VOLUME: I PAGES: 1-88 EXHIBITS: 1-2

IN THE UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF WISCONSIN

)

SCHEIDER, Individually and on behalf of all persons similarly situated, Plaintiffs

vs.

DEPOSITION OF DAVID OZONOFF, M.D., a witness called on behalf of the Defendant, Madison-Kipp Corporation, pursuant to the Federal Rules of Civil Procedure, before Kelly G. Patterson, a Notary Public in and for the Commonwealth of Massachusetts, at The Charles Hotel, 1 Bennett Street, Cambridge, Massachusetts, on Thursday, February 7, 2013, commencing at 10:04 a.m.

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(Pages 2 to 5)

r			(Pages 2 to 5)
	Page 2		Page 4
1	APPEARANCES:	1	P R O C E E D I N G S
2	THE COLLINS LAW FIRM (by Edward J. Manzke, Esquire)	2	(Curriculum vitae marked Exhibit
3	1770 Park Street, Suite 200	3	No. 1 for Identification.)
4	Naperville, Illinois 60563 Tel. (630) 527-1595		· · · · · · · · · · · · · · · · · · ·
5	ejmanzke@collinslaw.com for the Plaintiffs;	4	(Report of David Ozonoff, MD
6		5	marked Exhibit No. 2 for Identification.)
7	MICHAEL BEST & FRIEDRICH, LLP (by John A. Busch, Esquire)	6	DAVID OZONOFF, M.D., a witness
8	100 East Wisconsin Avenue, Suite 3300 Milwaukee, Wisconsin 53202	7	called for examination by counsel for the
	Tel. (414) 271-6560	8	Defendant, Madison-Kipp Corporation, having
9	jabusch@michaelbest.com for Madison-Kipp Corporation;	9	been satisfactorily identified by the
10 11	TROUTMAN SANDERS LLP	10	production of her/his driver's license,
	(by Rebecca L. Ross, Esquire)	11	being first sworn by the Notary Public, was
12	55 West Monroe Street, Suite 3000 Chicago, Illinois 60603	12	examined and testified as follows:
13	Tel. (312) 759-1921 becky.ross@troutmansanders.com	13	DIRECT EXAMINATION
14	for Continental Casualty Company and	14	(By Mr. Busch)
15	Columbia Casualty Company;	15	Q. Please state your name.
16	MEISSNER TIERNEY FISHER & NICHOLS, S.C. (by Jennifer A.B. Kreil, Esquire)	16	A. David Ozonoff.
17	111 East Kilbourn Avenue, 19th Floor	17	Q. Have you been retained as an expert in this
18	Milwaukee, Wisconsin 53202 Tel. (414) 273-1300	18	matter, the McHugh matter?
19	jbk@mtfn.com for United States Fire Insurance Company;	19	A. I haven't been retained, but I have been
20		20	asked to offer an opinion which I have
21	NISTLER LAW OFFICE, S.C. (by Jacques C. Condon, Esquire)	21	done.
22	3235 North 124th Street Brookfield, Wisconsin 53005	22	Q. When were you asked to render an opinion?
23	Tel. (262) 373-1420 JCondon@NistlerLaw.com	23	A. I think it was probably sometime in mid or
	for Lumbermen's and American Motorists	24	late last spring. I don't remember
24	Insurance Company.	27	
	Page 3		Page 5
1	I N D E X	1	exactly.
2	DEPONENT: PAGE	2	Q. Who approached you?
3	DAVID OZONOFF, M.D.	3	A. Mr. Manzke.
4	Examination by Mr. Busch 4	4	Q. Had you ever worked with Mr. Manzke in the
5	Examination by Mr. Condon 57, 84	5	past?
6	Examination by Ms. Ross 83	6	A. Yes.
7		7	Q. In what regard?
0	EXHIBITS	8	A. Essentially, I was a witness in some cases
8	NO. PAGE	9	that he had prior.
9	1 Curriculum vitae. 4	10	Q. Do you recall the cases for which you were
10	2 Report of David Ozonoff, MD. 4	11	a witness?
11		12	A. Well, one of them was called the Lockformer
12		13	case. I'm not exactly
13		14	Q. Can you spell it?
14		15	A Lisle, Illinois, and then there was one
15		16	in Indiana. I don't remember the name of
16		17	the case.
17		18	
18		10	Q. Do you recall any other cases?
19			A. I don't, but if there was another case it's
20		20	probably only one, but I'm not sure if
21		21	there was or not.
22		22	Q. Was there a pollutant or a contaminant in
23		23	the Lisle case upon which you rendered an
24		24	opinion?

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(Pages 6 to 9)

Page 61A. Yes.2Q. What was that?3A. That involved chlorinated ethylene like PCE4and TCE.5Q. Was there a fate or transport mechanism in6that case? By that I mean, was it a water7case, a vapor case, a ground case, or do8you recall?9A. I actually don't remember.10Q. Do you recall when that case was, when you11were hired?12A. Five years. Four years. I'm not really13sure.14Q. In the Indiana case, was there a defendant	
2Q. What was that?2changes. I think there's another3A. That involved chlorinated ethylene like PCE3publication.4and TCE.4Q. The university of which you spea5Q. Was there a fate or transport mechanism in5University?6that case? By that I mean, was it a water6A. Yes.7case, a vapor case, a ground case, or do7Q. Let me show you what's been ma8you recall?8Ozonoff Exhibit No. 2. That's bee9A. I actually don't remember.9910Q. Do you recall when that case was, when you10matter. If you take a look at it and11were hired?12A. Five years. Four years. I'm not really1213sure.13Q. Now, as of the date of this report.	
2Q. What was that?2changes. I think there's another3A. That involved chlorinated ethylene like PCE3publication.4and TCE.4Q. The university of which you spea5Q. Was there a fate or transport mechanism in5University?6that case? By that I mean, was it a water6A. Yes.7case, a vapor case, a ground case, or do7Q. Let me show you what's been ma8you recall?8Ozonoff Exhibit No. 2. That's bee9A. I actually don't remember.9proffered to us as your report in th10Q. Do you recall when that case was, when you10matter. If you take a look at it and11were hired?12A. Five years. Four years. I'm not really1213sure.13Q. Now, as of the date of this report.	
 A. That involved chlorinated ethylene like PCE and TCE. Q. Was there a fate or transport mechanism in that case? By that I mean, was it a water case, a vapor case, a ground case, or do you recall? A. I actually don't remember. Q. Do you recall when that case was, when you M. Five years. Four years. I'm not really sure. A. That involved chlorinated ethylene like PCE general data of the date of transport mechanism in that case? By that I mean, was it a water Case, a vapor case, a ground case, or do Herror Case, a vapor case, a ground case, or do Restrict the show you what's been ma Ozonoff Exhibit No. 2. That's been proffered to us as your report in the matter. If you take a look at it and confirm that that's what it is? A. Five years. Four years. I'm not really Q. Now, as of the date of this report. 	h is Poston
4and TCE.4Q. The university of which you spead5Q. Was there a fate or transport mechanism in5University?6that case? By that I mean, was it a water6A. Yes.7case, a vapor case, a ground case, or do7Q. Let me show you what's been ma8you recall?8Ozonoff Exhibit No. 2. That's bee9A. I actually don't remember.9Proffered to us as your report in th10Q. Do you recall when that case was, when you10matter. If you take a look at it and11were hired?11confirm that that's what it is?12A. Five years. Four years. I'm not really13Q. Now, as of the date of this report.	k is Roston
5Q. Was there a fate or transport mechanism in that case? By that I mean, was it a water case, a vapor case, a ground case, or do 8 you recall?5University?7case, a vapor case, a ground case, or do 9 A. I actually don't remember.6A. Yes.9A. I actually don't remember.910Q. Do you recall when that case was, when you 11 were hired?1012A. Five years. Four years. I'm not really 131213Sure.1314Q. Now, as of the date of this report.	
 6 that case? By that I mean, was it a water 7 case, a vapor case, a ground case, or do 8 you recall? 9 A. I actually don't remember. 10 Q. Do you recall when that case was, when you 11 were hired? 12 A. Five years. Four years. I'm not really 13 sure. 6 A. Yes. 7 Q. Let me show you what's been ma 8 Ozonoff Exhibit No. 2. That's bee 9 proffered to us as your report in th 10 matter. If you take a look at it and 11 confirm that that's what it is? 12 A. Five years. Four years. I'm not really 13 Q. Now, as of the date of this report. 	
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12A. Five years. Four years. I'm not really12A. Yes, I can confirm that.13sure.13Q. Now, as of the date of this report.	1
13sure.13Q. Now, as of the date of this report.	
	1.1.4
$1 \perp 4$ (). In the Indiana case, was there a detendant $1 \perp 4$ report contain all the which is	, did the
	6.1.
15in the Indiana case?15November 29, 2012. As of the dat	
16A. Yes.16report, does the report contain all of	
17Q. Who was that, do you recall?17opinions that you have in regard to	o this
18A. No, I don't.18matter?	
19Q. Do you recall the contamination or the19A. Yes.	
20toxic issue?20Q. Since the date of this report, the 2	
21A. Yeah, I think everything I've done for21November 2012, have you formula	ated any
22 Mr. Manzke has been chlorinated ethylene. 22 other opinions?	
23Q. Do you recall whether there was any23A. No.	
24particular method of transport of the24Q. Have you been asked to formulat	e any other
Page 7	Page 9
1 chlorinated ethylenes in the Indiana case? 1 opinions?	
2 By that I mean vapor, water, or 2 A. No.	
3 A. I actually don't remember. You know, I 3 Q. As you sit here today, do you know	w how much
4 think it was so improperly managed so it 4 time you spent in the work leading u	up to
5 wound up on the ground, wound up in the 5 this report?	-
6 ground water. You know, whether the 6 A. You mean work done for this case	?
7 pathway to human exposure was through 7 Q. Yes, I mean this case. I don't mean	n your
8 ground water or vapor intrusion, I don't 8 whole career.	•
9 remember that. 9 A. Yes, a lot of work went into this re	eport
10 Q. Let me show you what's been marked as 10 that was not related to this case.	
11 Ozonoff Exhibit 1, which was proffered to 11 Q. How much work related to this cas	se?
12 us as your CV, or curriculum vitae. Take a 12 A. I probably spent eight to ten hours,	
13 moment and look at that, and my question 13 something like that.	
14 is, is that your most recent CV? 14 Q. Can you tell me, specifically durin	g that
15 A. I think there is, you know, some minor 15 eight to ten hours, what you did rela	U
16 changes from this. 16 to this case that's contained in this	C
17 Q. As you sit here today, do you recall what 17 report?	
18 those are? 18 A. Well, a lot of my opinions have be	en
19 A. Well, my term on the EPA Science Advisory 19 previously written down and what I	
20 Board has ended, so I think that's probably 20 I looked at the data involving the cla	
21 on here. Yes. I don't know if this says I 21 residences and the site that were pro	
22 was on the Faculty Senate or not but I am 22 to me by counsel, and I looked at, ye	
23 on the Faculty Senate again, and I'm on the 23 know, some relative associated mate	
1^{23} on the radius behave again, and r in on the 1^{23} know, some relative associated matrix	NR, and

(Pages 10 to 13)

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	Page 10		Page 12
1	then I used the information to make the	1	Q. Do you know how many homes
2	appropriate changes in what I had already	2	A. Let me just say.
3	prepared, essentially established knowledge	3	Q. Go ahead.
4	about this.	4	A. I hesitated for a moment because, in fact,
5	Q. Directing your attention to Page 1 of the	5	when these solvents are in the air the
б	report.	6	principal root of exposure is through
7	A. Okay.	7	inhalation, but you can actually ingest it,
8	Q. At the bottom, there's a statement, and	8	so things like PCE are very lipid soluble
9	I'll just read it and then I'm going to ask	9	so they can get into things like butter and
10	you about it.	10	olive oil that are in the house and you can
11	The statement is, "Reports indicate	11	ingest it that way. I'd expect that to be
12	that a substantial contamination by	12	relatively minor in this case, but I tend
13	chlorinated ethylene solvents of soil,	13	to think of everything. I think this is
14	groundwater and soil vapor occurred at the	14	primarily inhalation.
15	Madison-Kipp Corporation (MKC) facility	15	Q. Understood. Do you know how many homes of
16	located at 201 Waubesa Street, beginning	16	the 34 or so homes that are part of the
17	decades ago and continuing until at least	17	Class have actually had reported exposures
18	1989, resulting from improper management	18	through inhalation of chlorinated ethylene
19	and disposal of chlorinated ethylene	19	solvents?
20	solvents."	20	A. Well, I've seen the data. I can't give you
21	The sentence indicates that reports	21	a number right now. I've seen maps, for
22	indicate, in particular, the fact that	22	example, which have the homes in which
23		23	there were detects located. I think it was
23	there was improper management and disposal of chlorinated ethylene solvents. Have you	24	probably most of them.
27		21	
	Page 11		Page 13
1	done any independent work to ascertain the	1	Q. Are you aware that some of the homes have
2	type of management and disposal of	2	non-detect?
3	chlorinated ethylene solvents that	3	A. Yes.
4	Madison-Kipp engaged in?	4	Q. Is it your opinion that the homes that have
5	A. No, I haven't, but the fact that, you know,	5	non-detect are not exposed or
6	the groundwater and soils are contaminated	6	MR. BUSCH: Strike that.
7	with these materials indicates that they	7	Q. The homes that have registered non-detect
8	weren't disposed of properly. Exactly the	8	do not have an unacceptable risk of cancer?
9	details of the improper disposal, I don't	9	A. So I'm not sure I understand your question.
10	know.	10	Q. Maybe I'll get to it another way. I
11	Q. On the next page, Page 2, there's the	11	believe it's your opinion, on Page 2, that
	Q. On the next page, I age 2, there's the		
12	statement that, and I'll just pick up at	12	the exposure to PCE in the residential
		12 13	
12	statement that, and I'll just pick up at the semicolon on Page 1, "This		the exposure to PCE in the residential
12 13	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the	13	the exposure to PCE in the residential environment presents an unacceptable risk
12 13 14	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor	13 14	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?
12 13 14 15	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC	13 14 15	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?A. Yes.Q. In the homes that have no detection of PCE,
12 13 14 15 16	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has	13 14 15 16	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?A. Yes.
12 13 14 15 16 17	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of	13 14 15 16 17	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?A. Yes.Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer?
12 13 14 15 16 17 18 19	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of chlorinated ethylene solvents (primarily	13 14 15 16 17 18	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?A. Yes.Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer?A. If you were in an area where there's
12 13 14 15 16 17 18 19 20	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of chlorinated ethylene solvents (primarily PCE) to residents of these homes."	13 14 15 16 17 18 19	the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct?A. Yes.Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer?A. If you were in an area where there's demonstrable contamination and yet there's
12 13 14 15 16 17 18 19 20 21	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of chlorinated ethylene solvents (primarily PCE) to residents of these homes." Is your opinion limited to the	13 14 15 16 17 18 19 20	 the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct? A. Yes. Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer? A. If you were in an area where there's demonstrable contamination and yet there's no detectable level, I'm not ready to
12 13 14 15 16 17 18 19 20 21 22	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of chlorinated ethylene solvents (primarily PCE) to residents of these homes." Is your opinion limited to the inhalation of chlorinated ethylene solvents	13 14 15 16 17 18 19 20 21	 the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct? A. Yes. Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer? A. If you were in an area where there's demonstrable contamination and yet there's no detectable level, I'm not ready to conclude that there's no exposure.
12 13 14 15 16 17 18 19 20 21	statement that, and I'll just pick up at the semicolon on Page 1, "This contamination found its way into the groundwater, soil, soil vapor and indoor air at homes in the vicinity of the MKC facility and that this contamination has resulted in exposures through inhalation of chlorinated ethylene solvents (primarily PCE) to residents of these homes." Is your opinion limited to the	13 14 15 16 17 18 19 20 21 22	 the exposure to PCE in the residential environment presents an unacceptable risk of cancer; is that correct? A. Yes. Q. In the homes that have no detection of PCE, is it your opinion that they do have an acceptable risk of cancer? A. If you were in an area where there's demonstrable contamination and yet there's no detectable level, I'm not ready to

(Pages 14 to 17)

			(Pages 14 to 17)
	Page 14		Page 16
1	A. I think it's likely that there is exposure.	1	the box, I wouldn't have had to have
2	Q. What's the basis of that?	2	written anything else, so I'm not sure how
3	A. Or at least potential for exposure.	3	to answer that.
4	Q. On Page 2, the next sentence reads, "Data	4	Q. Once again, the first sentence reads, "It
5	provided to me indicate that the	5	is my opinion, within a reasonable degree
6	concentrations of the chlorinated ethylene	6	of medical certainty, that exposures to PCE
7	organic solvents in the indoor air to which	7	in the residential environment present a
8	residents have been, are currently, and in	8	public health risk to the Class Area
9	the future could be exposed present an	9	residents."
10	imminent and substantial long term health	10	If I were to interpret what you said
11	danger." Is that your opinion?	11	previously, that's because it's your
12	A. Yes.	12	opinion that once it's detectable, it's
13	Q. Is there any it references the fact that	13	already unacceptable?
14	the concentrations of the chlorinated	14	A. Well, because, for this particular
15	ethylene organic found in the homes of the	15	chemical, detectable amounts actually
16	residents. What concentrations of	16	represent a substantial biological
17	chlorinated ethylene organic do you believe	17	potential.
18	must be reached before an imminent and	18	Q. And that's PCE?
19	substantial long term health danger is	19	A. Yes. It's not my opinion that once
20	presented?	20	anything is detectable.
21	A. It's my opinion that once you're able to	21	Q. It's PCE?
22	measure it then it's already an	22	A. Right. I'm talking about PCE.
23	unacceptable risk. The reason for that is	23	Q. The next sentence says, "This risk is
24	that, in terms of the biological potential	24	related to exposures to PCE and its
	Page 15		Page 17
1	that you have, it's plausibly reasonable,	1	degradation products via inhalation through
2	and it's certainly unacceptable, because	2	indoor air and ambient air."
3	there's no benefit to it; it only carries	3	Can you list for me the degradation
4	risk with it.	4	products that you reference there?
5	MS. ROSS: I'm sorry, I didn't	5	A. Well, what happens with PCE, if you think
6	hear the last of that sentence.	6	of the chemical structure of PCE, it's two
7	THE WITNESS: It only carries risk	7	carbons connected with these double bonds,
8	with it.	8	and then, like, four ears hanging off are
9	Q. Going to the box in the opinion on Page 2.	9	these four chlorines. That's the
10	Is there any significance in your reportage	10	tetrachloroethylene that's in its name.
11	as to the bolding and the placement of this	11	What happens in the environment is
12	language in a box?	12	that in anaerobic conditions, that is
13	A. Not beyond the obvious one, which is it was	13	conditions without oxygen, microbes in the
14	meant to set it off so that it would be	14	environment start stripping off those
15	easy to see.	15	chlorines one by one. When you remove the
16	Q. Okay. This really is at the core the	16	first one, you're left with
17	boxed in areas tend to be the core of your	17	trichloroethylene. When you remove the
18	opinions; is that fair to say?	18	second one, you're left with one of the
19	A. Well, I don't know what you mean by core of	19	isomers of dichloroethylene. And when you
20	my opinions. I'm a scientist so I have	20	remove three of them, you only have one of
21	lots of opinions on things. I think what's	21	the chlorines left, all the others have
22	in the box was what I thought was pertinent	22	been replaced by hydrogen, and you have
23	about my opinions for this case, to some	23	vinyl chloride. And then if you remove
24	extent. If all I needed was what was in	24	that one, you've gone all the way down to

(Pages 18 to 21)

	Page 18		Page 20
1	ethylene, which is a hydrocarbon. So the	1	it, then the arithmetic really has worked
2	degradation products are the anaerobic	2	against you because there's quite a lot of
3	dechlorinated compounds that are produced	3	it around once it's detected. Even though
4	from stripping off those chlorines.	4	the units of detection are sometimes
5	Q. Are there initials to describe	5	expressed in a way that make it sound
6	trichloroethylene?	6	small, like a part per billion, in
7	A. Yeah, TCE.	7	biological terms, actually, that's a very
8	Q. Are there initials to describe vinyl	8	large exposure because in terms of the
9	chloride?	9	number of molecules, which are the number
10	A. A lot of people call it VC. And	10	of potential interactions with a cell that
11	dichloroethylene is often abbreviated VDC	11	could produce a cancer is very, very large
12	or DCE. VDC because it's vinylidene	12	at that point.
13	chloride is sort of a generic name for it,	13	Q. Is your report limited to risk of cancer or
14	but it's chemical name is dichloroethylene	14	is it broader than risks of cancer?
15	and you have to say which of the isomers.	15	A. Well, my I think this report is largely
16	Q. What do the initials VOC, if anything,	16	related to cancer. There are risks that
17	describe?	17	are non-cancer risks, some of which are
18	A. Volatile organic chemical.	18	produced by literature that I've
19	Q. Are these that we just spoke VOCs?	19	contributed to.
20	A. They are.	20	Q. This opinion is primarily about cancer?
21	Q. In the box it also indicates that it's your	21	A. Yeah, this is primarily about cancer, but
22	opinion "within a reasonable degree of	22	if you want to know what my opinion is,
23	medical certainty that the	23	actually, since this was written I'm much
24	weight-of-the-evidence favors the	24	more concerned, not much more concerned,
	Page 19		Page 21
1	proposition that exposure to PCE in the	1	but I am concerned about non-cancer risks,
2	residential environment of Class Area	2	and I think that when I gave my opinions it
3	members presents an increased and	3	
4	-		was sort of implicit there that there are
	unacceptable risk of cancer to those		was sort of implicit there that there are public health risks in general not
	unacceptable risk of cancer to those exposed under the usual circumstances of	4	public health risks in general not
5	exposed under the usual circumstances of		public health risks in general not completely restricted to cancer.
5	exposed under the usual circumstances of living and working in a contaminated	4 5	public health risks in general not completely restricted to cancer.Q. Have you done any analysis of non-cancer
5 6	exposed under the usual circumstances of living and working in a contaminated environment such as in Madison, Wisconsin."	4 5 6	public health risks in general not completely restricted to cancer.Q. Have you done any analysis of non-cancer risk since your report?
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(Pages 22 to 25)

	Page 22		Page 24
1	Q. Okay.	1	on Page 6 in the Footnote 3?
2	A. One of them is an EPA grant for which I'm a	2	A. I'm not sure if this has all of them.
3	co-investigator, not a principal	3	Q. At least some of them are?
4	investigator. It's in the EPA STAR	4	A. Yeah, probably most of them. There may be
5	program. STAR is an acronym that stands	5	one that's not on there because it came out
б	for science to achieve results, and it's a	6	after this. I'm not sure.
7	program that EPA it's a grant program	7	Q. In regard to the NIH grant, is there any
8	that EPA established, at least the part	8	specific study that's being done with
9	that we're involved in, to deal with issues	9	regard to PCE in which you were involved?
10	of cumulative risk, and so the principal	10	A. This is the NIH grant.
11	investigator of that, Professor Madeleine	11	Q. How about the STAR?
12	Scammell, was my last graduate student, and	12	A. The STAR grant is a methodology grant.
13	I'm actually very pleased to say that she's	13	It's more theoretical and it has
14	my boss now on this grant, since I'm a	14	applications to PCE but it's about
15	co-investigator on her grant, and it makes	15	cumulative risk to all sorts of things in
16	me very proud to say that.	16	the environment.
17	But I also have another grant which	17	Q. In this matter, have you been asked to
18	she is on, so I'm her boss on that one, and	18	render any opinions in regard to PAHs?
19	the other grant is an NIH grant, and it's	19	A. No.
20	something that I've had for 17 years. It's	20	Q. Have you been asked to render any opinions
21	at the Superfund Research Center, and it's	21	in regard to PCBs?
22	a multi-project grant funded currently at	22	A. No. I know that there are PAHs and PCBs
23	the level of about 2.1 million dollars a	23	there and I have opinions about them.
24	year. I'm the program director of it.	24	Q. You didn't report them in your report, did
	Page 23		Page 25
1		1	Page 25
1	There are maybe six or seven project	1	Page 25 you?
2	There are maybe six or seven project leaders of which at least five of them are	2	Page 25 you? A. No well, I wasn't aware of any exposure
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(Pages 26 to 29)

Page 26Page 281Q. Which I'm sure is a rarity in your life. On Page 7, you have a discussion that a continues about the weight-of-the-evidence methodology in arriving at any opinions in this case?1(Previous question is read back by the Court Reporter.)3A. Yes.Q. Till restate it. Did you use the weight-of-the-evidence methodology in arriving at any opinion in this case?3Q. Till restate it. Did you use the weight-of-the-evidence methodology in arriving at any priorinon. To the extent that I have given scientific opinions in this report, that's use lots of other1A. Well, you know, weight-of-the-evidence methodology is sort of a term of art for a 13Q. Okay.14making judgments about the evidence and you give them in your decisions, and I'm not speaking quantitatively, sort other weight-of-the-evidence.14 Q. Okay.19methodologies in pursuing the ueweight-of-the-evidence.16Q. At Page 21, you make the statement that Toxicology is an experimental science, while epidemiology.202A. Well, I discuss quite a bit the nature of you see that?20Okay.2Page 27A. I ust for the record, there's also a footnore there that suggests that there are possible exceptions with respect to epidemiology.213A. Well, I discuss quite a bit the nature of you see that?24Q. Okay.2Page 27A. I was contific opinion. To the service opinion - you view you ropinion in this matter as an epidemiology.233Q. Uprecting your attention to Page 17. One you see that?30Q. Okay.<	1Q. Which I'm sure is a rarity in your life.12On Page 7, you have a discussion that23continues about the weight-of-the-evidence34methodology; do you see that?45A. Yes.56Q. Did you employ weight-of-the-evidence67methodology in arriving at your opinions in88this case?89A. Yes.90Q. Did you use any other methodology?101A. Well, you know, weight-of-the-evidence112methodology is sort of a term of art for a121of different things, which includes134making judgments about the evidence and145which pieces to weigh, how much importance59methodologies in pursuing the190weight-of-the-evidence.201Q. Those are the ones that you discuss at some212pose232pose2A. Well, I discuss quite a bit the nature of232scientific method and scientific judgments242Q. Directing your attention to Page 17. One34the question "Can chlorinated ethylene35you see that?17A. Yes.18Q. In opining on that, did you use the89weight-of-the-evidence methodology?94the question "Can chlorinated ethylene55golvents cause canc	Court Reporter.) restate it. Did you use the ght-of-the-evidence methodology in ving at an opinion other than "Can orinated ethylene solvents cause cancer uman beings?" ell, I do use weight-of-the-evidence hodology for arriving at my scientific nion. To the extent that I have given ntific opinions in this report, that's at I did. cay. (Discussion off the record.) Page 21, you make the statement that xicology is an experimental science, le epidemiology is an observational nce." Does that observation play any in your opinion? st for the record, there's also a mote there that suggests that there are sible exceptions with respect to
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19Q. Yes, I'm sorry, in this report.19least in part, in your report, correct?	0	
		· · · ·
21 going to say the answer is yes but now I 21 Q. Is there any part of observation or of		t in part, in your report, correct?
22 don't remember what the question was. 22 epidemiology that's important for your		t in part, in your report, correct? s, in part.
23 MR. BUSCH: Can you read back that 23 report that's not contained in your report?		t in part, in your report, correct? s, in part. there any part of observation or of
		t in part, in your report, correct? s, in part. there any part of observation or of lemiology that's important for your

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(Pages 30 to 33)

	De 20		(rages 50 co 55)
	Page 30		Page 32
1	report. There's quite a lot that's not	1	Q. In your opinion, is there a difference
2	here. I'm writing a book now on the	2	between the use of the word "probable" and
3	subject. But I don't think it affects any	3	"likely"?
4	of the opinions here.	4	A. No. At least that's not my understanding
5	Q. At Page 41 excuse me, Page 40 of your	5	there's a difference in EPA's language, and
б	report, you reference at Paragraph D,	6	I think in ordinary parlance there isn't
7	"Relationship with time," and in	7	either.
8	Paragraph E, "Dose-response relationship".	8	Q. Much of your work at Boston University and
9	Do either of those, "Relationship with	9	through grants has been relating to
10	time" and "Dose-response relationship" bear	10	exposure to PCE in drinking water, correct?
11	on your opinion in this case and if so how?	11	A. Didn't you just say how much.
12	A. Well, my opinion here is not a specific	12	Q. No, I just made a statement. Is it correct
13	causation opinion, it's a general	13	that much of your work over the past
14	causation, and it's not it's about the	14	several years at Boston University and
15	ability of these chemicals to do certain	15	otherwise has been in regard to exposure to
16	kinds of health effects, so these bear upon	16 17	PCE in drinking water?
17 18	the interpretation of epidemiological	18	A. Yes, probably the last 25 years.
18 19	studies, as described here, and I don't know what to say beyond that.	18	Q. Is the primary means of ingestion in those studies the actual consumption of water
20		20	that has PCE in it, as opposed to vapor
20	Q. It certainly comes into play but your opinion is not reliant upon any particular	21	that may come from the water?
22	dose-response or relationship with time; is	22	A. It's hard to say. Of course a lot of
23	that fair to say?	23	estimates are that when you have all of the
24	A. Yes, except in so far as those things are	24	organics in drinking water that about half
	Page 31		Page 33
1		- 1	
1	related to the interpretation of the	1	of the exposure may be through inhalation,
2 3	studies that are considered in this report. Q. Okay. Directing your attention to Page 48.	2 3	but that varies from setting to setting. Q. Have you done any
4	There's a statement, "It is my opinion,	4	A. And there's dermal exposure, too.
5	within a reasonable degree of medical	5	Q. Have you done any studies isolated on PCE
6	certainty, that exposure to PCE in the	6	and its degradation bi-products that's a
7	residential environment presents a public	7	bad term.
8	health risk to the Class Area. This risk	8	MR. BUSCH: I'll strike it.
9	is related to exposures to PCE and its	9	Q. Have you done any studies on PCE, DCE or
10	degradation products."	10	TCE limited solely to vapor being the means
11	How, if at all, does that opinion	11	of ingestion, inhalation?
12	differ from the opinion set forth on	12	A. No.
13	Page 2?	13	Q. At Page 137, in the last paragraph, you
14	A. I think it's saying it's the same general	14	reference some testimony from Michael
15	idea in different language.	15	Schmoller and some information from John
16	Q. At Page 68, in the box, there's a statement	16	Hausbeck referencing mitigation systems.
17	that "At the very least, it is clear there	17	Do you see that?
18	is independent, informed, scientific	18	A. Yes.
19	opinion that accepts the proposition that	19	Q. Are you aware of the types of mitigation
20	TCE and PCE are probable human	20	systems that are being offered to certain
21	carcinogens."	21	residents in the Class Area?
22	You italicized the word "probable";	22 23	A. From what I recall from descriptions that this is I can't remember exactly what
22			THE IS I CONT COMMON AVAILUTED IN
23 24	do you see that? A. Yes.	24	the exact term is, sub-slab ventilation or

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(Pages 34 to 37)

Page 34Page 31exhaustion or something like that.1Area?2Q. Have you had any or have you studied at any3Q. Thee xposure which we talk about are the3point in time the efficacy of such sub-slab3Q. The exposure, correct?5A. No. I say that our Superfund Center, not6me personally, but the center and the67program I direct, does do vapor intrusion7A. Yes. That would eliminate the9Q. Your opinion in you have not been asked9Q. Yes. The last sentence indicates that the,10to render nor are you rendering on opinion10or states that it's reasonable and11on the efficacy of sub-slab mitigation11supportable "for residents of the Class12systems as a means of addressing vapor13PCE, TCE and VC contamination of their14A. No.14groundwater, soil, soil vapor and indoor15Q. Directing your attention to Page 138.1516There's a the first phrase in the first1617sentence says that "current uncertainties1718do not allow precise estimation of cancer1819risk from exposure to PCE and potentially1910TCE and VC in the residential environment2421at levels seen in the Class Area." Do you2222see that?2323A. Yes.2424Q. Can you list for me the current2425Page 35Page 35 <td< th=""></td<>
2Q. Have you had any or have you studied at any point in time the efficacy of such sub-slab mitigation systems?2A. Eliminate exposure.3point in time the efficacy of such sub-slab mitigation systems?3Q. The exposure which we talk about are the detected exposures, correct?5A. No. I say that our Superfund Center, not me personally, but the center and the program I direct, does do vapor intrusion work.3Q. The exposure which we talk about are the detected exposures, correct?9Q. Your opinion in you have not been asked to render nor are you rendering on opinion on the efficacy of sub-slab mitigation 117A. Yes. That would eliminate the uncertainties, if that's the question.9Q. Your opinion in you have not been asked to render nor are you rendering on opinion on the efficacy of sub-slab mitigation 111012systems as a means of addressing vapor 131013pCE, TCE and VC contamination of their groundwater, soil, soil vapor and indoor air presents them with an excess risk of cancer not balanced by any benefit and could be considered unacceptable by a reasonable person."16There's a the first phrase in the first 161617sentence says that "current uncertainties 171718do not allow precise estimation of cancer 191819risk from exposure to PCE and potentially 202021at levels seen in the Class Area." Do you see that?2222see that?2323A. Yes.2424Q. Can you list for me the current
3point in time the efficacy of such sub-slab3Q. The exposure which we talk about are the detected exposures, correct?5A. No. I say that our Superfund Center, not6Mell, I'm saying eliminating exposure.6me personally, but the center and the program I direct, does do vapor intrusion5A. Well, I'm saying eliminating exposure.7program I direct, does do vapor intrusion7A. Yes. That would eliminate the uncertainties, if that's the question.9Q. Your opinion in you have not been asked9Q. Yes. The last sentence indicates that the, or states that it's reasonable and supportable "for residents of the Class10on the efficacy of sub-slab mitigation11supportable "for residents of the Class12systems as a means of addressing vapor12Area to believe that the measured levels of groundwater, soil, soil vapor and indoor air presents them with an excess risk of could be considered unacceptable by a reasonable person."15Q. Directing your attention to Page 138.15arcer not balanced by any benefit and could be considered unacceptable by a reasonable person."19risk from exposure to PCE and potentially19In the context of this report, what do you mean by "excess risk of cancer"?21at levels seen in the Class Area." Do you see that?22Q. At any level above that which would be there in its absence?23A. Yes.23Q. Can you list for me the current24Q. Wat makes it excess?24Q. Can you list for me the current24A. No, not necessarily.2 </td
4mitigation systems?4detected exposures, correct?5A. No. I say that our Superfund Center, not5A. Well, I'm saying eliminating exposure.6me personally, but the center and the6Q. At any level?7program I direct, does do vapor intrusion7A. Yes. That would eliminate the8work.8uncertainties, if that's the question.9Q. Your opinion in you have not been asked9Q. Yes. The last sentence indicates that the,10to render nor are you rendering on opinion10rate to believe that the measured levels of11on the efficacy of sub-slab mitigation11supportable "for residents of the Class12systems as a means of addressing vapor12Area to believe that the measured levels of13intrusion, are you?13PCE, TCE and VC contamination of their14A. No.14groundwater, soil, soil vapor and indoor15Q. Directing your attention to Page 138.15air presents them with an excess risk of16There's a the first phrase in the first16cancer not balanced by any benefit and17sentence says that "current uncertainties17could be considered unacceptable by a18do not allow precise estimation of cancer18reasonable person."19risk from exposure to PCE and potentially19In the context of this report, what20ze se that?22PCE.21at levels seen in the Class Area." Do you2324<
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8work.9Q. Your opinion in you have not been asked to render nor are you rendering on opinion 118uncertainties, if that's the question.9Q. Your opinion in you have not been asked to render nor are you rendering on opinion 119Q. Yes. The last sentence indicates that the, or states that it's reasonable and 1111on the efficacy of sub-slab mitigation 1211supportable "for residents of the Class are to believe that the measured levels of 1312systems as a means of addressing vapor intrusion, are you?12Area to believe that the measured levels of their sector of their groundwater, soil, soil vapor and indoor air presents them with an excess risk of cancer not balanced by any benefit and could be considered unacceptable by a reasonable person."14A. No.16There's a the first phrase in the first a do not allow precise estimation of cancer 191818do not allow precise estimation of cancer 19risk from exposure to PCE and potentially 2019In the context of this report, what do you mean by "excess risk of cancer"?21at levels seen in the Class Area." Do you 2222Q. At any level above that which would be 2424Q. Can you list for me the current22PCE.23A. Yes.23Q. At any level above that which would be there in its absence?24Q. Can you list for me the current24A. No, not necessarily.25Page 35Page 3526Page 35Page 31uncertainties of which you refer? 21
9Q. Your opinion in you have not been asked to render nor are you rendering on opinion 119Q. Yes. The last sentence indicates that the, or states that it's reasonable and supportable "for residents of the Class12systems as a means of addressing vapor11supportable "for residents of the Class12systems as a means of addressing vapor12Area to believe that the measured levels of PCE, TCE and VC contamination of their groundwater, soil, soil vapor and indoor14A. No.14groundwater, soil, soil vapor and indoor15Q. Directing your attention to Page 138.1516There's a the first phrase in the first sentence says that "current uncertainties1617sentence says that "current uncertainties1718do not allow precise estimation of cancer 191819risk from exposure to PCE and potentially 201920TCE and VC in the residential environment 212121at levels seen in the Class Area." Do you 222223A. Yes.2324Q. Can you list for me the current2425Page 35Page 3526Page 35Page 31uncertainties of which you refer? 212A. Just about everything that goes into making 323these kinds of estimates. The biological34where in its of all, if you can measure it,
10to render nor are you rendering on opinion10or states that it's reasonable and11on the efficacy of sub-slab mitigation11supportable "for residents of the Class12systems as a means of addressing vapor12Area to believe that the measured levels of13intrusion, are you?13PCE, TCE and VC contamination of their14A. No.14groundwater, soil, soil vapor and indoor15Q. Directing your attention to Page 138.15air presents them with an excess risk of16There's a the first phrase in the first16cancer not balanced by any benefit and17sentence says that "current uncertainties17could be considered unacceptable by a18do not allow precise estimation of cancer18reasonable person."19risk from exposure to PCE and potentially19In the context of this report, what20TCE and VC in the residential environment20do you mean by "excess risk of cancer"?21at levels seen in the Class Area." Do you21A. Cancer that's attributed to the exposure to22see that?23Q. At any level above that which would be24Q. Can you list for me the current24there in its absence?Page 351uncertainties of which you refer?2A. Just about everything that goes into making3A. Well, first of all, if you can measure it,3these kinds of estimates. The biological3A. Well, first of all, if you can measure it,<
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20TCE and VC in the residential environment at levels seen in the Class Area." Do you see that?20do you mean by "excess risk of cancer"? 2121at levels seen in the Class Area." Do you see that?21A. Cancer that's attributed to the exposure to PCE.23A. Yes.23Q. At any level above that which would be there in its absence?24Q. Can you list for me the current24Q. At any level above that which would be there in its absence?Page 35Page 35Page 31uncertainties of which you refer? 21A. No, not necessarily.2A. Just about everything that goes into making 32Q. What makes it excess? 33these kinds of estimates. The biological3A. Well, first of all, if you can measure it,
20TCE and VC in the residential environment at levels seen in the Class Area." Do you see that?20do you mean by "excess risk of cancer"? A. Cancer that's attributed to the exposure to PCE.23A. Yes.2324Q. Can you list for me the current24Page 352Page 351uncertainties of which you refer? A. Just about everything that goes into making 313these kinds of estimates. The biological320A. Well, first of all, if you can measure it,
22 see that? 22 PCE. 23 A. Yes. 23 Q. At any level above that which would be 24 Q. Can you list for me the current 24 Q. At any level above that which would be Page 35 1 uncertainties of which you refer? 1 A. No, not necessarily. 2 A. Just about everything that goes into making 3 these kinds of estimates. The biological 3 these kinds of estimates. The biological 3 A. Well, first of all, if you can measure it,
23 A. Yes. 23 Q. At any level above that which would be there in its absence? 24 Q. Can you list for me the current 24 Q. At any level above that which would be there in its absence? Page 35 1 uncertainties of which you refer? 1 A. No, not necessarily. 2 A. Just about everything that goes into making 2 Q. What makes it excess? 3 these kinds of estimates. The biological 3 A. Well, first of all, if you can measure it,
24 Q. Can you list for me the current 24 there in its absence? Page 35 1 uncertainties of which you refer? 1 A. No, not necessarily. 2 A. Just about everything that goes into making 2 Q. What makes it excess? 3 these kinds of estimates. The biological 3 A. Well, first of all, if you can measure it,
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2A. Just about everything that goes into making2Q. What makes it excess?3these kinds of estimates. The biological3A. Well, first of all, if you can measure it,
3 these kinds of estimates. The biological 3 A. Well, first of all, if you can measure it,
4 mechanistic bases of the models, the 4 then there's plenty of it around, because
5 parameters used in the models. The 5 our instruments are not that sensitive that
6 uncertainty in the inputs into the models 6 we can get down to levels that don't have,
7 and the fact that the models produce 7 I would say, biological potential of public
8 expected values and many of them don't 8 health significance.
9 produce distributions of possible risks. 9 Q. So once again, the fact that it's measured
10 Q. Excuse my ignorance, but can you be more 10 makes it in excess?
11 can you elaborate a little bit more on what 11 A. No, the fact that the level at which it's
12 you mean by "failure to produce 12 measured makes it an excess. If we had
13 distributions"? 13 instruments that were maybe a thousand
14 A. So they tend to produce expected values or 14 times more sensitive, you might be able to
15 average values, in layman's terms. So if 15 get down to a level at which people would
16 you have two people, one who is five feet 16 say I don't know.
17 tall and one person who is six feet tall, 17 Q. But based upon the fact that with the
18 their average is five-foot six, but nobody 18 current level of instrumentation that it
19 in that sample is five-foot six feet tall, 19 can be detected, that in and of itself
20 so the distribution is five feet and six 20 represents an excess risk?
21 feet. The average is five-foot six. 21 A. Yes, I think that's primarily a question of
22 Q. What, if anything, do you believe could be 22 arithmetic, and I think in this report, I
23 done to eliminate the uncertainties that 23 went through that arithmetic, and
24 you believe to be current in that Class 24 essentially it's because molecules are very

(Pages 38 to 41)

	Page 38		Page 40
	Page 30		Page 40
1	small and a microgram of PCE has got an	1	actions.
2	awful lot of molecules. Each of those	2	Q. Do you agree that exposures below regional
3	molecules has got some biological potential	3	screening levels can be considered not to
4	to cause some harm, but if there were a	4	present toxicological concerns?
5	handful of them, maybe a million of them or	5	A. Well, since regional screening levels
б	ten million or a hundred million, but we're	б	differ from region to region, that can
7	talking about one with fifteen zeros after	7	hardly be true.
8	it. We're talking about very, very, very	8	Q. Assuming that all regions agree as to an
9	large numbers of potential and biological	9	appropriate screening level, do you agree
10	interactions, and that's purely a function	10	with the proposition that exposures below
11	of the fact that what chemists refer to as	11	screening levels can be considered to not
12	Avogadro's number. It's the number of	12	present a toxilogical concern?
13	molecules in one gram molecular weight of a	13	A. No. EPA doesn't believe that and neither
14	chemical, and it's a huge number. It's	14	do I.
15	6.023 times ten to the 23rd. That's one	15	Q. Did you consider at all in your opinion the
16	with 23 zeros after it.	16	site specific dose and duration of
17	So if you have even a fraction of	17	exposure?
18	this, say one billionth of a mole gram	18	A. I'm not sure what you mean by that.
19	molecular weight, then you still have one	19	Q. Did you consider site specific information
20	with 15 zeros after it or 14 zeros after	20	in that part of your opinion that addresses
21	it. It's an incredibly large number. The	21	dose-response?
22	fact that a part per billion doesn't sound	22	A. I actually don't understand the question.
23	very big, that's just a function of the	23	Q. In your opinion, you do take into
24	unit that's being used, and if you use	24	consideration dose, correct?
	Page 39		Page 41
1	units of molecules, then that number	1	A. You mean specific doses?
2	suddenly is a very, very large exposure.	2	Q. Yes. Or do you not?
3	MR. BUSCH: This would be a good	3	A. I take well, first of all, there is no
4	time to break. We're an hour into it.	4	risk if you're not exposed.
5	THE WITNESS: Sure. That's	5	Q. Okay.
6	perfect actually.	6	A. And what I I took dose into account to
7	MR. BUSCH: Okay.	7	the extent that we've already discussed,
8	(Recess.)	8	which is that if you can see it, then we're
9	Q. Doctor, do you know what regional screening	9	talking about a biological potential here
10	levels are from the EPA?	10	that concerns me as a public health
11	A. You mean what the levels are?	11	scientist, so to that extent the answer is
12	Q. No, just generally the concept of regional	12	yes, I took it into account in that sense.
13	screening levels?	13	Q. Did you take into consideration or into
14	A. Yeah.	14	account the frequency and duration of
15	Q. What do you understand a regional screening	15	exposure?
16	level to be?	16	A. Yes, I think so.
17	A. They are my understanding is that	17	Q. How?
18	they're sort of well, it depends a	18	A. That when you're living in a house, the
19	little bit on what the relationship of EPA	19	frequency is daily and the duration is the
20	to the state is as to whether the state has	20	amount of time that you spend in that
21	prelacy or not, but they're some kind of	21	environment, so when I talk about risk to
		22	people living under ordinary circumstances,
22	guidance or direction to people who are	스스	people nying under ordinary circumstances,
22 23	trying to deal with environmental problems	23	or whatever the exact language was, I was

	D 40		
	Page 42		Page 44
1	Q. By the way, of the eight to ten hours that	1	assessment, that is to say a point or
2	you spent in compiling the report, how much	2	interval estimate of average risk.
3	of it did you spend in reviewing the site	3	Just to add to that. I did perform
4	specific data, do you know?	4	an assessment of risk. I assessed the
5	A. Well, you know, for example, not for	5	risk, but if you want to put if you want
6	example, but I review that because I wanted	6	to put the word assessment after risk then
7	to take what I had written about PCE and	7	you're referring to a particular kind of
8	make it appropriate to the setting, so I	8	operation, but I think my report is really
9	needed to see what the setting was.	9	an assessment of risk.
10	Q. But if the total amount of time spent was	10	Q. On a qualitative as opposed to quantitative
11	eight to ten hours, how much of it was in	11	basis?
12	reviewing the data?	12	A. It's not purely qualitative. When you talk
13	A. Probably at least half of it. I can't give	13	about quantitative basis, in the context of
14	you an exact. I wasn't doing one thing all	14	risk assessment, you're talking about a
15	at once. I would go back and forth.	15	point or interval assessment of a
16	Q. Would you agree with the definition, the	16	probability.
17	following definition, that risk assessment	17	Q. You did not do that in this case?
18	is the characterization of the potential	18	A. I did not do that, no, but I did other
19	adverse health effects of human exposures	19	quantitative things. For example, there's
20	to environmental hazards?	20	a fairly complete review of quantitative
21	A. Well, I don't think I object to it. I	21	aspects of the literature up through 2003
22	think one could probably come up with	22	or so.
23	different definitions of risk assessment.	23	Q. Did you use at all in your opinion or
24	I think that probably describes a lot of	24	reference at all or take into consideration
	Page 43		Page 45
			rage is
1	what's done	1	
1	what's done.	1	at all the EPA's screening level of 9.4
2	Q. Did you engage in risk assessment in	2	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE?
2 3	Q. Did you engage in risk assessment in formulating your opinions as set forth in	2 3	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what?
2 3 4	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?	2 3 4	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level.
2 3 4 5	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?A. So when you you're saying risk	2 3 4 5	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE?A. That refers to what?Q. The EPA screening level.A. For what?
2 3 4 5 6	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?A. So when you you're saying risk assessment now, you're specifically	2 3 4 5 6	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE?A. That refers to what?Q. The EPA screening level.A. For what?Q. PCE.
2 3 4 5 6 7	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?A. So when you you're saying risk assessment now, you're specifically referring to this definition?	2 3 4 5 6 7	at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE?A. That refers to what?Q. The EPA screening level.A. For what?Q. PCE.A. Well, are you talking about soil, soil gas,
2 3 4 5 6 7 8	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?A. So when you you're saying risk assessment now, you're specifically referring to this definition?Q. Let's go back. Do you use the term "risk	2 3 4 5 6 7 8	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air?
2 3 4 5 6 7 8 9	Q. Did you engage in risk assessment in formulating your opinions as set forth in the report?A. So when you you're saying risk assessment now, you're specifically referring to this definition?Q. Let's go back. Do you use the term "risk assessment" in your practice?	2 3 4 5 6 7 8 9	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air.
2 3 4 5 6 7 8 9 10	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. 	2 3 4 5 6 7 8 9 10	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air?
2 3 4 5 6 7 8 9 10 11	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me 	2 3 4 5 6 7 8 9 10 11	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes.
2 3 4 5 6 7 8 9 10 11 12	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. 	2 3 4 5 6 7 8 9 10 11 12	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again.
2 3 4 5 6 7 8 9 10 11 12 13	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. A. Well, when I've done risk assessments and 	2 3 4 5 6 7 8 9 10 11 12 13	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again. Q. 9.4 micrograms per cubic meter.
2 3 4 5 6 7 8 9 10 11 12 13 14	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. A. Well, when I've done risk assessments and when I hear other people talking about it, 	2 3 4 5 6 7 8 9 10 11 12 13 14	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again. Q. 9.4 micrograms per cubic meter. A. Well, the Massachusetts screening level is
2 3 4 5 6 7 8 9 10 11 12 13 14 15	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. A. Well, when I've done risk assessments and when I hear other people talking about it, they usually are talking about some kind of 	2 3 4 5 6 7 8 9 10 11 12 13 14 15	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again. Q. 9.4 micrograms per cubic meter. A. Well, the Massachusetts screening level is .21 parts per billion, so a part per
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. A. Well, when I've done risk assessments and when I hear other people talking about it, they usually are talking about some kind of point or interval estimate using one or 	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again. Q. 9.4 micrograms per cubic meter. A. Well, the Massachusetts screening level is .21 parts per billion, so a part per billion is about seven micrograms per cubic
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 Q. Did you engage in risk assessment in formulating your opinions as set forth in the report? A. So when you you're saying risk assessment now, you're specifically referring to this definition? Q. Let's go back. Do you use the term "risk assessment" in your practice? A. Yes. Q. Would you define "risk assessment" for me as you use it. A. Well, when I've done risk assessments and when I hear other people talking about it, they usually are talking about some kind of point or interval estimate using one or another kind of a model, so quantitative estimate, and a risk is a probability. Q. Did you perform a risk assessment in rendering your opinion as set forth in 	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 at all the EPA's screening level of 9.4 micrograms per cubic meter for PCE? A. That refers to what? Q. The EPA screening level. A. For what? Q. PCE. A. Well, are you talking about soil, soil gas, sub-slab, indoor air? Q. Excuse me, vapor. Indoor air. A. Indoor air? Q. Yes. A. Screening level of what? Say it again. Q. 9.4 micrograms per cubic meter. A. Well, the Massachusetts screening level is .21 parts per billion, so a part per billion is about seven micrograms per cubic meter so talking about 1.4. Q. 9.4? A. 1.4 parts per billion screening level, I believe, is what it is in Massachusetts, micrograms.

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1 2			
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	that I saw; is that correct?	1	world so.
	A. No, it wasn't.	2	Q. Do you know if the use of PCE is banned in
3	Q. Do you agree that indoor air typically	3	various cleaners and cleaning substances?
4	contains volatile organic chemicals,	4	A. Not that I'm aware of.
5	including PCE, from consumer products,	5	Q. Is it banned at all in any application to
6	building materials, and outdoor air?	6	your knowledge?
7	A. Yes, it often does.	7	A. Well, I think we just talked about dry
8	Q. Is indoor air concentration resulting from	8	cleaning.
9	these sources commonly called background?	9	Q. In Los Angeles but how about nationwide?
10	A. Yes, I think commonly but probably	10	A. Not yet.
11	inappropriately called background.	11	Q. Are you aware that a study was done by the
12	Q. Do you know, for example, some of the	12	United States Environmental Protection
13	sources from which background PCE may	13	Agency in regard to background indoor air
14	emanate?	14	concentrations of volatile organic
15	A. Yes.	15	compounds?
16	Q. Give me some examples, if you would.	16	A. Yes.
17	A. Well, PCE is used in dry cleaning. It's	17	Q. It was promulgated sometime in 2011?
18	found in some kind of products like drain	18	A. Well, there have been numerous studies.
19	cleaners, you know, other household things.	19	Q. Are you aware of one that was promulgated
20	I don't know what they all might be. Most	20	in 2011?
21	of the dry cleaning exposure is gone by the	21	A. I don't know what you mean by
22	time you get the clothes home but it	22	"promulgated".
23	contributes to urban background.	23	Q. Published.
24	Q. That is the more concentrated the	24	A. No.
	Page 47		Page 49
1	population the more background PCE, as a	1	Q. To your knowledge, is there an estimated
2	general proposition?	2	level of PCE nationwide that's deemed to be
3	A. May or may not be. It depends upon local	3	background?
4	conditions. So many dry cleaners are now	4	A. You mean an ambient outdoor air or indoor
5	moving away from PCE because of its	5	air?
	toxicity so my dry cleaner no longer uses	6	
6			O. Indoor air.
6 7	PCE.	7	Q. Indoor air. A. Well, I think my general impression that
		7	A. Well, I think my general impression that
7	PCE. Q. Is PCE a banned substance from any use in the United States?		
7 8	Q. Is PCE a banned substance from any use in	7 8	A. Well, I think my general impression that the 50th percentile in a distribution for
7 8 9	Q. Is PCE a banned substance from any use in the United States?	7 8 9	A. Well, I think my general impression that the 50th percentile in a distribution for indoor air concentration is somewhere
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	A. I haven't looked at this for a bit, but my	1	lognormal distribution to it. That's a
	recollection is somewhere around a half	2	bell-shaped curve which has been
3	part per billion as a volume measurement,	3	transformed logarithmically, so it's now
4	so that means that 50 percent of households	4	skewed, and they fit that and assume that a
5	will have that or less.	5	lot of the non-detects are there's stuff
6	Q. Is a half part per billion a measurable	6	there, but it goes according to the
7	level of PCE?	7	lognormal distribution. That's not a bad
8	A. Yes.	8	way to do it but it can produce certain
9	Q. Another way to put it is, that's a	9	kinds of bias when you do it, and you don't
10	detectable level of PCE?	10	really know what the measurements are below
11	A. Yes.	11	your level of detection, so that's kind of
12	Q. Does that mean that, on average, I know you	12	a long-winded way of saying we don't know.
13	don't like to I won't say that. That	13	Q. I appreciate that. I believe you said that
14	the level does that mean that 50 percent	14	one of the more prevalent uses of PCE, at
15	of the houses have one half part per	15	least here to for, has been in the dry
16	billion or that all houses have, on	16	cleaning industry?
17	average, a half a part per billion?	17	A. Yes, that and degreasing are probably the
18	A. It's not an average, it's a median, and	18	two principal uses.
19	that's an extremely important difference.	19	Q. Assume for the moment that my laundry, the
20	2 1	20	
20	Q. In the context of this, the median is the	20	laundry that I use to do my shirts, for example, uses PCE, and assume that I wear
21	mid-point number, correct? It means that	22	
	half of the detections excuse me, that	22	five laundered shirts a week and every
23	the highest, the mid-point between the	23 24	two weeks I take them to the laundry and I
24	highest and the lowest detection, is that	24	pick them up and put them in my car and I
	Page 51		Page 53
1	the median in this context?	1	drive ten shirts that are laundered in PCE
2	A. Well, no, it includes all the non-detects,	2	or have some PCE component in them from the
3	so supposing that you had 100 measurements	3	dry cleaning. Am I, as you understand it,
4	and 49 of them were non-detects and the	4	am I exposed during my car ride to a
5	50th was a half part per billion, then that	5	detectable level of PCE?
6	would be the median. In other words, you	6	
0			A. The data that I've seen, and I haven't
		7	A. The data that I've seen, and I haven't looked at it for awhile well, first of
7	take all the measurements and you line them up in order and you go halfway down the	7	looked at it for awhile well, first of
7 8	up in order and you go halfway down the	7 8	looked at it for awhile well, first of all, my advice to you would be to find
7 8 9	up in order and you go halfway down the line, so it doesn't take into account the	7 8 9	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them
7 8 9 10	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.	7 8 9 10	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so
7 8 9 10 11	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into	7 8 9	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although
7 8 9 10 11 12	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into account the distribution of PCE?	7 8 9 10 11	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out,
7 8 9 10 11 12 13	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into account the distribution of PCE?A. Yeah, the problem there's a different	7 8 9 10 11 12	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers.
7 8 9 10 11 12 13 14	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into account the distribution of PCE?A. Yeah, the problem there's a different kind of problem there because the	7 8 9 10 11 12 13 14	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers. So the answer to your question is
7 8 9 10 11 12 13 14 15	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into account the distribution of PCE?A. Yeah, the problem there's a different kind of problem there because the non-detects are not zero. Some of them may	7 8 9 10 11 12 13 14 15	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers. So the answer to your question is that the data that I've seen in the past,
7 8 9 10 11 12 13 14 15 16	up in order and you go halfway down the line, so it doesn't take into account the distribution at all.Q. Are you aware of any studies that take into account the distribution of PCE?A. Yeah, the problem there's a different kind of problem there because the non-detects are not zero. Some of them may be zero but a lot of them aren't, so in	7 8 9 10 11 12 13 14	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers. So the answer to your question is that the data that I've seen in the past, when people weren't quite as careful with
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7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 up in order and you go halfway down the line, so it doesn't take into account the distribution at all. Q. Are you aware of any studies that take into account the distribution of PCE? A. Yeah, the problem there's a different kind of problem there because the non-detects are not zero. Some of them may be zero but a lot of them aren't, so in order to figure out what the non-detects are, you have to make an assumption about what the underlying distribution of the data that it might be. So there's different ways to do it. One of them is you can take all the 	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers. So the answer to your question is that the data that I've seen in the past, when people weren't quite as careful with PCE, was that if you had dry cleaning, let's, say not your shirt but your jacket, your suit jacket, and you took it home on a very hot day wrapped up in plastic from the dry cleaners, that in a certain percentage of them there might be some measurable PCE
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	 up in order and you go halfway down the line, so it doesn't take into account the distribution at all. Q. Are you aware of any studies that take into account the distribution of PCE? A. Yeah, the problem there's a different kind of problem there because the non-detects are not zero. Some of them may be zero but a lot of them aren't, so in order to figure out what the non-detects are, you have to make an assumption about what the underlying distribution of the data that it might be. So there's different ways to do it. 	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	looked at it for awhile well, first of all, my advice to you would be to find another dry cleaner because a lot of them are moving away from PCE not because so much the risk to consumers, although consumers don't like it when they find out, but the risk to the workers. So the answer to your question is that the data that I've seen in the past, when people weren't quite as careful with PCE, was that if you had dry cleaning, let's, say not your shirt but your jacket, your suit jacket, and you took it home on a very hot day wrapped up in plastic from the dry cleaners, that in a certain percentage

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1	significant exposure. I don't think	1	opinions, have you?
2	there's probably anything to speak of from	2	A. No. Well, to be honest with you, from what
3	shirts.	3	I quickly saw from what she said, she seems
4		4	to agree with me, but I can't say that from
5	Q. But it's mostly those items that are truly	5	
	dry cleaned, like suits and woven fabrics?	6	a detailed reading of it. I expect that,
6 7	A. Yeah, and of those, only under special circumstances would there be a brief	7	you know, what she was asked to do is
		8	criticize me, and I was not surprised to
8	exposure under not well-defined		see, but her bottom line seems to be the
9	circumstances, like really hot days and	9 10	same as my bottom line; this is a likely
10	only from some dry cleaners. Dry cleaners	11	cause of cancer in human beings, or it's
11	differ. So you might bring it home from		likely to cause cancer in human beings.
12	one place and there might be no exposure	12	Q. You have not been asking to rebut any of
13	from another place, and now that they're	13	her specific opinions?
14	using the transfer method, there's not as	14	A. No.
15	much exposure that way.	15	MR. BUSCH: I want to take
16	Q. Have you taken any position at all publicly	16	five minutes. I may be able to eliminate
17	in regard to the desirability of banning	17	some of this stuff.
18	PCE from all use in the United States?	18	(Recess.)
19	A. It's my opinion it should be banned from	19	Q. Doctor, in your opinion, are there any
20	all use. Have I ever taken a public	20	members of the Class who are not exposed to
21	position on it? I can't remember. If	21	an unacceptable risk of cancer?
22	anybody asked me about it, that's what I	22	A. Well, just looking at the environmental
23	would say. I think I and a lot of people	23	setting here, the environment that's
24	consider it an unreasonably dangerous	24	substantially contaminated and the
	Page 55		
			Page 57
1	product in the sense that you don't need	1	Page 57 groundwater and the soil and in the air,
1 2		1 2	
	product in the sense that you don't need		groundwater and the soil and in the air,
2	product in the sense that you don't need it.	2	groundwater and the soil and in the air, and I think you have to be worried about
2 3	product in the sense that you don't need it. Q. Are you familiar with the U.S. EPA's vapor	2 3	groundwater and the soil and in the air, and I think you have to be worried about it's reasonable to consider that there's a
2 3 4	product in the sense that you don't need it.Q. Are you familiar with the U.S. EPA's vapor intrusion screening level calculator that	2 3 4	groundwater and the soil and in the air, and I think you have to be worried about it's reasonable to consider that there's a risk of harm to anybody who lives bordering
2 3 4 5	product in the sense that you don't need it.Q. Are you familiar with the U.S. EPA's vapor intrusion screening level calculator that was published in March of 2012?	2 3 4 5	groundwater and the soil and in the air, and I think you have to be worried about it's reasonable to consider that there's a risk of harm to anybody who lives bordering on this facility. This is pretty close
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	Page 58		Page 60
1	Q. Doctor Ozonoff, my name is Jacques Condon.	1	Department of Neurology?
2	I just have a few follow-up questions. Can	2	A. Yes.
3	you pull out Exhibit No. 1, which is your	3	Q. The report that has been marked as
4	CV. I noticed in here you described	4	Exhibit 2, you said in your earlier
5	yourself as an epidemiologist, correct?	5	testimony that came from either prior
6	A. Yes.	6	versions or it came from other sources; is
7	Q. For awhile you were in the staff at the	7	that right?
8	Department of Neurology at the Boston VA	8	A. It is in part, which is this is a report
9	Medical Center?	9	that I sort of developed over a period of
10	A. Yes.	10	time because this is what I do is
11	Q. What's the difference between neurology and	11	chlorinated ethylenes, and I wanted a way
12	epidemiology?	12	to explain this, not only to explain
13	A. They're completely different disciplines.	13	chlorinated ethylenes, but to explain the
14	Q. What are they? Can you explain the	14	whole process of how we understand these
15	difference?	15	things. A lot of people have read this, so
16	A. Neurology is the clinical discipline about	16	it's not like you're the only one to have
17	diseases of the nervous system, and	17	read it, but it's also useful in
18	epidemiology is a methodology for	18	circumstances like this and so each of the
19	understanding determinants of distribution	19	circumstances like this that I've used it
20	of a disease in a population.	20	with have had specific parameters to them,
21	Q. When you were at Cornell, was your emphasis	21	and so I make the changes that are
22	in neurology, epidemiology?	22	appropriate to that.
23	A. Are you asking me why I was in the	23	Q. There's a lot of background material in
24	Department of Neurology?	24	terms of methodology,
	Page 59		Page 61
1	Q. Yes.	1	weight-of-the-evidence, other things in
2	A. There's a very simple answer to that	2	this report, right?
3	question, which is that I was the	3	A. Yes. Actually, one reason is because it
4	co-director, along with a colleague who was	4	has become important when offering opinions
5	a neuropsychologist, of the Boston	5	these days to explain exactly how you
6	Environmental Hazard Center, which was the	6	arrived at your opinion, and I think that I
7	principle Gulf War research center for the	7	took a lot of care to explain that and
8	Department of Veterans' Affairs. So we	8	that's applicable to lots of different
9	were located at the Veterans' Hospital and	9	cases, not just this one.
10	I was given an appointment on the staff of	10	Q. The opinions in some of the background
11	the hospital, which meant that I could see	11	material that's in your report, have you
12	patients if I was so inclined, which I	12	published that separately?
13	wasn't, because I'm not a diagnosing or	13	A. No. Well, I'm an academic, so I write
14	treating physician at this point, although	14	papers and I'm sure that these ideas appear
15	I'm licensed to do that. It was	15	in other forms in different ways or they
16	essentially just an administrative slot for	16	were first part of papers and appear here.
17	me as the director of this center in a	17	I'm writing a book now on mathematical
18	clinical facility, and the reason it was in	18	foundations of epidemiology and obviously,
19	the Department of Neurology was because my	19	this is part of that.
20	colleague is a neuropsychologist. She	20	Q. When you sat down to prepare this report,
21	actually succeeded me in the department at	21	were you taking it from one or two sources,
22	Boston University.	22	did it come from different papers; how did
23	Q. So it was more a circumstance of being part	23	you come up with what we have as a 140
24	of the VA that you're listed under the	24	

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(Pages 62 to 65)

1 A. You mean the origin of this? 1 exactly. 2 Q. Right. 2 Q. I believe those cases were five or six years ago, or what was the timeframe of those? 3 A. My head. 3 six years ago, or what was the timeframe of those? 4 Q. Over time. 5 A. Yeah. It's original with me. I wrote it myself. I didn't it's not copied or taken from another source, except where ecited. I cited everything. 6 A. Something like that. There's more up-to-date citations in this one, but it's not systematic. I do, obviously, keep track of the literature because this is 9 9 Q. In the eight to ten hours you spent looking tathings in this case, did you write 10 and there are lots of citations in papers 11 140-page report in that time? 11 that I've co-authored on that have come on that five co-authored on that have come on that his period. I don't know if they're all cited in here or not. 14 things which were necessary in order to make this relevant. 15 Page 63 19 A. I adapted this report so that it addressed 19 Sweeteners and Bladder Cancer." Did yoi watele? 19 A. I adapted this report so that it addressed 19 Sweeteners and Bladder Cancer." Did yoi yoi you dat to this case. <tr< th=""><th>2 3</th><th></th><th></th><th>Page 64</th></tr<>	2 3			Page 64	
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	6 7	things that I've written in the past that talk about autoimmune disorders and birth		misunderstood." He said, "It's not my job	
	6 7 8	talk about autoimmune disorders and birth		misunderstood." He said, "It's not my job to teach people."	
11 Q. The report that you had already, what case 11 A. Well	6 7 8 9	talk about autoimmune disorders and birth defects, which could very well have been in	9	misunderstood." He said, "It's not my job to teach people."	
	6 7 8 9 10	talk about autoimmune disorders and birth defects, which could very well have been in this one.	9 10	misunderstood." He said, "It's not my job to teach people."Q. What was your conclusion?	
13A. Its been used in a number of cases.13conclusion?	6 7 8 9 10 11	talk about autoimmune disorders and birth defects, which could very well have been in this one.Q. The report that you had already, what case	9 10 11	misunderstood." He said, "It's not my job to teach people."Q. What was your conclusion?A. Well	
14 There's a case out in Burbank. I can't 14 A. I'm guessing that you've read it more	6 7 8 9 10 11 12	talk about autoimmune disorders and birth defects, which could very well have been in this one.Q. The report that you had already, what case was that?	9 10 11 12	misunderstood." He said, "It's not my job to teach people."Q. What was your conclusion?A. WellQ. Thirty-two years ago, what was your	
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22 information that would be case specific, 22 A. Yeah, I thought that the saccharin ban	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	 talk about autoimmune disorders and birth defects, which could very well have been in this one. Q. The report that you had already, what case was that? A. Its been used in a number of cases. There's a case out in Burbank. I can't remember what the caption was. Q. You talked about the Indiana case and another case. Were those reports, would they look similar to what I see in Exhibit 2? A. Yes, they would. 	9 10 11 12 13 14 15 16 17 18 19 20	 misunderstood." He said, "It's not my job to teach people." Q. What was your conclusion? A. Well Q. Thirty-two years ago, what was your conclusion? A. I'm guessing that you've read it more recently than I have since I read it 32 years ago when I wrote it. I can't remember exactly what the issue was anymore, to be perfectly honest. Q. Do you recall whether you were either 	
	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	 talk about autoimmune disorders and birth defects, which could very well have been in this one. Q. The report that you had already, what case was that? A. Its been used in a number of cases. There's a case out in Burbank. I can't remember what the caption was. Q. You talked about the Indiana case and another case. Were those reports, would they look similar to what I see in Exhibit 2? A. Yes, they would. Q. Same information with the exception of 	9 10 11 12 13 14 15 16 17 18 19 20 21 22	 misunderstood." He said, "It's not my job to teach people." Q. What was your conclusion? A. Well Q. Thirty-two years ago, what was your conclusion? A. I'm guessing that you've read it more recently than I have since I read it 32 years ago when I wrote it. I can't remember exactly what the issue was anymore, to be perfectly honest. Q. Do you recall whether you were either the article you were commenting on or your comment was negative towards saccharin? 	
A. Probably pretty much so. I can't remember 24 Q. If you go to Page 11. Let me know whe	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 talk about autoimmune disorders and birth defects, which could very well have been in this one. Q. The report that you had already, what case was that? A. Its been used in a number of cases. There's a case out in Burbank. I can't remember what the caption was. Q. You talked about the Indiana case and another case. Were those reports, would they look similar to what I see in Exhibit 2? A. Yes, they would. Q. Same information with the exception of information that would be case specific, right? 	9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	 misunderstood." He said, "It's not my job to teach people." Q. What was your conclusion? A. Well Q. Thirty-two years ago, what was your conclusion? A. I'm guessing that you've read it more recently than I have since I read it 32 years ago when I wrote it. I can't remember exactly what the issue was anymore, to be perfectly honest. Q. Do you recall whether you were either the article you were commenting on or your comment was negative towards saccharin? A. Yeah, I thought that the saccharin ban under the Delaney Clause was reasonable. 	

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(Pages 66 to 69)

			(rages 00 c0 0)
1	Page 66		Page 68
1	you're there.	1	Massachusetts." Do you see that?
2	A. Yeah.	2	A. Yes.
3	Q. You're there?	3	Q. Are you familiar with this cancer risk in
4	A. Uh-huh.	4	residential proximity to cranberry bog in
5	Q. Look at No. 64. It talks about "Cancer in	5	Massachusetts?
6	the Vicinity of a Department of Defense	6	A. Yes, I'm co-author of it.
7	Superfund site in Massachusetts," and this	7	Q. What was going on?
8	was something that was apparently published	8	A. Cape Cod, which is where we've done a lot
9	in a Toxicology and Industrial Health	9	of work, and this was either funded by
10	publication. Do you see that?	10	Massachusetts or NIH. I think it was
11	A. Yeah.	11	Q. You said NAH?
12	Q. Do you recall if you reached a conclusion	12	A. NIH. I think it was the Commonwealth of
13	in what this particular article or whatever	13	Massachusetts at this point. There are two
14	this was?	14	states, maybe three, actually, Wisconsin
15	A. Well, reach a conclusion. We reported an	15	may be one of them, that produce
16	association.	16	cranberries so a cranberry bog is like a
17	Q. Association of what?	17	giant pool full of cranberries, and in
18	A. A statistically significant association	18	order to grow them, they put pesticides on
19	between breast cancer and, I think it might	19	them, and often that's done through the
20	have been lung, and these mortar training	20	water. It's call chemigation. At one
21	positions on Otis Air Force Base on Cape	21	point it was done by airplanes, aerial
22	Cod.	22	spraying of cranberry bogs.
23	Q. You said there was a statistically	23	Now people live right along there,
24	significant correlation?	24	their houses border on the cranberry bogs,
	Page 67		Page 69
1	A. Association, yes.	1	and so we used a drift model for that have
2	Q. Is that based on studies that you reviewed	2	been used by the pesticide people about how
3	or what was that?	3	pesticides drift away when you're spraying
4	A. It was based on studies we did.	4	them.
5	Q. When you say "we," was it you, part of a	5	Q. Just so I'm clear, when you say "drift
6	grant, what was it, if you can recall?	6	model," is this an actual physical model or
7	A. It was part of a grant and, you know, those	7	more a model from a scientific
8	are my co-authors listed with me.	8	A. I'm not sure what you mean by a physical
9	Q. Was it a grant from governmental	9	model.
10	A. Yeah, it was either the Commonwealth of	10	Q. When you say "drift model," what is a drift
11	Massachusetts or NIH and I, on that date, I	11	model?
12	don't remember exactly who the funder was.	12	A. It's a, in this case it was an equation
13	Q. Okay.	13	predicting how pesticides drifted when you
14	A. Just to explain do you want me to	14	spray things, although we did something,
15	explain what it was about or you don't	15	now that I'm telling you, we used
16	care?	16	information on drift models, but we
17	Q. Let's move on. If you can go to your	17	actually used a buffer around the cranberry
18	report, which is Exhibit 2, and in	18	bogs. I think it was 2500 meters,
19	particular I want you to look at Page 6.	19	something like that, so we compared the
20	A. Okay.	20	cases of brain cancer within that buffer
21	Q. In the large footnote number three, if you	21	and outside that buffer zone, and that's
0.0	a second de la companya de seconda se confisione de la seconda de la companya de la companya de la companya de	22	where this association came from.
22	go eight lines down, there's a reference to		
22 23 24	"Cancer risk and residential proximity to cranberry bog cultivation in	22 23 24	Q. Was that also a grant? A. Yeah.

(Pages 70 to 73)

	Page 70		Page 72
1	Q. When you're part of this grant proposal and	1	outside of that 2500 meters by part of the
2	you're doing your research and you create a	2	study group, which were the members who
3	buffer around the zone, are you there	3	lived on Cape Cod?
4	literally taking samples or how does that	4	Q. In that particular study, you came up with
5	work?	5	the relative risk numbers?
6	A. Okay. It was not a grant proposal, it was	6	A. Yeah, it was estimated with something else
7	a grant. A proposal is how you get the	7	called an odds ratio.
8	grant.	8	Q. Odds ration, I saw that in your report.
9	Q. Thank you.	9	You refer to it as OR.
10	A. We were funded to do research by the	10	A. Yes.
11	Commonwealth of Massachusetts on cancer on	11	Q. There is some odds ratios related to births
12	Cape Cod, different kinds of cancer. I	12	and other things in some reports?
13	think there were seven different kinds of	13	A. Yeah, so often you can't measure a relative
14	cancer. One of them was brain cancer. And	14	risk directly because of the way your
15	one of the things we decided to look at was	15	observations are collected, and if you use
16	whether living near cranberry bogs, because	16	a study design called a case control
17	they're sprayed aerially, was related to	17	design, you don't actually get the relative
18	brain cancer, and there was actually a	18	risk, you get something called an odds
19	pretty strong association with brain cancer	19	ratio, which is the odds of having the
20	living close to the bog and the vicinity of	20	disease if you're exposed compared to the
21	the bog, so this was a study that we did	21	odds of having the disease if you're not
22	using the state's cancer registry and	22	exposed, but it turns out when the risk of
23	interviewing people.	23	getting the disease is relatively low, less
24	Q. What was your ultimate conclusion on the	24	than ten percent or less than one percent,
	Page 71		Page 73
1	spraying?	1	then the odds ratio and the risk ratio are
2	A. There was a relative risk, something like	2	basically the same thing.
3	four, four and a half, living close to the	3	Q. There are other references, and you just
4	cranberry bog.	4	mentioned in the Cape Cod that it sounds
5	Q. What do you mean by "relative risk"?	5	like it was an extensive study in Cape Cod?
6	A. In other words, the risk living close to	6	A. We have been studying them probably for
7	the bog compared to living farther away	7	20 years, maybe longer, and it's not the
8	from the bog.	8	same datus. We keep collecting new data.
9	Q. When you say "relative risk," that's a	9	Q. It's an ongoing study?
10	percentage?	10	A. Yes, its been ongoing and now it has been
11	A. I presume too much, I'm sorry. So if I	11	extended into Rhode Island.
12	were to ask what the relative risk of, say,	12	Q. Is it because of how the geography of Cape
13	being in this room versus not being in this	13	Cod or what's
14	room. I would take the risk, a measured	14	A. That's a good question. The original
15	risk of being in this room and compare it	15	impetus for the study was that when people
16	to the measured risk outside the room and	16	looked at the state's cancer registry they
	take their ratio. That's the relative	17	saw that the risk of cancer was about
17		10	25 percent higher if you lived on Cape Cod
18	risk. So a relative risk of ten would mean	18	
18 19	that it was ten times riskier to be in this	19	compared to the rest of the state by a
18 19 20	that it was ten times riskier to be in this room than outside this room.	19 20	compared to the rest of the state by a particular kind of measure, and then the
18 19 20 21	that it was ten times riskier to be in this room than outside this room. A relative risk of four for cranberry	19 20 21	compared to the rest of the state by a particular kind of measure, and then the question was why. So we were asked by the
18 19 20 21 22	that it was ten times riskier to be in this room than outside this room. A relative risk of four for cranberry bogs means that it was four, four and a	19 20 21 22	compared to the rest of the state by a particular kind of measure, and then the question was why. So we were asked by the state and funded by the state to try to
18 19 20 21	that it was ten times riskier to be in this room than outside this room. A relative risk of four for cranberry	19 20 21	compared to the rest of the state by a particular kind of measure, and then the question was why. So we were asked by the

(Pages 74 to 77)

	Page 74		Page 76
1	One of them was cranberry bogs and one of	1	areas, we'll give you a new kind of water
2	them was one of the original suspicions,	2	pipe. We'll coat the inside of it with a
3	which was Otis Air Force Base might be the	3	plastic," and a plastic is something called
4	source of contamination. Relevant to this	4	Piccotex. It's a resin.
5	case, it turned out that there was another	5	Q. Piccotex?
6	source of contamination on the Cape that	6	A. Yes, P-i-c-c-o-t-e-x. It's on the outside
7	people sort of knew about but didn't know	7	of milk cartons. So its been tested to be
8	what the extent of it was.	8	safe for contact with water and stuff like
9	Q. What was that?	9	that. So the question is how do you get
10	A. PCE contamination of the water. Now, the	10	this on the inside of the pipe. Well, what
11	really interesting part about this is where	11	they decided to do is dissolve it in PCE
12	that PCE contamination came from. It	12	and then paint the inside of the pipe with
13	turned out that it came from the lining of	13	it and under the assumption that the PCE
14	the water mains, which made this an	14	would evaporate and they would have a lined
15	extremely unique situation because it	15	plastic pipe, but there wasn't a big enough
16	became like a gigantic natural experiment.	16	market for this pipe so they made the pipe
17	Q. How long did it take to realize it's the	17	to order, and what that meant was that if
18	lining of the water mains	18	you lived in Falmouth on Cape Cod and you
19	A. It was going on for a full ten years before	19	were in the water department and you needed
20	anybody realized it, and they discovered it	20	to replace the water mains on Oak Street,
21	by accident in Rhode Island when they did	21	you ordered 100 feet of water main for Oak
22	some routine water testing and they found	22	Street and within 48 hours of the order
23	č	23	they would paint the inside of some
24	PCE in the water and they couldn't figure out where it was coming from because this	23 24	asbestos cement pipe and ship it off to
27		27	
	Page 75		Page 77
1	case is typical of where PCE comes from,	1	you, so you got freshly painted. They put
2	water and the air, which is someone throws	2	it in the ground and the assumption was
3	it on the ground and it gets into the	3	that it would go away. It would dry up and
4	groundwater, but they couldn't find any	4	by the time they put it in the ground, it
5	source of PCE here, and it took many months	5	would all be gone. Well, that turned out
6	for the EPA to figure this out, and here's	6	to be really wrong.
7	what the story turned out to be.	7	Q. Has it since been remediated?
8	Q. Were you part of the team that figured it	8	A. So they started putting the pipe in in 1969
9	out or was it EPA acting alone?	9	and by 1979 they figured this out. The
10	A. EPA and Commonwealth of Massachusetts and	10	amounts in the water were pretty
11	Rhode Island.	11	substantial.
12	Q. Okay. Keep going.	12	Q. Sorry, the mouths in the water?
13	A. Sure. So here's what happened. That there	13	A. The amounts in the water were pretty
14	is very soft sort of corrosive water in the	14	substantial and they had about 700 miles of
15	northeast and the water mains had been	15	this pipe and it was scattered all over the
16	coated with sort of tar, asphalt type	16	place. Oak Street might have some and then
17	substance to protect the water mains from	17	Main Street a mile away might have some for
18	corroding and so on, but with this soft	18	a block or two.
19	corrosive water it was creating color and	19	Q. When you talked about substantial amounts,
20	taste and odor problems. So in the late	20	they were doing tests and coming up with
21	1960's, two companies, Johns Manville	21	whatever the ratios were?
22	Corporation and, I think, CertainTeed, who	22	A. Yes. It was way over what EPA at that
23	are makers of asbestos cement pipe said	23	point allowed it, and the suggested no
24	"Well, you know, if you're in one of these	24	adverse response level for PCE in water was

(Pages 78 to 81)

			(14905 / 0 00 01)
	Page 78		Page 80
1	40 parts per billion. It's now five parts	1	I think we published our first cancer paper
2	per billion, and it was way over 40 parts	2	on PCE and bladder cancer in 1993 and one
3	per billion and some of the time it was	3	of the things that you'll find, if you look
4	thousands of parts per billion.	4	at the iris assessment, is that paper is
5	So the way they remediated it was to	5	cited as one of the half a dozen with the
6	a systematic program of flushing and	б	highest quality exposure assessments.
7	bleeding, so they put a tap on Oak Street	7	Q. I think you said, correct me if I'm wrong,
8	where this pipe was and they just kept	8	that you're part of the study that helped
9	running fresh water through it all the time	9	devise the flushing technique?
10	so it diluted it, basically, until they got	10	A. I was part of the advisory committee. It
11	it under the five-part per billion level,	11	all emerged from the advisory committee and
12	and they've been doing that ever since.	12	the department.
13	It's still there.	13	Q. Can't they just use different type of pipe?
14	Q. Still being flushed?	14	A. Well, they would have to dig up 700 miles
15	A. It's still being flushed, and the pipe is	15	of pipe. That would have been the ideal
16	still there but a lot of the PCE now is	16	solution, replace the pipe, but that was
17	leached out of the lining of the pipe.	17	not possible.
18	So what does this have to do with us?	18	Q. The other solution you came up with was a
19	So I was on an advisory committee for the	19	flushing technique?
20	Department of Environmental Quality	20	A. Yeah. Not ideal, obviously, but it did get
21	Engineering and this issue came before us,	21	the levels way down.
22	what are they going to do about the pipe	22	Q. Below the EPA level?
23	and about the health threat from it. So I	23	A. Yeah, substantially below, actually.
24	actually, and that's where this flushing	24	I should explain something.
	Page 79		Page 81
1	and bleeding was devised, and so I knew	1	Massachusetts is not like Wisconsin or
2	about this and I decided this would be a	2	Illinois. In fact, it's not like almost
3	really good subject for epidemiologic	3	any other state in the union.
4	investigation, and we were funded to you	4	Q. Well, nothing compares to Wisconsin.
5	know, along with all these other possible	5	A. Well, I'm from Wisconsin so I appreciate
6	sources of cancer, this is one that was a	6	that, but in this important respect, which
7	lot of interest to me, because one of the	7	is that every square inch of Massachusetts
8	things you'd like to do with an	8	is in a city or town. There's no such
9	epidemiological study is when you make a	9	thing as an unincorporated area. Counties,
10	comparison, you like to compare like with	10	basically, exist only on paper. So there's
11	like, and we have this natural experiment	11	351 cities and towns and almost as many
12	here, so we located where all the pipe was	12	water companies, so when you have all these
13	from records of the water companies and	13	cities and towns on Cape Cod, it's not like
14	then we did a big study by comparing cancer	14	you can do one thing to everybody at once.
15	of people who had cancer with the pipe in	15	You've got all these small jurisdictions.
16	front of their house and people who didn't	16	Q. Small jurisdictions, municipalities?
17 18	have the pipe.	17 18	A. Cities and towns, and that's all there is.
18	Now, I've simplified a little bit because we used a mathematical model	18 19	On Cape Cod it turns out there is a county
20	actually to estimate the amount of PCE that	20	health department but that's unusual. Probably more than you wanted to know
20	was leaching out of the pipe, given the	20 21	about this.
21	diameter of the pipe, the age of the pipe,	22	Q. Thank you. As part of the Cape Cod
23	and when the person moved into their house,	23	research, you're also looking at the
			· ·
24	so it's quite an elaborate methodology, and	24	drinking water aspect and the potential

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	Page 82		Page 84
1	cancer causing effect of the drinking	1	A. No.
2	water?	2	Q. Were there any opinions that you formed
3	A. That's the study I just described to you.	3	that you were asked not to provide?
4	Q. It's the same one?	4	A. No.
5	A. Yeah, because the PCE is in the drinking	5	Q. Are there any plaintiffs in the Class that
6	water, and it's in the drinking water if	6	you believe have not been exposed to PCE
7	you've got that pipe and it's not in the	7	through inhalation?
8	drinking water if you don't, so that's why	8	A. Well, I described the information that I
9	this is a giant natural experiment because	9	was given. On the basis of that
10	you might have PCE in your water and your	10	information, I can't make a determination
11	neighborhood in back of you doesn't	11	about individuals, but it's my opinion as a
12	because, and they didn't have that pipe	12	scientist that they all have substantial
13	replaced in front of their house.	13	potential for exposure, if not actual
14	So all of these studies about PCE	14	exposure.
15	that you see here cited on Page 6, those	15	Q. That's true of the non-detects, as well?
16	are all almost, I think every one of them	16	A. Yes.
17	is a study this situation of the PCE coming	17	Q. Thank you. That's all I have.
18	out of the lining of the pipe.	18	CROSS-EXAMINATION
19	Q. As an epidemiologist, you're looking at a	19	(By Mr. Condon)
20	natural setting and trying to determine if	20	Q. Did you ever provide the plaintiffs'
21	that natural setting relates to the actual	21	counsel with an itemization of your time
22	event for which you're researching?	22	that you spent?
23	A. Well, ideally, we like to do an experiment,	23	A. No, I don't.
24	which is randomly assign people to PCE	24	Q. Did you bill them?
	Page 83		Page 85
1	contaminated water and not. You can't do	1	A. I haven't billed them yet. I just have to
2	that. So you look around in the world for	2	remember to do that. I'm a horrible
3	something that's almost like a natural	3	business person and I don't do very much
4	experiment, and this is almost unique in	4	litigation anymore. I'll bill him, I'm
5	PCE studies. In fact, it is unique in PCE	5	sure.
6	studies because you have almost a natural	6	Q. So you haven't billed him yet. When you
7	experiment going on here that you can	7	provide him with a bill, do you have an
8	observe.	8	itemized bill, this amount doing this?
9	You should never ask an academic	9	A. It says one and a half days of whatever.
1	about his research. You'll never get out	10	Q. That's how you normally do it?
10			
11	of here. I'll just keep talking.	11	A. Yeah.
11 12	of here. I'll just keep talking. Q. On that note, I have no further questions	12	
11 12 13	Q. On that note, I have no further questions at this time. Thank you.	12 13	A. Yeah.Q. Okay. Thank you.MR. MANZKE: Why don't we reserve
11 12 13 14	Q. On that note, I have no further questions at this time. Thank you.MS. KREIL: I have no questions.	12 13 14	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript.
11 12 13 14 15	Q. On that note, I have no further questions at this time. Thank you.MS. KREIL: I have no questions.MS. ROSS: I just have a couple of	12 13 14 15	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.)
11 12 13 14 15 16	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. 	12 13 14 15 16	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran.
11 12 13 14 15 16 17	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. CROSS-EXAMINATION 	12 13 14 15 16 17	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran. MS. KREIL: Same, condensed and
11 12 13 14 15 16 17 18	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. CROSS-EXAMINATION (By Ms. Ross) 	12 13 14 15 16 17 18	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran. MS. KREIL: Same, condensed and e-tran.
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11 12 13 14 15 16 17 18 19 20 21	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. CROSS-EXAMINATION (By Ms. Ross) Q. I'm Becky Ross. I represent Continental Casualty Company and Columbia Casualty Company. 	12 13 14 15 16 17 18 19 20 21	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran. MS. KREIL: Same, condensed and e-tran. MS. ROSS: We'll take a condensed and e-mailed. MR. MANZKE: Condensed and e-tran.
11 12 13 14 15 16 17 18 19 20 21 22	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. CROSS-EXAMINATION (By Ms. Ross) Q. I'm Becky Ross. I represent Continental Casualty Company and Columbia Casualty Company. Were there any opinions that you were 	12 13 14 15 16 17 18 19 20 21 22	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran. MS. KREIL: Same, condensed and e-tran. MS. ROSS: We'll take a condensed and e-mailed. MR. MANZKE: Condensed and e-tran. (Whereupon the Deposition was
11 12 13 14 15 16 17 18 19 20 21	 Q. On that note, I have no further questions at this time. Thank you. MS. KREIL: I have no questions. MS. ROSS: I just have a couple of questions. CROSS-EXAMINATION (By Ms. Ross) Q. I'm Becky Ross. I represent Continental Casualty Company and Columbia Casualty Company. 	12 13 14 15 16 17 18 19 20 21	 A. Yeah. Q. Okay. Thank you. MR. MANZKE: Why don't we reserve and we can take a look at the transcript. (Discussion off the record.) MR. CONDON: Condensed and e-tran. MS. KREIL: Same, condensed and e-tran. MS. ROSS: We'll take a condensed and e-mailed. MR. MANZKE: Condensed and e-tran.

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(Pages 86 to 88)

			(Fages 00 CO 00)
	Page 86		Page 88
1	DEPONENT'S ERRATA SHEET	1	COMMONWEALTH OF MASSACHUSETTS
2	AND SIGNATURE INSTRUCTIONS	-	MIDDLESEX, ss.
3		2	WIDDLESEX, SS.
4	The original of the Errata Sheet has		L Kaller C. Datterror a Materry Dublie
	C C	3	I, Kelly G. Patterson, a Notary Public
5	been delivered to Atty. Edward J. Manzke.	4	duly commissioned and qualified within and
6	When the Errata Sheet has been	5	for the Commonwealth of Massachusetts, do
7	completed by the deponent and signed, a	6	hereby certify:
8	copy thereof should be delivered to each	7	That DAVID OZONOFF, M.D., the witness
9	party of record and the ORIGINAL delivered	8	whose deposition is hereinbefore set forth,
10	to Atty. John Busch to whom the original	9	was duly sworn by me, and that such
11	deposition transcript was delivered.	10	deposition is a true record of the
12		11	testimony given by the witness to the best
13	INSTRUCTIONS TO DEPONENT	12	of my skill, knowledge, and ability.
14		13	IN WITNESS WHEREOF, I have hereunto set my
15	After reading this volume of your	14	hand and my affixed notarial seal this 15th
_	deposition, indicate any corrections or	15	day of February, 2013.
16	changes to your testimony and the reasons	16	auj 011 columy, 2015.
-~	therefor on the Errata Sheet supplied to	17	
17	you and sign it. DO NOT make marks or	18	
1 /			
10	notations on the transcript volume itself.	19	Kelly G. Patterson
18			Notary Public
19	REPLACE THIS PAGE OF THE TRANSCRIPT WITH	20	
20	THE COMPLETED AND SIGNED ERRATA SHEET WHE		
21	RECEIVED.	22	
22			My Commission expires:
23		23	September 12, 2014
24		24	-
	Page 87		
1	ATTACH TO THE DEPOSITION OF DAVID OZONOFF, M.D.		
2	CASE: KATHLEEN McHUGH vs. MADISON-KIPP,		
3	et al.		
4	ERRATA SHEET		
	INSTRUCTIONS: After reading the transcript		
5	of your deposition, note any change or correction to your testimony and the reason		
б	therefor on this sheet. DO NOT make any marks or notations on the transcript volume		
7	itself. Sign and date this errata sheet		
8	(before a Notary Public, if required). Refer to Page 86 of the transcript for		
-	errata sheet distribution instructions.		
9	PAGE LINE		
10	CHANGE: REASON:		
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