter.

11 So, again, I don't know which document
12 you're talking about. What Schnatter was saying, that
13 it impacts the profits. It seems to me that all the
14 documents you showed me were by API and member groups
15 and not Schnatter or Wong or Irons.

16 Q. You do see at the very bottom that the
17 Bates stamp has Shell and two consecutively marked
18 Bates stamp pages there?

19 A. Yes. It has a Shell Bates stamp.

20 Q. And they are consecutively marked?

21 A. Yes.

22 Q. Let's go back to 13.

23 VIDEOGRAPHER: The Zoom just shut down.

24 MR. TUBIN: We are coming up on an

25 hour.

1 VIDEOPHOTOGRAPHER: Do you want to go off
2 record?

3 MR. TELAN: What's that?

4 MR. LEE: Let's go off. She needs some
5 water.

6 VIDEOPHOTOGRAPHER: We are now going off
7 record. The time is 2:47.

8 (A recess was taken from 2:47 to 2:58.)

9 VIDEOPHOTOGRAPHER: We are now back on the
10 record. The time is 2:58. You may continue.

11 BY MR. TELAN:

12 Q. Okay. Let's go back to 13, if we
13 could, and if you can turn to, let's see, 44374. Do
14 you have Bates stamped pages at the bottom of that
15 page?

16 A. I do.

17 Q. Under "Background," at the top, does it
18 say "International Leveraged Research Proposal"?

19 A. Yes.

20 Q. And it's speaking about "an
21 investigation of the effects and dose response of
22 hematological effects of benzene ... in Shanghai,"
23 right?

24 A. That's correct.

25 Q. This is the project that's been

1 reflected in several of the exhibits we've covered.
2 True?

3 A. Yes. And this is a document that I
4 have seen before, and it appears, I believe, on the
5 API website.

6 Q. Do you see it as part of this case?

7 A. No. I'd seen this in a prior
8 litigation.

9 Q. Was that in the smoking or in the
10 benzene case?

11 A. It was a benzene case.

12 Q. Were you asked questions about this
13 under oath?

14 A. I was. Well, no. All I was asked was
15 it was red, did I read it correctly, and there were no
16 questions, as far as I remember.

17 Q. And this again is from Dr. Schnatter,
18 as you mentioned, potentially a PowerPoint of some
19 kind, correct?

20 MR. TUBIN: Objection to foundation.

21 A. Presumably this is his PowerPoint --
22 you never know -- but his name is on the front page.
23 BY MR. TELAN:

24 Q. And under "Background," it says,
25 "Describe the significant issues of concern to global

1 petroleum industry that the research would affect."

2 Did I read that correctly?

3 A. Yes.

4 Q. Then he speaks about the "health
5 effects of ambient air concentrations" and the current
6 drive "calling for the reformulation of ... gasoline,
7 which would have massive financial impacts on
8 petroleum refiners."

9 Did I read that correctly?

10 A. Yes.

11 Q. So, again, Dr. Schnatter is mentioning
12 the fact that the expected health effects and the
13 drive would have an impact on finances. True?

14 MR. TUBIN: Objection to form and
15 foundation.

16 A. So, first of all, there's no "again,"
17 because we went to the other document and showed that
18 it wasn't a Schnatter document. Secondly here,
19 Schnatter has his name on it. We may or may not
20 assume that he's the one who put these slides together
21 or were showing them.

22 BY MR. TELAN:

23 Q. Okay. And in the second bullet point,
24 the thought is they're speaking about the impacts of
25 controlling emissions; is that right?

1 MR. TUBIN: Objection to form.

2 A. That's right.

3 BY MR. TELAN:

4 Q. And in the third point, they're talking
5 about the cleanup of contaminated soil and water from
6 benzene, correct?

7 A. Correct.

8 Q. And then the last point, they're
9 talking about, as a significant issue of concern, to
10 the global petroleum industry, the "Litigation
11 alleging induction of various forms of leukemia and
12 other hematopoietic diseases from exposure to
13 petroleum-derived benzene result in millions of
14 dollars in expenses to the industry."

15 Did I read that correctly?

16 MR. TUBIN: Objection to form.

17 A. You did read it correctly.

18 BY MR. TELAN:

19 Q. Do you find that odd at all that a
20 scientist is talking about litigation costs as it
21 relates to the impact of the scientific research on
22 industry?

23 MR. TUBIN: Objection.

24 A. Again, I don't know what scientists do
25 within industry, and I also don't know that this is

1 his slide or written for him or his presentation.

2 BY MR. TELAN:

3 Q. Under "Project Value," the next page,
4 what is the title of that heading, if you would read
5 that in, please.

6 A. "Project Value" underlined. "How will
7 research results enhance industry's ability to achieve
8 objectives on issue of global impact and concern,"
9 colon.

10 Q. And what is the first bullet?

11 A. "Provide strong scientific support for
12 the lack of a risk of leukemia or other hematological
13 disease at current ambient benzene concentrations to
14 the general population."

15 Q. And the second one?

16 A. "Establish that adherence to current
17 occupational exposure limits (in the range of 1 to 5
18 ppm) do not create a significant risk to workers
19 exposed to benzene."

20 Q. And then the third one?

21 A. "Refute the allegation that
22 non-Hodgkin's lymphoma can be induced by benzene
23 exposure."

24 Q. And you don't believe that benzene can
25 cause NHL, do you?

1 A. We've talked about that before. At the
2 current time, there's insufficient evidence to make
3 that causal conclusion.

4 Q. And when you say "there's insufficient
5 evidence," you're speaking for your evaluation of the
6 evidence, correct?

7 A. Well, not only me, but for human
8 evidence, as both my independent evaluation but, also,
9 IARC's evaluation as of 2018.

10 Q. Incidentally, in the Bradford Hill
11 considerations, one of the elements is consistency,
12 correct?

13 A. Correct.

14 Q. How is consistency defined?

15 A. Consistency is defined as common
16 results among different studies, different
17 populations, different methodology, period.

18 Q. Quantitatively, what does that mean?

19 A. There's no quantitative value to that.

20 Q. So qualitatively, what does that mean?

21 A. Well, it's an evaluation of the data,
22 what the risk estimates are, what the confidence
23 intervals are. Among those studies, what the
24 dose-response relationships are. And as you look at
25 high quality studies versus low quality studies, do

1 you start to see similar statistically significant
2 results among the higher quality studies, such as you
3 do, for example, benzene and AML would be a great
4 example of that.

5 Q. If there hypothetically are an equal
6 balance of high quality studies on either side of the
7 null value, is consistency achieved under a Bradford
8 Hill evaluation?

9 A. So I've been asked those types of
10 questions before, and it was sort of like 50 percent
11 or 60 percent or 70 percent, and we don't -- it's not
12 a soccer match, so we don't subscribe the number one
13 way or another, and high quality is not all the same.
14 Some studies, you can have a case-controlled study
15 that's high quality and a cohort study that's high
16 quality, but you will rank the high quality cohort
17 study over the case-controlled study, and you look and
18 see whether there are consistent results of one versus
19 the other.

20 Q. Can you meet consistency with less than
21 50 percent?

22 A. So it depends on the denominator and
23 what types of studies you're putting into the pool to
24 weigh the evidence. So, again, it's the highest
25 quality studies defined as the best methodologies, the

1 best statistical analysis, the success of the
2 methodologies. You know, do they really ascertain the
3 cohorts and that sort of thing, along with the quality
4 of the exposure assessment, because if you have a low
5 quality exposure assessment but everything else is
6 high quality, that's gonna end up with a lower weight.

7 So, again, you can't come up with
8 numbers of papers. I guess the answer is, as a
9 hypothetical, maybe, but as we sit here today for the
10 Camp Lejeune studies, we only have that for benzene
11 and AML and, arguably, the TCE and kidney cancer.

12 Q. I suppose you would agree that medicine
13 is not an exact science, correct?

14 A. That's a pretty broad statement. So
15 it's not always exact, and sometimes it is exact.

16 Q. So maybe rephrase it.

17 Medicine is part art and part science?

18 MR. TUBIN: Objection to form.

19 A. In many cases, that is true. Sometimes
20 it's all science. Sometimes it's probably more art.

21 BY MR. TELAN:

22 Q. And a lot of times, the art is done at
23 bedside by somebody who's exercising clinical judgment
24 in a particular situation?

25 MR. TUBIN: Objection to form.

1 A. Sure. But now we're not talking about
2 sufficient human evidence in epidemiology. We're
3 talking about an individual practitioner making a
4 decision or recommendation about a patient.

5 BY MR. TELAN:

6 Q. But judging the quality of studies is,
7 to some degree, subjective, correct?

8 MR. TUBIN: Objection to form.

9 A. It can be subjective, but it has to be
10 laid out in a transparent manner so that people could
11 see what the other person is doing and so that you're
12 gonna agree to disagree, but it's got to be
13 transparent.

14 BY MR. TELAN:

15 Q. But you would say that the more studies
16 that exist that favor a particular result, the more
17 likely it is that you can achieve consistency,
18 correct?

19 A. All things being equal, which really it
20 is, that would be correct.

21 Q. And folks like Schnatter and Irons and
22 Wong know that as well, don't they?

23 MR. TUBIN: Objection to form.

24 A. I would hope so.

25

1 BY MR. TELAN:

2 Q. So flooding the industry with science
3 would certainly -- let me ask you this. Have you done
4 any analysis to see whether industry-funded science is
5 more likely to result in favorable results to the
6 industry?

7 A. I have not done that analysis.

8 Q. Have you seen any studies that look at
9 that?

10 A. I have seen opinions that that is the
11 case. I'm not sure I've seen the data either way, and
12 that's a pretty hard thing to actually study, I would
13 think.

14 Q. If we go back to Exhibit 13, at the
15 very bottom of 44376, it says, "Primary participants
16 include," and then if you go to the top of the next
17 page, do you see the folks listed there under
18 "Epidemiology," Dr. Wong, Dr. Schnatter and Dr. Fu?

19 A. Yes, I see that.

20 Q. And, again, the project cost at the
21 bottom is essentially what it was previously, and
22 there's discussion, albeit brief, about how much it
23 would cost in the first year to fund laboratory
24 facilities in Shanghai. Do you see that?

25 A. Yes.

1 Q. Have you gone back to check to see how
2 many times you cited to Wong, Schnatter and Irons in
3 your report?

4 A. I'm not -- the answer is no. I don't
5 know why I would do that, but I cited their studies
6 among, boy, I don't know, maybe 60 other studies, and
7 I don't consider their studies among the highest
8 quality studies, like we get from NCI, the Australian
9 cohort, or the Plioform cohort, because I don't know
10 what the point is for me to see how often I cited
11 them.

12 MR. TELAN: Let's go to the next
13 exhibit.

14 COURT REPORTER: Fourteen?

15 MR. TELAN: This is 14, yes.

16 (Exhibit 14 was marked for
17 identification.)

18 BY MR. TELAN:

19 Q. By the way, have you read all of the
20 articles that you cited in your report?

21 A. Sure.

22 Q. Did you read them all for this, for
23 preparing your report?

24 A. No.

25 Q. You've read those, I've been guessing,

1 over years?

2 A. Many times.

3 Q. You had mentioned that you had searched
4 terms that would cue you in, in the event that a
5 relevant article popped up, right?

6 A. Correct.

7 Q. But they weren't -- they weren't enough
8 to find Goodman's articles that we talked about.
9 True?

10 MR. TUBIN: Objection to form.

11 A. Boy, I don't know how to answer that,
12 because Goodman's articles are totally irrelevant to
13 the types of searches. I mentioned before I didn't
14 search on the term "equipoise" in PubMed, but I did
15 for "likely as not" and found nothing for "as likely
16 as not," whether there's "more" or "as."

17 BY MR. TELAN:

18 Q. Did her articles you recall talk about
19 at least as likely as not?

20 A. We have to go back to the three of
21 them. I don't think so. I think it was equipoise.

22 Q. How do you --

23 A. Let me just state, so you understand
24 how PubMed works, it doesn't search the articles. It
25 searches the abstract of which mentioned equipoise in

1 the abstract. It searches the keywords and the
2 titles.

3 Q. I see. Were all your searches done on
4 PubMed?

5 A. Yes.

6 Q. Okay.

7 A. So if someone has a paper where, in the
8 discussion, they put in "as likely as not," I would
9 not capture that.

10 Q. Understood. Okay.

11 Let's go to 14. You see at the bottom,
12 it's got a date of April 18th, 2007, and the title of
13 "Risk Management"?

14 A. Yes.

15 Q. Under "Overall Issue Goals: API
16 supports the use of sound science in key risk
17 assessments for health and environmental rulemaking
18 decisions. API's risk management programs develop
19 scientific data for key issues across environmental
20 media for use in science advocacy, risk management,
21 litigation support, and risk communication."

22 These pro -- I'm sorry. "The programs
23 are designed to minimize excessively conservative
24 legislation and regulation affecting upstream and
25 downstream petroleum operations."

1 Did I read that correctly?

2 A. Yes.

3 Q. How does one design an epidemiological
4 study to minimize excessively conservative
5 legislation?

6 MR. TUBIN: Objection to form.

7 A. I don't see where you're getting from
8 this that they're saying they're developing an
9 epidemiological study to minimize excessively
10 conservative legislation.

11 BY MR. TELAN:

12 Q. What do you think they're talking about
13 when they say "programs"?

14 MR. TUBIN: Objection to form.

15 A. Developing key scientific data. So
16 what they're saying is we're going to develop data so
17 that decisions can be made from a risk-management
18 perspective for legislation and regulation based on
19 data and not defaulting to what would be common
20 practice as the precautionary principle.

21 BY MR. TELAN:

22 Q. And do you see under "Situation
23 Analysis," the first bullet point, the statement is
24 that "Benzene continues to be of particular concern to
25 the industry, due to its classification as a known

1 human carcinogen"?

2 A. Sure, as it should be.

3 Q. And then in the paragraph underneath
4 the bullet points, "Use of scientifically sound
5 peer-reviewed studies from the published literature
6 and the development of new data are needed to support
7 science advocacy, provide sound risk management,
8 support litigation, communicate with the public,
9 respond to congressional inquiries and any other
10 arenas, domestic and abroad."

11 Did I read that correctly?

12 A. That's right.

13 Q. If we go to the next page under
14 "Programs," does it state that the "Projects in the
15 American Petroleum Institute risk management program
16 are managed by either American Petroleum Institute
17 Toxicology or Benzene Task Force"?

18 A. That's what it says.

19 Q. And then underneath it, under "Product
20 and Compound Risk Management," does it state that
21 "projects are designed to provide a scientific basis
22 for balanced, protective legislation, regulation and
23 exposure standards that appropriately address and
24 manage risks posed by industry operations"?

25 Did I read that correctly?

1 A. Yes.

2 Q. And "By using published scientific data
3 and by developing new scientific evidence where
4 needed, API hopes to demonstrate that the existing
5 controls on regulated petroleum products, hydrocarbon
6 components and related compounds are sufficient, and
7 additional regulatory or standard-setting actions will
8 not provide further health or environmental benefits."

9 Did I read that correctly as well?

10 A. You did.

11 Q. And then under "Proposed Projects,"
12 there are eight of them going on to the next page. Do
13 you see that?

14 A. Yes.

15 Q. And number 7 is the "Re-examination of
16 the Pliofilm cohort data." Do you see that?

17 A. Yes.

18 Q. And the API was going to support a
19 re-examination of the worker data "in light of current
20 regulatory trends and recent publications that report
21 low-dose effects." Correct?

22 MR. TUBIN: Objection to form and
23 foundation.

24 A. You read that correctly.

25

1 BY MR. TELAN:

2 Q. What do you think they're saying there?

3 MR. TUBIN: Objection to form.

4 A. What they're saying and I believe what
5 they did was getting the Pliofilm cohort data and, in
6 their minds, doing better modeling to try to
7 understand the levels of exposure of the Pliofilm
8 cohort that measurably increases the risk of, and that
9 study was all leukemias combined, but I think they
10 also tried for AML as well.

11 BY MR. TELAN:

12 Q. And do you know if the American
13 Petroleum Institute achieved that goal of doing that?

14 A. I believe they have a publication.
15 There's been several groups that have gotten the
16 Pliofilm data by Crump, and I think Paxton was another
17 one, but they're cited in my report. There's two or
18 three papers that re-examine the Pliofilm worker
19 cohort. And just to be clear, I've cited those in my
20 report, but I haven't relied on them. I go back to
21 the actual publication by Rinski in 2002 as being the
22 most informative.

23 Q. I'm going to hand you the next exhibit.
24 This is 15.

25 (Exhibit 15 was marked for

1 identification.)

2 BY MR. TELAN:

3 Q. Is this a document that you recognize?

4 A. Yes.

5 Q. So API hired Gradient to do this,
6 didn't they?

7 A. They did.

8 Q. And Dr. Goodman, correct?

9 A. As the second author. That's correct.

10 Q. And Dr. Goodman is an expert in this
11 case, obviously. True?

12 A. That's right.

13 Q. The date of this article is 2016,
14 correct?

15 A. That's right.

16 Q. And do you cite to this paper in your
17 report?

18 A. Yes, I have.

19 Q. And the American Petroleum Institute
20 actually funded this study, correct?

21 A. That's what the footnotes say.

22 Q. Do you know if Gradient has a contract
23 with the American Petroleum Institute?

24 A. I don't know that either way.

25 Q. Does it matter to you or no?

1 A. It would be something that I would
2 consider. They're doing a reanalysis of the cohort
3 data, and they found exactly the same things that
4 Rinski and others have published. So the funding of
5 this paper in particular wouldn't matter, but it
6 wasn't one that I relied on heavily either way.

7 Q. Do you know what information, if any,
8 was conveyed by members of the benzene task force to
9 the Gradient folks who ran this paper in advance of
10 the study?

11 A. If it's not in the introduction
12 discussion, I wouldn't know that at all, and I'd have
13 to read the introduction discussion to see if it's
14 mentioned.

15 Q. As we're looking for the next numbered
16 exhibit, when you use the term "probable," does that
17 convey a likelihood of greater than 50 percent?

18 A. As I mentioned before, none of this is
19 quantitative from a scientific perspective.

20 Q. I'm talking about everyday vernacular.
21 If you say something is probable, do you interpret
22 that to mean that there's a greater than 50 percent
23 chance of something occurring?

24 A. It could be less. It could be more. I
25 guess it depends on the context. I'm not sure how to

1 answer that overly poor question.

2 Q. Do you think probability would allow
3 for a definition under 50 percent?

4 MR. TUBIN: Objection to form.

5 A. You know, I think I'm probably gonna
6 win the lottery. I don't get there, but I will say to
7 my friends I am probably going to win the lottery.
8 That's a lot less than 50 percent.

9 BY MR. TELAN:

10 Q. I'll probably bet your possibly going
11 to win the lottery. We might disagree.

12 A. Definitely maybe.

13 Q. So in terms of possibility versus
14 probability, what quantifiably has a more likelihood
15 of occurring?

16 MR. TUBIN: Objection to form.

17 A. I don't have an answer to that. I
18 think it will depend on the context, but I'm not even
19 sure where to go with that.

20 BY MR. TELAN:

21 Q. Do you consider the terminology at
22 least "as likely as not" to be synonymous with "more
23 likely than not"?

24 MR. TUBIN: Objection to form.

25 A. As -- it's not used in my everyday

1 language. As used here, I think they are different.
2 "As likely as not" then would mean a 50-50 flipped
3 coin, and "more likely than not," as used in this
4 litigation by your experts, would be more than a 50-50
5 flipped coin.

6 BY MR. TELAN:

7 Q. Did you cite in your paper to an
8 article by Dr. Schnatter and a scientist named Win
9 Chow Li? The title is "Benzene risk assessment. Does
10 new evidence on myelodysplastic syndrome justify a new
11 approach?"

12 A. Yes, I did.

13 Q. And what did you cite that paper for?
14 What was the proposition that you cited that for?

15 A. So, in part, it's here to be
16 comprehensive, but I was commenting on this concept of
17 this new approach was that they were trying to argue
18 that all levels of exposure, all durations of exposure
19 be considered for modeling risks, which is the case.
20 I thought they were trying to negate this concept of
21 what has been reproduced in multiple high quality epi
22 studies for the etiologic time window, the time since
23 last exposure, the development of AML being for 10 to
24 15 years.

25 And I think they were trying to say for

1 an epidemiologic purpose, we should be going past 15
2 years, and it was both nonconvincing. And given all
3 the documents we went through, it would be actually
4 anti-industry position, even though that's
5 Dr. Schnatter.

6 Q. Do you know if the benzene task force
7 expanded its reach into Europe?

8 A. I don't even know whether they started
9 or not started in Europe or Africa or expanded their
10 reach. I don't really know much about them offhand.

11 Q. You did see, though, that they had
12 connections that they spoke about in China, in
13 Shanghai, correct?

14 A. Well, that's where they were doing the
15 study. They were going to where the highest exposed
16 benzene workers were in the world and that were
17 accessible for research studies.

18 Q. Does the name "Colin North" ring a bell
19 to you?

20 A. Only as an author in some of the papers
21 I cited or maybe just one. I don't know.

22 Q. What about Rushton?

23 A. Rushton also has been cited. Several
24 of my -- several of his papers over many years have
25 been cited in my report.

1 Q. And he's also an ExxonMobil employee.
2 Did you know that?

3 MR. TUBIN: Objection to form.

4 A. I'd have to go back and check. I think
5 that's the case.

6 BY MR. TELAN:

7 Q. If you go to --

8 A. So I actually don't believe that is
9 correct, because his affiliation, as of 2013, was the
10 Imperial College of London, Department of Epidemiology
11 and Biostatistics. He published with Schnatter, who
12 is from ExxonMobil and, in this case, of this paper
13 that I'm citing, acute myeloid and chronic lymphoid
14 leukemia and exposure to low-level benzene among
15 petroleum workers. The third author was Deborah
16 Glass, who was from the Monash University in
17 Australia. So I don't think it's not correct that he,
18 at least at the time of this publication, was working
19 for --

20 Q. You're right. I stand corrected.
21 Schnatter was the second author on that, and he's with
22 ExxonMobil?

23 A. Correct. He always has been, as far as
24 I recall.

25 Q. And that study, that was at page 104 of

1 your report, I believe; is that correct?

2 A. I think I cited it in multiple places.
3 I'm looking -- the one I'm looking at is on page 131,
4 but I think It's cited several times.

5 Q. And what do you say about that paper at
6 page 104 of your report? This is the article. I'll
7 hand that to you. We'll mark that as the next number
8 exhibit. If it helps, Dr. Shields, I have a paper
9 copy for you.

10 A. No. I already have the article. I'm
11 trying to figure out where you're seeing that on page
12 104.

13 Q. I thought it was page 104. Is it cite
14 635? It's also page 106 and 110.

15 A. Yes. So it's cite 635, and what it
16 says -- what it's citing for on page 104 is it's one
17 of five cites grouped together, and it says, "Another
18 series of studies frequently cited for benzene risk in
19 AML are from the Health Watch, Australian Health Watch
20 Study of Refinery Workers. They indicated risk
21 increases of 8 to 10 PPMU's, although a reanalysis, as
22 part of a pool study of several refineries, did not
23 find an increased AML risk but did report an increased
24 MDS risk at lower levels where AML was not observed.
25 See below." And this Rushton paper is one of those I

1 recited.

2 Q. Okay. Do you know if Rushton receives
3 funding from the European chemical industry?

4 (Exhibit 16 was marked for
5 identification.)

6 A. So under, in that paper that we're
7 talking about, under "Conflict of Interest," it says,
8 "Leslie Rushton receives funding for board membership
9 at the European Center for Ecotoxicology and
10 Toxicology of Chemicals from the European Chemical
11 Industry Council via Imperial College for Projected
12 Work. So that's basically his salary is getting
13 funded through his university, as part of his
14 university job.

15 BY MR. TELAN:

16 Q. Through which industry?

17 A. Well, it says it's going to his board
18 membership in the European Center for Ecotoxicology
19 and Toxicology of Chemicals and from the European
20 Chemical Industry Council via Imperial College for
21 Project Work.

22 Q. Now, this is a 2014 publication,
23 correct?

24 A. Unless we're looking at different ones,
25 I have 2013.

1 Q. Okay. And the conclusion of the
2 article is that, "Overall, this study does not
3 persuasively demonstrate a risk between benzene and
4 AML." Do you see that, the abstract? It might be
5 easier just to look at the hard copy.

6 A. Actually, it's much easier and this is
7 much quicker, and this is why you want me to have a
8 laptop. You can do you and I can do me, but I'm
9 telling you that this is more efficient for you.

10 So in this paper, just as in the
11 previous Schnatter 2012 paper or another Rushton
12 paper, they oddly did not find a relationship between
13 benzene exposure and AML, but they did report a strong
14 relationship between MDS and AML, and that's what is
15 reported in this paper as well.

16 Q. And there's no doubt in your mind that
17 benzene does cause AML, correct?

18 MR. TUBIN: Objection to form.

19 A. Yes, that's correct. That's one of the
20 oddities of these studies that Schnatter and others
21 have published where they claim an association of
22 benzene exposure 2.9 ppm years is associated with MDS,
23 but they found no AML. And what likely happened is
24 when they went to define the diseases, they redefined
25 the AMLs and MDS when they shouldn't have and so is a

1 problem as I go into detail in my report. But that's
2 what these folks, including Schnatter, who's working
3 at Exxon, put on the map for benzene causing MDS at
4 low levels of exposure.

5 Q. And not AML?

6 A. And not AML, which is problematic for
7 them. I can tell you their theories in the papers,
8 but it doesn't hold water.

9 Q. If you look at the Table 1 from that
10 study, if you go over on the chronic CLL lymphoid
11 leukemia, and just let me know when you're there.

12 A. Yeah. I'm there.

13 Q. Okay. Do you see that both of the risk
14 ratios are above one as reported?

15 A. For?

16 Q. For CLL.

17 A. Yeah, but there's a lot of risk ratios
18 here. Many of them are below one. Like the average
19 benzene exposure intensity --

20 Q. I'm looking just at cumulative benzene
21 exposure. Do you see that?

22 A. Okay. Yes. So one of them is at 1.05
23 at the highest level of exposure, and the middle of
24 the level of exposure is 1.49, which is numerically
25 higher than the 1.05.

1 Q. So you would say that these results, as
2 it relates to CLL, are not statistically significant?

3 A. They are definitely not statistically
4 significant, and they're showing in a
5 not-tested-but-inverse-dose response.

6 Q. Do you think it would be appropriate if
7 you look at the mid-level exposure range of .348 to
8 2.93 to interpret the risk ratio, confidence interval
9 to state that the dataset parameter values are
10 consistent with values that range from below the no
11 value to a risk that approaches three times the risk
12 for chronic lymphoid leukemia?

13 MR. TUBIN: Objection to form.

14 A. To be clear, for that middle-level
15 exposure, it goes from 0.81 to 2.76.

16 BY MR. TELAN:

17 Q. So is my question, the way I asked it,
18 is that, would you agree with that or not?

19 A. Do you want to say the question again,
20 because I was giving you the actual data rather than
21 trying to reword their data.

22 Q. Yes. Would you agree that you could
23 interpret that confidence interval by saying that the
24 dataset includes values below the no value to
25 parameter values that approach 270 percent risk for

1 chronic lymphoid leukemia?

2 MR. TUBIN: Objection to form.

3 A. Yes. Anywhere from a 20 percent
4 increased risk to a 270 percent increased risk.

5 BY MR. TELAN:

6 Q. Okay. If we go to the Colin -- did you
7 cite to Colin North in your paper as well, did you
8 say?

9 A. Yes.

10 Q. Okay. Did you say --

11 A. He's got several papers, and I believe
12 I've cited some of the papers.

13 Q. And you knew that he was also
14 ExxonMobil or did you not?

15 A. He is ExxonMobil along with Schnatter.

16 Q. You don't say that again in your report
17 anywhere, right? Like, that's not something that you
18 actually overtly stated?

19 A. As I said, I considered that. None of
20 these papers I considered the high quality driving the
21 opinions I have, but I don't routinely put in what the
22 funding agency was.

23 Q. Okay.

24 A. Of any type, whether it's university or
25 federal government or industry.

1 Q. James Collins is another author that
2 you cited to. Do you know Dr. Collins?

3 A. Personally? No.

4 Q. Do you know of him?

5 A. Again, as an author.

6 Q. Do you know if he's an industry author
7 or not?

8 MR. TUBIN: Objection. Form.

9 A. It looks like Dr. Collins is from Dow
10 Chemical.

11 BY MR. TELAN:

12 Q. So he would be an industry author,
13 correct?

14 MR. TUBIN: Objection to form.

15 A. Correct.

16 BY MR. TELAN:

17 Q. Do you know if Dow is part of the
18 benzene task force?

19 A. No idea.

20 Q. You don't know or you do know?

21 A. No. I have no idea.

22 Q. Okay. The concept of risk assessment,
23 you agree that that's not something that should be
24 used in determining causality. True?

25 A. I'm trying to think how it's not used

1 and not just what I believe. I mean, risk assessment
2 is part of the hazard identification. Causation is --
3 the first part is whether or not something causes
4 cancer and at what level. Then that gets turned over
5 to folks like the risk assessors and that sort of
6 thing to figure out the model's risk in the
7 population.

8 Q. And you'd never use that to evaluate
9 individual causality, correct?

10 A. If you're asking me if someone does a
11 computer model that says this level of exposure will
12 increase three cancers in a million, would I ever use
13 that to say that that's a person's actual risk? The
14 answer is no.

15 Q. Okay. Let's me hand you what we'll
16 mark as the next numbered exhibit.

17 (Exhibit 17 was marked for
18 identification.)

19 BY MR. TELAN:

20 Q. I believe you cited to this. This is
21 the -- a Schnatter paper. And you see it's -- you
22 have Richard Irons and Lesley Rushton there as well?

23 A. Yes.

24 Q. And have we established that those are
25 all industry scientists?

1 MR. TUBIN: Objection to form.

2 A. Yes. Let me go back and look one more
3 time.

4 BY MR. TELAN:

5 Q. If you look at the paper, they're all
6 ExxonMobil.

7 A. No, that's not correct.

8 Q. I'm sorry. It is says Schnatter,
9 ExxonMobil.

10 What about Richard Irons?

11 A. Richard Irons, I believe, is the
12 University of California. Let me look. So you have
13 Richard Irons is from ExxonMobil.

14 The next author is Deborah Glass. We
15 just went through this, is at Monash University in
16 Australia. G.T. is Gong Tang, who is from the
17 University of Pittsburgh. And then Richard Irons is
18 from the University of Colorado. And then last,
19 Lesley Rushton, as we established, is from the
20 Imperial College of London.

21 Q. Okay. If we look at this particular
22 study, you do note that Richard Irons is the same
23 scientist who was involved in the Shanghai study that
24 was mentioned in the benzene task force memos,
25 correct?

1 MR. TUBIN: Objection.

2 A. That's correct. That's correct.

3 BY MR. TELAN:

4 Q. If you look at Figure 2, and this the
5 forest plot, if you go to page 1728, "Cumulative
6 Exposure."

7 A. Yes, I'm there.

8 Q. Are you there?

9 A. Yep.

10 Q. Does that meet consistency under a
11 Bradford Hill analysis?

12 A. I'm not sure how to answer that,
13 because consistency is across papers. It is not a
14 thing -- for Bradford Hill concepts for consistency
15 within a paper, you do look at the consistency of the
16 results within a paper, but that's different than the
17 Bradford Hill context.

18 Q. All of the results in this paper show
19 that cumulative exposures at low to high levels have
20 an increased risk of above null, correct, for AML.
21 True?

22 A. No, absolutely not.

23 Q. Okay. So what do you see for AML
24 under -- on page 1728?

25 A. That all the results are statistically

1 insignificant. They all drop the lower confidence
2 level below one.

3 Q. What about the relative risk ratio,
4 setting aside the confidence interval for a minute?

5 A. If you're asking me whether it's
6 numerically increased above one, sure. It's not
7 meaningful, but it's numerically increased.

8 Q. For every single disease, correct?

9 A. That's correct.

10 Q. And you would just say that that,
11 because the statistical, the confidence intervals
12 include one, that the results are meaningless,
13 correct?

14 MR. TUBIN: Objection to form.

15 A. Boy, there's so many different,
16 different contexts to that.

17 So, first of all, these are all
18 different diseases, so it's not appropriate to just
19 say gee across all of them. They're numerically
20 increased above one.

21 Secondly, they're giving you data for
22 dose response, and you can see things like, for CLL,
23 it decreases at the highest level, and CML, it
24 decreases at the highest level. So the data is really
25 all over the place.

1 But with the exception of MDS for
2 greater than 2.93 ppm years, all of these are not
3 statistically increased, and the true result could
4 either be below one, up to and including above one.

5 BY MR. TELAN:

6 Q. So the conclusions from the authors
7 were that relatively low exposure to benzene by the
8 petroleum workers was associated with an increased
9 risk of MDS but not AML, which was similar to the
10 paper we had chatted about before from Dr. Schnatter,
11 correct?

12 A. Yes. Which, as I said before, is -- I
13 think they have some important methodological issues,
14 and it's not just me, because they should have seen an
15 increase in AML, but what they novelly reported here
16 was the increase in MDS at the lowest levels of
17 exposure, even below those commonly associated with
18 AML.

19 Q. Let's go to the next numbered exhibit.
20 (Exhibit 18 was marked for
21 identification.)

22 A. Yes.

23 BY MR. TELAN:

24 Q. This is from James Collins, who I think
25 you had mentioned was a Dow employee?

1 A. That's correct.

2 Q. And this is benzene study looking at
3 lymphatic and hematopoietic cancers, correct?

4 A. Correct.

5 Q. Under the first paragraph, Dr. Collins
6 says, "The Pliofilm rubber worker study has been
7 seminal in helping to set exposure standards for
8 benzene, including U.S. EPA's cancer potency factor"
9 as well as "the Occupational Safety and Health
10 Administration's ... exposure limit and the ACGIH
11 proposed threshold limit values."

12 Do you see that? It's on page 1, first
13 paragraph.

14 Dr. Collins goes on to state that --

15 A. I'm still trying to find that.

16 Q. See, if you looked at the paper one,
17 it'd be quicker.

18 A. No. It's bigger here and it's easier
19 here, and I can search for keywords. I still don't
20 see where you're reading here.

21 Q. Can I just point? It's the first
22 paragraph.

23 A. Okay.

24 Q. Go ahead. Paper might be better. I'm
25 just saying.

1 Does Dr. Collins go on to say, "Other
2 leukemias and lymphoid neoplasms have also been
3 reported to be associated with benzene exposures in
4 some studies"?

5 A. That's right.

6 Q. And then, underneath that, "Recently,
7 myelodysplastic syndrome," which is something we've
8 just chatted about, "has been observed in an
9 epidemiology study at relatively low benzene exposure
10 levels. Myelodysplastic syndrome is a disease of the
11 blood-forming tissue in the bone marrow and sometimes
12 precedes acute nonlymphocytic leukemia." Is that
13 correct?

14 A. That's what they wrote.

15 Q. Okay. And this study was funded and
16 performed while Dr. Collins was still at the Dow
17 Chemical Company, correct?

18 MR. TUBIN: Objection to form.

19 A. I assume that that is correct.
20 Actually, it states that explicitly.

21 BY MR. TELAN:

22 Q. If you go to the very last page toward
23 the bottom, underneath the tables, there's a conc --
24 the sentence starts, "For cancers of lymphatic and
25 hematopoietic tissue among all workers." Do you see

1 that?

2 A. In the discussion?

3 Q. It's on page 160. I apologize.

4 A. 160. And what were the beginning
5 words?

6 Q. "For cancers of the lymphatic and
7 hematopoietic tissue among all workers."

8 A. Okay. I've got that.

9 Q. Okay. If you look across the relative
10 risk ratios, can we agree that, setting aside the
11 confidence intervals for a minute, all of the risk
12 ratios reported by Dr. Collins in this are above the
13 null value?

14 A. I'm not sure how to answer that, but I
15 think what you wanted to ask me was whether they are
16 all numerically above one, and the answer is yes.

17 Q. Yes. And then all of the risk, the
18 confidence intervals include the null value?

19 A. Correct. They all drop above and below
20 one.

21 Q. And the conclusion from Dr. Collins,
22 back on page 1, is "Our results for all leukemias are
23 consistent with a small increase in risk observed in
24 the lower-exposed subgroups of the Pliofilm study.
25 However, our results are also consistent with no

1 increased risk, especially for acute nonlymphocytic
2 leukemia."

3 Do you see that?

4 A. That's correct.

5 Q. Do you agree with that conclusion?

6 A. Well, it depends on how you want to
7 define "small increase in risk," because if you want
8 to say small increase in risk without statistical
9 significance, then I would agree with that, and in
10 this study, they don't have an increased risk for
11 acute nonlymphocytic leukemia.

12 Q. Yes. Other than for acute
13 nonlymphocytic leukemia, would you agree that this
14 study is consistent with a small increase in risk
15 across all other leukemias?

16 A. No, because they're not statistically
17 significant.

18 Q. So you disagree with his conclusion?

19 A. Well, they don't define whether they
20 have statistical significance or not. If they did,
21 then that would be clear. So it's ambiguous, but
22 their results are their results from the paper, which
23 is a numerical increase in risk without statistical
24 significance.

25 Q. Did you know that Dr. Collins is the

1 director -- or was at the time the director of
2 epidemiology at the Dow Chemical Company?

3 A. I don't know that.

4 Q. Presumably, he would understand the
5 concept of statistical significance, correct?

6 MR. TUBIN: Objection to form.

7 A. That's right.

8 BY MR. TELAN:

9 Q. And he chose the words and did not
10 include statistical significance in that conclusion,
11 correct?

12 MR. TUBIN: Objection to form.

13 A. No. He didn't need that, because he
14 has that in the results. You can see that the results
15 are not statistically significant.

16 BY MR. TELAN:

17 Q. So is his conclusion accurate?

18 A. It's accurate for a numerical increase
19 without statistical significance, which is clear from
20 the results section.

21 MR. TELAN: Okay. How are we doing --
22 how are you doing on --

23 THE WITNESS: If this is a good time to
24 break, we can take another five minutes?

25 MR. TELAN: Yeah.

1 VIDEOGRAPHER: We are now going off
2 record. The time is 3:50.

3 (A recess was taken from 3:50 to 4:05.)

4 VIDEOGRAPHER: We are now back on the
5 record. The time is 4:05. You may continue.

6 BY MR. TELAN:

7 Q. Dr. Shields, you reviewed the Cohn
8 Ecological Study, correct?

9 A. Correct.

10 Q. Did you make a comments in your report
11 about the quality of that study?

12 A. Likely.

13 MR. TELAN: Mark this as the next
14 numbered exhibit.

15 (Exhibit 19 was marked for
16 identification.)

17 BY MR. TELAN:

18 Q. This is an article from, again, Julie
19 Goodman at Gradient, right?

20 A. Yes. That's what you handed me.

21 Q. In fact, all of the authors are from
22 Gradient?

23 MR. TUBIN: Objection to form.

24 A. It appears so.
25

1 BY MR. TELAN:

2 Q. If you go to page 7 of that study, this
3 is an article looking at PCE and NHL, correct?

4 A. Yes.

5 Q. The first paragraph, it says, "Three
6 ecological studies examining the potential
7 associations between PCE exposure and NHL were
8 identified. As shown in Table 4, all of the
9 ecological studies are low quality with respect to
10 study design, exposure measurements, exposure levels
11 and confounders, with one exception: Cohn, et al."

12 Do you see that?

13 A. I'm sorry. So you said on page 7?

14 Q. Page 7 of "Ecological studies."

15 A. Oh, okay.

16 Q. Do you see what I was referring to?

17 A. Yes.

18 Q. And if you go to cite number 24 at the
19 back, I want you to confirm that Cohn study that she's
20 referring to is the ecological study evaluating
21 drinking water contamination and the incidence of
22 leukemia and non-Hodgkin's lymphoma.

23 A. Okay.

24 Q. Is that true?

25 A. Yes.

1 Q. What was your comment about the study?

2 A. So as an ecological study compared to
3 high quality studies we have for PCE and NHL, it's a
4 low quality study. As an ecological study compared to
5 the other ecological studies, which overall are given
6 low weight, it's an okay paper. I don't think it's a
7 high quality ecological study.

8 Q. So it's certainly not low quality,
9 correct, as far as ecological studies go?

10 A. It's not as bad as the other ones, but
11 that's not comparing much to much.

12 Q. Okay. You wouldn't tell the judge in
13 this case that it was a poorly designed or poorly run
14 study, correct?

15 A. That's a two-part thing. I'd have to
16 think about the poorly run. The design is what it is.
17 It's a low informative study. They don't have
18 individual exposures, which would, which separates an
19 ecological study from a higher quality nonecological
20 study.

21 Q. And you do note at page 8, Dr. Goodman
22 refers to the fact that the Cohn study revealed
23 increased risks of non-Hodgkin's lymphoma in males at
24 PCE concentrations from .1 to 5 parts per billion with
25 a risk ratio of 1.25 and a confidence interval that

1 goes from 1.07 to 1.46, correct?

2 MR. TUBIN: Objection to form.

3 A. Yes. At the lower level of exposure,
4 they had a statistically significant result but not in
5 those with high levels of exposure or in women in any
6 level of exposures, so if she's recording that
7 accurately.

8 (Exhibit 20 was marked for
9 identification.)

10 BY MR. TELAN:

11 Q. If we go to a study by Mundt, does that
12 ring a bell with you? M-u-n-d-t, K. A. Mundt?

13 A. The author is familiar to me. I'm not
14 sure I'm familiar with the paper itself.

15 Q. Did you cite that paper in your report?
16 Look at page 94.

17 A. Yes. It is citation 498. Do you have
18 a page number?

19 Q. Is it cite 498 at page 94?

20 A. Yes.

21 Q. Okay. And are you familiar with
22 Randoll Corporation -- Ramboll Corporation?

23 A. Where are you seeing that?

24 Q. Page 19 of 22. "This research was"
25 funded or "sponsored in part by a grant to Ramboll

1 U.S. Corporation from the Foundation for Chemistry
2 Research and Initiatives."

3 A. I'm not familiar with them.

4 Q. In any event, Dr. Mundt was looking at
5 literature related to four different chemicals,
6 correct? Benzene, formaldehyde, 1,3-butadiene and
7 smoking. True?

8 A. Yeah. I wouldn't call tobacco smoking
9 a chemical agent, but, yes, those are the four
10 exposures they're looking at.

11 Q. And I didn't call it that. That's his
12 words, right?

13 A. That's correct.

14 Q. Okay. If you go to page 8, if you see
15 at the bottom, the second paragraph from the bottom,
16 starting with "Since studies," do you see that?

17 A. Yes.

18 Q. "The meta-analysis of results for AML
19 was based on 27 estimates from 26 publications and
20 generated a summary relative risk of 1.3 with a
21 confidence interval that was 1.09 to 1.55."

22 Do you see that?

23 A. Yes.

24 Q. Does that indicate elevated risk that
25 is statistically significant, in your words?

1 A. The risk estimate would be
2 statistically significant.

3 Q. And then, below that, "For CML," the
4 paragraph below, "the meta-analysis of overall results
5 was based on 18 estimates ... in a summary risk of
6 1.25 with a confidence interval from 1.00 to 1.55."
7 How would you describe that confidence interval?

8 MR. TUBIN: Objection to form.

9 A. I think the convention is to call it
10 borderline statistically significant.

11 BY MR. TELAN:

12 Q. You wouldn't call it null, correct?

13 A. No. I would call it borderline
14 statistically significant.

15 Q. Would it be inappropriate to call a
16 study that revealed a positive association but where
17 the confidence interval included the null value to
18 simply refer to it as a null study?

19 A. You're saying that the lower confidence
20 interval was one?

21 Q. It was below one, hypothetically.

22 A. You know, this is all a spectrum. If
23 it was .99, I'd probably still call it borderline
24 significant or even .98, but it would also depend on
25 the context, and as important would be what is the

1 other data in the study rather than cherry-picking one
2 result.

3 Q. I'm asking you hypothetically if the
4 study revealed a relative risk that was positive,
5 let's say 1.3, but the risk ratio -- I'm sorry, but
6 the confidence interval went from 1.7 to 2.4. Would
7 it be appropriate to refer to that as a null study?

8 A. Yes. But most studies also have
9 multiple results. So let's assume that there's
10 multiple analyses all with that type of result, and
11 that would be a null study.

12 Q. If you look at the -- what is the
13 significance when Dr. Mundt states that "Publication
14 bias appears unlikely"?

15 A. What is the significance?

16 Q. Yeah.

17 A. So there are procedures to try to
18 predict whether there's publication bias or not.
19 They're actually not very good, but it's as good as
20 they get, and so they do these final plots and try to
21 see whether or not there's some results that are
22 skewed.

23 Another way to look at it is the
24 heterogeneity of the results. That's what you do.
25 But at the end of the day, you can't really know

1 whether you have publication bias or not, because you
2 don't know what didn't get submitted, so they try to
3 guesstimate whether that's an issue or not.

4 Q. If we go to page 94 of your report --

5 A. And let me -- I'm just sorry. So you
6 were reading the first half of that paragraph about
7 "publication by a superior is unlikely." Oh, then
8 they go on for --

9 Q. Yeah.

10 A. -- "myeloid leukemias combined." Okay.

11 Q. I was going to ask you when they
12 combine the myeloids together, both CML and AML, the
13 confidence interval becomes statistically significant,
14 does it not?

15 A. Yes, with evidence of publication bias.

16 Q. In your report, do you mention any of
17 those relative risk ratios that we just talked about?

18 You note that, under "Cigarette
19 Smoking," that "a Bradford Hill analysis indicates
20 that cigarette smoking is causally related to AML" but
21 nothing more for that particular study there, correct?

22 A. On that page. I'm looking to see
23 whether I've cited it elsewhere in my report. That
24 looks like it's the only place where it's cited.

25 Q. Why didn't you cite the relative risks

1 related to CML?

2 A. For smoking?

3 Q. For benzene.

4 A. I have no particular reason why I
5 didn't.

6 Q. If you go to the page 8 of 22,
7 Dr. Mundt states, "The meta-analysis for MDS generated
8 a summary risk of 1.87 with a confident interval of
9 1.39 to 2.52."

10 What is the significance of that
11 result?

12 A. That doesn't get any summary estimate
13 that's statistically significant.

14 Q. And this is for benzene, correct? All
15 the results we're talking about are for benzene if you
16 look at page 5 of 22, correct?

17 A. That's correct.

18 Q. And you only cited in the study to
19 suggest that cigarette smoking was related to AML?

20 A. That's right. I didn't cite this
21 anywhere else.

22 Q. But, in fact, this study is consistent
23 with elevations and risks from benzene alone for MDS,
24 AML and CML, correct?

25 MR. TUBIN: Objection to form.

1 A. Well, so I've -- what's indicated in my
2 report is that I believe that benzene is the cause of
3 MDS and AML, and rather than citing all meta-analyses,
4 I cited some. But, more importantly, I cited the
5 actual papers. I look at benzene and CML.

6 BY MR. TELAN:

7 Q. Does MDS frequently become AML?

8 MR. TUBIN: Objection to form.

9 A. About 30 percent of the time, it
10 transforms. They always start off as a different
11 disease, but in some cases, MDS will evolve into an
12 AML.

13 BY MR. TELAN:

14 Q. And so you would agree that the studies
15 that you've reviewed and cited to demonstrate that
16 benzene does, in fact, target the bone marrow as a
17 target tissue, correct?

18 A. Yes, for MDS and AML. Correct.

19 Q. And benzene's metabolites are both
20 genotoxic and mutagenic, correct?

21 A. I think that's the same thing.

22 Q. Is it?

23 A. Genotoxic is mutagenicity.
24 Mutagenicity is a genotoxic effect.

25 Q. Are all genotoxic substances mutagenic?

1 A. Not necessarily.

2 Q. Are all mutagenic substances genotoxic?

3 A. By definition, yes.

4 Q. So they're not apples to apples,
5 correct?

6 A. Well, you can measure genotoxicity, for
7 example, a DNA adduct that's not a mutation, but that
8 DNA adduct can transform during replication into a
9 mutation.

10 Q. But benzene is both? The metabolites
11 are both genotoxic and mutagenic, correct?

12 A. I have to go back for mutagenic. It's
13 clastogenic that causes chromosome damage. I think it
14 does cause mutagenics -- mutagenicity, but I have to
15 go back to my leukemogenesis section to confirm that.

16 Q. Does benzene create DNA adducts, the
17 metabolites?

18 A. Yes.

19 Q. Is benzene also immunotoxic?

20 A. Yes.

21 Q. Is TCE and its metabolites genotoxic?

22 A. I think that's debated. My
23 understanding is that it is, but I have not really
24 looked into that closely to remember that either way.

25 Q. What about immunotoxic?

1 A. It does have some immune system
2 effects.

3 Q. And as far as the folks who were at
4 Camp Lejeune are concerned, when they were exposed to
5 the water that was distributed through the Hadnot
6 Point Water Treatment Distribution System, they were
7 exposed to a multitude of chemicals, not just a single
8 carcinogenic chemical, correct?

9 MR. TUBIN: Objection to form.

10 A. There were several that were measured
11 in there. That's correct.

12 BY MR. TELAN:

13 Q. Is PCE mutagenic?

14 A. I'm not recalling that, whether it is
15 or it isn't.

16 Q. Does it share the same metabolites as
17 TCE?

18 A. Some.

19 Q. What are those?

20 A. I don't recall offhand.

21 Q. Is TCA a common metabolite of the two?

22 A. I don't think TCA comes from TCE. I
23 think it just comes from TCE.

24 Q. What about chlorohydrate?

25 A. I don't know.

1 Q. What about vinyl chloride? Is that
2 mutagenic?

3 A. I don't recall if that's the case or
4 not.

5 Q. In terms of the time that you spent
6 preparing your report, how long did it actually take
7 you to prepare this report?

8 A. I can't break out the times. I would
9 say you would have to add up the time. That's not in
10 meetings, plus or minus a few hours for those
11 meetings, and that would be the time to take to
12 prepare the report before the date of the report of
13 February 7th.

14 Q. When I look back at your invoices, it's
15 hard to tell how much time you spent researching
16 versus actually preparing the report. Are you able
17 to?

18 A. It's the same. I don't distinguish
19 that.

20 Q. So you couldn't tell us, right? You
21 couldn't tell us that, like, 80 percent of the time
22 was research versus 20 percent of the time preparing?

23 A. It's an iterative process, so I'm doing
24 both continuously.

25 Q. And you had no help, right, no help

1 preparing the report?

2 A. That's correct. You know, I'll be
3 searching a particular question, reviewing the
4 literature, putting it into the report and then moving
5 on to the next paragraph, next section, then find
6 something to go back to an earlier section or
7 something occurs to me in the shower, and then I go
8 back the next day and I update that. So there's no
9 way.

10 The only way that I would distinguish
11 it is to say some of those meetings were more
12 conceptual so -- and preparing for those meetings,
13 that would be not actually preparing for the report,
14 but the rest of the time would be all report
15 preparation before February 7.

16 Q. If two chemicals share similar
17 metabolites and both are known to be genotoxic, does
18 that create a situation for a synergistic interaction
19 between the two chemicals?

20 A. Not necessarily. They also be -- they
21 also be, can be competitive, and it also depends that
22 the level of damage that happens from each of those,
23 so it could be synergistic. It could be competitive.

24 Q. Are you going to tell the court in this
25 case that the cocktail, if you will, of compounds

1 would have been competitive? And I might use the word
2 "antagonistic."

3 MR. TUBIN: Objection to form.

4 A. No. What I'm gonna tell the court is
5 that there's no evidence for an additive or
6 synergistic effect in humans.

7 BY MR. TELAN:

8 Q. Is there in smoking? Do the chemicals
9 in cigarettes create an additive effect?

10 A. I am thinking about how to answer that.
11 People are exposed to cigarette smoke, so I'm not even
12 sure there's a way to test that, to know they're
13 additive or competitive processes that go on. People
14 get exposed to the single exposure.

15 Q. Can you separate out what cancers
16 smoking causes to any of the single chemicals
17 involved?

18 A. So there are some chemicals in
19 cigarette smoke that we know, for example, in an
20 occupational setting that cause that type of
21 cigarette -- cause that type of cancer that's also
22 seen in cigarette smoke, but you really can't separate
23 it out, because people are exposed to smoke.

24 I guess there would be one exception.
25 Well, it wouldn't be in humans, but you could

1 surgically resect out, for example, a tobacco-specific
2 nitrosamine from cigarette tobacco with the
3 implication that that would be less lung cancer, but
4 that's actually not been tested in people.

5 Q. Have you heard of the term
6 "manufactured doubt" before?

7 A. I don't think so.

8 Q. Did you hear it at all in the context
9 of the smoking case that you testified in?

10 A. Not that I recall.

11 MR. TELAN: The next exhibit to the
12 record.

13 (Exhibit 21 was marked for
14 identification.)

15 BY MR. TELAN:

16 Q. This is an article out of Environmental
17 Health, I guess. You're familiar with that journal?

18 A. Sure, yes.

19 Q. Out of Amherst. So this is not an
20 industry study, right? This is an academic study? Do
21 you see that at the bottom, "University of
22 Massachusetts, Amherst"?

23 A. Yes, but you can't make the assumption
24 that this was not industry funded. So I'm looking
25 toward the back at the funding and declarations.

1 Q. If industry funded this one, I'm going
2 to eat my own hand.

3 A. Well, I think good news for your hand,
4 there's no indication.

5 Q. Okay.

6 A. It was funded by, actually, the federal
7 government and a foundation.

8 Q. So this is the first time you would
9 have heard the term "manufactured doubt"?

10 A. I think so.

11 Q. In terms of the tobacco playbook, I'm
12 sure you've heard that before, correct?

13 A. Yes.

14 Q. And what did the playbook that the
15 tobacco industry ran during the course of your cases
16 involve?

17 A. Well, there's a number of things that
18 they did both in terms of word and marketing and
19 publication of studies as well as manufacturing
20 cigarettes, so that they become more addictive over
21 time and they lose -- and they don't lose smokers.

22 Q. In terms of the -- you've never read
23 this before, right?

24 A. No. I've never seen this before.

25 Q. We won't bother too much with that,

1 then. Put that away for a second.

2 I was asking you about your search
3 terms that you use to update research that you've done
4 in this case. Did you come across a 2025 article on
5 benzene by the author Yu, Y-u?

6 A. Yes.

7 Q. When did you come across that?

8 A. Sometime after my report.

9 Q. Have you added that to your
10 materials-considered list?

11 A. I have not. In the notes that we were
12 talking about earlier, I have that in there as one not
13 being cited in my report, because the report was
14 written before it was published.

15 Q. And I don't have a copy of those. You
16 didn't bring those, right?

17 A. Correct.

18 MR. TELAN: We did ask for those,
19 right? There's no privilege you're asserting
20 over those notes?

21 MR. TUBIN: No. Earlier, you made a
22 demand on the record, and I noted it, and
23 we'll evaluate it for discoverability.

24 MR. TELAN: I just want to make sure
25 there's no privilege being asserted for the

1 notes.

2 BY MR. TELAN:

3 Q. What was your takeaway from the Yu
4 study, as you sit here today?

5 A. Do you have it with you?

6 Q. I do, but from your memory, since it's
7 a 2025, I'm just curious what your takeaway was from
8 that.

9 A. I have to see it. I see so many
10 articles, I want to make sure I'm giving you an
11 accurate answer.

12 Q. We'll get that.
13 When was it firmly established in your
14 mind that TCE caused kidney cancer?

15 A. So you remember that I don't believe
16 that it does, so it couldn't have been established.

17 Q. Is it a fair statement that, in this
18 case, you don't believe that any of the exposures that
19 occurred to any of the Marines or civilians on base
20 was sufficient to have caused any of the cancers that
21 are being complained of?

22 MR. TUBIN: Objection to form.

23 A. That's correct. Benzene is a known
24 cause of AML, and those levels of exposure are known,
25 so you'd have to be sufficiently exposed. And then,

1 secondly, the TCE literature for kidney cancer is also
2 pretty clear about the high levels of exposure. One
3 needs to have those reported associations, assuming
4 you want to interpret the literature as sufficient
5 human evidence.

6 BY MR. TELAN:

7 Q. And does that opinion hold, even with
8 their Yu study that has come out?

9 A. Again, I want to see it, but the Yu
10 study is problematic. It's essentially an ecological
11 study from the UK Biobank, very large study, but all
12 volunteers, and curiously has results that are
13 positive for virtually -- I don't want to say
14 virtually every cancer, but I think it's like 18
15 cancers or something, which is something that's just
16 not biologically plausible.

17 Q. Just so that I'm clear in terms of
18 causality, breaking it down individually, is it your
19 opinion that none of the exposures at Camp Lejeune
20 would have caused any of the plaintiffs to have
21 developed kidney cancer?

22 A. Correct, because of their levels of
23 exposure compared to those studies that report
24 positive associations.

25 Q. Is it also fair that your opinion is

1 that no exposure at Camp Lejeune would have resulted
2 in any of the plaintiffs developing bladder cancer?

3 A. It would be the same answer. Well, no,
4 it's not the same answer, because none of the
5 exposures from Camp Lejeune are known causes of
6 bladder cancer.

7 Q. So your opinion is PCE is not a known
8 cause of bladder cancer?

9 A. Yes. And that's consistent with IARC
10 and others.

11 Q. Is smoking a known cause of bladder
12 cancer?

13 A. Yes.

14 Q. Which chemical in smoking causes
15 bladder cancer?

16 A. Cigarette smoke causes bladder cancer.
17 There are -- the thoughts are that the aromatic amines
18 in cigarette smoke do it, but, again, you can't
19 separate out any of that from cigarette smoke to know
20 what's causing it. It could be the aromatic amines
21 plus other chemicals. There is no PCE or TCE in
22 cigarette smoke. There's benzene, but benzene is not
23 considered a cause of bladder cancer, and there's no
24 vinyl chloride in cigarette smoke.

25 Q. Moving to the leukemia, your opinion

1 would be that there's no exposure at Camp Lejeune that
2 would have caused any of the plaintiffs to develop
3 leukemia. True?

4 A. So it's not one type of leukemia, but
5 for all the types of leukemias as well as other
6 hematologic malignancies, exposures at Camp Lejeune
7 would not be causing any of those types of cancers.

8 Q. So when you say "hematological
9 malignancies," that applies, also, to NHL as well?

10 A. Yes.

11 Q. You cited to the Hayes study, "Benzene
12 and the dose-related incidence of hematologic
13 neoplasms in China." It's a 1997 study at page 103 of
14 your report; is that correct?

15 A. Yes. I have cited Hayes. I'm just not
16 on that page yet.

17 Q. I believe it's page 103.

18 A. I've been cited in multiple places,
19 including page 130 and elsewhere. Do you want me to
20 go to specifically -- I guess your question is about
21 the paper or are you --

22 Q. Well, I just want to go to 103, because
23 it's the first, the first one that I could find that's
24 in the middle of the paragraph, middle of the last
25 paragraph.

1 A. Okay. I'm on 103.

2 Q. You mentioned that the Hayes series of
3 papers indicate that the risk for AML combined is
4 elevated at an average of 10 parts per million, and
5 you list the relative risk ratio with the confidence
6 interval, correct? Do you see that?

7 A. That's right.

8 Q. What you didn't list is that the
9 authors also found that the relative risk was elevated
10 for all hematologic neoplasms combined at a risk ratio
11 of 2.2 with a 1.12, 4.2 risk ratio. True?

12 A. That's true, but that has nothing to do
13 with this section. This section is about AML, so I
14 wouldn't mention the other ones. There's other
15 sections on NHL, for example, that does mention the
16 Hayes paper.

17 Q. Did you mention that particular result?

18 A. I'd have to go and look. Do you want
19 me to do that?

20 Q. Well, their conclusion was that the
21 results of the study suggests that benzene exposure is
22 associated with a spectrum of hematologic neoplasms
23 and related disorders. Do you disagree with that?

24 A. Well, they have associations with the
25 spectrum, so I don't, I don't disagree with that.

1 That's fine for them to say that.

2 Q. Okay. But you do not believe that
3 other than acute myeloid leukemia, benzene causes any
4 other forms of leukemia. True?

5 A. That's correct. And this study as well
6 as the follow-up studies have been evaluated multiple
7 times by IARC and others, who also said the same
8 thing, that there's insufficient human evidence for
9 benzene causing anything other than MDS/AML.

10 (Exhibit 22 was marked for
11 identification.)

12 BY MR. TELAN:

13 Q. You cited to a paper by, the last name
14 Poynter, P-o -- I think it's y-n-t-e-r. I might have
15 gotten that spelling wrong, but it's not Pointer,
16 pointer. It's P-o-y -- P-o-y-n-t-e-r. I believe that
17 was at 103 as well and page 118.

18 A. Okay.

19 Q. If you look under the abstract, the
20 authors state that there were significant associations
21 between MDS, AML and benzene. And the risk ratios for
22 AMS was 1.77 -- I'm sorry. MDS was 1.77 with a risk
23 ratio of 1.19 to 2.63. And for AML, it was 2.10 with
24 a risk ratio of 1.35 to 3.28. Do you see that?

25 A. I want to just make sure we're talking

1 about the Poynter paper, "Chemical Exposures and Risk
2 of Acute Myeloid Leukemia and Myelodysplastic
3 Syndrome --

4 Q. Yes.

5 A. -- in a Population-Based Study." Okay.
6 So I'm on the same paper with you.

7 Q. Okay. Do you see that the authors also
8 found a positive association between vinyl chloride
9 and both MDS and AML?

10 A. That's what they're reporting in the
11 abstract. I can go into the paper to see where those
12 numbers are coming from.

13 Q. What they state in conclusion is that
14 "We confirmed well established risk of MDS and AML
15 associated with benzene exposure." Do you agree that
16 there's a well established risk between benzene and
17 MDS?

18 A. Yes, I would agree with that.

19 Q. You cited to the Deborah Glass study,
20 "Leukemia Risk Associated with Low-Level Benzene
21 Exposure," at page 109 and 110 of your report. If you
22 would go to that, please.

23 A. I'm there.

24 Q. Was benzene also associated with
25 chronic lymphoid leukemia?

1 A. That's not my recollection from the
2 Australian studies as a statistically significant
3 result.

4 Q. And so your testimony is that it was
5 not consistent with an elevated risk in CLL?

6 A. My recollection is this is not
7 statistically significant. We can look at the paper
8 to make sure that I don't have a faulty memory.

9 Q. Okay. If you look at table -- I'm
10 sorry, page 574 of that study.

11 A. The Poynter study or Glass?

12 Q. Glass.

13 A. Okay. So I've got to open up the
14 Glass.

15 Q. I'm sorry. I thought you were on
16 Glass. I apologize.

17 A. No. I was still staying with Poynter,
18 because I didn't know if we were finished with that or
19 not.

20 MR. TUBIN: Pat, what year for the
21 Glass study you're referring to?

22 MR. TELAN: A video what?

23 MR. TUBIN: The year for the Glass
24 study you're referring to.

25 MR. TELAN: Oh. 2003.

1 A. What's the first word of the title?

2 BY MR. TELAN:

3 Q. "Leukemia Risk Associated with
4 Low-Level Benzene Exposure."

5 A. Okay. I've got it.

6 Q. Okay. If you would turn to page 575.
7 The first paragraph at the top, about three-quarters
8 of the way down the paragraph, it states, "In our
9 study, the risk of leukemia was increased at all
10 cumulative exposures above 1 part per million year
11 with a strong exposure response relationship. There
12 was no evidence of a threshold."

13 Do you agree with that?

14 A. Well, that's what they wrote. I don't
15 think that that is correct from the data. I'd have to
16 go back to the data and look at it.

17 Q. Do you want a copy of the paper doc?

18 A. I have it.

19 MR. TUBIN: You marked Poynter, right?

20 MR. TELAN: I did.

21 MR. TUBIN: So this would be 23, I
22 believe.

23 (Exhibit 23 was marked for
24 identification.)

25 MR. TELAN: We had mentioned the Yu

1 study before. We'll mark that as the next
2 numbered exhibit.

3 BY MR. TELAN:

4 Q. This is the pre-proof doc. I'm handing
5 it to you, unless you've got it.

6 Do you have the Yu study on your
7 computer?

8 A. I don't have that.

9 Q. Okay. Now, you've read this study,
10 right?

11 A. So just to be clear, we're either
12 moving off or coming back to Glass?

13 Q. Moving off of Glass for now, but since
14 you don't need to transition to your computer, we'll
15 just...

16 A. Okay.

17 Q. Does this look familiar to you?

18 A. Yes.

19 Q. Okay. The authors in this study, do
20 they conclude that the levels of exposure to benzene
21 that could cause a variety of cancers was well below 1
22 part per billion?

23 A. That's what their data supports as an
24 air exposure from air pollution.

25 Q. Do you have any criticisms of this

1 study?

2 A. Sure. So, admittedly, it's a large
3 study. UK Biobank study is a study of volunteers
4 which would be biased in many ways in terms of people
5 being healthier, more educated, more homogeneous in
6 terms of race, and their exposure assessments via air
7 pollution is something that is -- it's an ecologic
8 study, so you really don't know what people were
9 exposed to and how and how long and that sort of
10 thing.

11 They do have smoking data, which is
12 good, but the major issue is when you look at the
13 results, they have positive results for something like
14 18 different cancers, which is not only not
15 biologically plausible, but if that were true, then
16 multiple occupational studies of substantially higher
17 exposures would easily be able to see, for example,
18 the increases of breast cancer, head and neck cancer,
19 prostate cancer, colon cancer, rectum -- rectal
20 cancer. They've had a biliary tract cancer, stomach
21 cancer, uterus cancer, ovary cancer, esophageal
22 cancer, pancreatic cancer, kidney cancer, bladder
23 cancer, brain cancer and thyroid.

24 If this were correct, we would
25 absolutely know it by now, given all the studies we

1 have of heavily exposed persons from the NCI China
2 study, the Pliofilm cohort. They didn't do
3 Glaston-induced solid tumors, so I couldn't cite that.
4 But all the other numerous studies, I looked at all
5 the things.

6 So the data is just not biologically
7 plausible and inconsistent with the published studies.
8 This study -- this study is also, by the way, is
9 virtually identical to the author string by, I think
10 it was, Wang that was published a year before.

11 Q. Those are a mortality study, right?
12 Was Wang a mortality study?

13 A. I don't have that with me, because I
14 was gonna say that was inadvertently not cited in my
15 report. It's a different group but the same sort of
16 results from this -- using almost identical
17 methodology, so this is really just an update of one
18 more year.

19 I just want to point out that I didn't
20 have it in my report. That was inadvertently omitted.
21 But, nonetheless, if this paper were correct when you
22 put it in the context of other papers, we would know
23 whether or not benzene was a cause of all these other
24 cancers and it's not.

25 Q. The Wang study was published before

1 your report was final, correct?

2 A. That's correct.

3 Q. And you're saying that you knew about
4 it and you read it but didn't include it in the
5 materials-considered list documents reviewed or
6 mention it at all in the body of your report?

7 A. I realized after the report was written
8 that it wasn't included. I went back. I was aware of
9 the paper through my weekly email feed in, like,
10 January of '24. No. I'm sorry. It was in my files
11 of January '24 and then in my weekly email feed of
12 April of '24, and I just inadvertently did not put it
13 into the report.

14 Q. Is that email feed saved on your
15 computer?

16 A. I searched through my emails. I'd see
17 whether or not I have it or not, but if it's within a
18 year, it's probably still within my emails.

19 Q. What you're saying is that study should
20 have been included in your report?

21 A. Yes.

22 Q. But you didn't, you didn't even do an
23 evaluation of it, correct? There was nothing in your
24 report that was dedicated, devoted to an analysis of
25 the Wang study?

1 A. That's correct. I was aware of it, and
2 it was just an oversight that it was not in there.

3 Q. But the Wang study still used the .18
4 parts per billion, did they not?

5 A. I believe that's so. I mean, it was
6 virtually identical to the study, just an entirely
7 different research group.

8 Q. And it's the most well powered study of
9 all the studies that you've looked at in terms of the
10 number of people enrolled?

11 MR. TUBIN: Objection to form.

12 A. Now, that's totally not correct. Power
13 is the largest number of people in a cohort, but that
14 doesn't necessarily use more power because of both the
15 exposure level as well as the expected effect sizes.

16 BY MR. TELAN:

17 Q. The Wang study and this study both
18 speak to benzene causing kidney cancer, bladder
19 cancer, NHL and leukemia at lower levels than have
20 been reported in other studies. True?

21 MR. TUBIN: Objection to form.

22 A. I don't know what you mean by --
23 sorry -- speak to causing. What they're reporting is
24 positive associations for 18 different cancers,
25 including those with an ecological assessment of

1 ambient air pollution levels.

2 BY MR. TELAN:

3 Q. Let me rephrase. The Wang study and
4 the Yu study -- let me focus on Wang. The Wang study,
5 which was published before your report came out,
6 speaks to a positive risk association between
7 low-level benzene under 1 part per billion and kidney
8 cancer. True?

9 A. As estimated from air pollution, which
10 may or may not be correct, but that's what they
11 reported.

12 Q. And it also reports a positive
13 association with bladder cancer at less than 1 part
14 per billion. True?

15 A. Among 16 others cancers as well, so
16 that's correct.

17 Q. Including NHL, correct?

18 A. I believe that's correct.

19 Q. And leukemia?

20 A. Yes, that's correct.

21 Q. And you're saying you have the study,
22 but it was just an oversight on your part that this
23 single study that impacted four cancers just didn't
24 make its way into your report?

25 MR. TUBIN: Objection to form.

1 A. That's right. It should have been
2 included under the ecological section.

3 BY MR. TELAN:

4 Q. Why wasn't it supplemented in your
5 materials-considered list?

6 A. I haven't supplemented anything.

7 Q. Why not?

8 A. I wasn't asked to. I didn't think
9 about it. I mean, my experience is that the purpose
10 of the deposition is to update anything from the
11 report, and that's what we're doing here.

12 MR. TELAN: We marked this, right?

13 COURT REPORTER: No.

14 MR. TELAN: We'll mark that as the next
15 number. This is the Yu study.

16 (Exhibit 24 was marked for
17 identification.)

18 BY MR. TELAN:

19 Q. I guess before we leave this study, can
20 you confirm as -- I'm sorry. You're juggling. I
21 apologize.

22 Looking at -- it's probably easier if
23 you go to the last, second-to-last page.

24 A. So I've lost my Yu study, I think.

25 Q. Okay. If you go to the

1 second-to-the-last page, the graph is in a better font
2 size.

3 A. It's much easier on the computer.

4 Q. I'm not buying that.

5 If you go to leukemia, do you see that
6 the relative risk is 2.11 with a confidence interval
7 of 1.89 to 2.36?

8 A. Yes, I do.

9 Q. For non-Hodgkin's lymphoma, do you see
10 that it's 2.11 with a confidence interval of 1.92 to
11 2.30?

12 A. Correct.

13 Q. If you go down to kidney, do you see
14 it's 1.95 with a confidence interval of 1.76 to 2.17?

15 A. Yes.

16 Q. And then for bladder, it's 1.86 with a
17 confidence interval of 1.69 to 2.04?

18 A. Yes. And can I just supplement? You
19 asked me about the criticisms of this paper.

20 Q. Sure.

21 A. So you can also see from this figure
22 that they also have consistently, for all of those 16
23 or 18 cancers, increases in toluene and xylene, which
24 again would make this paper an extreme outlier, given
25 that there are a bunch of toluene and xylene studies.

1 Also, speaking to your issue of synergy, at least for
2 benzene, toluene and xylene, which at least some
3 people think theoretically should share mechanisms for
4 things like genotoxicity and that sort of thing.

5 Some people claim that there is benzene
6 in toluene and xylene, so they have the column here
7 for BTEX, which is a combination of all of those. And
8 you see that the risks are actually lower for
9 co-exposures than they are for benzene, certainly
10 failing to support a concept of synergy or
11 additiveness.

12 MR. TELAN: Next numbered exhibit is
13 going to be -- is it 25?

14 BY MR. TELAN:

15 Q. This is Wang study that you were
16 discussing earlier, Dr. Shields.

17 (Exhibit 25 was marked for
18 identification.)

19 A. And I know you want to hold on to that
20 for a second, but I may come back to that. Okay.

21 BY MR. TELAN:

22 Q. We've talked about this. The graphs
23 are a little easier to read, but this is mortality,
24 correct, mortality study?

25 A. Yes.

1 Q. And the conclusions are "Long-term
2 exposure to low concentrates of ambient benzene
3 significantly increases mortality risk in the general
4 population."

5 And if you look at specifically on page
6 990 under "Leukemia," the risk ratio is 1.22 with a
7 confidence interval of 1.12 to 1.33. Do you see that?

8 A. I'm sorry. For leukemia, under Figure
9 1?

10 Q. Under Figure 1, yes.

11 A. Yes, I see that now for the crude
12 model.

13 Q. Okay. And then under "Non-Hodgkin's
14 Lymphoma," it's a 1.19 with a confidence interval of
15 1.09 to 1.30, correct?

16 A. Yes.

17 Q. And I take it you would disagree with
18 the author's conclusions about long-term exposure to
19 benzene?

20 A. Well, I can't argue with their data. I
21 have to go back and remind myself what they consider
22 limitations, but there are clearly problems with this
23 data about them finding such relative risk assessments
24 are statistically significant or hazard ratios is
25 statistically significant. That's not been shown in

1 repeated high level exposure studies.

2 Q. If you look at the authors in this
3 study and the last study we just looked at, the Yu
4 study, I thought you said that they were all the same
5 except for one.

6 A. No. They're all different. It's a
7 totally different research group using the same data,
8 the same methods and, in some cases, virtually the
9 same language.

10 Q. So two different groups of scientists
11 studying the same cohort, correct?

12 A. That's right, using exactly the same
13 methods.

14 Q. One was a mortality study, and one was
15 an incident study?

16 A. That's right.

17 MR. TUBIN: Pat, we're coming up on the
18 hour, if you get to a stopping point soon.

19 MR. TELAN: Sure. We can take another
20 five if you want.

21 MR. TUBIN: All right.

22 VIDEOGRAPHER: We're now going off
23 record. The time is 4:58.

24 (A recess was taken from 4:58 to 5:09.)

25 VIDEOGRAPHER: We are now back on the

1 record. The time is 5:09. You may continue.

2 BY MR. TELAN:

3 Q. Dr. Shields, you cited to the Tomasetti
4 paper in your report. You're not going to tell the
5 judges that 65 percent of cancers are more, are caused
6 by bad luck, are you?

7 A. I cited several Tomasetti papers, and
8 that sounds at least correct, if not higher.

9 Q. You believe that 65 percent of lung
10 cancers are caused by bad luck?

11 A. That's a different question. I thought
12 you were asking about all cancers.

13 Q. I changed it up on you.

14 A. So lung cancer is the exception, where
15 90 percent of lung cancer is caused in some way by
16 smoking, but for most of the cancers, most patients
17 don't have identifiable causes. So, for example,
18 smoking is a known cause of AML, but most AML patients
19 are not smokers.

20 Q. You know that that paper has been under
21 a tremendous deal of scrutiny, correct?

22 MR. TUBIN: Objection to form.

23 A. I'm well aware of both sides of the
24 issue.

25

1 BY MR. TELAN:

2 Q. Do you -- did you ever see an interview
3 with Dr. Tomasetti, who he said that he did not mean
4 to imply that 65 percent of cancer is actually caused
5 by bad luck?

6 A. No.

7 Q. In your book, cancer epidemiology --
8 I'm sorry, Cancer Risk Assessment.

9 A. It's a great read.

10 Q. So I have to ask you a question,
11 because I spent a lot of money on it.

12 A. So, theoretically, I should be getting
13 a check.

14 Q. You are.

15 A. If the publisher can even find me.

16 Q. I've got a feeling you're going to bill
17 me for today.

18 A. Yeah.

19 Q. Under -- I'm going to read this to you,
20 and I'm going to give it to you. I didn't make a
21 copy, because I don't -- first of all, I think it
22 violates...

23 A. Copyright law?

24 Q. Yeah. At page 175, "Environmental
25 Lifestyle and Behavioral Factors," it states, "A

1 conclusion from the descriptive and analytical
2 epidemiology of cancer is that cancer should be
3 largely, although not completely, preventable, and
4 that environmental and behavioral factors should
5 account for a large percentage of the total cases,
6 often estimated up to 80 percent of cancer."

7 Does that sound correct to you?

8 A. I think that's been evolving since
9 then. Who -- is that my chapter or is that someone
10 else's chapter?

11 Q. It's called "Cancer Epidemiology." Let
12 me see who wrote it.

13 A. I didn't write that chapter.

14 Q. You edited the book, right?

15 A. Correct.

16 Q. So if you would have disagreed with it,
17 you would have let the author know, correct?

18 A. Not necessarily, no. What I do is when
19 I edit it, I make sure that it's quality, but each
20 individual author is entitled to their own academic
21 freedom and opinions.

22 Q. This is Dr. James Cerhan from the Mayo
23 Institute?

24 A. Sure. I mean, you know, depending on
25 some people's views, they feel like if we could deal

1 with smoking, obesity, get everyone to exercise
2 correctly, you know, lifestyle, then most cancer
3 should go away. In fact, after all these years,
4 that's not happening. An understanding of bad luck
5 with carcinogenic mechanisms, we understand now that
6 more cancers, if not most cancers, in those patients
7 who don't have identifiable risk factors, are probably
8 getting it.

9 You know, they call it bad luck. Some
10 people really don't like to call it bad luck. The
11 issues is, is that this is a carcinogenic process that
12 we've known predating Tomasetti, so there was nothing
13 new to it.

14 But, you know, as your body does what
15 it does, you know, DNA replicates, cells replicate,
16 typographical errors happen, immune system gets revved
17 up by internal problems. DNA damage from external
18 sources, from internal sources don't get repaired.
19 Program cell death doesn't happen. These are all
20 cumulative events that happen that are really beyond
21 our control.

22 Q. But you would agree what I just read to
23 you contradicts Dr. Tomasetti's theory on bad luck
24 being a cause of cancer, correct?

25 A. Well, that was written many years

1 before Tomasetti. After Tomasetti and Bert Vogelstein
2 published their paper, there was a large pushback from
3 the prevention community, because they interpreted
4 that paper.

5 And in their subsequent papers, which
6 they clarified, what they were saying was everyone was
7 thinking that, like, gee, everyone is gonna now
8 understand that prevention doesn't matter, and we all
9 can smoke and drink and overeat and not exercise.

10 And that's not at all what Tomasetti
11 and Vogelstein were saying. And in subsequent papers,
12 they clarify what it is, but they showed
13 mathematically that those cancers that have higher
14 replicative rates, meaning they had a higher chance of
15 errors, were well associated with the actual incidence
16 of those cancers. So the prevention community didn't
17 like the message. A lot of them didn't understand the
18 data and analysis. A lot of folks like us were like,
19 yeah, that's something we knew a long time.

20 Q. But doesn't the exposure to mutagenic
21 compounds increase the risk of spontaneous mutations?

22 A. Say that again.

23 Q. Does the exposure to mutagenic
24 compounds increase the risk for spontaneous mutations?

25 A. I'm trying to think about how to

1 rephrase that. I know what you're asking me. So,
2 look, if you're exposed to -- so we get exposed to
3 carcinogens every day beginning, you know, from
4 conception. Those carcinogens can be made in the body
5 endogenously, and they can come from external sources
6 like we're exposed to benzene every day and we're
7 exposed to diesel exhaust every day and these sort of
8 things.

9 Over time, these things accumulate, but
10 the body has an amazing ability to repair that damage,
11 and so if you get a mutation that's on the way to
12 cancer, the body can either repair it or realize that,
13 gee, that's a problem we can't repair. So there's
14 something called program cell death, and dead cells
15 can't become -- can't go on to become cancer.

16 So what happens is that these things go
17 awry over time, but, you know, if you think about it,
18 it's kind of amazing we all don't get cancer by the
19 age of three with the carcinogens we're exposed to,
20 and that's because we have all these protective
21 mechanisms.

22 It's amazing that, you know,
23 100 percent of cigarette smokers don't all get lung
24 cancer, and it's only one in ten, because we have all
25 these protective mechanisms. And so those folks who

1 have no identifiable risk factors, the leukemia is the
2 breast cancers. I mean, that's because they're --
3 it's this home view of things that are happening that
4 are not getting repaired. And, ultimately, for most
5 cancers, it's a disease of aging. So the older you
6 get, the more you accumulate and the more you have a
7 chance of actually developing a clinical cancer.

8 Q. When you said the body has a remarkable
9 way of healing itself, you're talking about the immune
10 system, right, the adaptive immune system?

11 A. DNA repair, program cell death.
12 There's a number of different hallmarks of cancer that
13 both control and contribute to cancer.

14 Q. Is that through the immune system?

15 A. That's only one part of it.

16 Q. But does an exposure to an immunotoxic
17 drug repair the body's ability to repair damage done
18 by a mutagenic compound?

19 A. Not that I know of. The immune system
20 helps surveillance to get rid of bad things in our
21 body, including cancer cells. One of the problems
22 with cancer is that it gets smarter than our bodies.
23 It escapes the immune system so that it can grow, and
24 a lot of our newer drugs now target that.

25 But the theory is for some medications

1 that really mess up the immune system, or something
2 like HIV, that makes it a permissive growth, but
3 that's not the case for things like -- you know,
4 that's the theory for benzene and AML. It is that
5 you're actually -- it's more of an immune system
6 problem than it is a mutagenic problem.

7 It's all theory. But they're separate
8 issues in terms of the immune system may go off
9 actually and cause things like oxidative damage and
10 free radical damage, which then can cause mutations as
11 yet another pathway, but the immune system is really
12 more in terms of immunosurveillance and not clearing
13 out sort of bad things.

14 Q. So you're going to say outside of
15 smoking, bad luck is responsible for the majority of
16 cancers?

17 MR. TUBIN: Objection to form.

18 A. Alcohol, obesity, poor exercise, some
19 people, which is the Tomasetti-Vogelstein stuff,
20 there's hereditary cancers. So what I'm saying is
21 that for most cancers, most patients don't have any
22 identifiable risk factors. You know, they're the
23 classic healthy, not overweight, nondrinker, nonsmoker
24 who gets colon cancer, and that's what most of those
25 patients are.

1 MR. TELAN: We're going to mark this
2 next exhibit as 27.

3 MR. TUBIN: You said you were going to
4 show him the book after you read him that
5 passage.

6 MR. TELAN: Oh, I'm sorry. We'll get
7 back to that. I've got to move on, because
8 we've got to move on. We've got about an hour
9 left.

10 MR. TUBIN: Okay.

11 COURT REPORTER: Twenty-six.

12 MR. TELAN: Oh, 26. I'm sorry.

13 MR. TUBIN: Correct. Yeah.

14 (Exhibit 26 was marked for
15 identification.)

16 BY MR. TELAN:

17 Q. By the way, as far as obesity goes,
18 there's no identified mode of action by which -- let
19 me ask in this. Do you believe that obesity is a
20 cause or a risk factor for cancer?

21 A. For some cancers, it's a cause.

22 Q. Which cancers?

23 A. Gee, I'd have to go back and look.
24 Colon cancer, AML. You know, there's probably about a
25 half a dozen or so. And the reference that I would

1 look to is IARC did a very nice review on what they
2 thought was sufficient evidence for obesity and
3 cancer, and that's cited in my report. And, you know,
4 we could find that, but that's in there.

5 Q. What's the mode of action?

6 A. So the mechanism of action is probably
7 a pro-inflammatory immune system problem where you're
8 causing inflammation that then causes DNA damage and
9 suppresses the immune system for surveillance.

10 Q. Is that a hypothesis or a known fact?

11 A. Well, obesity certainly does that.
12 It's definitely a pro-inflammatory state. So that's
13 the concept for how it's causing cancer.

14 Q. In the bone marrow?

15 A. I actually don't know either way, the
16 bone marrow. I actually never thought of that either
17 way, so I don't know whether there's data for that or
18 not. But, you know, certainly, the immune system gets
19 activated with obesity in ways, and then there's other
20 issues about storage of certain effects on steroids
21 and hormones and other things. I mean, obesity really
22 affects a lot of carcinogenic mechanisms in different
23 ways.

24 Q. There are studies that speak to how
25 chemicals like benzene and TCE impact neutrophil

1 counts and lymphocyte counts over time in patients
2 who've been exposed. True?

3 A. Well, there are cross-sectional studies
4 that have -- there's a whole section in my report on
5 this. There's cross-sectional studies that will
6 associate benzene exposure with decreased neutrophils
7 and the next study doesn't. But since, oh, it affects
8 it has an association with platelets, and the next
9 study, no, it's hemoglobin. So there's really not
10 consistency. What we know is high dose benzene
11 exposure does serious bone marrow depression in
12 aplastic anemia.

13 Q. Does obesity cause any of those markers
14 to be elevated or lowered in the blood?

15 A. Not that I recall.

16 Q. If you'd look at the next numbered
17 exhibit, this is the Odutola case. I think that you
18 may have cited to this at page 121.

19 A. Correct.

20 Q. Do you see that the authors here found
21 a positive association with exposure to any solvent
22 and follicular lymphoma with a risk ratio of 1.16 and
23 a confidence interval of 1.00 to 1.34? Do you see
24 that?

25 A. Yes, I see that now.

1 Q. And they also found an appositive
2 association between chlorinated solvents on a
3 meta-analysis at 1.35 and a confidence interval of
4 1.09 to 1.68, correct?

5 A. That's what they report in the
6 abstract.

7 Q. And benzene -- I'm sorry. TCE, PCE and
8 vinyl chloride are all chlorinated solvents?

9 A. Right. But you understand that
10 benzene, at least in this study, was not associated or
11 had an overall summary estimate that was statistically
12 increased. It looks like they have chlorinated
13 solvents, but they're not breaking down the type of
14 chlorinated solvents, and there's a wide variety that
15 makes the issue around biological plausibility.

16 Q. But the benzene is elevated on the risk
17 ratio. You're saying that it's not statistically
18 significant with the .88 to 1.75 confidence interval,
19 correct?

20 A. I think you're reading the wrong line,
21 but it's numerically increased with a confidence
22 interval as .86 to 1.97.

23 Q. Correct. Right. And you call this a
24 null value. True?

25 A. Yes. I would say this is not

1 statistically significant and fails to support the
2 hypothesis that benzene is causing or is associated
3 with follicular lymphoma.

4 Q. Would it be equally as reasonable to
5 say that the dataset is consistent with a positive
6 association but that the range of parameter values
7 extend from below the null to an increase of
8 197 percent?

9 A. That would not --

10 MR. TUBIN: Objection to form.

11 A. That would not be a correct way to
12 describe the results of this paper.

13 BY MR. TELAN:

14 Q. You cited to the Rana study, which is a
15 benzene NHL study at page 173. I'll hand that to you
16 as well. If you go to 173, I think you'll find it
17 there. Do you see that?

18 A. Yes.

19 Q. You don't cite to the strengths of the
20 study, correct?

21 (Exhibit 27 was marked for
22 identification.)

23 A. Well, I cited that their conclusion was
24 that they believed that Bradford Hill criteria were
25 met, and so I went on to evaluate the study.

1 BY MR. TELAN:

2 Q. But you disagree with the conclusion of
3 the study, that there's a causal link between benzene
4 and NHL, especially for diffuse large B-cell lymphoma?

5 A. Well, so they provide a discussion of
6 Bradford Hill analysis, which is sort of like a
7 hand-waving thing.

8 Q. What do you mean by that?

9 A. But they don't -- well, they're like
10 the final criteria of biological plausibility is
11 satisfied given current knowledge regarding the causes
12 and mechanisms of NHL, period, and then they go on.
13 Key risk factors for non-Hodgkin's lymphoma include
14 immunosuppression and pre-existing autoimmune disease,
15 neither of which are relevant to benzene exposure.

16 So it's really hard to understand how
17 they got to this meta-analysis, and I'll just note the
18 senior author, Luoping Zhang, maybe it's this paper
19 but was recently thrown out of court with the judge
20 calling her work junk science, and I think that was
21 this paper, but I may be misremembering that.

22 Q. You know that Dr. Valberg,
23 Dr. Goodman's boss, was also accused of testifying
24 contrary to the consensus of science by a court,
25 correct?

1 MR. TUBIN: Objection. Objection to
2 form.

3 A. You're asking me whether his opinions
4 were thrown out, like in a Daubert or something?

5 BY MR. TELAN:

6 Q. I'm not sure if they were thrown out,
7 but the judge's order stated that his testimony was
8 inconsistent with science.

9 MR. TUBIN: Objection to form.

10 A. I have some recollection of that.

11 BY MR. TELAN:

12 Q. But Dr. Rana was not the primary
13 author -- I'm sorry. Dr. Zhang is not the primary
14 author on that, on this report?

15 A. No, that's not correct. She was the
16 senior author, and correspondence is directed to her.

17 Q. So even though she's the last on the
18 chain, are you saying she's the primary author of the
19 study?

20 A. Yeah. The way, the way it works,
21 depending on the discipline, is that the first author
22 is the one who actually did the writing. The last one
23 is the senior person who takes the responsibility and
24 dealing with the correspondence. That's not
25 100 percent of the time true, but that's a pretty

1 conventional practice.

2 Q. And your testimony is that, based on
3 what she found in this report, she was Dauberted out
4 of the case based on this being junk science?

5 MR. TUBIN: Objection to form.

6 A. I think, I think this report, I know
7 for sure a judge labeled her work as junk science,
8 which is really huge, and I think it's this one, but I
9 could be misremembering that.

10 BY MR. TELAN:

11 Q. This is a study out of Cal Berkley,
12 right?

13 A. That's correct.

14 Q. Not an institution that's known for
15 junk science, correct?

16 MR. TUBIN: Objection to form.

17 A. Actually, some of their folks are
18 really high quality scientists, and a large number of
19 the people that I know there are also plaintiffs'
20 experts.

21 BY MR. TELAN:

22 Q. Is Martin Smith a high quality
23 scientist?

24 A. Yes.

25 Q. The Karami study is one you cited at

1 page 139 of your report. We'll mark that as the next
2 numbered exhibit.

3 (Exhibit 28 was marked for
4 identification.)

5 BY MR. TELAN:

6 Q. This is a TCE exposure and
7 haematopoietic cancer study?

8 A. Correct.

9 Q. If you look at the study itself in the
10 first paragraph introduction, it talks about the
11 National Academy of Sciences recommending that the
12 additional meta-analysis be conducted to further
13 examine human health and TCE and that, as a result, in
14 2011, the U.S. EPA released its human health
15 assessment raising the classification of TCE to
16 carcinogenic to humans. Do you see that?

17 A. Yes. I see where you're reading that.

18 Q. Okay. If you go to page 592 under the
19 second paragraph from the top, about midway down, it
20 says, "TCE exposure has ... been shown to stimulate
21 unscheduled DNA synthesis in vitro in human
22 lymphocytes, a mechanism that has been associated with
23 increased cancer risk. Since TCE can dysregulate and
24 impair immune functions, concerns about the solvent's
25 immunotoxic effects have motivated numerous

1 investigations of the association between TCE exposure
2 and lymphoma risk, which have been associated with
3 reduced immune function."

4 Do you agree with that?

5 A. I'm sorry. I'm still trying to find
6 where you have that.

7 Q. See, if you had the paper.

8 A. I'm holding the paper.

9 Q. Oh, you are? All right. So if you
10 look at -- if you look right here.

11 A. I'm going to make you pay for this at
12 some point.

13 MR. TUBIN: 592.

14 A. 592? 592?

15 BY MR. TELAN:

16 Q. 592.

17 A. Oh, you're in the introduction area.
18 Okay. Sorry. I was looking in the back.

19 Q. I said 592.

20 Do you agree with that sentence that I
21 read?

22 MR. TUBIN: Please remind Dr. Shields
23 the starts of the sentence. I just want to
24 make sure we're...

25 A. It's the second -- it's the first full

1 paragraph.

2 MR. TUBIN: Okay.

3 A. I have no problems with their summary
4 of the literature that way.

5 BY MR. TELAN:

6 Q. In terms of the findings under page
7 593, with the cohort studies, they found an increased
8 risk estimate of 1.52 with a relative risk of -- I'm
9 sorry, a confidence interval of 1.29 to 1.79. Do you
10 see that?

11 A. Yes.

12 Q. And at page 595, they speak to their
13 review and that -- it's toward the bottom right. "In
14 contrast to the most recent meta-analysis of TCE
15 exposure and NHL risk, our review integrated results
16 from an updated cohort study with 12 additional years
17 of follow-up." Do you see that?

18 A. Yes.

19 Q. If you go to the back page at 598, "In
20 summary, our meta-analysis differentiated between
21 studies that assessed TCE exposure specifically and
22 those that evaluated exposure to broader groups of
23 chlorinated solvents."

24 This is a high quality study, is it
25 not?

1 A. It's a meta-analysis and there -- I did
2 note in my report that -- so the short answer is it
3 is, it is a high enough quality meta-analysis, serve
4 one -- you know, serve as an important tool in
5 providing that overall summary estimate. It doesn't
6 evaluate the individual studies for a weight of
7 evidence concept, and this was 2013, and for some of
8 the studies, at least one of them that drove the
9 result was updated with no results. So that's
10 specifically the Hansen study from 2001, and they
11 don't have the Hansen 2013, which could easily change
12 the results. And, of course, they wouldn't have the
13 2013, because this is also 2013.

14 Q. They could have had that, right?

15 A. Probably not. They're probably being
16 published at the same time.

17 (Exhibit 29 was marked for
18 identification.)

19 BY MR. TELAN:

20 Q. If we look at PCE in bladder cancer,
21 you cited to this in your report, the Vlaanderen study
22 at page 216. Did I hand that to you already?

23 A. No. Did you get one?

24 MR. TUBIN: Yeah.

25

1 BY MR. TELAN:

2 Q. I believe that you mentioned that these
3 results were null. This is a PCE dry cleaning study,
4 correct, from 2014?

5 A. Well, they did both. They looked at
6 PERC, which was not increased, and then dry cleaners
7 that frequently use PERC that was statistically
8 increased.

9 Q. And so if you just look at the
10 beginning, this is -- I know what your answer is, but
11 I'm just going to ask it anyway. The PERC study
12 reveals an increased relative risk but a confidence
13 interval that includes the null value. In the first
14 paragraph for the PCE workers, you would say that
15 that's a null value, correct?

16 A. It's a null value, including people who
17 would be regularly using PERC at high levels.

18 Q. Okay. Now, for the dry cleaners, the
19 meta risk was 1.47 with a confidence interval of 1.6
20 to 1.85, correct?

21 A. That's correct.

22 Q. So what's the significance of that?

23 A. Well, for the purposes of the Camp
24 Lejeune litigation, the important result here is the
25 tetrachlorethylene-exposed workers. As far as the dry

1 cleaners itself, some of them would be exposed to
2 PERC, but they would have other exposures as well,
3 which they didn't define. As they say, they
4 encouraged mixed exposure.

5 Q. But this study found a positive result
6 between PERC exposure and bladder cancer in the dry
7 cleaning population, correct?

8 A. No, that's not correct.

9 Q. What's not correct about that?

10 A. What you just read. The meta relative
11 risk among tetrachlorethylene-exposed workers was
12 1.108, 95 percent confidence interval, 0.82 to 1.42.
13 So when they look at the ones where they know that dry
14 cleaners were exposed to tetrachlorethylene, they did
15 not have the increased risk.

16 Q. Well, the meta for bladder cancer for
17 laundry and cleaning workers was 1.20 with a
18 confidence interval of 1.06 to 1.36. You didn't
19 mention that, correct?

20 A. Did not mention it where?

21 Q. In your report.

22 A. No. It's mentioned.

23 Q. The positive finding with the
24 confidence interval?

25 A. I don't know if I put the confidence

1 interval in there, but I did point out that they had a
2 result, a positive result for dry cleaners where they
3 did not identify whatever the theoretical potential
4 bladder carcinogens were for those folks.

5 Q. But your conclusion, though, was that
6 this was a null result in terms of PCE and bladder
7 cancer?

8 A. That's absolutely correct.

9 Q. I am not sure if you cited this paper.
10 It's the next numbered exhibit.

11 MR. TELAN: What number is this?

12 MR. TUBIN: Vlaanderen was 29, and then
13 this should be 30.

14 COURT REPORTER: What's 28?

15 MR. TUBIN: Karami.

16 MR. TELAN: Karami, yeah.

17 (Exhibit 30 was marked for
18 identification.)

19 BY MR. TELAN:

20 Q. Did I hand that to you or not yet?

21 A. I have one.

22 COURT REPORTER: 29 is?

23 MR. TUBIN: The author is Jelle
24 Vlaanderen, "Tetrachloroethylene Exposure and
25 Bladder Cancer Risk." It looks like this.

1 Do you need 28 too?

2 COURT REPORTER: This is 28?

3 MR. TUBIN: Yes.

4 COURT REPORTER: Are we up to 30?

5 MR. TUBIN: Correct.

6 MR. TELAN: I thought I was putting
7 them here for you. I'm sorry. Thanks,
8 Marcus.

9 MR. TUBIN: You guys help me out, so,
10 you know.

11 BY MR. TELAN:

12 Q. All right. So I don't believe that you
13 cited to this, Dr. Shields, but you see that the risk
14 of living close to a petrochemical facility resulted
15 in hematologic malignancy, specifically leukemia at a
16 relative risk of 1.3, with a confidence interval of
17 1.09 to 1.55. Do you see that? That's on page 6 of
18 18.

19 A. Okay. I see the result. I'm just
20 reviewing the paper.

21 Okay. I see where you were showing
22 Figure 2 for people living within 5 kilometers of a
23 petrochemical plant, some of them categorizing as
24 downstream, some of them upstream, which tells me they
25 have no idea what the weather patterns are. But even

1 more importantly, not only are they combining all
2 types of leukemia together, but they're including
3 childhood leukemia, which is a totally different
4 ballgame, and at the same time on Figure 4, they do
5 not have an increased risk of NHL with all the same
6 caveats.

7 Q. You didn't consider this study,
8 correct?

9 A. I did not consider it. In looking at
10 it now, I would give it no weight because of its poor
11 methodology.

12 Q. This was a systematic review looking at
13 16 different studies, correct?

14 A. That's what they wrote.

15 Q. You cited to the -- I'm not going to
16 pronounce it correctly now -- Seyyedsalehi study.
17 It's a benzene kidney-bladder study; is that correct?
18 That's 31.

19 (Exhibit 31 was marked for
20 identification.)

21 BY MR. TELAN:

22 Q. And I know that you don't believe that
23 benzene causes either kidney or bladder cancer,
24 correct?

25 A. That's correct.

1 Q. So the association between benzene and
2 kidney cancer and unspecified urinary tract cancers
3 with a relative risk of 1.20 to a confidence interval
4 of 1.03 to 1.39 you don't find to be convincing for
5 the association. True?

6 A. Well, there's several things. I mean,
7 I just want to make it clear there's several things
8 you or one takes away from meta-analysis. One is that
9 overall point estimate, which is what you're citing,
10 which is an important tool, but that's not the be all
11 and end all of the meta-analysis. There's other
12 things that you have to look for, including
13 heterogeneity publication bias. And then, on top of
14 that, the most important figure is the forest plot,
15 and when you look at that for kidney cancer, which I'm
16 trying to find.

17 BY MR. TELAN:

18 Q. Is that Figure 2? On page 208?

19 A. Right. So in this case for bladder
20 cancer, they have no increase in risk, which is one of
21 your allegations. But for kidney cancer, so we're
22 cherry-picking out the results we like or dislike for
23 your plaintiffs' experts.

24 If you look at that forest plot, that's
25 a very unconvincing forest plot. They don't take into

1 consideration because meta-analyses don't do that,
2 which is the weight of the evidence for the papers
3 themselves. So they don't say the Pukkala is a higher
4 quality study, the Gun is a lower quality study. All
5 they do is look at the summary estimate or the
6 reported estimate, and they often pick what risk
7 estimate, relative risk ratio, what have you, from the
8 paper when they often report multiple results.

9 And all these things do is really talk
10 about just the size and where that point estimate
11 falls. But when you look at the forest plot, that's
12 pretty unconvincing for a meaningful result, even if
13 it is statistically significant.

14 Q. And you're looking graphically at the
15 forest plot, but the relative risk doesn't change.
16 It's 1.2, correct?

17 A. That's what they're reporting as their
18 relative risk, but that doesn't take into account the
19 actual consistency of the high quality studies.

20 Q. So you're saying this is a poorly --
21 you don't find the conclusion to be persuasive based
22 upon your belief that this is a poorly run study?

23 MR. TUBIN: Objection to form.

24 A. No, I didn't say this was a poorly run
25 study. What I'm saying is that a meta-analysis is

1 only one tool of the process of the causation
2 analysis. None of them really take into account the
3 high quality studies unless they specifically say
4 we're only going to give you a meta-analytic result
5 for those studies, for example, that have also had
6 AML. So you know that they're high exposed studies or
7 studies where, in these industries, they're known to
8 be the highest or for sure benzene study.

9 So if they don't do that, they don't
10 give you any information about whether they're
11 comparing apples and oranges. What they're giving you
12 is a number. You can put numbers into the computer
13 and get one out, and that's typical for meta-analyses,
14 but that's only one piece of the puzzle here.

15 BY MR. TELAN:

16 Q. I'm going to hand you the next numbered
17 exhibit is a benzene non-Hodgkin's lymphoma study.
18 You cite to it in your report, and you copied the part
19 of the abstract under "What's New?" on page 171 to
20 172, I believe.

21 Does this study ring a bell with you?

22 A. Yes.

23 (Exhibit 32 was marked for
24 identification.)
25

1 BY MR. TELAN:

2 Q. Why did you not include the first part
3 of the box that has the relative risk ratios and just
4 the, just the "What's New?" under the abstract?

5 A. I guess I'm not sure what you're asking
6 me, because I do cite the NHL risks on page 170 in a
7 table that's called "Large Studies for Benzene
8 Exposure, NHL Risk." The first paper is Bassig 2024,
9 which is what we're looking at. And I note that it
10 has statistically significantly cohort size of 73,087
11 with an NHL risk of 1.6 and 95 percent confidence
12 interval of 1.2 to 2.2.

13 Q. Did you cite the elevated risk for
14 chronic lymphocytic leukemia?

15 A. Well, let me look.

16 Q. The pending question is did you cite to
17 that?

18 A. Yeah. I'm looking at my CLL section.
19 So this is cited. Since it's a null study, there's a
20 statement about CLL and null studies, which includes
21 this.

22 Q. You don't cite the risk ratio or the
23 interval. You just call it a null study, correct?

24 A. That's right.

25 Q. And so you would disagree with the

1 conclusion of the authors at 2166 that, "Overall, our
2 pooled results suggest a significantly elevated risk
3 of NHL across all three benzene exposure metrics ...
4 And higher cumulative benzene exposure was associated
5 with an increased risk of NHL in both Chinese men and
6 women"?

7 A. I'm sorry. Where are you reading that?

8 Q. Right above the author's contributions,
9 last paragraph, "In conclusion." It's about halfway
10 down that paragraph.

11 A. We're talking about Bassig?

12 Q. Yes, Bassig.

13 A. 2024.

14 Q. Yes. Page 2166.

15 A. Oh, 2166.

16 Q. It's at the very end, right above
17 author's contributions.

18 A. I see. Let me just -- okay. I'm there
19 now.

20 Q. You didn't --

21 A. Hang on. Hang on. I haven't answered
22 your question yet.

23 Q. I thought you might have forgotten.

24 MR. TUBIN: I think the page numbers
25 for us got obscured by the staples.

1 MR. TELAN: He's there now, I think.

2 A. So you're asking me whether I agree
3 with, "Overall, our pooled results suggest a
4 significantly elevated risk of NHL across all three
5 benzene exposure metrics --

6 Q. Yes.

7 A. -- examined, and higher cumulative
8 benzene exposure was associated with an increased risk
9 of NHL in both Chinese men and women." That's what
10 their data shows.

11 Q. And this is a good study as well,
12 correct?

13 A. This is a good research group. The
14 Shanghai cohorts by Wei Zheng, both men and women,
15 there could be some concern about comparing -- or, I'm
16 sorry, combining two disparate studies, but I don't
17 really have a problem with their overall methodology.

18 MR. TELAN: Give me about 5 minutes, 10
19 minutes, and then I'm think we're home stretch
20 on the last 30 here.

21 MR. TUBIN: Okay.

22 VIDEOGRAPHER: We are now going off
23 record. The time is 5:53.

24 (A recess was taken from 5:53 to 6:09.)

25 VIDEOGRAPHER: We are now back on the

1 record. The time is 6:09. You may continue.

2 BY MR. TELAN:

3 Q. I know you've been asked this before,
4 but in terms of reaching consistency under a Bradford
5 Hill evaluation, you can reach consistency having a
6 number of positive risk associations with confidence
7 intervals that include the null value. True?

8 A. I wouldn't do that. The analogy I use,
9 if your doctor says I'm going to give you a medicine
10 that's been studied 10 times, but it's never been
11 statistically significantly proven, you would probably
12 get another doctor.

13 Q. In prior depositions, you've said you
14 could, but it's not common, correct?

15 MR. TUBIN: Objection to form.

16 A. I don't think that's correct. You can
17 show me what you're talking about. That's what
18 meta-analyses do. They try to combine studies that
19 are null, hoping to come up with a summary estimate,
20 but that fails to consider the individual studies.

21 BY MR. TELAN:

22 Q. Okay. So would your testimony then be
23 that you could not absolutely, 100 percent could not
24 reach consistency having numerous positive risk ratios
25 but having confidence intervals that include the null?

1 MR. TUBIN: Objection to form.

2 A. "You" meaning me in particular or are
3 there people who do that?

4 BY MR. TELAN:

5 Q. You in particular. I'm asking you.

6 A. If I had -- if all the high-quality
7 studies were all not statistically significant, I
8 would say that that's not supportive of a sufficient
9 human evidence. You could say that there's
10 associations, you know, limited evidence of a
11 certainly not sufficient. You have to have
12 high-quality studies that are showing statistically
13 significant increases with dose response relationships
14 and plausible strength of associations.

15 Q. Let me add to that. Let's assume that
16 you have positive biological plausibility from animal
17 studies in that scenario. Can you reach the
18 consistency under Bradford Hill analysis?

19 A. That's a totally different guideline,
20 so they're mixed, so, no, if biological plausibility
21 is evaluated separately from consistency. Some of
22 your experts are confused, and they say, well, under
23 consistency, there's an epi paper like Bove and
24 there's animal studies. That's consistent. That's
25 not ever what Bradford Hill did, nor is how it's

1 applied today. They just didn't understand it.

2 Q. And when you say some of our experts
3 were confused, who are you speaking about directly?

4 A. I'd have to go to my report. So I have
5 those tables, and we'd have to go through each one.
6 So you can figure it out pretty easily.

7 Q. I think I remember you mentioning
8 Dr. Hu and Dr. Mallon.

9 A. There was at least two of them that
10 were just using it totally incorrectly.

11 Q. And what would you cite to as a, as the
12 authority for how Bradford Hill should be applied?

13 A. Well, of course, there's the Bradford
14 Hill, and they're from the 1960s. But now among the
15 explanations is the IARC preamble, which was updated
16 in 2020. But lots of -- EPA, you know, describes that
17 the Bradford Hill, there's this scientific reference
18 manual from the federal judicial center that describes
19 how to apply those criteria. There's lots of
20 agencies. There's really not a whole lot of deviation
21 among them for how they interpret it.

22 Q. There's no set structure as to how many
23 of the considerations need to be met before causal
24 relationship is satisfied, correct?

25 A. That's correct. What it depends on is

1 what's your available dataset. Bradford Hill says we
2 don't need all of them, but if you have data for all
3 of them, then you can't ignore any of the data. So
4 when you have a robust epi database, you have to have
5 consistency dose response and strength of association.
6 You just can't throw them out and say, well, I've got
7 biological plausibility.

8 Having said that in some policy
9 constructs, some agencies will decide to -- and, in
10 fact, IARC will say something is a known carcinogen
11 based on mechanisms alone and limited human evidence,
12 but that's really a precautionary principle policy
13 concept.

14 Q. And you disagree with that, correct?

15 A. Not for policy. I'm not a policy
16 environmental person, but if that's what regulators or
17 agencies want to do as their criteria, again, it's
18 transparent. I don't disagree with that, but that's
19 not what we're talking about here for general
20 causation.

21 Q. Going through your report, I have a
22 couple questions for you. If you can pull it up at
23 page 8.

24 A. Okay.

25 Q. At number 8, you state, "Most patients

1 with cancer have no identifiable exogenous risk
2 factors for their cancer, which is referred to as an
3 idiopathic cancer."

4 What do you mean by "idiopathic cancer"
5 as you used it there?

6 A. It's just there's no exogenous external
7 causes, so not smokers, not obese, not drinkers.
8 That's all the stuff we were talking about earlier
9 about the inborn errors.

10 Q. But so, for instance, benzene, you
11 would say, is only a risk factor for AML and for no
12 other cancers. True?

13 A. That's correct. And for sufficient
14 human evidence, yes, and in sufficient levels of
15 exposure.

16 Q. And for TCE, it's only a risk factor
17 for -- you wouldn't agree with that. You don't even
18 believe that TCE is a risk factor for kidney cancer,
19 even at high levels of exposure, correct?

20 MR. TUBIN: Objection to form.

21 A. So -- so the way I'm phrasing it is
22 you've heard me is arguably, it is. If you want to
23 believe that it is, then you can go to those papers
24 and identify the levels of exposure that are
25 statistically increasing risk. And so should I take

1 the opinion that there is sufficient data? I also
2 have dose data and say I can play on the other side of
3 people who believe that there's a causation.

4 BY MR. TELAN:

5 Q. But in the argument, you would take the
6 alternative that there really is no causal
7 relationship between TCE and kidney cancer?

8 A. So I'd say there's insufficient human
9 evidence, but if someone wanted to conclude otherwise,
10 based on the higher quality studies, here are the
11 levels of exposure that statistically associate with
12 increased risk, and I have a table in my report that
13 shows those papers.

14 Q. The statement in number 2,
15 "Precancerous cells can revert to normal cells," is
16 that accurate?

17 A. Oh, yeah. A lot of lung lesions,
18 breast lesions, colon lesions, there's a whole science
19 behind that, which is pretty interesting stuff.

20 Q. Are there precancerous cells in the
21 hematopoietic cancer, or is that just solid tumors
22 you're talking about?

23 A. No. There's -- there are precancerous
24 cells that never go on. So there's something called
25 clonal hematopoiesis, and you can find that a lot of

1 our bodies' clones that have gene mutations that
2 ultimately, are ultimately found in AML, it's thought
3 that those people who have it and, likely, some of us
4 in the room have it, but it's unlikely that we'll all
5 get AMLs. So it's a small fraction. Interestingly,
6 about those cells, they call them chips, also increase
7 the risk of heart disease, and it's not clear why, but
8 that would be an example of malignant -- or not
9 malignant, but premalignant cells that never go on to
10 become cancer.

11 Q. From an epidemiological standpoint with
12 rare cancers, is it more difficult for a study to find
13 an association?

14 A. So the answer is it depends on how rare
15 it is. There's two parts. People always say that,
16 and your experts are saying that, but the fact is
17 something like mesothelioma and asbestos-exposed
18 workers with mesothelioma is extremely rare. All you
19 need, though, is one case in a study, and the risk
20 estimate is sky high, and since it's a little
21 significant. The same is true for angiosarcoma and
22 vinyl chloride. Now, when you want to say, well,
23 gee -- well, let's take CML or --

24 Q. Follicular?

25 A. Thank you. Let's take follicular

1 lymphoma, and you say, well, gee, that's too rare so
2 we're not gonna see it. But isn't that the point? If
3 benzene is causing follicular lymphoma, would it be
4 rare in that study of people who have very high
5 levels, hundreds of parts per million exposure to
6 benzene? It wouldn't be rare. We would see that.

7 So this concept of because it's rare,
8 we need bigger studies, power depends not only on the
9 size of the study but the effect size. And if you
10 really believe that benzene is causing follicular
11 lymphoma, then you should see that in sky high rates
12 in the Pliofilm cohorts and the NCI cohorts and you
13 don't.

14 Q. You don't believe there's any risk
15 factor for follicular lymphoma, do you?

16 MR. TUBIN: Objection to form.

17 A. I think obesity is one of them. I'd
18 have to go back and look at the review, but I think
19 for follicular lymphoma, that might be the only one.
20 I don't think there's any viral etiologies, but I may
21 be misremembering that. I think that's one of the
22 ones where we just don't know the causes.

23 BY MR. TELAN:

24 Q. What about for urothelial cell cancers?

25 A. Are you talking about, like, renal cell

1 cancers?

2 Q. Yeah.

3 A. Smoking, obesity, hypertension, kidney
4 stones. I had a section in my report on the major
5 causes of cancer that will include that. I mean, I
6 can go to the report, but there's a section also on
7 kidney cancer that talks about the etiology, but those
8 are some of the ones that are known risk factors for
9 kidney cancer.

10 Q. And just so that I'm clear, when you
11 say "obesity," let's me ask you this. If you're
12 overweight, you would say that that would predispose
13 you to renal cell carcinoma more than drinking benzene
14 every day for two years?

15 MR. TUBIN: Objection to form.

16 A. Yeah, absolutely. I mean, there's
17 no -- the evidence for benzene and kidney cancer is
18 extremely weak, notwithstanding the paper we just went
19 over. Now, there's two parts to that question, which
20 was also the overweight concept, and BMI is a
21 continuum, so I'd have to go back and look to see
22 whether or not a BMI representing overweight at 27 is
23 a risk factor at all or is that too little, as opposed
24 to meeting that BMI of 32 or 35.

25

1 BY MR. TELAN:

2 Q. Is obesity -- when you've used the term
3 "obesity" here, do you mean morbidly obese or just a
4 degree of obesity?

5 A. I'm generally referring to it as a 30
6 to 35 BMI, which is obesity, as opposed to morbid
7 obesity. Morbid obesity would be worse.

8 Q. So you're saying that if somebody has a
9 BMI of 35, they're at higher risk for any cancer than
10 if they were to drink TCE every day for two years?

11 MR. TUBIN: Objection to form.

12 A. Boy, that gets more confusing. So
13 drinking TCE, if you believe that TCE causes kidney
14 cancer, you'd have to drink enough TCE to mirror the
15 exposures in the occupational studies, and I think you
16 would probably die of neurotoxicity from TCE exposure
17 by drinking that much to mirror the exposures in the
18 workplace. It depends on dose.

19 BY MR. TELAN:

20 Q. Does TCE cause neurotoxicity?

21 A. Yeah. Dizziness, vomiting. I mean,
22 it's acute neurotoxicity.

23 Q. Changing the question to you about
24 obesity, it'd be your testimony that a BMI of 35 would
25 be a higher cause of non-Hodgkin's lymphoma than

1 drinking TCE in a solution with water and benzene and
2 PCE for two years?

3 A. So a major problem of your plaintiffs'
4 experts is they wave their hands like in a magic trick
5 and say, oh, TCE causes NHL. They never tell us how
6 much. And so if they want to believe that TCE causes
7 NHL, they've got to come up with saying, gee, this is
8 how much you need to drink, and this is what the Camp
9 Lejeune plaintiffs did. I mean, that's among the
10 major flaws for them.

11 If you don't think there's sufficient
12 evidence of TCE in NHL, I don't know that any of them
13 actually said they were sufficient. I think it was
14 always this equipoise or as likely as not. But
15 they've got to tell us what their high-quality study
16 is that would -- that shows a dose-response
17 relationship for how much it's gonna cause NHL from
18 TCE exposure and extrapolate it back to the Camp
19 Lejeune drinking levels. None of them have done that.

20 Q. So the answer to my question is, yes,
21 BMI of 35 would be a higher risk than drinking water
22 with TCE, benzene and PCE for two years?

23 MR. TUBIN: Objection to form.

24 A. At Camp Lejeune levels?
25

1 BY MR. TELAN:

2 Q. Yeah.

3 A. Or actually at any levels. I mean, I
4 don't think there's sufficient evidence to say that
5 TCE is causing NHL at any level of exposure, so they
6 could literally be drinking it every day, and that's
7 still not known as a risk factor, because occupational
8 studies with much higher levels of exposure don't show
9 that.

10 Q. And having now seen the Yu study, that
11 doesn't change your opinions at all relative to
12 benzene and its association with any of the cancers we
13 talked about. True?

14 MR. TUBIN: Objection to form.

15 A. True. That Yu study has substantial
16 problems. You know, you don't --

17 BY MR. TELAN:

18 Q. We've talked about those. I just want
19 to know that was yes or no on that. That doesn't
20 change your opinions that you've offered relative to
21 any of the four cancers?

22 A. No. Based on its studies, it's a low
23 weight, almost unhelpful study in the evaluation for
24 what we're talking about today.

25 Q. I know you've published a good bit.

1 Have you published anything relative to the cause of
2 renal cancer that's on your CV that you could point
3 to?

4 A. Not that I recall.

5 Q. What about bladder cancer?

6 A. I believe I've had at least one bladder
7 cancer publication with Paolo Vineis and aromatic
8 amines, but that may be the only one that I'm
9 recalling.

10 Q. Not involving any of the chemicals
11 we're talking about?

12 A. That would be correct.

13 Q. In term of the ATSDR framework, I know
14 that we discussed that earlier. The framework -- let
15 me go back just a bit first. You had mentioned IARC
16 has moved toward emphasizing biological plausibility
17 now more heavily than it has in years past. True?

18 MR. TUBIN: Objection to form.

19 A. That is correct.

20 BY MR. TELAN:

21 Q. Now, the dose-response gradient in a
22 Bradford Hill consideration, is that an absolute
23 requirement for causality under the Bradford Hill
24 analysis?

25 A. So I'm gonna say yes and then explain

1 that. It's an absolute requirement when you have a
2 sufficient number of human studies, as we do with all
3 the chemicals at issue here, except for maybe DCE, if
4 you have human studies and a sufficient number of
5 them, then you have to have those response.

6 Bradford Hill will say things like and
7 others will say, well, you don't have to have all of
8 them. You don't have to have that. But that's in the
9 context of when you don't have studies that look at
10 dose response.

11 But the consistency of the studies for
12 what we're talking about, with the exception of
13 benzene and AML and arguably the TCE and kidney
14 cancer, for the other ones, you don't have that. So
15 you can't just say, well, gee, I don't have to have
16 dose response, but if the papers contradict the dose
17 responses, which is what they do, you can't make a
18 positive causation opinion.

19 Q. Is there -- I think I know the answer
20 to this as well. Is there a threshold for each of the
21 chemicals that we've spoken about in your mind that
22 apply to their relationship to cancer?

23 MR. TUBIN: Objection to form.

24 A. So there's several studies of benzene
25 in AML that are high quality. The levels of exposure

1 that measurably increase risk range anywhere from 16
2 ppm up to 200 ppm. I think the best representative
3 studies are from NCI, which is the 40 ppm. That's the
4 Hayes Linet group.

5 BY MR. TELAN:

6 Q. That goes back to what year, the 40
7 ppm?

8 A. Yes.

9 Q. What year does that go back to?

10 A. Well, it was first in the '97 paper
11 from Hayes. And then for the TCE and kidney cancer,
12 if you think that the case-control studies are more
13 informative than the cohort studies, I'd have to go
14 back to my table, but I think that was like either 30
15 ppm years or 300 ppm years. I'd have to go back
16 specifically to the 2012 paper that shows different
17 levels of exposure. Only the highest level of
18 exposure was statistically increased.

19 Q. Is there a threshold level for smoking
20 and lung cancer?

21 A. There isn't, because it's such an
22 overwhelming exposure. People aren't inhaling all
23 those carcinogens, like putting your head in a chimney
24 and holding it in your lungs long enough to absorb the
25 nicotine. There are studies that show that one to

1 four cigarettes a day increase risk.

2 And, by extension, to show you how
3 strong cigarette smoking is for a lung carcinogen,
4 environmental tobacco smoke is also a cause of lung
5 cancer. So, you know, if you really want to know the
6 threshold, you'd have to go back to, you know, the ETS
7 studies, which actually poorly define exposure, but
8 that's where you would have to think about where
9 threshold would be for exposure to cigarette smoke.

10 Q. What about for breast cancer and
11 smoking?

12 MR. TUBIN: Objection to form.

13 A. So it's kind of an interesting and
14 complicated question that we've published on. So
15 smoking overall is not a cause of breast cancer. If
16 you divide the population based on their genetic
17 susceptibilities for metabolizing aromatic amines,
18 where about half of women metabolize one way; the
19 other half are slow acetylators. One group is at
20 risk. The other group decreases risk. We don't have
21 a level of smoke that would increase risk for those
22 lower.

23 Now, having said that, there's also a
24 fair amount of studies that indicate passive smoke
25 exposure is also a cause of breast cancer, and there's

1 some consistency there, but I think, again, the
2 problem is, is that it's really hard to quantify
3 passive cigarette smoke exposure for levels in terms
4 of the risk of any cancer.

5 BY MR. TELAN:

6 Q. For smokers who see smoking, does the
7 risk of developing AML continue for beyond 20 years
8 after one stops smoking?

9 A. I have that information in my report.
10 It does. I think it certainly goes down closer, but I
11 think it extends out at least 20 to 30 years, which
12 speaks to the idea that it's not just the benzene
13 alone in cigarette smoke that's causing AML.

14 Q. Did you cite the atom bomb study in
15 your report?

16 A. In any context?

17 Q. Yeah. I don't recall if I remember
18 seeing that.

19 A. I'm pretty sure I did. I have one
20 paper called "The late effect of atomic bomb radiation
21 on myeloid disorders, leukemia and mild dysplastic
22 syndromes." There's another one by Dale Preston on
23 leukemia, lymphoma, myeloma. Another one again on
24 lymphoma, myeloma by Nishiyama.

25 Q. Do any of --

1 A. So there's at least a half a dozen in
2 here.

3 Q. Do any of those studies speak to the
4 latency period extending beyond 50 years with an
5 increased risk for those patients having all forms of
6 leukemia, even after 50 years?

7 A. My recollection, my recollection is
8 only it being a risk for AML, but I could be
9 misremembering that, and my recollection also is that,
10 again, after 10 or 15 years, the risk of AML goes back
11 to background post the atomic bomb survivors.

12 MR. TELAN: Give me two minutes.

13 THE WITNESS: Okay.

14 MR. TELAN: Go off the record.

15 VIDEOGRAPHER: We are now going off
16 record. The time is 6:32.

17 (A recess was taken from 6:32 to 6:35.)

18 VIDEOGRAPHER: We are now back on the
19 record. The time is 6:35. You may continue.

20 BY MR. TELAN:

21 Q. Dr. Shields, at page 95 of your report,
22 this kind of follows up on the smoking discussion we
23 were having, quitting. You mentioned, "One
24 constituent of cigarette smoke is benzene. However,
25 it should not be inferred that benzene is the only

1 driver for AML causation, such as modeled by Korte."

2 You go on to state, further down in
3 that same paragraph, "Since cigarette smoking is not a
4 known cause of lymphomas, the relationship to leukemia
5 is more evident for 1,3-butadiene."

6 Did I read that correctly?

7 A. Yes.

8 Q. You didn't cite to any studies relating
9 butadiene to leukemia in that section, did you?

10 A. I'm pretty sure I have cited some of
11 those studies.

12 Q. Not in this paragraph to support that
13 statement. True?

14 A. So I'm citing the IARC monograph on
15 smoking, 100-F.

16 Q. Where is the cite to that?

17 A. It's at the bottom of page 95.

18 Q. 100-F?

19 A. Correct.

20 Q. Where are you reading? I'm just
21 missing that.

22 A. So it says above, "Another known
23 carcinogen of cigarette smoke is 1,3-butadiene that is
24 classified by IARC as a known cause of hematolymphoid
25 malignancies combined due to limited studies. The

1 subtypes are unclear, but IARC working group stated
2 there is evidence, strongest evidence for leukemia and
3 also indicates strong mechanistic report." And I'm
4 citing Citation 199.

5 Q. So your, your support for the
6 relationship from, for 1,3-butadiene to leukemia is
7 cite 199?

8 A. Correct.

9 Q. And what, what forms of leukemia does
10 1,3-butadiene cause?

11 A. So, you know, there's not a whole lot
12 of studies that isolate out human exposures, so we
13 don't know. So IARC combined all the hematolymphoid
14 and leukemias as saying strongest, but we don't really
15 have good studies. That's an example where you don't
16 have the epidemiology to make that clarification as
17 opposed to the chemicals at issue that we're talking
18 about today.

19 Q. And isn't that an issue that you take
20 with our experts who've grouped leukemias together?

21 A. Yeah. But you're confusing things. I
22 just said that for 1,3-butadiene, you don't have the
23 human studies. Your experts have lots of human
24 studies, many of which they didn't cite. They only
25 cherry-picked.

1 But we have a very robust database for
2 benzene, TCE, PCE and vinyl chloride. That's not the
3 case for butadiene, so you don't have a -- you aren't
4 able to separate that out, and that's stated in the
5 IARC monograph.

6 Q. You would say there's a robust database
7 for benzene and follicular lymphoma?

8 A. Less so. There's -- there's probably
9 three or four studies for benzene and follicular
10 lymphoma.

11 Q. What about TCE and follicular lymphoma?

12 A. I'd have to go back and look, but
13 there's a whole bunch of studies of TCE and NHL.

14 Q. But as far as subtyping, your position
15 is that it's inappropriate to suggest that a chemical
16 can cause all subtypes of a particular blood cancer,
17 correct?

18 A. No. You've mischaracterized what I've
19 said. For the leukemia subtypes, leukemia types are
20 extremely different. There's a wide variety of NHL
21 types as well, but some are closer than others, and
22 again, if you don't have the robust database for
23 follicular lymphoma, for example, to use yours, you
24 have to default to NHL. But if you have enough for
25 NHL, you can't just default and say all NHL plus

1 leukemias can all be combined together. That's wrong.
2 We do have limitations in science. We don't have a
3 perfect world, and some databases are more robust than
4 others.

5 Q. Is there evidence to show that benzene
6 affects the hematopoietic stem cells that govern both
7 lymphoid and myeloid lineage?

8 A. There are hypotheses around that.
9 They're probably not correct, because you don't see
10 that sort of crossover. So benzene -- you know, so
11 there's different levels of stem cells, and so some
12 are already differentiating towards a lymphoid, and
13 some are differentiating towards the myeloid, and
14 benzene is not affecting them the same way.

15 Q. Is there a progenitor stem cell that
16 has both the myeloid and lymphoid lineage?

17 MR. TUBIN: Objection to form.

18 A. Yes.

19 BY MR. TELAN:

20 Q. And does benzene impact that progenitor
21 stem cell?

22 MR. TUBIN: Objection to form.

23 A. That's almost impossible to study.
24 It's not clear if, when you study stem cells, what
25 progenitor stem cells you're actually looking at. So

1 the data is not clear for biological plausibility,
2 since you don't see, you know, since we're struggling
3 to show benzene is a cause of NHL, but we're not
4 struggling to cause benzene causing AML. It's
5 unlikely that is affecting that stem cell that can go
6 one way or another. What's happening is you may be
7 affecting it, but it's going towards the myeloid and
8 the acute myeloid line.

9 MR. TELAN: I will conclude but hold
10 the deposition open for review of the notes
11 that you all are going to produce. And --

12 MR. TUBIN: We're going to review their
13 discoverability and make a decision on the
14 production.

15 THE WITNESS: And I just --

16 MR. TELAN: And I understand -- sorry.
17 One second.

18 I understand your position. My
19 position is that there was no objection raised
20 to the production of those notes when they
21 were asked for.

22 MR. TUBIN: That's not true. I
23 objected on the basis of work product
24 doctrine.

25 MR. TELAN: You haven't seen them, so

1 how can you raise an objection to something
2 you haven't seen?

3 MR. TUBIN: I raised the objection. We
4 need to evaluate them for discoverability.

5 MR. TELAN: I get that, but I don't
6 think you can raise an objection in advance of
7 having seen a document. I don't think that's
8 an appropriate way to raise the objection.

9 So I think the question then becomes is
10 should you have seen those documents in
11 advance because of our request, and I think
12 the answer to that is -- again, I'm not the
13 judge, but I think the answer to that is yes,
14 you should have, because we asked for all
15 notes, and those notes have existed since that
16 time of the request.

17 So I'll hold the deposition open. I
18 understand it's your position that you'll
19 review it for an objection, but I also want to
20 hold it open to review the files that we still
21 had not been able to open on the computer at
22 least as of this morning at 9:30. I don't
23 know if we've been able to crack the code on
24 those things to this point.

25

1 BY MR. TELAN:

2 Q. And I'm sorry, Dr. Shields. I know you
3 were going to say something, and it's probably, hey, I
4 don't want to come back here and do this again. I get
5 it. But I'm sorry to cut you off. I just wanted to
6 make that clear.

7 A. I just wanted to say that just to
8 clarify on one of the questions about radiation, you
9 were asking about atomic bomb survivors causing other
10 forms other than AML, and I said I didn't recall any.
11 And just a quick glance at my report indicates not
12 only time and form but other radiation forms of
13 exposure. I've been associated with CML, so I was
14 just gonna say the report speaks for itself as opposed
15 to what I'm recalling.

16 BY MR. TELAN:

17 Q. Okay. And let me just ask this. As
18 far as the latency, it extends out past 50 years for
19 both AML and CML, correct?

20 A. I don't have anything in here about
21 CML, and I don't think that it extends out again. I
22 have to look at my report, but I think for AML, it's
23 also the 10- to 15-year window.

24 MR. TELAN: Okay.

25 VIDEOGRAPHER: No further questions?

1 MR. TELAN: Not from me.

2 MR. TUBIN: Not from us.

3 VIDEOGRAPHER: All right. This
4 adjourns the deposition of Dr. Peter Shields.
5 The time on the screen is 6:44 p.m., and we
6 are now off record.

7 MS. SPRAYREGEN: We do want a rough.

8 COURT REPORTER: Do you want a regular
9 copy too?

10 MS. SPRAYREGEN: Yes.

11 COURT REPORTER: Are you ordering this?

12 MR. LEE: Yes. Whatever the norm is.
13 Do we need a rough?

14 MR. TELAN: No.

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16 DEPOSITION ADJOURNED AT 6:46 P.M. EDT

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C E R T I F I C A T E

State of Ohio :
:
County of Hamilton :

I, Susan M. Gee, Registered Merit Reporter and Certified Realtime Reporter, a duly commissioned Notary Public in and for the State of Ohio, duly commissioned and qualified, do hereby certify that the within-named PETER GARY SHIELDS, M.D., was duly sworn to testify to the truth, the whole truth, and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by me at the time, place, and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal of office at Cincinnati, Ohio, on this 4th day of June

Susan M. Gee

S/ Susan M. Gee, RMR, CRR
Notary Public, State of Ohio
Registered Merit Reporter
Certified Realtime Reporter

My Commission Expires: September 20, 2025

STATE OF OHIO :
: SS

COUNTY OF _____:

I, PETER GARY SHIELDS, M.D., do hereby
certify that I have read the foregoing transcript of
my deposition given on May 12, 2025; that together
with the correction page attached thereto noting
changes to form or substance, if any, it is true and
correct.

PETER GARY SHIELDS, M.D.

I do hereby certify that the foregoing
transcript of the deposition of PETER GARY SHIELDS,
M.D., was submitted to the witness for reading and
signing; that after he had stated to the undersigned
Notary Public that he had read and examined his
deposition, he signed the same in my presence on this
_____ day of _____, 2025.

NOTARY PUBLIC - STATE OF OHIO

My commission expires: _____

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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