

Exhibit 159

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

IN RE:)
)
CAMP LEJEUNE WATER) CASE NO.
LITIGATION) 7:23-cv-00897
-----)
)
This Document Relates)
To:)
)
ALL CASES)
)

VIDEO-RECORDED ORAL DEPOSITION OF
MICHAEL D. FREEMAN, MD, PHD, MSCFMS, MPH
TUESDAY, JUNE 17, 2025

REPORTED BY:
DEBRA A. DIBBLE, FAPR, RDR, CRR, CRC, Notary
Public
JOB NO. 7364522

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3 VIDEO-RECORDED ORAL DEPOSITION OF
4 MICHAEL D. FREEMAN, MD, PHD, MSCFMS, MPH,
5 produced as a witness at the instance of the
6 Defendant and duly sworn, was taken in the
7 above-styled and numbered cause on the
8 above-referenced date, from 9:04 a.m. to
9 4:27 p.m. PDT, before Debra A. Dibble, CSR,
10 CCR, RDR, CRR, Fellow of the Academy of
11 Professional Reporters, Notary Public,
12 reported by realtime stenographic means at
13 the Gatti Law Offices, 235 Front Street SE,
14 Suite 200, Salem, Oregon.
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INDEX

APPEARANCES	3
PROCEEDINGS	12
EXAMINATION OF MICHAEL D. FREEMAN, MD, PHD, MSCFMS, MPH:	
BY MS. SILVERSTEIN	13
BY MR. SNIDOW	297
CERTIFICATE	308

DEPOSITION EXHIBITS

NUMBER	DESCRIPTION	PAGE
Exhibit 1	Invoices	18
Exhibit 2	12-8-2024 report, RE: Camp Lejeune Water Contamination Litigation: Kidney cancer outcome	37
Exhibit 3	12-6-24 report, RE: Camp Lejeune Water Contamination Litigation: Parkinson's Disease outcome	52
Exhibit 4	1-20-2017 ATSDR Public Health Assessment for Camp Lejeune Drinking Water	99
Exhibit 5	Is There Evidence for Synergy Among Air Pollutants in Causing Health Effects? (Mauderly/Samet)	104

1 Exhibit 6 Evaluation of mortality 141
2 among marines and navy
3 personnel exposed to
4 contaminated drinking water
5 at USMC Base Camp Lejeune:
6 A retrospective cohort
7 study (Bove/Ruckart/Maslia/
8 Larson),
9 CLJA_HEALTHEFFECTS-
10 0000141103 through
11 000014115,

12 Exhibit 7 Mortality study of civilian 149
13 employees exposed to
14 contaminated drinking water
15 at USMC bases Camp Lejeune:
16 A retrospective cohort
17 study (Bove/Ruckart/Maslia/
18 Larson),
19 CLJA_HEALTHEFFECTS-
20 0000291324 through
21 CLJA_HEALTHEFFECTS-
22 0000291336

1 Exhibit 8 April 2018 Morbidity Study 163
2 of Former Marines,
3 Employees, and Dependents
4 Potentially Exposed to
5 Contaminated Drinking Water
6 at U.S. Marine Corps Base
7 Camp Lejeune,
8 CLJA_HEALTHEFFECTS-
9 0000000214 through
10 CLJA_HEALTHEFFECTS-
11 0000000340

12 Exhibit 9 Cancer Incidence among 171
13 Marines and Navy Personnel
14 and Civilian Workers
15 Exposed to Industrial
16 Solvents in Drinking Water
17 at US Marine Corps Base
18 Camp Lejeune: A Cohort
19 Study
20 (Bove/Greek/Gatiba/Kohler/
21 Sherman/Shin/Bernstein)
22
23
24
25

1	Exhibit 10	Evaluation of mortality	177
2		among Marines, Navy	
3		personnel, and civilian	
4		workers exposed to	
5		contaminated drinking water	
6		at USMC base Camp Lejeune:	
7		A cohort study	
8	Exhibit 11	Occupational	191
9		Trichloroethylene Exposure	
10		and Kidney Cancer, A	
11		Meta-analysis	
12		(Kelsh/Alexander/Mink/	
13		Mandel)	
14	Exhibit 12	September 2011	197
15		Toxicological Review of	
16		Trichloroethylene	
17	Exhibit 13	Case-Control Study on Renal	199
18		Cell Cancer and	
19		Occupational Exposure to	
20		Trichloroethylene	
21		Part II: Epidemiological	
22		Aspects	
23		(Charbotel/Fevotte/Hours/	
24		Martin/Bergeret)	
25			

1			
2	Exhibit 14	Updated and Expanded	206
3		Swedish Cohort Study on	
4		Trichloroethylene and	
5		Cancer Risk	
6		(Axelson/Selden/	
7		Andersson/Hogstedt)	
8	Exhibit 15	Tetrachloroethylene	214
9		Exposure and Bladder Cancer	
10		Risk: A Meta-Analysis of	
11		Dry-Cleaning-Worker Studies	
12	Exhibit 16	January 2024 Toxicological	221
13		Profile for Vinyl Chloride	
14	Exhibit 17	2008, Lyon, France, IARC	224
15		Monographs on the	
16		Evaluation of Carcinogenic	
17		Risks to Humans, Volume 97	
18	Exhibit 18	August 2007 Toxicological	229
19		Profile for Benzene	
20	Exhibit 19	12-8-2024 Dr. Michael	239
21		Freeman - Supplemental	
22		Materials Considered	
23	Exhibit 20	Solvent Exposures and	246
24		Parkinson Disease Risk in	
25		Twins	

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Exhibit 21	Risk of Parkinson Disease Among Service Members at Marine Corps Base Camp Lejeune	253
Exhibit 22	Parkinson's Disease Progression and Exposure to Contaminated Water at Camp Lejeune	261

P R O C E E D I N G S
June 17, 2025, 9:04 a.m. PDT

THE VIDEOGRAPHER: We are now
on the video record. Today's date is
Tuesday, June 17, 2025, and the time
is 9:04 a.m.

This is the video-recorded
deposition of Dr. Michael Freeman,
being taken in the matter regarding
Camp Lejeune Water Litigation being
held in the United States District
Court, Eastern District of North
Carolina. Case No. 7:23-cv-00897.

We are located today at Gatti
Law Firm, Salem, Oregon 97301.

Appearances will be noted on
the stenographic record.

My name is Drew Goodman with
Golkow, a Veritext division. The
court reporter is Debra Dibble, who
will now swear or affirm the witness.

MICHAEL D. FREEMAN, MD, PhD, MScFMS, MPH,
having been duly sworn,
testified as follows:

EXAMINATION

BY MS. SILVERSTEIN:

Q. Hi, Dr. Freeman. I know we
introduced ourselves a few moments ago when
we both arrived. I am Kailey Silverstein.
This is my colleague Elizabeth Platt. We're
attorneys with the United States Department
of Justice and represent the United States in
the Camp Lejeune litigation.

What is your full name?

A. Michael Freeman, middle initial
D.

Q. And what is your current
business address?

A. I'm sorry, I have to look at my
e-mail for it because it's a P.O. Box.

Q. Oh, that's all right.

A. That's where I...

Q. No, that's okay. Is it P.O.

1 Box 96309?

2 A. It is.

3 Q. Great.

4 And that's here in -- is that
5 in Salem or in Portland?

6 A. That's in Portland, 96309,
7 Portland something. It's on -- I think it's
8 on the first page of my report.

9 Q. Okay.

10 And you've had your deposition
11 taken before, right?

12 A. I have.

13 Q. I think you're probably going
14 to be pretty familiar with the deposition
15 process, but I just want to go over a couple,
16 what I call, ground rules to make sure that
17 you and I are both on the same page.

18 You understand you're under
19 oath, right?

20 A. I do.

21 Q. And do you understand that
22 being under oath requires you to tell the
23 truth?

24 A. Yes, I do.

25 Q. And you understand that you are

1 under the penalty of perjury.

2 A. I do.

3 Q. And do you understand this is a
4 court proceeding, even though we're not in a
5 courtroom?

6 A. I do.

7 Q. The court reporter here is
8 taking down everything that you and I say.
9 There's a couple of things that we can do to
10 try to make her life easier. One of them is,
11 and you've already been doing this, it's
12 answering all of the questions I ask out
13 loud. I know in ordinary conversation,
14 nodding our heads or saying uh-huh is easy
15 and natural. That's hard to get down on a
16 stenographic record. Does that make sense?

17 A. (Witness nods.) Yes.

18 Q. I see what you did there.

19 You and I should also do our
20 best to not interrupt each other. There may
21 be times where you know exactly what question
22 I'm going to ask next. I'll ask that you
23 allow me to answer it anyway -- or, excuse
24 me, allow me to ask the question anyway
25 before you answer and I'll do my best to not

1 cut off any of your answers.

2 If I do, please let me know and
3 you can finish what you're saying.

4 Does that make sense?

5 THE VIDEOGRAPHER: I'm sorry to
6 interrupt. Can I check your
7 microphone really quick? I think it's
8 rubbing.

9 A. It does.

10 BY MS. SILVERSTEIN:

11 Q. You and I should also try to
12 speak at a reasonable pace. Sometimes I get
13 carried away and start talking quickly, but
14 it can be hard to keep track of what we're
15 saying if we do that. Does that make sense?

16 A. It does.

17 Q. Do you understand that you are
18 the only one testifying today?

19 A. I do.

20 Q. There may be times during this
21 deposition where I ask a poorly worded
22 question or something that doesn't make
23 sense. Please let me know if I do that or if
24 you don't understand what I'm saying and I
25 will clarify or rephrase my question.

1 If you answer my question, I'll
2 assume that you understood what I was asking.

3 Does that make sense?

4 A. It does.

5 Q. Great.

6 You may hear J.J. object during
7 the deposition. Unless he instructs you not
8 to answer, you're free to answer after he --
9 we note his objection.

10 Does that make sense?

11 A. It does.

12 Q. During the deposition, I try to
13 take a break every hour to an hour and a
14 half. If you need a break before that, just
15 let me know and we can take a break at any
16 time. I'll just ask that if I've already
17 asked a question that you haven't answered,
18 that you go ahead and answer the question
19 before we take a break. Does that make
20 sense?

21 A. It does.

22 Q. Do you understand that you're
23 here today in connection with the Camp
24 Lejeune water litigation?

25 A. I do.

1 Q. And I understand that you've
2 been retained by the plaintiffs to offer
3 expert opinions in that litigation; is that
4 correct?

5 A. That you understand that that
6 is the case or that is the case --

7 Q. Is it correct that you have
8 been retained to offer expert opinions in the
9 Camp Lejeune litigation?

10 A. Yes.

11 Q. When were you hired or
12 retained?

13 A. I'd have to look at my file to
14 be able to tell you that.

15 Q. I am going to go ahead and hand
16 you Exhibit 1.

17 (Freeman Deposition Exhibit 1,
18 Invoices, was marked for
19 identification.)

20 THE VIDEOGRAPHER: I apologize.
21 Can we go off the record real quick?

22 MS. SILVERSTEIN: Sure.

23 THE VIDEOGRAPHER: We are off
24 the record at 9:09 a.m.

25 (Recess taken, 9:09 a.m. to

1 9:10 a.m. PDT)

2 THE VIDEOGRAPHER: We are on
3 the record at 9:10 a.m.

4 BY MS. SILVERSTEIN:

5 Q. And, Dr. Freeman, I just handed
6 you what is Exhibit 1.

7 These appear to be invoices in
8 connection with your work on the Camp Lejeune
9 litigation.

10 Have you seen these documents
11 before?

12 A. Well, I assume that they came
13 from my file. I'm not sure if I've actually
14 seen them before.

15 Q. Do you prepare your own
16 invoices?

17 A. Someone from my office does. I
18 do not personally do that.

19 Q. Okay. The first page of these
20 invoices is dated November 27th, 2024.

21 Do you see that?

22 A. I do.

23 Q. Before November 2024, did you
24 do any work on the Camp Lejeune water
25 litigation?

1 A. Yes, I must have, because the
2 invoice represents work that was done prior
3 to that time.

4 Q. And what do you mean "the
5 invoice represents work done prior to that
6 time"?

7 A. The invoice describes a certain
8 number of hours during which work was
9 performed, and that means that the work was
10 performed prior to the time that the invoice
11 was submitted.

12 Q. Was the work performed prior to
13 November 2024?

14 A. If the invoice was issued at
15 that date, which I assume it was, then yes,
16 that would be correct.

17 Q. The date is November 27th,
18 2024, correct?

19 A. Yes.

20 Q. Do you know how long the
21 billing period is for invoices?

22 A. I'm assuming that question
23 refers to how long before that time the work
24 started, is that --

25 Q. Correct. Do you know how

1 long -- how many weeks or months this first
2 invoice represents?

3 A. Not without looking at my file.

4 Q. And do you know whether you
5 were retained prior to November 1st, 2024?

6 A. I would assume I must have
7 been, yes.

8 Q. Do you know if it was prior to
9 September 1st, 2024?

10 A. That I can't answer, without
11 looking at my file.

12 Q. So would it be fair to say
13 probably sometime between September 1st and
14 November 1st, 2024?

15 A. Well, it wouldn't be unfair to
16 say that, but I can't say it wasn't before
17 September 1st as well.

18 Q. Okay. Were you retained
19 sometime in 2024?

20 A. I assume that's correct, yes.
21 I'm sure it was during that time frame.

22 Q. And when is the first time that
23 you remember doing research or literature
24 review or other work for the Camp Lejeune
25 litigation?

1 A. I can't tell you that I know
2 that off the top of my head.

3 Q. Okay. There's not a time that
4 you remember whether or not you know for sure
5 it was the first instance? There's no time
6 that you remember doing work?

7 A. I certainly remember doing
8 work, I just don't remember exactly when that
9 was.

10 Q. Okay. So you have no idea when
11 you started working on your reports?

12 A. No, I wouldn't say that.

13 Q. Okay. So what is your
14 understanding of when you started working on
15 the reports?

16 A. Well, based on what we
17 discussed before, it's very reasonable it was
18 in 2024, and it was sometime before November
19 of 2024, November 27th of 2024, but the exact
20 time, like whether it was September or
21 October that the work started, that, I
22 couldn't answer without looking at my file.

23 Q. Have you billed for all of the
24 time that you worked on the Camp Lejeune
25 litigation in 2024?

1 A. Up until the time that the
2 reports were issued, yes, that is my
3 understanding.

4 Q. Okay. And -- okay.

5 So there's a bill here for
6 November 21st, 2024, for \$26,000. For six
7 days later, on November 27, 2024. And then
8 about a week later, on December 5th, 2024,
9 and a little over a month later on
10 January 14th, 2025. Do you see those?

11 A. Yes.

12 Q. Do you have a practice for how
13 frequently you send bills?

14 A. I would say in most cases,
15 billing goes out at the completion of the
16 work. So there's not a -- any kind of
17 monthly cycle for billing.

18 Q. There are two bills here. The
19 one's dated -- two invoices dated
20 November 27th, 2024, and December 5th, 2024.

21 At the bottom of each of these,
22 they say: Camp Lejeune-Kidney.

23 Do you see that?

24 A. Yes.

25 Q. Are those for different

1 projects or are they the same work?

2 A. Different -- can you please
3 clarify what you mean by different projects?

4 Q. Sure. You said a minute ago
5 that you generally bill at the completion of
6 the work, right?

7 A. Yes.

8 Q. And I see one that says: Camp
9 Lejeune-Parkinsons.

10 Would it be correct to say your
11 understanding is that invoice contains all of
12 the time you spent working on your
13 Parkinson's report?

14 A. Yes.

15 Q. And then there are two invoices
16 that both say: Camp Lejeune-Kidney.

17 Would it be correct to say that
18 to know how many hours you spent on the
19 kidney cancer report, we need to add the two
20 invoices together?

21 A. Yes.

22 Q. And then the last invoice says:
23 Camp Lejeune-Bladder research.

24 Right?

25 A. Yes.

1 Q. And you are not offering any
2 opinions related to bladder cancer, correct?

3 A. Correct.

4 Q. Do you recall who hired you?

5 A. I certainly know Mr. Snidow was
6 involved. And his law firm but there may
7 have been other law firms that were involved
8 as well.

9 Q. Do you remember working with
10 anyone other than Mr. Snidow about being
11 retained or completing any paperwork to on --
12 for this litigation?

13 A. I worked with Ms. Shannon, Lori
14 Shannon.

15 Q. Okay.

16 A. Those would be, I would say, my
17 two primary contacts.

18 Q. Okay. For -- did you work with
19 anybody in writing your reports?

20 A. In my practice?

21 Q. Yes.

22 A. Yes, I did.

23 Q. Who did you work with?

24 A. Primarily I worked with
25 Dr. Larry Teeter, T-E-E-T-E-R.

1 Q. Who is Dr. Larry Teeter?

2 A. He is an epidemiologist who
3 used to work for the CDC.

4 Q. And what did Mr. Teeter do --
5 or Dr. Teeter, excuse me, do for your
6 reports?

7 A. We collaborated on it.

8 Q. Okay.

9 A. So he took some parts; I took
10 some parts.

11 I was responsible for the final
12 product, but some of the writing was
13 initially done by him and then ultimately
14 edited by me and some of the writing was just
15 done by me.

16 Q. Okay. Was there any
17 particular -- were there any particular
18 topics that Dr. Teeter was responsible for?

19 A. No. I didn't treat him as a
20 specialist in one area versus another. I
21 think that it was more or less just splitting
22 up the tasks.

23 Q. Okay.

24 Aside from Dr. Teeter, did you
25 work with anybody else at your practice to

1 prepare your reports?

2 A. No, I don't -- I don't believe
3 I did.

4 Q. And if we wanted to know which
5 hours on the invoices reflect your work
6 versus Dr. Teeter's work, how would we be
7 able to tell?

8 A. You won't be able to tell that
9 from the invoices. They don't specify who
10 did what.

11 Q. Is that something that is kept
12 track of internally?

13 A. Only between myself and Dr.
14 Teeter.

15 Q. And you don't provide that
16 information to whoever does the billing with
17 your firm?

18 A. No.

19 Q. Before you were retained, had
20 you heard of Camp Lejeune?

21 A. Yes.

22 Q. What did you know about Camp
23 Lejeune?

24 A. Well, I've been retained in --
25 by multiple other firms in -- for Camp

1 Lejeune litigation. And so I familiarized
2 myself with the circumstances of Camp Lejeune
3 during that time.

4 Q. Who else have you been retained
5 by in connection with the Camp Lejeune
6 litigation?

7 MR. SNIDOW: And, Dr. Freeman,
8 just -- you obviously know better than
9 I do, but I do want to caution you to
10 protect any privilege with other
11 attorneys.

12 THE WITNESS: Understood.

13 A. I don't recall, frankly. It's
14 been over the past couple of years. And so
15 I -- I know we've been retained and some
16 materials have been sent, but I couldn't tell
17 you which firms they were that retained me.

18 And just to elaborate, I think
19 there's maybe three other firms, or three
20 other cases in which I've been retained
21 approximately.

22 BY MS. SILVERSTEIN:

23 Q. Okay. Approximately how many
24 years have you been retained by a firm
25 related to the Camp Lejeune litigation?

1 A. I wouldn't think it would be
2 much more than two years.

3 Q. Okay.

4 Prior to being retained by that
5 first law firm, had you heard about Camp
6 Lejeune?

7 A. I believe I had.

8 Q. And do you recall what you knew
9 about Camp Lejeune prior to being retained by
10 any law firm?

11 A. I think I heard about the
12 congressional action.

13 It just came up in a news feed.

14 Q. And between when you were
15 retained by that first law firm and when you
16 started working on your kidney cancer and
17 Parkinson's disease reports for this
18 litigation, what did you know about Camp
19 Lejeune?

20 A. I would have to just surmise
21 what my knowledge was. I couldn't give
22 you -- I didn't have a great deal of specific
23 knowledge about it other than that it was
24 considered a toxic site, and that there was
25 congressional action associated with it, and

1 that it was a military site.

2 Q. Okay.

3 You submitted two expert
4 reports in this case, one for kidney cancer
5 and one for Parkinson's disease, right?

6 A. Yes.

7 Q. How did you determine which
8 diseases to submit reports about?

9 A. They were the two topics that
10 reports were requested for.

11 Q. Okay.

12 A. Or I should say, analysis of
13 reports.

14 Q. Okay. So you were asked to
15 write reports specifically about kidney
16 cancer and Parkinson's; is that fair?

17 A. Yes.

18 Q. What did you do to prepare for
19 your deposition today?

20 A. I reviewed my reports. I
21 reviewed some of the underlying literature.
22 I chatted with Mr. Snidow. That's pretty
23 much it.

24 Q. Okay.

25 You said you reviewed some of

1 the underlying literature, right?

2 A. Yes.

3 Q. What literature do you recall
4 reviewing?

5 A. Primarily the studies
6 underlying some of the meta-analyses for the
7 TCE estimates. Because that was the largest
8 body of literature that I described
9 particularly for the kidney cancer.

10 Q. Are there any specific studies
11 that you recall reviewing?

12 A. No. There's so darn many of
13 them, that -- I can't separate them out in my
14 mind just offhand.

15 Q. Okay. And you said that you
16 met with Mr. Snidow, correct?

17 A. Yes.

18 Q. How many times did you meet
19 with him?

20 A. Four.

21 Q. About what time frame did these
22 meetings take place?

23 A. Three were Zoom meetings over
24 the past couple of weeks.

25 Q. Okay.

1 A. And then one was when I met him
2 today.

3 Q. Okay. For the Zoom meetings,
4 was anybody on the Zoom except for you and
5 Mr. Snidow?

6 A. I believe Ms. Shannon was
7 there.

8 Q. And Ms. Shannon is with the
9 same law firm as Mr. Snidow; is that right?
10 Is that your understanding?

11 A. It is.

12 Q. And about how long were the
13 Zoom meetings?

14 A. I think they were each about an
15 hour.

16 Q. And you said you met with
17 Mr. Snidow in person, right?

18 A. Yes. You were here for that.

19 Q. Okay. So you mean when you
20 came into the law firm this morning for the
21 deposition?

22 A. Yes.

23 Q. Did you meet with him in person
24 before this morning?

25 A. I did not.

1 Q. And aside from your reports and
2 the underlying studies that we discussed
3 earlier, have you reviewed any documents to
4 prepare for your deposition?

5 A. Offhand, not that I can think
6 of, no.

7 Q. Okay. And you've been deposed
8 before, right?

9 A. Yeah.

10 Q. About how many times?

11 A. Too many. Is that a reasonable
12 answer?

13 I believe the count is over
14 1400.

15 Q. And about, you know, how long
16 ago was the first one of those?

17 A. Late '90s.

18 Q. So in the past 25 to 30 years,
19 you've been deposed about 1400 times. Is
20 that -- does that sound right?

21 A. -ish, yes.

22 Q. Have all of those -- about how
23 many of those 1400 depositions have been
24 related to expert witness work?

25 A. All of them.

1 Q. Have you ever been deposed in
2 your personal capacity?

3 A. Yeah, I think we had, like, a
4 business litigation thing some years ago.

5 Q. Okay.

6 A. It was unrelated to anything.

7 Q. And that was just something to
8 do with a business issue?

9 A. Disputed value.

10 Q. Have you ever been deposed as a
11 treating physician?

12 A. No.

13 Oh, maybe.

14 No, I don't think I have,
15 actually.

16 Q. Okay.

17 And you've testified in trial,
18 correct?

19 A. Yes.

20 Q. About how many times have you
21 testified in trial?

22 A. I would estimate between 450
23 and 500 times. That may be a little bit of
24 an overestimate, because I'm not really clear
25 about the first ten years.

1 Q. Okay.

2 A. But more recent years, where
3 I've kept Rule 26(B) disclosures on my
4 testimony, was I could keep track of it that
5 way.

6 Q. So 450 to 500 is a ballpark?

7 A. Yes.

8 Q. Not a precise estimate?

9 A. Correct.

10 Q. Understood.

11 Just as you did there, if
12 you're estimating on something, please let me
13 know. We don't -- I don't want you to
14 speculate or take any wild guesses on things,
15 but just like there, if you're estimating,
16 let me know and we can make sure that that's
17 noted.

18 A. I understand.

19 Q. About how many expert reports
20 have you prepared over the course of your
21 career?

22 A. Thousands.

23 Q. Okay.

24 A. I can't give you a very precise
25 estimate, but it would definitely be

1 thousands.

2 Q. Do you --

3 A. Certainly over 2,000. Maybe
4 over 3,000-ish.

5 Q. Okay. Does it sound right to
6 say like 2500 to 3,000-ish, give or take a
7 little bit?

8 A. Well, emphasis on the -ish.

9 Q. Okay. Great.
10 Is there a specific topic that
11 you focus on as an expert witness?

12 A. I have a highly varied
13 practice. So I would say the majority of
14 reports that are done out of my practice
15 relate to traffic crash-related injury and
16 death.

17 Q. Okay.

18 A. Second after that would be
19 medical negligence.

20 And then after that would be
21 mass tort, life expectancy and product defect
22 in the civil arena.

23 Q. Okay.

24 A. And then about 20% of my work
25 is in the criminal arena. And so those are

1 typically wrongful death of some kind,
2 manslaughter or --

3 Q. Okay.

4 Of your civil cases, that 80%,
5 about 80% that makes up the civil cases,
6 about what percentage of that is mass tort
7 related?

8 A. Probably between 5 and 10%.

9 Q. Okay.

10 A. That may be an underestimate.
11 It may be as high as 15%, actually.

12 Q. Okay. Somewhere in the
13 ballpark of 5 to 15%? Does that sound right?

14 A. It really depends on how you
15 define mass tort.

16 Q. Sure.

17 A. So I think that's my
18 difficulty.

19 Q. Okay.

20 I am handing you Exhibit 2.

21 (Freeman Deposition Exhibit 2,
22 12-8-2024 report, RE: Camp Lejeune
23 Water Contamination Litigation:
24 Kidney cancer outcome, was marked for
25 identification.)

1 BY MS. SILVERSTEIN:

2 Q. I handed you Exhibit 2. And
3 this is your kidney cancer report, correct?

4 A. Along with my CV and my Rule 26
5 testimony list, it looks like it, yes.

6 Q. Sure. So it's got the
7 attachments to your report included, right?

8 A. Yes, I assume those were the
9 attachments to the report.

10 Q. And does this appear to be a
11 fair and accurate copy of your kidney cancer
12 report?

13 A. Yes. There is only one copy of
14 that.

15 Q. Okay. And, Dr. Freeman, did
16 you write this entire report?

17 A. Well, to the extent that I
18 described earlier, I was assisted in much of
19 the research, but all of the report was
20 ultimately written by me.

21 Q. Okay. And this report -- all
22 of the opinions in this report are your
23 opinions, right?

24 A. Yes.

25 Q. Are all of your opinions about

1 whether TCE, PCE, vinyl chloride, or benzene
2 can cause kidney cancer contained in this
3 report?

4 A. They are.

5 Q. Is there anything in this
6 kidney cancer report that you no longer agree
7 with or that needs to be changed?

8 A. I haven't been through it a few
9 times over the past couple of weeks. I can't
10 think of anything I've come across that stood
11 out as being something I didn't agree with at
12 the present time.

13 Q. And if there is anything that
14 you notice today during this deposition, that
15 you think needs to be changed or corrected,
16 please just let me know.

17 A. I most certainly will.

18 Q. Sitting here today, are there
19 any opinions about kidney cancer that you
20 intend to offer at trial that are not
21 contained in this report?

22 A. No.

23 Q. Could you turn to the --
24 Sure. Go ahead.

25 A. That was my finger being raised

1 as I was about to turn the page.

2 Q. Got it.

3 Could you turn to your CV,
4 which is one of the attachments?

5 And are you at your CV?

6 A. Yes, I am.

7 Q. Is this a fair and accurate
8 copy of your CV?

9 A. Well, it was in December of
10 2024. It's out of date currently.

11 Q. Okay. What needs to be
12 updated?

13 A. Stuff.
14 Let's see. Probably mostly
15 lectures and publications and media
16 appearances, I would say.

17 Q. Okay. Since December 2024,
18 about how many lectures have you done that
19 would need to be included in this report?

20 A. 3 or 4, anyway.

21 Q. Okay. Do you remember the
22 topics of those lectures?

23 A. Most recently -- yes.

24 Q. And what are those topics?

25 A. It's the role of numeracy and

1 wrongful convictions and exonerations.

2 Q. Do you remember the topics of
3 any of your other lectures?

4 A. Not really.

5 Q. Do you remember if any of the
6 lectures that you've done since December 2024
7 have been on kidney cancer?

8 A. No.

9 Q. Have they been on Parkinson's
10 disease?

11 A. I'm sorry. You asked me if I
12 remembered. Yes, I do remember, and the
13 answer is none of them have been on kidney
14 cancer. I should be more specific.

15 Q. Have any of your lectures been
16 on Parkinson's disease?

17 A. No.

18 Q. Have any of your lectures been
19 on trichloroethylene?

20 A. No.

21 Q. Have any of your lectures been
22 on purple ethylene?

23 A. No.

24 Q. Have any of your lectures been
25 on vinyl chloride?

1 A. No.

2 Q. Have any of your lectures been
3 on benzene?

4 A. Oh, on benzene?

5 Q. Yes.

6 A. No.

7 Q. And you said there may have
8 also been some media appearances that may
9 need to be updated?

10 A. Yes.

11 Q. About how many media
12 appearances?

13 A. About a dozen or so.

14 Q. And do you remember -- well, to
15 the best of your memory, what were those
16 media appearances about?

17 A. I think that they were all
18 present, and most of them were related to my
19 work for the Attorney General of Maryland on
20 death and custody.

21 Q. Okay. And aside from the media
22 appearances and lectures, is there -- are
23 there any other categories of information
24 that need to be updated on your CV?

25 A. Yes. I thought I said

1 publications, but maybe I omitted that.

2 Q. I may have forgotten.

3 And about how many publications
4 have you had since December 2024?

5 A. 3 or 4, I would estimate.

6 Q. And to the best of your memory,
7 what are the topics of those publications?

8 A. Well, a couple were on
9 pituitary and hypothalamic injury and
10 hormonal deficiency and traumatic brain
11 injury. I believe one is on posttraumatic
12 epilepsy. One is on neuropsychiatric aspects
13 of -- onset of forensic neuropsychiatric
14 aspects of juvenile onset of schizophrenia.

15 One is on peer review in the
16 forensic medical literature.

17 And the other ones escape me.

18 Q. And those are all of the
19 publications -- all of those publications
20 that you just described, those are since
21 December of 2024; is that right?

22 A. Yes, to the best of my --

23 Q. Roughly that time frame?

24 A. -- recollection.

25 Yes.

1 Q. About what percentage of your
2 work time do you spend in clinical practice?

3 A. I don't have a clinical
4 practice.

5 Q. Okay.

6 A. I'm not a clinical medical
7 doctor.

8 So that's not -- I don't treat
9 or diagnose live people.

10 Q. Okay.

11 A. I work as a medical scientist,
12 in the field of forensic medicine. So 2/3 of
13 my time is devoted to my forensic practice,
14 and then 1/3 of my time is devoted to
15 academia and editorial work.

16 Q. When you say "forensic
17 practice," what does that mean?

18 A. That was what we were -- I was
19 describing earlier, about the breakdown of my
20 forensic consulting.

21 Q. Okay.

22 A. Which is the breakdown of the
23 types of the cases that I've consulted on,
24 which is about 80% in the civil arena and 20%
25 in the criminal arena.

1 Q. So when you talk about your
2 forensic work, you're talking about, like,
3 expert consulting type of work, is that
4 right?

5 A. Yes. That is the -- a good
6 broad category for it.

7 Q. Okay.

8 And what is the remainder --
9 aside from your forensic -- your forensic
10 work, what is the remainder of your work time
11 spent on?

12 A. It's in academia. I supervise
13 Ph.D. students. In the field of forensic
14 medicine, typically physicians or scientists.
15 And then editorial work, which actually
16 consumes a fair amount of my time as I'm the
17 editor and chief of a forensic medical
18 journal.

19 Somewhere in there I write
20 papers too. I just don't know where I fit
21 that in.

22 Q. Sounds very busy.

23 Would it be fair to say that
24 your areas of expertise are forensic medicine
25 and forensic epidemiology?

1 A. Yes. Broadly, that's accurate.

2 Q. And do you distinguish yourself
3 between forensic epidemiologists and
4 epidemiologists?

5 A. Yes. To the extent that it can
6 be distinguished, or it should be
7 distinguished in a forensic setting, I do.

8 Q. Do you consider yourself an
9 epidemiologist?

10 A. I am. I have two, a doctoral
11 degree and master's degree in epidemiology.
12 I've been a professor of epidemiology for
13 about 30 years.

14 Q. What's the difference between
15 forensic epidemiology and epidemiology?

16 A. Epidemiology is very
17 prospective in nature in that it's used to
18 explore relationships in populations between
19 exposures in diseases and injuries. And it
20 is essentially the medicine of populations.
21 Everything we know about efficacy of
22 treatments or different kinds of medicines,
23 everything we know about harmful exposures,
24 everything we know about disease and death,
25 all comes from epidemiologic studies. It's

1 very, very broad.

2 Forensic epidemiology is the
3 use of that information -- or information
4 that's gleaned from epidemiology, to look
5 retrospectively at an outcome, particularly
6 on issues of cause or causation. And so it
7 has -- there's some unique aspects of
8 forensic epidemiology which take from
9 epidemiology but are applied at a very unique
10 way.

11 Q. What do you mean "applied in a
12 very unique way"?

13 A. Well, epidemiology or
14 epidemiologic principles used for
15 investigation is forensic epidemiology,
16 essentially.

17 It -- the investigation of an
18 outbreak, for example, is done
19 retrospectively, even though -- well, the CDC
20 actually coined the phrase epidemiology in
21 the 1990's. And they specifically coined it
22 to talk about outbreaks, but in that case it
23 was outbreaks that might be associated with
24 bioterrorist attacks. Epidemiology has been
25 used in that fashion to evaluate sporadic

1 cases of foodborne illness or blood-borne
2 illness by investigational bodies --
3 investigatory bodies -- investigational --
4 I'm going to go with investigational bodies
5 from the CDC or from state public health
6 departments. That is a forensic application
7 of epidemiology, because they're looking
8 backwards in time.

9 And more specifically in civil
10 or criminal litigation, epidemiology or
11 epidemiologic principles is used -- are used
12 to address questions of counterfactual
13 causation, meaning that a question looks not
14 only at what is the chance of getting sick or
15 killed or injured by an exposure, but when
16 applied to an individual, what was the chance
17 of that individual getting sick or killed or
18 injured in the absence of the exposure.

19 And that's very unique to
20 forensic epidemiology, taking that
21 population-based technique and applying it
22 more to an individual to answer that
23 question.

24 Q. Are conclusions drawn in
25 forensic epidemiology versus epidemiology, do

1 they apply the same scientific standards?

2 A. Yes, to the evidence that's
3 used. The same scientific standard is used.
4 Epidemiologic methods and principles are used
5 to evaluate the strength of evidence. It's
6 how that evidence is then applied to answer a
7 specific -- a causation -- that may be
8 general or specific causation -- in nature.

9 Q. Would you agree that forensic
10 epidemiology differs somewhat from general
11 epidemiology, and that it has to do with the
12 evaluation of specific facts about a case?
13 To then assess whether the epidemiologic
14 evidence applies or not?

15 A. Yes.

16 Q. Okay.

17 A. That was very well put. I
18 couldn't have put it any better myself.

19 Q. Have you reviewed any other
20 expert reports in this litigation?

21 A. If it's listed in my report,
22 then yes, I have.

23 Q. Okay. You can't recall any
24 that you've reviewed?

25 A. Offhand, no, because I wasn't

1 asked to address any other expert reports.

2 Q. And after finalizing and
3 submitting your kidney cancer and Parkinson's
4 disease reports, did you review any
5 additional expert reports in this litigation?

6 A. Not that I recall offhand, no.

7 Q. Okay. Do you consider yourself
8 a toxicologist?

9 A. No, but I am trained in
10 toxicology. It's part of my master's degree
11 in forensic medicine.

12 Q. But you don't consider yourself
13 an expert in toxicology?

14 A. That's a different question. I
15 would be considered an expert in toxicology
16 since my knowledge level is greater than the
17 average layperson.

18 Q. Okay.

19 A. By that definition. However,
20 as far as functioning as a professional
21 toxicologist, no, I would not consider myself
22 the equivalent.

23 Q. Okay. And do you practice
24 toxicology within the sphere of your forensic
25 epidemiology or academic work?

1 A. If I am asked a question that I
2 can't address, which is based on
3 toxicological principles, I may. I see a lot
4 of cases that involve lab values for drugs,
5 illicit drugs and an associated death.

6 And so understanding those
7 values and how they relate to potential
8 legality of a drug, for example, is an area
9 that I've written about.

10 So there is a small part of
11 what I do that's -- that is forensic
12 toxicology, but it's, in the universe of
13 toxicology, it's -- I would say it's quite
14 small.

15 Q. Okay. Have you ever taught any
16 courses specifically on toxicology?

17 A. Not solely on toxicology.
18 Toxicology has been a part of some of my
19 teachings, however.

20 Q. Okay. How has toxicology been
21 a part of some of your teachings?

22 A. Well, I developed and taught a
23 course in injury and trauma epidemiology for
24 15 years. Medical school, where I am on
25 faculty in Oregon, in Portland, Oregon Health

1 & Science University.

2 Q. Okay.

3 A. So toxicology is important in
4 understanding risk factors for injury and
5 death.

6 Q. Okay.

7 Have you ever been the
8 principal investigator for a toxicology
9 study?

10 A. No, I -- absolutely not, I
11 would say.

12 Q. Okay. Understood.

13 (Freeman Deposition Exhibit 3,
14 12-6-24 report, RE: Camp Lejeune
15 Water Contamination Litigation:
16 Parkinson's Disease outcome, was
17 marked for identification.)

18 BY MS. SILVERSTEIN:

19 Q. I am handing you Exhibit 3.

20 MR. SNIDOW: You didn't mark
21 the CV separately, right?

22 MS. SILVERSTEIN: Correct.

23 MR. SNIDOW: Great.

24 (Discussion off the record.)

25

1 BY MS. SILVERSTEIN:

2 Q. Dr. Freeman, I handed you
3 Exhibit 3. This is the report that you wrote
4 for Parkinson's disease, correct?

5 A. Yes.

6 Q. Are there any changes or
7 corrections that you need to make to this
8 Parkinson's disease report?

9 A. Yes.

10 Q. Okay. And what is that?

11 A. I found an instance in which I
12 referred to Parkinson's disease as kidney
13 cancer.

14 Q. Okay.

15 A. I don't remember exactly where
16 it was, but if you -- if you just search for
17 kidney, that's the place where I just -- I
18 don't know what I was thinking about, but
19 kidney cancer got placed in there.

20 Q. Okay. Aside from the
21 typographical error, switching kidneys for
22 Parkinson's, are there any other corrections
23 that you need to make?

24 A. I -- not that I recall, no. I
25 think when I was discussing the Goodman (sic)

1 study, actually. I could probably find it
2 for you again.

3 Q. Okay.

4 A. If you want me to.

5 Q. Is that a change that you need
6 to make?

7 MR. SNIDOW: He's talking about
8 the typo.

9 MS. SILVERSTEIN: Oh, the typo,
10 so there's no other changes except the
11 typo?

12 A. Yeah. Sorry. I was
13 perseverating or ruminating about it. I
14 believe it's in the section about the Goodman
15 study.

16 The error.

17 BY MS. SILVERSTEIN:

18 Q. Does this report contain all of
19 the opinions that you intend to offer at
20 trial about Parkinson's Disease?

21 A. Yes.

22 Q. And are all of the opinions in
23 the report your opinions?

24 A. They are.

25 Q. Aside from Dr. Teeter, and the

1 work that he did that we discussed earlier,
2 did anybody help you write this report?

3 A. No.

4 Q. And you don't intend to offer
5 any opinions about trans 1,2-DCE related to
6 Parkinson's Disease; is that correct?

7 A. That's correct.

8 Q. And you're also not offering
9 any opinions about trans 1,2-DCE and kidney
10 cancer; is that right?

11 A. That's correct.

12 Q. The --

13 A. Well, I guess I should say
14 aside from the diagram that I have that talks
15 about DCE.

16 Q. But you're not --

17 A. I'm not offering --
18 I'm sorry.

19 Q. You're not offering any
20 opinions about whether or not DCE can cause
21 kidney cancer or Parkinson's Disease; is that
22 correct?

23 A. That's correct.

24 Q. If you could turn to page 4 of
25 the Parkinson's report?

1 A. Yes. I'm there.

2 Q. And on page 4, you are
3 discussing the relevant background facts
4 pertaining to drinking water contamination at
5 Camp Lejeune; is that right?

6 A. Yes.

7 Q. Where did you -- where does
8 that information come from?

9 MR. SNIDOW: Objection to form.

10 And, Dr. Freeman, just know
11 that, you know, conversations with
12 counsel are privileged. But if you
13 can answer it, please go ahead.

14 A. It came from the information
15 that is cited in the report. So the citation
16 on the first page is from citation -- excuse
17 me, the information on the first page is from
18 the citations 1 and 2.

19 BY MS. SILVERSTEIN:

20 Q. Okay.

21 Dr. Freeman, would it be fair
22 to say that you're not a historian?

23 A. It would be fair to say that.

24 Q. Okay. And how did you decide
25 what information to include in this relevant

1 background facts section?

2 A. By relevance, specific to the
3 title of the section.

4 Q. How did you determine what was
5 relevant?

6 A. The way I always determine
7 what's relevant. I use my brain and my eyes
8 to determine which facts are -- seem to be
9 informative. This document is not written
10 just for you, it's also written for me, so
11 that if I'm asked the question, I have
12 everything that I've reviewed encapsulated in
13 my discussion in this report, and all of my
14 thoughts are in this report as well.

15 Q. Did you consult with Dr. Kyle
16 Longley on this background section?

17 A. No, I don't know who that is
18 offhand.

19 Q. And you didn't review
20 Dr. Longley's report?

21 A. Unless it's in the materials
22 that were reviewed, no.

23 Q. Do you recall reviewing a
24 report by Dr. Jay Brigham?

25 A. I'd have to give you the same

1 answer.

2 Q. You don't recall -- sitting
3 here right now, you don't recall if you
4 reviewed a report by Dr. Brigham?

5 A. I don't.

6 Q. And if you turn to page 9 of
7 your kidney cancer report -- or of the
8 Parkinson's Disease report. I apologize.

9 A. Trick question. I was ready.
10 I'm there.

11 Q. And do you see footnote 9 at
12 the bottom?

13 A. Yes.

14 Q. Footnote 9 is a citation to the
15 website tftptf.com.

16 Do you see that?

17 A. Yes.

18 Q. How did you come across this
19 website?

20 A. I can't tell you I can recall.
21 I assume it had to do with a search for
22 information on the topic.

23 Q. Was this a website that you or
24 Dr. Teeter discovered? Or was it provided to
25 you?

1 A. Unless it's in the materials
2 that have been provided to me, nothing
3 outside of that is anything that's been given
4 to me.

5 Q. Okay.

6 A. So the -- sorry.

7 Q. Sorry. Go ahead.

8 A. So to finish the answer, I
9 would say that it's probably something that
10 myself or Dr. Teeter...

11 Q. Do you know who the owner of
12 the website is?

13 A. Aside from what is stated in
14 the footnote, no.

15 Q. Okay.

16 Did you perform any fact
17 checking on the website before citing it in
18 your report?

19 A. No. If I had to fact check
20 every document that I cited, I wouldn't be
21 here because I'd still be working on the
22 document. There are just too many documents
23 for me to do so.

24 So that -- that's not my --
25 that's not even part of my goal in providing

1 background facts.

2 Q. Would you agree that when
3 providing information in an expert report,
4 it's important that the information you
5 provide is reliable?

6 MR. SNIDOW: Objection to form.

7 A. To the extent that I can find
8 that it is reliable, I'll rely on it.
9 However, if it doesn't form the basis for an
10 opinion, and it's just background
11 information, it's far less important.

12 BY MS. SILVERSTEIN:

13 Q. Does the background
14 information, does that help form the basis of
15 any of your opinions?

16 A. Not in the slightest.

17 Q. Okay. When determining whether
18 there's an association between a chemical and
19 a disease, would you agree that a literature
20 search is a key step?

21 A. Certainly.

22 Q. And a literature search should
23 be crafted to produce both positive and
24 negative results, correct?

25 A. All results, yes.

1 If there are no negative
2 results or no positive results, you can't
3 craft a search to do something that it cannot
4 provide, however.

5 Q. If you don't craft a search to
6 include any relevant or any positive or
7 negative results that exist, you can't review
8 all of the information; is that right?

9 MR. SNIDOW: Objection to form.

10 A. I interpret that question as
11 saying if it's a poorly formed search can you
12 have inadequate results of the search? And
13 if I'm correct in that interpretation, then
14 my answer would be yes, I agree.

15 BY MS. SILVERSTEIN:

16 Q. Did you perform -- you
17 performed a literature search for these
18 reports; is that right?

19 A. Myself and Dr. Teeter did, yes.

20 Q. Did you perform the search on
21 PubMed?

22 A. Typically PubMed or Google
23 Scholar. Although there are proprietary
24 academic databases as well that I use.

25 Q. How did you determine which

1 studies to include in your report?

2 A. Well, there's a lot of
3 different studies in my report. Since we're
4 talking about the background facts --

5 Q. In your report, when discussing
6 kidney cancer or Parkinson's disease, how did
7 you determine which studies to include in
8 your report?

9 MR. SNIDOW: Object to form.

10 A. So what I would say is it
11 depends on what I'm relying on the study for.
12 If I'm relying on the study or the
13 description for background facts, that's
14 going to be different. But if I'm relying on
15 the study for a strength of association, or
16 for fulfilling the Hill Criteria, or a
17 different aspect of the Hill Criteria.

18 So there's going to be closer
19 scrutiny on how a study was done if I'm
20 relying on the study for fulfilling some of
21 the Hill Criteria, particularly strength of
22 association.

23 BY MS. SILVERSTEIN:

24 Q. So when you're looking at a
25 study to determine -- when you're determining

1 what studies to include, in an expert report
2 when discussing the Hill Criteria, how do you
3 determine which studies are included?

4 MR. SNIDOW: Object to form.

5 A. Well, it's going to be based on
6 the level of evidence that's provided by the
7 study. So case studies are going to be least
8 helpful. Retrospective studies,
9 observational studies will be much more
10 helpful and really in many ways the only kind
11 of studies we can look at.

12 And then meta-analyses of such
13 studies are going to be the -- sort of the
14 first line of information that I'm going to
15 be looking at.

16 BY MS. SILVERSTEIN:

17 Q. So let's take meta-analyses,
18 for example.

19 How would you determine whether
20 or not to include a meta-analyses in your
21 report when discussing or evaluating the
22 Bradford Hill criteria?

23 A. I believe both of my reports
24 included all of the meta-analyses that were
25 relevant that were found.

1 So positive and negative
2 meta-analyses need to be described, because
3 they are the largest bodies of evidence.

4 Q. And how do you determine
5 whether or not a meta-analyses is relevant?

6 A. Well, it has to do with whether
7 or not it is addressing the question of
8 interest. So a meta-analysis of -- it
9 doesn't involve, for example, TCE and kidney
10 cancer, or TCE and Parkinson's Disease, is
11 not going to be very relevant unless I'm
12 looking to fulfill an analogy, for example.
13 If there was thinner evidence for strength of
14 association and consistency, I might have to
15 look at the analogy, which might involve a
16 seemingly less relevant topic of study.

17 Q. So, for example, if you're
18 talking about kidney cancer and TCE, should
19 all meta-analyses that discuss or analyze
20 kidney cancer and TCE be included?

21 MR. SNIDOW: Object to form.

22 A. Not if they -- if they've been
23 supplanted by new information. So if there's
24 a meta-analysis that was done in 1991 or
25 1995, and then there's a meta-analysis of the

1 same literature plus new literature up and to
2 2020, for example, I'm not going to use the
3 older meta-analysis. I'll use the newer one
4 that supplanted the old one. So the most
5 current meta-analyses are going to be the
6 ones that are going to be included,
7 typically, and older ones are of less benefit
8 if the science is evolving over time.

9 BY MS. SILVERSTEIN:

10 Q. And how do you determine when a
11 meta-analyses has been supplanted?

12 A. By doing a review of the
13 literature and seeing if such a thing exists.

14 Q. So if the study -- in order for
15 you to consider a meta-analyses to have been
16 supplanted, does a later meta-analyses need
17 to analyze all of the same studies plus new
18 ones? Or just some of the same studies? Or
19 does it just need to be more recent in time?

20 MR. SNIDOW: Objection, form.

21 A. It depends. All of that would
22 be considered. Causal analysis is based on
23 a -- on the conceptual framework of a web of
24 evidence. And so you can have little bits
25 and pieces of that web that are investigated

1 and included, in coming to a conclusion. The
2 process is not based on a chain where any
3 weakness means that the entire -- the whole
4 entire body of information is rejected.

5 So if there was just a more
6 recent meta-analysis, that very well may be
7 included. Even if it doesn't include the
8 older studies. It just depends on what I
9 find in the literature.

10 I didn't write those studies,
11 so I have to look and see what everybody else
12 has provided for me.

13 BY MS. SILVERSTEIN:

14 Q. If someone was trying to
15 understand what process you followed in, for
16 example, your kidney cancer report, to
17 determine whether or not to include a study,
18 how would you describe that decision-making
19 process to them?

20 A. Much in the way that I've just
21 described it. The most recent, larger, well
22 designed studies will be included. Outdated
23 information will be less likely to be
24 included unless it's just for giving
25 historical background on what we used to

1 think and what we think now.

2 Q. How do you determine whether or
3 not a study is well designed?

4 A. Well, certain aspects need to
5 be fulfilled for the study to be considered
6 well designed sufficiently to rely on it.
7 That are based on basic epidemiologic tenets
8 of controlling for bias and confounding, and
9 using appropriate well-accepted study designs
10 such as cohort, retrospective or prospective,
11 although prospective doesn't work for this
12 particular topic, but retrospective cohort
13 design or case-control design. Those are
14 really the two main study designs that we
15 have with the exception of the one twin study
16 that was done by Goodman for looking at
17 Parkinson's Disease, which is a bit different
18 than those -- than the other study designs.

19 And then ultimately it comes
20 down to a matter of judgment of the
21 individual epidemiologist.

22 Q. So do you agree that when
23 determining -- when deciding whether or not a
24 study is high quality, you would need to
25 consider whether or not they account for

1 confounding or bias?

2 A. Yes, the design needs to,
3 typically, have some control for bias or at
4 least describe the role the bias might play
5 so that it can be evaluated by the reader.

6 Q. And you also said that in
7 addition to whether or not the study is well
8 designed, you consider whether it's outdated;
9 is that right?

10 A. If the information has been
11 supplanted by other information that is of
12 better quality, then it doesn't make any
13 sense to go back and rely on older, outdated
14 information. So, yes.

15 Q. How do you determine whether or
16 not a study is outdated?

17 A. By whether there's a newer
18 study with -- that was better designed or has
19 more information that makes sense from a
20 scientific or biological perspective.

21 For example, if you're looking
22 at cancer, more lag time is typically going
23 to be better for a study, because cancers
24 require time for them to manifest.

25 So just -- there's a lot of

1 little bits and pieces to understand about
2 these studies, and so each study is evaluated
3 individually, and that's why my,
4 unfortunately, report had to be 70 pages
5 long.

6 Q. Did you make the decisions
7 about whether or not to include a specific
8 study yourself or did someone else help make
9 those decisions for you?

10 A. Are you referring to
11 Dr. Teeter?

12 Q. Dr. Teeter or anyone.

13 A. Well, no one else from my
14 practice was involved with the analysis, so
15 there wouldn't be anybody else. Everything
16 that goes in -- went into these reports was a
17 result of work that we did together, so...

18 I mean, if you're asking me if
19 I had input from the attorneys, for example,
20 that would not be my normal process. My
21 normal process is to do the science.

22 Q. Are there studies that
23 Dr. Teeter made the decision not to include
24 that you did not review?

25 A. Possibly. I did not -- it

1 wasn't my hands over his hands on the laptop
2 figuring out what he's looking at. So he has
3 to make those critical decisions, which he's
4 very, very capable of.

5 Q. So sitting here today, you
6 can't tell us whether or not a high quality
7 study was excluded by Dr. Teeter in his
8 analysis?

9 MR. SNIDOW: Object to form.

10 A. In my experience with Dr.
11 Teeter for over ten years, that has never
12 happened, and I wouldn't expect that to
13 happen.

14 BY MS. SILVERSTEIN:

15 Q. You didn't review the studies
16 that he excluded, correct?

17 A. No, but we used the same
18 methodology for including studies.

19 Q. But you didn't review the
20 studies that he chose to exclude?

21 A. If there were studies that were
22 not relevant -- that he felt were not
23 relevant, I didn't ask to see the ones he
24 said were not relevant, no. That's not --
25 would not be how we operate.

1 Q. And if there were studies that
2 Dr. Teeter did not include because they were
3 not relevant, you didn't review those studies
4 either, correct?

5 MR. SNIDOW: Objection, asked
6 and answered.

7 A. I would say I would give you
8 the same answer for that, which is we use the
9 same criteria, generally for what is an
10 acceptable study. For example, case series
11 or case studies are mostly excluded from any
12 of the analysis that I do, because they're
13 not super helpful for causal analysis,
14 although they can give some degree of
15 information.

16 BY MS. SILVERSTEIN:

17 Q. Did the plaintiffs provide you
18 with any studies that they asked you to
19 specifically include?

20 A. You mean was I instructed by
21 plaintiffs to include certain studies?

22 Q. Yes.

23 A. I don't have a specific
24 recollection of that; however, when I'm
25 working on a case which is very broad in

1 scope, I will ask for retaining attorneys to
2 send me whatever literature you have, which
3 will shortcut some of my work. And then it's
4 up to me to determine whether or not the
5 study is relevant for inclusion in my review.

6 Q. Are there any studies that you
7 reviewed and considered that you did not cite
8 in your report?

9 A. Those would be the studies that
10 were rejected for quality or relevance, so
11 probably.

12 Q. Are there any studies that you
13 considered that contributed to your opinion
14 that you didn't include in your report?

15 A. No.

16 MS. SILVERSTEIN: We've been
17 going a little over an hour. I think
18 this is a good time to take a break.

19 THE VIDEOGRAPHER: We are off
20 the record at 10:08 a.m.

21 (Recess taken, 10:08 a.m. to
22 10:19 a.m. PDT)

23 THE VIDEOGRAPHER: We are on
24 the record at 10:19 a.m.

25

1 BY MS. SILVERSTEIN:

2 Q. Dr. Freeman, did you talk to
3 anybody about the substance of your testimony
4 during the break?

5 A. I went downstairs and
6 introduced myself to my insurance agent and
7 told her I was upstairs testifying, but I
8 don't think I gave her any details that were
9 relevant.

10 Q. Great.

11 A. I mostly just thanked her for
12 taking care of my mom who is probably driving
13 her crazy.

14 Q. Understood. I notice that you
15 have a laptop in front of you. Well, two
16 laptops in front of you.

17 One from Golkow, and is the
18 other one a personal laptop?

19 A. It is.

20 Q. Why did you bring your laptop
21 today?

22 A. In case you asked me something
23 that I need to look at my file for.

24 Q. And what information is on your
25 laptop?

1 A. The file.

2 Q. Is there anything else on the
3 laptop?

4 A. Yeah. Tons of stuff.

5 Q. Is this a personal laptop that
6 you use in your daily forensic practice?

7 A. Yes.

8 Q. And have you looked at that
9 laptop since the deposition began?

10 A. No, I haven't.

11 Q. And did you look at anything on
12 the laptop during the break?

13 A. I didn't.

14 Q. Dr. Freeman, would it be fair
15 to say that in epidemiology, in association,
16 isn't the same thing as causation?

17 A. I think it's fair to say that
18 with science generally, but very specifically
19 to epidemiology, yes as well.

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

23 A. Depends on the study.

24 Q. Okay. In what circumstances
25 would you draw a conclusion about causation

1 based on one single study?

2 A. Well, if I have information
3 that is collateral to that study, that says
4 that there's a causal relationship between,
5 for example, a substance, like TCE and kidney
6 cancer, and then there's a single study of a
7 population, for example, like the residents
8 of Camp Lejeune over certain periods of time
9 that compares their outcomes for kidney
10 cancer to another place, for example, Camp
11 Pendleton. Of course, I'm speaking of the
12 Bove study, B-O-V-E.

13 Then that will be a study that
14 was not taken on its own. In other words,
15 it's not describing the relationship between
16 TCE and kidney cancer for the very first
17 time. It's building on that information but
18 talking about a specific population.

19 So if we're talking about a
20 specific population, then I can use that
21 study, because the only way you can actually
22 understand what's happening within a specific
23 population is to study it.

24 Q. Okay. So if I'm understanding
25 correctly, in your opinion, could you

1 consider just a Bove study to determine
2 whether or not TCE causes kidney cancer?

3 MR. SNIDOW: Object to form.

4 A. No. No, absolutely not. Nor
5 would I. The Bove study tells me whether
6 exposure to Camp Lejeune water causes kidney
7 cancer. The additional information
8 addressing plausibility of that relationship
9 is the information I was talking about as far
10 as background information.

11 BY MS. SILVERSTEIN:

12 Q. Okay. And what kind of
13 information are you considering background
14 information?

15 A. Well, if we know, for example,
16 there are these four chemicals that are
17 present in Camp Lejeune water, and there is
18 background information showing that the
19 chemicals individually or acting together can
20 and do cause kidney cancer; and that we also
21 see that in Camp Lejeune residents, they have
22 a higher rate of kidney cancer, then you
23 would expect, if there was not something in
24 their environment that was causing that
25 illness, and we know that there is good

1 casual information about TCE being a cause of
2 getting cancer, then we can put that
3 information together. So I now can say
4 something about people being at Camp Lejeune,
5 being at Camp Lejeune, drinking Camp Lejeune
6 water, can and does that cause kidney cancer.
7 The mechanism by which it does so would then
8 be associated with the exposure to the four
9 chemicals of interest.

10 Q. Okay.

11 Maybe I'm a little bit
12 confused. Would you consider that drawing a
13 conclusion based on a single study?

14 MR. SNIDOW: Object to form.

15 A. It would -- it consists of me
16 drawing a conclusion about Camp Lejeune
17 exposure causing cancer, but not based on a
18 single study to determine the -- whether the
19 Hill Criteria are met to say was the exposure
20 at Camp Lejeune the cause of the kidney
21 cancer, some of the kidney cancer that we're
22 looking at.

23 BY MS. SILVERSTEIN:

24 Q. Let's be more specific. If you
25 wanted to know whether vinyl chloride causes

1 kidney cancer, would you look at a single
2 study to make that determination?

3 MR. SNIDOW: Object to form,
4 asked and answered.

5 A. And just to be clear, when
6 you're saying a single study, you're not
7 referring to a meta-analysis, you're
8 referring to a single study of vinyl
9 chloride.

10 BY MS. SILVERSTEIN:

11 Q. Correct.

12 A. It would depend on what the
13 additional information was out there, but
14 generally no, I would not do so.

15 Q. A study's risk ratio indicates
16 the level of association observed by the
17 study, right?

18 A. That's one measure of it, yes.

19 Q. A risk ratio of 1.0 indicates
20 no association, right?

21 A. No association above equipoise,
22 correct.

23 E-Q-U-I-P-O-I-S-E.

24 Q. And when you say no association
25 above equipoise, what do you mean?

1 A. It's a different way of saying
2 what you just said. 1.0 is considered a
3 level of equipoise, where there's a balance
4 between factors.

5 Q. Okay. Would 1.0, is that --
6 does that indicate that this study does not
7 show -- this specific study does not show
8 evidence that a specific chemical causes a
9 specific outcome?

10 A. It does not show that the
11 chemical causes a specific outcome at a level
12 greater than the control population.

13 Q. What level of risk ratio do you
14 consider to show there to be an association?

15 MR. SNIDOW: Objection to form.

16 A. It depends on the measure that
17 I'm using to determine whether or not I
18 believe that the -- an association is present
19 or not, or whether it's explained by other
20 factors such as random scatter in the data.

21 BY MS. SILVERSTEIN:

22 Q. Okay.

23 A. So anything over 1.0 with a
24 confident interval that does not cross the
25 1.0 boundary at the 95% level is the most

1 commonly used measure; however, there are
2 other measures used as well, particularly
3 depending on the populations that are
4 studied.

5 Q. Are you familiar with Dr. David
6 Savitz?

7 A. David Savitz.

8 Q. Savitz?

9 A. Could you spell it, please.

10 Q. S-A-V-I-T-Z?

11 A. I don't know him personally,
12 no.

13 Q. Are you familiar with his work?

14 A. Offhand, I can't say that it's
15 ringing a bell, but if you showed me
16 something I might say, oh, yes, I know that
17 document, for example.

18 Q. Have you, to the best of your
19 recollection, ever reviewed or referenced
20 Dr. Salvitz's book Interpreting
21 Epidemiological Evidence?

22 A. I don't recall.

23 Q. Have you reviewed or referenced
24 his book Epidemiology and the Law.

25 A. No, I don't think I have.

1 Q. If Dr. Savitz defined a modest
2 association as a relative risk of 1.2, would
3 you agree with Dr. Savitz?

4 MR. SNIDOW: Objection to form.

5 A. Yes, that's a reasonable
6 characterization for a 20% increased
7 prevalence of an illness or disease.

8 BY MS. SILVERSTEIN:

9 Q. And if Dr. Savitz defined a
10 larger association as having a risk ratio of
11 1.5 or higher, would you agree with Dr.
12 Savitz?

13 A. Mathematically. You can't
14 really argue with that. That is 1.5 is more
15 than 1.2.

16 Q. Would you agree that it's
17 important to analyze the precision of a
18 study's risk estimate?

19 A. Yes.

20 Q. And one way you can do that is
21 through the 95% confidence interval, right?

22 A. That is one way to do it, yes.

23 Q. When do you consider a
24 confidence interval to be wide?

25 A. It depends. If a confidence

1 interval -- if a confidence interval is over
2 the 1.0 in the lower bound, then a wide
3 confidence interval may not be too much of a
4 factor, it just represents the fact that
5 there is a small number of study subjects or
6 affected individuals. But if you have a
7 confidence interval that is, again, the lower
8 bound is not below 1.0, then you would be
9 able to still say, well, there's scatter
10 here, but it's still reliable enough to say,
11 I think this association is real, that is due
12 to the effect of the exposure.

13 If it -- the lower bound dips
14 below 1.0 but stays relatively tight and
15 there is an association that's greater than
16 1.0, then that may be considered as positive
17 evidence.

18 So you really have to take each
19 study finding as its own idiosyncratic
20 outcome and make a judgment about it. There
21 is the talk about the confidence interval
22 ratio in some of the materials that I've
23 reviewed, and I've talked about that in my
24 reports, which says that there shouldn't be a
25 ratio that's more than three if you have --

1 particularly if you have a relatively low
2 confidence -- or excuse me, point estimate.
3 That's a reasonable approach as well.

4 So it's -- there's various ways
5 to look at various kinds of information to
6 try to improve the precision of a conclusion.

7 Q. Sure. And I think my question
8 is maybe a little different. I'm not asking
9 about how you determine whether or not a
10 study should be considered based on the
11 confidence interval, but rather when you're
12 looking at a confidence interval, how do you
13 determine whether it's a narrow confidence
14 interval versus a wide confidence interval?

15 MR. SNIDOW: Objection to form.

16 A. Just as a very broad term, it
17 would depend on the confidence interval I was
18 looking at. If I saw a point estimate of
19 2.5, and the confidence interval was 1.05 to
20 50, I would consider that very, very wide.

21 But if it was a -- the
22 confidence interval was 1.05 to 4.1, for
23 example, I would consider that fairly narrow.

24 So because it's more or less
25 even around the point estimate.

1 BY MS. SILVERSTEIN:

2 Q. Okay. So then would something
3 you look at be how far on each side of the
4 point estimate the confidence interval is?

5 A. That would be one way to look
6 at it, particularly if the confidence
7 interval is -- or excuse me, the point
8 estimate is a bit higher.

9 Q. Okay. And the wider the
10 confidence interval, the less confidence in
11 the point estimate, right?

12 A. I don't know that I would say
13 that. I mean, from a biostatistical
14 perspective, if you have a 1.05 and a 50 at
15 the top, or bounded around 5.0, for example,
16 that would still be considered a reportable
17 outcome. You would probably discuss in the
18 limitations of that outcome, the fact that's
19 got a pretty wide confidence interval,
20 however, and say that, you know, scatter may
21 have something to do with it, but based on
22 the definitions that we're using, which is
23 95% confidence interval, you would say it's
24 still equal to a peak value of .05 or less.

25 Q. And, you know, again, I'm not

1 asking you about whether or not you would
2 still consider a study, but generally
3 speaking, would a study with a wider -- or a
4 result with a wider confidence interval
5 versus a narrower confidence interval, would
6 you have less confidence in the study -- in
7 the results with the wider confidence
8 interval?

9 MR. SNIDOW: Objection, form,
10 asked and answered.

11 A. Generally. It depends on how
12 it fits into the rest of the evidence. I was
13 talking about a web of evidence. As a piece
14 of the web, if that's the only piece I've
15 got, I'm going to have less confidence than
16 if I have a stronger piece. But if it's part
17 of other evidence, then it all can sort of
18 fit within the web.

19 So it depends on what else
20 there is that's out there.

21 If it's that one study, I'm
22 going to have less confidence in it than if
23 there's another study that has a much tighter
24 confidence interval.

25

1 BY MS. SILVERSTEIN:

2 Q. When determining whether a
3 study supports a causalization, you would
4 consider statistical significance, right?

5 A. Of course.

6 Q. And one way you can consider
7 statistical significance is by the p-value,
8 right?

9 A. Sure.

10 Q. And would you agree that a
11 p-value less than 0.05 is considered to be
12 statically significant?

13 A. Almost universally, that would
14 be considered to be statically significant
15 for almost all studies; although .1 is also
16 considered as a well-known statistic of
17 significance depending on the study.

18 Q. And you said .1 is considered a
19 level of statistical significance?

20 A. Yes.

21 Q. What is that based on?

22 A. What is --

23 Q. How do you determine that the
24 .05 or .1 p-value applies to a study?

25 A. It depends on your data and the

1 source of your data.

2 If your best -- if your best
3 data showed that you've got statistical
4 significance at .1 rather than .05, but
5 there's other information that suggests that
6 a -- an association is causal, then you're
7 going to pay more heed to it. You're not
8 going to say, we're going to ignore it.

9 Again, it's part of the web of
10 evidence that you are looking at. These
11 numbers are all arbitrary. So .05 just says
12 there's a 1 in 20 or less chance that the
13 result that we got is due to random scatter.
14 .1 says there's less than 1 in 10 or 1 in 10
15 or less chance that the results are due to
16 random scatter.

17 What's your tolerance for
18 random scatter has to do with the topic that
19 you are studying, and the source of the data.

20 Q. Is there -- are you aware of an
21 authority that says that the -- what is
22 considered statistically significant changes
23 depending on the study?

24 A. Yeah, there's a lot of debate
25 about the .05 level of statistical

1 significance in the epidemiological and
2 biostatistical community, and there's lots of
3 discussion about that. It's -- there is --
4 there are many in the general community who
5 feel that it should play much, much less of a
6 role than it does in describing the results
7 of studies and what gets published and what
8 doesn't get published.

9 Q. And maybe I'm a little bit
10 confused, but it sounds like you're saying
11 that a study can be statistically significant
12 at a higher p-value depending on other
13 information besides just the study results;
14 is that right?

15 A. More or less, yes. That you --
16 because .05 is an arbitrary number. .1 is
17 equally arbitrary.

18 Q. And how does information
19 external to the study change whether or not a
20 study is statistically significant?

21 A. Do you mean at the .1 or .05
22 value? What that level of statistical
23 significance is? Because the statistical
24 significance, if it's preset, is going to be
25 a matter of numbers and variants in the data.

1 Q. What do you mean by if
2 statistical significance is preset?

3 A. You pick before you do your
4 study whether you're willing to -- whether
5 you are willing to accept a lesser value of
6 statistical significance to say, I think
7 we've got a result that is reliable.

8 Q. So whether or not a study is
9 statistically significant depends on whether
10 it meets the standards set by the study
11 author?

12 A. Yes. It's called an
13 a priori -- A P-R-I-O-R-I -- set value for
14 significance.

15 Q. And can you also determine
16 statistical significance by looking at
17 confidence intervals?

18 A. Well, you can determine whether
19 they've fit within a preset value. I mean,
20 if you say 1.0 is the lowest that I'm going
21 to go, then that's the lowest you're going to
22 go on your -- on the lower bound of your
23 confidence interval, or upper bound,
24 depending on what you're looking for in your
25 study, whether it's protective or harm --

1 protection or harm that you're looking at.

2 But you can accept a wider
3 confidence interval as well.

4 Q. So there's not a generally
5 accepted confidence interval range that is
6 considered statistically significant; is that
7 right?

8 MR. SNIDOW: Object to form.

9 A. I can tell you what is most
10 common, which is above or below 1.0,
11 depending on whether you're looking at an
12 upper or lower bound.

13 That's most common for the 95%
14 confidence interval that's used in most
15 studies that you see, but there are other
16 studies that are -- accept a lower level of
17 statistical significance to take action.

18 For example, a study of
19 getting pregnant women antiretroviral therapy
20 when they're HIV positive, to see whether
21 that prevents vertical transmission. You're
22 not waiting to get to .05 before you say, oh,
23 it's protective. Stop the trial. Give
24 everybody the drug, which is actually what
25 happened, going back to the early '90s. I

1 think it was early '90s when that happened.

2 So that would be a good example
3 where tolerance for scatter is increased,
4 because of the type of study that's being
5 done.

6 BY MS. SILVERSTEIN:

7 Q. But you would agree that the
8 most commonly accepted confidence interval,
9 when looking at statistical significance,
10 it's most commonly accepted that if a
11 confidence interval goes below one it's not
12 statistically significant; is that fair?

13 A. Most commonly, yes. There may
14 be something that's considered to be a trend
15 towards confidence. For example, if it's .98
16 on the lower bound, and 3.5 or around 1.5,
17 that's going to be probably considered just
18 about as good.

19 But if you've got .5 up to 2.5,
20 around a point -- a 1.02, you're not going to
21 say that 1.02 actually has meaning.

22 Q. Okay.

23 A. That's when you're going to
24 step back and say, wait a minute, this is
25 pretty close to equipoise.

1 Q. Okay.

2 A. And the rest -- and any
3 association there is most likely explained by
4 the amount of scatter that's being
5 represented by that wide confidence interval
6 that's far below one.

7 Q. And, Dr. Freeman, in your
8 kidney cancer and Parkinson's Disease
9 reports, you evaluated the four chemicals
10 TCE, PCE, vinyl chloride and benzene
11 individually, right?

12 A. Yes, and collectively.

13 Q. Sure. That was going to be my
14 next question.

15 You also retain -- also, excuse
16 me, analyzed them as the total of the OCE
17 amount in the water, right?

18 A. Yes.

19 Q. When you're talking about your
20 opinions that the Camp Lejeune water can
21 cause kidney cancer or Parkinson's Disease,
22 what combination of contaminants are you
23 identifying?

24 A. The four chemicals that you've
25 described are the only ones I've examined.

1 Q. So when you're offering those
2 opinions, are you referring to when all four
3 of the chemicals are present in the water?

4 A. When I'm referring to exposure
5 to Camp Lejeune water, by definition, all
6 four chemicals are present in the water.

7 Q. Are you familiar with the ATSDR
8 Camp Lejeune water model?

9 A. Yes.

10 Q. Does your opinion that the Camp
11 Lejeune water can cause kidney cancer or
12 Parkinson's Disease, does that opinion apply
13 to all locations on base?

14 A. It doesn't differentiate
15 between all the locations. And I know that
16 the water has been modeled to have different
17 concentrations at different locations, but
18 there isn't good evidence that there is a big
19 difference between locations on base that
20 I've seen. It's more generally Camp Lejeune
21 exposure.

22 Q. Do your opinions that the Camp
23 Lejeune water causes kidney cancer and
24 Parkinson's Disease, does that apply to all
25 years that the water was contaminated between

1 1953 and 1987?

2 A. I haven't examined that time
3 frame specifically to determine whether the
4 exposure would begin. No one has actually
5 asked me that. I would say that exposure
6 from that time forward is what's covered by
7 my opinion, but whether there was any
8 evidence for contamination before that time
9 is something that I haven't seen. So I -- I
10 haven't attempted to say that someone who was
11 on base in 1950, for example, had some degree
12 of exposure. It's not something I've even
13 examined.

14 Q. Sure. And I'm not asking about
15 anything later than 1987 or before 1953. I'm
16 not asking about --

17 Does your opinion that Camp
18 Lejeune water can cause kidney cancer and
19 Parkinson's Disease, does that apply to every
20 year between 1953 and 1987?

21 MR. SNIDOW: Objection, form,
22 asked and answered.

23 A. I've seen no evidence that
24 would allow me to discriminate between years
25 of exposure.

1 BY MS. SILVERSTEIN:

2 Q. And you said you're familiar --
3 you are aware of the ATSDR water model; is
4 that right?

5 A. Yes.

6 Q. Have you ever reviewed it?

7 A. It's really out of any area of
8 expertise, water modeling. So I've reviewed
9 it into understanding what's being
10 referenced, but the methods that are used are
11 not methods that I could critique or give
12 input on.

13 Q. Since you have reviewed it, not
14 in a water modeling context, you are aware
15 that the ATSDR models contaminate
16 concentration levels differently depending on
17 the time frame, right?

18 A. Yes.

19 Q. And there were some years of
20 ATSDR model that had only one or two
21 chemicals present, right?

22 A. Yes.

23 Q. Does your opinion that the Camp
24 Lejeune water causes kidney cancer and
25 bladder cancer apply to any combination of

1 contaminants that ATSDR models?

2 A. I haven't seen any evidence
3 that would allow me to discriminate between
4 years, depending on the level of contaminants
5 modeled by ATSDR or anybody else.

6 Q. What scientific literature did
7 you review that discusses the carcinogenic
8 effects of the mixture of TCE, PCE, vinyl
9 chloride, and benzene?

10 A. It's described in my report.
11 Would you like me to turn to that page?

12 Q. The literature you reviewed is
13 described in your report? Is that what you
14 mean?

15 A. Yes.

16 Q. And are you referring to the
17 Mauderly article?

18 A. I'd have to turn to the page to
19 tell you which -- which article that was and
20 how I was relying on it.

21 MR. SNIDOW: Do you want to
22 just show him, Ms. Silverstein?

23 BY MS. SILVERSTEIN:

24 Q. So you can go ahead and turn to
25 page 40 of your Parkinson's report.

1 Is this the literature that
2 you're referring to?

3 A. Sorry. I picked up the wrong
4 report.

5 MR. SNIDOW: For the record,
6 it's Exhibit 3.

7 THE WITNESS: Thank you.

8 MR. SNIDOW: You're welcome.

9 A. Yeah, probably for this report
10 it would be the discussion on page 40.

11 BY MS. SILVERSTEIN:

12 Q. Okay. And the literature that
13 you say on page 40 is Mauderly and Samet,
14 correct?

15 A. I cite to Bove.

16 Q. When discussing mixtures? You
17 said -- when you say you cite to Bove, you're
18 talking about the Bove studies that looked at
19 the Camp Lejeune population, right?

20 A. Right. By definition, they're
21 looking at all chemicals working in
22 conjunction with each other.

23 Q. Sure. Did you review any
24 literature that talked about the possible
25 synergistic effect of these four chemicals?

1 MR. SNIDOW: Objection to form,
2 asked and answered.

3 A. Yes, I did. That is the
4 Mauderly report, which is M-A-U-D-E-R-L-Y.
5 BY MS. SILVERSTEIN:

6 Q. And is it your opinion that the
7 Mauderly report specifically addresses these
8 four chemicals?

9 The Mauderly study specifically
10 addresses these four chemicals?

11 A. No.

12 Q. What literature did you review
13 that discusses the synergy or possible
14 synergistic effect of TCE, PCE, vinyl
15 chloride and benzene?

16 MR. SNIDOW: Objection to form,
17 asked and answered.

18 A. We'd have to go back to Bove.
19 The evidence that when people were exposed to
20 all four chemicals, that there was increased
21 evidence for illness is the best evidence
22 that we have of an effect of all four
23 chemicals working together.

24 BY MS. SILVERSTEIN:

25 Q. You didn't review any other

1 literature that discusses the synergistic
2 effect of those chemicals, right?

3 MR. SNIDOW: Objection to form.

4 A. Not that I referenced in my
5 report, no.

6 BY MS. SILVERSTEIN:

7 Q. Did you review any literature
8 discussing the synergistic effect of those
9 four chemicals that you considered for your
10 report and didn't cite in your report?

11 A. Not that I recall.

12 (Freeman Deposition Exhibit 4,
13 1-20-2017 ATSDR Public Health
14 Assessment for Camp Lejeune Drinking
15 Water, was marked for identification.)

16 BY MS. SILVERSTEIN:

17 Q. Dr. Freeman, you were just
18 handed Exhibit 4, which is the: 2017 ATSDR
19 Public Health Assessment.

20 Have you reviewed this document
21 before?

22 MR. SNIDOW: Do you have one
23 for me?

24 MS. SILVERSTEIN: I don't.

25 MR. SNIDOW: That's all right.

1 MS. PLATT: Can I upload it for
2 you?

3 MR. SNIDOW: No. Just give me
4 a second to pull it up.

5 MS. SILVERSTEIN: Sure.

6 MR. SNIDOW: All right.

7 A. There's a pending question?

8 BY MS. SILVERSTEIN:

9 Q. Have you reviewed the ATSDR
10 2017 Public Health Assessment before?

11 A. I have.

12 Q. And, Dr. Freeman, would you
13 agree that a claim that two chemicals have
14 synergy requires scientific evidence?

15 A. Give that to me one more time,
16 please?

17 Q. Would you agree that a
18 claim that two chemicals have synergy require
19 scientific evidence?

20 A. Yes.

21 Q. And did you review the EPA
22 toxicology review for TCE, PCE, vinyl
23 chloride, or benzene?

24 A. I did.

25 Q. So you would -- you would have

1 reviewed EPA's discussion of the possible
2 synergistic or additive effects in those
3 profiles, right?

4 A. I would think so, yes.

5 Q. Go ahead and turn to page 33 of
6 Exhibit 4.

7 MR. SNIDOW: Internal page --

8 MS. SILVERSTEIN: The page
9 numbered 33.

10 MR. SNIDOW: Thank you.

11 BY MS. SILVERSTEIN:

12 Q. Are you on page 33,
13 Dr. Freeman?

14 A. I am.

15 Q. On page 33, ATSDR has a section
16 titled: Evaluation of Combined Cancer and
17 Noncancer Effects of Exposure to Chemical
18 Mixtures.

19 Right?

20 A. Yes.

21 Q. And then there is a subheading
22 that says: PCE-TCE Interaction.

23 Do you see that?

24 A. Yes.

25 Q. And then, about three sentences

1 in, the sentence starting: TCE is
2 generally...

3 Do you see that sentence?

4 A. Yes.

5 Q. It says: TCE is generally
6 metabolized at a higher rate than PCE. As a
7 result, TCE is primarily eliminated from the
8 body in the urine, whereas PCE is eliminated
9 primarily by exhalation. Evidence in animal
10 studies suggest that PCE will inhibit the
11 metabolism of TCE. However, that effect may
12 only occur at exposure doses that are much
13 higher than could have been experienced by
14 individuals contacting water from the Camp
15 Lejeune systems. There does not to be
16 evidence of synergistic effects (i.e.,
17 greater than additive) resulting from
18 combined exposures to PCE and TCE.

19 Did I read that correctly?

20 A. Yes.

21 MR. SNIDOW: I think you --
22 just for the record, think you missed
23 an appear. "There does not appear to
24 be evidence."

25 MS. SILVERSTEIN: Thanks.

1 MR. SNIDOW: But I won't make
2 you reread it.

3 A. I retract my answer. No.

4 BY MS. SILVERSTEIN:

5 Q. The last sentence is: There
6 does not appear to be evidence of synergistic
7 effects (i.e., greater than additive)
8 resulting from combined exposures to PCE and
9 TCE.

10 Did I read that correctly?

11 A. Yes.

12 Q. The sentence says: The results
13 of the Binary Weight of Evidence (BINWOE)
14 analysis from the Interaction Toxicological
15 Profile (ATSDR 2004; shown in Appendix D)
16 shows that the effects of TCE on PCE are
17 considered to be additive and the effect of
18 PCE on TCE toxicity are additive for
19 neurologic defect and slightly inhibitory for
20 effects on the liver and kidney (likely due
21 to the effects on TCE metabolism) (ATSDR
22 2004).

23 Did I read that correctly?

24 A. Yes.

25 Q. You can go ahead and set

1 Exhibit 4 aside.

2 I want to turn back to Mauderly
3 and Samet.

4 (Freeman Deposition Exhibit 5,
5 Is There Evidence for Synergy Among
6 Air Pollutants in Causing Health
7 Effects? (Mauderly/Samet), was marked
8 for identification.)

9 BY MS. SILVERSTEIN:

10 Q. Dr. Freeman, you were just
11 handed Exhibit 5, which is titled: Is There
12 Evidence For Synergy Among Air Pollutants in
13 Causing Health Effects. By Mauderly and
14 Samet.

15 Do you see that?

16 A. Yes.

17 Q. And this is the article that
18 you reviewed when discussing synergy and your
19 Parkinson's opinion, correct?

20 A. Yes.

21 Q. You would agree that this
22 article is specifically discussing air
23 pollutants, correct?

24 A. Yes.

25 Q. It's analyzing potential

1 synergy between ozone and other pollutants,
2 right?

3 A. Yes.

4 Q. If you go ahead and turn to
5 Table 3.

6 A. Is that a trick question?

7 Q. Yeah.

8 A. Or is it Table 1? That's it.

9 Q. Okay. Go ahead and set that
10 aside.

11 This article didn't consider
12 kidney cancer, correct?

13 A. No. It wasn't specifically to
14 the chemicals at Camp Lejeune, or in the Camp
15 Lejeune water, nor is it specifically to the
16 specific illness that -- either Parkinson's
17 or kidney cancer.

18 Q. You agree it's not specific to
19 the chemicals that were present in the Camp
20 Lejeune water?

21 A. Yes.

22 Q. You can go ahead and set that
23 document aside.

24 A. I already done did that.

25 Q. Great.

1 You would agree that -- well, I
2 guess I want to turn to the Bradford Hill
3 criteria now.

4 You analyzed the Bradford Hill
5 viewpoints for both of your reports, right?

6 A. I did.

7 Q. And you applied the Bradford
8 Hill viewpoints separately for each of the
9 chemicals as well as the Camp Lejeune water,
10 is that fair?

11 A. Yes.

12 Q. Before applying the Bradford
13 Hill viewpoints, would you agree that an
14 association needs to be more than just
15 observed?

16 MR. SNIDOW: Objection to form.

17 A. How else do you observe
18 something if you don't observe it? I think
19 the question is baffling me.

20 BY MS. SILVERSTEIN:

21 Q. Would you agree that an
22 association shouldn't be -- before applying
23 the Bradford Hill criteria, association
24 doesn't need to be -- needs to be more than
25 just observed? In other words, it needs to

1 be clear-cut?

2 A. Those aren't terms that I would
3 normally hear. I mean, observational study
4 is how we find associations.

5 So observation is a critical
6 part of finding an association.

7 Q. And if the observational
8 studies all show no association --

9 A. Oh.

10 Q. -- you wouldn't apply the
11 Bradford Hill criteria?

12 A. I understand what you're
13 saying.

14 MR. SNIDOW: Hold on. Let me
15 get an objection to form in. Go
16 ahead.

17 A. I understand you now. I wasn't
18 clear on what the question was.

19 There needs to be an
20 association that is, I think in your terms,
21 is greater of an equipoise potentially or one
22 that is demonstrated to some degree of
23 statistical reliability or precision.

24 Am I interpreting the question
25 correctly?

1 BY MS. SILVERSTEIN:

2 Q. So when you're looking at
3 observational studies, before applying
4 Bradford Hill criteria, you would need to see
5 a clear-cut association in the observational
6 studies, correct?

7 MR. SNIDOW: Objection, asked
8 and answered.

9 A. It truly does depend on the
10 situation. An emerging threat, there may not
11 be information that is reliable to -- enough
12 on a large population based -- large
13 population basis to draw a highly reliable
14 conclusion, but there still may be a danger
15 that's perceived. So a public health
16 protection always comes first in such an
17 analysis. So it very -- it is very
18 idiosyncratic to the situation.

19 BY MS. SILVERSTEIN:

20 Q. How did you determine that
21 there was an association between the Camp
22 Lejeune water and the four chemicals -- or
23 the Camp Lejeune water and the four chemicals
24 and kidney cancer or Parkinson's Disease in
25 order to apply the Bradford Hill criteria?

1 A. Well, because the chemicals
2 that were established to be present in the
3 water were plausibly associated with both
4 diseases based on a variety of literature
5 that's been present for decades. An evolving
6 understanding of the effects of the four
7 chemicals individually, along with studies of
8 people who have been exposed to Camp Lejeune
9 water compared to people who had been exposed
10 to water from another source, such as Camp
11 Pendleton.

12 So I have both general
13 causation for the individual chemicals, but
14 also for the specific combination of
15 chemicals that people were exposed to at Camp
16 Pendleton, which, as ATSDR said, is additive.
17 So when you get one chemical, it's not just
18 that one chemical, you add the other chemical
19 and we don't know if it's synergistic, for
20 example, benzene, or vinyl chloride. But at
21 least we know that some of the effects are
22 reasonably additive. You have to look at the
23 people who were exposed, and so those studies
24 are going to be -- the studies that I
25 referred to, Bove and Goodman are going to be

1 the best studies, the best evidence that we
2 have.

3 Q. When determining whether
4 there's a causal relationship between a
5 chemical and a disease, it's appropriate to
6 look at studies looking at that specific
7 chemical and that specific disease, right?

8 A. Typically, yes.

9 Q. One of the Bradford Hill
10 viewpoints is strength of association; is
11 that right?

12 A. It is.

13 Q. And would it be fair to say
14 that the higher the relative risk, the
15 greater likelihood that the relationship is
16 causal?

17 A. Generally, that's true, unless
18 it's a heavily confounded relationship.

19 Q. And similarly, the lower the
20 relative risk, the less likely the
21 relationship is causal, right?

22 A. Not necessarily, no.

23 Q. When would that not be true?

24 A. If you have good consistent
25 evidence of an association over multiple

1 studies, and multiple populations, and you
2 have a good plausible biologically credible
3 link between the exposure and the illness,
4 even a small association can be highly
5 likely, as long as it is repeatedly seen.

6 Q. That -- it would be less likely
7 that that small association represented
8 causation than if that consistent association
9 was higher, right?

10 MR. SNIDOW: Objection to form,
11 asked and answered.

12 A. No, it's no longer a factor
13 once you have consistency. That -- the
14 degree of the strength of the association or
15 relative risk is no longer a factor to
16 consider. It's when we're talking about, for
17 example, the first study that was ever done,
18 and you see a ten times greater illness in an
19 exposed population than an unexposed
20 population, you think, boy, maybe that
21 exposure is causal. Whereas, if you see a
22 very small relationship, let's say 1.2, then,
23 I agree with you, that's -- you're -- you are
24 much more likely to believe that the ten
25 times greater frequency as amongst the

1 exposed is real, and associated with the
2 exposure than if it's only 1.2 because then
3 there are other factors that might be at
4 play. But for both relationships, if they're
5 shown consistently, they're equally valid.

6 BY MS. SILVERSTEIN:

7 Q. You'd agree that it's possible
8 for a relative risk to be elevated due to
9 bias or confounding, right?

10 A. Of course.

11 Relative to the actual relative
12 risk for the exposure. As opposed to the one
13 that is influenced by threats to the study of
14 validity.

15 Q. Another Bradford Hill viewpoint
16 is consistency, right?

17 A. Yes.

18 Q. It's important that a study be
19 replicated in different populations and by
20 different investigators to -- before a causal
21 relationship is accepted, right?

22 A. Generally, yes.

23 Q. It's important that different
24 studies examine the same exposure-disease
25 relationship -- excuse me. It's important

1 that different studies that examine the same
2 exposure-disease relationship yield similar
3 results, right?

4 MR. SNIDOW: Objection to form.

5 A. Depends on the -- what we're
6 talking about. If we're talking about
7 something that's highly variable, like the
8 amount of VOCs in drinking water from one
9 population to another population, you don't
10 have to show that you're going to get the
11 same degree of association necessarily. It
12 can definitely vary. Because there are other
13 variables that are going on there, which may
14 have to do with the concentration of the VOCs
15 in the environment.

16 BY MS. SILVERSTEIN:

17 Q. So you wouldn't consider
18 whether studies examining the same
19 exposure-disease relationship yield similar
20 results?

21 MR. SNIDOW: Objection to form,
22 misstates testimony.

23 A. It depends on the circumstance.
24 In the circumstance I just gave you, it would
25 be less important than it might be if we were

1 studying, for example, the same population.
2 But another investigator is studying the same
3 population using the same methods, if they
4 come up with very different results, then
5 that has to be scrutinized more carefully.

6 BY MS. SILVERSTEIN:

7 Q. Evidence of consistency can
8 come from multiple studies of varied
9 populations, right?

10 A. Yes.

11 Q. Biological gradient is another
12 Bradford Hill viewpoint, right?

13 A. Yes.

14 Q. Biological gradient means the
15 outcome increases monotonically with
16 increasing dose of exposure, right?

17 A. Yes.

18 Q. And that's also called a
19 dose-response, right?

20 A. Yes.

21 Q. A dose-response relationship
22 means that the greater the exposure, the
23 greater the risk of disease, right?

24 A. Yes, a positive dose-response
25 relationship, yes.

1 Q. Which means that a higher
2 exposure or longer duration of exposure, you
3 would generally expect to see a greater
4 incidence of disease, right?

5 A. Generally that's true, yes.

6 Q. Because generally higher
7 exposures should increase the incidence or
8 severity of the disease, right?

9 A. Generally, that's true.

10 Q. And just like a dose-response
11 gradient supports a causal effect, the
12 absence of a dose-response gradient calls
13 into question whether there's a causal
14 effect, right?

15 MR. SNIDOW: Objection to form.

16 A. No, I wouldn't necessarily
17 agree with that. It depends on the study.
18 If we have a study where there's too much
19 scatter at higher levels of exposure, so that
20 you don't find that there is the -- a
21 monotonic relationship for a gradient over
22 multiple quintiles or tertiles of exposure.
23 But an ever/never exposure does show a
24 relationship. You also have to take that
25 into account. So it really -- it really

1 depends on the data that you're looking at.

2 BY MS. SILVERSTEIN:

3 Q. You agree that you need to take
4 into account the absence of a dose-response
5 relationship, correct?

6 A. Right. You have to balance
7 whether it's best explained by the fact that
8 this web of evidence is incorrect, that other
9 evidence should be ignored. Or that the
10 evidence in this particular study didn't show
11 this one particular aspect of a relationship.
12 And does that mean that that evidence is no
13 longer valid or -- the body of evidence is no
14 longer valid or that the failure to meet a
15 certain level of evidence, as part of the
16 Bradford Hill criteria or viewpoints, are not
17 met completely.

18 So it's -- you -- all of that
19 evidence has to be weighed in relationship to
20 what other evidences exist.

21 Q. One of the Bradford Hill
22 viewpoints is also specificity, right?

23 A. Yes.

24 Q. Which means that -- an
25 association exhibits specificity if the

1 exposure is associated only with a single
2 disease or type of diseases, correct?

3 A. Yes.

4 Q. Because the vast majority of
5 agents do not cause a variety of effects,
6 right?

7 A. The vast majority of --
8 I have to think about that
9 statement.

10 I think generally that's true,
11 yes.

12 Q. And you would agree that a
13 study that finds an agent is associated with
14 many different diseases should be examined
15 skeptically, right?

16 A. Well, all relationships should
17 be examined skeptically, to make sure that
18 there isn't some error being made.

19 However, because specificity so
20 rarely met for disease to exposure ratio,
21 like, for example, asbestos and mesothelioma.
22 Which is one of the relatively few examples
23 of a high degree of specificity between
24 exposure and disease, it's -- specificity is
25 often left out of applied Bradford Hill

1 criteria or viewpoints.

2 Q. You'd agree --

3 A. In the literature, I should
4 say.

5 Q. You'd agree that if a study
6 finds an agent is associated with a wide
7 variety of diseases, you need to examine that
8 study to determine whether confounding or
9 bias was causing that wide variety of
10 relationship, right?

11 MR. SNIDOW: Objection to form.

12 A. That would be important whether
13 or not the exposure was associated with a
14 wide variety or just one disease. You'd
15 still want to examine the study for presence
16 of bias and confounding.

17 BY MS. SILVERSTEIN:

18 Q. Do you weigh the Bradford Hill
19 considerations relative to each other?

20 A. To some degree.

21 Q. Are there certain
22 considerations that you give more weight to?

23 A. Certainly.

24 Q. Which considerations?

25 A. Temporality is critical. I

1 can't put the cart before the horses, as
2 Bradford Hill said.

3 Q. So is it that if temporality
4 exists, that is the most important Bradford
5 Hill consideration for you?

6 A. Well, you can't not have a
7 temporal order that is appropriate. You
8 can't look at a population who may have had
9 the disease before the exposure.

10 Q. You'd agree that you can have a
11 population that acquired the disease after
12 the exposure and causation or a positive
13 association not exist, right?

14 A. Yes, but you have to have
15 temporal order.

16 So it's critical that you meet
17 temporality, but there's a reason there's
18 nine viewpoints, or sometimes 10 or 11
19 viewpoints or criteria that are used for
20 causal associations, or examination of causal
21 association, because there -- none of them
22 are really taken in isolation.

23 Q. Sure. Aside from temporality,
24 what Bradford Hill criteria do you weigh the
25 most heavily?

1 A. Well, obviously strength of
2 association is an important measure. But it
3 depends on the source of information for
4 strength of association.

5 If the association is being
6 examined in a very specific population, with
7 a very specific exposure, like, for example,
8 foodborne illness outbreak at a restaurant,
9 then different Bradford Hill criteria are
10 going to get different emphasis.

11 But establishing biologic
12 plausibility as essentially a cumulative sort
13 of analysis of the seven criteria that go
14 towards biologic plausibility is probably --
15 I would put them all sort of collectively
16 under one heading as being to some degree
17 equally important. For example, you may --
18 the specificity is rare, but a really strong
19 dose-response is a specialized form of -- can
20 be a specialized form of like temporality, as
21 is a dechallenge or rechallenge criteria,
22 depending on what the exposure is that we're
23 looking at. So without sounding like I'm
24 vacillating, I have to go with it really
25 depends on the circumstances. Bradford Hill

1 are used for pretty much all causal
2 determinations, or they form a part of
3 virtually all causal determinations, applied
4 in a wide variety of areas. In fact, areas
5 that I've written a lot about.

6 And that's why it's hard for me
7 to give you a firm statement that, oh, I like
8 strength of association first, and then
9 temporality, and then I really like analogy,
10 for example. It just depends on what the
11 evidence is that you're evaluating.

12 Sorry for the bad answer.

13 Q. You need to evaluate both
14 whether a Bradford Hill viewpoint is met and
15 whether it's not met, right?

16 A. If you're doing such an
17 analysis, yes, you would want to discuss
18 whether you -- whether in your judgment the
19 criteria is met or satisfied.

20 Q. Have you heard the saying the
21 dose makes the poison?

22 A. I have.

23 Q. You would agree that risk
24 depends on the potency of a chemical and the
25 magnitude of exposure, right?

1 A. Well, generally. It depends on
2 the population exposed. I mean, we're
3 talking about long-term diseases. Then
4 you're talking about illnesses that are
5 associated with multiple factors. It's not
6 like giving somebody cyanide, where if you
7 give them a big dose, they're always going to
8 die.

9 That's not what we're dealing
10 with when you're talking about chronic
11 illness or exposure to environmental factors
12 that don't cause injury as opposed to -- or
13 overt injury as opposed to long-term disease
14 acquisition.

15 Q. Dr. Freeman, you would agree
16 that someone who was exposed to a moderate
17 amount of TCE for five years probably has a
18 greater risk of developing a disease than
19 someone who's exposed to a small amount of
20 TCE for one year, right?

21 MR. SNIDOW: Objection to form.

22 A. As a general principle, all
23 other things being the same and fixed, yes.
24 BY MS. SILVERSTEIN:

25 Q. And determining how much of a

1 chemical someone has been exposed to,
2 involves an exposure assessment, right?

3 A. Of some form.

4 Q. And it could develop -- it
5 could require a risk assessment, right?

6 MR. SNIDOW: Objection to form.

7 A. Can you give me a little more
8 explanation as to what it is that you mean
9 when you say that?

10 BY MS. SILVERSTEIN:

11 Q. Are you familiar with
12 regulatory risk assessment?

13 A. Generally, yes.

14 Q. And regulatory risk assessment
15 considers the amount of a chemical that
16 someone is exposed to, right? Or population
17 is exposed to, right?

18 A. Well, it considers maximum
19 contaminant levels and other sorts of values,
20 which are permissible or over a permissible
21 level, if that's what you're referring to.

22 Q. You didn't conduct an exposure
23 assessment here, right?

24 A. That's not quite correct.
25 Exposure is not just the amount of a

1 chemical, it's also the duration of the
2 exposure to the chemical. Once we know how
3 often the chemical has shown up based on
4 whether it's modeling, by somebody else, or
5 some other information that's present, then
6 the most relevant measure after that point in
7 time is just duration of exposure.

8 Q. Dr. Freeman, you didn't analyze
9 how long any person or group of people was
10 exposed to contamination at Camp Lejeune,
11 correct?

12 MR. SNIDOW: Objection to form,
13 asked and answered.

14 A. There are exposure durations
15 that are considered in some of my -- some of
16 the literature that I've cited to.

17 BY MS. SILVERSTEIN:

18 Q. Did you do an assessment of how
19 long anyone was actually exposed to a
20 chemical?

21 A. No, I'm --

22 MR. SNIDOW: Objection to form.

23 A. My report is only addressing
24 general causation issues, so I'm not
25 addressing any individual's specific

1 circumstances.

2 BY MS. SILVERSTEIN:

3 Q. Would you agree that animal
4 studies that don't reflect realistic dosage
5 for humans are unreliable?

6 MR. SNIDOW: Objection to form.

7 A. It depends on what you mean by
8 "unreliable." They're unreliable to say,
9 here's a dose that we're going to set and say
10 it's minimum or maximum or whatever the
11 threshold is, because, you know, animals can
12 have different physiologic responses than
13 humans. And typically do.

14 However, to find out whether or
15 not something is potentially dangerous or
16 carcinogenic, the animal study may be very
17 reliable to move on to the next step, which
18 is to examine exposed human populations.

19 BY MS. SILVERSTEIN:

20 Q. But you would agree that you
21 can't determine that a chemical is a human
22 carcinogen, for example, based solely on
23 animal studies, correct?

24 MR. SNIDOW: Objection to form.

25 A. I agree with that, not solely

1 on animal evidence, but they form the part of
2 the web of evidence. Some studies form part
3 of the web of evidence, I should say.

4 MS. SILVERSTEIN: I think we've
5 been going about an hour, so this is a
6 good time for a break.

7 A. Yeah. I'm going to grab some
8 water.

9 THE VIDEOGRAPHER: We are off
10 the record at 11:22 a.m.

11 (Recess taken, 11:22 a.m. to
12 11:29 a.m. PDT)

13 THE VIDEOGRAPHER: We are on
14 the record at 11:29 a.m.

15 BY MS. SILVERSTEIN:

16 Q. Dr. Freeman, did you talk to
17 anybody about the substance of your testimony
18 during the break?

19 A. I didn't.

20 Q. For both your kidney cancer
21 report and your Parkinson's Disease report,
22 you reviewed 5 ATSDR studies, right?

23 A. Roughly.

24 Q. This includes the Bove 2014
25 Marine Mortality study, right?

1 A. Oh, publication by ATSDR.

2 Sorry.

3 Yes, that is correct.

4 Q. It also includes the Bove 2014
5 Civilian Mortality study, right?

6 A. Yes.

7 Q. It includes the ATSDR 2018
8 Morbidity study, correct?

9 A. Yes.

10 Q. That includes the Bove 2024
11 Cancer Incidence study, right?

12 A. Yes.

13 Q. And the 5th is the Bove 2024
14 Mortality study, right?

15 A. Yes.

16 Q. These five studies all studied
17 sample populations polled from the population
18 of individuals at Camp Lejeune after 1975,
19 right?

20 A. Yes.

21 Q. You also reviewed and discussed
22 the 1997 ATSDR Public Health Assessment,
23 right?

24 A. Yes.

25 Q. Are you aware that the 1997

1 Public Health Assessment was retracted?

2 A. I might be.

3 Q. Is it your general practice to
4 rely on retracted studies?

5 A. It would not be my general
6 practice to rely on retracted studies.

7 Q. Are you aware of why the 1997
8 Public Health Assessment was retracted?

9 A. Offhand, I don't recall.

10 Q. You also reviewed the 2009
11 report by the National Research Council
12 titled: Contaminated Water Supplies At Camp
13 Lejeune: Assessing Potential Health Effects.
14 Correct?

15 A. Yes.

16 Q. Do you generally consider the
17 National Research Council to be reputable?

18 A. Yes. Just as I considered the
19 ATSDR to be reputable.

20 Q. Did you consider the NRC's
21 conclusion that the available scientific
22 information doesn't provide a sufficient
23 basis for determining whether the population
24 at Camp Lejeune was suffering adverse health
25 effects?

1 A. I did, as described in my
2 report.

3 Q. And you're aware that NRC
4 classified kidney cancer as having limited or
5 suggestive evidence of an association, right?

6 A. That language sounds like the
7 language that's in my report.

8 Q. Do you disagree with NRC's
9 conclusion about kidney cancer?

10 A. If I was asked that question in
11 2009, I'd probably say no, but I'm being
12 asked that question in 2025, and I have the
13 advantage of an additional 16 years of
14 information and evidence.

15 So because this is an evolving
16 topic, and the information and science on the
17 topic is evolving as well, what was true in
18 2009 as far as a consensus judgment has
19 changed.

20 So yeah, at the time, I -- you
21 know, if I looked at their same evidence, I
22 may very well have come to the same
23 conclusion.

24 Q. But today, you disagree with
25 the NRC, correct?

1 A. Today I think that the 2009 NRC
2 conclusion has been supplanted by new search
3 that is described in my report.

4 Q. Are you aware that the NRC
5 classified Parkinson's Disease as having
6 inadequate or insufficient evidence to
7 determine whether an association exists?

8 A. I believe that's also in my
9 report.

10 Q. Do you disagree with the NRC?

11 A. I would give you the exact same
12 answer and the rationale as I did with the
13 kidney cancer which is to say that
14 information has evolved and supplanted the
15 information in 2009, and if I was looking at
16 the same evidence that the NRC was in 2009, I
17 may very well have come to the same
18 conclusion.

19 Q. But you'd agree that today you
20 disagree with the NRC, correct?

21 MR. SNIDOW: Objection to form,
22 asked and answered.

23 A. I would say that the evidence
24 has demonstrated that the NRC's position in
25 2009 has been supplanted by new evidence and

1 evolved in positions by other agencies.

2 BY MS. SILVERSTEIN:

3 Q. Dr. Freeman, you'd agree that
4 age is the most important risk factor for
5 Parkinson's Disease, correct?

6 A. Yes.

7 Q. You'd agree that the incidence
8 and prevalence of Parkinson's steadily rises
9 in adults beginning in the 5th decade, right?

10 A. Yes.

11 Q. A family history of Parkinson's
12 and a first-degree relative is associated
13 with a 2 to 3 fold increase in the risk of
14 Parkinson's, right?

15 A. Yes, that sounds about right.

16 Q. Exposure to pesticides is a
17 risk factor for Parkinson's, right?

18 A. Yes.

19 Q. Exposure to air pollution is a
20 risk factor for Parkinson's?

21 A. Yes.

22 Q. High consumption of dairy
23 products is a risk factor for Parkinson's,
24 right?

25 A. Maybe.

1 Q. Living in an urban or
2 industrial area with high release of copper,
3 manganese or lead is a risk factor for
4 Parkinson's right?

5 A. I'd have to look at that
6 evidence, but it's reasonable. It's an
7 environmental cause.

8 Q. Looking in rural areas can be a
9 risk factor for Parkinson's?

10 A. Depends on which rural area you
11 live in.

12 Q. Farming or agriculture work is
13 a risk factor to Parkinson's, correct?

14 A. That may be a proxy for
15 pesticide exposure, so yes.

16 Q. Use of well water is a risk
17 factor for Parkinson's, right?

18 A. I would have to look at the
19 evidence to be able to answer that question.

20 Q. Do you want to go ahead and
21 turn to page 27 of your report?

22 A. Exhibit 3?

23 Q. Are you on page 27?

24 A. I am.

25 Q. And do you see the paragraph, I

1 guess, that says: Many environmental
2 exposures have been identified as risk
3 factors for PD and epidemiologic studies?

4 A. Yes.

5 Q. And the third from the bottom
6 there is the use of well water, right?

7 A. I see that.

8 Q. You agree that high dietary
9 intake of iron is a risk factor for
10 Parkinson's Disease?

11 A. No. Again, the issue here is
12 these are examples that have been described
13 as potential risk factors. I don't know that
14 it is a risk factor. They've just been
15 described in the literature as potentially
16 being risk factors.

17 Q. So you listed these risk
18 factors in your report as having been
19 identified as risk factors for Parkinson's
20 Disease but don't have an opinion on whether
21 or not they could be risk factors for
22 Parkinson's Disease?

23 A. Right. I haven't evaluated
24 that evidence.

25 Q. Is there other information that

1 you've provided in your Parkinson's Disease
2 report that you haven't evaluated and has not
3 been -- cannot tell us the accuracy of?

4 MR. SNIDOW: Objection, form.

5 A. You're asking me about the
6 validity of the statement that well water,
7 for example, is a risk factor for
8 Parkinson's. That's just an example of
9 what's been identified. I can't tell you
10 about the -- how good that evidence is. It's
11 just been identified as a risk factor. I'm
12 not identifying it as being a validator risk
13 factor or what that level of evidence is for
14 it.

15 BY MS. SILVERSTEIN:

16 Q. Are there other -- is there
17 other information in your Parkinson's Disease
18 report that you can not tell us the validity
19 of?

20 A. Well, it's a long report, and
21 some of the information that I have is just
22 repeated from other sources, like, when we
23 started the deposition you asked me where I
24 got some of my history, historical
25 information. And I can't tell you that I

1 know the validity of that historical
2 information.

3 Q. So would it be fair to say that
4 there's information contained in your expert
5 reports that may or may not be valid?

6 MR. SNIDOW: Objection to form.

7 A. No, it's valid for what it's
8 represented as. I understand the history of
9 Camp Lejeune to be what I've put down,
10 what -- if it's -- in my report.

11 Whether or not there may be
12 conflict or someone else has done more
13 investigation is not something I'm
14 addressing. So if somebody showed me
15 evidence and said, well, actually, this
16 statement is not quite correct, because
17 somebody else found something else and this
18 is the investigation they did, I don't have a
19 basis to disagree with that necessarily.

20 Same thing here. I'm just
21 giving a list of various risk factors that
22 have been identified, but have -- I don't
23 have any information on the validity of them.
24 I -- this report is on the validity of Camp
25 Lejeune exposure as a risk factor for causing

1 Parkinson's Disease or increasing the risk of
2 Parkinson's Disease. That's the evidence
3 that I've evaluated for validity. But I'm
4 not looking at the underlying evidence for
5 the validity of a broad statement about risk
6 factors that have been identified or
7 described in the literature at some point in
8 time.

9 BY MS. SILVERSTEIN:

10 Q. Okay. Are you aware that
11 constipation has been identified as a risk
12 factor for Parkinson's?

13 A. I have -- I have it listed
14 under another risk factor that is identified,
15 but which is almost certainly heavily
16 confounded.

17 Q. So that's a yes, you're aware
18 that constipation has been identified as a
19 risk factor, right?

20 A. It's been described as a risk
21 factor. It's almost certainly a
22 confounded -- a confounded risk factor,
23 however.

24 That's just a multifactorial.
25 It's just another term that has been -- or

1 another risk factor that has been enumerated,
2 but as far as the validation of it using
3 carefully controlled studies is something
4 that I can't comment on.

5 Q. I'm asking if you're aware that
6 it's been identified as a risk factor. And
7 you say in your report: Among the most
8 consistently identified risk factors are.

9 And you list constipation,
10 right?

11 MR. SNIDOW: Objection to form.
12 Asked and answered.

13 A. I can't tell you whether it's a
14 true risk factor, I can just tell you it's
15 been identified as one.

16 BY MS. SILVERSTEIN:

17 Q. And you're also aware that
18 depression has been identified as a risk
19 factor, right?

20 A. That is also on the list that's
21 on page 27.

22 Q. So you are aware that it's been
23 identified as a risk factor?

24 A. Yes, to the same -- with the
25 same caveats that go with all of the other

1 risk factors that are identified.

2 Q. You are aware that excess body
3 weight and metabolic syndrome have been
4 identified as risk factors for Parkinson's,
5 correct?

6 A. That is also on the list, and,
7 yes, that has also been identified somewhere
8 in the literature.

9 Q. You are aware that Type II
10 diabetes has been identified as a risk
11 factor, correct?

12 A. Yes, it is also on the list of
13 identified risk factors.

14 Q. You are aware that history of
15 traumatic brain injury has been identified as
16 a risk factor for Parkinson's Disease, right?

17 A. Yes, and that actually is a
18 validated association.

19 Q. You'd agree that for kidney
20 cancer, there are several hereditary
21 syndromes that are risk factors, right?

22 A. Yes.

23 Q. You'd also agree that for
24 kidney cancer, smoking is a risk factor,
25 right?

1 A. Yes.

2 Q. And you'd agree that for kidney
3 cancer, obesity is a risk factor, right?

4 A. I'd have to go back to my
5 report and see if that was listed. If you're
6 reading from my report, then I'd kind of
7 disagree, but I'd have to look at it if you
8 want to direct me toward that page.

9 Q. So sitting here today, you
10 don't remember whether obesity has been
11 identified as a risk factor --

12 A. I have not --

13 Q. -- is that fair?

14 A. -- committed the entire report
15 to memory, no.

16 Q. Are you aware that hypertension
17 has been identified as a risk factor for
18 kidney cancer?

19 A. Yes, that is a validated risk
20 factor.

21 Q. And are you aware that
22 prolonged ingestion of analgesic combinations
23 has been identified as a risk factor for
24 kidney cancer?

25 A. Yes, also validated.

1 Q. And are you aware that
2 hepatitis C infection has been identified as
3 a risk factor to kidney cancer.

4 A. I don't recall the background
5 for that one. I'd have to look -- if it's in
6 my report, it would be to the extent that I
7 describe it. I just can't tell you that I
8 know much about it.

9 Q. Okay.
10 If you want to go to page 30 of
11 your report.

12 A. Exhibit 2?

13 Q. Correct.

14 Are you on page 30?

15 A. I am.

16 Q. The second paragraph on page 30
17 says: Sporadic, non-hereditary cases account
18 for the majority of RCC. Several risk
19 factors have been associated with sporadic
20 RCC including exposure to toxic compounds,
21 smoking, obesity, hypertension, prolonged
22 ingestion of analgesic combinations,
23 cytotoxic chemotherapy, chronic hepatitis C
24 infection, kidney stones, acquired cystic
25 disease of the kidney, and chronic kidney

1 disease.

2 Correct?

3 A. Yes.

4 Q. And the next paragraph says:
5 Cigarette smoking is associated with an
6 increased risk of developing RCC.

7 Correct?

8 A. Yes. That's a validated --

9 Q. And when you say RCC, you --

10 A. -- association.

11 Q. I'm sorry, I didn't mean to cut
12 you off.

13 What were you saying about
14 smoking?

15 A. That's a validated association.

16 Q. When you say RCC, you're
17 referring to renal cell carcinoma, right?

18 A. I am.

19 (Freeman Deposition Exhibit 6,
20 Evaluation of mortality among marines
21 and navy personnel exposed to
22 contaminated drinking water at USMC
23 bases Camp Lejeune: A retrospective
24 cohort study
25 (Bove/Ruckart/Maslia/Larson),

1 CLJA_HEALTHEFFECTS-0000141103-
2 000014115, was marked for
3 identification.)

4 BY MS. SILVERSTEIN:

5 Q. This is the 2014 mortality
6 study.

7 MR. SNIDOW: Okay.

8 MS. PLATT: Would you like me
9 to upload you a copy?

10 MR. SNIDOW: No.

11 You said Marine, right?

12 MS. SILVERSTEIN: Yeah, Marine.

13 BY MS. SILVERSTEIN:

14 Q. Dr. Freeman, you were handed
15 Exhibit 6, which is titled: Evaluation of
16 mortality among marines and navy personnel
17 exposed to contaminated drinking water at
18 USMS Base Camp Lejeune: A retrospective
19 cohort study.

20 Correct?

21 A. Yes.

22 Q. And this is a publication by:
23 Bove et al. from 2014.

24 Right?

25 A. Yes.

1 Q. Are you aware that Dr. Bove
2 testified that this study suffered from
3 exposure misclassification issues?

4 A. I'm aware of the exposure
5 misclassification issues. I can't tell you
6 that I -- I don't believe I have his
7 testimony.

8 Q. But you are aware of the
9 misclassification issues in the study?

10 A. The potential for them, yes.

11 Q. And are you aware that the
12 study had very little information on where
13 Marines were barracked?

14 A. Yes, I am aware of that fact.

15 Q. And of the information that the
16 investigators did have on where Marines were
17 barracked, came from Marine -- individual
18 Marine's memory. Are you aware of that?

19 A. I would assume that was
20 correct, rather than from records that were
21 reviewed, but I don't recall that offhand,
22 no.

23 Q. If you turn to page 13 of the
24 study.

25 MR. SNIDOW: Internal 13?

1 MS. SILVERSTEIN: Yes, it
2 should be the same on the PDF and --
3 but the document number page 13,
4 either way.

5 MR. SNIDOW: Great.

6 BY MS. SILVERSTEIN:

7 Q. If you look at the conclusion
8 section the study concluded that: The
9 precision of many hazard ratio estimates was
10 low as indicated by wide confidence
11 intervals.

12 Right?

13 A. Yes.

14 Q. You can go ahead and turn to
15 page 7.

16 A. I'm there.

17 Q. Page 7 has Table 4, which is
18 titled: Standardized mortality ratios,
19 underlying cause of death.

20 Do you see that?

21 A. Yes.

22 Q. This study found that the
23 standardized mortality ratio for kidney
24 cancer was 1.16, correct?

25 A. Yes.

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

3 A. Yes.

4 Q. Which means the confidence
5 interval includes 1?

6 A. Yes. By definition.

7 Q. Which means it's not
8 statistically significant, right?

9 A. Not at the 99% confidence
10 interval.

11 Q. At the bottom of Table 4, below
12 Table 4, it says: Not evaluated due to small
13 numbers were Parkinson's Disease and male
14 breast cancer.

15 A. Yes.

16 Q. Turn to page 10.

17 Are you on page 10?

18 A. I am there.

19 Q. Do you see Table 7?

20 A. I do.

21 Q. Table 7 is titled: Hazard
22 ratios (95% confidence interval) for
23 categorical cumulative exposure, and
24 coefficients (95% confidence interval) for
25 continuous cumulative exposure.

1 Do you see that?

2 A. Yes.

3 Q. The hazard ratio here is shown
4 only -- for kidney cancer is shown for PCE
5 and total volatile organic compounds, right?

6 A. Yes.

7 Q. For total volatile organic
8 compounds, the high exposure hazard ratio is
9 1.54, right?

10 A. Yes.

11 Q. The confidence interval for
12 that is 0.63 to 3.75, right?

13 A. Yes.

14 Q. Which means the confidence
15 interval includes one? Right?

16 A. It does.

17 Q. And at the 95% confidence
18 interval, that finding isn't statistically
19 significant, correct?

20 A. Correct.

21 Q. And for PCE, there is not a
22 monotonic dose-response relationship,
23 correct?

24 A. There is between a low and
25 high, but across low, medium, and high, that

1 is not demonstrated by the point estimates.

2 Q. The Marine mortality study
3 didn't take into account whether participants
4 had a traumatic brain injury, did it?

5 MR. SNIDOW: Objection to form.

6 A. I don't recall offhand.

7 BY MS. SILVERSTEIN:

8 Q. Are you aware of whether the
9 Marine mortality study took into account
10 whether participants had exposure to
11 pesticides?

12 MR. SNIDOW: Objection to form.

13 A. I don't recall offhand.

14 BY MS. SILVERSTEIN:

15 Q. Are you aware of whether the
16 Marine mortality study took into account
17 whether participants drank well water?

18 A. I have to give you the same
19 answer, I don't recall offhand.

20 Q. And you don't recall whether
21 the study considered if participants had a
22 history of constipation or depression?

23 A. I have to back up to my last
24 answer, because I think that if you were at
25 Camp Lejeune, you drank well water. And that

1 was the source of the -- I mean, those are
2 the considered wells, I believe.

3 I think your question is more:
4 Do you drink from well water that's on your
5 own property? I mean; is that what you're
6 intending?

7 Q. Did the study take into account
8 whether or not participants grew up drinking
9 well water?

10 MR. SNIDOW: Objection to form.

11 A. Again, if it's well water
12 from -- they described as different wells
13 within Camp Lejeune, I think that the
14 implication there is that the water source is
15 from the wells in Camp Lejeune. So it's not
16 a super direct answer for you.

17 BY MS. SILVERSTEIN:

18 Q. Dr. Freeman, you'd agree that
19 the Marine mortality study was evaluating
20 Marines at Camp Lejeune, correct?

21 A. Yes.

22 Q. And Marines are adults?

23 A. Yes.

24 Q. So the study is not evaluating
25 what kind of water those Marines drank as

1 children, correct?

2 A. That's true.

3 Q. And it didn't consider whether
4 or not they grew up drinking from well water
5 on their property, right?

6 A. I don't recall that
7 specifically. I wouldn't be surprised if
8 that wasn't considered, however.

9 Q. And to the best of your
10 recollection, the study didn't take into
11 account whether participants had hereditary
12 syndrome like Von Hippel-Lindau syndrome,
13 correct?

14 A. That's with two Ps.
15 That's correct.

16 (Freeman Deposition Exhibit 7,
17 Mortality study of civilian employees
18 exposed to contaminated drinking water
19 at USMC Base Camp Lejeune: A
20 retrospective cohort study
21 (Bove/Ruckart/Maslia/Larson),
22 CLJA_HEALTHEFFECTS-0000291324 through
23 CLJA_HEALTHEFFECTS-0000291336, was
24 marked for identification.)
25

1 BY MS. SILVERSTEIN:

2 Q. Dr. Freeman, you were just
3 handed Exhibit 7, which is titled: Mortality
4 study of civilian employees exposed to
5 contaminated drinking water at USMC Base Camp
6 Lejeune: A retrospective cohort study.

7 Correct?

8 A. Yes.

9 Q. And this is a 2014 study by
10 Bove, et al., right?

11 A. Yes.

12 Q. Are you aware of the
13 misclassification bias in this study?

14 MR. SNIDOW: Objection to form.

15 A. The potential for
16 misclassification bias, as far as the source
17 of the water, I think, is what you're
18 referencing?

19 And yes, I'm aware of that in
20 all of the studies that looked at a
21 comparison of Camp Lejeune to Camp Pendleton.

22 BY MS. SILVERSTEIN:

23 Q. Are you aware that this study
24 lacked data on the civilian employee
25 participants' water use?

1 A. Yes.

2 Q. And are you aware that some of
3 the workers may not have used Camp Lejeune
4 water at all?

5 A. Yes. All with bias toward the
6 null.

7 Q. If you go ahead and turn to
8 page 7.

9 (Clarification by reporter.)

10 BY MS. SILVERSTEIN:

11 Q. Are you on page 7?

12 A. I am.

13 Q. Do you see Table 3:
14 Standardized Mortality Ratios (SMRs),
15 Underlying cause of death?

16 A. Yes.

17 Q. You'd agree that the SMR for
18 kidney cancer is -- at Camp Lejeune is 1.3,
19 correct?

20 A. Yes.

21 Q. And you'd agree that the
22 confidence interval is 0.52 to 2.67, right?

23 A. I agree.

24 Q. Which means it includes 1,
25 right?

1 A. I agree.

2 Q. Which means that the 95% -- at
3 the 95% confidence interval, the results for
4 kidney cancer are not statistically
5 significant, correct?

6 A. I agree.

7 Q. Below that table, the authors
8 discuss diseases of secondary interest. Do
9 you see that?

10 A. Within the same table.

11 Q. Do you see the paragraph below
12 the table that says: Diseases of Secondary
13 Interest?

14 A. Oh, yeah. But also it's in the
15 same table. You threw me off.

16 Q. And in that paragraph below the
17 table, the authors discuss Parkinson's
18 Disease, right?

19 A. They do.

20 Q. And you'd agree that the hazard
21 ratio for Parkinson's Disease listed there is
22 3.13?

23 A. Yes.

24 Q. With a 95% confidence interval
25 of 0.76 to 12.86, correct?

1 A. Yes.

2 Q. Which means that at the 95%
3 confidence interval, that result is not
4 statistically significant, correct?

5 A. I agree.

6 Q. In the table under diseases of
7 secondary interest, they also provide the SMR
8 for Parkinson's Disease, correct?

9 A. Yes, at the bottom.

10 Q. And at Camp Lejeune, the SMR is
11 2.28, right?

12 A. I am seeing 2.19.
13 You're looking at the expected.

14 Q. You're right. Thank you.
15 The SMR is 2.19, correct?

16 A. Yes.

17 Q. And the confidence interval is
18 7.1 to 5.11, right?

19 A. Yes.

20 Q. Which means that the 95%
21 confidence interval, that result is not
22 statistically significant, correct?

23 A. I can't argue with that logic,
24 yes.

25 Q. And then if you turn to page 8,

1 Table 4.

2 Are you on page 8?

3 A. I am.

4 Q. And Table 4 is: Camp Lejeune
5 vs Camp Pendleton: Hazard ratios and 95%
6 confidence intervals, adjusted by sex, race,
7 occupation (blue collar vs white collar) and
8 education, 10-year lag.

9 Correct?

10 A. Yes.

11 Q. You'd agree that Table 4 shows
12 the hazard ratio for kidney cancer to be
13 1.92, right?

14 A. Yes.

15 Q. And the 95% confidence interval
16 for kidney cancer is 0.58 to 6.34, correct?

17 A. Yes.

18 Q. Which means that at the 95%
19 confidence interval, that finding for kidney
20 cancer is not statistically significant,
21 right?

22 A. Yes.

23 Q. The p-value for kidney cancer
24 is 0.28, correct?

25 A. Yes.

1 Q. Which is also not statistically
2 significant, right?

3 A. At a p-value set at .05, yes.

4 Q. It's also not statistically
5 significant at a p-value of .1, right?

6 A. Yes. That means it's almost 1
7 in 3 chance that the effects are due to
8 random error, or random scatter.

9 Q. The hazards ratio in Table 4
10 for Parkinson's Disease is 3.13, correct?

11 A. Yes.

12 Q. And the 95% confidence interval
13 is 0.76 to 12.86, right?

14 MR. SNIDOW: Asked and
15 answered, but...

16 A. Yes.

17 BY MS. SILVERSTEIN:

18 Q. Which means that finding
19 reported in Table 4 is not statistically
20 significant, right?

21 A. Yes.

22 Q. The p-value for Parkinson's in
23 Table 4 is 0.11, right?

24 A. Yes.

25 Q. Which means that it's not

1 statistically significant at the 0.05 level,
2 correct?

3 A. Agreed.

4 Q. Or at the 0.1 level, correct?

5 A. Agreed.

6 Q. And, Dr. Freeman, you are aware
7 that Camp Pendleton is a Superfund site,
8 right?

9 A. Yes.

10 Q. And are you aware that the EPA
11 has stated that chemicals of concern at Camp
12 Pendleton include TCE?

13 A. Yes.

14 Q. You're not aware of the levels
15 of contamination at Camp Pendleton, correct?

16 A. I haven't studied it, no.

17 Q. And so you didn't consider the
18 levels of contaminants at Camp Pendleton when
19 interpreting the Bove 2014 civilian mortality
20 study rate?

21 A. That's not quite correct, no.

22 Q. How is that not correct?

23 A. That it's -- it's -- that it's
24 incorrect.

25 Q. Did you consider the levels of

1 contaminants when evaluating the civilian
2 mortality study?

3 A. Well, I considered that there
4 are contaminants at Camp Pendleton, which
5 would bias the results toward the null,
6 between the two sites. Therefore, it dilutes
7 the difference between the two sites.

8 Q. Directing you back to my
9 question. You didn't consider the level of
10 contaminant at Camp Pendleton, did you?

11 A. You're using "level"
12 differently than I would use it.

13 The level is different than it
14 would be from the SMR. For example, the base
15 rate that is in the general population. That
16 is Camp Pendleton would have a higher level
17 of contamination and be expected for the
18 general population.

19 So to that extent, yes, it's
20 expected that they have a higher level of
21 contamination than the general population,
22 but knowing the specific level, I don't have
23 that information.

24 Q. And you don't know for example
25 whether Camp Pendleton had higher amounts of

1 TCE than Camp Lejeune did, do you?

2 A. I've not evaluated that issue
3 at all, no.

4 Q. Can you turn to page 10?
5 Do you see Table 6?

6 A. I do.

7 Q. Table 6 is titled: Hazard
8 ratios (95% confidence interval) for a
9 categorized (less than median reference more
10 than or equal to median) maximum cumulative
11 exposure and coefficients (95% confidence
12 interval) for continuous cumulative exposure
13 (in micrograms per liter year).

14 Correct?

15 A. Yes.

16 Q. The hazard ratio for kidney
17 cancer for the total volatile organic
18 compound is 4.44, correct?

19 A. Yes.

20 Q. And the confidence interval is
21 0.52 to 38.19, correct?

22 A. Yes.

23 Q. Would you agree that that's a
24 wide confidence interval?

25 A. I would.

1 Q. And it's not statistically
2 significant at the 95% confidence interval,
3 correct?

4 A. I agree.

5 Q. For kidney cancer and benzene,
6 the hazard ratio is 1.82, correct?

7 A. Yes.

8 Q. And the confidence interval is
9 0.34 to 9.78, right?

10 A. Correct.

11 Q. Do you consider that a wide
12 confidence interval?

13 A. That's pretty wide, yeah.

14 Q. And you would agree that, at
15 the 95% confidence interval, the reported
16 result for kidney cancer and benzene in
17 Table 6 is not statistically significant,
18 right?

19 A. I agree.

20 Q. Of the entire Camp Lejeune
21 cohort 4,647 people, only seven had kidney
22 cancer, correct?

23 A. Yes.

24 Q. And would you agree that there
25 was not enough information to calculate the

1 finding -- the hazard ratio for PCE, TCE and
2 vinyl chloride?

3 A. Yes.

4 Q. For Parkinson's Disease, out of
5 a Camp Lejeune cohort of 4,647 people only
6 five had Parkinson's, correct?

7 A. Yes.

8 Q. And for PCE, and Parkinson's
9 disease, the hazard ratio is 2.68, right?

10 A. Yes.

11 Q. And the confidence interval is
12 0.22 to 33.28, right?

13 A. Yes.

14 Q. That's a wide confidence
15 interval, right?

16 A. It is.

17 Q. And at the 95% confidence
18 interval, the finding for PCE and Parkinson's
19 Disease is not statistically significant,
20 right?

21 A. Yes, that's correct.

22 Q. For Parkinson's Disease and
23 TCE, the hazard ratio is 2.51, right?

24 A. Yes.

25 Q. The confidence interval is 0.21

1 to 30.76, correct?

2 A. Correct.

3 Q. And that's again a wide
4 confidence interval, right?

5 A. Yes.

6 Q. And at the 95% confidence
7 interval, that is not statistically
8 significant, correct?

9 A. Correct.

10 Q. For vinyl chloride, the hazard
11 ratio is 2.81, right?

12 A. Yes.

13 Q. And the confidence interval is
14 0.23 to 34.11?

15 A. Yes.

16 Q. Which means that it is not
17 statistically significant, correct?

18 A. At the 95% confidence interval,
19 correct.

20 Q. For TVOC, the hazard ratio is
21 2.52, correct?

22 A. Yes.

23 Q. And the confidence interval is
24 0.21 to 30.83, right?

25 A. Yes.

1 Q. Which is a wide confidence
2 interval, right?

3 A. Yes.

4 Q. And it includes, at the 95%
5 confidence interval level, it's not
6 statistically significant, right?

7 A. For the greater the median
8 exposure, yes.

9 Q. To the best of your
10 recollection, the civilian morality study
11 didn't take into account whatever
12 participants had a traumatic brain injury,
13 correct?

14 A. Your -- your knowledge of that
15 detail is better than mine. I don't recall
16 that offhand.

17 Q. You don't recall whether they
18 took into account traumatic brain injury?

19 A. Not offhand.

20 Q. And you don't recall whether
21 the civilian mortality study took into
22 account whether participants grew up drinking
23 from on-property well water, right?

24 A. Now that we've established what
25 that is, no, I don't recall having a

1 recollection of them looking at childhood
2 exposure to well water.

3 Q. And you don't recall whether
4 participants had a history -- whether the
5 study took into account whether the
6 participants had a history of constipation or
7 depression, right?

8 A. That's correct.

9 Q. And you don't recall whether
10 the study took into account whether
11 participants had a hereditary syndrome like
12 Von Hippel-Lindau syndrome, right?

13 A. Also true.

14 Q. You don't recall whether the
15 study took into account where the
16 participants will be, right?

17 A. I don't have a recollection of
18 that specifically, I agree.

19 Q. You can go ahead and set the
20 civilian mortality study to the side.

21 (Freeman Deposition Exhibit 8,
22 April 2018 Morbidity Study of Former
23 Marines, Employees, and Dependents
24 Potentially Exposed to Contaminated
25 Drinking Water at U.S. Marine Corps

1 Base Camp Lejeune,
2 CLJA_HEALTHEFFECTS-0000000214 through
3 CLJA_HEALTHEFFECTS-0000000340, was
4 marked for identification.)

5 BY MS. SILVERSTEIN:

6 Q. Dr. Freeman, you were just
7 handed Exhibit 8, which is titled: Morbidity
8 Study of Former Marines, Employees, and
9 Dependents Potentially Exposed to
10 Contaminated Drinking Water at U.S. Marine
11 Corps Base Camp Lejeune.

12 Correct?

13 A. Yes.

14 Q. And this is an ATSDR study from
15 April of 2018, right?

16 A. Yes.

17 Q. And this is something that you
18 reviewed when preparing your reports?

19 A. It is.

20 Q. If you can go ahead and turn to
21 page 54.

22 A. Okay.

23 Q. Do you see the heading on
24 page 54 that says: Limitations?

25 A. Yes.

1 Q. Under the heading Limitations,
2 it says: The study has several major
3 limitations. Surveys could not be sent to
4 20% of the cohort due to lack of complete and
5 accurate addresses for mailing a survey.
6 Additionally, some of the surveys coded as
7 "not returned" likely did not reach the
8 intended recipient.

9 Correct?

10 A. Correct that it says that?

11 Q. Is that what it says?

12 A. That is what it says.

13 Q. And go ahead and turn to
14 page 55.

15 The last sentence on that first
16 partial paragraph, it says: Nevertheless,
17 selection biases are still a concern because
18 of the low participation rate and past media
19 coverage.

20 Did I read that correctly?

21 A. Yes.

22 Q. The next paragraph says that:
23 About 50% of Marines and 40% of civilian
24 employees did not complete a HIPAA form to
25 allow for medical confirmation which reduced

1 the precision of the odds ratio estimates.

2 Did I read that correctly?

3 A. Yes.

4 Q. And it says: In the
5 categorical analyses, there were small
6 numbers of cases for some of the diseases and
7 the exposure categories, especially for
8 civilian employees. Therefore, confidence
9 intervals were wide and these results need to
10 be interpreted cautiously.

11 Correct?

12 A. Yes.

13 Q. ATSDR 2018 also identifies
14 several sources of exposure
15 misclassification, right?

16 A. Yes.

17 Q. And you are aware that there
18 were uncertainties and variabilities
19 concerning the amount of water each
20 individual consumed, right?

21 A. Yes.

22 Q. You're aware that the study:
23 Assumed that all civilian employees worked on
24 mainside and were served by the Hadnot Point
25 drinking water system and all civilian

1 employees consumed drinking water while on
2 base.

3 Right?

4 A. Where are you reading from?

5 MR. SNIDOW: Do you want me to
6 show him?

7 MS. SILVERSTEIN: Sure.

8 MR. SNIDOW: 56, down like
9 about 1, 2, 3 -- 9 or 10 up from the
10 bottom. Down a little bit.

11 There you go.

12 A. Oh, up from the bottom.

13 MR. SNIDOW: Yep.

14 A. Not down from the top. Got it.
15 Yes, I now see where you are.

16 BY MS. SILVERSTEIN:

17 Q. And so you're aware that the
18 study assumed that civilian employees worked
19 on mainside and were served by Hadnot Point
20 water system and that civilian employees
21 consumed drinking water on base, right?

22 A. Yes. Well, I am now.

23 Q. And are you aware that civilian
24 employees may have worked on parts of base
25 that were not served by the Hadnot Point

1 drinking water system?

2 A. That seems to be suggested by
3 the statement, yes.

4 Q. Did you consider these
5 limitations when evaluating the 2018 study?

6 A. Particularly in this
7 classification, yes. This is all bias toward
8 the null.

9 Q. Go ahead and turn to page 10.

10 A. I am there.

11 Q. The last full paragraph on
12 page -- or sorry, the last paragraph on
13 page 10, the last full sentence starts:
14 However.

15 Do you see where that is?

16 A. Yes.

17 Q. And it says: However, results
18 of this study need to be interpreted with
19 caution for several reasons. First, the low
20 response rate and small numbers for some of
21 the diseases of interest resulted in wide
22 confidence interval.

23 Right?

24 A. Yes.

25 Q. And the bottom of that

1 paragraph says: The Camp Lejeune
2 participants with health problems may have
3 been more likely to participate because they
4 were aware of the contaminated drinking water
5 and believed they were affected by their
6 exposures.

7 Do you see that?

8 A. Yes.

9 Q. That would represent a
10 selection bias, correct?

11 A. A potential selection bias,
12 yes.

13 Q. Are you aware that this 2018
14 study was not peer-reviewed?

15 A. Not offhand, no.

16 Q. Would you generally consider it
17 your practice to include non-peer-reviewed
18 studies in your epidemiologic analyses?

19 A. A regulatory agency, typically,
20 yes. I mean, however, their internal
21 processes function. I would consider what
22 the regulatory agency -- what they had said
23 about a particular topic in a particular
24 report.

25 Q. So you'd consider that

1 whether -- even if it's not been
2 peer-reviewed?

3 A. Well sure. I mean, it's
4 whatever their processes are, would be
5 something that I would -- if I was asked
6 about it I could certainly examine. But the
7 processes very well may be more stringent
8 than typical peer review. It just depends on
9 the agency and how they evaluate the
10 publications that they put out.

11 Q. And you're not aware of how
12 ATSDR evaluated this 2018 study, are you?

13 A. Not offhand, no.

14 Q. And it's not something that you
15 considered when determining how much weight
16 to give the study, is it?

17 A. No, and I don't think I
18 weighted it particularly one way or the
19 other.

20 Q. It's not something you
21 considered when deciding whether or not this
22 study was reliable?

23 A. Whether it was peer-reviewed?

24 Q. What the internal review
25 process was?

1 A. No. That's ATSDR's business,
2 not mine.

3 Q. Okay. So it doesn't matter to
4 you what kind of process articles undergo
5 before publication?

6 MR. SNIDOW: Objection to form,
7 misstates his testimony.

8 A. It is a publication from the
9 ATSDR. They're given equal weight because
10 it's from ATSDR. So it's -- it is what it
11 is. It is an ATSDR publication.

12 BY MS. SILVERSTEIN:

13 Q. Okay. You can go ahead and set
14 that study aside.

15 (Freeman Deposition Exhibit 9,
16 Cancer Incidence among Marines and
17 Navy Personnel and Civilian Workers
18 Exposed to Industrial Solvents in
19 Drinking Water at US Marine Corps Base
20 Camp Lejeune: A Cohort Study
21 (Bove/Greek/Gatiba/Kohler/Sherman/Shin
22 /Bernstein), was marked for
23 identification.)

24 BY MS. SILVERSTEIN:

25 Q. Actually, I think I handed you

1 the wrong copy.

2 MR. SNIDOW: Me or him?

3 MS. SILVERSTEIN: Him.

4 (Discussion off the record.)

5 BY MS. SILVERSTEIN:

6 Q. Dr. Freeman, I handed you the
7 2024 cancer incidence study, correct?

8 A. Yes.

9 Q. And this is one of the studies
10 that you relied on in forming your
11 conclusions, right?

12 A. Yes.

13 Q. And this study is for -- this
14 is a publication regarding the cancer
15 incidence of Marine and Naval personnel
16 stationed at Camp Lejeune 1975 to 1985,
17 right?

18 A. Yes.

19 Q. And are you aware that the
20 cancer incidence study did not perform any
21 statistical significance testing?

22 A. Are you referring to the study
23 I'm looking at now?

24 Q. Yes.

25 A. I have 95% confidence intervals

1 on Table 3. I'm not sure what you're
2 referring to.

3 Q. Okay. And you didn't review
4 Dr. Bove's testimony regarding the cancer
5 incidence study, correct?

6 A. Not that I recall, no.

7 Q. So you wouldn't be aware if
8 Dr. Bove said that he didn't perform any
9 confidence interval testing, right?

10 MR. SNIDOW: Objection to form.

11 BY MS. SILVERSTEIN:

12 Q. Specifically significant
13 testings?

14 MR. SNIDOW: Objection to the
15 form, the study speaks for itself.

16 A. I mean, I'm looking at values
17 that provide degrees of statistical
18 significance. I'm not sure what that -- what
19 Dr. Bove was referring to.

20 BY MS. SILVERSTEIN:

21 Q. Okay. Would you want to
22 consider what the author of the study said
23 about the study when analyzing the
24 information?

25 MR. SNIDOW: Object to form.

1 A. I would want to consider what
2 was published. I mean, that's what the
3 entire world sees. I mean, not many people
4 actually see what he said about it.

5 BY MS. SILVERSTEIN:

6 Q. Okay. So you don't --

7 A. So --

8 Q. You don't care about what
9 Dr. Bove said about the study?

10 MR. SNIDOW: Objection,
11 misstates the testimony.

12 A. Well, I'm interested in what's
13 been published. I mean that's what is
14 accessible to me.

15 So I -- I don't know what
16 Dr. Bove said, and I don't know what the
17 meaning is of what he said. But what I can
18 tell you is that I'm looking at tests of
19 statistical significance that are throughout
20 Table 3 and Table 4, and the other tables
21 that I'm looking at. So I'm not sure what's
22 being referenced.

23 Q. Put aside the statistical
24 significance question.

25 Would you -- if Dr. Bove had

1 made statements about his work on the cancer
2 incidence study, is that something that you
3 would want to consider when determining how
4 much to weigh on the cancer incidence study?

5 MR. SNIDOW: Objection to form.

6 A. I'd be interested to see what
7 he had to say, but again, I have to rely on
8 what's been put out to the world at large in
9 a peer-reviewed journal article.

10 BY MS. SILVERSTEIN:

11 Q. You are aware that no
12 individualized exposure assessment was
13 performed for the cancer incidence study,
14 correct?

15 A. Individualized to each
16 individual in the study?

17 Q. Yes.

18 A. I can't answer that question
19 off the top of my head. That makes sense. I
20 don't think that such a thing would be
21 feasible.

22 Q. Which creates the potential for
23 misclassification bias based on how much
24 water individuals consumed, correct?

25 A. Bias toward the null, yes.

1 Q. Go ahead and turn to Table 3.

2 A. Yes, that's what I'm looking
3 at.

4 Q. Table 3 is the: Comparison of
5 cancer outcomes at Camp Lejeune vs. Camp
6 Pendleton, among the Marines/Navy personnel
7 subgroup who began active duty and were
8 stationed at either base between 1975 and
9 1985.

10 Correct?

11 A. Yes.

12 Q. You'd agree that the results
13 for Table 3 don't provide any results prior
14 to 1975, correct?

15 A. Yes.

16 Q. The adjusted hazard ratio for
17 kidney cancer is 1.06, correct?

18 A. For kidney and renal pelvis,
19 yes.

20 Q. Would you consider 1.06 to be
21 an elevated incident?

22 A. Not at the level we're talking
23 about for this sort of evidence.

24 Q. Okay. Would you consider it to
25 show a positive association that could

1 potentially be causation?

2 MR. SNIDOW: Objection to form.

3 A. Potentially.

4 BY MS. SILVERSTEIN:

5 Q. Okay. And to the best of your
6 recollection, did the cancer incidence study
7 take into account whether participants had a
8 hereditary syndrome like Von Hippel-Lindau
9 syndrome?

10 A. I have no recollection of such
11 a thing being examined in any of the studies
12 that we've been talking about, including this
13 one.

14 Q. Okay. We can go ahead and set
15 that exhibit aside.

16 (Freeman Deposition Exhibit 10,
17 Evaluation of mortality among Marines,
18 Navy personnel, and civilian workers
19 exposed to contaminated drinking water
20 at USMC base Camp Lejeune: A cohort
21 study, was marked for identification.)

22 BY MS. SILVERSTEIN:

23 Q. You were just handed
24 Exhibit 10, which is the Bove 2024 mortality
25 study, right?

1 A. Yes.

2 Q. For this study, no
3 individualized exposure assessment was
4 performed for participants, correct?

5 A. Yeah, I don't think that would
6 be feasible, so, yes, I think I can agree
7 with that offhand.

8 Q. Are you aware that the ATSDR
9 water model wasn't used for either the 2024
10 Bove studies?

11 A. I'd have to go back and look at
12 the studies to tell you whether that was
13 something that was in the back of my mind.

14 Q. In the 2024 mortality study,
15 the dose response analysis was based on
16 duration on base, correct?

17 A. Hold on. I can look at the
18 study that's in front of me or I can look at
19 my report. But I do want to make sure that I
20 look at it before I answer your question.

21 [Document review.]

22 A. It's not jumping out at me.

23 BY MS. SILVERSTEIN:

24 Q. So you're not aware of whether
25 duration or contaminant ML was analyzed for

1 the dose-response?

2 MR. SNIDOW: Objection to form,
3 and just for the record, the witness
4 asked to be shown the part of the
5 study or in his report that you're
6 referring to.

7 A. As I sit here, I obviously have
8 not memorized the studies. I'd have to look
9 at something where I either referred to it in
10 the report or the part of the study to be
11 able to answer that question.

12 BY MS. SILVERSTEIN:

13 Q. So right now, you don't recall?

14 A. I don't recall specifically
15 where that is stated, that's correct.

16 Q. Are you aware that estimated
17 concentrations were not considered in
18 analyzing dose-response?

19 A. I don't see any evidence that
20 that was taken into account, so, yes, I would
21 say I am aware of that.

22 Q. Okay. Did you review the
23 supplemental tables to the 2024 mortality
24 study?

25 A. Yes.

1 Q. Go ahead and turn to
2 supplemental Table 6.

3 A. S6 or just 6?

4 Q. Yeah, S, Supplemental 6.

5 A. Okay.

6 Q. Table S6 is: Hazard ratios
7 (HR) and 95% lower and upper confidence
8 interval (CI) for the Marines/Navy personnel
9 subgroup analysis of base duration between
10 1975 and 1985 at Camp Lejeune with Camp
11 Pendleton as reference: Underlying cause of
12 death.

13 Correct?

14 A. Yes.

15 Q. And you'd agree that for kidney
16 cancer, the lower duration, medium duration
17 and high duration actually shows an inverse
18 dose-response relationship, right?

19 A. Yes.

20 Q. Which means that the lower
21 duration hazard ratio is higher than the
22 medium duration hazard ratio, right?

23 A. The point estimates, yes. None
24 of them are statistically significant at the
25 95% confidence interval.

1 Q. And the medium duration hazard
2 ratio is higher than the high duration hazard
3 ratio at the point estimated, correct?

4 A. Yes.

5 Q. And if you turn to the next
6 page, do you see Parkinson's Disease toward
7 the bottom?

8 A. Yes.

9 Q. You'd agree that Parkinson's
10 Disease does not -- that the high -- the
11 hazard ratio for high duration exposure for
12 Parkinson's Disease is lower than either the
13 low duration exposure or the medium duration
14 exposure at the point estimate, correct?

15 A. I agree.

16 Q. And to the best of your
17 recollection, the 2024 mortality study didn't
18 take into account whether participants had a
19 history of traumatic brain injury, correct?

20 A. I don't have a recollection of
21 whether or not that was evaluated. I
22 certainly don't have a recollection that it
23 was evaluated, however.

24 Q. And to the best of your
25 recollection, the study didn't take into

1 account whether participants grew up drinking
2 from well water on property, correct?

3 A. No, that's correct. Quite sure
4 that was not accounted for.

5 Q. To the best of your
6 recollection, the study didn't take into
7 account whether participants had a history of
8 constipation or depression, right?

9 A. Also true.

10 Q. To the best of your
11 recollection, the study didn't take into
12 account whether participants had hereditary
13 syndrome like Von Hippel-Lindau syndrome,
14 correct?

15 A. Also true.

16 Q. And it didn't take into account
17 whether participants had a history of
18 obesity, correct?

19 A. That one I can't offer a --
20 that one I cannot answer off the top of my
21 head.

22 Q. You have no recollection as to
23 whether or not the study took into account
24 whether participants had a history of
25 obesity, right?

1 A. That's correct, as I sit here I
2 do not recall.

3 MS. SILVERSTEIN: Since we've
4 been going about an hour, is this a
5 good time to take a break.

6 THE VIDEOGRAPHER: We are off
7 the record at 12:33.

8 (Recess taken, 12:33 p.m. to
9 1:36 p.m. PDT)

10 THE VIDEOGRAPHER: We are on
11 the record at 1:36 p.m.

12 BY MS. SILVERSTEIN:

13 Q. Welcome back, Dr. Freeman.
14 During the break, did you talk
15 to anybody about the substance of your
16 testimony?

17 A. No, not really. I mostly
18 talked about tacos.

19 Q. A great topic of conversation.
20 It looked like you were
21 checking something on your personal laptop
22 right at the start of the break; is that
23 right?

24 A. Yes.

25 Q. What were you looking at?

1 A. Well, that is a personal
2 question on my personal laptop.

3 I was checking my e-mail.

4 Q. Your personal e-mail?

5 A. To find out how many things I
6 had missed. Yeah, I wasn't communicating
7 with anybody about the case.

8 Q. And when checking your e-mail,
9 did you review any e-mails about the Camp
10 Lejeune litigation?

11 A. I had no discussions with
12 anybody about any aspect of the case.

13 Q. Does that include that you
14 didn't read any e-mails related to Camp
15 Lejeune?

16 A. Same -- yes, all -- yeah, 0. I
17 was just trying to find out how much stuff
18 has stacked up while we were chatting.

19 Q. When you were reviewing your
20 e-mail, did you review any e-mail about TCE,
21 PCE, vinyl chloride or benzene?

22 A. No, Camp Lejeune has pretty
23 much gotten all of my attention on those
24 topics, and nobody has written to me about
25 that.

1 Q. What about kidney cancer or
2 Parkinson's Disease, did you review any
3 e-mails about those two diseases?

4 A. No. I'm not that fast.

5 Q. All right. I want to talk now
6 for a little bit about your kidney cancer
7 report, which I think is Exhibit 2. Do your
8 opinions about kidney cancer apply to both
9 clear cell, renal cell carcinoma and
10 papillary renal cell carcinoma?

11 A. Yes.

12 Q. Do you have any opinions that
13 differ between those two types of renal cell
14 carcinoma?

15 A. No. To the extent that they're
16 studied under one collective term of kidney
17 cancer, typically in the epidemiological
18 literature, I consider them collectively.

19 Q. And if you had any opinions
20 that differ between those two types of renal
21 cell carcinoma, would you have specified that
22 in your report?

23 A. Yes, and I discussed that
24 literature in my report.

25 Q. Do your opinions regarding

1 kidney cancer apply to upper urinary tract
2 urothelial cancer?

3 A. Yes.

4 Q. Are there any differences in
5 your opinions on upper tract urothelial
6 cancer and other renal cell carcinoma?

7 A. Not as far as the evidence for
8 the environmental exposure to TCE, PCE, and
9 benzene and vinyl chloride, no.

10 Q. Are you familiar with a
11 confidence interval ratio? CIR?

12 A. Yeah, I am. I discussed that
13 at some length in my report.

14 Q. And you calculated the CIRs in
15 some of the tables in your report, right?

16 A. If it wasn't furnished, and it
17 was appropriate, yes.

18 Q. Let's go ahead and look at
19 Table 5 in your kidney cancer report.

20 A. Can you tell me the page that
21 that's on?

22 Q. I can in just a second.

23 A. I turned to it immediately on
24 page 33.

25 Q. That is extraordinary luck.

1 Did you calculate the CIRs in
2 Table 5?

3 A. Yes.

4 Q. And these CIRs, then, aren't
5 provided in the -- the ATSDR study, the Bove
6 study, right?

7 A. For that particular study,
8 that's correct.

9 Q. A confidence interval ratio is
10 something thought up by Dr. Bove and his
11 coauthors, right?

12 MR. SNIDOW: Object to form.

13 A. I'm not sure that's true.

14 BY MS. SILVERSTEIN:

15 Q. Have you seen discussion of the
16 confidence interval ratio in other places in
17 the literature?

18 A. Yes. Most certainly.

19 Q. Where?

20 A. I'd have to look at the
21 literature to be able to tell you, but I've
22 seen it in a number of other places.

23 Q. Okay. Can you think of any
24 other location that you've seen discussion of
25 CIRs?

1 A. Not without my laptop and being
2 able to reference to some sort of
3 documentation.

4 Q. So sitting here today, you
5 can't think of any other locations?

6 A. I can't tell you out of my
7 memory. I can tell you without doubt that
8 there are a number of other publications that
9 have discussed it, though. And it goes back
10 before, I believe, Dr. Bove's discussion of
11 it, as far as the timing of publication.

12 Q. Okay.

13 A. To the best of my recollection.

14 Q. Would you agree that an
15 appropriate CIR level for precision has not
16 been specified or validated in the
17 literature?

18 A. I would say that it's like
19 p-values, in confidence interval that a
20 confidence interval ratio is also a -- just a
21 construct and one that can not be validated.
22 Or not readily validated.

23 So to that extent, yes.

24 Q. If on page 33 you look at the
25 full paragraph above Table 5 that starts:

1 Steady investigators?

2 Do you see that paragraph?

3 A. Study investigators, yes.

4 Q. The last or second sentence in
5 that paragraph says: Although an appropriate
6 CIR level for precision has not been
7 specified or validated in the literature, the
8 authors consider CIRs of less than or greater
9 than -- less than or equal to 3 to indicate
10 reasonable precision of the adjusted hazard
11 ratios?

12 Correct?

13 A. Yes.

14 Q. So you'd agree that an
15 appropriate CIR level for precision has not
16 been specified or validated in the
17 literature, right?

18 A. Not generally, that's true,
19 because it's not a term that's typically
20 used.

21 Or measure, I should say,
22 that's been typically used.

23 Q. You'd agree that the author's
24 determination to use a CIR less than or equal
25 to three isn't based on the scientific

1 consensus, right?

2 MR. SNIDOW: Objection to form.

3 A. When you say "scientific
4 consensus," that's a very broad term. It's
5 based on the scientific principle of the
6 width of the confidence interval or some way
7 to measure it in a very -- a very easy to
8 identify form, with a cut off.

9 But as far as whether there are
10 others who use it, which I guess you could
11 say is a form of consensus, there are some
12 others who have described using it. But is
13 it -- I guess my answer is, it's not in
14 general use. To my knowledge.

15 So to that extent, it doesn't
16 have general use throughout the literature,
17 the epidemiological literature.

18 Sorry, that's another bad
19 answer, but it's hard to answer that question
20 because some people use it, but most people
21 don't.

22 BY MS. SILVERSTEIN:

23 Q. You'd agree that a
24 determination that an appropriate CIR is less
25 than or equal to three is an arbitrary

1 cutoff, right?

2 A. Yes, as are all cutoffs.

3 Q. Go ahead and turn to page 36 of
4 your kidney cancer report.

5 (Clarification by reporter.)

6 BY MS. SILVERSTEIN:

7 Q. So page 36 is the start of your
8 discussion on kidney cancer and TCE, right?

9 A. I'm sorry, page 36?

10 Q. Yes.

11 A. Yes. Yes, correct.

12 Q. And you cited three
13 meta-analyses to support the proposition that
14 meta-analyses -- three meta-analysis
15 evaluated the association between TCE
16 exposure and subsequent kidney cancer, right?

17 A. Yes.

18 Q. One of those studies is Kelsh
19 2010, right?

20 A. Yes.

21 (Freeman Deposition Exhibit 11,
22 Occupational Trichloroethylene
23 Exposure and Kidney Cancer, A
24 Meta-analysis
25 (Kelsh/Alexander/Mink/Mandel), was

1 marked for identification.)

2 BY MS. SILVERSTEIN:

3 Q. You were handed Exhibit 11,
4 which is Kelsh 2010, correct?

5 A. Yes.

6 Q. And this is one of the studies
7 that -- one of the meta-analyses that you
8 relied on for your conclusion that TCE can
9 cause kidney cancer, right?

10 A. That's one of the ones that I
11 described in my report, yes.

12 Q. Did you rely on it?

13 A. Well, I think that what I
14 relied on to come to the -- my ultimate
15 conclusion is described in my Hill criteria
16 analyses.

17 Q. Okay. You discuss Kelsh in
18 your report, correct?

19 A. I did.

20 Q. If you could look at page 1
21 under: Conclusions.

22 Which is on the right-hand
23 side.

24 A. Yes.

25 Q. Under conclusions, the authors

1 wrote: Positive associations were observed
2 across various study groups. However,
3 considerations of unmeasured potential
4 confounding, lack of exposure response
5 patterns, limit epidemiologic insight into
6 the role of trichloroethylene exposure and
7 its potential causal association to kidney
8 cancer.

9 Correct?

10 A. Yes.

11 Q. The authors did not believe
12 that there was enough evidence for
13 epidemiologic insight into the role of TCE in
14 kidney cancer, right?

15 A. That's what they claimed.

16 Q. Do you disagree with that piece
17 of the author's conclusions?

18 A. I'm familiar with the authors
19 and their modus operandi, which tends to be
20 less public health protection and more on
21 industry protection, so I'm not surprised to
22 find that conclusion. But I still included
23 it in my discussion of meta-analyses from the
24 literature.

25 Q. I think my question was maybe a

1 little bit different. Do you agree with the
2 authors that there's not sufficient
3 epidemiologic data to draw a conclusion on
4 TCE and kidney cancer based on this
5 meta-analyses?

6 A. I didn't look at the study with
7 that particular goal in mind to see if I
8 could support their conclusions. As I said,
9 I'm -- I'm a bit skeptical about the way they
10 described their findings, because I'm
11 familiar with how they've described other
12 findings from an industry-based perspective
13 rather than a public health protection
14 perspective. So I wasn't looking to critique
15 what they said, I was looking to describe
16 what their findings were.

17 Q. And do you believe that the
18 study supports a finding that there is
19 epidemiologic evidence to support -- based on
20 this study to show that TCE can cause kidney
21 cancer?

22 A. Well, I think that there is
23 good evidence TCE can and does cause kidney
24 cancer. So this study's findings as -- or
25 stands as an outlier compared to the other --

1 a lot of other literature.

2 But specifically what they
3 described, and how they described it, I
4 haven't looked at it with that particular
5 goal in mind to find out whether or not I
6 agree with their conclusions.

7 Q. You didn't look at Kelsh 2010
8 to determine whether it supported a finding
9 that there is epidemiological evidence to
10 show TCE causes kidney cancer?

11 A. I just described what their
12 findings were. I didn't describe what their
13 narrative conclusions were.

14 Q. And based on their findings, do
15 you believe that the findings in Kelsh 2010
16 show that there is epidemiologic evidence to
17 support a causal relationship between TCE and
18 kidney cancer?

19 A. Well, as I describe in my
20 report, when you take the specific studies,
21 groups as they -- as the way they were
22 grouped by the authors, you'll find that
23 there are several findings of statistically
24 significant increased risk, a strength of
25 association is described that is

1 meta-analyzed.

2 As I described, that group one
3 studies as described by these authors, found
4 a 1.34 relative risk with a statistically
5 significant confidence interval.

6 And their group two cohort did
7 not. It was not statistically significant.
8 But for the case control studies, again, it
9 was statistically significant it was
10 elevated.

11 So if you just look at the
12 results of the -- part of their
13 meta-analysis, it suggests that there's a
14 relationship between TCE exposure and kidney
15 cancer.

16 So the conclusions don't seem
17 to be very congruent with what the findings
18 were, and they are not consistent with what I
19 would say is best practices for public health
20 protection.

21 Q. Go ahead and turn to page 39 of
22 your report.

23 A. Are you all done with this guy?

24 Q. For now, yeah.

25 On page 39, when discussing

1 dose-response, you identify two studies that
2 were included in all three meta-analyses,
3 right?

4 A. Yes.

5 Q. And one of those studies was
6 Moore 2010, correct?

7 A. Yes.

8 (Freeman Deposition Exhibit 12,
9 September 2011 Toxicological Review of
10 Trichloroethylene, was marked for
11 identification.)

12 BY MS. SILVERSTEIN:

13 Q. I handed you the EPA --

14 A. My exercise for the day? Is
15 that what you mean to say?

16 Q. Yeah, your exercise for the
17 day.

18 EPA's 2011 Toxicological Review
19 of trichloroethylene.

20 Right?

21 A. Yes, you did.

22 Q. Are you familiar with this
23 document?

24 A. Yes.

25 Q. If you go ahead and turn to

1 page 5-139.

2 I know.

3 And don't worry, I won't ask
4 too many questions about this one.

5 A. Okay.

6 Q. Are you on page 5-139?

7 A. I am indeed.

8 Q. At the top of page 5-139 in
9 Section 5.2.2, which is the: Dose-Response
10 Analysis: Human Epidemiologic Data.

11 Right?

12 A. Yes.

13 Q. And in that section, about
14 eight lines down, there's a sentence that
15 begins: While.

16 Do you see that?

17 A. Yes.

18 Q. In EPA stated that: While the
19 detailed approach used by Moore et al. (2010)
20 should be fairly reliable for general
21 rankings, the resulting estimates are not
22 expected to be as quantitatively accurate as
23 those in the Charbotel, et al. (2006).

24 Correct?

25 A. That it says that, yes.

1 Q. And then they selected
2 Charbotel 2006 as the: Sole basis for the
3 derivation of inhalation unit risk estimate
4 for kidney cancer.

5 Correct?

6 A. Yes, it does say that.

7 Q. Are you familiar with the
8 Charbotel study?

9 A. I can't remember if I cited it
10 or not.

11 Q. Does it ring a bell sitting
12 here today?

13 A. That's not going to be good
14 enough. I mean, there are so many papers
15 that I've cited, I couldn't tell you that I
16 did or didn't cite it.

17 Q. Sure. Do you remember the
18 Charbotel study at all?

19 A. No, there's so many studies
20 that just the name isn't going to be very
21 helpful for me.

22 Q. And as promised, you can go
23 ahead and set that very large document aside.

24 (Freeman Deposition Exhibit 13,
25 Case-Control Study on Renal Cell

1 Cancer and Occupational Exposure to
2 Trichloroethylene Part II:
3 Epidemiological Aspects
4 (Charbotel/Fevotte/Hours/Martin/
5 Bergeret), was marked for
6 identification.)

7 A. Oh, there it is. Number 87.

8 BY MS. SILVERSTEIN:

9 Q. You were handed Exhibit 13,
10 which is a document with the title:
11 Case-Control Study on Renal Cell Cancer and
12 Occupational Exposure to Trichloroethylene.
13 Part II: Epidemiological Aspects.

14 Right?

15 A. Yes, that's number 87, cited,
16 that I see right in front of me --

17 Q. So --

18 A. -- of my report.

19 Q. So you're familiar with the
20 Charbotel 2006 study?

21 A. Well, I was when I wrote the
22 report, yes.

23 Q. And you're aware, then, that
24 Charbotel only found a statistically
25 significant increase where the exposure was

1 335 parts per million year or more, right?

2 A. Offhand, no. Do you want to
3 point me toward someplace...

4 Q. Sure. Go ahead --

5 A. That I should be looking at.

6 Q. You don't remember -- did you
7 rely on Moore or Charbotel for your
8 conclusion?

9 A. Well, to the extent they're
10 described in my report, yes.

11 Q. Did you rely on both of them?
12 On one or the other?

13 A. I'd have to go to the extent
14 that they're described in the report, because
15 of the size of the report and the complexity
16 of it. I can't tell you that offhand.

17 Q. I'll go ahead and direct you to
18 page 39 of your report.

19 A. Yes, I see that.

20 Q. And on page 39, you discuss
21 Moore and associates -- Moore 2010, and their
22 findings, correct?

23 A. Yes.

24 Q. You do not discuss Charbotel,
25 correct?

1 A. Not in any kind of detail, no.

2 Q. Did you give more weight to
3 Moore than to Charbotel?

4 A. I described Moore, but not in
5 terms of more weight than Charbotel. I
6 described Moore because of the detail in the
7 Moore paper, so...

8 Q. What detail are you describing?

9 A. There was detail in Moore of
10 exposures that was, as described in the EPA
11 document, of a high level of -- a high level
12 of detail. And so for that reason, I chose
13 that to describe in my section on
14 dose-response.

15 Q. When drafting your report, were
16 you aware that EPA believed that Moore's
17 dose-response was only reliable in terms of
18 qualitative comparison between groups and not
19 in terms of quantitative exposure?

20 MR. SNIDOW: Object to form.

21 A. I'd have to go back to exactly
22 what the EPA said about Moore versus
23 Charbotel to tell you whether I was aware of
24 that. But at the time I drafted the report,
25 I found Moore to be a good reference for

1 dose-response. And specifically where I
2 categorize Charbotel in that hierarchy, I
3 can't tell you.

4 BY MS. SILVERSTEIN:

5 Q. When you say Moore was a good
6 study for dose-response, do you mean in terms
7 of the actual amounts referenced in Moore or
8 in terms of a qualitative assessment?

9 MR. SNIDOW: Objection to form.

10 A. Well, there's a quantitative
11 assessment in order to rank the exposure
12 levels, but not in terms of actual chemical
13 values. Which is not terribly important, if
14 qualitative -- their semi-quantitative
15 analysis is perfectly legitimate for
16 assessing dose-response.

17 BY MS. SILVERSTEIN:

18 Q. Did you consider the actual
19 amounts discussed in Moore?

20 A. It's -- it is described in my
21 report. To the extent it's described in my
22 report, yes.

23 Q. And did you consider the actual
24 amounts when forming your conclusions?

25 A. To the extent that my

1 conclusions include the incidents ratios,
2 yes. But to basically take all of the
3 information out of Moore, that wasn't the
4 purpose of the report. The purpose of the
5 report was to say there is support for
6 dose-response in the literature. At least in
7 this section of the report.

8 Q. Is your opinion that there's
9 evidence of a dose-response at any amount of
10 TCE, or does there need to be a certain
11 amount of TCE that a person's exposed to
12 before that relationship exists?

13 MR. SNIDOW: Objection to form.

14 A. I don't believe that evidence
15 exists.

16 BY MS. SILVERSTEIN:

17 Q. Would it be right to say, then,
18 that you don't know how much TCE someone
19 needs to be exposed to for a causal
20 relationship to potentially exist?

21 MR. SNIDOW: Objection, form,
22 misstates.

23 A. It would be correct to say that
24 I don't believe that anybody has that
25 information that that sort of detail doesn't

1 exist.

2 BY MS. SILVERSTEIN:

3 Q. If you go ahead and look at the
4 chart that you made on page 38 of your
5 report.

6 A. Yes.

7 Q. You'd agree that all three
8 meta-analyses discussed Charbotel, right?

9 A. Yes, that is correct.

10 Q. And you'd agree that all three
11 meta-analyses also included Axelson, right?

12 A. Included -- I'm sorry, what was
13 the name?

14 Q. Axelson.

15 A. I don't see -- I don't see
16 where I describe where Axelson is listed in
17 all three, so I can't agree with that.

18 Oh, no. There it is. On
19 Table 9. Yes. I take it back. Yes. All
20 three were included -- or all three
21 meta-analyses included Axelson, and you are
22 correct.

23 Q. And did you review Axelson?

24 A. Separately? I believe so, yes.
25 (Freeman Deposition Exhibit 14,

1 Updated and Expanded Swedish Cohort
2 Study on Trichloroethylene and Cancer
3 Risk (Axelson/Selden/
4 Andersson/Hogstedt), was marked for
5 identification.)

6 MS. PLATT: Can I upload it for
7 you?

8 MR. SNIDOW: Yeah, this one I
9 will need.

10 MS. PLATT: Okay.

11 MR. SNIDOW: Thank you.

12 BY MS. SILVERSTEIN:

13 Q. You can go ahead and turn to
14 page 556.

15 A. I will. Oh, 556 is the first
16 page.

17 I didn't have to turn anything.

18 Q. Perfect.

19 And I'm looking at that
20 italicized paragraph at the top of the --
21 right away in the article. Do you see --

22 A. The abstract? Yes.

23 Q. At the end of that paragraph,
24 the authors wrote: It is concluded that this
25 study provides no evidence that

1 trichloroethylene is a human carcinogen,
2 i.e., when the exposure is as low as for this
3 study population.

4 Right?

5 A. Yes.

6 Q. They concluded that their study
7 didn't show evidence of TCE as a human
8 carcinogen?

9 MR. SNIDOW: Object to form.

10 A. Yes.

11 BY MS. SILVERSTEIN:

12 Q. You can go ahead and set that
13 article to the side.

14 And, Dr. Freeman, in your
15 kidney cancer report, you didn't report -- in
16 the TCE and kidney cancer section, you didn't
17 report results for Garabrant 1988, right?

18 A. I have no idea.

19 MR. SNIDOW: Did you say 1988?

20 MS. SILVERSTEIN: Yes.

21 A. Let me take a look and see if I
22 can answer your question.

23 MR. SNIDOW: Are you looking at
24 the table on page 38?

25 A. Yeah, I'm looking at page 38.

1 [Document review.]

2 A. I'm not sure what the reason is
3 why there isn't a relative risk there. It
4 might not have been reported in the paper.

5 BY MS. SILVERSTEIN:

6 Q. Okay. And you didn't report it
7 on your own, correct?

8 A. No, I'm not going to make up
9 something for the paper that wasn't there.

10 Q. So you didn't review Garabrant
11 1988 to see what the results of the study
12 were to report?

13 A. I don't remember.

14 Q. You didn't report results for
15 Blair 1989?

16 A. Correct.

17 Q. You didn't report results for
18 Ritz 1999, correct?

19 A. So, I'm sorry, what is it?

20 Q. Ritz.

21 A. R-I-T-Z?

22 Q. Yes.

23 It's on the bottom of page 37.

24 A. Oh, there it is.

25 No, those are not reported as

1 well.

2 Q. And in your kidney cancer
3 report in the section on TCE and kidney
4 cancer, you did not cite Michalek 2019,
5 correct?

6 A. Would you give me the question
7 one more time, please?

8 Q. In your kidney cancer report in
9 the section on TCE and kidney cancer, you did
10 not cite Michalek, M-I-C-H-A-L-E-K, 2019,
11 correct?

12 A. I don't know that I can tell
13 you the answer to that, because there are so
14 many citations here. But I can look through
15 it and see if I can find it.

16 Q. Every study that you cite, that
17 you reviewed for your report is cited in your
18 report, correct?

19 A. Yes.

20 Q. So if a study is not cited in
21 your report it means that you did not
22 consider it for your report?

23 A. I didn't describe it in the
24 report, yeah.

25 Q. Are there studies that you

1 considered in forming your conclusions that
2 you did not cite in your report?

3 A. No. I think you asked me that
4 at the beginning of the deposition, and I
5 said no. If I considered it, then it would
6 be cited in the report, whether it was
7 positive or negative.

8 Q. So if it's not cited in the
9 report, you didn't consider it, correct?

10 A. Not arriving at the opinions
11 that are in the report, that's correct.

12 Q. Go ahead and turn to page 45.

13 A. I am there.

14 Q. And do you see the section
15 where you begin discussing PCE?

16 A. I do.

17 Q. Right under where it says
18 "Epidemiologic studies," you wrote: In the
19 analysis internal to the Camp Lejeune cohort
20 of military personnel a nonmonotonic
21 exposure-response trend was observed in the
22 point estimates of the association between
23 PCE and kidney cancer, meaning that the risk
24 of kidney cancer increased with increasing
25 levels of exposure.

1 Right?

2 A. Yes.

3 Q. A nonmonotonic exposure
4 response trend means that there are results
5 for a more duration or more exposure that are
6 lower than a lower amount, correct?

7 A. Yes, typically.

8 Q. And if, for example, the point
9 estimate for medium exposure is lower than
10 the point estimate for low exposure, that
11 does not demonstrate increasing levels of
12 risk for the medium exposure as compared to
13 the low exposure, right?

14 A. Correct.

15 Q. For that assertion that we were
16 just discussing, you provide one citation,
17 which is to the Bove Marine mortality study
18 from 2014, correct?

19 A. Yes.

20 Q. And then you refer to Table 7,
21 right?

22 A. Yes.

23 Q. If you turn to page 34.
24 Page 34 has Table 7.

25 A. Sorry, the next page is

1 Figure 7. It threw me off.

2 I've got ya.

3 I'm on page 34, for Table 7,
4 rather than the table or whatever the figure
5 is on seven. That is Figure 7. Yes. Fire
6 away.

7 Q. In Table 7, for PCE, you'd
8 agree that the -- the adjusted hazard ratio
9 for high exposure is actually lower than the
10 adjusted hazard ratio for medium exposure,
11 right?

12 A. Yes.

13 Q. Which means that those point
14 estimates are showing that the risk of kidney
15 cancer from PCE is less at high exposure than
16 at medium exposure, right?

17 A. Yes, not statistically
18 significantly lower, but it is lower, the
19 point estimate.

20 Q. You'd agree that the results
21 that you reported in Table 7 for PCE are not
22 statistically significant at low exposure,
23 medium exposure, or high exposure, correct?

24 A. Yes. As far as not meeting the
25 95% confidence interval by not crossing the

1 boundary of 1.0.

2 Q. You can go ahead and go back to
3 page 45, please.

4 A. Okay.

5 Q. You'd agree that no
6 meta-analysis have been conducted for PCE and
7 kidney cancer, right?

8 A. That's my understanding, yes.

9 Q. Instead, you rely on the 2019
10 ATSDR toxicological profile for PCE on that
11 summary of epidemiology studies, right?

12 A. Yes.

13 Q. You agree that the ATSDR 2019
14 tox profile summarized studies do not
15 consistently observe increased risk, right?

16 A. I do agree with that.

17 Q. And only one study demonstrated
18 elevated risk that was statistically
19 significant, correct?

20 A. Correct.

21 Q. So instead, you looked to a
22 meta-analyses about PCE and bladder cancer,
23 right?

24 A. When you say "instead," you
25 mean in addition? Right? Or am I -- am I

1 misinterpreting what you're saying?

2 Q. Instead of any meta-analyses on
3 PCE and kidney cancer, you looked at a
4 meta-analyses on PCE and bladder cancer,
5 right?

6 A. Right, if there's nothing
7 there, then I didn't look at that so I also
8 included a -- the bladder cancer
9 meta-analysis, correct.

10 Q. And you'd agree that bladder
11 cancer and kidney cancer are different
12 diseases, correct?

13 A. I do agree, yeah.

14 (Freeman Deposition Exhibit 15,
15 Tetrachloroethylene Exposure and
16 Bladder Cancer Risk: A Meta-Analysis
17 of Dry-Cleaning-Worker Studies, was
18 marked for identification.)

19 BY MS. SILVERSTEIN:

20 Q. You were handed Exhibit 15,
21 which is Vlaanderen 2014, correct?

22 A. Yes.

23 Q. And is this the meta-analyses
24 on PCE and bladder cancer that you reviewed
25 when writing your kidney cancer report?

1 A. Yes, I believe that's the one
2 that I referenced. Hold on a minute. Let me
3 just make sure I'm finding it.

4 [Document review.]

5 A. Yes, that is correct.

6 BY MS. SILVERSTEIN:

7 Q. If you look on that first page
8 in the blue box, do you see where it says:
9 Results?

10 A. I do.

11 Q. And the authors wrote: The
12 meta-relative risk (mRR) among
13 tetrachloroethylene-exposed workers was 1.08.
14 (95% confidence interval: 0.82 to 1.42;
15 three studies, 463 exposed cases).

16 Correct?

17 A. Yes.

18 Q. And under conclusion, the
19 authors acknowledge that dry cleaners
20 incurred mixed exposures, right?

21 A. Yes.

22 Q. And you'd agree that the
23 Vlaanderen 2014 study wasn't looking at renal
24 cell carcinoma, right?

25 A. I do agree with that.

1 Q. And it wasn't specifically
2 looking at transitional cell carcinoma
3 either, was it?

4 A. No, it did not subdivide out
5 the types of cancers.

6 Q. It was focused on bladder
7 cancer, right?

8 A. Yes.

9 Q. Go ahead and turn to page 665.
10 It says 665 in the bottom
11 right-hand corner.

12 A. I am there.

13 Q. And on page 665, the author
14 said: Therefore, the higher risk of bladder
15 cancer in dry cleaners may have been due to
16 tetrachloroethylene exposure, the primary
17 solvent used in dry cleaning. However, with
18 limited evidence from studies that
19 specifically assessed exposure to
20 tetrachloroethylene, we're not able to
21 corroborate this hypothesis.

22 Correct?

23 A. Yes, that is what it says.

24 Q. Go ahead and turn to page 51 of
25 your report.

1 And you can set aside the
2 Vlaanderen article.

3 A. All right.

4 I am there.

5 Q. Actually, if you go back to
6 page 50 where it says: Number 1, Strength of
7 association?

8 A. Yes.

9 Q. Under strength of association,
10 you only discuss one study specifically to
11 PCE and kidney cancer, right?

12 [Document review.]

13 A. That's correct.

14 BY MS. SILVERSTEIN:

15 Q. And then at the top of page 51,
16 you discuss Vlaanderen under strength of
17 association, right?

18 A. Yes.

19 Q. Okay. And you say: Using an
20 analysis of bladder cancer epidemiology in
21 the meta-analysis by Vlaanderen and
22 coworkers, the association found between PCE
23 and bladder cancer can be extended to
24 urothelial carcinoma of the renal pelvic.

25 Correct?

1 A. Yes.

2 Q. You don't say that you're
3 extending it to renal cell carcinoma, do you?

4 A. No. That's a different kind of
5 cancer.

6 Q. Would you agree that -- well,
7 let me say it this way instead.

8 In your analysis of PCE and
9 kidney cancer, when you discussed Vlaanderen,
10 did your discussion apply just to urothelial
11 carcinoma of the renal pelvis or does that
12 discussion also apply to renal cell
13 carcinoma?

14 A. No, it is specifically to
15 urothelial cell carcinoma.

16 Q. Okay. And you'd agree that for
17 consistency, when looking at studies
18 specifically to PCE and kidney cancer,
19 consistency is not met, correct?

20 MR. SNIDOW: Objection to form.

21 A. PCE and kidney cancer -- yes, I
22 do agree with that.

23 BY MS. SILVERSTEIN:

24 Q. And for your PCE and kidney
25 cancer section, if you considered a study,

1 you would have cited that study in your
2 report, right?

3 A. Yes, that is correct. That
4 hasn't changed.

5 Q. If we can go ahead and turn to
6 page 52.

7 Do you see the section on page
8 52 that -- the header is: Vinyl chloride?

9 A. I do.

10 Q. On page 52, you say that: In
11 the analysis internal to the Camp Lejeune
12 cohort of military personnel with follow-up
13 between 1979 and 2008, a nonmonotonic
14 exposure-response trend was observed for
15 vinyl chloride and kidney cancer.

16 Right?

17 A. Yes.

18 Q. And then that last sentence,
19 you have: Compared to those with no exposure
20 to vinyl chloride, the hazard ratios for the
21 low, medium, and high exposure categories
22 were, 1.66, 1.61 and 1.51, respectively.

23 Right?

24 A. Yes.

25 Q. And you'd agree that that

1 represents an inverse dose-response trend,
2 right?

3 A. I don't have the confidence
4 intervals that are listed here. So I would
5 say it's probably -- it's -- there probably
6 aren't significant differences between the
7 groups, because they all are pretty close.
8 So it probably just represents about the same
9 across the board. I wouldn't say it's a
10 downward trend.

11 Q. You'd agree that 1.66 is higher
12 than 1.61, right?

13 A. Mathematically, I can't argue
14 with that.

15 Q. And 1.61 is higher than 1.51?

16 A. I would also agree.

17 Q. Which means, in terms of lowest
18 hazard ratio to highest hazard ratio, it's
19 actually the high exposure category that has
20 the lowest hazard ratio, and the lowest
21 exposure category that has the highest hazard
22 ratio, right?

23 A. Yes. Also can't disagree with
24 that.

25 Q. All right. You then go on to

1 discuss the development of cancer in humans
2 as a result of vinyl chloride exposure,
3 right?

4 A. Sorry, looking for a table.
5 I'm sorry, give that to me one more time,
6 please.

7 Q. You discuss the development of
8 cancer in humans as a result of vinyl
9 chloride exposure, right?

10 A. Yes, on the same page, page 52.

11 Q. And you talk about IARC's 2008
12 monograph for vinyl chloride in humans,
13 right? And cancer risk?

14 A. Yes.

15 MR. SNIDOW: Is that the
16 monograph?

17 MS. SILVERSTEIN: Yeah.

18 MR. SNIDOW: The whole thing?

19 MS. SILVERSTEIN: Yeah. This
20 is the tox profile, the ATSDR tox
21 profile. My apologies.

22 MR. SNIDOW: No problem.

23 (Freeman Deposition Exhibit 16,
24 January 2024 Toxicological Profile for
25 Vinyl Chloride, was marked for

1 identification.)

2 MS. PLATT: Can I send you this
3 one?

4 MR. SNIDOW: I've got this one.
5 Thank you, though.

6 BY MS. SILVERSTEIN:

7 Q. You also cite the toxicological
8 profile for vinyl chloride from the ATSDR,
9 correct?

10 A. I do.

11 Q. And the document I just handed
12 you is that ATSDR tox profile for vinyl
13 chloride, right?

14 A. It certainly appears to be so,
15 yes.

16 Q. And since you cited this, this
17 is a document that you're familiar with,
18 right?

19 A. Well, I mean, I've reviewed it.
20 I can't say I've memorized it.

21 Q. Sure. This isn't the first
22 time that you're seeing this tox profile,
23 right?

24 A. That is certainly true, yes.

25 Q. If you can turn to page 7.

1 MR. SNIDOW: It looks like
2 seven --

3 MS. SILVERSTEIN: Yes, the
4 document number 7.

5 BY MS. SILVERSTEIN:

6 Q. Are you on page 7?

7 A. I am.

8 Q. And do you see where it says:
9 Cancer?

10 A. I do.

11 Q. Would you agree that when
12 discussing the production industry, ATSDR
13 notes positive results for liver
14 angiosarcoma, hepatic angiosarcoma,
15 hepatocellular carcinoma and
16 cholangiocellular carcinoma; is that right?

17 A. Yes.

18 Q. Pronunciation aside.
19 And these are all cancers of
20 the liver or bile duct, right?

21 A. Correct.

22 Q. Any one of those listed cancers
23 are kidney cancer, correct?

24 A. Correct.

25 (Clarification by reporter.)

1 BY MS. SILVERSTEIN:

2 Q. And as we mentioned a minute
3 ago, we also cited the IARC 2008 monograph
4 for vinyl chloride, right?

5 A. Yes.

6 (Freeman Deposition Exhibit 17,
7 2008, Lyon, France, IARC Monographs on
8 the Evaluation of Carcinogenic Risks
9 to Humans, Volume 97, was marked for
10 identification.)

11 BY MS. SILVERSTEIN:

12 Q. Dr. Freeman, this is the 2008
13 IARC monograph on vinyl chloride that you
14 reviewed, right?

15 A. Yes.

16 Q. Can you go ahead and turn to
17 page 425?

18 A. I would love to.

19 I'm there.

20 Q. Do you see on page 425:
21 Section 6.1, Carcinogenicity in humans?

22 A. I do.

23 Q. That section is two sentences
24 long. It says: There is sufficient evidence
25 in humans for the carcinogenicity of vinyl

1 chloride. Vinyl chloride causes
2 angiosarcomas of the liver and hepatocellular
3 carcinomas.

4 Correct?

5 A. Yes.

6 Q. If you could turn to page 31 of
7 the document, please.

8 A. I'm there.

9 Q. Do you see: Section 6(a),
10 Carcinogenicity in humans?

11 A. I do.

12 Q. And I want to look at:
13 Sufficient evidence of carcinogenicity.

14 Do you see that?

15 A. Yes.

16 Q. The second-to-last full
17 sentence begins with: A statement.

18 Do you see that?

19 A. Yes.

20 Q. It says: A statement that
21 there is sufficient evidence is followed by a
22 separate sentence that identifies the target
23 organs or tissues where an increased risk of
24 cancer was observed in humans.

25 Identification of a specific target organ or

1 tissue does not preclude the possibility that
2 the agent may cause cancer of other sites.

3 Do you see that?

4 A. I do.

5 Q. And you'd agree that the target
6 organ specified in the IARC monograph didn't
7 include kidney, correct? The kidney, right?

8 A. I agree.

9 Q. You can go ahead and set that
10 document aside.

11 It's a lot of paper.

12 Go ahead and turn to page 54 of
13 your report.

14 On page 54, in the paragraph
15 that begins: In rats.

16 Do you see the sentence:
17 Nephroblastoma, a kidney cancer also known as
18 Wilms tumor, occurred with vinyl chloride
19 exposures as low as 25 parts per million in a
20 small number of animals (0.8%) but increased
21 to effect approximately 10% of animals at
22 higher doses.

23 Do you see that?

24 A. Yes.

25 Q. You'd agree that nephroblastoma

1 is a different type of cancer than renal cell
2 carcinoma, right?

3 A. God, I have to remember the
4 pathology of Wilms tumor. I don't know that
5 it involves renal cells offhand.

6 I'd have to actually -- I'd
7 have to actually make sure I was being
8 correct about that. I don't know that that's
9 necessarily correct.

10 Q. You'd agree that a
11 nephroblastoma is a different type of kidney
12 cancer than upper tract urothelial cancer,
13 right?

14 A. Yes.

15 Q. If you'd turn to page 55 of
16 your report?

17 A. I'm here.

18 Q. On page 55, you're discussing
19 the application of the Bradford Hill criteria
20 to vinyl chloride and kidney cancer, right?

21 A. Yes.

22 Q. You'd agree that consistency is
23 not met, right?

24 A. Yes.

25 Q. You'd agree specificity is not

1 met, correct?

2 A. Yes.

3 Q. For strengths of association,
4 you only discussed one study, right?

5 A. Yes.

6 Q. For biological -- well for
7 plausibility, you discuss a study involving a
8 nephroblastoma, right?

9 A. Yes.

10 Q. And you can't recall sitting
11 here today whether nephroblastoma and renal
12 cell carcinoma are the same type of cancer,
13 right?

14 A. Correct. I'm not -- I'm not
15 sure about the cell type.

16 Q. And for vinyl chloride, just
17 like for TCE and PCE, if you considered a
18 study, it would be cited in your report,
19 correct?

20 A. Yes.

21 Q. Can you turn now to page 56 to
22 your section on benzene?

23 A. I'm there.

24 Q. In the second paragraph you
25 say: The evidence available on the

1 association between occupational exposure to
2 benzene and cancer of the kidney was reviewed
3 by IARC in 2012 and judged to be inadequate
4 at that time.

5 Right?

6 A. Yes.

7 Q. Have you reviewed the ATSDR
8 2007 tox profile for benzene?

9 Did you want me to re-ask that?
10 I know there was some background noise.

11 A. No, I heard it. I was trying
12 to figure out what was going on out there.

13 I think I cite to IARC. I
14 don't see ATSDR that is listed as one of the
15 sources in this section.

16 I don't see it listed as one of
17 the sources, so I'm not sure that it was --
18 whether it was a source or not for this
19 section. But as I said, I don't see it.

20 Q. To the best of your
21 recollection, have you ever reviewed the 2007
22 ATSDR tox profile for benzene?

23 A. Yes, for sure.

24 (Freeman Deposition Exhibit 18,
25 August 2007 Toxicological Profile for

1 Benzene, was marked for
2 identification.)

3 MS. SILVERSTEIN: Do you want
4 us to send you a copy, J.J.?

5 MR. SNIDOW: I think I'm okay.
6 I just looked at it and now I see why.

7 BY MS. SILVERSTEIN:

8 Q. Dr. Freeman, this is the 2007
9 ATSDR tox profile for benzene, right?

10 A. Yes.

11 Q. And this isn't the first time
12 you've ever seen this document, right?

13 A. It is not.

14 Q. Can you turn to Table 6-3,
15 which is on page 200 -- oh, geez.

16 A. You have me on the edge of my
17 seat. What page am I looking for?

18 Q. Yeah, just a second.

19 MR. SNIDOW: Six point what?

20 MS. SILVERSTEIN: Table 6-3.
21 Which is on page 275.

22 Sorry. Apologize guys. It's
23 on page 272.

24 A. Okay. I'm there.

25

1 BY MS. SILVERSTEIN:

2 Q. This table, Table 6-3 is
3 titled: Benzene in Food.

4 Correct?

5 A. Yes.

6 Q. And Table 6-3 shows that the --
7 in the cellular reviewing they found more
8 than 100 parts per billion of benzene in at
9 least one sample each of a cola, raw bananas
10 and coleslaw, right?

11 A. Yes.

12 Q. And on page 271, if you flip
13 back a page.

14 In Section 6.4.4: Other
15 Environmental Media.

16 Do you see that?

17 A. Yes.

18 Q. They're discussing a study,
19 Hattemer-Frey, et al. 1990.

20 And they note: Eggs had the
21 highest concentrations (2,100 parts per
22 billion [uncooked] and 500 to 1,900 parts per
23 billion [hard boiled]), followed by haddock,
24 Jamaican rum, irradiated beef, heat-treated
25 canned beef, and butter.

1 Do you see that?

2 A. I do. I'm really disappointed
3 to see Jamaican rum had high levels of
4 benzene.

5 Q. In your opinion, should we be
6 concerned about the level of benzene in these
7 foods?

8 MR. SNIDOW: Objection to form,
9 and beyond the scope.

10 A. It's not a question I examined
11 the evidence for to be able to give you an
12 answer.

13 BY MS. SILVERSTEIN:

14 Q. Do you have an opinion on
15 whether we should be concerned about
16 consuming something with 1900 parts per
17 billion of benzene in it?

18 MR. SNIDOW: Same objection.

19 A. I have to give you the same
20 answer. I simply haven't looked at the
21 evidence for it to determine what a
22 reasonable answer to your question would be.

23 BY MS. SILVERSTEIN:

24 Q. You didn't look at the evidence
25 to determine how much benzene poses a risk of

1 kidney cancer?

2 MR. SNIDOW: Objection,
3 misstates what he testified.

4 A. All of my opinions about
5 benzene are in the section of my report on
6 benzene.

7 BY MS. SILVERSTEIN:

8 Q. So you don't have an opinion on
9 how much benzene someone needs to be exposed
10 to to increase their risk of kidney cancer,
11 is that fair?

12 MR. SNIDOW: Objection to form,
13 misstates.

14 A. Sub thresholds don't really
15 exist for benzene. We don't know how little
16 it takes to cause cancer.

17 BY MS. SILVERSTEIN:

18 Q. You can go ahead and set that
19 document aside.

20 A. Thank you.

21 MR. SNIDOW: That was 18?

22 MS. SILVERSTEIN: Yes.

23 BY MS. SILVERSTEIN:

24 Q. On page 59, you discuss the --
25 well, show the results of four epidemiologic

1 studies evaluating whether there's a possible
2 dose-response relationship between benzene
3 and colon cancer, right?

4 A. Yes.

5 Q. Only one of those four studies
6 demonstrated a dose-dependent effect,
7 correct?

8 A. Yes.

9 Q. And you'd agree that the
10 Seyyedsalehi did not find a significant
11 dose-related trend for kidney cancer, right?

12 A. Can you direct me to where
13 you're looking?

14 Q. At the paragraph at the top of
15 page 59, the last sentence you say:
16 Seyyedsalehi and colleagues associated
17 combined the findings from these studies and
18 did not find a significant dose-related trend
19 for kidney cancer.

20 Right?

21 A. I do see that.

22 Q. And you'd agree that in
23 Table 13, you show the relative risk for
24 Gerin 1998, right?

25 A. Yes, correct.

1 Q. And you'd agree that neither
2 the low nor medium, high results for Gerin
3 1998 are statistically significant, correct?

4 A. I agree.

5 Q. Pesch -- you then have -- show
6 the results for Pesch 2000, right?

7 A. Yes.

8 Q. And you'd agree that Pesch 2000
9 does not show a dose-dependent effect,
10 correct?

11 A. Other than for low or no
12 exposure to more than low or no exposure,
13 there's not a difference between medium and
14 high.

15 Q. And you don't report results
16 for low and no exposure, right?

17 A. These are ratios, so they're
18 ratios to -- they're ratios for no exposure.

19 Q. But you don't show any results
20 for Pesch 2000 for low exposure; is that
21 right?

22 A. That's right. I'm not sure if
23 that's because Pesch didn't show them, or --
24 actually, I'm not sure why -- they might have
25 been combined in the study.

1 Q. Are you aware that Pesch 2000
2 specifically looked at upper tract urothelial
3 cancer?

4 A. I'd have to look back at Pesch
5 to be able to answer that. I don't recall
6 that offhand.

7 Q. You'd agree that Pesch 2012
8 does not demonstrate a dose-dependent effect,
9 correct?

10 A. I do agree with that, yes.

11 Q. And you say in your report that
12 Wong provided evidence showing a
13 dose-dependent effect. Is that still your
14 opinion?

15 A. Can you point me toward where
16 you're reading --

17 Q. In that top paragraph on page
18 59 you say: Only the study by Wong and
19 coworkers provided evidence suggesting a
20 dose-dependent effect.

21 Correct?

22 A. Suggesting a dose-dependent
23 effect. Yes. Yes, that is correct, that
24 their data suggests a dose-dependent effect,
25 but do not demonstrate it.

1 Q. You'd agree that the medium
2 exposure risk ratio for Wong is 0.83, right?

3 A. Yes.

4 Q. Which does not show a positive
5 association, correct?

6 A. Well, the confidence interval
7 was too wide to draw any conclusions.

8 Q. Would you agree that the point
9 estimate -- a point estimate of .83 isn't a
10 positive correlation?

11 A. No, there's no correlation at
12 all based on the width of the confidence
13 interval, which goes down to .06.

14 Q. Okay.

15 A. And up to almost 6.

16 Q. For high exposure, the risk
17 ratio is 1.54, correct?

18 A. Yes.

19 Q. The 95% confidence interval you
20 reported there is 0.15 to 1.59, correct?

21 A. Yes.

22 Q. That's not statistically
23 significant, right?

24 A. It is not.

25 Q. If you'd turn to page 60.

1 A. Yes.

2 Q. The last sentence in that first
3 paragraph is: None of the studies of cancer
4 in experimental animals reviewed in the 2018
5 IARC monograph on benzene describe --
6 described exposure associated kidney tumors.
7 Correct?

8 A. Yes.

9 Q. And for benzene, like the other
10 chemicals, if you considered a study when
11 forming your conclusions, you cited it in
12 your report, correct?

13 A. Yes.

14 Q. You can go ahead and set the
15 kidney cancer report aside.

16 MS. SILVERSTEIN: And I think
17 we've been going for over an hour, so
18 this would be a good time for a break.

19 THE WITNESS: All right.

20 THE VIDEOGRAPHER: We are off
21 the record at 2:50 p.m.

22 (Recess taken, 2:50 p.m. to
23 2:59 p.m. PDT)

24 THE VIDEOGRAPHER: We are on
25 the record at 2:59 p.m.

1 BY MS. SILVERSTEIN:

2 Q. Dr. Freeman, during the break
3 did you talk to anybody about the substance
4 of your testimony?

5 A. I did not.

6 (Freeman Deposition Exhibit 19,
7 12-8-2024 Dr. Michael Freeman -
8 Supplemental Materials Considered, was
9 marked for identification.)

10 BY MS. SILVERSTEIN:

11 Q. And you are holding Exhibit 19,
12 which is Dr. Michael Freeman's supplemental
13 materials considered list for your kidney
14 cancer general causation report, correct?

15 A. Yes.

16 Q. And this lists a study by Yu,
17 correct?

18 A. I --

19 MR. SNIDOW: Y-U.

20 A. None of those names are mine.

21 MR. SNIDOW: Y-U.

22 BY MS. SILVERSTEIN:

23 Q. The author of the study, their
24 last name is Yu, correct?

25 A. I could do this all day. No,

1 it ---

2 Yes, it is Yu, spelled Y-U.

3 Q. Okay.

4 A. Sorry.

5 Q. And aside from this study here,
6 by authors, Yu, Y-U, and the citations in
7 your kidney cancer report, there are no other
8 studies, articles, materials that you
9 reviewed for your kidney cancer report,
10 correct?

11 A. Not that I'm aware of or can
12 think of, yes.

13 Q. You can go ahead and set that
14 to the side.

15 A. Sorry for the schtick.

16 MR. SNIDOW: Yeah. It's
17 getting late here.

18 BY MS. SILVERSTEIN:

19 Q. Could you go ahead and pull out
20 your Parkinson's Disease report? Which is, I
21 believe, Exhibit 3.

22 A. Yes. Yes, it is.

23 Q. And, Dr. Freeman, you're not
24 offering any opinion about whether or not DCE
25 causes Parkinson's Disease, correct?

1 A. Correct. I'm only addressing
2 the four chemicals that we talked about
3 previously.

4 Q. Could you go ahead and turn to
5 page 37?

6 A. I'm there.

7 Q. In your opinion, there is below
8 equipoise evidence of a causal relationship
9 between vinyl chlorides and the Camp Lejeune
10 water and Parkinson's Disease, correct?

11 A. Yes.

12 Q. And that's because there's not
13 sufficient epidemiologic and mechanistic
14 studies, right?

15 A. I agree.

16 Q. And it's your opinion that
17 there's below equipoise evidence for a causal
18 relationship between benzene and Parkinson's
19 Disease, correct?

20 A. I agree.

21 Q. Because, again, there's not
22 sufficient epidemiologic and mechanistic
23 studies, right?

24 A. Yes.

25 Q. And you'd agree that

1 Parkinson's Disease is not a cancer, right?

2 A. I do agree with that.

3 Q. Great.

4 It's a neurological condition,
5 right?

6 A. Yes, a neurodegenerative
7 condition.

8 Q. So a chemical's -- a potential
9 carcinogenicity doesn't tell us whether or
10 not the chemical can cause a
11 neurodegenerative disease, right?

12 A. Agreed.

13 Q. Can you turn to page 31?

14 And do you see, actually
15 beginning with the bold there, the: Median
16 cumulative exposure was 4,970 micrograms per
17 liter per month, more than 50 times the
18 permissible level?

19 Do you see that?

20 A. Yes.

21 Q. How did you determine the
22 permissible level?

23 A. Give me a minute.

24 [Document review.]

25 A. It was from the ATSDR report, I

1 believe.

2 BY MS. SILVERSTEIN:

3 Q. What measure in the ATSDR
4 report?

5 A. The one that said it was more
6 than 50 times the permissible level.

7 Q. Do you know what the
8 permissible level is?

9 A. I do not specify that here in
10 my report, from what ATSDR says.

11 Q. Would you agree that MCLs
12 represent the highest level of a contaminant
13 that's allowed in drinking water?

14 A. It sets a standard for that,
15 yes.

16 Q. And would you agree that
17 drinking water contamination is governed by
18 the Safe Drinking Water Act?

19 A. I think the regulation of
20 drinking water is somewhat beyond me.

21 Q. Okay.

22 A. It would make sense that it
23 would be governed by the Safe Water Act;
24 however, I don't know what else, local
25 regulations, state wide, county wide, might

1 also govern drinking water safety.

2 Q. Are MCLs something you are
3 familiar with?

4 A. Yes.

5 Q. And you'd agree that MCLs are
6 based on health conservative assumptions
7 incorporated in decision-making processes,
8 right?

9 MR. SNIDOW: Objection to form,
10 and beyond the scope.

11 A. Yes, I do agree with that.

12 BY MS. SILVERSTEIN:

13 Q. Can you turn to page 37?

14 And it's your opinion that
15 there is sufficient evidence for a causal
16 relationship between TCE and Parkinson's
17 Disease, right?

18 A. Yes, and specifically at Camp
19 Lejeune.

20 Q. And you'd also agree that there
21 haven't been any TCE specific meta-analyses
22 for Parkinson's, correct?

23 A. Yes, I agree.

24 Q. And that the epidemiologic
25 evidence on TCE and Parkinson's Disease is

1 limited?

2 A. It is.

3 Q. In your opinion, there is
4 equipoise and above evidence for a causal
5 relationship between PCE and Parkinson's
6 Disease, right?

7 A. Yes.

8 Q. You'd agree that epidemiologic
9 evidence is roughly equivalent for PCE and
10 Parkinson's Disease as to TCE and Parkinson's
11 Disease?

12 A. Yes.

13 Well, it's a bit more sparse.
14 It's not exactly equivalent. There's a
15 reason why I characterized it as being
16 equipoise and above rather than being
17 sufficient.

18 Q. And would you agree that
19 equipoise and above means that there's less
20 evidence for PCE than for TCE?

21 A. Yes.

22 Q. And you agree that the
23 mechanistic evidence for Parkinson's Disease
24 is lacking for PCE, right?

25 A. Yes.

1 Q. I want to talk about the
2 Goldman studies that you referenced.

3 You'd agree that the studies by
4 Bove that we discussed earlier and by Goldman
5 are the main epidemiology studies for PCE or
6 TCE in Parkinson's Disease, right?

7 A. And Camp Lejeune exposure, yes.

8 Q. Okay. I'm handing you another
9 document.

10 (Freeman Deposition Exhibit 20,
11 Solvent Exposures and Parkinson
12 Disease Risk in Twins, was marked for
13 identification.)

14 BY MS. SILVERSTEIN:

15 Q. Dr. Freeman, you were just
16 handed Exhibit 20, which is titled: Solvent
17 Exposures and Parkinson Disease Risk in
18 Twins.

19 Correct?

20 A. Yes.

21 Q. And this is Goldman 2012,
22 right?

23 A. Yes.

24 MR. SNIDOW: I think not.

25 MS. PLATT: Sorry, I handed you

1 the wrong one.

2 BY MS. SILVERSTEIN:

3 Q. This is Goldman 2012, right?

4 A. Yes.

5 Q. And this is one of the studies
6 that you reviewed to draw your conclusion on
7 TCE or PCE and Parkinson's Disease, right?

8 A. Yes.

9 Q. If you turn to page 777.

10 A. Okay.

11 Q. Under "Results," you'd agree
12 that this is a study analyzing 99 twin pairs,
13 correct?

14 A. Yes.

15 Q. And the study relied on
16 self-reporting, right?

17 A. Yes.

18 Q. Where informants weren't
19 available, it relied on proxy reporting,
20 right?

21 A. Yes.

22 I've got 99 twins. It would
23 approximate one.

24 MR. SNIDOW: Didn't see that
25 reference coming up in this particular

1 deposition.

2 BY MS. SILVERSTEIN:

3 Q. The study inferred solvent
4 exposure was based on occupational and hobby
5 history, correct?

6 A. Yes.

7 Q. And it didn't have specific
8 exposure data for the study population,
9 right?

10 A. Yes.

11 Q. And inferring exposure based on
12 job and hobby history creates the potential
13 for exposure misclassification, right?

14 A. Potentially.

15 Q. Would you agree that twins
16 don't have identical exposures, particularly
17 in adulthood?

18 A. Yes.

19 Q. Where they live could lead to
20 different environmental exposures, right?

21 A. Potentially, yes.

22 Q. Where they work could lead to
23 different environmental exposures, right?

24 A. Potentially, yes.

25 Q. And Goldman 2012 didn't have

1 access to other exposure information, right?

2 A. Other than what they took out
3 of the interviews of the individuals or the
4 proxies, I agree.

5 Q. And they didn't have access to
6 the residential history of the participants,
7 right?

8 A. That I can't tell you off the
9 top of my head.

10 Q. Go ahead and turn to page 780.

11 Would you agree that TCE, PCE,
12 and CCL4 have been used extensively worldwide
13 for decades?

14 MR. SNIDOW: CCL4.

15 MS. SILVERSTEIN: Oh, thank
16 you.

17 MR. SNIDOW: Yep.

18 BY MS. SILVERSTEIN:

19 Q. Would you agree that TCE, PCE,
20 and CCL4 have been used extensively worldwide
21 for decades?

22 A. I would agree it says that
23 here, yes.

24 Q. Can you go to Table 3?

25 A. Okay.

1 Q. You'd agree that the odds ratio
2 for TCE in Table 3 is 6.1, right?

3 A. I do.

4 Q. And the confidence interval is
5 1.2 to 33, right?

6 A. Yes.

7 Q. Do you agree that 1.2 to 33 is
8 a wide confidence interval?

9 A. I do.

10 Q. And you'd agree that Goldman
11 found the relative risk ratio for -- the odds
12 ratio, excuse me, for PCE to be 10.5, right?

13 A. Yes.

14 Q. On the confidence interval for
15 PCE is 0.97 to 113?

16 A. Yes.

17 Q. That's a wide confidence
18 interval, right?

19 A. Very.

20 Q. And it's not statistically
21 significant, right?

22 A. It's pretty darn close.

23 Q. You'd agree that the lower
24 95 -- the low end of the 95% confidence
25 interval is below 1?

1 A. Barely, but not to the point
2 where you'd reject the finding and say, I
3 don't believe it. It's just outside of the
4 arbitrary cut off of .05.

5 Q. Okay. You'd agree that the .97
6 is below 1 as well, right?

7 A. I agree that .97 is below 1,
8 yes.

9 Q. And you'd agree that Goldman
10 2012 only considered nine test individuals
11 exposed to TCE, right?

12 A. Hold on a second here.

13 MR. SNIDOW: Do you want to say
14 the question again, Kailey?

15 BY MS. SILVERSTEIN:

16 Q. Sure. Would you agree that
17 Goldman 2012 only considered nine test
18 individuals as exposed to TCE?

19 MR. SNIDOW: Objection to form.
20 Misstates testimony.

21 [Document review.]

22 A. So the number of controls that
23 have a history of exposure is your question.
24 What's the number of -- or the number of
25 cases that have a history of exposure. Which

1 one were you asking me about?

2 BY MS. SILVERSTEIN:

3 Q. Do you see the second column it
4 says: Case Positive, Control Negative?

5 A. Yes.

6 Q. And the number of individuals
7 for TCE considered there is 9, right?

8 A. That have a history of TCE
9 exposure, yes.

10 Q. In that same column for PCE,
11 the number of individuals considered is 5,
12 correct?

13 A. Yes.

14 Q. Turning --

15 A. Not considered, but who had a
16 positive history.

17 Q. Can you turn to page 781,
18 please.

19 A. I am there.

20 Q. The very last paragraph that
21 begins on page 781. It says: The major
22 limitations of the study are its small sample
23 size, which yielded imprecise risk estimates,
24 and exposure inferences based on
25 retrospective recall -- a virtually

1 unavoidable limitation of a disease such as
2 PD, in which relevant exposures may occur
3 decades before clinical disease is apparent.

4 Right?

5 A. It does say that, yes.

6 Q. And then, on page 782, at the
7 bottom of that paragraph that began on the
8 prior page.

9 Two sentences from the bottom
10 of that paragraph. It says: Another
11 limitation is the difficulty isolating
12 specific effects of single agents, because
13 many work settings involve exposure to
14 multiple agents.

15 Right?

16 A. Yes.

17 Q. You can go ahead and set
18 Goldman 2012 aside.

19 A. All right.

20 (Freeman Deposition Exhibit 21,
21 Risk of Parkinson Disease Among
22 Service Members at Marine Corps Base
23 Camp Lejeune, was marked for
24 identification.)
25

1 BY MS. SILVERSTEIN:

2 Q. You were just handed
3 Exhibit 21, which is titled: Risk of
4 Parkinson Disease Among Service Members at
5 Marine Corps Base Camp Lejeune.

6 Right?

7 A. Yes.

8 Q. And that's the 2023 publication
9 by Goldman?

10 A. Yes.

11 Q. And you relied on Goldman 2023
12 in forming your conclusions about Parkinson's
13 Disease and PCE and TCE, correct?

14 A. Exposure at Camp Lejeune, yes,
15 correct.

16 Q. You'd agree that the sample
17 population for Goldman 2023 was the same
18 population as in Bove 2014, right?

19 A. I think so.

20 Q. Turn to page 674.

21 A. I'm there.

22 Q. And do you see where it says:
23 Cohort Assembly?

24 A. Yes.

25 Q. The bold heading?

1 A. Yes.

2 Ahh, "as reported by Bove."

3 There it is.

4 Q. Right. It says the: Study
5 cohorts were previously assembled by the US
6 Agency For Toxic Substances and Disease
7 Registry (ATSDR) as reported by Bove et al.

8 Correct?

9 A. Yes.

10 Q. And is the same population in
11 Goldman 2023 the same as in the Bove 2024
12 study, correct?

13 A. Yes.

14 Q. And Goldman 2023 -- Goldman
15 2023's cohort included only individuals who
16 used veterans health administration or
17 Medicaid health services, right?

18 If you look at the sentence
19 before: Parkinson Disease ascertainment?

20 A. I see that. Yeah, I was trying
21 to determine if I can fully agree with you,
22 only because they started out with the total
23 cohort, and then they did narrow it down to
24 the group that had VA, or Medicare healthcare
25 services.

1 Q. Right. They say: The cohort
2 included 1,000 -- or 172,128 individuals who
3 served at Camp Lejeune and 168,361 who served
4 at Camp Pendleton. Within these, we
5 identified an analytic cohort that included
6 all individuals who ever used Veterans Health
7 Administration (VHA) or Medicare healthcare
8 services.

9 Correct?

10 A. Yes.

11 Q. So individuals who never
12 received VHA or Medicare services were not
13 included in the Goldman 2023 analytical
14 cohort, right?

15 A. Yes.

16 Q. And that could limit a study
17 population, right?

18 MR. SNIDOW: Objection to form.

19 A. It depends on your study
20 population. I mean, it -- if your study
21 population is all older people, which is what
22 you would expect for generally veterans, and
23 certainly -- but also Medicare recipients and
24 for people with a diagnosis of Parkinson's,
25 then there might be some limitation, but it

1 would not necessarily be a drastic reduction.

2 BY MS. SILVERSTEIN:

3 Q. You didn't analyze how much the
4 cohorts from Bove were reduced to meet the
5 analytical cohort requirement of individuals
6 who used VHA or Medicare services, did you?

7 A. I did not describe it in my
8 report that I can recall, so no.

9 Q. And sitting here today, it's
10 not something that you are aware of?

11 A. Well, it's in Table 1, so --
12 I mean, I can look at Table 1
13 and tell you.

14 Q. It's not something that you
15 described in your report, right?

16 A. I don't believe so, no.

17 Q. You'd agree that Goldman 2023
18 did not have data on direct exposure, right?

19 MR. SNIDOW: Object to form,
20 vague.

21 A. Quantitative exposure? I
22 think? Is that -- am I interpreting that
23 question correctly?

24 BY MS. SILVERSTEIN:

25 Q. You'd agree that Goldman 2023

1 did not have data on the exposure levels for
2 the study participants, correct?

3 A. Not quantifying the individual
4 chemicals they were exposed to, yes.

5 Q. Turn to page 279.

6 A. Did you -- you said 679, right?
7 Or did you --

8 Q. I didn't, but that's what I
9 meant.

10 A. You meant to say 679? All
11 right.

12 Q. Yeah.

13 In the right-hand column, the
14 first full paragraph. Do you see that?

15 A. Highly plausible?

16 Q. Yes.

17 The second sentence in that
18 paragraph acknowledges that the authors:
19 Cannot be certain that everyone who resided
20 at Camp Lejeune between 1975 and 1985 was in
21 fact exposed to biologically meaningful
22 levels of contaminants.

23 Right?

24 A. Yes.

25 Q. And they didn't account for

1 other environmental exposures that
2 individuals may have sustained before,
3 during, or after military service, right?

4 A. That's true.

5 Q. Goldman 2023 had the conclusion
6 on the association between Parkinson's and
7 TCE, right?

8 A. Yes.

9 Q. They don't have -- they did not
10 suggest an association between PCE and
11 Parkinson's, right?

12 MR. SNIDOW: Objection to form.

13 A. Only that they could have
14 contributed, not that they did.

15 BY MS. SILVERSTEIN:

16 Q. Turn to Table 3.

17 A. Okay. I'm there.

18 Q. Now I just have to get there.

19 Table 3 is the: Risk of
20 Parkinson Disease in Residents of Camp
21 Lejeune vs Camp Pendleton.

22 Right?

23 A. Yes.

24 Q. And for possible or probable
25 PD, they note an odds ratio of 1.7, right?

1 A. Yes.

2 Q. When they -- for PD ascertained
3 before January 13, 2017, the odds ratio is
4 only 1.28, correct?

5 A. Yes.

6 Q. And the confidence interval for
7 Parkinson's ascertained before January 13,
8 2017, the confidence interval includes 1,
9 right?

10 A. It does.

11 Q. Are you aware that
12 January 13th, 2017, is when the VA designated
13 Parkinson's as a presumptive service
14 connected condition for veterans at Camp
15 Lejeune?

16 A. If I noted that in my report I
17 would have been aware of it, but I don't
18 recall specifically whether that's noted or
19 not.

20 Q. If you turn to page 674.

21 A. Okay.

22 Q. And on the left-hand side, the
23 second paragraph, at the bottom it says:
24 Despite relatively limited human
25 epidemiology, in light of this contamination,

1 on January 13, 2017, the U.S. Congress and
2 Veterans Administration (VA) designated PD a
3 presumptive service-connected condition for
4 veterans who served at Camp Lejeune between
5 August 1st, 1953, and December 31st, 1987,
6 making them eligible for benefits.

7 Correct?

8 A. That it says that? Yes.

9 Q. Would you agree that
10 information collected after January 13, 2017,
11 could have a reporting bias?

12 MR. SNIDOW: Object to form.

13 A. I do agree with that.

14 BY MS. SILVERSTEIN:

15 Q. And a reporting bias could be a
16 limitation of the study, right?

17 A. Potentially.

18 Q. You can go ahead and set that
19 document aside.

20 (Freeman Deposition Exhibit 22,
21 Parkinson's Disease Progression and
22 Exposure to Contaminated Water at Camp
23 Lejeune, was marked for
24 identification.)
25

1 BY MS. SILVERSTEIN:

2 Q. You were just handed
3 Exhibit 22, which is titled: Parkinson's
4 Disease Progression and Exposure to
5 Contaminated Water at Camp Lejeune.

6 Right?

7 A. Yes.

8 Q. This is by Goldman, right?

9 A. Yes.

10 Q. Who is the same author of the
11 2012 and 2023 studies that we discussed,
12 right?

13 A. Yes.

14 Q. And this is his 2024 study?

15 A. Yes.

16 Q. And this is a study that you
17 analyzed and considered in forming your
18 conclusions about Parkinson's Disease, right?

19 A. Yes.

20 Q. This is the same population
21 that was analyzed in Bove 2024, right?

22 A. Yes.

23 Q. And this study is again limited
24 to only those individuals that received
25 healthcare through the veterans health

1 administration or Medicare, right?

2 A. Yes.

3 Q. And Goldman -- the authors,
4 didn't have data on other lifetime exposures
5 for the participants, right?

6 A. Correct.

7 Q. Would you agree that Goldman
8 did not observe an earlier age of Parkinson's
9 diagnosis in exposed individuals?

10 If you want to turn to
11 page 1737.

12 Are you on page 1737?

13 A. I'm there, yes.

14 Q. In the right-hand column, that
15 paragraph that starts on -- in the other
16 column, the authors wrote: We did not
17 observe an earlier age at PD diagnosis in
18 exposed individuals as has been reported for
19 hydrocarbon-exposed workers.

20 Right?

21 A. Yes.

22 Q. You'd agree that Goldman 2012,
23 Goldman 2023, and Goldman 2024, all have the
24 same primary author, right?

25 A. Yes.

1 Q. You can go ahead and set that
2 aside.

3 If you'd turn to page 32 of
4 your report.

5 A. I'm there.

6 Q. On page 32, you discuss Pezzoli
7 and Cereda's 2013 meta-analysis, right?

8 A. Yes.

9 Q. And are you aware that Pezzoli
10 and Cereda did not specifically evaluate TCE?

11 A. I am.

12 Q. Dr. Freeman, you'd agree that
13 PCE and TCE are different chemicals, right?

14 A. I do.

15 Q. Do you agree that there are no
16 mechanistic studies on PCE and Parkinson's
17 Disease?

18 A. I do.

19 Q. And there are no epi studies
20 showing a statistically significant
21 association between PCE and Parkinson's
22 Disease, right?

23 A. I agree.

24 Q. It's your opinion that there's
25 equipoise and above evidence for a causal

1 association between PCE and Parkinson's
2 Disease, right?

3 A. Yes.

4 Q. Which I think we discussed
5 earlier, that's a lower level of evidence
6 than your opinion on TCE and Parkinson's
7 Disease, right?

8 A. I agree.

9 Q. The reason for the lower level
10 of evidence for PCE is that there's only
11 indirect mechanistic evidence for PCE in
12 Parkinson's, right?

13 A. Yes.

14 Q. If you look at page 37 of your
15 report.

16 And on page 37 to your opinion
17 for PCE. You say: However, since PCE can be
18 metabolized to TCE by microbes in
19 groundwater, and since TCE and PCE share some
20 common metabolites there is indirect
21 mechanistic evidence for PCE and PD.

22 Right?

23 A. Yes.

24 Q. You didn't provide any
25 citations for this statement, right?

1 A. That's discussed earlier in the
2 report.

3 Q. When you're discussing it in
4 your conclusions, you didn't provide any
5 citations, right?

6 A. No, because it was, again,
7 earlier in the report.

8 Q. Where earlier in the report is
9 this?

10 [Document review.]

11 A. Page 15.

12 BY MS. SILVERSTEIN:

13 Q. Did you say 15?

14 A. Page 15, yes.

15 Q. This is about the degradation
16 of chemical contaminants of the Camp Lejeune
17 water, right?

18 A. Yes.

19 Q. And here you say: Notably, PCE
20 breaks down to TCE by the removal of one
21 chlorine (dechlorination) anaerobically and
22 that vinyl chloride is a breakdown product of
23 both PCE and TCE after additional
24 dechlorination.

25 Right?

1 A. Yes.

2 Q. So in this section, it looks
3 like you have three citations, one to
4 Valdiviezo, from 2022, right?

5 A. V-A-L-D-I-V-I-E-Z-O.

6 Q. And then, the others -- one of
7 the other citations is the IARC working group
8 on evaluation of carcinogenic risks to
9 humans, right?

10 A. Yes.

11 Q. And you'd agree that
12 Parkinson's Disease is not a cancer, right?

13 A. Yes. This is only support for
14 the degradation of the Camp Lejeune water in
15 the environment -- or the -- sorry, the
16 contaminants of the Camp Lejeune water in the
17 environment. It does not reference diseases
18 associated with it.

19 Q. But you still agree that
20 Parkinson's is not a cancer, right?

21 A. Yes, that hasn't changed since
22 we started talking.

23 Q. And the third document that you
24 cite is Dolinova, et al., from 2017, correct?

25 A. Yes.

1 Q. And then you cite
2 Emsbo-Mattingly 2022, right?

3 A. Yes. Dolinova is
4 D-O-L-I-N-O-V-A.

5 Emsbo-Mattingly is E-M-S-B-O
6 hyphen M-A-T-T-I-N-G-L-Y.

7 Q. Dr. Freeman, do you consider
8 yourself an expert in pharmacokinetics?

9 A. No. I have a -- I have a --
10 what I would say is a relatively minimal
11 background in it compared to people who are
12 experts in it.

13 Q. Okay. And are you an expert in
14 physiologically-based pharmacokinetic
15 modeling?

16 A. Even less so.

17 Q. What studies are you relying on
18 to show that TCE and PCE are sufficiently
19 analogous for studies related to TCE to be
20 extrapolated to PCE?

21 A. I didn't make that statement in
22 my report.

23 Q. In your opinion, can -- in your
24 opinion, are TCE and PCE sufficiently
25 analogous to allow studies related to TCE

1 specifically to be extrapolated to PCE?

2 A. No. Only that TCE -- or PCE is
3 converted in the environment to TCE. And
4 that TCE as a demonstrable relationship to a
5 Parkinson's Disease risk in the Camp Lejeune
6 cohort.

7 Q. Have you reviewed an article
8 Trichlorethylene, a ubiquitous environmental
9 contaminant in the risk for Parkinson's
10 Disease by Dameranda?

11 A. Is it cited in my report?

12 Q. Have you ever reviewed -- or do
13 you recall ever reviewing this article by
14 Dameranda?

15 A. I couldn't tell you off the top
16 of my head.

17 Q. I'll represent that it's not
18 cited in your report.

19 A. Okay.

20 Q. And are you -- do you recall
21 reviewing this article in any other context?

22 A. Not offhand, no.

23 Q. Would you agree that closely
24 related chemical structures doesn't
25 necessarily mean that two chemicals have the

1 same biological effect?

2 A. I do agree with that.

3 Q. Would you agree that PCE is
4 more dense than TCE?

5 A. PCE is more dense. Do you mean
6 chemically, because it's got extra chlorine?

7 Q. Yes.

8 A. I guess you would call this
9 dense.

10 Q. Would you agree that PCE is
11 less soluble than TCE?

12 MR. SNIDOW: Let me interpose a
13 form and scope objection.

14 A. By the nature of its chemical
15 composition, I would agree.

16 BY MS. SILVERSTEIN:

17 Q. Would you agree that PCE is
18 less volatile than TCE?

19 A. I would say based on the same
20 principle, yes.

21 Q. Okay. You can go ahead and set
22 aside your Parkinson's Disease report for
23 now.

24 In your opinion, the levels of
25 chemicals in the Camp Lejeune water were

1 hazardous to human beings. Is that fair?

2 A. Yes.

3 Q. Can you turn to page 66 of your
4 kidney cancer report? Which is Exhibit 2.

5 A. I'm on page 66.

6 Q. On page 66, I'm looking under
7 the heading --

8 A. Did you say 56 or 66?

9 Q. 66.

10 A. Okay.

11 Q. I'm looking under the heading:
12 Levels of contaminants that have been
13 associated with hazards to humans and causal
14 relationship to kidney cancer.

15 Do you see that?

16 A. I do.

17 Q. You say: Moore and co-workers
18 showed that average exposures to TCE at
19 levels at or exceeding 76 parts per billion
20 were associated with a significantly
21 increased risk of renal cancer (odds ratio,
22 2.41; 95% confidence interval 1.05, 5.56).
23 The risk associated with TCE exposures less
24 than 76 parts per billion was also elevated
25 (odds ratio 1.73) but the difference was not

1 statistically significant. The mean TCE
2 concentration in the Hadnot Point system was
3 358.7 parts per billion between 1975 and
4 1985.

5 Right?

6 A. Yes.

7 Q. Does your opinion that the Camp
8 Lejeune water is hazardous to human health,
9 and has a causal relationship to kidney
10 cancer and Parkinson's Disease, does that
11 only apply to the time period 1975 to 1985?

12 MR. SNIDOW: Objection to form.

13 A. No.

14 BY MS. SILVERSTEIN:

15 Q. What time frame does that apply
16 to?

17 MR. SNIDOW: Objection to form.

18 A. I have not restricted it to any
19 particular time frame during which there's
20 been identified a hazard in the water.

21 I understand the 75 to 85 as
22 the period in which it's thought that the
23 concentrations were at their highest level,
24 but I don't have any evidence that allows me
25 to discriminate between those times.

1 BY MS. SILVERSTEIN:

2 Q. And you'd agree that the Bove
3 studies and the Goldman studies were both --
4 were all restricted to 1975 to 1985, right?

5 A. Right. Because of the greater
6 availability of information on where people
7 were stationed.

8 Q. So you haven't --

9 A. To my understanding.

10 Q. Apologies. I didn't mean to
11 cut you off there.

12 Did you finish your answer?

13 A. I believe so.

14 Q. Okay. I apologize.

15 You didn't review any studies
16 about the Camp Lejeune water prior to 1975,
17 right?

18 A. That's correct, yes.

19 Q. You haven't then analyzed
20 whether there is a positive association
21 between the Camp Lejeune water prior to 1975
22 and kidney cancer with Parkinson's Disease.
23 Is that fair?

24 A. Correct. I'd have to go back
25 to the statement that I don't have enough

1 evidence to discriminate between those times.

2 Q. Sure. Would it be fair to say
3 you also don't have enough evidence to
4 conclude that before 1975 there's evidence of
5 a causal relationship?

6 A. If I was asked if it's a
7 reasonable inference based on what we know
8 about '75 to '85, I would say yes, but I
9 don't know the magnitude of the relationship.

10 Q. Is your opinion limited to
11 exposure from the Hadnot Point water system?

12 A. I believe that that's not the
13 case. I think I state in the report that
14 it's not just Hadnot.

15 Q. Hadnot Point?

16 A. It's not just Hadnot Point.
17 That it's also the Tarawa system.

18 Q. So is your opinion, then,
19 limited to Hadnot Point and Tarawa Terrace?

20 A. It would be what is specified
21 in my report. But those are the two main
22 contamination areas that are described.

23 Q. Do you have an opinion on
24 whether any water system other than the
25 Hadnot Point and Tarawa Terrace water systems

1 had enough of any contaminant to cause either
2 kidney cancer or Parkinson's Disease?

3 A. I don't have evidence that they
4 didn't, I think is the best way to approach
5 it.

6 I mean, there's evidence that
7 people who were in the area and were exposed
8 to the water had increased risks of certain
9 diseases, exactly where that water came from,
10 is something that is difficult to determine.
11 I haven't delved into that opinion in any
12 detail outside of what's in my report.

13 Q. Since you are -- looked at the
14 ATSDR water modeling, you are aware that they
15 modeled contamination for Hadnot Point and
16 Tarawa Terrace, right?

17 MR. SNIDOW: Objection to form,
18 scope.

19 A. I believe that is correct,
20 actually.

21 I didn't mean to make that
22 sound like you actually said something
23 correct. I mean, I think I agree off my
24 memory that that was the two areas that
25 were --

1 Q. Are you aware there are six
2 other water systems that ATSDR did not model
3 any contamination at?

4 A. I couldn't tell you the total
5 number of water systems, but I know they
6 focused on those two. So to the extent that
7 there were other water systems, that makes
8 sense.

9 Q. Since you reviewed the ATSDR
10 water modeling, are you aware that there were
11 some months where ATSDR modeled mean monthly
12 concentrations of one or more chemicals was
13 0 micrograms per liter?

14 A. Yes, I described that in my
15 report.

16 Q. And is it your opinion that
17 even in those months where ATSDR modeled one
18 or more chemicals at 0 micrograms per liter,
19 the Camp Lejeune water was hazardous to
20 humans and could cause kidney cancer or
21 Parkinson's disease?

22 A. I believe the question is if
23 there were times where there was very -- if I
24 understand it correctly, there were times
25 when there was no chemicals in the water? If

1 that was actually true, would that have the
2 same risks as the other months when there
3 were chemicals modeled in the water, the
4 answer is presumably not.

5 Q. Were you aware that ATSDR has
6 said that their water modeling represented a
7 conservative estimate of the amount of
8 contaminants in the water?

9 MR. SNIDOW: Object to form.

10 A. Yes.

11 BY MS. SILVERSTEIN:

12 Q. And you're aware that
13 Dr. Bove's ATSDR studies didn't evaluate how
14 much of any chemical a participant -- that
15 the participants in the study were actually
16 exposed to, right?

17 A. Yes.

18 Q. And it didn't analyze what the
19 participant's dose of any chemical was,
20 right?

21 A. Yes. I think we've already
22 talked about that.

23 Q. Did you consider possible dose
24 in your analysis?

25 MR. SNIDOW: Objection to form,

1 vague.

2 A. The exposures that I talked
3 about had to do mostly with time. But I did
4 talk about dose to some degree.

5 To the extent it's in my
6 report, yes, but I didn't attempt to do any
7 kind of specific quantification outside of
8 what was related in the materials I reviewed.

9 Q. Do you have an opinion on what
10 average daily dose a person needs to be
11 exposed to to increase their risk of kidney
12 cancer or Parkinson's Disease?

13 MR. SNIDOW: Objection to form.

14 A. My opinion is that that's not
15 been established. There is no threshold
16 dose.

17 BY MS. SILVERSTEIN:

18 Q. And when you say there is no
19 threshold dose, do you mean that it's your
20 opinion that it can be caused at any level of
21 exposure? Or just that we don't know what
22 the minimum required exposure is?

23 A. The latter. Because it's a
24 multifactorial illness. Both PD and kidney
25 cancer are multifactorial illnesses. It's

1 reasonable to assume that different levels of
2 exposure are required for different
3 individuals to trigger the disease.

4 Q. Would you agree that they have
5 some threshold amount being required for an
6 individual to acquire a specific disease is a
7 widely accepted scientific principle?

8 MR. SNIDOW: Objection to form.

9 A. Depends on what you're
10 studying.

11 BY MS. SILVERSTEIN:

12 Q. So, for TCE, would you agree
13 that there's some threshold dose by which
14 before that individuals can be exposed to the
15 contaminant and not increase their risk of
16 kidney cancer or Parkinson's Disease, and
17 after that amount, it could increase their
18 risk?

19 MR. SNIDOW: Objection to form.

20 A. There's a vague gray area type
21 of a threshold, I think that's not
22 unreasonable for the individual chemicals.
23 How the chemicals work together as an
24 additive or possibly synergistic effect,
25 though, is completely unknown.

1 MS. SILVERSTEIN: I think we've
2 been going for almost an hour. Just
3 under an hour, so this is a good spot
4 to take a break.

5 THE VIDEOGRAPHER: All right.
6 We are off the record at 3:50 p.m.

7 (Recess taken, 3:50 p.m. to
8 3:58 p.m. PDT)

9 THE VIDEOGRAPHER: We are on
10 the record at 3:58 p.m.

11 BY MS. SILVERSTEIN:

12 Q. Dr. Freeman, did you talk to
13 anybody about the substance of your testimony
14 during the break?

15 A. I did not.

16 Q. Could you turn to your kidney
17 cancer report, Exhibit 2?

18 A. I'm looking at it.

19 Q. Can you go to page 23, please?

20 A. Yes.

21 Q. Under the heading: Evidence
22 against a causal relationship.

23 Well, I guess not really under
24 that heading, but after that heading you have
25 a paragraph that starts: As described above.

1 Do you see that?

2 A. Yes.

3 Q. And it says: As described
4 above, the Camp Lejeune Justice Act of 2021
5 specified that claimants who file in court
6 are entitled to a standard of proof lower
7 than the preponderance-of-the-evidence
8 standard typically used in tort cases and
9 that they need only show that "a causal
10 relationship is at least as likely as not"
11 corresponding to the ATSDR classification
12 "equipoise and above."

13 Did I read that correctly?

14 A. You did.

15 Q. Where did you get the "at least
16 as likely as not" language from?

17 A. From the Camp Lejeune Justice
18 Act of 2021.

19 Q. Dr. Freeman, you'd agree you're
20 not an expert in legal analysis, right?

21 A. I'm an expert in medical/legal
22 analysis, which has an element of legal
23 analysis to it, but not in just legal
24 analysis, per se.

25 Q. Are you an expert in statutory

1 interpretation?

2 A. No, definitely not.

3 Q. And you don't have a law
4 degree, right?

5 A. No. My wife has promised she'd
6 divorce me if I got one.

7 Q. No more degrees for you.
8 And so my understanding, then,
9 is you used the "at least as likely as not"
10 language because it's in the Camp Lejeune
11 Justice Act; is that right?

12 A. Yes.

13 Q. Did you review the entire
14 statute?

15 A. Yes. Somewhere along the line,
16 yes. Along the way.

17 Q. Were you asked or instructed by
18 anybody to include the "at least as likely as
19 not" language?

20 MR. SNIDOW: Ob --

21 A. No.

22 Sorry.

23 MR. SNIDOW: It sounds like
24 we're fine, but just instruct you to
25 preserve privilege.

1 A. No. But that would be critical
2 for my analysis to understand what legal
3 standard is being applied for the
4 interpretation of the causal evidence.

5 BY MS. SILVERSTEIN:

6 Q. Have you used "at least as
7 likely as not" in any scientific publications
8 that you've authored?

9 A. No, I have not. I have used
10 only substantial factor.

11 Q. Have you seen the language "at
12 least as likely as not" in peer-reviewed
13 literature that you've reviewed?

14 A. I can't tell you that I have
15 any specific recollection that I have or
16 haven't.

17 Q. And you state here that the "at
18 least as likely as not" standard corresponds
19 to the ATSDR classification of equipoise and
20 above, right?

21 A. Yes.

22 Q. And is your understanding that
23 this is from the ATSDR 2017 Public Health
24 Assessment?

25 A. Yes.

1 Q. Are you aware that the 2017
2 Public Health Assessment is a regulatory
3 document?

4 A. That's my understanding, yes.

5 Q. And you'd agree that regulatory
6 work and litigation are different, right?

7 A. Yes.

8 Q. Have you used the phrase
9 "equipoise and above" in any scientific
10 publications that you've authored?

11 A. No. That's -- I think you
12 already asked me that. Did you not?

13 Q. I asked you earlier about
14 whether you used the language "at least as
15 likely as not" in any scientific articles
16 that you've authored.

17 A. Right. Which I interpret as
18 equipoise.

19 Q. But you haven't used the
20 language "at least as likely or not" or
21 "equipoise and above" in any of your
22 scientific publications, right?

23 A. No, I'm quite sure I have not.

24 Q. Would you agree that agency --
25 your regulatory work is different than

1 scientific research?

2 A. I think they're Venn diagrams
3 with lots of overlap, including overlap with
4 legal and statutory requirements.

5 They all have to overlap, they
6 all have to intersect if courts are going to
7 consider scientific evidence.

8 Q. Would you agree that a
9 regulatory health agency, for example, could
10 make decisions at a lower standard of
11 evidence to protect the public health?

12 A. Yes.

13 Q. And that could include
14 sometimes making decisions where there's not
15 a lot of evidence of causation, right?

16 MR. SNIDOW: Objection to form.

17 A. Well, there has to meet some
18 sort of -- some sort of a threshold has to be
19 met to determine that there's a hazard and
20 that hazard is likely to be nontrivial. But
21 at that point in time, the -- because
22 evidence increases over time, making an
23 advanced regulatory decision, that is
24 intended to favor a protection of public
25 health, is what public health agencies are

1 mandated to do.

2 So, yes, I agree with, I think,
3 everything that you just said.

4 BY MS. SILVERSTEIN:

5 Q. Would you agree that equipoise
6 denotes a lack of consensus across the
7 medical community?

8 MR. SNIDOW: Objection to form.

9 A. No.

10 BY MS. SILVERSTEIN:

11 Q. In your opinion, does equipoise
12 mean that the scientific community has
13 consensus that the evidence for that exists?

14 MR. SNIDOW: Object to the
15 form.

16 A. I think it's more complicated
17 than that when you're talking about a
18 contaminated site where there has been
19 evidence that there is disease manifestation
20 associated with the site, so that, for other
21 diseases where there might be -- it's not
22 found to be less than equipoise, at
23 equipoise, I think that the intent then is to
24 satisfy that requirement that you're talking
25 about, which is, we know this place is

1 dangerous, we have evidence which is somewhat
2 equivocal, but we're going to include that as
3 a means of protecting the public. That's not
4 a scientific consensus or community consensus
5 issue.

6 BY MS. SILVERSTEIN:

7 Q. So just to make sure I
8 understood what you said correctly, would it
9 be fair to say that when a public health
10 agency makes a determination that evidence is
11 equipoise or higher, that doesn't mean that
12 the scientific community is weighing in and
13 agrees that there is sufficient evidence
14 of -- or equipoise evidence of causation?

15 MR. SNIDOW: Object to form,
16 scope.

17 A. Well, I think equipoise
18 evidence is something that is scientifically
19 determined. So I don't think that that's
20 really an issue.

21 I think it goes back to the
22 explanation I gave you before. If we're
23 talking about a place that's known to be
24 dangerous and we have another illness that
25 we're -- that we're examining it and the

1 evidence is equivocal, that action can be
2 taken based on that evidence. That concept
3 is trans -- apparently has translated into
4 the statutory language. That's not a
5 scientific community issue. Again, it is how
6 we protect the community.

7 So that's -- I see this as
8 being a rather unique situation, in which
9 the -- a different standard or a lower
10 standard has made its way into, okay, how are
11 we going to evaluate the scientific evidence?
12 Not the way we normally would if we're
13 putting into the peer-reviewed literature,
14 but we're doing it in a way that we're going
15 to satisfy statutory language.

16 And then, of course, we also
17 can include a higher level of risk, however,
18 including that lower level, where it's
19 equivocal, is based on -- I think, again,
20 going back to that term, that web of
21 evidence, or -- that's used to build a
22 causal -- a causal judgment.

23 BY MS. SILVERSTEIN:

24 Q. How do you determine what
25 standard of review you use in an expert

1 report?

2 A. What do you mean by "review"?

3 Q. How do you determine whether
4 you use a standard "at least as likely as
5 not" versus preponderance of the evidence,
6 versus sufficient factor, or something else
7 in your scientific review?

8 A. It's typically statutory
9 language for whether we're dealing with a
10 preponderance of evidence issue or a
11 substantial causation issue. Those are the
12 two major areas in which there will be a
13 difference of magnitude of strength of
14 association in the cases that I'm involved
15 with. This is the first instance in which
16 I've dealt with equipoise or better.

17 Q. So then would it be fair to say
18 that when you say in your expert reports that
19 you're holding your opinion to a reasonable
20 degree of medical or scientific certainty,
21 what reasonable degree of medical or
22 scientific certainty means can change in each
23 of your reports?

24 A. No. That's not true. It is --
25 the reasonable degree of medical or

1 scientific certainty or probability refers to
2 my confidence in the opinions I've given. It
3 doesn't refer to the strength of evidence.

4 Q. Okay.

5 So, then, the strength of
6 evidence, for example, if you were reviewing
7 the relationship between PCE and Parkinson's
8 Disease in a case where the standard of
9 review was more likely than not, or say
10 preponderance of the evidence, you might have
11 a different conclusion than you did in your
12 report for Camp Lejeune. Is that fair?

13 MR. SNIDOW: Object to form,
14 incomplete hypothetical.

15 A. If the standard is more likely
16 than not, then that's a threshold. That's
17 the 2.0 threshold.

18 So a study either meets it --
19 or findings either meet it or they don't meet
20 it. If we're talking about substantial
21 factor, then that's above equipoise, but it
22 could be below 2.0.

23 So the study either meets that
24 or it doesn't. That's -- but there's still a
25 yardstick to judge by in that case, as there

1 is with equipoise or better.

2 BY MS. SILVERSTEIN:

3 Q. What's the yardstick that
4 you're judging by for equipoise?

5 A. It's the language that's in my
6 report, which is it's -- it's 1.0 or better,
7 it's equipoise or better. And the -- that is
8 a -- that is a standard that is described in
9 the statutory language. Or the ATSDR
10 language, rather.

11 So I'm using that language to
12 describe it. It's not a standard that I
13 manufactured, it's a standard that I'm just
14 representing what I've read.

15 Q. And to the best of your
16 recollection, did the Camp Lejeune Justice
17 Act specify that the standard from ATSDR
18 2017's Public Health Assessment should be
19 used to evaluate the scientific evidence?

20 MR. SNIDOW: Object to form.

21 A. I don't think I specified that
22 in my report, so I can't tell you what the
23 answer is off the top of my head.

24 BY MS. SILVERSTEIN:

25 Q. And you don't recall from

1 reviewing the Camp Lejeune Justice Act?

2 A. I didn't memorize it, so no.

3 Q. Dr. Freeman, would you agree
4 that the -- that you believe the appropriate
5 standard for a scientific conclusion in the
6 field of forensic epidemiology depends on the
7 jurisdiction?

8 MR. SNIDOW: Objection to form.

9 A. It depends on what the
10 statutory language is for that particular
11 jurisdiction.

12 BY MS. SILVERSTEIN:

13 Q. So it could differ between two
14 cases you're an expert witness on, is that
15 fair?

16 A. Certainly. If you're talking
17 about, for example, California law.
18 Substantial factor causation is quite a bit
19 different, the preponderance of evidence, but
20 it is defined statutorily.

21 Q. Have you ever applied the "at
22 least as likely as not" standard in your
23 expert work for criminal cases?

24 A. No. That wouldn't be
25 appropriate.

1 Q. And I apologize if I already
2 asked and answered you this, but have you
3 applied the "at least as likely as not"
4 standard in other cases that you've been an
5 expert for?

6 A. I have not.
7 You did ask me before.

8 MR. SNIDOW: Asked and
9 answered.

10 MS. SILVERSTEIN: I appreciate
11 you providing me the answer a second
12 time.

13 BY MS. SILVERSTEIN:

14 Q. Earlier you talked about
15 someone that you worked with, Dr. Teeter; is
16 that right?

17 A. Yes.

18 Q. How did you and Dr. Teeter
19 determine which parts of the report he would
20 work on versus you?

21 MR. SNIDOW: Objection, asked
22 and answered.

23 A. Largely through discussion of
24 what do you want to take on, what can you
25 take on, what are you most comfortable with,

1 versus what I could take on. It had to do
2 with timing, for me, and his interest in
3 particular topics that he was chasing down.

4 BY MS. SILVERSTEIN:

5 Q. For your kidney cancer report,
6 are there any sections that you did the
7 research and the first draft of?

8 A. Yeah, there's a bunch of
9 sections that I did the research for drafting
10 it.

11 Q. And for your kidney cancer
12 report, are there sections that Dr. Teeter
13 did the research and first draft of?

14 A. First draft of the report was
15 all my editing. So I took his information as
16 basically the information I incorporated into
17 the report, but everything was edited by me.
18 So all those words are -- virtually all of
19 those words are words that I have written,
20 but some of it -- some of the information is
21 based on information I got through
22 Dr. Teeter.

23 Q. When you say "words that you
24 edited," do you mean that you took his
25 research and then drafted a paragraph for the

1 first time? Or do you mean you took a
2 paragraph and modified the paragraph to
3 language you were more comfortable with?

4 A. Depends. Usually the latter,
5 but sometimes the former.

6 Q. Do you recall which sections it
7 was the latter for?

8 A. No.

9 Q. Were there any chemical-disease
10 pairings that Dr. Teeter did the primary work
11 and you came in and edited paragraphs that he
12 had initially drafted?

13 A. Well, like I said, anything he
14 sent to me was edited and turned into my own
15 words. Not to say that he's not an excellent
16 writer, but I have my own particular style.

17 Q. Okay. Did you read every study
18 that you cited in your report?

19 A. If I cited it, I read it.

20 Q. So all of the studies cited in
21 the footnotes in your report, you personally
22 read the study, is that fair?

23 A. No. If I personally cited
24 the -- if I personally cited the study, then
25 I read the report. If Dr. Teeter cited the

1 study, then he read the report, or the study.
2 Sorry, if he cited it in the -- information
3 that I had, in a paragraph, for example, then
4 it was something that he read. I might then
5 have reviewed the study that he reviewed as
6 well.

7 Q. So in the -- in your reports
8 that we were discussing today, for your
9 kidney cancer and Parkinson's Disease, would
10 it be correct to say that there are studies
11 cited in the footnotes of those reports that
12 you haven't reviewed?

13 A. Yes, there would be some that
14 I've not read an extense of.

15 Q. And for those studies, did you
16 rely on Dr. Teeter's interpretation of the
17 study results?

18 A. No, they're not interpreted --
19 they're abstracted, but not interpreted.

20 Q. Did you rely on Dr. Teeter's
21 abstraction of those study results?

22 A. In some cases, yes.

23 MS. SILVERSTEIN: And I think I
24 am done with my questions.

25 THE WITNESS: All right.

1 MS. SILVERSTEIN: Thank you so
2 much for your time today, Doctor.

3 MR. SNIDOW: Just a brief
4 redirect.

5 THE WITNESS: Nope, I'm
6 leaving.

7 MR. SNIDOW: Good.

8 J.J. Snidow on behalf of the
9 plaintiff leadership group.

10 -----

11 EXAMINATION

12 -----

13 BY MR. SNIDOW:

14 Q. Dr. Freeman, thank you for your
15 time today. Just a few follow-up questions.

16 First, I think earlier in the
17 deposition, when referring to a Parkinson's
18 study, you said the Goodman study a couple of
19 times. Am I right that you meant the Goldman
20 studies?

21 A. Yes.

22 Q. Thank you.

23 I think earlier in the
24 deposition you mentioned -- you were
25 discussing with Ms. Silverstein the 95th

1 percent confidence interval.

2 Do you remember that?

3 A. Yes.

4 Q. And I think at one point you
5 said that's the most commonly used measure of
6 significance. Did you mean statistical
7 significance?

8 A. Yes.

9 Q. And am I correct that a result
10 can be statistically not significant but
11 still provide evidence in favor of causation?

12 A. Without question.

13 MS. SILVERSTEIN: Objection.

14 A. Sorry.

15 BY MR. SNIDOW:

16 Q. You were asked by
17 Ms. Silverstein whether a risk ratio of 1.2
18 would be characterized as a modest
19 association. Do you remember that?

20 A. Yes.

21 Q. Can modest association still be
22 causal?

23 A. Absolutely.

24 Q. Ms. Silverstein asked you about
25 dose-response, in particular whether certain

1 results were monotonically dose-response.

2 Do you remember that?

3 A. Yes.

4 Q. If there's a dose-response
5 relationship but it's not monotonic, can that
6 provide evidence in favor of causation?

7 MS. SILVERSTEIN: Objection.

8 A. It can.

9 BY MR. SNIDOW:

10 Q. Ms. Silverstein asked you
11 whether you performed a risk assessment. Are
12 you a risk assessor?

13 A. Not in the way that she was
14 asking.

15 Q. Okay. Did you rely primarily
16 on epidemiology rather than theoretical
17 modeling of risks?

18 A. Yes. It's a very loose use of
19 risk. Results of the studies that I
20 performed and the forensic analyses that I do
21 are often characterized in terms of risk, or
22 risk ratios or odds, and odds ratios, which
23 are a form of risk. So it's a bit -- it's a
24 term that has specific meaning coming from my
25 discipline.

1 But once she clarified what she
2 was referring to, that is far outside of the
3 area that I work in.

4 Q. On a few occasions you
5 mentioned to Ms. Silverstein that certain
6 site designs would bias the results toward
7 the null. Could you explain what you mean by
8 that?

9 A. Yes. If, for example, as
10 described in the Bove and Goldman studies,
11 there are mixed in with the Camp Lejeune, the
12 quote, exposed group, there are people who
13 are not exposed or they're less exposed, then
14 you're diluting the effect of actually being
15 exposed. So that biases the difference in
16 risk towards 0, which is another term for the
17 null.

18 Q. So when there is bias toward
19 the null in a study, will that make the
20 results appear stronger or weaker than they
21 are in reality?

22 MS. SILVERSTEIN: Objection.

23 A. Weaker.

24 MR. SNIDOW: Thank you.

25

1 BY MR. SNIDOW:

2 Q. What's a point estimate?

3 A. That is the single estimate of
4 risk or relative risk or odds ratio around
5 which a confidence interval is bracketed.

6 Q. Am I correct that the point
7 estimate is the best estimate being provided
8 by a study regardless of how big the
9 confidence intervals are?

10 MS. SILVERSTEIN: Objection.

11 A. Yes, you always have to start
12 with a point estimate.

13 BY MR. SNIDOW:

14 Q. You were asked on several
15 occasions whether confidential intervals were
16 wide or not. Is that kind of a subjective
17 judgment?

18 A. Generally it is.

19 I think that the questions that
20 I -- where I was asked about confidence
21 intervals, and whether I would consider them
22 wide, would be generally deemed to be wide,
23 however.

24 Q. Some of them were quite large?

25 A. Yes.

1 Q. But am I correct, there's
2 not -- there's not a set standard for when a
3 confidence interval is, quote/unquote, wide?

4 A. Correct. The confidence
5 interval ratio, for example, of three, is
6 relatively narrow. Four is not what I would
7 consider wide, but ten, I would expect, would
8 generally be considered wide.

9 Q. And I think Ms. Silverstein
10 asked you about some that were on the rate of
11 30, maybe?

12 A. Yes.

13 Q. Ms. Silverstein asked you a
14 number of questions about whether studies had
15 controlled for various risk factors. Do you
16 remember that?

17 A. Yes.

18 Q. And I believe she asked you
19 about well water, obesity, traumatic brain
20 injury, family history, smoking, and maybe a
21 couple of other ones I missed.

22 A. Yes.

23 Q. Do you remember that
24 conversation?

25 A. Yes.

1 Q. In the study, you know what
2 confounding is?

3 A. I do.

4 Q. For a risk factor to lead to
5 confounding in a study, what conditions need
6 to be true?

7 A. Well, it has to be associated
8 with both the exposure and the outcome.

9 Q. And in any of the studies that
10 she mentioned, was there any evidence, for
11 example, that the people in the study who got
12 kidney cancer had been exposed to more well
13 water?

14 MS. SILVERSTEIN: Objection.

15 A. No. Nor is there evidence --
16 is there any evidence that that rate of
17 exposure, of well water as a child, for
18 example, there is any difference between --
19 difference between Camp Pendleton and Camp
20 Lejeune.

21 BY MR. SNIDOW:

22 Q. That was my next question. For
23 obesity, traumatic brain injury, family
24 history, any other risk factors, any evidence
25 in the literature that those risk factors are

1 distributed differently in the Camp Lejeune
2 population than they are in the Camp
3 Pendleton population?

4 MS. SILVERSTEIN: Objection.

5 A. Not that I'm aware of.

6 BY MR. SNIDOW:

7 Q. All right. Ms. Silverstein
8 asked you a variety of questions about
9 threshold dose, and I believe you said that
10 nobody has detailed information -- excuse me.
11 Strike that.

12 I believe you said that nobody
13 has detailed enough information about how
14 much TCE is needed to cause kidney cancer.
15 Do you remember that?

16 A. Yes.

17 Q. Were you suggesting that there
18 is a threshold dose for TCE and kidney
19 cancer?

20 A. There may be, it's just never
21 been defined.

22 Q. And at the levels we're
23 operating here at Camp Lejeune, based on your
24 review of the literature, is there any
25 indication that we are below the threshold or

1 anywhere near that?

2 A. No.

3 MS. SILVERSTEIN: Objection.

4 BY MR. SNIDOW:

5 Q. You were asked about whether
6 you reviewed individual papers underlying one
7 of the meta-analyses.

8 Do you remember that?

9 A. Yes.

10 Q. What's the purpose of a
11 meta-analysis?

12 A. It is to review -- it's a study
13 of studies. The purpose is to evaluate and
14 if possible pool information from a number of
15 different studies to strengthen the
16 conclusions set from a statistical
17 perspective.

18 Q. You were asked about the
19 Goldman 2012 twin study. Do you remember
20 that?

21 A. Distinctly.

22 Q. Yes. Was there any suggestion
23 in that study that the various risk factors
24 Ms. Silverstein identified were more common
25 in the twin who had been exposed to PC or

1 TCE?

2 MS. SILVERSTEIN: Objection.

3 A. No, none at all.

4 BY MR. SNIDOW:

5 Q. And given that -- strike that.

6 You were asked questions about
7 the Goldman 2012 study. Do you remember
8 that?

9 A. Yes.

10 Q. And Ms. Silverstein was asking
11 you questions about whether there were only
12 five and nine test cases in the study. Do
13 you remember that?

14 A. Yes.

15 Q. Here's my question: Is it
16 correct to say that the Goldman 2012 study
17 only included five or nine people in the
18 study?

19 A. No.

20 MR. SNIDOW: Almost done.

21 BY MR. SNIDOW:

22 Q. Ms. Silverstein asked you about
23 whether you had seen the phrase "as likely as
24 not" in the peer-reviewed literature. Do you
25 remember that?

1 A. Yes.

2 Q. Have you seen the word
3 equipoise in the peer-reviewed literature?

4 MS. SILVERSTEIN: Objection.

5 A. No. It doesn't really pop up
6 in the literature that I reviewed, anyway.

7 BY MR. SNIDOW:

8 Q. Okay.

9 A. I'm not saying that it hasn't
10 appeared in the literature, other than the
11 literature we're talking about, of course.

12 Q. Sure.

13 A. But no, it's not something that
14 I've been familiar with in the past, and --
15 at least in the kind of epidemiologic studies
16 I typically review or write or edit.

17 MR. SNIDOW: Okay. No further
18 questions.

19 MS. SILVERSTEIN: I don't have
20 anything further. Thank you again for
21 your time today, Dr. Freeman.

22 THE VIDEOGRAPHER: This
23 concludes the video deposition. We
24 are off the record at 4:27 p.m.

25 (Time noted: 4:27 p.m. PDT)

C E R T I F I C A T E

I, DEBRA A. DIBBLE, RDR, CRR, CRC,
Notary Public, do hereby certify:

That MICHAEL D. FREEMAN, MD, PhD,
MScFMS, MPH, the witness whose deposition is
hereinbefore set forth, was duly sworn by me
and that such deposition is a true record of
the testimony given by such witness;

That pursuant to FRCP Rule 30,
signature of the witness was not requested by
the witness or other party before the
conclusion of the deposition;

I further certify that I am not
related to any of the parties to this action
by blood or marriage, and that I am in no
way interested in the outcome of this matter.

IN WITNESS WHEREOF, I have
hereunto set my hand on this 26th day of
June. 2025.



Debra A. Dibble
Fellow of the Academy of Professional
Reporters
Registered Diplomate Reporter

1 I HEREBY CERTIFY that I have read
2 this transcript of my deposition, and that
3 this transcript accurately states the
4 testimony given by me, with the changes or
5 corrections, if any, as noted.

6
7
8 X _____
9 MICHAEL D. FREEMAN, MD, PhD, MScFMS, MPH

1 ERRATA SHEET FOR THE TRANSCRIPT OF:

2 CASE NAME: In Re: Camp Lejeune Water

3 Litigation

4 DEP DATE: June 17, 2025

5 DEPONENT: MICHAEL D. FREEMAN, MD, PhD,

6 MScFMS, MPH

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25 MICHAEL D. FREEMAN, MD, PhD, MScFMS, MPH

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0	000014115 7:11	82:2,8,14,16	1.92 154:13
0 184:16	142:2	89:20 90:10	1/3 44:14
276:13,18	0000291324	291:6	10 9:1 37:8
300:16	7:20 149:22	1.0. 213:1	87:14,14
0.05 86:11	0000291336	1.02 91:20,21	119:18 145:16
156:1	7:22 149:23	1.05 83:19,22	145:17 154:8
0.1 156:4	00897 1:4	84:14 271:22	158:4 167:9
0.11 155:23	12:15	1.06 176:17,20	168:9,13
0.15 237:20	05 84:24 86:24	1.08. 215:13	177:16,24
0.21 160:25	87:4,11,25	1.16 144:24	226:21
161:24	88:16,21 90:22	1.2 81:2 111:22	10.5 250:12
0.22 160:12	155:3 251:4	112:2 250:5,7	100 231:8
0.23 161:14	06 237:13	298:17	104 6:15
0.28 154:24	1	1.2. 81:15	10:08 72:20,21
0.34 159:9	1 6:3 18:16,17	1.28 260:4	10:19 72:22,24
0.52 151:22	19:6 56:18	1.3 151:18	11 9:8 119:18
158:21	86:15,18,24	1.34 196:4	191:21 192:3
0.58 154:16	87:4,12,14,14	1.42 215:14	1100 3:4
0.63 146:12	87:14 88:16,21	1.5 81:11,14	1101 3:3
0.76 152:25	105:8 145:5	91:16	111 3:13
155:13	151:24 155:5,6	1.51 219:22	113 250:15
0.8 226:20	167:9 192:20	220:15	11:22 126:10
0.82 215:14	217:6 250:25	1.54 146:9	126:11
0.83 237:2	251:6,7 257:11	237:17	11:29 126:12
0.84 145:2	257:12 260:8	1.57 145:2	126:14
0.97 250:15	1,000 256:2	1.59 237:20	12 5:4 9:14
0000000214 8:9	1,2 55:5,9	1.61 219:22	197:8
164:2	1,900 231:22	220:12,15	12-6-24 6:8
0000000340	1-20-2017 6:12	1.66 219:22	52:14
8:11 164:3	99:13	220:11	12-8-2024 6:4
		1.7 259:25	10:20 37:22
			239:7

12.86 152:25 155:13 12:33 183:7,8 13 5:8 9:17 143:23,25 144:3 199:24 200:9 234:23 260:3,7 261:1 261:10 13th 260:12 14 10:2 205:25 1400 33:14,19 33:23 141 7:1 149 7:12 14th 23:10 15 10:8 37:11 37:13 51:24 214:14,20 266:11,13,14 150 3:8 16 10:12 129:13 221:23 163 8:1 168,361 256:3 17 1:13 10:14 12:3,7 224:6 310:4 171 8:12 172,128 256:2 1737 263:11,12 177 9:1 18 6:3 10:18 229:24 233:21	18854 308:21 19 10:20 239:6 239:11 1900 232:16 191 9:8 1950 94:11 1953 94:1,15,20 261:5 197 9:14 1975 127:18 172:16 176:8 176:14 180:10 258:20 272:3 272:11 273:4 273:16,21 274:4 1979 219:13 1985 172:16 176:9 180:10 258:20 272:4 272:11 273:4 1987 94:1,15,20 261:5 1988 207:17,19 208:11 1989 208:15 199 9:17 1990 231:19 1990's 47:21 1991 64:24 1995 64:25 1997 127:22,25 128:7	1998 234:24 235:3 1999 208:18 1:36 183:9,11 1st 21:5,9,13,14 21:17 261:5 2 2 6:4 37:20,21 38:2 56:18 131:13 140:12 167:9 185:7 271:4 280:17 2,000 36:3 2,100 231:21 2.0 290:17 2.0. 290:22 2.19 153:15 2.19. 153:12 2.28 153:11 2.41 271:22 2.5 83:19 91:19 2.51 160:23 2.52 161:21 2.67 151:22 2.68 160:9 2.81 161:11 2/3 44:12 20 10:23 36:24 44:24 81:6 87:12 165:4 246:10,16 200 2:14 230:15	2000 235:6,8,20 236:1 20036 3:4 2004 103:15,22 20044 3:25 2006 198:23 199:2 200:20 2007 10:18 229:8,21,25 230:8 2008 10:14 219:13 221:11 224:3,7,12 2009 128:10 129:11,18 130:1,15,16,25 2010 191:19 192:4 195:7,15 197:6 198:19 201:21 2011 9:14 197:9,18 2012 229:3 236:7 246:21 247:3 248:25 251:10,17 253:18 262:11 263:22 305:19 306:7,16 2013 264:7 2014 126:24 127:4 142:5,23 150:9 156:19 211:18 214:21
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215:23 254:18 2017 99:18 100:10 260:3,8 260:12 261:1 261:10 267:24 283:23 284:1 2017's 291:18 2018 8:1 127:7 163:22 164:15 166:13 168:5 169:13 170:12 238:4 2019 209:4,10 213:9,13 202 3:5,25 2020 65:2 2021 281:4,18 2022 267:4 268:2 2023 254:8,11 254:17 255:11 255:14 256:13 257:17,25 259:5 262:11 263:23 2023's 255:15 2024 10:12 19:20,23 20:13 20:18 21:5,9 21:14,19 22:18 22:19,19,25 23:6,7,8,20,20 40:10,17 41:6 43:4,21 127:10	127:13 172:7 177:24 178:9 178:14 179:23 181:17 221:24 255:11 262:14 262:21 263:23 2025 1:13 12:3 12:7 23:10 129:12 308:20 310:4 206 10:2 21 11:2 253:20 254:3 214 10:8 21st 23:6 22 11:6 261:20 262:3 221 10:12 224 10:14 229 10:18 23 280:19 235 2:13 239 10:20 246 10:23 25 33:18 226:19 2500 36:6 253 11:2 26 35:3 38:4 26,000 23:6 261 11:6 26th 308:19 27 23:7 132:21 132:23 137:21	271 231:12 272 230:23 275 230:21 27611 3:19 27843 3:19 279 258:5 27th 19:20 20:17 22:19 23:20 297 5:9 2:50 238:21,22 2:59 238:23,25 3 3 5:3 6:8 40:20 43:5 52:13,19 53:3 97:6 105:5 131:13 132:22 151:13 155:7 167:9 173:1 174:20 176:1,4,13 189:9 240:21 249:24 250:2 259:16,19 3,000 36:4,6 3.13 152:22 155:10 3.5 91:16 3.75 146:12 30 33:18 46:13 140:10,14,16 302:11 308:10	30.76 161:1 30.83 161:24 307-5818 3:25 308 5:11 31 225:6 242:13 312 3:10 31st 261:5 32 264:3,6 33 101:5,9,12 101:15 186:24 188:24 250:5,7 33.28 160:12 335 201:1 34 211:23,24 212:3 34.11 161:14 340 3:24 358.7 272:3 36 191:3,7,9 37 6:4 208:23 241:5 244:13 265:14,16 38 205:4 207:24,25 38.19 158:21 39 196:21,25 201:18,20 3:50 280:6,7 3:58 280:8,10 4 4 6:12 40:20 43:5 55:24
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

56:2 99:12,18 101:6 104:1 144:17 145:11 145:12 154:1,4 154:11 155:9 155:19,23 174:20 4,647 159:21 160:5 4,970 242:16 4.1 83:22 4.44 158:18 40 96:25 97:10 97:13 165:23 4100 3:9 425 224:17,20 45 210:12 213:3 450 34:22 35:6 463 215:15 4:27 2:9 307:24 307:25	5.56 271:22 50 83:20 84:14 165:23 217:6 242:17 243:6 500 3:14 34:23 35:6 231:22 51 216:24 217:15 512 3:15 52 6:8 219:6,8 219:10 221:10 529-3351 3:20 54 164:21,24 226:12,14 55 165:14 227:15,18 556 206:14,15 56 167:8 228:21 271:8 59 233:24 234:15 236:18 5th 23:8,20 127:13 131:9	6.34 154:16 6.4.4 231:14 60 237:25 60606 3:9 66 271:3,5,6,8,9 665 216:9,10,13 674 254:20 260:20 679 258:6,10 690-0990 3:15	8 8 8:1 153:25 154:2 163:21 164:7 80 37:4,5 44:24 83 237:9 85 272:21 274:8 87 200:7,15
5	6	7	9
5 6:15 37:8,13 91:19 104:4,11 126:22 186:19 187:2 188:25 252:11 5-139 198:1,6,8 5.0 84:15 5.11 153:18 5.2.2 198:9	6 7:1 141:19 142:15 158:5,7 159:17 180:2,3 180:4 225:9 237:15 6-3 230:14,20 231:2,6 6.1 224:21 250:2	7 7:12 144:15 144:17 145:19 145:21 149:16 150:3 151:8,11 211:20,24 212:1,3,5,7,21 222:25 223:4,6 7.1 153:18 70 69:4 7364522 1:24 741-5220 3:10 742-5404 3:5 75 272:21 274:8 76 271:19,24 777 247:9 780 249:10 781 252:17,21 782 253:6 78701 3:14 7:23 1:4 12:15	9 8:12 58:6,11 58:14 167:9 171:15 205:19 252:7 9.78 159:9 90s 33:17 90:25 91:1 919 3:20 95 79:25 81:21 84:23 90:13 145:22,24 146:17 152:2,3 152:24 153:2 153:20 154:5 154:15,18 155:12 158:8 158:11 159:2 159:15 160:17 161:6,18 162:4 172:25 180:7 180:25 212:25 215:14 237:19 250:24,24

271:22 95th 297:25 96309 14:1,6 97 10:17 224:9 251:5,7 97301 12:17 98 91:15 99 6:12 145:9 247:12,22 9:04 2:8 12:3,8 9:09 18:24,25 9:10 19:1,3	absence 48:18 115:12 116:4 absolutely 52:10 76:4 298:23 abstract 206:22 abstracted 296:19 abstraction 296:21 academia 44:15 45:12 academic 50:25 61:24 academy 2:10 308:23 accept 89:5 90:2,16 acceptable 71:10 accepted 67:9 90:5 91:8,10 112:21 279:7 access 249:1,5 accessible 174:14 account 67:25 115:25 116:4 140:17 147:3,9 147:16 148:7 149:11 162:11 162:18,22 163:5,10,15 177:7 179:20	181:18 182:1,7 182:12,16,23 258:25 accounted 182:4 accuracy 134:3 accurate 38:11 40:7 46:1 165:5 198:22 accurately 309:3 acknowledge 215:19 acknowledges 258:18 acquire 279:6 acquired 119:11 140:24 acquisition 122:14 act 243:18,23 281:4,18 282:11 291:17 292:1 acting 76:19 action 29:12,25 90:17 288:1 308:15 active 176:7 actual 112:11 203:7,12,18,23 actually 19:13 34:15 37:11 45:15 47:20	54:1 75:21 90:24 91:21 94:4 124:19 135:15 138:17 171:25 174:4 180:17 212:9 217:5 220:19 227:6,7 235:24 242:14 275:20 275:22 277:1 277:15 300:14 add 24:19 109:18 addition 68:7 213:25 additional 50:5 76:7 78:13 129:13 266:23 additionally 165:6 additive 101:2 102:17 103:7 103:17,18 109:16,22 279:24 address 13:20 48:12 50:1 51:2 addresses 98:7 98:10 165:5 addressing 64:7 76:8 124:23,25 135:14 241:1
a			
a.m. 2:8 12:3,8 18:24,25 19:1 19:3 72:20,21 72:22,24 126:10,11,12 126:14 able 18:14 27:7 27:8 82:9 132:19 179:11 187:21 188:2 216:20 232:11 236:5 above 2:7,8 78:21,25 90:10 188:25 245:4 245:16,19 264:25 280:25 281:4,12 283:20 284:9 284:21 290:21			

adjusted 154:6 176:16 189:10 212:8,10 administration 255:16 256:7 261:2 263:1 adulthood 248:17 adults 131:9 148:22 advanced 285:23 advantage 129:13 adverse 128:24 affected 82:6 169:5 affirm 12:23 age 131:4 263:8 263:17 agencies 131:1 285:25 agency 169:19 169:22 170:9 255:6 284:24 285:9 287:10 agent 73:6 117:13 118:6 226:2 agents 117:5 253:12,14 ago 13:10 24:4 33:16 34:4 224:3	agree 39:6,11 49:9 60:2,19 61:14 67:22 81:3,11,16 86:10 91:7 100:13,17 104:21 105:18 106:1,13,21 111:23 112:7 115:17 116:3 117:12 118:2,5 119:10 121:23 122:15 125:3 125:20,25 130:19 131:3,7 133:8 138:19 138:23 139:2 148:18 151:17 151:21,23 152:1,6,20 153:5 154:11 158:23 159:4 159:14,19,24 163:18 176:12 178:6 180:15 181:9,15 188:14 189:14 189:23 190:23 194:1 195:6 205:7,10,17 212:8,20 213:5 213:13,16 214:10,13 215:22,25	218:6,16,22 219:25 220:11 220:16 223:11 226:5,8,25 227:10,22,25 234:9,22 235:1 235:4,8 236:7 236:10 237:1,8 241:15,20,25 242:2 243:11 243:16 244:5 244:11,20,23 245:8,18,22 246:3 247:11 248:15 249:4 249:11,19,22 250:1,7,10,23 251:5,7,9,16 254:16 255:21 257:17,25 261:9,13 263:7 263:22 264:12 264:15,23 265:8 267:11 267:19 269:23 270:2,3,10,15 270:17 273:2 275:23 279:4 279:12 281:19 284:5,24 285:8 286:2,5 292:3 agreed 156:3,5 242:12	agrees 287:13 agriculture 132:12 ahead 17:18 18:15 39:24 56:13 59:7 96:24 101:5 103:25 105:4,9 105:22 107:16 132:20 144:14 151:7 163:19 164:20 165:13 168:9 171:13 176:1 177:14 180:1 186:18 191:3 196:21 197:25 199:23 201:4,17 205:3 206:13 207:12 210:12 213:2 216:9,24 219:5 224:16 226:9 226:12 233:18 238:14 240:13 240:19 241:4 249:10 253:17 261:18 264:1 270:21 ahh 255:2 air 6:16 104:6 104:12,22 131:19 al 142:23 150:10 198:19
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

198:23 231:19 255:7 267:24 alexander 9:12 191:25 allow 15:23,24 94:24 96:3 165:25 268:25 allowed 243:13 allows 272:24 amount 45:16 92:4,17 113:8 122:17,19 123:15,25 166:19 204:9 204:11 211:6 277:7 279:5,17 amounts 157:25 203:7 203:19,24 anaerobically 266:21 analgesic 139:22 140:22 analogous 268:19,25 analogy 64:12 64:15 121:9 analyses 31:6 63:12,17,20,24 64:2,5,19 65:5 65:11,15,16 166:5 169:18 191:13,14 192:7,16	193:23 194:5 197:2 205:8,11 205:21 213:22 214:2,4,23 244:21 299:20 305:7 analysis 9:11 10:10 30:12 64:8,24,25 65:3,22 66:6 69:14 70:8 71:12,13 78:7 103:14 108:17 120:13 121:17 178:15 180:9 191:14,24 196:13 198:10 203:15 210:19 213:6 214:9,16 217:20,21 218:8 219:11 264:7 277:24 281:20,22,23 281:24 283:2 305:11 analytic 256:5 analytical 256:13 257:5 analyze 64:19 65:17 81:17 124:8 257:3 277:18 analyzed 92:16 106:4 178:25	196:1 262:17 262:21 273:19 analyzing 104:25 173:23 179:18 247:12 andersson 10:7 206:4 angiosarcoma 223:14,14 angiosarcomas 225:2 animal 102:9 125:3,16,23 126:1 animals 125:11 226:20,21 238:4 answer 15:23 15:25 17:1,8,8 17:18 21:10 22:22 33:12 41:13 48:22 49:6 56:13 58:1 59:8 61:14 71:8 103:3 121:12 130:12 132:19 147:19,24 148:16 175:18 178:20 179:11 182:20 190:13 190:19,19 207:22 209:13 232:12,20,22	236:5 273:12 277:4 291:23 293:11 answered 17:17 71:6 78:4 85:10 94:22 98:2,17 108:8 111:11 124:13 130:22 137:12 155:15 293:2,9,22 answering 15:12 answers 16:1 antiretroviral 90:19 anybody 25:19 26:25 32:4 55:2 69:15 73:3 96:5 126:17 183:15 184:7,12 204:24 239:3 280:13 282:18 anyway 15:23 15:24 40:20 307:6 apologies 221:21 273:10 apologize 18:20 58:8 230:22 273:14 293:1 apparent 253:3
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

apparently 288:3	appreciate 293:10	arriving 210:10	98:2,17 108:7
appear 19:7 38:10 102:23 102:23 103:6 300:20	approach 83:3 198:19 275:4	article 96:17,19 104:17,22 105:11 175:9 206:21 207:13 217:2 269:7,13 269:21	111:11 124:13 129:10,12 130:22 134:23 137:12 155:14 170:5 179:4 210:3 274:6 282:17 284:12 284:13 293:2,8 293:21 298:16 298:24 299:10 301:14,20 302:10,13,18 304:8 305:5,18 306:6,22
appearances 5:3 12:18 40:16 42:8,12 42:16,22	appropriate 67:9 110:5 119:7 186:17 188:15 189:5 189:15 190:24 292:4,25	articles 171:4 240:8 284:15	
appeared 307:10	approximate 247:23	ascertained 260:2,7	
appears 222:14	approximately 28:21,23 226:21	ascertainment 255:19	
appendix 103:15	april 8:1 163:22 164:15	aside 26:24 33:1 42:21 45:9 53:20 54:25 55:14 59:13 104:1 105:10,23 119:23 171:14 174:23 177:15 199:23 217:1 223:18 226:10 233:19 238:15 240:5 253:18 261:19 264:2 270:22	
application 48:6 227:19	arbitrary 87:11 88:16,17 190:25 251:4		asking 17:2 69:18 83:8 85:1 94:14,16 134:5 137:5 252:1 299:14 306:10
applied 47:9,11 48:16 49:6 106:7 117:25 121:3 283:3 292:21 293:3	area 26:20 51:8 95:7 132:2,10 275:7 279:20 300:3		aspect 62:17 116:11 184:12
applies 49:14 86:24	areas 45:24 121:4,4 132:8 274:22 275:24 289:12		aspects 9:22 43:12,14 47:7 67:4 200:3,13
apply 49:1 93:12,24 94:19 95:25 107:10 108:25 185:8 186:1 218:10 218:12 272:11 272:15	arena 36:22,25 44:24,25	asked 17:17 30:14 41:11 50:1 51:1 57:11 71:5,18 73:22 78:4 85:10 94:5,22	assembled 255:5
applying 48:21 106:12,22 108:3	argue 81:14 153:23 220:13		assembly 254:23
	arrived 13:11		assertion 211:15
			assess 49:13

assessed 216:19	106:14,22,23	atsdr 6:12 93:7	attorney 42:19
assessing	107:6,8,20	95:3,15,20	attorneys 13:13
128:13 203:16	108:5,21	96:1,5 99:13	28:11 69:19
assessment	110:10,25	99:18 100:9	72:1
6:13 99:14,19	111:4,7,8,14	101:15 103:15	august 10:18
100:10 123:2,5	113:11 116:25	103:21 109:16	229:25 261:5
123:12,14,23	119:13,21	126:22 127:1,7	austin 3:14
124:18 127:22	120:2,4,5	127:22 128:19	author 89:11
128:1,8 175:12	121:8 129:5	164:14 166:13	173:22 216:13
178:3 203:8,11	130:7 138:18	170:12 171:9	239:23 262:10
283:24 284:2	141:10,15	171:10,11	263:24
291:18 299:11	176:25 191:15	178:8 187:5	author's
assessor 299:12	193:7 195:25	213:10,13	189:23 193:17
assisted 38:18	210:22 217:7,9	221:20 222:8	authored 283:8
associated	217:17,22	222:12 223:12	284:10,16
29:25 47:23	228:3 229:1	229:7,14,22	authority 87:21
51:5 77:8	237:5 259:6,10	230:9 242:25	authors 152:7
109:3 112:1	264:21 265:1	243:3,10 255:7	152:17 189:8
117:1,13 118:6	273:20 289:14	275:14 276:2,9	192:25 193:11
118:13 122:5	298:19,21	276:11,17	193:18 194:2
131:12 140:19	associations	277:5,13	195:22 196:3
141:5 234:16	107:4 119:20	281:11 283:19	206:24 215:11
238:6 267:18	193:1	283:23 291:9	215:19 240:6
271:13,20,23	assume 17:2	291:17	258:18 263:3
286:20 303:7	19:12 20:15	atsdr's 171:1	263:16
associates	21:6,20 38:8	attachments	availability
201:21	58:21 143:19	38:7,9 40:4	273:6
association	279:1	attacks 47:24	available
60:18 62:15,22	assumed	attempt 278:6	128:21 228:25
64:14 74:15	166:23 167:18	attempted	247:19
78:16,20,21,24	assuming 20:22	94:10	avenue 3:3,13
79:14,18 81:2	assumptions	attention	average 50:17
81:10 82:11,15	244:6	184:23	271:18 278:10
87:6 92:3			

<p>aware 87:20 95:3,14 127:25 128:7 129:3 130:4 136:10 136:17 137:5 137:17,22 138:2,9,14 139:16,21 140:1 143:1,4 143:8,11,14,18 147:8,15 150:12,19,23 151:2 156:6,10 156:14 166:17 166:22 167:17 167:23 169:4 169:13 170:11 172:19 173:7 175:11 178:8 178:24 179:16 179:21 200:23 202:16,23 236:1 240:11 257:10 260:11 260:17 264:9 275:14 276:1 276:10 277:5 277:12 284:1 304:5 axelson 10:6 205:11,14,16 205:21,23 206:3</p>	<p>b</p> <p>b 35:3 75:12 268:5 back 68:13 90:25 91:24 98:18 104:2 139:4 147:23 157:8 178:11 178:13 183:13 188:9 202:21 205:19 213:2 217:5 231:13 236:4 273:24 287:21 288:20 background 56:3 57:1,16 60:1,10,13 62:4,13 66:25 76:10,13,18 140:4 229:10 268:11 backwards 48:8 bad 121:12 190:18 baffling 106:19 balance 79:3 116:6 ballpark 35:6 37:13 bananas 231:9 barely 251:1</p>	<p>barracked 143:13,17 base 7:5 8:6,17 9:6 11:4 93:13 93:19 94:11 142:18 149:19 150:5 157:14 164:1,11 167:2 167:21,24 171:19 176:8 177:20 178:16 180:9 253:22 254:5 based 22:16 48:21 51:2 63:5 65:22 66:2 67:7 75:1 77:13,17 83:10 84:21 86:21 108:12 109:4 124:3 125:22 175:23 178:15 189:25 190:5 194:4,12,19 195:14 237:12 244:6 248:4,11 252:24 268:14 270:19 274:7 288:2,19 294:21 304:23 bases 7:15 141:23 bash 3:12</p>	<p>basic 67:7 basically 204:2 294:16 basis 60:9,14 108:13 128:23 135:19 199:2 beef 231:24,25 began 74:9 176:7 253:7 beginning 131:9 210:4 242:15 begins 198:15 225:17 226:15 252:21 behalf 297:8 beings 271:1 believe 27:2 29:7 32:6 33:13 43:11 54:14 63:23 79:18 111:24 130:8 143:6 148:2 188:10 193:11 194:17 195:15 204:14 204:24 205:24 215:1 240:21 243:1 251:3 257:16 273:13 274:12 275:19 276:22 292:4 302:18 304:9 304:12</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

believed 169:5 202:16	291:15 301:7	binwoe 103:13	bodies 48:2,3,4 64:3
bell 80:15 199:11	better 28:8 49:18 68:12,18 68:23 162:15 289:16 291:1,6 291:7	biologic 120:11 120:14	body 31:8 66:4 102:8 116:13 138:2
benefit 65:7	beyond 232:9 243:20 244:10	biological 68:20 114:11 114:14 228:6 270:1	boiled 231:23
benefits 261:6	bias 67:8 68:1,3 68:4 112:9 118:9,16 150:13,16 151:5 157:5 168:7 169:10 169:11 175:23 175:25 261:11 261:15 300:6 300:18	biologically 111:2 258:21	bold 242:15 254:25
benzene 10:19 39:1 42:3,4 92:10 96:9 98:15 100:23 109:20 159:5 159:16 184:21 186:9 228:22 229:2,8,22 230:1,9 231:3 231:8 232:4,6 232:17,25 233:5,6,9,15 234:2 238:5,9 241:18	biases 165:17 300:15	biostatistical 84:13 88:2	book 80:20,24
bergeret 9:24 200:5	big 93:18 122:7 301:8	bioterrorist 47:24	borne 48:1
bernstein 8:21 171:22	bile 223:20	bit 34:23 36:7 67:17 77:11 84:8 88:9 167:10 185:6 194:1,9 245:13 292:18 299:23	bottom 23:21 58:12 133:5 145:11 153:9 167:10,12 168:25 181:7 208:23 216:10 253:7,9 260:23
best 15:20,25 42:15 43:6,22 80:18 87:2,2 98:21 110:1,1 116:7 149:9 162:9 177:5 181:16,24 182:5,10 188:13 196:19 229:20 275:4	bill 23:5 24:5	bladder 10:9 24:23 25:2 95:25 213:22 214:4,8,10,16 214:24 216:6 216:14 217:20 217:23	bound 82:2,8 82:13 89:22,23 90:12 91:16
	billed 22:23	blair 208:15	boundary 79:25 213:1
	billing 20:21 23:15,17 27:16	blood 48:1 308:16	bounded 84:15
	billion 231:8,22 231:23 232:17 271:19,24 272:3	blue 154:7 215:8	bove 7:7,17 8:20 75:12 76:1,5 97:15 97:17,18 98:18 109:25 126:24 127:4,10,13 141:25 142:23 143:1 149:21 150:10 156:19 171:21 173:8 173:19 174:9
	bills 23:13,18	board 220:9	
	binary 103:13		

174:16,25 177:24 178:10 187:5,10 211:17 246:4 254:18 255:2,7 255:11 257:4 262:21 273:2 300:10 bove's 173:4 188:10 277:13 box 3:19,24 13:22 14:1 215:8 boy 111:20 bracketed 301:5 bradford 63:22 106:2,4,7,12,23 107:11 108:4 108:25 110:9 112:15 114:12 116:16,21 117:25 118:18 119:2,4,24 120:9,25 121:14 227:19 brain 43:10 57:7 138:15 147:4 162:12 162:18 181:19 302:19 303:23 branch 3:24 break 17:13,14 17:15,19 72:18	73:4 74:12 126:6,18 183:5 183:14,22 238:18 239:2 280:4,14 breakdown 44:19,22 266:22 breaks 266:20 breast 145:14 brief 297:3 brigham 57:24 58:4 bring 73:20 broad 45:6 47:1 71:25 83:16 136:5 190:4 broadly 46:1 build 288:21 building 75:17 bunch 294:8 business 13:20 34:4,8 171:1 busy 45:22 butter 231:25 c c 3:1 12:2 140:2 140:23 209:10 308:1,1 calculate 159:25 187:1	calculated 186:14 california 292:17 call 14:16 270:8 called 89:12 114:18 calls 115:12 camp 1:4 6:4,8 6:13 7:5,15 8:7 8:18 9:6 11:4,8 12:12 13:15 17:23 18:9 19:8,24 21:24 22:24 23:22 24:8,16,23 27:20,22,25 28:2,5,25 29:5 29:9,18 37:22 52:14 56:5 75:8,10 76:6 76:17,21 77:4 77:5,5,16,20 92:20 93:5,8 93:10,20,22 94:17 95:23 97:19 99:14 102:14 105:14 105:14,19 106:9 108:21 108:23 109:8 109:10,15 124:10 127:18	128:12,24 135:9,24 141:23 142:18 147:25 148:13 148:15,20 149:19 150:5 150:21,21 151:3,18 153:10 154:4,5 156:7,11,15,18 157:4,10,16,25 158:1 159:20 160:5 164:1,11 169:1 171:20 172:16 176:5,5 177:20 180:10 180:10 184:9 184:14,22 210:19 219:11 241:9 244:18 246:7 253:23 254:5,14 256:3 256:4 258:20 259:20,21 260:14 261:4 261:22 262:5 266:16 267:14 267:16 269:5 270:25 272:7 273:16,21 276:19 281:4 281:17 282:10 290:12 291:16 292:1 300:11
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

303:19,19	172:14,20	242:1 267:12	carcinomas
304:1,2,23	173:4 175:1,4	267:20 271:4	225:3
310:2	175:13 176:5	271:14,21	care 73:12
cancer 6:6 8:12	176:17 177:6	272:10 273:22	174:8
9:10,18 10:5,9	180:16 185:1,6	275:2 276:20	career 35:21
24:19 25:2	185:8,17 186:1	278:12,25	carefully 114:5
29:16 30:4,16	186:2,6,19	279:16 280:17	137:3
31:9 37:24	191:4,8,16,23	294:5,11 296:9	carolina 1:1
38:3,11 39:2,6	192:9 193:8,14	303:12 304:14	3:19 12:15
39:19 41:7,14	194:4,21,24	304:19	carried 16:13
50:3 53:13,19	195:10,18	cancers 68:23	cart 119:1
55:10,21 58:7	196:15 199:4	216:5 223:19	case 1:4 9:17
62:6 64:10,18	200:1,11 206:2	223:22	12:15 18:6,6
64:20 66:16	207:15,16	canned 231:25	30:4 47:22
68:22 75:6,10	209:2,4,8,9	capable 70:4	49:12 63:7
75:16 76:2,7	210:23,24	capacity 34:2	67:13 71:10,11
76:20,22 77:2	212:15 213:7	carcinogen	71:25 73:22
77:6,17,21,21	213:22 214:3,4	125:22 207:1,8	184:7,12 196:8
78:1 92:8,21	214:8,11,11,16	carcinogenic	199:25 200:11
93:11,23 94:18	214:24,25	10:16 96:7	252:4 274:13
95:24,25	216:7,15	125:16 224:8	290:8,25 310:2
101:16 105:12	217:11,20,23	267:8	cases 1:7 23:14
105:17 108:24	218:5,9,18,21	carcinogenicity	28:20 37:4,5
126:20 127:11	218:25 219:15	224:21,25	44:23 48:1
129:4,9 130:13	221:1,8,13	225:10,13	51:4 140:17
138:20,24	223:9,23	242:9	166:6 215:15
139:3,18,24	225:24 226:2	carcinoma	251:25 281:8
140:3 144:24	226:17 227:1	141:17 185:9	289:14 292:14
145:14 146:4	227:12,12,20	185:10,14,21	292:23 293:4
151:18 152:4	228:12 229:2	186:6 215:24	296:22 306:12
154:12,16,20	233:1,10,16	216:2 217:24	casual 77:1
154:23 158:17	234:3,11,19	218:3,11,13,15	categorical
159:5,16,22	236:3 238:3,15	223:15,16	145:23 166:5
171:16 172:7	239:14 240:7,9	227:2 228:12	

categories 42:23 166:7 219:21	289:11 292:18 298:11 299:6	cdc 26:3 47:19 48:5	chain 66:2
categorize 203:2	cause 2:7 39:2 47:6 55:20	cell 9:18 141:17 185:9,9,10,13	chance 48:14 48:16 87:12,15 155:7
categorized 158:9	76:20 77:1,6 77:20 92:21	185:21 186:6 199:25 200:11	change 54:5 88:19 289:22
category 45:6 220:19,21	93:11 94:18 117:5 122:12	215:24 216:2 218:3,12,15	changed 39:7 39:15 129:19 219:4 267:21
causal 65:22 71:13 75:4	132:7 144:19 151:15 180:11	227:1 228:12 228:15	changes 53:6 54:10 87:22 309:4
87:6 110:4,16 110:21 111:21	192:9 194:20 194:23 226:2	cells 227:5	characterizati... 81:6
112:20 115:11 115:13 119:20	233:16 242:10 275:1 276:20	cellular 231:7	characterized 245:15 298:18 299:21
119:20 121:1,3 193:7 195:17	304:14 caused 278:20	cereda 264:10	charbotel 9:23 198:23 199:2,8 199:18 200:4 200:20,24 201:7,24 202:3 202:5,23 203:2 205:8
204:19 241:8 241:17 244:15	causes 76:2,6 77:25 79:8,11	cereda's 264:7	chart 205:4
245:4 264:25 271:13 272:9	93:23 95:24 195:10 225:1 240:25	certain 20:7 67:4 71:21 75:8 116:15 118:21 204:10 258:19 275:8 298:25 300:5	chasing 294:3
274:5 280:22 281:9 283:4	causing 6:17 76:24 77:17	certainly 22:7 25:5 36:3 39:17 60:21 118:23 136:15 136:21 170:6 181:22 187:18 222:14,24 256:23 292:16	chatted 30:22
288:22,22 298:22	104:6,13 118:9 135:25	certainty 289:20,22 290:1	chatting 184:18
causalization 86:3	caution 28:9 168:19	certificate 5:11	check 16:6 59:19
causation 47:6 48:13 49:7,8	cautiously 166:10	certify 308:4,14 309:1	checking 59:17 183:21 184:3,8
74:16,21,25 109:13 111:8	caveats 137:25		chemical 60:18 79:8,11 101:17
119:12 124:24 177:1 239:14 285:15 287:14	cc14 249:12 ccl4 249:14,20 ccr 2:10		

109:17,18,18 110:5,7 121:24 123:1,15 124:1 124:2,3,20 125:21 203:12 242:10 266:16 269:24 270:14 277:14,19 295:9 chemical's 242:8 chemically 270:6 chemicals 76:16,19 77:9 92:9,24 93:3,6 95:21 97:21,25 98:8,10,20,23 99:2,9 100:13 100:18 105:14 105:19 106:9 108:22,23 109:1,7,13,15 156:11 238:10 241:2 258:4 264:13 269:25 270:25 276:12 276:18,25 277:3 279:22 279:23 chemotherapy 140:23 chicago 3:9	chief 45:17 child 303:17 childhood 163:1 children 149:1 chloride 10:13 39:1 41:25 77:25 78:9 92:10 96:9 98:15 100:23 109:20 160:2 161:10 184:21 186:9 219:8,15 219:20 221:2,9 221:12,25 222:8,13 224:4 224:13 225:1,1 226:18 227:20 228:16 266:22 chlorides 241:9 chlorine 266:21 270:6 cholangiocell... 223:16 chose 70:20 202:12 chronic 122:10 140:23,25 ci 180:8 cigarette 141:5 cir 186:11 188:15 189:6 189:15,24 190:24	circumstance 113:23,24 circumstances 28:2 74:24 120:25 125:1 cirs 186:14 187:1,4,25 189:8 citation 56:15 56:16 58:14 211:16 citations 56:18 209:14 240:6 265:25 266:5 267:3,7 cite 72:7 97:15 97:17 99:10 199:16 209:4 209:10,16 210:2 222:7 229:13 267:24 268:1 cited 56:15 59:20 124:16 191:12 199:9 199:15 200:15 209:17,20 210:6,8 219:1 222:16 224:3 228:18 238:11 269:11,18 295:18,19,20 295:23,24,25 296:2,11	citing 59:17 civil 3:24 36:22 37:4,5 44:24 48:9 civilian 7:12 8:14 9:3 127:5 149:17 150:4 150:24 156:19 157:1 162:10 162:21 163:20 165:23 166:8 166:23,25 167:18,20,23 171:17 177:18 claim 100:13 100:18 claimants 281:5 claimed 193:15 clarification 151:9 191:5 223:25 clarified 300:1 clarify 16:25 24:3 classification 168:7 281:11 283:19 classified 129:4 130:5 cleaners 215:19 216:15 cleaning 10:11 214:17 216:17
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

clear 34:24 78:5 107:1,18 108:5 185:9 clinical 44:2,3 44:6 253:3 clja 7:9,19,21 8:8,10 142:1 149:22,23 164:2,3 close 91:25 220:7 250:22 closely 269:23 closer 62:18 coauthors 187:11 coded 165:6 coefficients 145:24 158:11 cohort 7:6,16 8:18 9:7 10:3 67:10,12 141:24 142:19 149:20 150:6 159:21 160:5 165:4 171:20 177:20 196:6 206:1 210:19 219:12 254:23 255:15,23 256:1,5,14 257:5 269:6 cohorts 255:5 257:4	coined 47:20,21 cola 231:9 coleslaw 231:10 collaborated 26:7 collar 154:7,7 collateral 75:3 colleague 13:12 colleagues 234:16 collected 261:10 collective 185:16 collectively 92:12 120:15 185:18 colon 234:3 column 252:3 252:10 258:13 263:14,16 combination 92:22 95:25 109:14 combinations 139:22 140:22 combined 101:16 102:18 103:8 234:17 235:25 come 39:10 56:8 58:18 114:4,8 129:22	130:17 192:14 comes 46:25 67:19 108:16 comfortable 293:25 295:3 coming 66:1 247:25 299:24 comment 137:4 committed 139:14 common 90:10 90:13 265:20 305:24 commonly 80:1 91:8,10,13 298:5 communicating 184:6 community 88:2,4 286:7 286:12 287:4 287:12 288:5,6 compared 109:9 194:25 211:12 219:19 268:11 compares 75:9 comparison 150:21 176:4 202:18 complete 165:4 165:24 completely 116:17 279:25	completing 25:11 completion 23:15 24:5 complexity 201:15 complicated 286:16 composition 270:15 compound 158:18 compounds 140:20 146:5,8 concentration 95:16 113:14 272:2 concentrations 93:17 179:17 231:21 272:23 276:12 concept 288:2 conceptual 65:23 concern 156:11 165:17 concerned 232:6,15 concerning 166:19 conclude 274:4 concluded 144:8 206:24 207:6
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

concludes 307:23	82:1,3,7,21 83:2,11,12,13	298:1 301:5,9 301:20 302:3,4	286:13 287:4,4
conclusion 66:1 74:21,25 77:13 77:16 83:6 108:14 128:21 129:9,23 130:2 130:18 144:7 192:8,15 193:22 194:3 201:8 215:18 247:6 259:5 290:11 292:5 308:13	83:14,17,19,22 84:4,6,10,10,19 84:23 85:4,5,6 85:7,15,22,24 89:17,23 90:3 90:5,14 91:8 91:11,15 92:5 144:10 145:1,4 145:9,22,24 146:11,14,17 151:22 152:3 152:24 153:3 153:17,21 154:6,15,19 155:12 158:8 158:11,20,24 159:2,8,12,15 160:11,14,17 160:25 161:4,6 161:13,18,23 162:1,5 166:8 168:22 172:25 173:9 180:7,25 186:11 187:9 187:16 188:19 188:20 190:6 196:5 212:25 215:14 220:3 237:6,12,19 250:4,8,14,17 250:24 260:6,8 271:22 290:2	confident 79:24 confidential 301:15 confirmation 165:25 conflict 135:12 confounded 110:18 136:16 136:22,22 confounding 67:8 68:1 112:9 118:8,16 193:4 303:2,5 confused 77:12 88:10 congress 3:13 261:1 congressional 29:12,25 congruent 196:17 conjunction 97:22 connected 260:14 261:3 connecticut 3:3 connection 17:23 19:8 28:5 consensus 129:18 190:1,4 190:11 286:6	conservative 244:6 277:7 consider 46:8 50:7,12,21 65:15 67:25 68:8 76:1 77:12 79:14 81:23 83:20,23 85:2 86:4,6 105:11 111:16 113:17 128:16 128:20 149:3 156:17,25 157:9 159:11 168:4 169:16 169:21,25 173:22 174:1 175:3 176:20 176:24 185:18 189:8 203:18 203:23 209:22 210:9 268:7 277:23 285:7 301:21 302:7 consideration 119:5 considerations 118:19,22,24 193:3 considered 10:22 29:24 50:15 65:22 67:5 72:7,13

79:2 82:16 83:10 84:16 86:11,14,16,18 87:22 90:6 91:14,17 99:9 103:17 124:15 128:18 147:21 148:2 149:8 157:3 170:15 170:21 179:17 210:1,5 218:25 228:17 238:10 239:8,13 251:10,17 252:7,11,15 262:17 302:8 considering 76:13 considers 123:15,18 consistency 64:14 111:13 112:16 114:7 218:17,19 227:22 consistent 110:24 111:8 196:18 consistently 112:5 137:8 213:15 consists 77:15 constipation 136:11,18	137:9 147:22 163:6 182:8 construct 188:21 consult 57:15 consulted 44:23 consulting 44:20 45:3 consumed 166:20 167:1 167:21 175:24 consumes 45:16 consuming 232:16 consumption 131:22 contacting 102:14 contacts 25:17 contain 54:18 contained 39:2 39:21 135:4 contains 24:11 contaminant 123:19 157:10 178:25 243:12 269:9 275:1 279:15 contaminants 92:22 96:1,4 156:18 157:1,4 258:22 266:16	267:16 271:12 277:8 contaminate 95:15 contaminated 7:4,14 8:5 9:5 11:8 93:25 128:12 141:22 142:17 149:18 150:5 163:24 164:10 169:4 177:19 261:22 262:5 286:18 contamination 6:5,9 37:23 52:15 56:4 94:8 124:10 156:15 157:17 157:21 243:17 260:25 274:22 275:15 276:3 context 95:14 269:21 continuous 145:25 158:12 contributed 72:13 259:14 control 9:17 67:13 68:3 79:12 196:8 199:25 200:11 252:4 controlled 137:3 302:15	controlling 67:8 controls 251:22 conversation 15:13 183:19 302:24 conversations 56:11 converted 269:3 convictions 41:1 copper 132:2 copy 38:11,13 40:8 142:9 172:1 230:4 corner 216:11 corps 8:6,17 11:4 163:25 164:11 171:19 253:22 254:5 correct 18:4,7 20:16,18,25 21:20 24:10,17 25:2,3 31:16 34:18 35:9 38:3 52:22 53:4 55:6,7,11 55:22,23 60:24 61:13 70:16 71:4 78:11,22 97:14 104:19 104:23 105:12 108:6 116:5
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

117:2 123:24	183:1 187:8	255:12 256:9	county 243:25
124:11 125:23	189:12 191:11	258:2 260:4	couple 14:15
127:3,8 128:14	192:4,18 193:9	261:7 263:6	15:9 28:14
129:25 130:20	197:6 198:24	267:24 273:18	31:24 39:9
131:5 132:13	199:5 201:22	273:24 275:19	43:8 297:18
135:16 138:5	201:25 204:23	275:23 296:10	302:21
138:11 140:13	205:9,22 208:7	298:9 301:6	course 35:20
141:2,7 142:20	208:16,18	302:1,4 306:16	51:23 75:11
143:20 144:24	209:5,11,18	corrected 39:15	86:5 112:10
145:2 146:19	210:9,11 211:6	corrections	288:16 307:11
146:20,23	211:14,18	53:7,22 309:5	courses 51:16
148:20 149:1	212:23 213:19	correctly 75:25	court 1:1 12:14
149:13,15	213:20 214:9	102:19 103:10	12:22 15:4,7
150:7 151:19	214:12,21	103:23 107:25	281:5
152:5,25 153:4	215:5,16	165:20 166:2	courtroom 15:5
153:8,15,22	216:22 217:13	257:23 276:24	courts 285:6
154:9,16,24	217:25 218:19	281:13 287:8	coverage
155:10 156:2,4	219:3 222:9	correlation	165:19
156:15,21,22	223:21,23,24	237:10,11	covered 94:6
158:14,18,21	225:4 226:7	corresponding	coworkers
159:3,6,10,22	227:8,9 228:1	281:11	217:22 236:19
160:6,21 161:1	228:14,19	corresponds	craft 61:3,5
161:2,8,9,17,19	231:4 234:7,25	283:18	crafted 60:23
161:21 162:13	235:3,10 236:9	corroborate	crash 36:15
163:8 164:12	236:21,23	216:21	crazy 73:13
165:9,10	237:5,17,20	council 128:11	crc 1:22 308:3
166:11 169:10	238:7,12	128:17	creates 175:22
172:7 173:5	239:14,17,24	counsel 3:5,10	248:12
175:14,24	240:10,25	3:15,20 4:1	credible 111:2
176:10,14,17	241:1,10,19	56:12	criminal 36:25
178:4,16	244:22 246:19	count 33:13	44:25 48:10
179:15 180:13	247:13 248:5	counterfactual	292:23
181:3,14,19	252:12 254:13	48:12	criteria 62:16
182:2,3,14,18	254:15 255:8		62:17,21 63:2

63:22 71:9 77:19 106:3,23 107:11 108:4 108:25 116:16 118:1 119:19 119:24 120:9 120:13,21 121:19 192:15 227:19 critical 70:3 107:5 118:25 119:16 283:1 critique 95:11 194:14 cross 79:24 crossing 212:25 crr 1:22 2:10 308:3 csr 2:9 cumulative 120:12 145:23 145:25 158:10 158:12 242:16 current 13:19 65:5 currently 40:10 custody 42:20 cut 16:1 107:1 108:5 141:11 190:8 251:4 273:11 cutoff 191:1 cutoffs 191:2	cv 1:4 12:15 38:4 40:3,5,8 42:24 52:21 cyanide 122:6 cycle 23:17 cystic 140:24 cytotoxic 140:23 d d 1:12 2:4 5:6 12:2 13:2,18 98:4 103:15 267:5 268:4 308:5 309:9 310:5,25 daily 74:6 278:10 dairy 131:22 dameranda 269:10,14 danger 108:14 dangerous 125:15 287:1 287:24 darn 31:12 250:22 data 79:20 86:25 87:1,3 87:19 88:25 116:1 150:24 194:3 198:10 236:24 248:8 257:18 258:1	263:4 databases 61:24 date 2:8 12:6 20:15,17 40:10 310:4 dated 19:20 23:19,19 david 80:5,7 day 197:14,17 239:25 308:19 days 23:7 dc 3:4,25 dce 55:5,9,15 55:20 240:24 deal 29:22 dealing 122:9 289:9 dealt 289:16 death 36:16 37:1 42:20 46:24 51:5 52:5 144:19 151:15 180:12 debate 87:24 debra 1:22 2:9 12:22 308:3,22 decade 131:9 decades 109:5 249:13,21 253:3 december 23:8 23:20 40:9,17 41:6 43:4,21	261:5 dechallenge 120:21 dechlorination 266:21,24 decide 56:24 deciding 67:23 170:21 decision 66:18 69:23 244:7 285:23 decisions 69:6 69:9 70:3 285:10,14 deemed 301:22 defect 36:21 103:19 defendant 2:6 4:1 deficiency 43:10 define 37:15 defined 81:1,9 292:20 304:21 definitely 35:25 113:12 282:2 definition 50:19 93:5 97:20 145:6 definitions 84:22 degradation 266:15 267:14
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

degree 46:11 46:11 50:10 71:14 94:11 107:22 111:14 113:11 117:23 118:20 120:16 131:12 278:4 282:4 289:20 289:21,25	dependents 8:3 163:23 164:9 depending 80:3 86:17 87:23 88:12 89:24 90:11 95:16 96:4 120:22 depends 37:14 62:11 65:21 66:8 74:23 79:16 81:25 85:11,19 86:25 89:9 113:5,23 115:17 116:1 120:3,25 121:10,24 122:1 125:7 132:10 170:8 256:19 279:9 292:6,9 295:4 deponent 310:5 deposed 33:7 33:19 34:1,10 deposition 1:11 2:3 6:1 12:10 14:10,14 16:21 17:7,12 18:17 30:19 32:21 33:4 37:21 39:14 52:13 74:9 99:12 104:4 134:23 141:19 149:16 163:21 171:15	177:16 191:21 197:8 199:24 205:25 210:4 214:14 221:23 224:6 229:24 239:6 246:10 248:1 253:20 261:20 297:17 297:24 307:23 308:6,8,13 309:2 depositions 33:23 depression 137:18 147:22 163:7 182:8 derivation 199:3 describe 66:18 68:4 140:7 194:15 195:12 195:19 202:13 205:16 209:23 238:5 257:7 291:12 described 31:8 38:18 43:20 64:2 66:21 92:25 96:10,13 129:1 130:3 133:12,15 136:7,20 148:12 190:12 192:11,15	194:10,11 195:3,3,11,25 196:2,3 201:10 201:14 202:4,6 202:10 203:20 203:21 238:6 257:15 274:22 276:14 280:25 281:3 291:8 300:10 describes 20:7 describing 44:19 75:15 88:6 202:8 description 6:2 62:13 design 67:13,13 68:2 designated 260:12 261:2 designed 66:22 67:3,6 68:8,18 designs 67:9,14 67:18 300:6 despite 260:24 detail 162:15 202:1,6,8,9,12 204:25 275:12 detailed 198:19 304:10,13 details 73:8 determination 78:2 189:24 190:24 287:10
---------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

determinations 121:2,3	devoted 44:13 44:14	194:1 214:11 218:4 227:1,11	disclosures 35:3
determine 30:7 57:4,6,8 61:25 62:7,25 63:3 63:19 64:4 65:10 66:17 67:2 68:15 72:4 76:1 77:18 79:17 83:9,13 86:23 89:15,18 94:3 108:20 118:8 125:21 130:7 195:8 232:21 232:25 242:21 255:21 275:10 285:19 288:24 289:3 293:19	diabetes 138:10 diagnose 44:9 diagnosis 256:24 263:9 263:17 diagram 55:14 diagrams 285:2 dibble 1:22 2:9 12:22 308:3,22 die 122:8 dietary 133:8 differ 185:13 185:20 292:13 difference 46:14 93:19 157:7 235:13 271:25 289:13 300:15 303:18 303:19	248:20,23 264:13 279:1,2 284:6,25 288:9 290:11 292:19 305:15 differentiate 93:14 differently 95:16 157:12 304:1 differs 49:10 difficult 275:10 difficulty 37:18 253:11 dilutes 157:6 diluting 300:14 diplomate 308:24 dips 82:13 direct 139:8 148:16 201:17 234:12 257:18 directing 157:8 disagree 129:8 129:24 130:10 130:20 135:19 139:7 193:16 220:23 disappointed 232:2 discipline 299:25	discovered 58:24 discovery 4:6 discriminate 94:24 96:3 272:25 274:1 discuss 64:19 84:17 121:17 152:8,17 192:17 201:20 201:24 217:10 217:16 221:1,7 228:7 233:24 264:6 discussed 22:17 33:2 55:1 127:21 185:23 186:12 188:9 203:19 205:8 218:9 228:4 246:4 262:11 265:4 266:1 discusses 96:7 98:13 99:1 discussing 53:25 56:3 62:5 63:2,21 97:16 99:8 104:18,22 196:25 210:15 211:16 223:12 227:18 231:18

266:3 296:8	134:1,17 136:1	153:6 166:6	261:19 266:10
297:25	136:2 138:16	168:21 185:3	267:23 284:3
discussion	140:25 141:1	214:12 267:17	documentation
52:24 57:13	145:13 152:18	275:9 286:21	188:3
88:3 97:10	152:21 153:8	disputed 34:9	documents
101:1 172:4	155:10 160:4,9	distinctly	19:10 33:3
187:15,24	160:19,22	305:21	59:22
188:10 191:8	181:6,10,12	distinguish	doing 15:11
193:23 218:10	185:2 240:20	46:2	21:23 22:6,7
218:12 293:23	240:25 241:10	distinguished	65:12 121:16
discussions	241:19 242:1	46:6,7	288:14
184:11	242:11 244:17	distributed	dolinova
disease 6:11	244:25 245:6	304:1	267:24 268:3
10:24 11:2,6	245:10,11,23	district 1:1,1	dosage 125:4
29:17 30:5	246:6,12,17	12:13,14	dose 114:16,19
41:10,16 46:24	247:7 253:1,3	division 3:24	114:21,24
50:4 52:16	253:21 254:4	12:21	115:10,12
53:4,8,12	254:13 255:6	divorce 282:6	116:4 120:19
54:20 55:6,21	255:19 259:20	doctor 44:7	121:21 122:7
58:8 60:19	261:21 262:4	297:2	125:9 146:22
62:6 64:10	262:18 264:17	doctoral 46:10	178:15 179:1
67:17 81:7	264:22 265:2,7	document 1:6	179:18 180:18
92:8,21 93:12	267:12 269:5	57:9 59:20,22	197:1 198:9
93:24 94:19	269:10 270:22	80:17 99:20	202:14,17
108:24 110:5,7	272:10 273:22	105:23 144:3	203:1,6,16
112:24 113:2	275:2 276:21	178:21 197:23	204:6,9 220:1
113:19 114:23	278:12 279:3,6	199:23 200:10	234:2,6,11,18
115:4,8 117:2	279:16 286:19	202:11 208:1	235:9 236:8,13
117:20,24	290:8 295:9	215:4 217:12	236:20,22,24
118:14 119:9	296:9	222:11,17	277:19,23
119:11 122:13	diseases 30:8	223:4 225:7	278:4,10,16,19
122:18 126:21	46:19 109:4	226:10 230:12	279:13 298:25
130:5 131:5	117:2,14 118:7	233:19 242:24	299:1,4 304:9
133:10,20,22	122:3 152:8,12	246:9 251:21	304:18

doses 102:12 226:22	173:4,8,19 174:9,16,25	9:5 56:4 77:5 99:14 113:8	durations 124:14
doubt 188:7	183:13 187:10	141:22 142:17	duty 176:7
dowling 3:17 3:18	188:10 207:14 224:12 230:8	148:8 149:4,18 150:5 162:22	e
dowlingfirm.... 3:18	239:2,7,12 240:23 246:15	163:25 164:10 166:25 167:1	e 3:1,1 12:2,2 13:22 25:25,25 25:25 75:12 78:23,23 98:4 184:3,4,8,9,14 184:20,20 185:3 209:10 267:5 268:5 308:1,1
downstairs 73:5	264:12 268:7 277:13 280:12	167:21 168:1 169:4 171:19 177:19 182:1 243:13,17,18 243:20 244:1	earlier 33:3 38:18 44:19 55:1 246:4 263:8,17 265:5 266:1,7,8 284:13 293:14 297:16,23
downward 220:10	281:19 292:3 293:15,18 294:12,22 295:10,25 296:16,20 297:14 307:21	driving 73:12 drug 51:8 90:24	early 90:25 91:1
dozen 42:13	draft 294:7,13 294:14	drugs 51:4,5	easier 15:10
dr 10:20 12:10 13:9 19:5 25:25 26:1,5 26:18,24 27:6 27:13 28:7 38:15 53:2 54:25 56:10,21 57:15,20,24 58:4,24 59:10 61:19 69:11,12 69:23 70:7,10 71:2 73:2 74:14 80:5,20 81:1,3,9,11 92:7 99:17 100:12 101:13 104:10 122:15 124:8 126:16 131:3 142:14 143:1 148:18 150:2 156:6 164:6 172:6	drafted 202:24 294:25 295:12 drafting 202:15 294:9 drank 147:17 147:25 148:25 drastic 257:1 draw 74:20,25 108:13 194:3 237:7 247:6 drawing 77:12 77:16 drawn 48:24 drew 4:6 12:20 drink 148:4 drinking 6:14 7:4,14 8:5,16	dry 10:11 214:17 215:19 216:15,17 duct 223:20 due 82:11 87:13,15 103:20 112:8 145:12 155:7 165:4 216:15 duly 2:6 13:3 308:7 duration 115:2 124:1,7 178:16 178:25 180:9 180:16,16,17 180:21,22 181:1,2,11,13 181:13 211:5	eastern 1:1 12:14 easy 15:14 190:7 edge 230:16 edit 307:16 edited 26:14 294:17,24 295:11,14

editing 294:15 editor 45:17 editorial 44:15 45:15 education 154:8 effect 82:12 97:25 98:14,22 99:2,8 102:11 103:17 115:11 115:14 226:21 234:6 235:9 236:8,13,20,23 236:24 270:1 279:24 300:14 effects 6:18 96:8 101:2,17 102:16 103:7 103:16,20,21 104:7,13 109:6 109:21 117:5 128:13,25 155:7 253:12 efficacy 46:21 eggs 231:20 eight 198:14 either 71:4 105:16 144:4 176:8 178:9 179:9 181:12 216:3 275:1 290:18,19,23 elaborate 28:18	element 281:22 elevated 112:8 176:21 196:10 213:18 271:24 eligible 261:6 eliminated 102:7,8 elizabeth 3:23 13:12 elizabeth.k.pl... 3:23 emerging 108:10 emphasis 36:8 120:10 employee 150:24 employees 7:13 8:3 149:17 150:4 163:23 164:8 165:24 166:8,23 167:1 167:18,20,24 emsbo 268:2,5 encapsulated 57:12 entire 38:16 66:3,4 139:14 159:20 174:3 282:13 entitled 281:6 enumerated 137:1	environment 76:24 113:15 267:15,17 269:3 environmental 122:11 132:7 133:1 186:8 231:15 248:20 248:23 259:1 269:8 epa 100:21 156:10 197:13 198:18 202:10 202:16,22 epa's 101:1 197:18 epi 264:19 epidemiologic 46:25 47:14 48:11 49:4,13 67:7 133:3 169:18 193:5 193:13 194:3 194:19 195:16 198:10 210:18 233:25 241:13 241:22 244:24 245:8 307:15 epidemiologi... 9:21 80:21 88:1 185:17 190:17 195:9 200:3,13	epidemiologist 26:2 46:9 67:21 epidemiologi... 46:3,4 epidemiology 45:25 46:11,12 46:15,15,16 47:2,4,8,9,13 47:15,20,24 48:7,10,20,25 48:25 49:10,11 50:25 51:23 74:15,19 80:24 213:11 217:20 246:5 260:25 292:6 299:16 epilepsy 43:12 equal 84:24 158:10 171:9 189:9,24 190:25 equally 88:17 112:5 120:17 equipoise 78:21 78:25 79:3 91:25 107:21 241:8,17 245:4 245:16,19 264:25 281:12 283:19 284:9 284:18,21 286:5,11,22,23 287:11,14,17
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

289:16 290:21 291:1,4,7 307:3 equivalent 50:22 245:9,14 equivocal 287:2 288:1,19 errata 310:1 error 53:21 54:16 117:18 155:8 escape 43:17 especially 166:7 esquire 3:2,7 3:12,18,22,23 essentially 46:20 47:16 120:12 established 109:2 162:24 278:15 establishing 120:11 estimate 34:22 35:8,25 43:5 81:18 83:2,18 83:25 84:4,8 84:11 181:14 199:3 211:9,10 212:19 237:9,9 277:7 301:2,3 301:7,7,12	estimated 179:16 181:3 estimates 31:7 144:9 147:1 166:1 180:23 198:21 210:22 212:14 252:23 estimating 35:12,15 et 142:23 150:10 198:19 198:23 231:19 255:7 267:24 ethylene 41:22 evaluate 47:25 49:5 121:13 170:9 264:10 277:13 288:11 291:19 305:13 evaluated 68:5 69:2 92:9 133:23 134:2 136:3 145:12 158:2 170:12 181:21,23 191:15 evaluating 63:21 121:11 148:19,24 157:1 168:5 234:1 evaluation 7:1 9:1 10:16 49:12 101:16	141:20 142:15 177:17 224:8 267:8 everybody 66:11 90:24 evidence 6:15 49:2,5,6,14 63:6 64:3,13 65:24 79:8 80:21 82:17 85:12,13,17 87:10 93:18 94:8,23 96:2 98:19,21,21 100:14,19 102:9,16,24 103:6,13 104:5 104:12 110:1 110:25 114:7 116:8,9,10,12 116:13,15,19 121:11 126:1,2 126:3 129:5,14 129:21 130:6 130:16,23,25 132:6,19 133:24 134:10 134:13 135:15 136:2,4 176:23 179:19 186:7 193:12 194:19 194:23 195:9 195:16 204:9 204:14 206:25	207:7 216:18 224:24 225:13 225:21 228:25 232:11,21,24 236:12,19 241:8,17 244:15,25 245:4,9,20,23 264:25 265:5 265:10,11,21 272:24 274:1,3 274:4 275:3,6 280:21 281:7 283:4 285:7,11 285:15,22 286:13,19 287:1,10,13,14 287:18 288:1,2 288:11,21 289:5,10 290:3 290:6,10 291:19 292:19 298:11 299:6 303:10,15,16 303:24 evidences 116:20 evolved 130:14 131:1 evolving 65:8 109:5 129:15 129:17 exact 22:19 130:11
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

exactly 15:21 22:8 53:15 202:21 245:14 275:9	285:9 290:6 292:17 296:3 300:9 302:5 303:11,18	37:20,21 38:2 52:13,19 53:3 97:6 99:12,18 101:6 104:1,4 104:11 132:22 140:12 141:19 142:15 149:16 150:3 163:21 164:7 171:15 177:15,16,24 185:7 191:21 192:3 197:8 199:24 200:9 205:25 214:14 214:20 221:23 224:6 229:24 239:6,11 240:21 246:10 246:16 253:20 254:3 261:20 262:3 271:4 280:17	expanded 10:2 206:1 expect 70:12 76:23 115:3 256:22 302:7 expectancy 36:21 expected 153:13 157:17 157:20 198:22 experience 70:10 experienced 102:13 experimental 238:4 expert 18:3,8 30:3 33:24 35:19 36:11 45:3 49:20 50:1,5,13,15 60:3 63:1 135:4 268:8,13 281:20,21,25 288:25 289:18 292:14,23 293:5 expertise 45:24 95:8 experts 268:12 explain 300:7 explained 79:19 92:3 116:7
examination 5:6 13:6 119:20 297:11	examples 117:22 133:12		
examine 112:24 113:1 118:7,15 125:18 170:6	exceeding 271:19		
examined 92:25 94:2,13 117:14,17 120:6 177:11 232:10	excellent 295:15		
examining 113:18 287:25	except 32:4 54:10		
example 47:18 51:8 63:18 64:9,12,17 65:2 66:16 68:21 69:19 71:10 75:5,7 75:10 76:15 80:17 83:23 84:15 90:18 91:2,15 94:11 109:20 111:17 114:1 117:21 120:7,17 121:10 125:22 134:7,8 157:14 157:24 211:8	exception 67:15 excess 138:2 exclude 70:20 excluded 70:7 70:16 71:11 excuse 15:23 26:5 56:16 83:2 84:7 92:15 112:25 250:12 304:10 exercise 197:14 197:16 exhalation 102:9 exhibit 6:3,4,8 6:12,15 7:1,12 8:1,12 9:1,8,14 9:17 10:2,8,12 10:14,18,20,23 11:2,6 18:16 18:17 19:6		
		exhibits 6:1 116:25 exist 61:7 116:20 119:13 204:20 205:1 233:15 exists 65:13 119:4 130:7 204:12,15 286:13 exonerations 41:1	

explanation 123:8 287:22 explore 46:18 exposed 7:3,13 8:4,15 9:4 98:19 109:8,9 109:15,23 111:19 112:1 122:2,16,19 123:1,16,17 124:10,19 125:18 141:21 142:17 149:18 150:4 163:24 164:9 171:18 177:19 204:11 204:19 215:13 215:15 233:9 251:11,18 258:4,21 263:9 263:18,19 275:7 277:16 278:11 279:14 300:12,13,13 300:15 303:12 305:25 exposure 9:9 9:19 10:9 11:7 48:15,18 76:6 77:8,17,19 82:12 93:4,21 94:4,5,12,25 101:17 102:12 111:3,21 112:2	112:12,24 113:2,19 114:16,22 115:2,2,19,22 115:23 117:1 117:20,24 118:13 119:9 119:12 120:7 120:22 121:25 122:11 123:2 123:22,25 124:2,7,14 131:16,19 132:15 135:25 140:20 143:3,4 145:23,25 146:8 147:10 158:11,12 162:8 163:2 166:7,14 175:12 178:3 181:11,13,14 186:8 191:16 191:23 193:4,6 196:14 200:1 200:12,25 202:19 203:11 207:2 210:21 210:25 211:3,5 211:9,10,12,13 212:9,10,15,16 212:22,23,23 214:15 216:16 216:19 219:14	219:19,21 220:19,21 221:2,9 229:1 235:12,12,16 235:18,20 237:2,16 238:6 242:16 246:7 248:4,8,11,13 249:1 251:23 251:25 252:9 252:24 253:13 254:14 257:18 257:21 258:1 261:22 262:4 274:11 278:21 278:22 279:2 303:8,17 exposures 10:23 46:19,23 102:18 103:8 115:7 133:2 169:6 202:10 215:20 226:19 246:11,17 248:16,20,23 253:2 259:1 263:4 271:18 271:23 278:2 extended 217:23 extending 218:3 extense 296:14	extensively 249:12,20 extent 38:17 46:5 60:7 140:6 157:19 185:15 188:23 190:15 201:9 201:13 203:21 203:25 276:6 278:5 external 88:19 extra 270:6 extraordinary 186:25 extrapolated 268:20 269:1 eyes 57:7 f f 308:1 fact 59:16,19 82:4 84:18 116:7 121:4 143:14 258:21 factor 82:4 111:12,15 131:4,17,20,23 132:3,9,13,17 133:9,14 134:7 134:11,13 135:25 136:12 136:14,19,21 136:22 137:1,6 137:14,19,23
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

138:11,16,24 139:3,11,17,20 139:23 140:3 283:10 289:6 290:21 292:18 303:4 factors 52:4 79:4,20 112:3 122:5,11 133:3 133:13,16,18 133:19,21 135:21 136:6 137:8 138:1,4 138:13,21 140:19 302:15 303:24,25 305:23 facts 49:12 56:3 57:1,8 60:1 62:4,13 faculty 51:25 failure 116:14 fair 21:12 30:16 38:11 40:7 45:16,23 56:21,23 74:14 74:17 91:12 106:10 110:13 135:3 139:13 233:11 271:1 273:23 274:2 287:9 289:17 290:12 292:15 295:22	fairly 83:23 198:20 familiar 14:14 80:5,13 93:7 95:2 123:11 186:10 193:18 194:11 197:22 199:7 200:19 222:17 244:3 307:14 familiarized 28:1 family 131:11 302:20 303:23 fapr 1:22 far 50:20 60:11 76:9 84:3 92:6 129:18 137:2 150:16 186:7 188:11 190:9 212:24 300:2 farming 132:12 fashion 47:25 fast 185:4 favor 285:24 298:11 299:6 feasible 175:21 178:6 feed 29:13 feel 88:5 fellow 2:10 308:23 felt 70:22	fevotte 9:23 200:4 field 44:12 45:13 292:6 figure 212:1,4 212:5 229:12 figuring 70:2 file 18:13 19:13 21:3,11 22:22 73:23 74:1 281:5 final 26:11 finalizing 50:2 find 54:1 60:7 66:9 107:4 115:20 125:14 184:5,17 193:22 195:5 195:22 209:15 234:10,18 finding 82:19 107:6 145:2 146:18 154:19 155:18 160:1 160:18 194:18 195:8 215:3 251:2 findings 194:10 194:12,16,24 195:12,14,15 195:23 196:17 201:22 234:17 290:19	finds 117:13 118:6 fine 282:24 finger 39:25 finish 16:3 59:8 273:12 fire 212:5 firm 3:17 12:17 25:6 27:17 28:24 29:5,10 29:15 32:9,20 121:7 firms 25:7 27:25 28:17,19 first 14:8 19:19 21:1,22 22:5 29:5,15 33:16 34:25 56:16,17 63:14 75:16 108:16 111:17 121:8 131:12 165:15 168:19 206:15 215:7 222:21 230:11 238:2 258:14 289:15 294:7 294:13,14 295:1 297:16 fit 45:20 85:18 89:19 fits 85:12 five 122:17 127:16 160:6 306:12,17
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

fixed 122:23	64:21 65:20	277:9,25	94:3 95:17
flip 231:12	70:9 76:3	278:13 279:8	272:15,19
focus 36:11	77:14 78:3	279:19 285:16	framework
focused 216:6	79:15 81:4	286:8,15	65:23
276:6	83:15 85:9	287:15 290:13	france 10:14
fold 131:13	90:8 94:21	291:20 292:8	224:7
follow 219:12	98:1,16 99:3	299:23	frankly 28:13
297:15	106:16 107:15	formed 61:11	frcp 308:10
followed 66:15	111:10 113:4	former 8:2	free 17:8
225:21 231:23	113:21 115:15	163:22 164:8	freeman 1:12
follows 13:4	118:11 120:19	295:5	2:4 5:6 10:21
food 231:3	120:20 121:2	forming 172:10	12:10 13:2,9
foodborne 48:1	122:21 123:3,6	203:24 210:1	13:17 18:17
120:8	124:12,22	238:11 254:12	19:5 28:7
foods 232:7	125:6,24 126:1	262:17	37:21 38:15
footnote 58:11	126:2 130:21	forth 308:7	52:13 53:2
58:14 59:14	134:4 135:6	forward 94:6	56:10,21 73:2
footnotes	137:11 147:5	found 53:11	74:14 92:7
295:21 296:11	147:12 148:10	63:25 135:17	99:12,17
forensic 43:13	150:14 165:24	144:22 196:3	100:12 101:13
43:16 44:12,13	171:6 173:10	200:24 202:25	104:4,10
44:16,20 45:2	173:15,25	217:22 231:7	122:15 124:8
45:9,9,13,17,24	175:5 177:2	250:11 286:22	126:16 131:3
45:25 46:3,7	179:2 187:12	four 31:20	141:19 142:14
46:15 47:2,8	190:2,8,11	76:16 77:8	148:18 149:16
47:15 48:6,20	202:20 203:9	92:9,24 93:2,6	150:2 156:6
48:25 49:9	204:13,21	97:25 98:8,10	163:21 164:6
50:11,24 51:11	207:9 218:20	98:20,22 99:9	171:15 172:6
74:6 292:6	232:8 233:12	108:22,23	177:16 183:13
299:20	244:9 251:19	109:6 233:25	191:21 197:8
forgotten 43:2	256:18 257:19	234:5 241:2	199:24 205:25
form 56:9 60:6	259:12 261:12	302:6	207:14 214:14
60:9,14 61:9	270:13 272:12	frame 21:21	221:23 224:6
62:9 63:4	272:17 275:17	31:21 43:23	224:12 229:24

230:8 239:2,6 239:7 240:23 246:10,15 253:20 261:20 264:12 268:7 280:12 281:19 292:3 297:14 307:21 308:5 309:9 310:5,25 freeman's 239:12 frequency 111:25 frequently 23:13 frey 231:19 front 2:13 73:15,16 178:18 200:16 fulfill 64:12 fulfilled 67:5 fulfilling 62:16 62:20 full 13:16 168:11,13 188:25 225:16 258:14 fully 255:21 function 169:21 functioning 50:20 furnished 186:16	further 307:17 307:20 308:14 g g 12:2 268:6 garabrant 207:17 208:10 gatiba 8:20 171:21 gatti 2:13 12:16 geez 230:15 general 42:19 49:8,10 88:4 109:12 122:22 124:24 128:3,5 157:15,18,21 190:14,16 198:20 239:14 generally 24:5 71:9 74:18 78:14 85:2,11 90:4 93:20 102:2,5 110:17 112:22 115:3,5 115:6,9 117:10 122:1 123:13 128:16 169:16 189:18 256:22 301:18,22 302:8 gerin 234:24 235:2 getting 48:14 48:17 77:2	90:19 240:17 give 29:21 35:24 36:6 57:25 71:7,14 90:23 95:11 100:3,15 118:22 121:7 122:7 123:7 130:11 147:18 170:16 202:2 209:6 221:5 232:11,19 242:23 given 59:3 171:9 290:2 306:5 308:9 309:4 giving 66:24 122:6 135:21 gleaned 47:4 go 14:15 17:18 18:15,21 39:24 48:4 56:13 59:7 68:13 89:21,22 96:24 98:18 101:5 103:25 105:4,9 105:22 107:15 120:13,24 132:20 137:25 139:4 140:10 144:14 151:7 163:19 164:20 165:13 167:11	168:9 171:13 176:1 177:14 178:11 180:1 186:18 191:3 196:21 197:25 199:22 201:4 201:13,17 202:21 205:3 206:13 207:12 210:12 213:2,2 216:9,24 217:5 219:5 220:25 224:16 226:9 226:12 233:18 238:14 240:13 240:19 241:4 249:10,24 253:17 261:18 264:1 270:21 273:24 280:19 goal 59:25 194:7 195:5 god 227:3 goes 23:15 69:16 91:11 188:9 237:13 287:21 going 14:13 15:22 18:15 48:4 62:14,18 63:5,7,13,14 64:11 65:2,5,6 68:22 72:17 85:15,22 87:7
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

87:8,8 88:24 89:20,21 90:25 91:17,20,23 92:13 109:24 109:25 113:10 113:13 120:10 122:7 125:9 126:5,7 183:4 199:13,20 208:8 229:12 238:17 280:2 285:6 287:2 288:11,14,20 goldman 246:2 246:4,21 247:3 248:25 250:10 251:9,17 253:18 254:9 254:11,17 255:11,14,14 256:13 257:17 257:25 259:5 262:8 263:3,7 263:22,23,23 273:3 297:19 300:10 305:19 306:7,16 golkow 12:21 73:17 good 45:5 72:18 76:25 91:2,18 93:18 110:24 111:2 126:6 134:10	183:5 194:23 199:13 202:25 203:5 238:18 280:3 297:7 goodman 4:6 12:20 53:25 54:14 67:16 109:25 297:18 google 61:22 gotten 184:23 govern 244:1 governed 243:17,23 grab 126:7 gradient 114:11,14 115:11,12,21 gray 279:20 great 14:3 17:5 29:22 36:9 52:23 73:10 105:25 144:5 183:19 242:3 greater 50:16 79:12 82:15 102:17 103:7 107:21 110:15 111:18,25 114:22,23 115:3 122:18 162:7 189:8 273:5 greek 8:20 171:21	grew 148:8 149:4 162:22 182:1 ground 14:16 groundwater 265:19 group 124:9 196:2,6 255:24 267:7 297:9 300:12 grouped 195:22 groups 193:2 195:21 202:18 220:7 guess 55:13 106:2 133:1 190:10,13 270:8 280:23 guesses 35:14 guy 196:23 guys 230:22 h h 209:10 haddock 231:23 hadnot 166:24 167:19,25 272:2 274:11 274:14,15,16 274:19,25 275:15	half 17:14 hand 18:15 192:22 216:11 258:13 260:22 263:14 308:19 handed 19:5 38:2 53:2 99:18 104:11 142:14 150:3 164:7 171:25 172:6 177:23 192:3 197:13 200:9 214:20 222:11 246:16 246:25 254:2 262:2 handing 37:20 52:19 246:8 hands 70:1,1 happen 70:13 happened 70:12 90:25 91:1 happening 75:22 hard 15:15 16:14 121:6 190:19 231:23 harm 89:25 90:1 harmful 46:23 hattemer 231:19
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

hazard 144:9 145:21 146:3,8 152:20 154:5 154:12 158:7 158:16 159:6 160:1,9,23 161:10,20 176:16 180:6 180:21,22 181:1,2,11 189:10 212:8 212:10 219:20 220:18,18,20 220:21 272:20 285:19,20	100:10 104:6 104:13 108:15 127:22 128:1,8 128:13,24 169:2 193:20 194:13 196:19 244:6 255:16 255:17 256:6 262:25 272:8 283:23 284:2 285:9,11,25,25 287:9 291:18	hepatic 223:14 hepatitis 140:2 140:23 hepatocellular 223:15 225:2 hereditary 138:20 140:17 149:11 163:11 177:8 182:12 hereinbefore 308:7 hereunto 308:19 hi 13:9 hierarchy 203:2 high 37:11 67:24 70:6 117:23 131:22 132:2 133:8 146:8,25,25 180:17 181:2 181:10,11 202:11,11 212:9,15,23 219:21 220:19 232:3 235:2,14 237:16 higher 76:22 81:11 84:8 88:12 102:6,13 110:14 111:9 115:1,6,19 157:16,20,25	180:21 181:2 216:14 220:11 220:15 226:22 287:11 288:17 highest 220:18 220:21 231:21 243:12 272:23 highly 36:12 108:13 111:4 113:7 258:15 hill 62:16,17,21 63:2,22 77:19 106:2,4,8,13,23 107:11 108:4 108:25 110:9 112:15 114:12 116:16,21 117:25 118:18 119:2,5,24 120:9,25 121:14 192:15 227:19 hipaa 165:24 hippel 149:12 163:12 177:8 182:13 hired 18:11 25:4 historian 56:22 historical 66:25 134:24 135:1 history 131:11 134:24 135:8 138:14 147:22
hazardous 271:1 272:8 276:19 hazards 155:9 271:13 head 22:2 175:19 182:21 249:9 269:16 291:23 header 219:8 heading 120:16 164:23 165:1 254:25 271:7 271:11 280:21 280:24,24 heads 15:14 health 6:13,18 48:5 51:25 99:13,19	healthcare 255:24 256:7 262:25 healtheffects 7:9,19,21 8:8 8:10 142:1 149:22,23 164:2,3 hear 17:6 107:3 heard 27:20 29:5,11 121:20 229:11 heat 231:24 heavily 110:18 119:25 136:15 heed 87:7 held 12:13 help 55:2 60:14 69:8 helpful 63:8,10 71:13 199:21		

163:4,6 181:19 182:7,17,24 248:5,12 249:6 251:23,25 252:8,16 302:20 303:24 hiv 90:20 hobby 248:4,12 hogstedt 10:7 206:4 hold 107:14 178:17 215:2 251:12 holding 239:11 289:19 hormonal 43:10 horses 119:1 hour 17:13,13 32:15 72:17 126:5 183:4 238:17 280:2,3 hours 9:23 20:8 24:18 27:5 200:4 hr 180:7 huh 15:14 human 125:18 125:21 198:10 207:1,7 260:24 271:1 272:8 humans 10:17 125:5,13 221:1 221:8,12 224:9	224:21,25 225:10,24 267:9 271:13 276:20 hydrocarbon 263:19 hypertension 139:16 140:21 hyphen 268:6 hypothalamic 43:9 hypothesis 216:21 hypothetical 290:14	192:1 197:11 200:6 206:5 214:18 222:1 224:10 225:25 230:2 239:9 246:13 253:24 261:24 identified 133:2,19 134:9 134:11 135:22 136:6,11,14,18 137:6,8,15,18 137:23 138:1,4 138:7,10,13,15 139:11,17,23 140:2 256:5 272:20 305:24 identifies 166:13 225:22 identify 190:8 197:1 identifying 92:23 134:12 idiosyncratic 82:19 108:18 ignore 87:8 ignored 116:9 ii 9:21 138:9 200:2,13 illicit 51:5 illinois 3:9 illness 48:1,2 76:25 81:7 98:21 105:16	111:3,18 120:8 122:11 278:24 287:24 illnesses 122:4 278:25 immediately 186:23 implication 148:14 important 52:3 60:4,11 81:17 112:18,23,25 113:25 118:12 119:4 120:2,17 131:4 203:13 imprecise 252:23 improve 83:6 inadequate 61:12 130:6 229:3 incidence 8:12 115:4,7 127:11 131:7 171:16 172:7,15,20 173:5 175:2,4 175:13 177:6 incident 176:21 incidents 204:1 include 56:25 61:6 62:1,7 63:1,20 66:7 66:17 69:7,23 71:2,19,21
	i		
	i.e. 102:16 103:7 207:2 iarc 10:14 224:3,7,13 226:6 229:3,13 238:5 267:7 iarc's 221:11 idea 22:10 207:18 identical 248:16 identification 18:19 37:25 52:17 99:15 104:8 142:3 149:24 164:4 171:23 177:21		

72:14 156:12 169:17 184:13 204:1 226:7 282:18 285:13 287:2 288:17 included 38:7 40:19 63:3,24 64:20 65:6 66:1,7,22,24 193:22 197:2 205:11,12,20 205:21 214:8 255:15 256:2,5 256:13 306:17 includes 126:24 127:4,7,10 145:5 146:15 151:24 162:4 260:8 including 70:18 140:20 177:12 285:3 288:18 inclusion 72:5 incomplete 290:14 incorporated 244:7 294:16 incorrect 116:8 156:24 increase 115:7 131:13 200:25 233:10 278:11 279:15,17	increased 81:6 91:3 98:20 141:6 195:24 210:24 213:15 225:23 226:20 271:21 275:8 increases 114:15 285:22 increasing 114:16 136:1 210:24 211:11 incurred 215:20 index 5:1 indicate 79:6 189:9 indicated 144:10 indicates 78:15 78:19 indication 304:25 indirect 265:11 265:20 individual 48:16,17,22 67:21 109:13 143:17 166:20 175:16 258:3 279:6,22 305:6 individual's 124:25 individualized 175:12,15	178:3 individually 69:3 76:19 92:11 109:7 individuals 82:6 102:14 127:18 175:24 249:3 251:10 251:18 252:6 252:11 255:15 256:2,6,11 257:5 259:2 262:24 263:9 263:18 279:3 279:14 industrial 8:15 132:2 171:18 industry 193:21 194:12 223:12 infection 140:2 140:24 inference 274:7 inferences 252:24 inferred 248:3 inferring 248:11 influenced 112:13 informants 247:18 information 27:16 42:23	47:3,3 56:8,14 56:17,25 58:22 60:3,4,11,14 61:8 63:14 64:23 66:4,23 68:10,11,14,19 71:15 73:24 75:2,17 76:7,9 76:10,13,14,18 77:1,3 78:13 83:5 87:5 88:13,18 108:11 120:3 124:5 128:22 129:14,16 130:14,15 133:25 134:17 134:21,25 135:2,4,23 143:12,15 157:23 159:25 173:24 204:3 204:25 249:1 261:10 273:6 294:15,16,20 294:21 296:2 304:10,13 305:14 informative 57:9 ingestion 139:22 140:22 inhalation 199:3
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

inhibit 102:10	intended 165:8	interrupt 15:20	250:25 260:6,8
inhibitory	285:24	16:6	271:22 298:1
103:19	intending	intersect 285:6	301:5 302:3,5
initial 13:17	148:6	interval 79:24	intervals 89:17
initially 26:13	intent 286:23	81:21,24 82:1	144:11 154:6
295:12	interaction	82:1,3,7,21	166:9 172:25
injured 48:15	101:22 103:14	83:11,12,14,14	220:4 301:9,15
48:18	interest 64:8	83:17,19,22	301:21
injuries 46:19	77:9 152:8,13	84:4,7,10,19,23	interviews
injury 36:15	153:7 168:21	85:4,5,8,24	249:3
43:9,11 51:23	294:2	89:23 90:3,5	introduced
52:4 122:12,13	interested	90:14 91:8,11	13:10 73:6
138:15 147:4	174:12 175:6	92:5 145:1,5	inverse 180:17
162:12,18	308:17	145:10,22,24	220:1
181:19 302:20	internal 101:7	146:11,15,18	investigated
303:23	143:25 169:20	151:22 152:3	65:25
input 69:19	170:24 210:19	152:24 153:3	investigation
95:12	219:11	153:17,21	47:15,17
insight 193:5	internally	154:15,19	135:13,18
193:13	27:12	155:12 158:8	investigational
instance 2:5	interpose	158:12,20,24	48:2,3,4
22:5 53:11	270:12	159:2,8,12,15	investigator
289:15	interpret 61:10	160:11,15,18	52:8 114:2
instruct 282:24	284:17	160:25 161:4,7	investigators
instructed	interpretation	161:13,18,23	112:20 143:16
71:20 282:17	61:13 282:1	162:2,5 168:22	189:1,3
instructs 17:7	283:4 296:16	173:9 180:8,25	investigatory
insufficient	interpreted	186:11 187:9	48:3
130:6	166:10 168:18	187:16 188:19	invoice 20:2,5,7
insurance 73:6	296:18,19	188:20 190:6	20:10,14 21:2
intake 133:9	interpreting	196:5 212:25	24:11,22
intend 39:20	80:20 107:24	215:14 237:6	invoices 6:3
54:19 55:4	156:19 257:22	237:13,19	18:18 19:7,16
		250:4,8,14,18	19:20 20:21

23:19 24:15,20 27:5,9 involve 51:4 64:9,15 253:13 involved 25:6,7 69:14 289:14 involves 123:2 227:5 involving 228:7 iron 133:9 irradiated 231:24 ish 33:21 36:4,6 36:8 isolating 253:11 isolation 119:22 issue 34:8 133:11 158:2 287:5,20 288:5 289:10,11 issued 20:14 23:2 issues 47:6 124:24 143:3,5 143:9 italicized 206:20	jamaican 231:24 232:3 january 10:12 23:10 221:24 260:3,7,12 261:1,10 jay 57:24 jj.snidow 3:3 job 1:24 248:12 journal 45:18 175:9 judge 290:25 judged 229:3 judging 291:4 judgment 67:20 82:20 121:18 129:18 288:22 301:17 jumping 178:22 june 1:13 12:3 12:7 308:20 310:4 jurisdiction 292:7,11 justice 3:21 4:3 13:14 281:4,17 282:11 291:16 292:1 juvenile 43:14	kailey 3:22 13:11 251:14 kailey.silvers... 3:22 keep 16:14 35:4 keller 3:2,7,12 4:3 kellerpostma... 3:3,8,13 kelsh 9:12 191:18,25 192:4,17 195:7 195:15 kept 27:11 35:3 key 60:20 kidney 6:6 9:10 23:22 24:16,19 29:16 30:4,15 31:9 37:24 38:3,11 39:2,6 39:19 41:7,13 50:3 53:12,17 53:19 55:9,21 58:7 62:6 64:9 64:18,20 66:16 75:5,9,16 76:2 76:6,20,22 77:6,20,21 78:1 92:8,21 93:11,23 94:18 95:24 103:20 105:12,17 108:24 126:20 129:4,9 130:13	138:19,24 139:2,18,24 140:3,24,25,25 144:23 146:4 151:18 152:4 154:12,16,19 154:23 158:16 159:5,16,21 176:17,18 180:15 185:1,6 185:8,16 186:1 186:19 191:4,8 191:16,23 192:9 193:7,14 194:4,20,23 195:10,18 196:14 199:4 207:15,16 209:2,3,8,9 210:23,24 212:14 213:7 214:3,11,25 217:11 218:9 218:18,21,24 219:15 223:23 226:7,7,17 227:11,20 229:2 233:1,10 234:11,19 238:6,15 239:13 240:7,9 271:4,14 272:9 273:22 275:2 276:20 278:11
j	k		
j.j. 3:2 17:6 230:4 297:8	k 3:23 209:10		

278:24 279:16 280:16 294:5 294:11 296:9 303:12 304:14 304:18 kidneys 53:21 killed 48:15,17 kind 23:16 37:1 63:10 76:12 139:6 148:25 171:4 202:1 218:4 278:7 301:16 307:15 kinds 46:22 83:5 knew 29:8 know 13:9 15:13,21 16:2 16:23 17:15 20:20,25 21:4 21:8 22:1,4 24:18 25:5 27:4,22 28:8 28:15 29:18 33:15 35:13,16 39:16 45:20 46:21,23,24 53:18 56:10,11 57:17 59:11 76:15,25 77:25 80:11,16 84:12 84:20,25 93:15 109:19,21 124:2 125:11	129:21 133:13 135:1 140:8 157:24 174:15 174:16 198:2 204:18 209:12 227:4,8 229:10 233:15 243:7 243:24 274:7,9 276:5 278:21 286:25 303:1 knowing 157:22 knowledge 29:21,23 50:16 162:14 190:14 known 86:16 226:17 287:23 kohler 8:20 171:21 kyle 57:15 l l 98:4 209:10 267:5 268:4,6 lab 51:4 lack 165:4 193:4 286:6 lacked 150:24 lacking 245:24 lacresha 4:3 lag 68:22 154:8 language 129:6 129:7 281:16 282:10,19	283:11 284:14 284:20 288:4 288:15 289:9 291:5,9,10,11 292:10 295:3 laptop 70:1 73:15,18,20,25 74:3,5,9,12 183:21 184:2 188:1 laptops 73:16 large 108:12,12 175:8 199:23 301:24 largely 293:23 larger 66:21 81:10 largest 31:7 64:3 larry 25:25 26:1 larson 7:8,18 141:25 149:21 late 33:17 240:17 laura 3:7 law 2:13 12:17 25:6,7 29:5,10 29:15 32:9,20 80:24 282:3 292:17 layperson 50:17	lead 132:3 248:19,22 303:4 leadership 297:9 leaving 297:6 lectures 40:15 40:18,22 41:3 41:6,15,18,21 41:24 42:2,22 left 117:25 260:22 legal 281:20,21 281:22,23 283:2 285:4 legality 51:8 legitimate 203:15 lejeune 1:4 6:5 6:9,14 7:5,15 8:7,18 9:6 11:5 11:9 12:12 13:15 17:24 18:9 19:8,24 21:24 22:24 23:22 24:9,16 24:23 27:20,23 28:1,2,5,25 29:6,9,19 37:22 52:14 56:5 75:8 76:6 76:17,21 77:4 77:5,5,16,20 92:20 93:5,8
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

93:11,20,23	276:19 281:4	304:22	182:13
94:18 95:24	281:17 282:10	life 15:10 36:21	line 63:14
97:19 99:14	290:12 291:16	lifetime 263:4	282:15
102:15 105:14	292:1 300:11	light 260:25	lines 198:14
105:15,20	303:20 304:1	likelihood	link 111:3
106:9 108:22	304:23 310:2	110:15	list 38:5 135:21
108:23 109:8	length 186:13	likely 66:23	137:9,20 138:6
124:10 127:18	lesser 89:5	92:3 103:20	138:12 239:13
128:13,24	level 50:16 63:6	110:20 111:5,6	listed 49:21
135:9,25	78:16 79:3,11	111:24 165:7	133:17 136:13
141:23 142:18	79:13,25 86:19	169:3 281:10	139:5 152:21
147:25 148:13	87:25 88:22	281:16 282:9	205:16 220:4
148:15,20	90:16 96:4	282:18 283:7	223:22 229:14
149:19 150:6	116:15 123:21	283:12,18	229:16
150:21 151:3	134:13 156:1,4	284:15,20	lists 239:16
151:18 153:10	157:9,11,13,16	285:20 289:4	liter 158:13
154:4 158:1	157:20,22	290:9,15	242:17 276:13
159:20 160:5	162:5 176:22	292:22 293:3	276:18
164:1,11 169:1	188:15 189:6	306:23	literature
171:20 172:16	189:15 202:11	limit 193:5	21:23 30:21
176:5 177:20	202:11 232:6	256:16	31:1,3,8 43:16
180:10 184:10	242:18,22	limitation	60:19,22 61:17
184:15,22	243:6,8,12	253:1,11	65:1,1,13 66:9
210:19 219:11	265:5,9 272:23	256:25 261:16	72:2 96:6,12
241:9 244:19	278:20 288:17	limitations	97:1,12,24
246:7 253:23	288:18	84:18 164:24	98:12 99:1,7
254:5,14 256:3	levels 95:16	165:1,3 168:5	109:4 118:3
258:20 259:21	115:19 123:19	252:22	124:16 133:15
260:15 261:4	156:14,18,25	limited 129:4	136:7 138:8
261:23 262:5	203:12 210:25	216:18 245:1	185:18,24
266:16 267:14	211:11 232:3	260:24 262:23	187:17,21
267:16 269:5	258:1,22	274:10,19	188:17 189:7
270:25 272:8	270:24 271:12	lindau 149:12	189:17 190:16
273:16,21	271:19 279:1	163:12 177:8	190:17 193:24

195:1 204:6 283:13 288:13 303:25 304:24 306:24 307:3,6 307:10,11 litigation 1:4 4:6 6:6,10 12:12 13:15 17:24 18:3,9 19:9,25 21:25 22:25 25:12 28:1,6,25 29:18 34:4 37:23 48:10 49:20 50:5 52:15 184:10 284:6 310:3 little 23:9 34:23 36:7 65:24 69:1 72:17 77:11 83:8 88:9 123:7 143:12 167:10 185:6 194:1 233:15 live 44:9 132:11 248:19 liver 103:20 223:13,20 225:2 living 132:1 llc 3:2,7,12 ln 310:7	local 243:24 located 12:16 location 187:24 locations 93:13 93:15,17,19 188:5 logic 153:23 long 20:20,23 21:1 32:12 33:15 69:5 111:5 122:3,13 124:9,19 134:20 224:24 longer 39:6 111:12,15 115:2 116:13 116:14 longley 57:16 longley's 57:20 look 13:21 18:13 47:4 63:11 64:15 66:11 73:23 74:11 78:1 83:5 84:3,5 109:22 110:6 119:8 132:5,18 139:7 140:5 144:7 178:11 178:17,18,20 179:8 186:18 187:20 188:24 192:20 194:6 195:7 196:11	205:3 207:21 209:14 214:7 215:7 225:12 232:24 236:4 255:18 257:12 265:14 looked 74:8 97:18 129:21 150:20 183:20 195:4 213:21 214:3 230:6 232:20 236:2 275:13 looking 21:3,11 22:22 48:7 62:24 63:15 64:12 67:16 68:21 70:2 77:22 83:12,18 87:10 89:16,24 90:1,11 91:9 97:21 108:2 110:6 116:1 120:23 130:15 132:8 136:4 153:13 163:1 172:23 173:16 174:18,21 176:2 183:25 194:14,15 201:5 206:19 207:23,25 215:23 216:2 218:17 221:4	230:17 234:13 271:6,11 280:18 looks 38:5 48:13 223:1 267:2 loose 299:18 lori 25:13 lot 51:3 62:2 68:25 87:24 121:5 195:1 226:11 285:15 lots 88:2 285:3 loud 15:13 love 224:18 low 83:1 144:10 146:24 146:25 165:18 168:19 181:13 207:2 211:10 211:13 212:22 219:21 226:19 235:2,11,12,16 235:20 250:24 lower 82:2,7,13 89:22 90:12,16 91:16 110:19 180:7,16,20 181:12 211:6,6 211:9 212:9,18 212:18 250:23 265:5,9 281:6 285:10 288:9 288:18
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

lowest 89:20,21 220:17,20,20 ls 3:8 luck 186:25 lyon 10:14 224:7	68:12 69:6,8 70:3 78:2 82:20 103:1 117:17 178:19 208:8 215:3 227:7 243:22 268:21 275:21 285:10 287:7 300:19 makes 37:5 68:19 121:21 175:19 276:7 287:10 making 66:18 244:7 261:6 285:14,22 male 145:13 mandated 286:1 mandel 4:3 9:13 191:25 manganese 132:3 manifest 68:24 manifestation 286:19 manslaughter 37:2 manufactured 291:13 marine 8:6,17 11:4 126:25 142:11,12 143:17 147:2,9	147:16 148:19 163:25 164:10 171:19 172:15 211:17 253:22 254:5 marine's 143:18 marines 7:2 8:2 8:13 9:2 141:20 142:16 143:13,16 148:20,22,25 163:23 164:8 165:23 171:16 176:6 177:17 180:8 mark 52:20 marked 18:18 37:24 52:17 99:15 104:7 142:2 149:24 164:4 171:22 177:21 192:1 197:10 200:5 206:4 214:18 221:25 224:9 230:1 239:9 246:12 253:23 261:23 marriage 308:16 martin 9:24 200:4	maryland 42:19 maslia 7:7,17 141:25 149:21 mass 36:21 37:6,15 master's 46:11 50:10 materials 10:22 28:16 57:21 59:1 82:22 239:8,13 240:8 278:8 mathematically 81:13 220:13 matter 12:11 67:20 88:25 171:3 308:17 mattingly 268:2,5 mauderly 6:19 96:17 97:13 98:4,7,9 104:2 104:7,13 maximum 123:18 125:10 158:10 mcls 243:11 244:2,5 md 1:12 2:4 5:6 13:2 308:5 309:9 310:5,25 mean 20:4 24:3 32:19 44:17
m			
m 98:4 209:10 268:5,6 made 69:23 117:18 175:1 205:4 288:10 magnitude 121:25 274:9 289:13 mail 13:22 184:3,4,8,20,20 mailing 165:5 mails 184:9,14 185:3 main 67:14 246:5 274:21 mainside 166:24 167:19 major 165:2 252:21 289:12 majority 36:13 117:4,7 140:18 make 14:16 15:10,16 16:4 16:15,22 17:3 17:10,19 35:16 53:7,23 54:6			

47:11 69:18 71:20 78:25 84:13 88:21 89:1,19 96:14 107:3 116:12 122:2 123:8 125:7 141:11 148:1,5 169:20 170:3 173:16 174:2,3,13 197:15 199:14 203:6 213:25 222:19 256:20 257:12 269:25 270:5 272:1 273:10 275:6 275:21,23 276:11 278:19 286:12 287:11 289:2 294:24 295:1 298:6 300:7 meaning 48:13 91:21 174:17 210:23 299:24 meaningful 258:21 means 2:12 20:9 66:3 114:14,22 115:1 116:24 145:4,7 146:14 151:24 152:2 153:2,20	154:18 155:6 155:18,25 161:16 180:20 209:21 211:4 212:13 220:17 245:19 287:3 289:22 meant 258:9,10 297:19 measure 78:18 79:16 80:1 120:2 124:6 189:21 190:7 243:3 298:5 measures 80:2 mechanism 77:7 mechanistic 241:13,22 245:23 264:16 265:11,21 media 40:15 42:8,11,16,21 165:18 231:15 median 158:9 158:10 162:7 242:15 medicaid 255:17 medical 36:19 43:16 44:6,11 45:17 51:24 165:25 281:21 286:7 289:20	289:21,25 medicare 255:24 256:7 256:12,23 257:6 263:1 medicine 44:12 45:14,24 46:20 50:11 medicines 46:22 medium 146:25 180:16,22 181:1,13 211:9 211:12 212:10 212:16,23 219:21 235:2 235:13 237:1 meet 31:18 32:23 116:14 119:16 257:4 285:17 290:19 290:19 meeting 212:24 meetings 31:22 31:23 32:3,13 meets 89:10 290:18,23 members 11:3 253:22 254:4 memorize 292:2 memorized 179:8 222:20	memory 42:15 43:6 139:15 143:18 188:7 275:24 mentioned 224:2 297:24 300:5 303:10 mesothelioma 117:21 met 31:16 32:1 32:16 77:19 116:17 117:20 121:14,15,19 218:19 227:23 228:1 285:19 meta 9:11 10:10 31:6 63:12,17,20,24 64:2,5,8,19,24 64:25 65:3,5 65:11,15,16 66:6 78:7 191:13,14,14 191:24 192:7 193:23 194:5 196:1,13 197:2 205:8,11,21 213:6,22 214:2 214:4,9,16,23 215:12 217:21 244:21 264:7 305:7,11 metabolic 138:3
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

metabolism 102:11 103:21	195:5	modeled 93:16 96:5 275:15 276:11,17 277:3	months 21:1 276:11,17 277:2
metabolites 265:20	mine 162:15 171:2 239:20	minimal 268:10	moore 197:6 198:19 201:7 201:21,21 202:3,4,6,7,9 202:22,25 203:5,7,19 204:3 271:17
metabolized 102:6 265:18	minimum 125:10 278:22	modeling 95:8 95:14 124:4 268:15 275:14 276:10 277:6 299:17	moore's 202:16
methodology 70:18	mink 9:12 191:25	models 95:15 96:1	morality 162:10
methods 49:4 95:10,11 114:3	minute 24:4 91:24 215:2 224:2 242:23	moderate 122:16	morbidity 8:1 127:8 163:22 164:7
michael 1:12 2:4 3:18 5:6 10:20 12:10 13:2,17 239:7 239:12 308:5 309:9 310:5,25	misclassificat... 143:3,5,9 150:13,16 166:15 175:23 248:13	modest 81:1 298:18,21	modified 295:2
michalek 209:4 209:10	misinterpreting 214:1	modus 193:19	modus 193:19
microbes 265:18	missed 102:22 184:6 302:21	mom 73:12	moments 13:10
micrograms 158:13 242:16 276:13,18	misstates 113:22 171:7 174:11 204:22 233:3,13 251:20	monograph 221:12,16 224:3,13 226:6 238:5	monograph 221:12,16 224:3,13 226:6 238:5
microphone 16:7	mixed 215:20 300:11	monographs 10:15 224:7	monographs 10:15 224:7
middle 13:17	mike 3:18	monotonic 115:21 146:22 299:5	monotonic 115:21 146:22 299:5
military 30:1 210:20 219:12 259:3	mixture 96:8	monotonically 114:15 299:1	monotonically 114:15 299:1
million 201:1 226:19	mixtures 97:16 101:18	month 23:9 242:17	month 23:9 242:17
mind 31:14 178:13 194:7	ml 178:25	monthly 23:17 276:11	monthly 23:17 276:11
	model 93:8 95:3,20 178:9 276:2		move 125:17

mph 1:12 2:4 5:7 13:2 308:6 309:9 310:6,25 mrr 215:12 mscfms 1:12 2:4 5:7 13:2 308:6 309:9 310:6,25 multifactorial 136:24 278:24 278:25 multiple 27:25 110:25 111:1 114:8 115:22 122:5 253:14	natural 15:15 nature 46:17 49:8 270:14 naval 172:15 navy 7:2 8:13 9:2 141:21 142:16 171:17 176:6 177:18 180:8 near 305:1 necessarily 110:22 113:11 115:16 135:19 227:9 257:1 269:25 need 17:14 24:19 40:19 42:9,24 53:7 53:23 54:5 64:2 65:16,19 67:4,24 73:23 106:24 108:4 116:3 118:7 121:13 166:9 168:18 204:10 206:9 281:9 303:5 needed 304:14 needs 39:7,15 40:11 68:2 106:14,24,25 107:19 204:19 233:9 278:10	negative 60:24 61:1,7 64:1 210:7 252:4 negligence 36:19 neither 235:1 nephroblasto... 226:17,25 227:11 228:8 228:11 neurodegener... 242:6,11 neurologic 103:19 neurological 242:4 neuropsychia... 43:12,13 never 70:11 115:23 256:11 304:20 nevertheless 165:16 new 64:23 65:1 65:17 130:2,25 newer 65:3 68:17 news 29:13 nine 119:18 251:10,17 306:12,17 nodding 15:14 nods 15:17	noise 229:10 non 140:17 169:17 noncancer 101:17 nonmonotonic 210:20 211:3 219:13 nontrivial 285:20 nope 297:5 normal 69:20 69:21 normally 107:3 288:12 north 1:1 3:19 12:14 notably 266:19 notary 1:22 2:11 308:4 note 17:9 231:20 259:25 noted 12:18 35:17 260:16 260:18 307:25 309:5 notes 223:13 notice 39:14 73:14 november 19:20,23 20:13 20:17 21:5,14 22:18,19 23:6 23:7,20
n			
n 3:1,8 12:2 268:4,6 n.w. 3:3 name 12:20 13:16 199:20 205:13 239:24 310:2 names 239:20 narrative 195:13 narrow 83:13 83:23 255:23 302:6 narrower 85:5 national 128:11 128:17			

nrc 129:3,25 130:1,4,10,16 130:20 nrc's 128:20 129:8 130:24 null 151:6 157:5 168:8 175:25 300:7 300:17,19 number 6:2 20:8 82:5 88:16 144:3 187:22 188:8 200:7,15 217:6 223:4 226:20 251:22,24,24 252:6,11 276:5 302:14 305:14 numbered 2:7 101:9 numbers 87:11 88:25 145:13 166:6 168:20 numeracy 40:25	obesity 139:3 139:10 140:21 182:18,25 302:19 303:23 object 17:6 62:9 63:4 64:21 70:9 76:3 77:14 78:3 90:8 173:25 187:12 202:20 207:9 257:19 261:12 277:9 286:14 287:15 290:13 291:20 objection 17:9 56:9 60:6 61:9 65:20 71:5 79:15 81:4 83:15 85:9 94:21 98:1,16 99:3 106:16 107:15 108:7 111:10 113:4 113:21 115:15 118:11 122:21 123:6 124:12 124:22 125:6 125:24 130:21 134:4 135:6 137:11 147:5 147:12 148:10 150:14 171:6 173:10,14	174:10 175:5 177:2 179:2 190:2 203:9 204:13,21 218:20 232:8 232:18 233:2 233:12 244:9 251:19 256:18 259:12 270:13 272:12,17 275:17 277:25 278:13 279:8 279:19 285:16 286:8 292:8 293:21 298:13 299:7 300:22 301:10 303:14 304:4 305:3 306:2 307:4 observation 107:5 observational 63:9 107:3,7 108:3,5 observe 106:17 106:18 213:15 263:8,17 observed 78:16 106:15,25 193:1 210:21 219:14 225:24 obviously 28:8 120:1 179:7	occasions 300:4 301:15 occupation 154:7 occupational 9:8,19 191:22 200:1,12 229:1 248:4 occur 102:12 253:2 occurred 226:18 oce 92:16 october 22:21 odds 166:1 250:1,11 259:25 260:3 271:21,25 299:22,22 301:4 offer 18:2,8 39:20 54:19 55:4 182:19 offering 25:1 55:8,17,19 93:1 240:24 offhand 31:14 33:5 49:25 50:6 57:18 80:14 128:9 143:21 147:6 147:13,19 162:16,19 169:15 170:13
o			
o 12:2 75:12 78:23 89:13 267:5 268:4,4 268:5 oath 14:19,22 ob 282:20			

178:7 201:2,16 227:5 236:6 269:22 office 3:19 19:17 offices 2:13 oh 13:23 34:13 42:4 54:9 80:16 90:22 107:9 121:7 127:1 152:14 167:12 200:7 205:18 206:15 208:24 230:15 249:15 okay 13:25 14:9 19:19 21:18 22:3,10 22:13 23:4,4 25:15,18 26:8 26:16,23 28:23 29:3 30:2,11 30:14,24 31:15 31:25 32:3,19 33:7 34:5,16 35:1,23 36:5,9 36:17,23 37:3 37:9,12,19 38:15,21 40:11 40:17,21 42:21 44:5,10,21 45:7 49:16,23 50:7,18,23 51:15,20 52:2	52:6,12 53:10 53:14,20 54:3 56:20,24 59:5 59:15 60:17 74:24 75:24 76:12 77:10 79:5,22 84:2,9 91:22 92:1 97:12 105:9 136:10 140:9 142:7 164:22 171:3,13 173:3 173:21 174:6 176:24 177:5 177:14 179:22 180:5 187:23 188:12 192:17 198:5 206:10 208:6 213:4 217:19 218:16 230:5,24 237:14 240:3 243:21 246:8 247:10 249:25 251:5 259:17 260:21 268:13 269:19 270:21 271:10 273:14 288:10 290:4 295:17 299:15 307:8,17 old 65:4 older 65:3,7 66:8 68:13	256:21 omitted 43:1 once 111:13 124:2 300:1 one's 23:19 ones 43:17 65:6 65:7,18 70:23 92:25 192:10 302:21 onset 43:13,14 operandi 193:19 operate 70:25 operating 304:23 opinion 60:10 72:13 75:25 93:10,12 94:7 94:17 95:23 98:6 104:19 133:20 204:8 232:5,14 233:8 236:14 240:24 241:7,16 244:14 245:3 264:24 265:6 265:16 268:23 268:24 270:24 272:7 274:10 274:18,23 275:11 276:16 278:9,14,20 286:11 289:19	opinions 18:3,8 25:2 38:22,23 38:25 39:19 54:19,22,23 55:5,9,20 60:15 92:20 93:2,22 185:8 185:12,19,25 186:5 210:10 233:4 290:2 opposed 112:12 122:12,13 oral 1:11 2:3 order 65:14 108:25 119:7 119:15 203:11 ordinary 15:13 oregon 2:14 12:17 51:25,25 organ 225:25 226:6 organic 146:5,7 158:17 organs 225:23 outbreak 47:18 120:8 outbreaks 47:22,23 outcome 6:7,11 37:24 47:5 52:16 79:9,11 82:20 84:17,18 114:15 303:8 308:17
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

outcomes 75:9 176:5 outdated 66:22 68:8,13,16 outlier 194:25 outside 59:3 251:3 275:12 278:7 300:2 overestimate 34:24 overlap 285:3,3 285:5 overt 122:13 own 19:15 75:14 82:19 148:5 208:7 295:14,16 owner 59:11 ozone 105:1	p.o. 3:24 13:22 13:25 pace 16:12 page 6:2 14:8 14:17 19:19 40:1 55:24 56:2,16,17 58:6 96:11,18 96:25 97:10,13 101:5,7,8,12,15 132:21,23 137:21 139:8 140:10,14,16 143:23 144:3 144:15,17 145:16,17 151:8,11 153:25 154:2 158:4 164:21 164:24 165:14 168:9,12,13 181:6 186:20 186:24 188:24 191:3,7,9 192:20 196:21 196:25 198:1,6 198:8 201:18 201:20 205:4 206:14,16 207:24,25 208:23 210:12 211:23,24,25 212:3 213:3 215:7 216:9,13	216:24 217:6 217:15 219:6,7 219:10 221:10 221:10 222:25 223:6 224:17 224:20 225:6 226:12,14 227:15,18 228:21 230:15 230:17,21,23 231:12,13 233:24 234:15 236:17 237:25 241:5 242:13 244:13 247:9 249:10 252:17 252:21 253:6,8 254:20 258:5 260:20 263:11 263:12 264:3,6 265:14,16 266:11,14 271:3,5,6 280:19 pages 69:4 pairings 295:10 pairs 247:12 paper 202:7 208:4,9 226:11 papers 45:20 199:14 305:6 paperwork 25:11	papillary 185:10 paragraph 132:25 140:16 141:4 152:11 152:16 165:16 165:22 168:11 168:12 169:1 188:25 189:2,5 206:20,23 226:14 228:24 234:14 236:17 238:3 252:20 253:7,10 258:14,18 260:23 263:15 280:25 294:25 295:2,2 296:3 paragraphs 295:11 parkinson 10:24 11:2 246:11,17 253:21 254:4 255:19 259:20 parkinson's 6:10 11:6 24:13 29:17 30:5,16 41:9 41:16 50:3 52:16 53:4,8 53:12,22 54:20 55:6,21,25 58:8 62:6
<p style="text-align: center;">p</p>			
p 3:1,1 12:2 78:23 86:7,11 86:24 88:12 89:13 154:23 155:3,5,22 188:19 p.m. 2:9 183:8 183:9,11 238:21,22,23 238:25 280:6,7 280:8,10 307:24,25			

64:10 67:17 92:8,21 93:12 93:24 94:19 96:25 104:19 105:16 108:24 126:21 130:5 131:5,8,11,14 131:17,20,23 132:4,9,13,17 133:10,19,22 134:1,8,17 136:1,2,12 138:4,16 145:13 152:17 152:21 153:8 155:10,22 160:4,6,8,18,22 181:6,9,12 185:2 240:20 240:25 241:10 241:18 242:1 244:16,22,25 245:5,10,10,23 246:6 247:7 254:12 256:24 259:6,11 260:7 260:13 261:21 262:3,18 263:8 264:16,21 265:1,6,12 267:12,20 269:5,9 270:22 272:10 273:22 275:2 276:21	278:12 279:16 290:7 296:9 297:17 parkinsons 24:9 part 9:21 50:10 51:10,18,21 59:25 85:16 87:9 107:6 116:15 121:2 126:1,2 179:4 179:10 196:12 200:2,13 partial 165:16 participant 277:14 participant's 277:19 participants 147:3,10,17,21 148:8 149:11 150:25 162:12 162:22 163:4,6 163:11,16 169:2 177:7 178:4 181:18 182:1,7,12,17 182:24 249:6 258:2 263:5 277:15 participate 169:3 participation 165:18	particular 26:17,17 67:12 116:10,11 169:23,23 187:7 194:7 195:4 247:25 272:19 292:10 294:3 295:16 298:25 particularly 31:9 47:5 62:21 80:2 83:1 84:6 168:6 170:18 248:16 parties 308:15 parts 26:9,10 167:24 201:1 226:19 231:8 231:21,22 232:16 271:19 271:24 272:3 293:19 party 308:12 past 28:14 31:24 33:18 39:9 165:18 307:14 pathology 227:4 patterns 193:5 pay 87:7 pc 305:25	pce 39:1 92:10 96:8 98:14 100:22 101:22 102:6,8,10,18 103:8,16,18 146:4,21 160:1 160:8,18 184:21 186:8 210:15,23 212:7,15,21 213:6,10,22 214:3,4,24 217:11,22 218:8,18,21,24 228:17 245:5,9 245:20,24 246:5 247:7 249:11,19 250:12,15 252:10 254:13 259:10 264:13 264:16,21 265:1,10,11,17 265:17,19,21 266:19,23 268:18,20,24 269:1,2 270:3 270:5,10,17 290:7 pd 133:3 253:2 259:25 260:2 261:2 263:17 265:21 278:24
----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

pdf 144:2	268:11 273:6	personal 34:2	phd 1:12 2:4
pdt 2:9 12:3	275:7 300:12	73:18 74:5	5:6 13:2 308:5
19:1 72:22	303:11 306:17	183:21 184:1,2	309:9 310:5,25
126:12 183:9	perceived	184:4	phrase 47:20
238:23 280:8	108:15	personally	284:8 306:23
307:25	percent 298:1	19:18 80:11	physician
peak 84:24	percentage	295:21,23,24	34:11
peer 43:15	37:6 44:1	personnel 7:3	physicians
169:14,17	perfect 206:18	8:13 9:3	45:14
170:2,8,23	perfectly	141:21 142:16	physiologic
175:9 283:12	203:15	171:17 172:15	125:12
288:13 306:24	perform 59:16	176:6 177:18	physiologically
307:3	61:16,20	180:8 210:20	268:14
pelvic 217:24	172:20 173:8	219:12	pick 89:3
pelvis 176:18	performed 20:9	perspective	picked 97:3
218:11	20:10,12 61:17	68:20 84:14	piece 85:13,14
penalty 15:1	175:13 178:4	194:12,14	85:16 193:16
pending 100:7	299:11,20	305:17	pieces 65:25
pendleton	period 20:21	pertaining 56:4	69:1
75:11 109:11	272:11,22	pesch 235:5,6,8	pituitary 43:9
109:16 150:21	periods 75:8	235:20,23	place 31:22
154:5 156:7,12	perjury 15:1	236:1,4,7	53:17 75:10
156:15,18	permissible	pesticide	286:25 287:23
157:4,10,16,25	123:20,20	132:15	placed 53:19
176:6 180:11	242:18,22	pesticides	places 187:16
256:4 259:21	243:6,8	131:16 147:11	187:22
303:19 304:3	perseverating	pezzoli 264:6,9	plaintiff 297:9
people 44:9	54:13	pg 310:7	plaintiffs 3:5
77:4 98:19	person 32:17	ph.d. 45:13	3:10,15,20
109:8,9,15,23	32:23 124:9	pharmacokin...	18:2 71:17,21
124:9 159:21	278:10	268:14	platt 3:23
160:5 174:3	person's	pharmacokin...	13:12 100:1
190:20,20	204:11	268:8	142:8 206:6,10
256:21,24			222:2 246:25

plausibility 76:8 120:12,14 228:7	298:4 301:2,6 301:12	portland 14:5,6 14:7 51:25	potentially 8:4 107:21 125:15
plausible 111:2 258:15	poison 121:21	poses 232:25	133:15 163:24
plausibly 109:3	polled 127:17	position 130:24	164:9 177:1,3
play 68:4 88:5 112:4	pollutants 6:17 104:6,12,23 105:1	positions 131:1	204:20 248:14
plaza 3:8	pollution 131:19	positive 60:23 61:2,6 64:1 82:16 90:20 114:24 119:12 176:25 193:1 210:7 223:13 237:4,10 252:4 252:16 273:20	248:21,24 261:17
please 16:2,23 24:2 35:12 39:16 56:13 80:9 100:16 209:7 213:3 221:6 225:7 252:18 280:19	pool 305:14	possibility 226:1	practice 23:12 25:20 26:25 36:13,14 44:2 44:4,13,17 50:23 69:14 74:6 128:3,6 169:17
pllc 3:17	poorly 16:21 61:11	possible 97:24 98:13 101:1 112:7 234:1 259:24 277:23 305:14	practices 196:19
plus 65:1,17	pop 307:5	possibly 69:25 279:24	precise 35:8,24
point 83:2,18 83:25 84:4,7 84:11 91:20 124:6 136:7 147:1 166:24 167:19,25 180:23 181:3 181:14 201:3 210:22 211:8 211:10 212:13 212:19 230:19 236:15 237:8,9 251:1 272:2 274:11,15,16 274:19,25 275:15 285:21	population 48:21 75:7,18 75:20,23 79:12 97:19 108:12 108:13 111:19 111:20 113:9,9 114:1,3 119:8 119:11 120:6 122:2 123:16 127:17 128:23 157:15,18,21 207:3 248:8 254:17,18 255:10 256:17 256:20,21 262:20 304:2,3	post 3:19	precision 81:17 83:6 107:23 144:9 166:1 188:15 189:6 189:10,15
	populations 46:18,20 80:3 111:1 112:19 114:9 125:18 127:17	postman 3:2,7 3:12 4:3	preclude 226:1
		posttraumatic 43:11	pregnant 90:19
		potency 121:24	prepare 19:15 27:1 30:18 33:4
		potential 51:7 104:25 128:13 133:13 143:10 150:15 169:11 175:22 193:3,7 242:8 248:12	prepared 35:20
			preparing 164:18
			preponderance 281:7 289:5,10 290:10 292:19

<p>presence 118:15</p> <p>present 4:2 39:12 42:18 76:17 79:18 93:3,6 95:21 105:19 109:2,5 124:5</p> <p>preserve 282:25</p> <p>preset 88:24 89:2,19</p> <p>presumably 277:4</p> <p>presumptive 260:13 261:3</p> <p>pretty 14:14 30:22 84:19 91:25 121:1 159:13 184:22 220:7 250:22</p> <p>prevalence 81:7 131:8</p> <p>prevents 90:21</p> <p>previously 241:3 255:5</p> <p>primarily 25:24 31:5 102:7,9 299:15</p> <p>primary 25:17 216:16 263:24 295:10</p> <p>principal 52:8</p>	<p>principle 122:22 190:5 270:20 279:7</p> <p>principles 47:14 48:11 49:4 51:3</p> <p>prior 20:2,5,10 20:12 21:5,8 29:4,9 176:13 253:8 273:16 273:21</p> <p>priori 89:13</p> <p>privilege 28:10 282:25</p> <p>privileged 56:12</p> <p>probability 290:1</p> <p>probable 259:24</p> <p>probably 14:13 21:13 37:8 40:14 54:1 59:9 72:11 73:12 84:17 91:17 97:9 120:14 122:17 129:11 220:5,5 220:8</p> <p>problem 221:22</p> <p>problems 169:2</p> <p>proceeding 15:4</p>	<p>proceedings 5:4</p> <p>process 14:15 66:2,15,19 69:20,21 170:25 171:4</p> <p>processes 169:21 170:4,7 244:7</p> <p>produce 60:23</p> <p>produced 2:5</p> <p>product 26:12 36:21 266:22</p> <p>production 223:12</p> <p>products 131:23</p> <p>professional 2:11 50:20 308:23</p> <p>professor 46:12</p> <p>profile 10:13 10:19 103:15 213:10,14 221:20,21,24 222:8,12,22 229:8,22,25 230:9</p> <p>profiles 101:3</p> <p>progression 11:7 261:21 262:4</p> <p>projects 24:1,3</p>	<p>prolonged 139:22 140:21</p> <p>promised 199:22 282:5</p> <p>pronunciation 223:18</p> <p>proof 281:6</p> <p>property 148:5 149:5 162:23 182:2</p> <p>proposition 191:13</p> <p>proprietary 61:23</p> <p>prospective 46:17 67:10,11</p> <p>protect 28:10 285:11 288:6</p> <p>protecting 287:3</p> <p>protection 90:1 108:16 193:20 193:21 194:13 196:20 285:24</p> <p>protective 89:25 90:23</p> <p>provide 27:15 60:5 61:4 71:17 128:22 153:7 173:17 176:13 211:16 265:24 266:4 298:11 299:6</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

provided 58:24 59:2 63:6 66:12 134:1 187:5 236:12 236:19 301:7 provides 206:25 providing 59:25 60:3 293:11 proxies 249:4 proxy 132:14 247:19 ps 149:14 public 1:23 2:11 6:12 48:5 99:13,19 100:10 108:15 127:22 128:1,8 193:20 194:13 196:19 283:23 284:2 285:11 285:24,25 287:3,9 291:18 308:4 publication 127:1 142:22 171:5,8,11 172:14 188:11 254:8 publications 40:15 43:1,3,7 43:19,19 170:10 188:8	283:7 284:10 284:22 published 88:7 88:8 174:2,13 pubmed 61:21 61:22 pull 100:4 240:19 purple 41:22 purpose 204:4 204:4 305:10 305:13 pursuant 308:10 put 49:17,18 77:2 119:1 120:15 135:9 170:10 174:23 175:8 putting 288:13	203:14 257:21 quantitatively 198:22 question 15:21 15:24 16:22,25 17:1,17,18 20:22 48:13,23 50:14 51:1 57:11 58:9 61:10 64:7 83:7 92:14 100:7 105:6 106:19 107:18 107:24 115:13 129:10,12 132:19 148:3 157:9 174:24 175:18 178:20 179:11 184:2 190:19 193:25 207:22 209:6 232:10,22 251:14,23 257:23 276:22 298:12 303:22 306:15 questions 15:12 48:12 198:4 296:24 297:15 301:19 302:14 304:8 306:6,11 307:18 quick 16:7 18:21	quickly 16:13 quintiles 115:22 quite 51:13 123:24 135:16 156:21 182:3 284:23 292:18 301:24 quote 300:12 302:3
			r
			r 3:1 12:2 25:25 89:13,13 98:4 208:21 308:1 race 154:6 raised 39:25 raleigh 3:19 random 79:20 87:13,16,18 155:8,8 range 90:5 rank 203:11 rankings 198:21 rare 120:18 rarely 117:20 rate 76:22 102:6 156:20 157:15 165:18 168:20 302:10 303:16 rather 83:11 87:4 143:20

194:13 212:4	299:22,22	183:17 232:2	260:18 269:13
245:16 288:8	rats 226:15	233:14 280:23	269:20 291:25
291:10 299:16	raw 231:9	287:20 307:5	295:6
ratio 78:15,19	rcc 140:18,20	realtime 2:12	received
79:13 81:10	141:6,9,16	reason 119:17	256:12 262:24
82:22,25	rdr 1:22 2:10	202:12 208:2	recent 35:2
117:20 144:9	308:3	245:15 265:9	65:19 66:6,21
144:23 146:3,8	reach 165:7	310:7	recently 40:23
152:21 154:12	read 102:19	reasonable	recess 18:25
155:9 158:16	103:10,23	16:12 22:17	72:21 126:11
159:6 160:1,9	165:20 166:2	33:11 81:5	183:8 238:22
160:23 161:11	184:14 281:13	83:3 132:6	280:7
161:20 166:1	291:14 295:17	189:10 232:22	rechallenge
176:16 180:21	295:19,22,25	274:7 279:1	120:21
180:22 181:2,3	296:1,4,14	289:19,21,25	recipient 165:8
181:11 186:11	309:1 310:7	reasonably	recipients
187:9,16	reader 68:5	109:22	256:23
188:20 212:8	readily 188:22	reasons 168:19	recollection
212:10 220:18	reading 139:6	recall 25:4	43:24 71:24
220:18,20,22	167:4 236:16	28:13 29:8	80:19 149:10
237:2,17 250:1	reads 310:7	31:3,11 49:23	162:10 163:1
250:11,12	ready 58:9	50:6 53:24	163:17 177:6
259:25 260:3	real 18:21	57:23 58:2,3	177:10 181:17
271:21,25	82:11 112:1	58:20 80:22	181:20,22,25
298:17 301:4	realistic 125:4	99:11 128:9	182:6,11,22
302:5	reality 300:21	140:4 143:21	188:13 229:21
rationale	really 16:7	147:6,13,19,20	283:15 291:16
130:12	34:24 37:14	149:6 162:15	record 12:6,19
ratios 144:18	41:4 63:10	162:17,20,25	15:16 18:21,24
145:22 151:14	67:14 81:14	163:3,9,14	19:3 52:24
154:5 158:8	82:18 95:7	173:6 179:13	72:20,24 97:5
180:6 189:11	115:25,25	179:14 183:2	102:22 126:10
204:1 219:20	119:22 120:18	228:10 236:5	126:14 172:4
235:17,18,18	120:24 121:9	252:25 257:8	179:3 183:7,11

238:21,25 280:6,10 307:24 308:8 recorded 1:11 2:3 12:9 records 143:20 redirect 297:4 reduced 165:25 257:4 reduction 257:1 refer 211:20 290:3 reference 158:9 180:11 188:2 202:25 247:25 267:17 referenced 2:8 80:19,23 95:10 99:4 174:22 203:7 215:2 246:2 referencing 150:18 referred 53:12 109:25 179:9 referring 69:10 78:7,8 93:2,4 96:16 97:2 123:21 141:17 172:22 173:2 173:19 179:6 297:17 300:2	refers 20:23 290:1 reflect 27:5 125:4 regarding 12:11 172:14 173:4 185:25 regardless 301:8 registered 308:24 registry 255:7 regulation 243:19 regulations 243:25 regulatory 123:12,14 169:19,22 284:2,5,25 285:9,23 reject 251:2 rejected 66:4 72:10 relate 36:15 51:7 related 25:2 28:25 33:24 36:15 37:7 42:18 55:5 184:14 234:11 234:18 268:19 268:25 269:24 278:8 308:15	relates 1:6 relationship 75:4,15 76:8 110:4,15,18,21 111:22 112:21 112:25 113:2 113:19 114:21 114:25 115:21 115:24 116:5 116:11,19 118:10 146:22 180:18 195:17 196:14 204:12 204:20 234:2 241:8,18 244:16 245:5 269:4 271:14 272:9 274:5,9 280:22 281:10 290:7 299:5 relationships 46:18 112:4 117:16 relative 81:2 110:14,20 111:15 112:8 112:11,11 118:19 131:12 196:4 208:3 215:12 234:23 250:11 301:4 relatively 82:14 83:1 117:22 260:24 268:10	302:6 release 132:2 relevance 57:2 72:10 relevant 56:3 56:25 57:5,7 61:6 63:25 64:5,11,16 70:22,23,24 71:3 72:5 73:9 124:6 253:2 reliability 107:23 reliable 60:5,8 82:10 89:7 108:11,13 125:17 170:22 198:20 202:17 relied 172:10 192:8,14 247:15,19 254:11 rely 60:8 67:6 68:13 128:4,6 175:7 192:12 201:7,11 213:9 296:16,20 299:15 relying 62:11 62:12,14,20 96:20 268:17 remainder 45:8 45:10
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

remember 21:23 22:4,6,7 22:8 25:9 40:21 41:2,5 41:12 42:14 53:15 139:10 199:9,17 201:6 208:13 227:3 298:2,19 299:2 302:16,23 304:15 305:8 305:19 306:7 306:13,25	37:22 38:3,7,9 38:12,16,19,21 38:22 39:3,6 39:21 40:19 49:21 52:14 53:3,8 54:18 54:23 55:2,25 56:15 57:13,14 57:20,24 58:4 58:7,8 59:18 60:3 62:1,3,5,8 63:1,21 66:16 69:4 72:8,14 96:10,13,25 97:4,9 98:4,7 99:5,10,10	201:14,15,18 202:15,24 203:21,22 204:4,5,7 205:5 207:15 207:15,17 208:6,12,14,17 209:3,8,17,18 209:21,22,24 210:2,6,9,11 214:25 216:25 219:2 226:13 227:16 228:18 233:5 235:15 236:11 238:12 238:15 239:14 240:7,9,20 242:25 243:4 243:10 257:8 257:15 260:16 264:4 265:15 266:2,7,8 268:22 269:11 269:18 270:22 271:4 274:13 274:21 275:12 276:15 278:6 280:17 289:1 290:12 291:6 291:22 293:19 294:5,12,14,17 295:18,21,25 296:1	reportable 84:16 reported 1:21 2:12 155:19 159:15 208:4 208:25 212:21 237:20 255:2,7 263:18 reporter 12:22 15:7 151:9 191:5 223:25 308:24 reporters 2:11 308:23 reporting 247:16,19 261:11,15 reports 22:11 22:15 23:2 25:19 26:6 27:1 29:17 30:4,8,10,13,15 30:20 33:1 35:19 36:14 49:20 50:1,4,5 61:18 63:23 69:16 82:24 92:9 106:5 135:5 164:18 289:18,23 296:7,11 represent 13:14 169:9 243:12 269:17
remembered 41:12	124:23 126:21 126:21 128:11 129:2,7 130:3 130:9 132:21 133:18 134:2 134:18,20 135:10,24 137:7 139:5,6 139:14 140:6 140:11 169:24 178:19 179:5 179:10 185:7 185:22,24 186:13,15,19 191:4 192:11 192:18 195:20 196:22 200:18 200:22 201:10		
removal 266:20			
renal 9:17 141:17 176:18 185:9,10,13,20 186:6 199:25 200:11 215:23 217:24 218:3 218:11,12 227:1,5 228:11 271:21			
repeated 134:22			
repeatedly 111:5			
rephrase 16:25			
replicated 112:19			
report 6:4,8 14:8 24:13,19			

represented 92:5 111:7 135:8 277:6	respectively 219:22	resulting 102:17 103:8 198:21	retrospective 7:6,16 63:8 67:10,12
representing 291:14	response 114:19,21,24 115:10,12	results 60:24 60:25 61:2,2,7 61:12 85:7	141:23 142:18 149:20 150:6 252:25
represents 20:2 20:5 21:2 82:4 220:1,8	116:4 120:19 146:22 168:20 178:15 179:1	87:15 88:6,13 103:12 113:3 113:20 114:4	retrospectively 47:5,19
reputable 128:17,19	179:18 180:18 193:4 197:1	152:3 157:5 166:9 168:17	returned 165:7
requested 30:10 308:11	198:9 202:14 202:17 203:1,6	176:12,13 196:12 207:17	review 9:15 21:24 43:15
require 68:24 100:18 123:5	203:16 204:6,9 210:21 211:4	208:11,14,17 211:4 212:20	50:4 57:19 61:7 65:12
required 278:22 279:2,5	219:14 220:1 234:2 298:25	215:9 223:13 233:25 235:2,6	69:24 70:15,19 71:3 72:5 96:7
requirement 257:5 286:24	299:1,4	235:15,19 247:11 296:17	97:23 98:12,25 99:7 100:21,22
requirements 285:4	responses 125:12	296:21 299:1 299:19 300:6	170:8,24 173:3 178:21 179:22
requires 14:22 100:14	responsible 26:11,18	300:20	184:9,20 185:2 197:9,18
reread 103:2	rest 85:12 92:2	retain 92:15	205:23 208:1 208:10 215:4
research 21:23 24:23 38:19	restaurant 120:8	retained 18:2,8 18:12 21:5,18	217:12 242:24 251:21 266:10
128:11,17 285:1 294:7,9	restricted 272:18 273:4	25:11 27:19,24 28:4,15,17,20	273:15 282:13 288:25 289:2,7
294:13,25	result 69:17 85:4 87:13	28:24 29:4,9 29:15	290:9 304:24 305:12 307:16
resided 258:19	89:7 102:7 153:3,21	retaining 72:1	reviewed 30:20 30:21,25 33:3
residential 249:6	159:16 221:2,8 298:9	retract 103:3	49:19,24 57:12 57:22 58:4
residents 75:7 76:21 259:20	resulted 168:21	retracted 128:1 128:4,6,8	72:7 80:19,23

82:23 95:6,8	74:22 78:17,20	151:22,25	212:11,16
95:13 96:12	81:21 84:11	152:18 153:11	213:7,11,15,23
99:20 100:9	86:4,8 88:14	153:14,18	213:25 214:5,6
101:1 104:18	90:7 92:11,17	154:13,21	215:20,24
126:22 127:21	95:4,17,21	155:2,5,13,20	216:7,11 217:3
128:10 143:21	97:19,20 99:2	155:23 156:8	217:11,17
164:18 169:14	99:25 100:6	159:9,18 160:9	219:2,16,23
169:17 170:2	101:3,19 105:2	160:12,15,20	220:2,12,22,25
170:23 175:9	106:5 110:7,11	160:23 161:4	221:3,9,13
209:17 214:24	110:21 111:9	161:11,24	222:13,18,23
222:19 224:14	112:9,16,21	162:2,6,23	223:16,20
229:2,7,21	113:3 114:9,12	163:7,12,16	224:4,14 226:7
238:4 240:9	114:16,19,23	164:15 166:15	227:2,13,20,23
247:6 269:7,12	115:4,8,14	166:20 167:3	228:4,8,13
276:9 278:8	116:6,22 117:6	167:21 168:23	229:5 230:9,12
283:12,13	117:15 118:10	172:11,17	231:10 234:3
288:13 296:5,5	119:13 121:15	173:9 177:25	234:11,20,24
296:12 305:6	121:25 122:20	179:13 180:18	235:6,16,21,22
306:24 307:3,6	123:2,5,16,17	180:22 182:8	237:2,23
reviewing 31:4	123:23 126:22	182:25 183:22	238:19 241:14
31:11 57:23	126:25 127:5	183:23 185:5	241:23 242:1,5
184:19 231:7	127:11,14,19	186:15 187:6	242:11 244:8
269:13,21	127:23 129:5	187:11 189:17	244:17 245:6
290:6 292:1	131:9,14,15,17	190:1 191:1,8	245:24 246:6
right 13:23	131:24 132:4	191:16,19	246:22 247:3,7
14:11,19 24:6	132:17 133:6	192:9,22	247:16,20
24:24 30:5	133:23 136:19	193:14 197:3	248:9,13,20,23
31:1 32:9,17	137:10,19	197:20 198:11	249:1,7 250:2
33:8,20 36:5	138:16,21,25	200:14,16	250:5,12,18,21
37:13 38:7,23	139:3 141:17	201:1 204:17	251:6,11 252:7
43:21 45:4	142:11,24	205:8,11	253:4,15,19
52:21 55:10	144:12 145:8	206:21 207:4	254:6,18 255:4
56:5 58:3 61:8	146:5,9,12,15	207:17 210:17	255:17 256:1
61:18 68:9	149:5 150:10	211:1,13,21	256:14,17

257:15,18	123:5,12,14	279:18 288:17	s6 180:3,6
258:6,11,13,23	131:4,13,17,20	298:17 299:11	safe 243:18,23
259:3,7,11,22	131:23 132:3,9	299:12,19,21	safety 244:1
259:25 260:9	132:13,16	299:22,23	saalem 2:14
261:16 262:6,8	133:2,9,13,14	300:16 301:4,4	12:17 14:5
262:12,18,21	133:16,17,19	302:15 303:4	salvitz's 80:20
263:1,5,14,20	133:21 134:7	303:24,25	samet 6:19
263:24 264:7	134:11,12	305:23	97:13 104:3,7
264:13,22	135:21,25	risks 10:17	104:14
265:2,7,12,22	136:1,5,11,14	224:8 267:8	sample 127:17
265:25 266:5	136:19,20,22	275:8 277:2	231:9 252:22
266:17,25	137:1,6,8,14,18	299:17	254:16
267:4,9,12,20	137:23 138:1,4	ritz 208:18,20	satisfied 121:19
268:2 272:5	138:10,13,16	riverside 3:8	satisfy 286:24
273:4,5,17	138:21,24	role 40:25 68:4	288:15
275:16 277:16	139:3,11,17,19	88:6 193:6,13	savitz 80:6,7,8
277:20 280:5	139:23 140:3	roughly 43:23	81:1,3,9,12
281:20 282:4	140:18 141:6	126:23 245:9	saw 83:18
282:11 283:20	195:24 196:4	rubbing 16:8	saying 15:14
284:6,17,22	199:3 206:3	ruckart 7:7,17	16:3,15,24
285:15 293:16	208:3 210:23	141:25 149:21	61:11 78:6
296:25 297:19	211:12 212:14	rule 35:3 38:4	79:1 88:10
304:7	213:15,18	308:10	107:13 121:20
ring 199:11	214:16 215:12	rules 14:16	141:13 214:1
ringing 80:15	216:14 221:13	rum 231:24	307:9
rises 131:8	225:23 232:25	232:3	says 24:8,22
risk 10:5,10,24	233:10 234:23	ruminating	75:3 82:24
11:2 52:4	237:2,16	54:13	87:11,14,21
78:15,19 79:13	246:12,17	rural 132:8,10	101:22 102:5
81:2,10,18	250:11 252:23	s	103:12 133:1
110:14,20	253:21 254:3	s 3:1 12:2 78:23	140:17 141:4
111:15 112:8	259:19 269:5,9	80:10 180:4	145:12 152:12
112:12 114:23	271:21,23	268:5	164:24 165:2
121:23 122:18	278:11 279:15		165:10,11,12

165:16,22	287:12 288:5	198:9,13	209:15 210:14
166:4 168:17	288:11 289:7	202:13 204:7	215:8 219:7
169:1 189:5	289:20,22	207:16 209:3,9	223:8 224:20
198:25 210:17	290:1 291:19	210:14 218:25	225:9,14,18
215:8 216:10	292:5	219:7 224:21	226:3,16,23
216:23 217:6	scientifically	224:23 225:9	229:14,16,19
223:8 224:24	287:18	228:22 229:15	230:6 231:16
225:20 243:10	scientist 44:11	229:19 231:14	232:1,3 234:21
249:22 252:4	scientists 45:14	233:5 267:2	242:14,19
252:21 253:10	scope 72:1	sections 294:6	247:24 252:3
254:22 255:4	232:9 244:10	294:9,12 295:6	254:22 255:20
260:23 261:8	270:13 275:18	see 15:18 19:21	258:14 271:15
281:3	287:16	23:10,23 24:8	281:1 288:7
scatter 79:20	scrutinized	40:14 51:3	seeing 65:13
82:9 84:20	114:5	58:11,16 66:11	153:12 222:22
87:13,16,18	scrutiny 62:19	70:23 76:21	seem 57:8
91:3 92:4	se 2:13 281:24	90:15,20	196:16
115:19 155:8	search 53:16	101:23 102:3	seemingly
schizophrenia	58:21 60:20,22	104:15 108:4	64:16
43:14	61:3,5,11,12,17	111:18,21	seems 168:2
scholar 61:23	61:20 130:2	115:3 132:25	seen 19:10,14
school 51:24	seat 230:17	133:7 139:5	93:20 94:9,23
schtick 240:15	second 36:18	144:20 145:19	96:2 111:5
science 52:1	100:4 140:16	146:1 151:13	187:15,22,24
65:8 69:21	186:22 189:4	152:9,11 158:5	230:12 283:11
74:18 129:16	225:16 228:24	164:23 167:15	306:23 307:2
scientific 49:1,3	230:18 251:12	168:15 169:7	sees 174:3
68:20 96:6	252:3 258:17	174:4 175:6	selden 10:6
100:14,19	260:23 293:11	179:19 181:6	206:3
128:21 189:25	secondary	189:2 194:7	selected 199:1
190:3,5 279:7	152:8,12 153:7	198:16 200:16	selection
283:7 284:9,15	section 54:14	201:19 205:15	165:17 169:10
284:22 285:1,7	57:1,3,16	205:15 206:21	169:11
286:12 287:4	101:15 144:8	207:21 208:11	

self 247:16	256:3,3 261:4	seyyedsalehi	shows 103:16
semi 203:14	service 11:3	234:10,16	154:11 180:17
send 23:13 72:2	253:22 254:4	shannon 3:7	231:6
222:2 230:4	259:3 260:13	25:13,14 32:6	sic 53:25
sense 15:16	261:3	32:8	sick 48:14,17
16:4,15,23	services 4:6	share 265:19	side 84:3
17:3,10,20	255:17,25	she'd 282:5	163:20 192:23
68:13,19	256:8,12 257:6	sheet 310:1	207:13 240:14
175:19 243:22	set 89:10,13	sherman 8:21	260:22
276:8	103:25 105:9	171:21	signature
sent 28:16	105:22 125:9	shin 8:21	308:11,21
165:3 295:14	155:3 163:19	171:21	significance
sentence 102:1	171:13 177:14	shortcut 72:3	86:4,7,17,19
102:3 103:5,12	199:23 207:12	show 79:7,7,10	87:4 88:1,23
165:15 168:13	217:1 226:9	79:14 96:22	88:24 89:2,6
189:4 198:14	233:18 238:14	107:8 113:10	89:14,16 90:17
219:18 225:17	240:13 253:17	115:23 116:10	91:9 172:21
225:22 226:16	261:18 264:1	167:6 176:25	173:18 174:19
234:15 238:2	270:21 302:2	194:20 195:10	174:24 298:6,7
255:18 258:17	305:16 308:7	195:16 207:7	significant
sentences	308:19	233:25 234:23	86:12,14 87:22
101:25 224:23	sets 243:14	235:5,9,19,23	88:11,20 89:9
253:9	setting 46:7	237:4 268:18	90:6 91:12
separate 31:13	settings 253:13	281:9	145:8 146:19
225:22	seven 120:13	showed 80:15	152:5 153:4,22
separately	159:21 212:5	87:3 135:14	154:20 155:2,5
52:21 106:8	223:2	271:18	155:20 156:1
205:24	several 138:20	showing 76:18	159:2,17
september 9:14	140:18 165:2	212:14 236:12	160:19 161:8
21:9,13,17	166:14 168:19	264:20	161:17 162:6
22:20 197:9	195:23 301:14	shown 103:15	173:12 180:24
series 71:10	severity 115:8	112:5 124:3	195:24 196:5,7
served 166:24	sex 154:6	146:3,4 179:4	196:9 200:25
167:19,25			212:22 213:19

220:6 234:10	125:19 126:4	244:12 246:14	301:3
234:18 235:3	126:15 131:2	247:2 248:2	sit 179:7 183:1
237:23 250:21	134:15 136:9	249:15,18	site 29:24 30:1
264:20 272:1	137:16 142:4	251:15 252:2	156:7 286:18
298:10	142:12,13	254:1 257:2,24	286:20 300:6
significantly	144:1,6 147:7	259:15 261:14	sites 157:6,7
212:18 271:20	147:14 148:17	262:1 266:12	226:2
silverstein 3:22	150:1,22	270:16 272:14	sitting 39:18
5:8 13:8,11	151:10 155:17	273:1 277:11	58:2 70:5
16:10 18:22	164:5 167:7,16	278:17 279:11	139:9 188:4
19:4 28:22	171:12,24	280:1,11 283:5	199:11 228:10
38:1 52:18,22	172:3,5 173:11	286:4,10 287:6	257:9
53:1 54:9,17	173:20 174:5	288:23 291:2	situation
56:19 60:12	175:10 177:4	291:24 292:12	108:10,18
61:15 62:23	177:22 178:23	293:10,13	288:8
63:16 65:9	179:12 183:3	294:4 296:23	six 23:6 230:19
66:13 70:14	183:12 187:14	297:1,25	276:1
71:16 72:16	190:22 191:6	298:13,17,24	size 201:15
73:1 76:11	192:2 197:12	299:7,10 300:5	252:23
77:23 78:10	200:8 203:4,17	300:22 301:10	skeptical 194:9
79:21 81:8	204:16 205:2	302:9,13	skeptically
84:1 86:1 91:6	206:12 207:11	303:14 304:4,7	117:15,17
95:1 96:22,23	207:20 208:5	305:3,24 306:2	slightest 60:16
97:11 98:5,24	214:19 215:6	306:10,22	slightly 103:19
99:6,16,24	217:14 218:23	307:4,19	small 51:10,14
100:5,8 101:8	221:17,19	similar 113:2	82:5 111:4,7
101:11 102:25	222:6 223:3,5	113:19	111:22 122:19
103:4 104:9	224:1,11 230:3	similarly	145:12 166:5
106:20 108:1	230:7,20 231:1	110:19	168:20 226:20
108:19 112:6	232:13,23	simply 232:20	252:22
113:16 114:6	233:7,17,22,23	single 74:21	smoking
116:2 118:17	238:16 239:1	75:1,6 77:13	138:24 140:21
122:24 123:10	239:10,22	77:18 78:1,6,8	141:5,14
124:17 125:2	240:18 243:2	117:1 253:12	302:20

smr 151:17 153:7,10,15 157:14	148:10 150:14 155:14 167:5,8 167:13 171:6	293:8,21 297:3 297:7,8,13 298:15 299:9	230:22 240:4 240:15 246:25 267:15 282:22
smrs 151:14	172:2 173:10	300:24 301:1	296:2 298:14
snidow 3:2 5:9 25:5,10 28:7 30:22 31:16 32:5,9,17 52:20,23 54:7 56:9 60:6 61:9 62:9 63:4 64:21 65:20 70:9 71:5 76:3 77:14 78:3 79:15 81:4 83:15 85:9 90:8 94:21 96:21 97:5,8 98:1,16 99:3 99:22,25 100:3 100:6 101:7,10 102:21 103:1 106:16 107:14 108:7 111:10 113:4,21 115:15 118:11 122:21 123:6 124:12,22 125:6,24 130:21 134:4 135:6 137:11 142:7,10 143:25 144:5 147:5,12	173:14,25 174:10 175:5 177:2 179:2 187:12 190:2 202:20 203:9 204:13,21 206:8,11 207:9 207:19,23 218:20 221:15 221:18,22 222:4 223:1 230:5,19 232:8 232:18 233:2 233:12,21 239:19,21 240:16 244:9 246:24 247:24 249:14,17 251:13,19 256:18 257:19 259:12 261:12 270:12 272:12 272:17 275:17 277:9,25 278:13 279:8 279:19 282:20 282:23 285:16 286:8,14 287:15 290:13 291:20 292:8	301:13 303:21 304:6 305:4 306:4,20,21 307:7,17 sole 199:2 solely 51:17 125:22,25 soluble 270:11 solvent 10:23 216:17 246:11 246:16 248:3 solvents 8:16 171:18 somebody 122:6 124:4 135:14,17 someplace 201:3 somewhat 49:10 243:20 287:1 sorry 13:21 16:5 41:11 54:12 55:18 59:6,7 97:3 121:12 127:2 141:11 168:12 190:18 191:9 205:12 208:19 211:25 221:4,5	sort 63:13 85:17 120:12 120:15 176:23 188:2 204:25 285:18,18 sorts 123:19 sound 33:20 36:5 37:13 275:22 sounding 120:23 sounds 45:22 88:10 129:6 131:15 282:23 source 87:1,19 109:10 120:3 148:1,14 150:16 229:18 sources 134:22 166:14 229:15 229:17 sparse 245:13 speak 16:12 speaking 75:11 85:3 speaks 173:15 specialist 26:20 specialized 120:19,20

specific 29:22 31:10 36:10 41:14 49:7,8 49:12 57:2 69:7 71:23 75:18,20,22 77:24 79:7,8,9 79:11 105:16 105:18 109:14 110:6,7 120:6 120:7 124:25 157:22 195:20 225:25 244:21 248:7 253:12 278:7 279:6 283:15 299:24 specifically 30:15 47:21 48:9 51:16 71:19 74:18 94:3 98:7,9 104:22 105:13 105:15 149:7 163:18 173:12 179:14 195:2 203:1 216:1,19 217:10 218:14 218:18 236:2 244:18 260:18 264:10 269:1 specificity 116:22,25 117:19,23,24 120:18 227:25	specified 185:21 188:16 189:7,16 226:6 274:20 281:5 291:21 specify 27:9 243:9 291:17 speculate 35:14 spell 80:9 spelled 240:2 spend 44:2 spent 24:12,18 45:11 sphere 50:24 splitting 26:21 sporadic 47:25 140:17,19 spot 280:3 stacked 184:18 standard 49:3 243:14 281:6,8 283:3,18 285:10 288:9 288:10,25 289:4 290:8,15 291:8,12,13,17 292:5,22 293:4 302:2 standardized 144:18,23 151:14 standards 49:1 89:10	stands 194:25 start 16:13 183:22 191:7 301:11 started 20:24 22:11,14,21 29:16 134:23 255:22 267:22 starting 102:1 starts 168:13 188:25 263:15 280:25 state 48:5 243:25 274:13 283:17 stated 59:13 156:11 179:15 198:18 statement 117:9 121:7 134:6 135:16 136:5 168:3 225:17,20 265:25 268:21 273:25 statements 175:1 states 1:1 12:13 13:13,14 309:3 statically 86:12 86:14 stationed 172:16 176:8 273:7	statistic 86:16 statistical 86:4 86:7,19 87:3 87:25 88:22,23 89:2,6,16 90:17 91:9 107:23 172:21 173:17 174:19 174:23 298:6 305:16 statistically 87:22 88:11,20 89:9 90:6 91:12 145:8 146:18 152:4 153:4,22 154:20 155:1,4 155:19 156:1 159:1,17 160:19 161:7 161:17 162:6 180:24 195:23 196:4,7,9 200:24 212:17 212:22 213:18 235:3 237:22 250:20 264:20 272:1 298:10 statute 282:14 statutorily 292:20 statutory 281:25 285:4 288:4,15 289:8
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

291:9 292:10 stays 82:14 steadily 131:8 steady 189:1 stenographic 2:12 12:19 15:16 step 60:20 91:24 125:17 stones 140:24 stood 39:10 stop 90:23 street 2:13 strength 49:5 62:15,21 64:13 110:10 111:14 120:1,4 121:8 195:24 217:6,9 217:16 289:13 290:3,5 strengthen 305:15 strengths 228:3 strike 304:11 306:5 stringent 170:7 strong 120:18 stronger 85:16 300:20 structures 269:24 students 45:13 studied 80:4 127:16 156:16	185:16 studies 10:11 31:5,10 33:2 46:25 62:1,3,7 63:1,3,7,8,9,11 63:13 65:17,18 66:8,10,22 69:2,22 70:15 70:18,20,21 71:1,3,11,18,21 72:6,9,12 86:15 88:7 90:15,16 97:18 102:10 107:8 108:3,6 109:7 109:23,24 110:1,6 111:1 112:24 113:1 113:18 114:8 125:4,23 126:2 126:22 127:16 128:4,6 133:3 137:3 150:20 169:18 172:9 177:11 178:10 178:12 179:8 191:18 192:6 195:20 196:3,8 197:1,5 199:19 209:25 210:18 213:11,14 214:17 215:15 216:18 218:17 234:1,5,17	238:3 240:8 241:14,23 246:2,3,5 247:5 262:11 264:16,19 268:17,19,25 273:3,3,15 277:13 295:20 296:10,15 297:20 299:19 300:10 302:14 303:9 305:13 305:15 307:15 study 7:7,12,17 8:1,19 9:7,17 10:3 52:9 54:1 54:15 62:11,12 62:15,19,20,25 63:7 64:16 65:14 66:17 67:3,5,9,14,15 67:18,24 68:7 68:16,18,23 69:2,8 70:7 71:10 72:5 74:22,23 75:1 75:3,6,12,13,21 75:23 76:1,5 77:13,18 78:2 78:6,8,17 79:6 79:7 82:5,19 83:10 85:2,3,6 85:21,23 86:3 86:17,24 87:23	88:11,13,19,20 89:4,8,10,25 90:18 91:4 98:9 107:3 111:17 112:13 112:18 115:17 115:18 116:10 117:13 118:5,8 118:15 125:16 126:25 127:5,8 127:11,14 141:24 142:6 142:19 143:2,9 143:12,24 144:8,22 147:2 147:9,16,21 148:7,19,24 149:10,17,20 150:4,6,9,13,23 156:20 157:2 162:10,21 163:5,10,15,20 163:22 164:8 164:14 165:2 166:22 167:18 168:5,18 169:14 170:12 170:16,22 171:14,20 172:7,13,20,22 173:5,15,22,23 174:9 175:2,4 175:13,16 177:6,21,25
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

178:2,14,18 179:5,10,24 181:17,25 182:6,11,23 187:5,6,7 189:3 193:2 194:6,18,20 199:8,18,25 200:11,20 203:6 206:2,25 207:3,6 208:11 209:16,20 211:17 213:17 215:23 217:10 218:25 219:1 228:4,7,18 231:18 235:25 236:18 238:10 239:16,23 240:5 247:12 247:15 248:3,8 252:22 255:4 255:12 256:16 256:19,20 258:2 261:16 262:14,16,23 277:15 290:18 290:23 295:17 295:22,24 296:1,1,5,17,21 297:18,18 300:19 301:8 303:1,5,11 305:12,19,23	306:7,12,16,18 study's 78:15 81:18 194:24 studying 87:19 114:1,2 279:10 stuff 40:13 74:4 184:17 style 295:16 styled 2:7 sub 233:14 subdivide 216:4 subgroup 176:7 180:9 subheading 101:21 subjective 301:16 subjects 82:5 submit 30:8 submitted 20:11 30:3 submitting 50:3 subsequent 191:16 substance 73:3 75:5 126:17 183:15 239:3 280:13 substances 255:6 substantial 283:10 289:11	290:20 292:18 suffered 143:2 suffering 128:24 sufficient 128:22 194:2 224:24 225:13 225:21 241:13 241:22 244:15 245:17 287:13 289:6 sufficiently 67:6 268:18,24 suggest 102:10 259:10 suggested 168:2 suggesting 236:19,22 304:17 suggestion 305:22 suggestive 129:5 suggests 87:5 196:13 236:24 suite 2:14 3:4,9 3:14 summarized 213:14 summary 213:11 super 71:13 148:16	superfund 156:7 supervise 45:12 supplanted 64:23 65:4,11 65:16 68:11 130:2,14,25 supplemental 10:21 179:23 180:2,4 239:8 239:12 supplies 128:12 support 191:13 194:8,19 195:17 204:5 267:13 supported 195:8 supports 86:3 115:11 194:18 sure 14:16 18:22 19:13 21:21 22:4 24:4 35:16 37:16 38:6 39:24 83:7 86:9 92:13 94:14 97:23 100:5 117:17 119:23 167:7 170:3 173:1,18 174:21 178:19 182:3 187:13 199:17 201:4
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

208:2 215:3 222:21 227:7 228:15 229:17 229:23 235:22 235:24 251:16 274:2 284:23 287:7 307:12 surmise 29:20 surprised 149:7 193:21 survey 165:5 surveys 165:3,6 sustained 259:2 swear 12:23 swedish 10:3 206:1 switching 53:21 sworn 2:6 13:3 308:7 syndrome 138:3 149:12 149:12 163:11 163:12 177:8,9 182:13,13 syndromes 138:21 synergistic 97:25 98:14 99:1,8 101:2 102:16 103:6 109:19 279:24 synergy 6:16 98:13 100:14	100:18 104:5 104:12,18 105:1 system 166:25 167:20 168:1 272:2 274:11 274:17,24 systems 102:15 274:25 276:2,5 276:7 t t 25:25,25 80:10 208:21 268:6,6 308:1 308:1 table 105:5,8 144:17 145:11 145:12,19,21 151:13 152:7 152:10,12,15 152:17 153:6 154:1,4,11 155:9,19,23 158:5,7 159:17 173:1 174:20 174:20 176:1,4 176:13 180:2,6 186:19 187:2 188:25 205:19 207:24 211:20 211:24 212:3,4 212:7,21 221:4 230:14,20	231:2,2,6 234:23 249:24 250:2 257:11 257:12 259:16 259:19 tables 174:20 179:23 186:15 tacos 183:18 take 17:13,15 17:19 31:22 35:14 36:6 47:8 63:17 72:18 82:18 90:17 115:24 116:3 147:3 148:7 149:10 162:11 177:7 181:18,25 182:6,11,16 183:5 195:20 204:2 205:19 207:21 280:4 293:24,25 294:1 taken 2:6 12:11 14:11 18:25 72:21 75:14 119:22 126:11 179:20 183:8 238:22 280:7 288:2 takes 233:16 talk 45:1 47:22 73:2 82:21	126:16 183:14 185:5 221:11 239:3 246:1 278:4 280:12 talked 82:23 97:24 183:18 241:2 277:22 278:2 293:14 talking 16:13 45:2 54:7 62:4 64:18 75:18,19 76:9 85:13 92:19 97:18 111:16 113:6,6 122:3,4,10 176:22 177:12 267:22 286:17 286:24 287:23 290:20 292:16 307:11 talks 55:14 tarawa 274:17 274:19,25 275:16 target 225:22 225:25 226:5 tasks 26:22 taught 51:15 51:22 tce 31:7 39:1 64:9,10,18,20 75:5,16 76:2 77:1 92:10 96:8 98:14
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

100:22 101:22 102:1,5,7,11,18 103:9,16,18,21 122:17,20 156:12 158:1 160:1,23 184:20 186:8 191:8,15 192:8 193:13 194:4 194:20,23 195:10,17 196:14 204:10 204:11,18 207:7,16 209:3 209:9 228:17 244:16,21,25 245:10,20 246:6 247:7 249:11,19 250:2 251:11 251:18 252:7,8 254:13 259:7 264:10,13 265:6,18,19 266:20,23 268:18,19,24 268:25 269:2,3 269:4 270:4,11 270:18 271:18 271:23 272:1 279:12 304:14 304:18 306:1 teachings 51:19 51:21	technique 48:21 teeter 25:25 26:1,4,5,18,24 27:14 54:25 58:24 59:10 61:19 69:11,12 69:23 70:7,11 71:2 293:15,18 294:12,22 295:10,25 teeter's 27:6 296:16,20 tell 14:22 18:14 22:1 27:7,8 28:16 58:20 70:6 90:9 96:19 134:3,9 134:18,25 137:13,14 140:7 143:5 174:18 178:12 186:20 187:21 188:6,7 199:15 201:16 202:23 203:3 209:12 242:9 249:8 257:13 269:15 276:4 283:14 291:22 tells 76:5 temporal 119:7 119:15	temporality 118:25 119:3 119:17,23 120:20 121:9 ten 34:25 70:11 111:18,24 302:7 tends 193:19 tenets 67:7 term 83:16 122:3,13 136:25 185:16 189:19 190:4 288:20 299:24 300:16 terms 107:2,20 202:5,17,19 203:6,8,12 220:17 299:21 terrace 274:19 274:25 275:16 terribly 203:13 tertiles 115:22 test 251:10,17 306:12 testified 13:4 34:17,21 143:2 233:3 testifying 16:18 73:7 testimony 35:4 38:5 73:3 113:22 126:17 143:7 171:7	173:4 174:11 183:16 239:4 251:20 280:13 308:9 309:4 testing 172:21 173:9 testings 173:13 tests 174:18 tetrachloroet... 10:8 214:15 215:13 216:16 216:20 texas 3:14 tftptf.com. 58:15 thank 97:7 101:10 153:14 206:11 222:5 233:20 249:15 297:1,14,22 300:24 307:20 thanked 73:11 thanks 102:25 theoretical 299:16 therapy 90:19 thing 34:4 65:13 74:16 135:20 175:20 177:11 221:18 things 15:9 35:14 122:23 184:5
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

think 14:7,13 16:7 26:21 28:18 29:1,11 32:14 33:5 34:3,14 37:17 39:10,15 42:17 53:25 67:1,1 72:17 73:8 74:17 80:25 82:11 83:7 89:6 91:1 101:4 102:21 102:22 106:18 107:20 111:20 117:8,10 126:4 130:1 147:24 148:3,13 150:17 170:17 171:25 175:20 178:5,6 185:7 187:23 188:5 192:13 193:25 194:22 210:3 229:13 230:5 238:16 240:12 243:19 246:24 254:19 257:22 265:4 274:13 275:4,23 277:21 279:21 280:1 284:11 285:2 286:2,16 286:23 287:17 287:19,21	288:19 291:21 296:23 297:16 297:23 298:4 301:19 302:9 thinking 53:18 thinner 64:13 third 133:5 267:23 thought 42:25 187:10 272:22 thoughts 57:14 thousands 35:22 36:1 threat 108:10 threats 112:13 three 28:19,19 31:23 82:25 101:25 189:25 190:25 191:12 191:14 197:2 205:7,10,17,20 205:20 215:15 267:3 302:5 threshold 125:11 278:15 278:19 279:5 279:13,21 285:18 290:16 290:17 304:9 304:18,25 thresholds 233:14 threw 152:15 212:1	tight 82:14 tighter 85:23 time 12:7 17:16 20:3,6,10,23 21:21,22 22:3 22:5,20,24 23:1 24:12 28:3 31:21 39:12 43:23 44:2,13,14 45:10,16 48:8 65:8,19 68:22 68:24 72:18 75:8,17 94:2,6 94:8 95:17 100:15 124:7 126:6 129:20 136:8 183:5 202:24 209:7 221:5 222:22 229:4 230:11 238:18 272:11 272:15,19 278:3 285:21 285:22 293:12 295:1 297:2,15 307:21,25 times 15:21 16:20 31:18 33:10,19 34:20 34:23 39:9 111:18,25 242:17 243:6 272:25 274:1	276:23,24 297:19 timing 188:11 294:2 tissue 226:1 tissues 225:23 title 57:3 200:10 titled 101:16 104:11 128:12 142:15 144:18 145:21 150:3 158:7 164:7 231:3 246:16 254:3 262:3 today 12:16 16:18 17:23 30:19 32:2 39:14,18 70:5 73:21 129:24 130:1,19 139:9 188:4 199:12 228:11 257:9 296:8 297:2,15 307:21 today's 12:6 together 24:20 69:17 76:19 77:3 98:23 279:23 told 73:7 tolerance 87:17 91:3
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

tons 74:4	236:15 300:6	transitional	207:1
took 26:9,9	300:18	216:2	trick 58:9
147:9,16	towards 91:15	translated	105:6
162:18,21	120:14 300:16	288:3	trigger 279:3
163:5,10,15	tox 213:14	transmission	true 110:17,23
182:23 249:2	221:20,20	90:21	115:5,9 117:10
294:15,24	222:12,22	trauma 51:23	129:17 137:14
295:1	229:8,22 230:9	traumatic	149:2 163:13
top 22:2 84:15	toxic 29:24	43:10 138:15	182:9,15
167:14 175:19	140:20 255:6	147:4 162:12	187:13 189:18
182:20 198:8	toxicity 103:18	162:18 181:19	222:24 259:4
206:20 217:15	toxicological	302:19 303:23	277:1 289:24
234:14 236:17	9:15 10:12,18	treat 26:19	303:6 308:8
249:9 269:15	51:3 103:14	44:8	truly 108:9
291:23	197:9,18	treated 231:24	truth 14:23
topic 36:10	213:10 221:24	treating 34:11	try 15:10 16:11
58:22 64:16	222:7 229:25	treatments	17:12 83:6
67:12 87:18	toxicologist	46:22	trying 66:14
129:16,17	50:8,21	trend 91:14	184:17 229:11
169:23 183:19	toxicology	210:21 211:4	255:20
topics 26:18	50:10,13,15,24	219:14 220:1	tuesday 1:13
30:9 40:22,24	51:12,13,16,17	220:10 234:11	12:7
41:2 43:7	51:18,20 52:3	234:18	tumor 226:18
184:24 294:3	52:8 100:22	trial 34:17,21	227:4
tort 36:21 37:6	track 16:14	39:20 54:20	tumors 238:6
37:15 281:8	27:12 35:4	90:23	turn 39:23 40:1
torts 3:24	tract 186:1,5	trichlorethyle...	40:3 55:24
total 92:16	227:12 236:2	269:8	58:6 96:11,18
146:5,7 158:17	traffic 36:15	trichloroethyl...	96:24 101:5
255:22 276:4	trained 50:9	9:9,16,20 10:4	104:2 105:4
toward 139:8	trans 55:5,9	41:19 191:22	106:2 132:21
151:5 157:5	288:3	193:6 197:10	143:23 144:14
168:7 175:25	transcript	197:19 200:2	145:16 151:7
181:6 201:3	309:2,3 310:1	200:12 206:2	153:25 158:4

164:20 165:13 168:9 176:1 180:1 181:5 191:3 196:21 197:25 206:13 206:17 210:12 211:23 216:9 216:24 219:5 222:25 224:16 225:6 226:12 227:15 228:21 230:14 237:25 241:4 242:13 244:13 247:9 249:10 252:17 254:20 258:5 259:16 260:20 263:10 264:3 271:3 280:16 turned 186:23 295:14 turning 252:14 tvoc 161:20 twin 67:15 247:12 305:19 305:25 twins 10:25 246:12,18 247:22 248:15 two 23:18,19 24:15,19 25:17 29:2 30:3,9 46:10 67:14 73:15 95:20	100:13,18 149:14 157:6,7 185:3,13,20 196:6 197:1 224:23 253:9 269:25 274:21 275:24 276:6 289:12 292:13 type 45:3 91:4 117:2 138:9 227:1,11 228:12,15 279:20 types 44:23 185:13,20 216:5 typical 170:8 typically 37:1 45:14 61:22 65:7 68:3,22 74:20 110:8 125:13 169:19 185:17 189:19 189:22 211:7 281:8 289:8 307:16 typo 54:8,9,11 typographical 53:21	u.s. 3:21 8:6 163:25 164:10 261:1 ubiquitous 269:8 uh 15:14 ultimate 192:14 ultimately 26:13 38:20 67:19 unavoidable 253:1 uncertainties 166:18 uncooked 231:22 under 14:18,22 15:1 120:16 136:14 153:6 165:1 185:16 192:21,25 210:17 215:18 217:9,16 247:11 271:6 271:11 280:3 280:21,23 underestimate 37:10 undergo 171:4 underlying 30:21 31:1,6 33:2 136:4 144:19 151:15	180:11 305:6 understand 14:18,21,25 15:3 16:17,24 17:22 18:1,5 35:18 66:15 69:1 75:22 107:12,17 135:8 272:21 276:24 283:2 understanding 22:14 23:3 24:11 32:10 51:6 52:4 75:24 95:9 109:6 213:8 273:9 282:8 283:22 284:4 understood 17:2 28:12 35:10 52:12 73:14 287:8 unexposed 111:19 unfair 21:15 unfortunately 69:4 unique 47:7,9 47:12 48:19 288:8 unit 199:3 united 1:1 12:13 13:13,14
	u		
	u 78:23 98:4 239:19,21 240:2,6		

universally 86:13 universe 51:12 university 52:1 unknown 279:25 unmeasured 193:3 unquote 302:3 unreasonable 279:22 unrelated 34:6 unreliable 125:5,8,8 updated 10:2 40:12 42:9,24 206:1 upload 100:1 142:9 206:6 upper 89:23 90:12 180:7 186:1,5 227:12 236:2 upstairs 73:7 urban 132:1 urinary 186:1 urine 102:8 urothelial 186:2,5 217:24 218:10,15 227:12 236:2 usdoj.gov 3:22 3:23	use 47:3 57:7 61:24 65:2,3 71:8 74:6 75:20 132:16 133:6 150:25 157:12 189:24 190:10,14,16 190:20 288:25 289:4 299:18 used 26:3 46:17 47:14,25 48:11 48:11 49:3,3,4 66:25 70:17 80:1,2 90:14 95:10 119:19 121:1 151:3 178:9 189:20 189:22 198:19 216:17 249:12 249:20 255:16 256:6 257:6 281:8 282:9 283:6,9 284:8 284:14,19 288:21 291:19 298:5 using 67:9 79:17 84:22 114:3 137:2 157:11 190:12 217:19 291:11 usmc 7:5,15 9:6 141:22 149:19 150:5 177:20	usms 142:18 usually 295:4	89:5,13,19 154:23 155:3,5 155:22
		v v 75:12 80:10 267:5,5 268:4 va 255:24 260:12 261:2 vacillating 120:24 vague 257:20 278:1 279:20 valdiviezo 267:4 valid 112:5 116:13,14 135:5,7 validated 138:18 139:19 139:25 141:8 141:15 188:16 188:21,22 189:7,16 validation 137:2 validator 134:12 validity 112:14 134:6,18 135:1 135:23,24 136:3,5 value 34:9 84:24 86:7,11 86:24 88:12,22	values 51:4,7 123:19 173:16 188:19 203:13 variabilities 166:18 variable 113:7 variables 113:13 variants 88:25 varied 36:12 114:8 variety 109:4 117:5 118:7,9 118:14 121:4 304:8 various 83:4,5 135:21 193:2 302:15 305:23 vary 113:12 vast 117:4,7 venn 285:2 veritext 12:21 versus 26:20 27:6 48:25 83:14 85:5 202:22 289:5,6 293:20 294:1 vertical 90:21 veterans 255:16 256:6 256:22 260:14

261:2,4 262:25 vha 256:7,12 257:6 video 1:11 2:3 12:6,9 307:23 videographer 4:5 12:5 16:5 18:20,23 19:2 72:19,23 126:9 126:13 183:6 183:10 238:20 238:24 280:5,9 307:22 viewpoint 112:15 114:12 121:14 viewpoints 106:5,8,13 110:10 116:16 116:22 118:1 119:18,19 vinyl 10:13 39:1 41:25 77:25 78:8 92:10 96:8 98:14 100:22 109:20 160:2 161:10 184:21 186:9 219:8,15 219:20 221:2,8 221:12,25 222:8,12 224:4 224:13,25 225:1 226:18	227:20 228:16 241:9 266:22 virtually 121:3 252:25 294:18 vlaanderen 214:21 215:23 217:2,16,21 218:9 vocs 113:8,14 volatile 146:5,7 158:17 270:18 volume 10:17 224:9 von 149:12 163:12 177:8 182:13 vs 154:5,7 176:5 259:21	230:3 246:1 251:13 263:10 293:24 wanted 27:4 77:25 washington 3:4 3:25 water 1:4 6:5,9 6:14 7:4,14 8:5 8:16 9:5 11:8 12:12 17:24 19:24 37:23 52:15 56:4 76:6,17 77:6 92:17,20 93:3 93:5,6,8,11,16 93:23,25 94:18 95:3,8,14,24 99:15 102:14 105:15,20 106:9 108:22 108:23 109:3,9 109:10 113:8 126:8 128:12 132:16 133:6 134:6 141:22 142:17 147:17 147:25 148:4,9 148:11,14,25 149:4,18 150:5 150:17,25 151:4 162:23 163:2,25 164:10 166:19	166:25 167:1 167:20,21 168:1 169:4 171:19 175:24 177:19 178:9 182:2 241:10 243:13,17,18 243:20,23 244:1 261:22 262:5 266:17 267:14,16 270:25 272:8 272:20 273:16 273:21 274:11 274:24,25 275:8,9,14 276:2,5,7,10,19 276:25 277:3,6 277:8 302:19 303:13,17 310:2 way 35:5 47:10 47:12 57:6 66:20 75:21 79:1 81:20,22 84:5 86:6 144:4 170:18 190:6 194:9 195:21 218:7 275:4 282:16 288:10,12,14 299:13 308:17 ways 63:10 83:4
	w		
	w 3:18 wait 91:24 waiting 90:22 want 14:15 28:9 35:13 54:4 96:21 104:2 106:2 118:15 121:17 132:20 139:8 140:10 167:5 173:21 174:1 175:3 178:19 185:5 201:2 225:12 229:9		

we've 28:15 72:16 89:7 126:4 162:24 177:12 183:3 238:17 277:21 280:1 weaker 300:20 300:23 weakness 66:3 web 65:23,25 85:13,14,18 87:9 116:8 126:2,3 288:20 website 58:15 58:19,23 59:12 59:17 week 23:8 weeks 21:1 31:24 39:9 weigh 118:18 119:24 175:4 weighed 116:19 weighing 287:12 weight 103:13 118:22 138:3 170:15 171:9 202:2,5 weighted 170:18 welcome 97:8 183:13 wells 148:2,12 148:15	went 69:16 73:5 whereof 308:18 white 154:7 wide 81:24 82:2 83:14,20 84:19 92:5 118:6,9,14 121:4 144:10 158:24 159:11 159:13 160:14 161:3 162:1 166:9 168:21 237:7 243:25 243:25 250:8 250:17 301:16 301:22,22 302:3,7,8 widely 279:7 wider 84:9 85:3 85:4,7 90:2 width 190:6 237:12 wife 282:5 wild 35:14 willing 89:4,5 wilms 226:18 227:4 witness 2:5 12:23 15:17 28:12 33:24 36:11 97:7 179:3 238:19 292:14 296:25	297:5 308:6,9 308:11,12,18 women 90:19 wong 236:12 236:18 237:2 word 307:2 worded 16:21 words 75:14 106:25 294:18 294:19,19,23 295:15 work 19:8,24 20:2,5,8,9,12 20:23 21:24 22:6,8,21 23:16 24:1,6 25:18,23 26:3 26:25 27:5,6 33:24 36:24 42:19 44:2,11 44:15 45:2,3 45:10,10,15 50:25 55:1 67:11 69:17 72:3 80:13 132:12 175:1 248:22 253:13 279:23 284:6 284:25 292:23 293:20 295:10 300:3 worked 22:24 25:13,24 166:23 167:18	167:24 293:15 worker 10:11 214:17 workers 8:14 9:4 151:3 171:17 177:18 215:13 263:19 271:17 working 22:11 22:14 24:12 25:9 29:16 59:21 71:25 97:21 98:23 267:7 world 174:3 175:8 worldwide 249:12,20 worry 198:3 write 30:15 38:16 45:19 55:2 66:10 307:16 writer 295:16 writing 25:19 26:12,14 214:25 written 38:20 51:9 57:9,10 121:5 184:24 294:19 wrong 97:3 172:1 247:1
-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

wrongful 37:1 41:1 wrote 53:3 193:1 200:21 206:24 210:18 215:11 263:16	years 28:14,24 29:2 33:18 34:4,25 35:2 46:13 51:24 70:11 93:25 94:24 95:19 96:4 122:17 129:13 yep 167:13 249:17 yield 113:2,19 yielded 252:23 yu 239:16,24 240:2,6
x	
x 309:8 310:24	
y	
y 98:4 239:19 239:21 240:2,6 268:6 ya 212:2 yardstick 290:25 291:3 yeah 33:9 34:3 54:12 74:4 87:24 97:9 105:7 126:7 129:20 142:12 152:14 159:13 178:5 180:4 184:6,16 186:12 196:24 197:16 206:8 207:25 209:24 214:13 221:17 221:19 230:18 240:16 255:20 258:12 294:8 year 94:20 122:20 154:8 158:13 201:1	z z 80:10 208:21 267:5 zachary 4:3 zina 3:12 zina.bash 3:13 zoom 3:7,12,18 31:23 32:3,4 32:13