## Exhibit 3

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            UNITED STATES DISTRICT COURT
           NORTHERN DISTRICT OF CALIFORNIA
    _____)
    IN RE: ROUNDUP PRODUCTS ) MDL No. 2741
    LIABILITY LITIGATION ) Case No. 16-md-02741-VC
5
    _____)
6
    This document relates to: )
7
    ALL ACTIONS
8
9
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11
12
               VIDEOTAPED DEPOSITION OF
13
              ALFRED NEUGUT, M.D., Ph.D.
14
                  New York, New York
15
                    August 7, 2017
16
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19
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21
22
23
  Reported by: BONNIE PRUSZYNSKI, RMR, RPR, CLR
24
  JOB NO. 127893
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10	700 Broadway	9	Exhibit 14-10 Cleveland Clinic Journal 94
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18	BY: ERIC LASKER, ESQ.	18	Cancer Incidence among Glyphosate-Exposed Pesticide
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19	, 2	20	Applicators in the Agricultural Health Study
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1	Exhibit 14-14 Cancer Epidemiology, 152	1	THE VIDEOGRAPHER: This is the
2	Biomarkers & Prevention by	2	start of media labeled number one of the
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4	McDuffie, et al	4	video recorded deposition of Dr. Alfred
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5	1992, Pesticides and Other		Products Litigation on August 7th, 2017,
6	Agricultural Risk Factors for	6	at approximately 9:01 a.m.
7	Non-Hodgkin's Lymphoma among	7	My name is Lem Lattimer. I'm the
8	Men in Iowa and Minnesota	8	legal video specialist from TSG
9	Exhibit 14-16 American Journal of 222	9	Reporting. The court reporter is Bonnie
10	Epidemiology, Reported	10	Pruszynski from TSG Reporting.
11	Residential Pesticide use and	11	Counsels, please introduce
12	Breast Cancer Risk on Long	12	yourselves.
13	Island, New York	13	MR. LASKER: Eric Lasker from
14	Exhibit 14-17 Exposure to Pesticides as 225	14	Hollingsworth LLP for Monsanto.
15	Risk Factor for Non-Hodgkin's	15	MR. HOLLINGSWORTH: Grant
16	Lymphoma and Hair Cell	16	Hollingsworth from Hollingsworth LLP for
17	Leukemia: Pooled Analysis of	17	Monsanto.
18	Two Swedish Case-control	18	MR. TRAVERS: Jeff Travers from the
19	Studies	19	Miller Firm LLC for Dr. Neugut.
20		20	MS. ROBERTSON: Pearl Robertson
21	Exhibit 14-18 Integrative assessment of 229	21	
	multiple pesticides as risk		with Weitz & Luxenberg for Dr. Neugut.
22	factors for non-Hodgkin's	22	THE VIDEOGRAPHER: Will the court
23	lymphoma among men, Occup	23	reporter please swear the witness in.
24	Environ Med 2003	24	THE WITNESS: I will affirm.
25		25	
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1	Exhibit 14-19 Non-Hodgkin's Lymphoma 235	1	ALFRED NEUGUT, M.D., Ph.D.,
	Exhibit 14-19 Non-Hodgkin's Lymphoma 235 Among Asthmatics exposed to	2	ALFRED NEUGUT, M.D., Ph.D., called as a witness, having been first
2	Exhibit 14-19 Non-Hodgkin's Lymphoma 235 Among Asthmatics exposed to Pesticides	2	ALFRED NEUGUT, M.D., Ph.D., called as a witness, having been first duly sworn, was examined and testified
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2 3 4	Exhibit 14-19 Non-Hodgkin's Lymphoma Among Asthmatics exposed to Pesticides Exhibit 14-20 An Evaluation of Glyphosate Use and the Risk of	2 3 4 5	ALFRED NEUGUT, M.D., Ph.D., called as a witness, having been first duly sworn, was examined and testified as follows: EXAMINATION
2 3 4 5	Exhibit 14-19 Non-Hodgkin's Lymphoma Among Asthmatics exposed to Pesticides Exhibit 14-20 An Evaluation of 244 Glyphosate Use and the Risk of Non-Hodgkin Lymphoma Major	2 3 4 5 6	ALFRED NEUGUT, M.D., Ph.D., called as a witness, having been first duly sworn, was examined and testified as follows: EXAMINATION BY MR. LASKER:
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Page 10 Page 12 1 (Exhibit 14-1, Deposition Notice Q. Let's mark as Exhibit 14-2 a 2 2 and Document Request marked for declaration that you had submitted early on 3 3 identification, as of this date.) in this litigation. Q. For the record, Exhibit 14-1 is a 4 (Exhibit 14-2, Declaration of 5 5 deposition notice for your deposition here Alfred Neugut marked for identification, today. And there is a list at the end, 6 as of this date.) 7 request for production of certain types of Q. Dr. Neugut, first of all, can you 8 8 documents. confirm that this is your signature on this 9 9 We have been provided by your document? 10 10 counsel with a copy of your CV and a copy of A. Yes. some billing records. But if you can review 11 11 Q. And this is dated April 28, is that 12 2015 or 2016? 12 the request for production and confirm that you do not have any other documents that 13 13 A. It looks like 2016. would be responsive to these requests. 14 Q. '16. 15 And this is a declaration that you 15 A. No. Everything that I had I sent 16 16 to Mr. Travers to forward to you. submitted setting forth your opinions as of 17 Q. And that would be your billing 17 April 28, 2016, with respect to glyphosate 18 18 and cancer; correct? records and your CV; correct? 19 19 A. I sent him a copy of a lecture that A. Yes. 2.0 I gave to the Court on Science Day a few 20 Q. I'm going to mark as Exhibit 14-3 21 months ago, so that also, I think. 21 one of the invoices that you provided for 22 Q. Anything else? 22 your time as of February 17, 2017. 23 A. Off the top of my head, I'm not (Exhibit 14-3, February 17. 2017) 23 2.4 recalling anything else that was responsive 24 Invoice, Neugut to Miller Firm marked for 25 25 identification, as of this date.) to this. Page 11 Page 13 1 1 Q. Dr. Neugut, can you identify Q. Okay. 2 2 Exhibit 14-3 as an invoice that you submitted MR. LASKER: I am not sure if we 3 received those slides from you, although with your time for services rendered in this 4 litigation as of February 17, 2017? 4 I believe we have them. 5 A. Yes. MR. TRAVERS: Yeah. I sent Heather 6 6 an e-mail asking if she needed us to Q. As of February 17, 2017, you had 7 7 resend them. spent ten hours of work in reviewing 8 documents and literature and having various Q. Dr. Neugut, just so I can be clear 9 9 starting off, am I correct in my meetings with and preparing some documents 10 understanding that prior to being retained by 10 with plaintiffs' counsel; correct? 11 plaintiffs' counsel for purposes of this 11 A. I don't recall. It is my first 12 litigation, you had not conducted any review 12 bill. 13 of the epidemiological literature with regard 13 O. As of this bill, if this bill is 14 to glyphosate and cancer? 14 accurate, as of February 2017, you had spent A. I don't believe so, not 15 15 ten hours of work on this litigation; 16 16 specifically, no. correct? 17 Q. So, you had not looked at the 17 A. As I say, I would have to see all 18 literature of NHL and glyphosate or cancer 18 my bills to know how they are laid out. I 19 and glyphosate? 19 don't have them in my head in terms of the history of this litigation and my billing, 2.0 2.0 A. No. 21 21 Q. So, it would be fair to say then but if this is the first bill, then this 22 2.2 that you had not formed any opinion with would sort of compile, although I might have 23 23 respect to any potential association between put time in previously unbilled prior to glyphosate and NHL or cancer; correct? 24 24 taking the case. 25 2.5 A. I didn't know anything about it. Q. Do you have any reason to believe,

2.0

Page 14

first of all, that your invoice for -- that you have submitted to plaintiffs' counsel for your time as of February 2017 would be inaccurate?

2.0

2.4

2.0

2.2

MR. TRAVERS: Objection, asked and answered.

- A. Not inaccurate in the sense of what I billed for my time working on the case on behalf of plaintiffs. But as I say, I wouldn't have taken the case without previously reviewing -- if I were asked to take the case, I would have spent some time on my own reviewing the literature, which I would not have billed for. So, I might have -- I'm sure that I put some time into reviewing the literature on glyphosate and lymphoma before agreeing to act as a witness.
- Q. Do you recall, sitting here today, how much time you spent reviewing literature before you agreed to work with plaintiffs' counsel in this case?
- A. I wouldn't have kept a record of that, and this is a while ago, but it would have been certainly on the order of a couple or a few hours.

Page 16

Page 17

- Q. Okay. I think I understand then. So, as of the time of this April 2016 declaration, you had reviewed the IARC monograph; correct?
- A. I wouldn't have taken the case, I think, absent that.
- Q. And it was subsequent to this declaration that you then started reviewing the underlying epidemiological literature in preparing the report.
- A. I don't know the timing of that. That would have been probably more in line with -- well, what report are we talking about now?
- Q. Your expert report in the MDL that you submitted.
- A. That would be more in conjunction with the timing for that, yes.
- Q. Okay. So, the actual review of the underlying studies, epidemiological studies, would have taken place after your April 2016 declaration.
- A. Yes.
- Q. You state -- well, let me ask it this way: Is it your opinion, Dr. Neugut,

Page 15

- Q. Do you recall how much time you had spent reviewing the literature as of the date of your April 2016 declaration, which would be approximately ten months, nine to ten months before your first bill here?
  - A. No.
- Q. Would it have been more than five hours?
- A. It would have been -- again, I'm reconstructing, going back to that time, but my -- my assumption is that at the time, I would not have taken -- my taking the case was heavily based on the IARC review, and if I had, I had read the IARC review, then -- I don't know if I am a fast or a slow reader, but it would have taken me a few hours to read, and I would have based my opinion heavily on that document, and I am assuming that would have been a few hours.

But I don't know if I particularly billed -- if my ten hours subsequently included that review, those hours, or if that was, as I say, part of my initial review prior to even taking the case, for which I didn't necessarily bill plaintiffs.

- that the IARC monograph classifying glyphosate as a probable carcinogen in and of itself provides a reliable scientific basis for you to opine that glyphosate causes NHL in humans?
- A. I think that the IARC reviews are the most authoritative reviews in the field, and I think as a starting point, yes, it's a fair starting point, and unless there is a strong reason to disbelieve them for some reason, the answer is yes.
- Q. Just to be clear, in your April 2016 declaration, at paragraph 16, you state in the second paragraph that IARC's assessment -- or second sentence of paragraph 16 --

MR. TRAVERS: Do you mean paragraph --

MR. LASKER: Let me start that again. I had the wrong number here.

Q. In your April 2016 declaration, paragraph six, the second sentence, you state quote, "IARC's assessment on glyphosate provides a reliable scientific basis for an opinion that glyphosate does cause

Page 18 Page 20 1 1 non-Hodgkin's lymphoma in humans; correct? you -- and for the record, this is, 2 2 A. And we're talking about paragraph Exhibit 14-4 is the preamble to the IARC 3 3 monographs dated 2006, that had been marked six? Q. Yes. 4 previously in this litigation, both by 5 plaintiffs' counsel and by Monsanto in 5 A. Yes. 6 6 Q. And to be clear, in reaching your various depositions. 7 7 opinion that is expressed in your expert If I could direct you to page 22 of 8 8 declaration in April 2016 that glyphosate the preamble. And at this place in the 9 9 causes non-Hodgkin's lymphoma in humans, you preamble, IARC is setting forth it various 10 10 relied solely on the IARC monograph; correct? classification schemes for -- for substances 11 A. I would not say solely, but I would 11 that they analyze; correct? 12 say heavily. 12 A. Yes. 13 Q. And for group two -- we are going Q. You had not reviewed any of the 13 14 14 underlying literature at that time, though? to go through this. Group one would be if an 15 15 A. I cannot recall. My guess is, I agent is carcinogenic to humans according to 16 16 may have looked up one or two of the papers, IARC; correct? 17 A. Yes. 17 but heavily -- but predominantly, it was the 18 18 Q. And for IARC, that category is used monograph itself. 19 when there is sufficient evidence of 19 Q. Now, as a basis for your reliance 20 on the IARC monograph, you also state in 20 carcinogenicity in humans; correct? 21 A. Yes. 21 paragraph two of your April 2016 declaration, 22 22 Q. So, group two is a category for the last sentence, that you would -- and I am 23 substances that IARC defines as being either 23 quoting from your declaration, "equate the 2.4 term 'probable' as used in the IARC monograph 24 probably carcinogenic or possibly 25 carcinogenic to humans; correct? 25 as corresponding to my understanding of the Page 19 Page 21 1 1 legal term 'within a reasonable degree of A. Yes. 2 medical certainty"; correct? 2 Q. And in its preamble, IARC states, 3 A. Yes, that's-- there I -- yes, and it's at lines 29 and 30 on page 22, that 4 4 that's what I wrote. Um-hum. the terms "probably carcinogenic" and 5 "possibly carcinogenic" have no quantitive Q. Now, IARC in its preamble states 6 6 significance; correct? that the term "probable" has no quantitative 7 7 significance. A. Correct. 8 Q. And IARC also states in its MR. TRAVERS: Objection. 9 9 O. Correct? monograph that IARC may ident- -- let me 10 10 start that again. MR. TRAVERS: Calls for a legal 11 IARC also states in its monograph 11 conclusion. 12 12 A. I don't know. that IARC may identify cancer hazards even 13 13 when risks are very low with known patterns Q. Have you ever reviewed the preamble 14 to the IARC monographs? 14 of use or exposure; correct? 15 15 A. Yes, but I don't recall offhand A. I don't know where you are reading. that sentence, but --16 16 Q. Do you know that? You have 17 17 Q. Okay. reviewed the monograph, haven't you? You 18 MR. LASKER: Let's mark that as 18 said that you have. 19 19 Exhibit 14-4. A. Yes. 2.0 Q. And does that sound familiar to 2.0 (Exhibit 14-4, World Health 21 2.1 Organization IARC Monographs on the you? 22 Evaluation of Carcinogenic Risks to 22 A. Yes. 23 Humans, Myon, France, 2006 marked for 23 Q. And just so we are clear, on page 24 24 identification, as of this date.) two of the monograph, lines 22 through 24, in 25 25 Q. And Dr. Neugut, if I could direct the preamble, IARC states exactly that, makes

Page 22 Page 24 1 exactly that point; correct? play stickball together. But I mean, I 2 2 A. Yes. certainly know him by reputation. 3 3 Q. You also state in your April 2016 O. Okav. Dr. Blair has -- what is report, and this is in paragraph six, the 4 your understanding of Dr. Blair's reputation? 5 first sentence, "In reviewing Monograph 112, A. It's outstanding. 5 6 it is my opinion that IARC continued its Q. And Dr. Blair was the chairperson 7 7 tradition of rigorous transparent analysis of Working Group 112 that conducted this 8 8 and used a sound methodological approach when analysis and evaluation of glyphosate; 9 9 reviewing the evidence on glyphosate." correct? 10 1.0 Correct? A. Yes. 11 11 A. Yes. Q. And Dr. Blair was deposed in this 12 12 litigation about the IARC working group's Q. What investigation did you conduct 13 analysis; correct? 13 prior to signing this declaration to confirm 14 14 for yourself that the Working Group 112 in A. Yes. its analysis of glyphosate had followed a 15 15 Q. And you have read that deposition; 16 16 rigorous transparent analysis and followed a correct? 17 17 sound methodological approach? A. Yes. 18 Q. Dr. Blair testified specifically 18 A. Because I read through the report 19 with respect to the Working Group 112 and 19 carefully. 20 20 glyphosate, that the working group only spent Q. Did you do anything other than 21 one or two days total in analyzing whether 21 reading the report in reaching this opinion? 22 22 glyphosate can cause cancer; correct? A. No. 2.3 MR. TRAVERS: Objection, misstates 23 Q. What is your understanding of the 2.4 24 his testimony. amount of time that the working group spent 25 A. I don't recall offhand, but I do 25 in conducting its analysis of glyphosate Page 23 Page 25 1 prior to issuing its classification? 1 recall that it was only a couple of -- they 2 2 MR. TRAVERS: Objection, calls for were evaluating several carcinogens at the 3 same time, so it was a limited amount of time speculation. 4 4 THE WITNESS: Am I supposed to on glyphosate specifically. 5 MR. LASKER: Just so we are clear, answer? 6 6 Q. Yes. because of the objection, let's mark as 7 Exhibit 14-4 -- I'm sorry, 14-5. I MR. TRAVERS: If you can. Q. Unless he tells you not to answer, 8 didn't mean to mess that up. I don't 9 9 you should answer the question. think we have to mark the declaration. 10 A. Well, the meetings run about a week 10 Let's just use this as an exhibit. 11 11 or more, but I mean, the preparation for the MR. TRAVERS: Yeah. Do you have a 12 12 meetings run weeks. 13 Q. And so, it's your understanding 13 MR. LASKER: Yes. We are not going 14 that the -- how much time then would you 14 to mark this as an exhibit. We will just 15 15 understand the working group spent in use this for the witness' reference. 16 analyzing and evaluating glyphosate to reach Q. So, if I could ask you to turn to 17 17 its classification? pages 115, or page 115, and this in the 18 A. Weeks. 18 minuscript version, so there is four pages 19 19 per page, but page 115, line 12 to line 16, MR. TRAVERS: Objection, calls for 2.0 2.0 speculation. there was a question of Dr. Blair: 21 2.1 Q. Now, you know an individual named "So, you would have maybe a day or 22 Dr. Aaron Blair? 22 two of analysis and evaluation that went 23 23 into the IARC working group A. I don't think -- I cannot -- I 24 24 classification of glyphosate; correct?" probably have met him at least once, like 25 25 years ago, but I don't know him. We don't "Answer: Roughly correct."

	Page 26		Page 28
1	Do you see that?	1	session because it did not have sufficient
2	A. Yes.	2	time; correct?
3	MR. TRAVERS: Objection. This	3	MR. TRAVERS: Objection, misstates
4	takes it out of context.	4	the evidence.
5	Q. You have no reason to doubt	5	A. I don't know.
6	Dr. Blair's testimony?	6	Q. Do you know Dr. Charles Jameson?
7	A. No.	7	A. No.
8	Q. And to provide context, if I could	8	Q. Dr. Jameson chaired the animal
9	ask you to look to page 114, lines 13 through	9	cancer bioassay subcommittee on glyphosate
10	21, here Dr. Blair is being asked about that	10	for the IARC working group. Were you aware
11	time period prior to the working group	11	of that?
12	meeting; correct?	12	A. No.
13	A. So, it's it will take me a	13	Q. Do you know that Dr. Jameson was
14	minute to orient, if I can have that.	14	deposed in this litigation about his
15	Q. That's fine.	15	subgroup's work in analyzing the animal data
16	A. Okay. Your question?	16	for the IARC monograph?
17	Q. And Dr. Blair on page 114 states	17	A. Do I know that he was deposed?
18	that while there was some assembling of data	18	Q. Yes.
19	tables prior to the working group meeting	19	A. I don't think I have a specific
20	during that one-week period, the evaluation	20	knowledge of that, no.
21	processes didn't start until the actual	21	Q. Let me show you Dr. Jameson's
22	•	22	deposition testimony. We will be going back
23	working group meeting; correct?  A. Yes.	23	
24		24	to Dr. Blair's deposition testimony at some
25	Q. And in fact, Dr. Blair resists the	25	point. You can put that to the side for the
23	suggestion that any analysis was done prior	23	moment.
	Page 27		Page 29
1	Page 27 to that one-week meeting, doesn't he?	1	
1 2		1 2	Page 29  MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review
	to that one-week meeting, doesn't he?		MR. TRAVERS: I'm just going to
2	to that one-week meeting, doesn't he?  A. I wouldn't know.	2	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review
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2 3 4 5	to that one-week meeting, doesn't he?  A. I wouldn't know.  Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table.	2 3 4 5	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so MR. LASKER: I understand that, but Dr
2 3 4 5 6	to that one-week meeting, doesn't he?  A. I wouldn't know.  Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table.  That's hardly an analysis, it's an assembly	2 3 4 5 6	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so MR. LASKER: I understand that, but Dr MR. TRAVERS: He's not going to
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	to that one-week meeting, doesn't he?  A. I wouldn't know.  Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table.  That's hardly an analysis, it's an assembly of the data." Correct?  MR. TRAVERS: Objection. I think your previous question misstates his testimony.  Q. That's what Dr. Blair testifies; correct?  A. That's what he says.  Q. And do you consider a one- to two-day review of all of the scientific evidence regarding glyphosate and cancer, and that would be not only the epidemiology but the animal studies and the genotox, to be a rigorous analysis?  MR. TRAVERS: Objection, misstates his testimony.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so MR. LASKER: I understand that, but Dr MR. TRAVERS: He's not going to have sufficient time to fully analyze Dr. Jameson's testimony to accurately answer questions. MR. LASKER: That I understand that, but Dr. Neugut is the one who offered an expert opinion that the IARC working group had put in a what was his words? rigorous analysis of the glyphosate data, and to that extent, his lack of knowledge of that process is relevant. Q. Dr. Neugut, if I could direct you to Dr. Jameson's testimony on page 191, lines 12 to 24. And whoops, I'm sorry. Lines 12 to 24 on page 191,
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	to that one-week meeting, doesn't he?  A. I wouldn't know.  Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table.  That's hardly an analysis, it's an assembly of the data." Correct?  MR. TRAVERS: Objection. I think your previous question misstates his testimony.  Q. That's what Dr. Blair testifies; correct?  A. That's what he says.  Q. And do you consider a one- to two-day review of all of the scientific evidence regarding glyphosate and cancer, and that would be not only the epidemiology but the animal studies and the genotox, to be a rigorous analysis?  MR. TRAVERS: Objection, misstates his testimony.  A. I would have no way of knowing.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so MR. LASKER: I understand that, but Dr MR. TRAVERS: He's not going to have sufficient time to fully analyze Dr. Jameson's testimony to accurately answer questions. MR. LASKER: That I understand that, but Dr. Neugut is the one who offered an expert opinion that the IARC working group had put in a what was his words? rigorous analysis of the glyphosate data, and to that extent, his lack of knowledge of that process is relevant. Q. Dr. Neugut, if I could direct you to Dr. Jameson's testimony on page 191, lines 12 to 24. And whoops, I'm sorry. Lines 12 to 24 on page 191, Dr. Jameson is referring to the fact that
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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 23	to that one-week meeting, doesn't he?  A. I wouldn't know.  Q. Well, he states at line eight, in describing what happened beforehand, "Some of the time it's just putting things in a table.  That's hardly an analysis, it's an assembly of the data." Correct?  MR. TRAVERS: Objection. I think your previous question misstates his testimony.  Q. That's what Dr. Blair testifies; correct?  A. That's what he says.  Q. And do you consider a one- to two-day review of all of the scientific evidence regarding glyphosate and cancer, and that would be not only the epidemiology but the animal studies and the genotox, to be a rigorous analysis?  MR. TRAVERS: Objection, misstates his testimony.  A. I would have no way of knowing.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	MR. TRAVERS: I'm just going to object, because Dr. Neugut didn't review or rely upon this deposition, so MR. LASKER: I understand that, but Dr MR. TRAVERS: He's not going to have sufficient time to fully analyze Dr. Jameson's testimony to accurately answer questions. MR. LASKER: That I understand that, but Dr. Neugut is the one who offered an expert opinion that the IARC working group had put in a what was his words? rigorous analysis of the glyphosate data, and to that extent, his lack of knowledge of that process is relevant. Q. Dr. Neugut, if I could direct you to Dr. Jameson's testimony on page 191, lines 12 to 24. And whoops, I'm sorry. Lines 12 to 24 on page 191, Dr. Jameson is referring to the fact that

Page 30 Page 32 1 1 line 190 -- on page 190, line nine, these available, and relied on what they did report 2 2 were data tables with respect to underlying in their monograph and what they voted on as 3 3 study data for tumor counts of 14 cancer part of their process, as part of their bioassays on glyphosate. 4 normal process. 5 5 And then we continue on to Q. Now, Dr. Jameson, you talked about 6 6 page 191, where he is asked whether he had the animal studies that IARC did discuss, and 7 access to those materials during the IARC there were four animal studies that are 8 8 working group meeting. discussed in the monograph as providing the 9 9 data upon which the working group relied in Do you see that? 10 10 reaching its conclusion or its classification A. Yes. 11 Q. And on -- further down, starting at 11 that glyphosate was a probable carcinogen; 12 line 25 on page 191, and then continuing on 12 correct? 13 13 to 192, line six, question: MR. TRAVERS: Wait. Objection. 14 14 "You did not then proceed to Wait. You say "Dr. Jameson, you talked actually review and look at the data that about." Do you mean, "Dr. Neugut, you 15 15 was provided in those supplemental 16 talked about the animal studies"? 16 17 17 tables; correct?" MR. LASKER: I'm sorry. I will 18 18 And there is an objection, and then start that again. Thank you. 19 19 Q. Dr. Neugut, you had previously in the answer: 2.0 "There was -- the amount of data in 20 one of your previous answers -- you can keep 21 21 the tables was overwhelming, and it would 22 22 not have been possible to review those, In one of your previous answers, 23 that data during the meeting." you said you relied upon what IARC described 23 24 Correct? 24 in its monograph, what the working group 25 25 described in its monograph with respect to A. Yes. Page 31 Page 33 1 1 Q. Do you believe that having the animal studies; correct? 2 insufficient time to consider all of the data 2 A. Yes. 3 on the animal cancer bioassays for glyphosate Q. And the monograph relies upon four 4 4 reflects a rigorous evaluation process? animal studies as providing the data that 5 MR. TRAVERS: Objection, misstates they used in reaching their classification; 6 6 the testimony. correct? 7 A. I would have no way of being able A. Yes. 8 8 to characterize what he was able or not able Q. Now, Dr. Jameson testified that the 9 9 to evaluate at the meeting. I mean, I think IARC working group did not actually have the 10 10 study documents for those four animal the data that was described in the monograph 11 11 was consistent with, with the report of studies. 12 12 carcinogenicity that came out of the report. MR. TRAVERS: Objection. 13 O. But just to be clear, in offering 13 O. Are you aware of that? 14 your opinion in April 2016 that glyphosate 14 A. No. 15 15 can cause NHL, in which you relied upon the MR. TRAVERS: Misstates his 16 16 rigorous process that the working group testimony. 17 engaged in, you were not aware of the fact 17 Q. Okay. Let's have you look to 18 that there was animal data tables that the 18 Dr. Jameson's deposition at page 279, lines 19 19 six to 16. And here Dr. Jameson testifies IARC working group did not review because 2.0 2.0 they didn't have time; correct? that IARC relied on summaries of the studies 21 21 MR. TRAVERS: Objection, misstates provided by either EPA or JMPR as opposed to 2.2 the testimony, and it's inconsistent with 22 the actual studies themselves; correct? 23 23 IARC monographs. A. I don't have the ability to absorb 24 24 A. Certainly, I'm not aware of whether this at this point, but it looks like that. 25 25 they had or did not have data that wasn't Q. And Dr. Jameson also acknowledges,

Page 34 Page 36 1 1 continuing on, on page 279, lines 17 through from that. 2 2 24, that the scientists who prepared those MR. TRAVERS: I mean, he just says 3 3 summaries at EPA or at the JMPR, which is that -- he references a document. We part of the World Health Organization, they 4 were just -- we don't know what document 5 5 were the ones who had actually looked at the it is. 6 underlying study documents; correct? 6 MR. LASKER: Well, maybe you should 7 7 A. I don't know where you are review the deposition testimony of 8 8 referencing. Dr. Jameson, but the testimony is very 9 Q. Lines -- page 279, line 17 through clear. 10 10 24. MR. TRAVERS: Well --11 11 A. MR. LASKER: Let me ask --12 O. And those EPA and World Health 12 MR. TRAVERS: Can you offer the 13 13 Organization scientists, in the very same document so the witness knows which one 14 14 summaries upon which IARC relied, concluded it refers to? 15 that the four studies at issue did not 15 BY MR. LASKER: 16 16 provide evidence that glyphosate causes Q. If you're -- if -- Dr. Neugut, 17 17 starting on 283, line 14, directly before the cancer; correct? 18 18 testimony I just read, Dr. Jameson is MR. TRAVERS: Objection, misstates 19 the evidence. 19 confirming that this is, the discussion is 2.0 20 Q. And if you want, I can direct you with respect to the four animal data -- four 21 21 to page 284, lines eight through 17, and why animal studies that IARC relied upon in its 2.2 don't we read that -- I will read that into 2.2 monograph; correct? 23 the record. Question to Dr. Jameson: 23 A. By now I have forgotten the 2.4 24 "And with respect to all four of question. I'm sorry. So --25 25 Q. From page 283, line 14, through these studies, the findings that IARC Page 35 Page 37 1 1 cited to as evidence in support of a 284. line 17. 2 2 sufficient evidence of carcinogenicity in A. Um-hum. 3 animals, in all of those students, the Q. Dr. Jameson states that IARC's 4 4 EPA or the JMPR had concluded that those conclusion was based upon a summary or review 5 5 findings were not related to glyphosate; document prepared, one by EPA and the other 6 6 correct?" by JMPR, and that is the question starting 7 7 line 283 on line 21, answering on 284, line There is an objection. 8 8 "Answer: That's what their seven; correct? 9 9 document indicated." A. Yes. 10 10 MR. TRAVERS: I have got the same Correct. 11 11 MR. TRAVERS: I'm going to object. objection. 12 Q. And from line eight -- page 284, 12 We don't know which EPA document this is 13 13 line eight to line 17, Dr. Jameson confirms talking about. There are several EPA 14 14 that in that review document that IARC relied documents. 15 15 MR. LASKER: Okay. We are going to upon for those four studies, the EPA or the 16 16 just note for the record the speaking JMPR concluded that the findings were not 17 17 objections and the sort of misinformed related to glyphosate; correct? 18 18 MR. TRAVERS: I have got the same objections --19 19 MR. TRAVERS: It's not misinformed. objection. 2.0 2.0 It's just unclear what document. A. Correct. 21 Q. Dr. Neugut, is it your opinion that 21 MR. LASKER: It may be unclear to 22 you. It's very clear that there was some 22 for a scientist, relying upon a summary 23 23 testimony. If you are going to continue document rather than the underlying study 24 24 itself reflects a rigorous review process? to make those sort of objections to every 25 25 question, we will have to seek relief A. I don't know what Dr. Jameson

Page 38 Page 40 relied upon, so I don't know, but I would say 1 1 account biology, et cetera, yes. 2 2 it's better of course to rely on the original Q. You agree that the epidemiology 3 3 alone is not sufficient to show a causal data. 4 4 Q. Do you agree, sitting here today, relationship between glyphosate and 5 5 non-Hodgkin's lymphoma; is that correct? with the IARC working group's assessment of 6 6 the epidemiological literature regarding A. For -- for the purposes for which 7 7 formulated glyphosate products and they were evaluating it, I would say that's 8 8 non-Hodgkin's lymphoma? correct. 9 9 A. Specifically with regard only to Q. The IARC working group also 10 10 the epidemiologic data? concluded that there was not even limited 11 11 epidemiological evidence to associate Q. Yes. 12 A. Yes. 12 glyphosate with any other type of cancer; 13 Q. The IARC working group on the 13 correct? 14 14 monograph concluded that the epidemiological A. That adds to the causal 15 15 evidence associating glyphosate with relationship. 16 16 non-Hodgkin's lymphoma was limited; correct? Q. I'm not sure I understood your 17 17 A. Was limited, it's probably even a answer. Maybe my question wasn't clear. 18 18 The IARC working group in little stronger than that, but it's on --19 19 considering cancers other than non-Hodgkin's let's say it's on the stronger side of 20 limited, but I think limited is fair. 20 lymphoma concluded that there was not even 21 21 limited evidence --Q. As defined by IARC again in that 22 22 preamble, the term "limited" means, quote, a A. Correct. 23 2.3 positive association has been observed Q. -- to support an association; 24 24 correct? between exposure here to glyphosate and 25 25 non-Hodgkin's lymphoma, for which a causal A. Yes. Page 39 Page 41 1 interpretation is credible, but chance, bias 1 Q. And you agree with that; correct? 2 2 or confounding could not be ruled out with Α. 3 3 reasonable confidence; correct? Q. So, let's break down the three 4 4 A. Purely on the basis of the qualifiers in the IARC -- in the definition 5 5 epidemiologic studies, without taking into of "limited" that we have spoken about with 6 account, say, biology, toxicology, et cetera, 6 respect to the epidemiology. 7 7 So, when you talk about the fact et cetera. 8 Q. You agree with that assessment; 8 that chance could not be ruled out, with 9 9 correct? respect to any epidemiological association 10 10 between glyphosate and non-Hodgkin's A. Yes. 11 11 Q. Now, the IARC working group had the lymphoma, that is addressing an issue that 12 12 epidemiologists deal with, with tests for option and chose not to -- well, strike that. 13 13 things like statistical significance; The IARC working group concluded 14 14 that the epidemiological evidence did not correct? 15 15 reach the level of being sufficient to A. Part of it is statistical 16 16 establish a causal relationship between significance, yes. 17 17 Q. And the way that epidemiologists glyphosate and NHL; correct? 18 18 A. I'm sorry. try to rule out chance is, they look to see 19 19 whether the -- either the odds ratios or the Q. The IARC working group determined 20 20 relative risks are above 1.0 and are that the epidemiological evidence did not 21 21 reach the level where they could find it was statistically significant; correct? 22 22 A. Yes. sufficient to show a causal relationship 23 23 Q. You would agree that for an between glyphosate and non-Hodgkin's --24 24 epidemiological study to be considered a A. Purely on the basis of the 25 25 positive study with respect to a potential epidemiologic studies, without taking into

Page 42 Page 44 1 exposure and an outcome, that study must Q. So, when a study does not show a 2 2 report an odds ratio or relative risk that is positive or a negative finding, it is 3 3 considered a null study that has no finding; above 1.0 and is statistically significant; 4 correct? 4 correct? 5 5 A. Statistical significance nowadays A. Or it's in a direction and not 6 6 is not really as much of a requirement as it quite statistically significant. 7 7 might have been in the past, so I would not Q. Let me ask you again. We will be 8 8 agree that it's totally mandated. switching from various testimony you have 9 9 offered in the past, but let's take the Q. Okay. Let me ask you, if I 10 could -- and let's mark -- we will mark this, October 22, 2014 testimony. And I'm sorry, I 10 11 a deposition transcript, but this is 11 will be referring back and forth to some of 12 12 deposition testimony that you gave in the these, so we will just have to work our way 13 13 through that. Actos litigation in January of 2013. Just to 14 14 set the -- to establish the precedent, you Here you go. 15 15 served as an expert for the Miller firm, the This is again testimony that you 16 16 same plaintiffs' counsel here today, in provided in that other Actos litigation, on 17 17 October 22, 2014, and if I could turn you to connection with the Actos litigation; 18 page, or refer you to page 117 -- I'm sorry, 18 correct? 19 19 page 113, lines 15 to 21, and just to give A. Yes. 2.0 Q. And you were deposed a number of 20 you a reference point, this is a fairly long 21 21 answer that you are providing that starts on times in that litigation, just like you are 22 page 111, but it continues to be your 2.2 being deposed here today; correct? 23 testimony through to page 113. 23 A. Yes. 24 Q. So, I'm going to ask you about some 24 And there you state that, on line 2.5 of your testimony in that litigation at 25 17 through 19, "When a study does not show a Page 45 Page 43 1 various points today. 1 positive finding, it is actually null. It 2 But if we could start just on your 2 has no finding." Correct? 3 January 7, 2013 deposition testimony, and in MR. TRAVERS: Sorry, which page is 4 4 particular, on page one -- I'm sorry, 233 of this on again? your testimony. And in particular, line nine 5 5 MR. LASKER: On page 113, from through line 13. I think I asked this 6 lines 17 through 19. 6 7 question the exact same way here today, but Q. Dr. Neugut, you testified that 8 8 the question was asked of you, "When you say "when a study does not show a positive 9 9 a positive study, are you saying a study that finding, it is actually null. It has no 10 has an odds ratio relative risk of greater 10 finding." Correct? A. Yes. 11 11 than one and is statistically significant?" And your answer is "yes"; correct? 12 12 Q. And you agree with that; correct? 13 13 A. Yes. A. Yes. 14 Q. And that is your -- you agree with 14 Q. And you would not label an exposure 15 that testimony: correct? as being associated with an outcome unless 15 16 16 A. Yes. there is a finding of an increased risk that 17 is statistically significant; correct? 17 Q. Now, when a study does not show a 18 18 positive finding, it is considered -- well, A. That's correct. 19 19 Q. Epidemiologists determine whether a strike that. 20 2.0 finding is statistically significant -- they There is also the possibility of a 21 21 negative study in which you have an odds can do that in different ways. One is based 22 ratio or relative risk below 1.0 that is 22 upon a 95 percent confidence interval; is 23 23 not -- that is also statistically that correct? 24 significant; correct? 24 A. Yes. 25 25 A. Yes. Q. And a finding would be then

	Page 46		Page 48
1	statistically significant in the positive	1	A. Yes, but that's okay. Yes, that
2	direction if the lower bound for the	2	is that's sort of an a posteriori way of
3	95 percent confidence interval is greater	3	looking at it, but yes.
4	than 1.0; correct?	4	Q. You would agree that it's not
5	A. Yes.	5	proper epidemiological methodology to measure
6	Q. Epidemiologists can also measure	6	power based on the total number of
7	statistical significance with something	7	individuals who are in the study; correct?
8	called a P value; correct?	8	A. Can you rephrase that or give me
9	A. Yes.	9	a better tell me what you mean exactly.
10	Q. And a study is statistically	10	Q. For example, if you have a
11	significant if a P value is less than 0.05;	11	case-control study, and in that case-control
12	correct?	12	study there is a certain number of
13	A. Yes.	13	individuals whose data is reviewed who had
14	Q. The size of a study can also impact	14	the outcome of had the, let's say,
15	the ability, or can impact the ability of a	15	non-Hodgkin's lymphoma. So, you have a
16	study to find a statistically significant	16	case-control study, and there is a certain
17	result; correct?	17	number of people who have non-Hodgkin's
18	A. Yes.	18	lymphoma in the study.
19	Q. So, this is measured by what	19	With respect to any one exposure
20	epidemiologists refer to as power, the power	20	measure
21	of a study; correct?	21	A. Yes.
22	A. Yes.	22	Q it would not be appropriate to
23	Q. A study that has more power will be	23	determine the power of the study based upon
24	better able to identify statistically	24	the number of individuals who were in the
25	significant associations if they exist;	25	study; correct?
	organization in they exist,		study, correct.
	Page 47		Page 49
1	correct?	1	A. The power of the study is going to
2	A. Yes.	2	be determined by both by really by the
3	Q. Epidemiologists generally give less	3	number of endpoints, by the number of people
4	weight to studies that have lower power;	4	with the disease, but also by the number of
5	correct?	5	people who are likely to be exposed.
6	A. I'm sorry, that didn't	6	Q. Right.
7	Q. Say it again? I will do it again.	7	So, with respect to a study, if you
8	A. Yeah.	8	had 10,000 people in a study but only three
9	Q. Epidemiologists, in evaluating a	9	of them were exposed to the substance at
10	study, would give it less weight if it has	10	issue, the fact that there is 10,000 people
11	low power; correct?	11	in the study wouldn't make it a powerful
12	A. Because you don't have the ability	12	study; correct?
13	to assess significance.	13	A. That's correct.
14	Q. So yes	14	Q. And it wouldn't be reasonable to
15	A. Yes.	15	call a case-control study a big study and say
16	Q low power means	16	that it has more weight just because there is
17	A. Um-hum.	17	a large number of individuals who start out
18	Q. One way to measure, sort of a	18	as potential cases in the study; correct?
19	shorthand way of measuring the power of a	19	MR. TRAVERS: Objection, calls for
20	study is to look at the width of the	20	speculation.
21	confidence intervals; correct?	21	A. So, you would have to look at each
22	A. Yes.	22	study and kind of assess it on a on its
23	Q. So, the narrower the confidence	23	own merits with regard to those parameters.
24	interval, the greater the power of the study;	24	Q. Okay. But as a general matter, you
25	correct?	25	would want to look at the number of
		1	

	Page 50		Page 52
1	individuals who are have the outcome and	1	Q. And the table indicates that this
2	have the exposure you are looking at to	2	study included 1,869 individuals with
3	determine power; correct?	3	non-Hodgkin's lymphoma; correct?
4	A. Yes.	4	MR. TRAVERS: Same objection as to
5	Q. It would not be a reasonable	5	the source of this table.
6	methodology just to look at the number of	6	A. Yes.
7	individuals in a case-control study that had	7	Q. Now, it would not be fair, though,
8	the outcome of interest; correct?	8	to suggest from this table presentation that
9	MR. TRAVERS: Objection, asked and	9	Cocco is the most powerful study looking at
10	answered.	10	glyphosate and non-Hodgkin's lymphoma;
11	A. Yes.	11	correct?
12	Q. Let me show you a table listing	12	MR. TRAVERS: Same objection to the
13	some of the glyphosate epidemiological	13	source of the table.
14	studies.	14	A. Again, you would need to know the
15	(Exhibit 14-5, Table of Studies	15	likelihood of exposure.
16	marked for identification, as of this	16	Q. Well, you know, in fact, that Cocco
17	date.)	17	was the least powerful of all of the studies
18	MR. TRAVERS: Who prepared this	18	looking at glyphosate and non-Hodgkin's
19	table?	19	lymphoma; correct?
20	MR. LASKER: We will address that	20	A. I don't have a good memory, and I
21	shortly, but I have some questions first.	21	don't know I can't relate to each paper
22	MR. TRAVERS: Can we	22	without seeing it.
23	Q. Dr. Neugut	23	Q. Okay. Let's mark your expert
24	MR. TRAVERS: I object.	24	report, because this is in your expert
25	MR. LASKER: You can object. Your	25	report.
	Page 51		Page 53
1	objection is noted.	1	MR. LASKER: And we can make this,
2	objection is noted.  MR. TRAVERS: I think it's	2	MR. LASKER: And we can make this, I'm sorry, 14-6.
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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 23	objection is noted.  MR. TRAVERS: I think it's important to know who prepared the table before answering questions about it.  MR. LASKER: That's fine.  Q. Dr. Neugut, there is a table, and these are a listing of some of the studies, I take it you are familiar with as well, with respect to glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.  Q. And this has a listing of various studies with the number of cases in the study identified; correct?  MR. TRAVERS: I'm going to still object. We don't know where this table comes from or the accuracy of the members.  Q. Dr. Neugut?  A. Yes.  Q. Now, the table lists at the very top, the study that is listed at the very top of this table is the Cocco 2013 study;	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	MR. LASKER: And we can make this, I'm sorry, 14-6.  (Exhibit 14-6, Expert Report of Albert Neugut, M.D., Ph.D. marked for identification, as of this date.)  Q. And you discuss the Cocco paper, I believe it is on pages 16 and 17 of your report.  A. Um-hum, yes.  Q. And you can refresh your recollection, but specifically on page 17, you talk about the the numbers of exposed cases and controls and the power of the study; correct?  A. Yes.  Q. And does this refresh your recollection that this study that is listed in the table 14-5 as the largest of the studies in fact was the least powerful of all the epidemiological studies looking at glyphosate in non-Hodgkin's lymphoma?  A. It didn't have much exposure, correct.

Page 54 Page 56 1 1 subjects, by itself does not provide any necessarily be totally informative. 2 2 meaningful information regarding the relative Q. This table does not provide you 3 3 power of these glyphosate studies, does it? with any information as it's presented on the MR. TRAVERS: Objection, form. 4 relative power of these studies at all; 5 5 A. Well, you can judge the power by correct? 6 the width of the 95 percent confidence 6 A. It's not complete. 7 Q. And an epidemiologist who presented interval. 8 8 Q. I understand. But if you could this table as an illustration of the relative 9 look to 14-5 in specific, the prior exhibit 9 power of these studies would not be following 10 10 that we had. a reliable epidemiological methodology; 11 A. 14-5? 11 correct? 12 Q. The table, I'm sorry. Not your 12 MR. TRAVERS: Objection, calls for 13 report, the prior exhibit, which has this 13 speculation, and takes the document out 14 table listed. 14 of context. 15 So, this table 14-5 does not 15 A. I'm -- I don't know what an 16 provide any meaningful information with 16 epidemiologist would do. I wouldn't be able 17 respect to the relative power of the 17 to assess power directly from this. Power is 18 glyphosate epidemiological studies regarding 18 based on a number of factors that go beyond 19 non-Hodgkin's lymphoma; correct? 19 the sample size. 2.0 MR. TRAVERS: Objection to form. 20 Q. Okay. You said you wouldn't know 21 A. I suppose not. It doesn't say 21 what an epidemiologist would -- you know, you 22 anything about it. are an epidemiologist; correct? You have 2.2 Q. And you would not consider this to 23 23 been trained in epidemiology? 24 be a methodologically sound approach for an 2.4 A. So, sample -- so power is not based 25 epidemiologist to take in analyzing the 25 solely on the sample size. Page 55 Page 57 1 relative power of these studies; correct? 1 Q. So, this table does not follow 2 2 A. I guess a priori it might have been standard epidemiological methodology of 3 3 a good try, but if in fact the exposures are looking at questions like power; correct? 4 4 rare, then it's -- you don't get a lot of MR. TRAVERS: Objection, it takes 5 5 power from -- even from a large study. it out of context. 6 Q. So, for an epidemiologist who had 6 A. It's not complete, I would say. 7 7 actually looked at the underlying studies and Q. You would not present the data in 8 8 understood the actual data, this would not be this way yourself; correct? 9 9 a methodologically sound way to present the A. It depends on what I wanted to show 10 data on these tables -- on these studies; 10 to someone. 11 11 correct? Q. If you wanted to talk about the 12 12 relative power of a study, you would not MR. TRAVERS: Objection to form. 13 A. The question doesn't make sense to 13 present the data this way: correct? 14 me, but -- so I can't answer the question. 14 A. It would be a beginning of showing 15 15 Q. Okay. Let me restate the question it, but it wouldn't be a totality. 16 16 Q. But you would present other data if then. 17 An expert who had reviewed the --17 you were trying to present the power of 18 an expert epidemiologist who reviewed the 18 studies: correct? 19 underlying glyphosate literature would not 19 A. That's correct. 2.0 2.0 present data in this fashion to compare the MR. TRAVERS: It's been about an 21 2.1 relative power of these studies; correct? hour, if you want to take a break. 22 MR. TRAVERS: Objection, calls for 22 MR. LASKER: Let's just put this 23 23 speculation. into context. 24 24 A. I mean, it would be a -- it might Q. Dr. Neugut, you are aware that 25 25 be one way to start, but it wouldn't plaintiffs retained another epidemiology

	Page 58		Page 60
1	expert in this litigation; correct?	1	10:06 a.m. We are off the record.
2	A. You mean someone against me?	2	(Recess taken.)
3	Q. No. Someone on the same side,	3	THE VIDEOGRAPHER: The time is
4	plaintiffs' counsel.	4	10:15 a.m. We are on the record.
5	A. Oh, plaintiffs.	5	BY MR. LASKER:
6	Q. Yes.	6	Q. So, Dr. Neugut, let's go back to
7	A. I'm sorry. Yes.	7	the limited epidemiological evidence
8	Q. Dr. Ritz?	8	THE VIDEOGRAPHER: Sir, is your
9	A. Yes.	9	mike on?
10	Q. And I have shown	10	MR. LASKER: Oh, I'm sorry. Let's
11	MR. LASKER: Let's mark this as	11	not go back. Go back in a second. Thank
12	14-6? 7, sorry.	12	you.
13	(Exhibit 14-7, Expert Report of Dr.	13	Q. We were discussing I'm sorry.
14	Beate Ritz, M.D., Ph.D. marked for	14	MR. LASKER: Is this good?
15	identification, as of this date.)	15	Q. Dr. Neugut, we were discussing the
16	Q. So, just to confirm, now, this is	16	limited epidemiological evidence with respect
17	Dr. Ritz's expert report that she submitted	17	to glyphosate and non-Hodgkin's lymphoma, and
18	in this litigation, and just to confirm, if	18	one of the other factors that you mentioned
19	you could turn to page 15.	19	is that bias and confounding could not be
20	A. Fifteen?	20	excluded as an explanation for the findings
21	Q. Of Dr. Ritz's expert report. And	21	in those studies; correct?
22	on the top of page 15, Dr. Ritz states, "In	22	A. I don't believe I mentioned that,
23	reviewing the literature, the sample sizes,	23	but
24	and especially the number of cases, should be	24	Q. That is the definition of
25	noted because of their bearing on statistical	25	"limited"; correct? That bias and
	noted because of their bearing on statistical		innica , correct: That olas and
	Page 59		Page 61
1	significance and the width of confidence	1	confounding could not be ruled out as an
2	intervals." Correct?	2	explanation for the findings; correct?
3	A. Yes.	3	A. So, again, we are now going along
4	Q. And she states, "Because many of	4	with the IARC definition of you know, with
5	the smaller studies had suggestive findings	5	the IARC definition of "limited," yes.
6	but wide confidence intervals, it is	6	Q. And we talked about your your
7	particularly important to instead consider	7	testimony regarding the limited definition
8	pools and meta-analysis that summarize across	8	of
9	these smaller studies and not only provide a	9	A. Um-hum.
10	much larger sample size but may allow us to	10	Q the glyphosate epidemiology;
11	assess NHL subtypes with sufficient	11	correct?
12	precision." Correct?	12	A. Purely on the basis of the
13	A. Yes.	13	epidemiologic data.
14	Q. And then it states, "Here I show	14	Q. Right.
15	the sample sizes of each human study of	15	A. Correct, um-hum.
16	glyphosate in non-Hodgkin's lymphoma";	16	Q. So, looking just at the
17	correct?	17	epidemiological data, bias and confounding
18	A. Yes.	18	cannot be excluded as an explanation for the
19	Q. And the table that Dr. Ritz then	19	findings in those studies; correct?
20	presents in her expert report is the exact	20	A. Yes.
21	same table that has been marked as	21	Q. And these are additional and
22	Exhibit 14-5; correct?	22	separate concerns that are not addressed by
23	A. Yes.	23	measures of statistical significance;
24	MR. LASKER: We can take a break.	24	correct?
25	THE VIDEOGRAPHER: The time is	25	A. I I would say that they are all

Page 62 Page 64 1 1 intertwined and bound together. It's hard (Exhibit 14-8, ASCO-SEP Medical 2 2 Oncology Self-Evaluation Program, Third to --3 3 Q. Okay. Edition Excerpt marked for 4 A. To say -- it's hard to separate one 4 identification, as of this date.) 5 5 from the other. That's going back to -- to --Q. Okay. Let me restate --6 Not too far. I think this is 2014 7 A. This is all a -- I think in or so. 8 8 epidemiologic thinking, you can't so easily A. You could be reading the -- I'm up take one thread and separate it from the 9 9 to the sixth edition now. You guys are out 10 10 other threads. of date. 11 11 Q. Let me restate the question. Q. It's hard to get these. 12 A calculation of statistical 12 But in any event, just for the 13 significance does not answer the question 13 record, chapter -- this is a book produced by about whether the underlying study has issues 14 ASCO-SEP Medical Oncology Self-Evaluation Program. And this is, as you note, the third 15 with bias or confounding; correct? 15 16 A. Correct. 16 edition, and I have copied here chapter one, 17 Q. And a finding of a statistically 17 which is the chapter that you prepared on 18 significant association by itself does not 18 epidemiology and prevention; correct? 19 mean that there is a cause and effect between 19 A. Yes. 2.0 an exposure and the outcome of interest; 20 Q. And in this chapter, you discuss a 21 correct? 21 number of issues, including how to properly 22 A. Correct. 22 evaluate epidemiological data; correct? 23 Q. And that's because although a 23 A. Yes. 24 statistical -- a statistically significant 2.4 Q. And on page five, you were 25 association may exist, there is always the 25 discussing the issue of confounding in Page 63 Page 65 1 1 concern that the finding may reflect bias in connection with smoking and asbestos and lung 2 the way that the study was conducted or the 2 cancer, I believe. In the middle of that 3 3 presence of confounding factors; correct? first column, the first full paragraph that 4 4 A. If we are talking about a single starts, "In analytical epidemiology, 5 study, yes, um-hum. 5 observational studies are carried out." 6 Q. Confounding factors are factors 6 Do you see that? 7 7 that are associated with both exposure and A. Yes. 8 8 the outcome, and therefore could lead to a Q. And at the end of that paragraph, 9 9 reported association that is not truly a you state, last sentence, "It is mandatory in 10 relationship between the two, exposure and 10 a study that looks at this exposure and 11 11 outcome to collect smoking information so outcome; right? 12 A. Yes. 12 that it can be statistically controlled and 13 Q. When an epidemiological study is 13 the individual effects of asbestos exposure 14 conducted, it's therefore mandatory that the 14 can be appropriately measured." Correct? 15 study collect information on potential 15 A. Yes. 16 confounders, so that the analysis can be 16 Q. And so, there are circumstances in 17 controlled to measure the -- to properly 17 which you agree that it is mandatory to 18 measure the effect of the exposure of 18 collect data on potential confounders; 19 interest: correct? 19 correct? 20 A. "Mandatory" is a strong word. 2.0 A. I think that that is true. So, 21 "Desirable" I think would be a better word. 21 again, are you asking me a question? 22 Q. Okay. Let's mark -- this may be 22 Q. I just did. I think that was a 23 taking you back a ways, a little ways. 23 question, and you are answering, yeah. 24 MR. LASKER: Let's mark this as 24 A. So again, I mean, I think the 25 14-8. 25 answer is contextual. You know, let's say

2.0

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that the -- how mandatory it is, is a contextual issue, and I would say if we are talking about asbestos, smoking and lung cancer, then where you have a risk factor which has a relative risk of ten, then yes, doing an asbestos study with lung cancer and not taking into account cigarette smoking is a very -- would be -- would be difficult -- or would be mandatory there or -- but that doesn't mean that in every instance, you can take into account every confounding factor. That would be almost impossible in real life.

And so, that's why I say it's desirable in many instances to take into account confounders, and it's done to varying degrees under different circumstances. But sure, one wants to take into account confounders to the degree that it's possible.

Q. Do you agree -- and we can go back to his deposition testimony if you want, but do you agree with Dr. Blair that there is evidence of an increased risk of non-Hodgkin's lymphoma in farmers that existed prior to the introduction of glyphosate?

his prior testimony.

- A. Well, to some degree by -- if it's possible, yes.
- Q. So, for example, any epidemiological analysis that is trying to properly measure a potential association between glyphosate and non-Hodgkin's lymphoma should be adjusted to control for potential confounding effects of exposures to other pesticides; correct?

Page 68

Page 69

MR. TRAVERS: Objection, calls for speculation.

- A. Well, other pesticides that are known to cause lymphoma.
- Q. And you, in fact, make that point a number of places in your expert report, that an epidemiological analysis of glyphosate and non-Hodgkin's lymphoma should control for exposures to these other pesticides; correct?
- A. To the degree that it's possible, yes.
- Q. Now, there are standard epidemiological methods that are used to try and adjust for confounding; correct?
  - A. Yes.

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A. Yes.

2.0

2.0

Q. So, there is something going on with farmers and their exposures that is leading to an increased risk of non-Hodgkin's lymphoma that we know for a fact is not glyphosate; correct?

A. Yes.

- Q. So, farming, to the extent that glyphosate exposure is associated with farming, which is a fair assumption; correct? Farmers use glyphosate; correct?
  - A. Yes.
- Q. So, farming or at last some other farming exposures would be confounders of any epidemiological analysis of glyphosate in non-Hodgkin's lymphoma; correct?
  - A. Yes.
  - Q. For -- strike that.

So, you agree that it would be mandatory or at least extremely desirable in trying to reach an epidemiological finding with respect to glyphosate and non-Hodgkin's lymphoma to control for these potentially confounding other farming exposures; correct?

MR. TRAVERS: Objection, misstates

Q. So, there is -- one method is to do some statistical analyses or regression analyses to be able to adjust for exposures to other risk factors; correct?

MR. TRAVERS: Objection, compound question.

- A. Yes.
- Q. Another method is to conduct a stratified analysis; right?
  - A. Define that.
- Q. Okay. So, in a stratified analysis, you compare -- you look at the odds ratios of individuals with exposure to the substance you are looking at, but not a confounding exposure, and you also have a measure that has it where they are exposed to that substance and the other factor. You have one that doesn't have the confounding and the other that does. Correct?
  - A. That could be done.
- Q. So, the -- we talked about statistical significance. We talked about confounding. The third issue that is raised with respect to limited epidemiological evidence is bias; correct?

Page 70 Page 72 1 1 A. I don't know. Q. Given the choice between these two 2 2 Q. Okay. Let me go back. The study designs, most people prefer cohort 3 3 definition of "limited" that we have talked studies, because the individuals in the study 4 4 about for the epidemiological evidence in are unbiased at the beginning of the study 5 5 this case, for glyphosate and non-Hodgkin's when you get your data; correct? 6 6 lymphoma, cannot exclude the possibility of MR. TRAVERS: Objection, calls for 7 7 bias: correct? speculation. 8 8 A. I would say that in general, one A. Yes. 9 9 prefers cohort studies to case-control Q. How would you define the concept of 10 10 studies, for the reason you give, but the bias in an epidemiological study? 11 11 A. Every study has bias. reality is that the truth is, it's the 12 12 O. What is bias, just sort of the lay quality with which the studies are conducted 13 13 perspective? that in the end determine which one is really 14 14 the better one. A. Bias is a directional error. There are errors in every study. We are human 15 15 Q. But just to confirm, as a general 16 16 beings, so every study, particularly in matter, most people prefer a cohort study, 17 humans, that is conducted, has errors 17 given the choice between the two, because 18 18 inherent in it. Every study, observational people are unbiased at the beginning of the 19 19 study when you get your data; correct? studies in particular. MR. TRAVERS: Objection, asked and 2.0 So, the errors can be random or the 20 21 21 answered, calls for speculation. errors can be directional. So, bias are 22 22 A. I would say that -- let's say that directional errors where there is -- where 23 cohort studies are preferred. I'm not sure I 23 the -- because of the nature of the error, it 24 gives a tilt to the estimate that you get for 24 would agree with -- precisely with the reason 25 the odds ratio, for the risk ratio, at the 25 that you are giving, but the answer is that Page 71 Page 73 1 1 the cohort studies are generally preferred. end. It tends to give it a -- either a 2 2 positive or a negative result because of the Q. Okay. Let's go back to your 3 3 nature of the responses that the subjects January 7, 2013 deposition. That should 4 4 still be in front of you. It's going to be give. 5 5 I mean, the truth is error is bad. one of these transcripts. I think it's the 6 but whether it's directional -- well, you can 6 top one there. Yeah. 7 7 smile, but error -- nondirectional error is A. Did I misquote myself? 8 8 bad also, but biased error is worse than --O. You disagreed with yourself a 9 9 little bit, but -than non-biased error. 10 O. And biased error is what you 10 MR. TRAVERS: Objection, move to 11 11 defined as a directional error. strike. 12 12 A. Right. Q. Let's look at page 174 in your 13 Q. And a directional error means that 13 deposition. 14 you have a reported odds ratio, a risk ratio 14 A. Is it -- is this the document? 15 that is actually not reflective of the true 15 Q. The January 7 one, yeah. It should 16 association, because it has been artificially 16 have January. 17 shifted in a certain direction, either higher 17 Page 174, lines seven through ten, 18 18 or lower; correct? and I believe I quoted you correctly. "Most 19 A. Yes. 19 people prefer a cohort study, given the 20 O. Now, in your expert report, you 20 choice between the two, mainly because the 21 discuss two study designs for observational 21 people are unbiased at the beginning of the 22 epidemiology, cohort and case-control 22 study when you get your data." Correct? 23 studies, that can be subject to different 23 MR. TRAVERS: Objection. You 24 types of biases; correct? 24 didn't read the full answer. 25 A. Yes. 25 A. So, yes. No, I'm not disagreeing

	Page 74		Page 76
1	with what I said four years ago, but if you	1	Is that correct?
2	are asking me as I sit here now why people	2	A. Temporality is very rarely I
3	prefer a cohort to a case-control study,	3	would have to say uncommonly a major a
4	there are other reasons.	4	major concern.
5	Q. What other reasons are there that	5	Q. Let's we will circle back to
6	people prefer a cohort study to a	6	that. Let me just continue from your report.
7	case-control study?	7	In your report you mentioned that
8	A. I think it's a more naturalistic	8	the main difficulty with cohort design is
9	it's more naturalistic.	9	that they are expensive and time-consuming,
10	Q. That is because you are actually	10	particularly with outcomes like cancer;
11	following people over time to see outcomes?	11	correct?
12	A. Just it's prospective. I think	12	A. Yes.
13	it's prospective as opposed to retrospective.	13	Q. But as compared to a cohort study,
14	Q. And given the choice between the	14	a case-control study is more susceptible to
15	two study designs, a prospective study design	15	bias; correct?
16	is	16	A. They are both susceptible to bias,
17	A. It's more natural. It's the	17	just different biases.
18	natural order of life.	18	Q. Let's look at your expert report.
19	Q. And as an epidemiologist, that is	19	A. I will say they are both
20	preferable in the study design?	20	* *
21	A. Again, we are talking sort of do	21	susceptible to error, just different error.
22	you prefer apples or do you prefer pears, but	22	Q. Your expert report, which I think
23		23	was 14-6. It should be still in front of
24	again, whether you like apples or pears, the	24	you, Dr. Neugut.
25	truth is, when you look at the fruit, the one	25	MR. LASKER: If you can give him
23	that has the bruises on it is the one you are	23	his expert report.
	Page 75		Page 77
1			
1	not going to eat. So, the quality of how you	1	O. It's 14-6. They should be in
2	not going to eat. So, the quality of how you carry out the study is ultimately a bad	1 2	Q. It's 14-6. They should be in order.
	carry out the study is ultimately a bad		order.
2	carry out the study is ultimately a bad cohort study is not as good as a good	2	order. No, you can keep it. I have my own
2	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.	2 3	order. No, you can keep it. I have my own copy.
2 3 4	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality	2 3 4	order. No, you can keep it. I have my own copy. A. Sorry.
2 3 4 5	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.	2 3 4 5	order. No, you can keep it. I have my own copy. A. Sorry. Q. And just on page eight of your
2 3 4 5 6	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are.	2 3 4 5 6	order.  No, you can keep it. I have my own copy.  A. Sorry. Q. And just on page eight of your expert report well, pages seven through
2 3 4 5 6 7	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are.  But I'm saying that	2 3 4 5 6 7	order. No, you can keep it. I have my own copy. A. Sorry. Q. And just on page eight of your expert report well, pages seven through nine, you are comparing the cohort study
2 3 4 5 6 7 8	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are.  But I'm saying that  Q. I want to make sure I got your full	2 3 4 5 6 7 8	order.  No, you can keep it. I have my own copy.  A. Sorry. Q. And just on page eight of your expert report well, pages seven through
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are. But I'm saying that  Q. I want to make sure I got your full answer, though, because you had stated that there is testimony about cohort studies, the individuals are unbiased at the beginning of the study.  A. Um-hum.  Q. That was one. And two, you mentioned that cohort studies are more naturalistic than case-control studies. Are there  A. Again, this brings up the issue of temporality, but again, temporality is not usually a major issue.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	order.  No, you can keep it. I have my own copy.  A. Sorry.  Q. And just on page eight of your expert report well, pages seven through nine, you are comparing the cohort study design to the case-control study design; correct?  A. Yes.  Q. And at the bottom of page eight, with respect to case-control studies, you state that a disadvantage of case-control studies, as compared to cohort studies, is that they have an increased susceptibility to bias; correct?  A. Yes.  Q. For example, one disadvantage of a case-control study that you don't have with cohort studies generally is the possibility
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are. But I'm saying that  Q. I want to make sure I got your full answer, though, because you had stated that there is testimony about cohort studies, the individuals are unbiased at the beginning of the study.  A. Um-hum.  Q. That was one. And two, you mentioned that cohort studies are more naturalistic than case-control studies. Are there  A. Again, this brings up the issue of temporality, but again, temporality is not usually a major issue.  Q. Okay. So, with temporality, if I	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	order.  No, you can keep it. I have my own copy.  A. Sorry. Q. And just on page eight of your expert report well, pages seven through nine, you are comparing the cohort study design to the case-control study design; correct?  A. Yes. Q. And at the bottom of page eight, with respect to case-control studies, you state that a disadvantage of case-control studies, as compared to cohort studies, is that they have an increased susceptibility to bias; correct?  A. Yes. Q. For example, one disadvantage of a case-control study that you don't have with cohort studies generally is the possibility of recall bias; correct?
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are. But I'm saying that  Q. I want to make sure I got your full answer, though, because you had stated that there is testimony about cohort studies, the individuals are unbiased at the beginning of the study.  A. Um-hum.  Q. That was one. And two, you mentioned that cohort studies are more naturalistic than case-control studies. Are there  A. Again, this brings up the issue of temporality, but again, temporality is not usually a major issue.  Q. Okay. So, with temporality, if I understand correctly, a cohort study allows	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	order.  No, you can keep it. I have my own copy.  A. Sorry. Q. And just on page eight of your expert report well, pages seven through nine, you are comparing the cohort study design to the case-control study design; correct?  A. Yes. Q. And at the bottom of page eight, with respect to case-control studies, you state that a disadvantage of case-control studies, as compared to cohort studies, is that they have an increased susceptibility to bias; correct?  A. Yes. Q. For example, one disadvantage of a case-control study that you don't have with cohort studies generally is the possibility of recall bias; correct?  A. Have less concern for recall bias,
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	carry out the study is ultimately a bad cohort study is not as good as a good case-control study, and vice-versa, you know.  Q. We are going to look at the quality of the studies.  A. No, I understand, I'm sure we are. But I'm saying that  Q. I want to make sure I got your full answer, though, because you had stated that there is testimony about cohort studies, the individuals are unbiased at the beginning of the study.  A. Um-hum.  Q. That was one. And two, you mentioned that cohort studies are more naturalistic than case-control studies. Are there  A. Again, this brings up the issue of temporality, but again, temporality is not usually a major issue.  Q. Okay. So, with temporality, if I	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	order.  No, you can keep it. I have my own copy.  A. Sorry. Q. And just on page eight of your expert report well, pages seven through nine, you are comparing the cohort study design to the case-control study design; correct?  A. Yes. Q. And at the bottom of page eight, with respect to case-control studies, you state that a disadvantage of case-control studies, as compared to cohort studies, is that they have an increased susceptibility to bias; correct?  A. Yes. Q. For example, one disadvantage of a case-control study that you don't have with cohort studies generally is the possibility of recall bias; correct?

Page 78 Page 80 1 for example, of NHL, people with NHL, are correct? 2 2 more likely to recall prior exposures than MR. TRAVERS: Objection, compound 3 healthy controls that don't have the disease; 3 question. 4 correct? 4 A. I don't understand the point. 5 5 A. Yes. Q. Okay. If there is, in a Q. Recall bias is not an issue in 6 case-control study, some difference in the 7 7 cohort studies because the study population selection of cases or controls that impact 8 8 is followed prospectively and the the likelihood of exposure, that can 9 9 investigators gather the exposure information introduce a bias into the study; correct? 10 10 prior to any cancer diagnosis. I'll do it MR. TRAVERS: Objection, calls for 11 11 speculation. 12 Recall bias is not an issue in 12 A. Again, I'm not following the 13 13 cohort studies because the study population question easily. 14 14 is followed prospectively and the Q. In a case-control study --15 investigators gather exposure information 15 A. Um-hum. 16 16 prior to any cancer diagnosis; correct? Q. -- if there is some difference in 17 17 A. Recall bias is much less or not an the selection method or the selection of 18 18 issue, ves. cases and controls that is associated with 19 19 the exposure of interest, that would create a Q. It's not an issue at all; correct? 20 A. Not in the way it is in a 20 selection bias: correct? 21 case-control study, that's correct. 21 MR. TRAVERS: Objection, calls for 22 O. Case-control studies are also more 22 speculation. 23 23 prone to selection bias than cohort studies; A. That would be -- that would be 24 correct? 24 extraordinarily uncommon, if I'm 25 25 understanding correctly what you are asking, A. Yes. Page 79 Page 81 1 1 Q. Selection bias can occur when a and I don't think it would be applicable in 2 selection of individuals into a study is 2 this particular -- I don't think it would be 3 based both on the disease status and their applicable in -- at least in the context of 4 4 exposure status; correct? what we are talking about. A. I'm sorry, say that again. 5 O. Okay. But if there was some 6 Q. Selection bias can occur when 6 difference in the selection of cases or 7 7 selection of individuals into a study is controls in a cohort study that was 8 related both to their disease status and to associated with the likelihood of exposure, 9 9 their exposure status. that would create a selection bias; correct? 10 A. It's possible. 10 MR. TRAVERS: Objection, asked and 11 11 answered. Q. And with a case-control study, you 12 are specifically selecting subjects based 12 A. Yes, it could, but as I say, I 13 upon their disease status. That's how you 13 don't think it would be relevant in the 14 choose the cases: correct? 14 context. There might be exposures and 15 15 outcomes where that might play a role in a A. Yes. 16 16 Q. So, that takes you halfway to where case-control study -- we're talking now of 17 17 case-control studies or -you could have a selection bias problem; 18 right? You have one of the --18 O. Um-hum. 19 19 A. You have to talk louder. A. But I don't think that would be 2.0 20 Q. That would take you halfway to applicable here. 21 21 where you could have a selection bias Q. If there was a difference in the 22 22 problem. You are already selecting based response rate for inclusion in the study 23 23 upon disease, so if there is anything in the between cases and controls, in other words, 24 24 cases participate in a study at a higher methodology that creates selection based upon 25 25 exposure, you have a selection bias issue; likelihood than controls, that can raise a

concern about selection bias; correct?  MR. TRAYERS: Objection, calls for speculation.  A. Yes, but then you might not know the arrow could go either way.  Q. A cohort study - strike that.  In your expert report, you talk about two types of biases with - that can occur in a cohort study, and there is lots and lots of publications - MR. LASKER: - which hy design is a study design.  A. Yes.  Q. And one method - and loss to follow-up; correct?  A. Yes.  Q. And one method - and loss to follow-up is, own are following them prospectively and you want to know what happens to them prospectively, and if ten years from now you lose track of that person, you can't track what happened to them, you have such a database, and that so follow-up, is if they have another source of information for outcomes, like a hospital database or a Medicare database, to be able  Page 83  to track the outcome of those individuals.  Q. But when you do have such a database, but hat is often difficult with free living individuals.  Q. But when you do have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. Yes.  Q. And with respect to the database?  A. In a large cohort study, you hope you have such a database, but that is often difficult with free living individuals.  Q. But when you do have such a database, in fact; they were able to continue to track the where the registry is.  Q. And with respect to the MR. LASKER: The Agricultural Health Study, that was the case, in fact; they were able to continue to track the database?  A. Yes.  Q. From the volume of the service database, and in particular the AHS study had that that addresses this concern of loss to follow-up; correct?  A. Yes.  Q. And with respect to the database?  A. Yes.  Q. And with respect to the fact; they were able to continue to track thought the database?  A. Yes.  Q. You also state - which by design is a study, which is that the knowledge of the - of the exposure affects the - affects the officently when you		Page 82		Page 84
and the subject to detection observer bias.  MR. TRAVERS: Objection, calls for speculation.  A. Yes, but then you might not know which way the — again, the direction of the arrow could go either way.  Q. A cohort study — strike that. In your expert report, you talk about two types of biases with — that can occur in a cohort study, and the first is loss to follow-up; correct?  A. Yes.  Q. And one method — and loss to follow-up; correct?  A. Yes.  Q. And one method — and loss to follow-up; correct?  A. Yes.  Q. And one method — and loss to follow-up; correct?  A. Yes.  Q. De Roos 2005?  A. Yes.  Q. Okay, You also state that cohort studies may be subject to detection observer bias.  A. Im sorry?  Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. Im sorry?  A. Is na large cohort study.  A. Is have you were going to ask me that.  Page 83  to track the outcome of those individuals prospectively; correct?  A. In a large cohort study, you hope you have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. A. In a large cohort study, you hope you have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. A. So long as the people stay in the area where the registry is.  Q. And with respect to the Agricultural Health Study, that was the case, in fact; they were able to continue to track those individuals through the database?  A. Yes.  Q. You also state —  A. Im sefering to the —  Q. De Roos 2005?  A. Yes.  Q. In your expert report, you say that cohort studies may be subject to detection observer bias. What is that?  A. Is have you were going to ask me that.  Q. If you don't know, that's fine.  This is mentioned in your expert report on page eight; right?  A. That — it's basically the — it's the complement to what you — we talked about earlier with regard to the case-control studies.  A. Yes.  Q. And with respect to the fall the propertin	1		1	
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4 A. Yes, but then you might not know which way the — again, the direction of the arrow could go either way.  7 Q. A cohort study — strike that. 8 In your expert report, you talk about two types of biases with — that can occur in a cohort study, and the study, and the sis lots and lots of publications — MR. TRAVERS: Okay.  8 In your expert report, you talk about two types of biases with — that can occur in a cohort study, and the sis to follow—up; correct?  11 A. Yes. 12 A. Yes. 13 Q. And one method — and loss to follow—up; syou are following them prospectively, and ou want to know what happens to them prospectively, and if ten years from now you lose track of that person, you can't track what happened to them, you have a loss to follow—up; correct? 20 A. Yes. 21 Q. So, one method that epidemiologists can use to reduce the problem of loss to follow—up; correct? 22 can use to reduce the problem of loss to follow—up; if they have another source of information for outcomes, like a hospital database or a Medicare database, to be able  1 to track the outcome of those individuals prospectively; correct? 2 A. In a large cohort study, you hope you have such a database, but that is often difficult with free living individuals. 4 Q. But when you do have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow—up; correct? 3 A. La la large cohort study, you hope you have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow—up; correct? 4 A. A. So long as the people stay in the area where the registry is. 5 Q. Ond with respect to the Agricultural Health Study, that was the case, in fact; they were able to continue to track those individuals through the database? 4 A. Yes.  Q. If you don't know, that's fine.  This is mentioned in your expert report on page eight; right?  A. That — it's basically the — it's the exposure affects the — affects the fine prospectively in the area where the registry is.  Q. And with respect to the	3	•	3	
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In your expert report, you talk about two types of biases with that can occur in a cohort study, and the first is loss to follow-up; correct?  A. Yes.  Q. And one method and loss to follow-up is, you are following them prospectively and you want to know what happens to them prospectively, and if ten years from now you lose track of that person, you can't track what happened to them, you have a loss to follow-up; correct?  A. Yes.  Q. So, one method that epidemiologists can use to reduce the problem of loss to follow-up, is if they have another source of information for outcomes, like a hospital database or a Medicare database, to be able  Page 83  to track the outcome of those individuals prospectively; correct?  A. In a large cohort study, you hope you have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. A. Ses. Q. But when you do have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. A. Ses. Q. But when you do have such a database, and in particular the AHS study had that, that addresses this concern of loss to follow-up; correct?  A. A. Yes. Q. And with respect to the Agricultural Health Study, that was the case, in fact; they were able to continue to track those individuals through the database? A. That referring to the Q. Deav beloe to detection observer bias.  MR. TRAVERS: I just want to just an objection. When you say "AHS," are you referring to De Roos 2005 or MR. LASKER: The Agricultural Health study. That would be De Roos 2005 as well, yes. The study is the study.  MR. TRAVERS: Well, it's two  MR. TRAVERS: Well, it's two	7		7	*
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occur in a cohort study, and the first is loss to follow-up; correct?  A. Yes.  Q. And one method – and loss to follow-up is, you are following them prospectively and you want to know what happens to them prospectively, and if ten you can't track what happened to them, you have a loss to follow-up; correct?  A. Yes.  Q. Okay. You also state that cohort studies may be subject to detection observer bias.  A. I'm sorry? Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. I'm sorry? Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. I'm sorry? Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. I'm sorry? Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. I'm sorry? Q. In your expert report, you say that cohort studies may be subject to detection observer bias.  A. I'm sorry? A. That - it's basically the	9		9	, ,
11 Loss to follow-up; correct? 12 A. Yes. 13 Q. And one method – and loss to 14 follow-up is, you are following them 15 prospectively and you want to know what 16 happens to them prospectively, and if ten 17 years from now you lose track of that person, 18 you can't track what happened to them, you 19 have a loss to follow-up; correct? 20 A. Yes. 21 Q. So, one method that epidemiologists 22 can use to reduce the problem of loss to 23 follow-up, is if they have another source of 24 information for outcomes, like a hospital 25 database or a Medicare database, to be able 26 prospectively; correct? 27 A. In a large cohort study, you hope 28 you have such a database, but that is often 29 database, and in particular the AHS study had 30 that, that addresses this concern of loss to 31 follow-up; correct? 32 A. In a large cohort study, you hope 44 you have such a database, but that is often 45 difficult with free living individuals. 46 Q. But when you do have such a 46 database, and in particular the AHS study had 47 that, that addresses this concern of loss to 49 follow-up; correct? 40 A. As long as the people stay in the 41 area where the registry is. 40 Q. And with respect to the 41 area where the registry is. 41 Q. And with respect to the 42 disposs subsequently. So show they are diagnosed subsequently. 41 Q. That issue, detection observer 42 disposs subsequently. So show they are diagnosed subsequently. 42 Q. You also state	10	• •	10	
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Q. Okay. You also state that cohort follow-up is, you are following them prospectively and if ten years from now you lose track of that person, you can't track what happened to them, you have a loss to follow-up; correct?  A. Yes.  Q. So, one method that epidemiologists can use to reduce the problem of loss to follow-up, is if they have another source of information for outcomes, like a hospital database or a Medicare database, to be able  Page 83  to track the outcome of those individuals prospectively; correct?  A. In sure you were going to ask me that.  Page 85  to track the outcome of those individuals prospectively; correct?  A. In a large cohort studies may be subject to detection observer bias. What is that?  A. I knew you were going to ask me that.  Co. If you don't know, that's fine.  This is mentioned in your expert report on page eight, right?  A. That it's basically the it's  Page 85  the complement to what you we talked about earlier with regard to the case-control study, which is that the knowledge of the of the exposure affects the affects the diagnosis subsequently. So, it's sort of the prospective equivalent of what you were calling earlier what we were calling earlier selection or diagnostic bias, that knowing, for example, that someone was exposed to to an exposure, might influence how they are diagnosed subsequently.  A. Yes.  Q. You also state  MR. TRAYERS: I just want to  just an objection. When you say "AHS,"  A. R. I knew you also state that cohort studies may be subject to detection observer bias. What is that?  A. I knew you were going to ask me that.  A. I knew you were going to ask me that.  A. I knew you were going to ask me that.  A. I knew you were soling to ask me that.  A. I knew you were dispit to chection observer bias. What is that?  A. That it's basically the it's diagnosis subsequently. So, it's sort of the grow and that, that addresses this concern of loss to follow-up; correct?  A. As long as the people stay in the area where the registry	12		12	•
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	Page 86		Page 88
1	Q. I'm just trying to clarify that	1	College of Physicians entitled
2	that issue, detection	2	"Meta-Analysis: Use of combined oral
3	A. Right. So	3	contraceptives in the past 10 years is
4	Q. Sorry. Detection observer bias is	4	associated with an increased risk for breast
5	not a concern with the Agricultural Health	5	cancer."
6	Study; correct?	6	
7	A. I would probably not rate it as a	7	MR. TRAVERS: I just have one
8	ž *	8	question. Is this just the abstract or
9	major bias in the analysis of the outcomes.	9	is there a full study?  MR. LASKER: This is the full
10	Q. It's not any bias. I mean, there	10	
11	is no issue of people being diagnosed with	11	document. It's a commentary.
12	non-Hodgkin's lymphoma based upon their	12	MR. TRAVERS: Okay.
13	exposure; correct?	13	Q. And on page three of your
	MR. TRAVERS: Objection to form.	14	commentary, or three of four, the first
14	A. I would doubt it.	15	the second paragraph, I'm sorry, you state:
15	Q. Now, in its conclusion that the	16	"As is usual for meta-analysis for
16	epidemiological literature for glyphosate and	17	meta-analyses, the overall results do not
17	non-Hodgkin's lymphoma is limited, IARC also	18	substantially alter one's understanding of
18	considered an IARC meta-analysis of the	19	the previous studies."
19	epidemiological studies; correct?	20	And by "previous," you mean the
20	A. Yes.	21	underlying studies, I take it; correct?
21 22	Q. Now, you have never conducted or	22	A. Yes.
	published a meta-analysis yourself; correct?	23	Q. And you agree with that; correct?
23 24	MR. TRAVERS: Objection, compound	24	A. Yes.
25	question.	25	Q. And in particular, when
25	A. Personally, I have not. I think	23	observational studies report small relative
	Page 87		Page 89
1	one of our fellows has done one now that is	1	risks, less than 2.0, it's your view that
2	sort of winding its way through the	2	meta-analyses are probably as good as can be
3	literature, but for all intents and purposes,	3	done and suggest that there is not a greater
4	the answer is no.	4	concern, or greater cause for concern;
5	Q. You do agree, though, that	5	correct?
6	meta-analyses usually do not substantially		correct.
	meta analyses asaany ao not saostantiany	6	
7		6 7	MR. TRAVERS: Objection, misstates his commentary.
7 8	alter one's understanding of the underlying studies; correct?		MR. TRAVERS: Objection, misstates
	alter one's understanding of the underlying	7	MR. TRAVERS: Objection, misstates his commentary.
8	alter one's understanding of the underlying studies; correct?  MR. TRAVERS: Objection, calls for speculation.	7 8	MR. TRAVERS: Objection, misstates his commentary. A. Yes. Q. Just to be clear, my question was, correct, you do believe that when
8 9 10 11	alter one's understanding of the underlying studies; correct?  MR. TRAVERS: Objection, calls for speculation.  A. I don't know what that means.	7 8 9	MR. TRAVERS: Objection, misstates his commentary. A. Yes. Q. Just to be clear, my question was, correct, you do believe that when observational studies report small relative
8 9 10 11 12	alter one's understanding of the underlying studies; correct?  MR. TRAVERS: Objection, calls for speculation.  A. I don't know what that means. Q. Okay. Let's mark as 14-9 an	7 8 9 10	MR. TRAVERS: Objection, misstates his commentary. A. Yes. Q. Just to be clear, my question was, correct, you do believe that when observational studies report small relative risks, meta-analyses are probably as good as
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Page 90 Page 92 1 1 carcinogen, which is why -- why we are -- why significant, but instead should state that 2 2 such findings are statistically significant we are sitting here. 3 3 but small: correct? Q. Just so I understand your prior 4 A. I would point out that this was 4 testimony, one of the factors that you 5 5 written 20 years ago. mentioned in your consideration of these Q. That's why I am asking you today. 6 types of findings in meta-analysis is your 7 A. And this is -understanding of the changes in the Daubert 8 8 O. You agree -standard with respect to what courts are 9 9 A. And this is an old -- you know, I looking for? 10 10 had hair then. A. No, I'm not making a legal -- I was 11 Q. That's good to know. 11 not trying to make a legal conclusion for you 12 A. So --12 guys. That's your job. I'm simply saying, I 13 recognize that -- I'm simply saying that even Q. I'm asking if you agree with that 13 14 statement today. 14 in the legal field, the standard of what is 15 A. I think -- so, I agree that with 15 big and small, if I am understanding the smaller risk ratios, one has to exhibit more 16 16 legal ramifications, has changed also in the 17 caution, but I think that the field has moved 17 last 20 years. 18 in that direction. And by "the field," I am 18 Q. There are certain guidelines that 19 referring to epidemiology in general. And 19 have been set forth on how to conduct 2.0 that back in the 1990s, that there was more 20 meta-analyses; correct? 21 caution with going below risk ratios of two, 21 A. Yes. 22 and even legally, the Daubert -- if we are 22 Q. And you cite to such guidelines in 2.3 talking about a Daubert hearing, the legal 23 your expert report; correct? 24 field would have been more cautious below a 24 MR. TRAVERS: What page is that? 25 risk ratio of two. 25 MR. LASKER: Page nine. Page 91 Page 93 1 1 But now, risk ratios of 1.3 and 1.4 A. Yes. 2 2 Q. And in particular, you cite to an are taken seriously. Many risk factors that 3 we take very seriously in public health are article, and this is the third full paragraph 4 4 really at that level of 1.3 and 1.4, and even in the meta-analysis, in discussing how to 5 perform a meta-analysis, you cite to a --1.2, and we consider them significant 6 carcinogens and act on them in the public 6 guidelines prepared by Walker, Hernandez and 7 7 Kattan in 2008; correct? health sphere. 8 A. 2008? So, I would say that -- that while 9 9 it is true that it's more difficult, it makes O. Yes. 10 10 A. Um-hum. it more difficult methodologically to 11 11 establish a risk in that range, and that's Q. Is that correct? 12 why we are for the most part sitting here 12 Yes. 13 13 talking about this risk ratio, but that O. This is an article that you rely 14 doesn't mean it's unimportant. I would 14 upon as authoritative in providing guidelines 15 15 disagree with my statement to the degree that on proper approaches for meta-analyses; 16 it's -- when I say statistically significant correct? 17 but small, "small" doesn't mean unimportant. 17 A. Yes. Again, I don't do them 18 "Small" means small and difficult to 18 personally, but as a reference. 19 establish with -- to the degree that we would 19 MR. LASKER: Let's mark this paper 2.0 2.0 like to be comfortable and confident that as 14-10. 21 2.1 it's a true causal association. (Exhibit 14-10, Cleveland Clinic 2.2 22 Journal of Medicine, June 2008, It makes it more difficult 23 23 methodologically for us an epidemiologists Meta-analysis: Its strengths and 24 24 limitations marked for identification, as and scientists to be -- to establish it as a 25 25 probable carcinogen or a true or an absolute of this date.)

Page 94 Page 96 1 1 Q. Dr. Neugut, this is the guideline randomized trial is a specialized -- falls 2 2 under the rubric of cohort studies. I article that you cite in your expert report 3 3 for meta-analyses; correct? mean --A. Yes. 4 Q. Okay. Fair enough. 5 5 Q. So, as one of the key points at the A. But, I mean, it's an easy -- it's 6 beginning on this first page of the Walker an easier form of study to analyze, because 7 7 guidelines, one of the key points that is you have -- you are giving the exposure to 8 8 stated right under the abstract, is that the individual or not giving the exposure to 9 9 the individual, rather than having it be there are many caveats in performing a valid 10 10 meta-analysis, and in some cases a decided upon by subject choice or by, you 11 meta-analysis is not appropriate and the 11 know, random -- by -- not random, but by --12 12 results can be misleading. Correct? well, by subject decision. 13 A. Yes. 13 O. The concern that the Walker 14 Q. And you agree with that; correct? 14 guidelines are noting here with meta-analyses 15 outside of randomized control trials is that 15 A. I suppose, yes. 16 Q. And on page 436, there is a section 16 observational trials are more prone to 17 on randomized control trials versus 17 confounding and bias errors than randomized 18 18 control trials: correct? observational trials. 19 19 A. I'm sorry, page? A. I think they are saying that to 2.0 Q. 436. Do you see that? 20 meta-analyze observational studies, there is 21 21 going to be heterogeneity between the A. Yes. 22 22 studies, so it makes it a little more Q. And the Walker guidelines state 2.3 difficult or makes it more difficult to 2.3 that some researchers believe that 2.4 meta-analysis -- meta-analyses should be 24 combine them in a way where you can be 2.5 conducted only on randomized control trials; 25 confident that the result that you get is not Page 95 Page 97 1 correct? 1 due to some -- something other than purely 2 2 A. Yes. the exposure and outcome relationship. 3 Q. And there -- the meta-analysis O. And that is because -- let's take a 4 step back and define, a randomized control methodology does not allow for the 4 5 5 style -- a randomized control trial is a investigators to address problems of 6 different type of epidemiological study 6 confounding or bias in the underlying 7 7 where, for instance, in drug studies, where studies: correct? 8 they will have a placebo group and a control A. In the usual meta-analysis, the 9 9 group, and the investigators will provide the answer is, for the most part, no. For the 10 medication to the subjects and actually have 10 most part, no. Again, I'm not an expert in 11 11 meta -- I mean, I can read them, I can a controlled study going forward; correct? 12 MR. TRAVERS: I object to the 12 analyze them, but for the most part, the 13 13 testimony of counsel. answer is no. 14 A. A randomized control trial is a 14 Q. Okay. Just to be clear for my 15 15 cohort study where the -- where the question, so the answer is no, in a 16 investigators provide the exposure to the meta-analysis, you cannot fix problems of 17 17 subjects. bias or confounding in the underlying 18 18 Q. Okay. So, let me make sure I studies. 19 understand your testimony then. Is it your 19 MR. TRAVERS: Objection, misstates. testimony that a randomized control trial is 2.0 2.0 A. I don't want to misstate it. I 21 2.1 a -- is a type of cohort study? mean, the truth is that generally speaking, 2.2 A. Yes. I mean it's a specialized 22 if you put together several studies, the 23 23 biases are going to dilute out presumably form. It falls under -- there are only two 24 kinds of studies in epidemiology, cohort 24 over the -- over the several studies, and 25 25 studies and case-control studies. A it's probably not going to be as big a

2.0

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problem as -- you know, as people think or as one might presume.

2.4

You can't -- bias is omnipresent. So, if you are going to start just throwing around the word "bias," and say, "Bias, bias, bias, the study sucks," then you can throw out 90 percent of the epidemiology studies, and then we know nothing about anything.

But you have to look at studies and use judgment and common sense, and assess how big the bias is, how important is the bias, how well does the study address the bias, and then put them together, and that's part of the methodology of putting -- of doing a meta-analysis, is to qualitatively assess them as well.

- Q. Okay. So, just so the record is clear, if an underlying study has an issue with recall bias --
- A. Every study has an issue with recall bias.
- Q. I understand. Let me ask the question.

If an underlying study has a problem with recall bias, the meta-analysis

problem with confounding in any of the underlying studies; correct?

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- A. Not if the study itself did not address it, no.
- Q. Now, another concern raised about meta-analysis in these Walker guidelines, and you mention it as well in your expert report, is the issue of publication bias; correct?
  - A. Yes.
- Q. And publication bias occurs where investigators will not submit findings where there is no showing of a statistically significant result because those data are, for whatever reason, perceived as being less interesting; correct?

MR. TRAVERS: Objection, misstates the evidence.

- A. That is a little simplistic. I would say publication bias is more complicated than that.
- Q. But the concern about publication bias is that statistically significant associations are published and findings that are null are not published. That would be a publication bias; correct?

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methodology will not change that; correct?

MR. TRAVERS: Objection, asked and answered.

- A. Not necessarily, no, but then again, you have to ask yourself how big is the recall bias. You have to ask yourself why is it only in non-Hodgkin's lymphoma. You have to ask yourself why -- you know, how -- it's not enough to say recall bias, the study can't be looked at.
- Q. I'm not -- that wasn't my question. Mine is a methodological question, and we will be discussing individual studies. But methodologically, a meta-analysis does not provide any -- does not fix an underlying recall bias in one of the underlying studies; correct?

MR. TRAVERS: Objection, asked and answered.

- A. No, it does not.
- Q. And the meta-analysis would not fix an underlying selection bias in any of the studies, underlying studies; correct?
  - A. No, it would not.
  - Q. And a meta-analysis would not fix a

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MR. TRAVERS: Objection, asked and answered.

A. So, the entire epidemiology methodologic system is set up to be conservative, so that null findings are the norm. We don't want to find positive findings. The system is set up not to find positive findings. It's biased, for lack of a better word, to avoid finding positive findings. Sort of like the legal system, you don't want to find someone guilty, you want everyone to be innocent unless they are really guilty.

So, on some level that's how epidemiology is constructed. So, when you have a positive finding, it's taken more seriously than when you have a null finding. So, on a certain level, publication follows that -- that track or that scenario, so that when you do have a positive finding, an editor, a publisher, a reviewer takes a positive finding as something that is more significant than several negative findings or null findings. I don't mean negative, that may have been null.

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And so, so it's more important to report positive findings. So yes, there is some bias towards publishing positive findings, but that is how the system -- that is not necessarily a, let's say a, a criticism. That is not necessarily a, a bad thing in the literature. That may be the way it should be, that -- I mean, it wasn't intended that everything should come out 50/50, you know, that 50 percent of the studies should be null and 50 percent of the studies should be positive.

2.0

2.2

2.0

2.2

But then again, some of the publication bias is also that some studies never reach -- there's publication bias in other ways, that some studies, if you started off and you wanted to recruit 200 patients into your sample, and you ended up running out of money after 100 people, so you never finished your study, so those studies don't get published either, because you only reached 100, and so a half study -- half studies don't get published either. So, that is part of publication bias also.

What happened to all those, you

are -- I'm sure there are positive findings.
I have many papers that are sitting in my

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computer on my hard drive that I thought were the greatest studies ever done, and that have

been rejected by ten or 12 journals and that
 are not published, and they are sitting there
 gathering dust in my computer that, you know,

8 I think the world is waiting to see, and no
9 iournal will publish them, and who knows?

journal will publish them, and who knows?
 You know, so, there is that bias, too.

Q. Okay. But specifically with respect to this, the guidelines for meta-analysis, the concern that you raise and that Dr. Walker raises in his guidelines is that positive findings may be published and null findings may not be published; correct?

MR. TRAVERS: Objection, misstates.

A. That tends to be the way it goes. Yes.

Q. And the meta-analysis guidelines you cite in your expert report state that, quote, to ameliorate the effects of publication bias on the results of meta-analysis --

A. I'm sorry. Are you quoting me now

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know, incomplete -- there are incomplete studies that are part of publication bias, too. There are all sorts of -- if you want to call them biases that -- you know.

Q. Well, just to be clear, because "publication bias" is the term in your expert report, and it's also in the Walker guidelines that you cite to, just so I am understanding the term correctly, publication bias refers to the situation where positive findings are published but null findings in another study may not be published; correct?

A. Publication bias refers to where anything isn't published that could have been, should have been, might have been published. Could be positive findings. As I say, if you didn't finish a positive study and it never got published, or you dropped dead before your successor could -- and so no one ever picked up the study to submit it to a journal, that is also publication bias. It goes both ways.

I suspect, as you say, more null findings are not published than positive findings, but it's also true that there

or you're quoting this?

Q. I'm quoting your guidelines, and if you want, it's on page 432.

MR. TRAVERS: Objection. They are not his guidelines.

A. You are quoting this.

Q. Okay. The Walker guidelines cited in your expert report. The meta-analysis guidelines you cite in your expert report state on page 432, and it's in the second column, the third full paragraph, "to ameliorate the effect of publication bias on the results of meta-analysis, a serious effort should be made to identify unpublished studies." Right?

A. Yes.

Q. And the same guidelines that you cite in your expert report, on page 433, state, in the border, "Exclusion of non-published studies increases selection bias." Correct?

A. Yes.

Q. How can the exclusion of non-published studies from meta-analysis increase selection bias?

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	Page 106		Page 108
1	A. I'm sorry, say it again.	1	cancer, there is usually a period of years
2	Q. How can the exclusion of	2	after an exposure before cancer would be
3	non-published studies from a meta-analysis	3	developed and diagnosable; correct?
4	increase selection bias?	4	A. Depends on what the exposure and
5	A. I suppose if you haven't included	5	the outcome is.
6	every study, then you are you have to be	6	Q. But the concept of latency is that
7	concerned that you are biasing the results	7	there is some time period that elapses from
8	upward.	8	exposure until a cancer; correct?
9	Q. And these recommendations in the	9	A. Yes.
10	Walker guidelines that you cite in your	10	Q. And you would then be looking
11	expert report, they are consistent with lots	11	for time trend, you would be looking for
12	of other meta-analyses guidelines on how to	12	impacts on the cancer rate some years after
13	treat unpublished studies, aren't they?	13	changes in the exposure incidence; correct?
14	A. I don't know.	14	A. Again, it would depend on the
15	Q. So, you have also written about the	15	specific context that we are talking about.
16	use of time trends for the incidence of	16	It varies from every exposure and every
17	specific cancers to provide some clues as to	17	
18	potential causes of cancer; correct?	18	outcome has its own unique idiosyncratic
19	-	19	relationship.
20			Q. Plaintiffs' expert Dr. Weisenburger
21	Q. Yes.	20	has, and he's an expert in this litigation
22	A. I guess.	21	for plaintiffs, has opined that the latency
	Q. Well, let's go back to your chapter	22	created for non-Hodgkin's lymphoma caused by
23	on epidemiology and prevention in the	23	pesticide exposure would be on the order of
24	ASCO-SEP, and I didn't write the number on	24	ten years or more. Does that sound right to
25	this one. Which is this? 14-8.	25	you?
	Dama 107		
	Page 107		Page 109
1		1	
1 2	A. That is the ASCO-SEP?	1 2	MR. TRAVERS: Objection. Do you
2	<ul><li>A. That is the ASCO-SEP?</li><li>Q. Yes.</li></ul>	2	MR. TRAVERS: Objection. Do you have his report, if you are going to ask
	<ul><li>A. That is the ASCO-SEP?</li><li>Q. Yes.</li><li>MR. TRAVERS: And this is a 1996</li></ul>		MR. TRAVERS: Objection. Do you have his report, if you are going to ask about it?
2 3 4	<ul><li>A. That is the ASCO-SEP?</li><li>Q. Yes.</li><li>MR. TRAVERS: And this is a 1996 article?</li></ul>	2 3	MR. TRAVERS: Objection. Do you have his report, if you are going to ask about it?  Q. First off, while we are getting the
2 3 4 5	<ul><li>A. That is the ASCO-SEP?</li><li>Q. Yes.</li><li>MR. TRAVERS: And this is a 1996 article?</li><li>MR. LASKER: No. This is 2014,</li></ul>	2 3 4	MR. TRAVERS: Objection. Do you have his report, if you are going to ask about it?  Q. First off, while we are getting the report, out, let me ask you, does ten years
2 3 4	A. That is the ASCO-SEP? Q. Yes. MR. TRAVERS: And this is a 1996 article? MR. LASKER: No. This is 2014, maybe. I don't know when this the	2 3 4 5	MR. TRAVERS: Objection. Do you have his report, if you are going to ask about it?  Q. First off, while we are getting the report, out, let me ask you, does ten years sound like a reasonable estimate of the
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Page 110 Page 112 1 1 Q. And Dr. Weisenburger's report --Q. Disagree with Dr. Weisenburger's 2 2 MR. LASKER: Let's mark as -- what analysis of latency. 3 3 MR. TRAVERS: Objection, calls for did I sav it was? 14-11. (Exhibit 14-11, Expert Report of 4 speculation. 5 5 Dr. Dennis Weisenburger, M.D. marked for A. I have no basis on which to agree identification, as of this date.) 6 or disagree. It would depend on what --7 Q. It's Dr. Weisenburger's report, and whether one thinks that glyphosate is a tumor 8 8 we are marking pages one through six, because initiator or a tumor promoter. You know, 9 9 that's the section in which he discusses the latency periods can be as short as one or two 10 10 issue of latency. years, depending on the exposure and the 11 MR. TRAVERS: I will object, that 11 outcome. 12 it's not the full report. 12 And I am not sure, even as I sit 13 13 MR. LASKER: That's fine. here, what the actual mechanism is by 14 which -- that is not my expertise per se, Q. And on page five of his expert report, Dr. Weisenburger is talking about the 15 15 what the precise mechanism is by which 16 glyphosate causes non-Hodgkin's lymphoma 16 issue of latency; correct? 17 A. I'm on page five. Can you point 17 biologically, so I would have difficulty 18 18 characterizing the latency period, but I have out --19 19 no reason to doubt his expertise. Q. The whole paragraph on page five. 2.0 A. The one that begins, "Only one 20 Q. So, just to be clear, you do not 21 large cohort study"? 21 have an expert opinion on the latency period 22 22 That's it. for glyphosate exposure and non-Hodgkin's O. Can I have a moment to look at it? 23 23 Α. lymphoma? 2.4 You can. 24 A. Correct. 25 25 A. Okay. What is the question? Q. And you do not have an expert Page 111 Page 113 1 Q. So, Dr. Weisenburger in this 1 opinion that glyphosate is a tumor promoter; 2 2 paragraph is talking about the issue of correct? 3 latency for pesticide exposure and A. As opposed to an initiator? 4 Q. Yes. 4 non-Hodgkin's lymphoma; correct? 5 5 A. Yes. A. Well, it wasn't shown to be a 6 6 Q. And Dr. Weisenburger talks about mutagen, so I guess once it's not a mutagen 7 7 or -- I don't know -- as I said, I don't know 6.7 years as perhaps being too short of a 8 time period to account for latency between specifically its exact mechanism of how it's 9 9 pesticide exposure and non-Hodgkin's causing -- how it is precisely causing 10 10 cancer. lymphoma; correct? 11 11 A. In terms of latency? Q. So for a -- if we are doing a time 12 12 Yes. trend analysis of non-Hodgkin's lymphoma, if Q. 13 13 Dr. Weisenburger is correct with a ten-year Yes. A. 14 14 latency period, we would want to look and see Q. And he talks about various studies 15 15 and suggests a cutoff of ten years as being how incidence of non-Hodgkin's lymphoma 16 16 the, you know, reasonable estimate of the changed ten years after exposures to 17 17 glyphosate? Is that a correct understanding latency period for exposure to pesticide and 18 non-Hodgkin's lymphoma; correct? 18 of how the time trend analysis would work? MR. TRAVERS: Objection, compound 19 19 A. Yes. 20 2.0 and misstates Dr. Weisenburger's MR. TRAVERS: Objection, misstates 21 2.1 his opinion. testimony. 22 Q. And do you have any reason to 22 A. Are you talking now on a population 23 23 disagree with Dr. Weisenburger's analysis of scale? 24 24 this issue of latency? Q. Yes. Like the way you presented in 25 25 A. Do I have any reason to -your chapter.

Page 114

A. So, when I talk about it in my chapter, we are talking about lifestyle factors that are prevalent across an entire population, like cigarette smoking or postmenopausal women taking hormonal -- you know, menopausal hormones, which is a very widespread phenomenon.

2.0

2.2

2.4

2.0

2.2

If you are talking about exposures where only a small fraction of the population is actually exposed, and where the relative risk is 1.2 or 1.3 or 1.4 -- let's say 1.3 or 1.4, then to see that impact on the -- you know, on the population prevalence of non-Hodgkin's lymphoma would require quite a -- that would be rather -- rather profound. I don't know if you would see it on a population scale.

- Q. So, is it your understanding that exposures to glyphosate in the population are rare?
- A. No. It's fairly common, but in a -- in a selective portion of the population.
- Q. And those would be sort of agricultural populations?

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Page 117

- A. Yeah.
  - MR. TRAVERS: What page?
- Q. Well, if you need to refer to your expert report for this, it's at page six.

But first, principles of causal inference are used to construct theories which help us formulate testable hypotheses; correct?

- A. Yes.
- Q. Epidemiologists then design studies to test those causal hypotheses; correct?
  - A. Yes.
- Q. And that is the definition of a scientific method; right? The formulation of hypotheses and the testing of those hypotheses to determine whether they can be validated; correct?
  - A. Yes.
- Q. And you also agree that a hypothesis generally cannot be validated based upon the results of any one epidemiological study; correct?

MR. TRAVERS: Objection, calls for speculation.

A. Any one single -- well, I'm sorry,

Page 115

A. Agricultural, gardeners, you know, my wife, I don't know, but she's got tomato plants now, but -- so, it may be profound. I don't know. It's not my -- again, I am not going to put myself up as an expert in that regard, in how much the attributable risk is going to be across the population.

I'm simply saying that if you want to see a population effect, it has to be a fairly prevalent -- it's not just -- it's both the risk and the prevalence of exposure that is significant in order to see a -- to see a population-based time trend change, you know.

- Q. Fair enough.
- A. In addition to the latency. You know, I mean then first latency will play a role and you might have to wait -- again, if he says ten years, you might have to wait ten years to first see it show up.
- Q. Dr. Neugut, in your report, you -your expert report, you note that epidemiological studies use a multistep process to establish causal inferences; correct?

say that question again.

Q. You would agree that a hypothesis generally cannot be validated based upon the results of any one epidemiologic study.

MR. TRAVERS: Same objection.

- A. You mean could there be one single epidemiologic study which is so terrific or so profoundly good that I could reach a conclusion based solely on that? The answer is, there probably could be.
  - Q. But as a general matter?
- A. But -- and there have been, so the answer is, I don't agree with that statement, but I think with -- with risk ratios like this, and prevalences like this, this isn't one of the contexts where that is probably going to be true.
- Q. Okay. So, in the context particularly that we are dealing with here, a scientist following the scientific method would be formulating hypotheses, testing those hypotheses to see if they could be validated, and then testing those hypotheses again to determine whether those findings are replicated; correct?

Page 118 Page 120 1 1 designed -- let me state that again. A. Yes. 2 2 Q. Epidemiologist studies also --When an epidemiologist is analyzing 3 3 the finding of an epidemiological study, one strike that. 4 Epidemiological studies sometimes 4 question that must be considered is whether 5 will report out results that are not linked that study was designed to test the 5 6 to any preset hypothesis; correct? 6 hypothesis that is the subject of that 7 7 A. So, could you just define that a epidemiologist's inquiry; correct? 8 8 little better for me? MR. TRAVERS: Objections, calls for 9 9 Q. So you -- epidemiological studies, speculation. 10 10 they can have a hypothesis that they are A. Whether it was the primary 11 designed to test. 11 hypothesis? 12 A. Right. 12 O. Correct. 13 Q. But they can also report out other 13 A. Yes. 14 14 results that are not part of the original Q. Okay. Let's talk about the -- some hypothesis, but they have the data; correct? 15 15 of the specific epidemiological studies you 16 16 A. Yes. mentioned in your expert report. And let's 17 17 start with the De Roos study, 2005 De Roos And those types of studies are O. 18 study. There is two of them. 18 often studies that report out a large number 19 19 of different potential associations relating MR. LASKER: We will mark that as 20 to different exposures; correct? 20 Exhibit 14-12. 21 21 MR. TRAVERS: Objection, calls for (Exhibit 14-12, Environmental 22 2.2 speculation. Health Perspectives, January 2005, Cancer Yes. 23 Incidence among Glyphosate-Exposed 23 Α. 24 Those are often referred to as 24 Pesticide Applicators in the Agricultural 2.5 25 Health Study marked for identification, exploratory studies; correct? Page 121 Page 119 1 1 A. Sometimes, yes. as of this date.) 2 2 Q. And Dr. Neugut, we have already had Q. And in those studies, the results 3 can generate future hypotheses that then must some brief mention of this study. The be tested through studies that are designed 4 De Roos 2005 is part of a larger initiative 4 5 to test those hypotheses; correct? 5 called the Agricultural Health Study: 6 MR. TRAVERS: Objection, calls for 6 correct? 7 7 A. Yes. 8 Q. And the Agricultural Health Study A. So, again, how much weight you put 9 9 on them really is again a contextual is funded by the National Cancer Institute 10 10 question, but in general, I would probably and the National Institute of Environmental agree with what you are saying. 11 Health Sciences in collaboration with EPA and 11 12 MR. LASKER: And just in -the National Institution of Occupational 12 13 Safety and Health; correct? 13 objection, calls for speculation, with an 14 14 expert witness I have never heard before. A. Yes. 15 Q. The AHS study is not funded by 15 All of his testimony is his opinion, none 16 private companies; correct? 16 of it is speculation, so I'm going to 17 17 A. Not to my knowledge. object to your objection. 18 MR. TRAVERS: Well, you are asking 18 O. Monsanto does not fund the 19 19 Agricultural Health Study; correct? for speculation. 2.0 2.0 MR. LASKER: I'm asking for his A. I don't think so. 21 21 opinions. MR. TRAVERS: Objection, which -- I 2.2 Q. So, just so I understand, when an 22 think we have to be specific, because 23 2.3 epidemiologist reviews the findings of an there is one AHS study funded by 24 epidemiological study, one question that must 24 Monsanto. 25 25 be considered is whether the study was MR. LASKER: That's not correct.

	Page 122		Page 124
1	MR. TRAVERS: It's from the AHS	1	Q. The AHS study was initiated to
2	cohort.	2	avoid the problem of recall bias in
3	Q. Dr. Neugut, specifically, De Roos	3	case-control studies; correct?
4	2005 was not funded by Monsanto; correct?	4	A. Yes.
5	A. I would have no idea, but not to my	5	Q. The Agricultural Health Study also
6	knowledge.	6	was designed to avoid misclassification bias;
7	Q. The Agricultural Health Study, and	7	correct?
8	specifically De Roos well, the	8	A. Misclassification bias of what
9	Agricultural Health Study is the only	9	type?
10	prospective cohort study that has looked for	10	Q. Misclassification of exposures.
11	a possible association between glyphosate and	11	A. How did it do that?
12	cancer; correct?	12	Q. By going to farmers that had better
13	A. The only cohort study, yes.	13	recall and also periodic follow-up.
14	Q. Yes.	14	MR. TRAVERS: Objection, move to
15	The Agricultural Health Study was	15	strike.
16	initiated to address some of the limitations	16	A. So, you are saying it did not have
17	of case-control studies that had looked at	17	misclassification bias? Misclassification
18	potential associations between farming	18	error?
19	exposure and cancer; correct?	19	Q. I direct you to Dr. Blair's
20	MR. TRAVERS: Objection, calls for	20	deposition testimony at page 96, line two
21	speculation.	21 22	through seven.
22 23	A. I don't know, but I assume.	23	A. To try and deal with issues of
24	Q. Okay. Can you pull out Dr. Blair's	23	misclassification.
25	deposition testimony again. It should still	25	Q. Yes.
25	be in front of you. I think it's probably	25	"The Agricultural Health Study was
	Page 123		Page 125
1	Page 123 over there.	1	Page 125 also designed to try and deal with issues
1 2		1 2	
	over there.  Dr. Blair is one of the initiators, one of the original investigators for the		also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified
2 3 4	over there.  Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?	2 3 4	also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also
2 3 4 5	over there.  Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?  A. He's a coworker.	2 3 4 5	also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also periodic follow-up; correct?
2 3 4 5 6	over there.  Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?  A. He's a coworker.  Q. And if I can refer you to	2 3 4 5 6	also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also periodic follow-up; correct?  Answer by Dr. Blair: "Yes."
2 3 4 5 6 7	over there.  Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?  A. He's a coworker.  Q. And if I can refer you to Dr. Blair's deposition testimony at page 94,	2 3 4 5 6 7	also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also periodic follow-up; correct?  Answer by Dr. Blair: "Yes."  A. I emphasize the word "tried."
2 3 4 5 6 7 8	over there.  Dr. Blair is one of the initiators, one of the original investigators for the Agricultural Health Study; correct?  A. He's a coworker.  Q. And if I can refer you to Dr. Blair's deposition testimony at page 94, specifically, line page 94, lines six to	2 3 4 5 6 7 8	also designed to try and deal with issues of misclassification of exposures by going to farmers, who you testified earlier had better recall, and also periodic follow-up; correct?  Answer by Dr. Blair: "Yes."  A. I emphasize the word "tried."  Q. You have no reason to believe
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Page 126 Page 128 1 1 enrollment into the study; correct? Q. De Roos 2005 also does not find any 2 2 increased association with non-Hodgkin's A. Yes. 3 lymphoma with higher exposure levels to 3 O. And Dr. Neugut, I think it's going 4 4 to be easier for the videographer if you glyphosate either measured by duration or 5 5 could remove your hand -measured by duration and intensity of 6 A. I apologize. exposure; correct? 7 A. Correct. Q. No problem. I think the court 8 8 reporter is getting it, but --Q. The days of exposure to 9 glyphosate-based herbicides in the exposed 9 MR. TRAVERS: We have been going 10 members in the Agricultural Health Study 10 over an hour. cohort in De Roos 2005 was significantly 11 11 MR. LASKER: Do you want to take a 12 12 higher than any reported days of exposure in break? 13 the glyphosate case-control studies; correct? 13 MR. TRAVERS: Yeah, before you get 14 A. In the glyphosate -into it. 15 15 MR. LASKER: That's fine. O. Case-control studies. 16 16 THE VIDEOGRAPHER: The time is A. Yes. 17 17 11:35 a.m. We are off the record. Q. The lowest exposure group in 18 18 De Roos 2005 had between one and 20 total (Recess taken.) 19 19 THE VIDEOGRAPHER: The time is days of glyphosate exposure; correct? 2.0 11:41 a.m. We are on the record. 20 A. Yes. 21 THE WITNESS: Thank you. 21 Q. The lowest exposure group in 22 22 De Roos 2005 includes individuals who would BY MR. LASKER: 23 23 Q. Dr. Neugut, before the break, we be categorized in the highest exposure groups 24 were talking about the Agricultural Health 24 in both McDuffie and the Eriksson 2008 25 Study. The Agricultural Health Study focused 25 studies; correct? Page 127 Page 129 1 1 on private and commercial applicators of A. Yes. 2 pesticide because they were likely to have 2 Q. The highest exposure group in the the highest levels of exposures to 3 Eriksson study was ten days or more; correct? 4 pesticides; correct? 4 MR. TRAVERS: Objection. If we are 5 A. Yes. 5 going to ask about specific studies, I 6 6 Q. The hypothesis being tested in think we need the --7 7 De Roos 2005 was whether glyphosate exposure A. I don't recall offhand. 8 8 was associated with cancer or cancer MR. LASKER: Okay. Well, if you 9 9 subtypes; correct? want to refer to the study, we can do 10 10 A. Oh. Yes. that. 11 11 Q. And we will -- I'm going to turn to Mark this as 14-13. 12 some of the comments you have in your expert 12 (Exhibit 14-13, Pesticide exposure 13 report in a minute, but you would agree, I 13 as risk factor for non-Hodgkin lymphoma 14 take it, that De Roos 2005 does not provide 14 including histopathological subgroup 15 evidence that would validate the hypothesis 15 analysis marked for identification, as of 16 that glyphosate exposure causes non-Hodgkin's 16 this date.) 17 lymphoma; correct? 17 Q. So, this is the Eriksson study and -- a 2008 study, and at page 1659 in that 18 A. Yes. 18 19 Q. And De Roos 2005 did not find an 19 study --20 association between glyphosate exposure and 2.0 MR. TRAVERS: Sorry, do you have a 21 non-Hodgkin's lymphoma either in its analysis 21 copy? 22 22 adjusted solely for age or in its analysis MR. LASKER: I'm sorry, I didn't 23 controlling for other pesticides or other 23 include you? 24 potential confounders; correct? 24 MR. TRAVERS: Or did you? 25 25 A. Correct. MR. LASKER: Is that what's in your

Page 130 Page 132 1 1 Q. And compared to the lowest dose hand? 2 2 MR. TRAVERS: No. This is De Roos. group, the risk of non-Hodgkin's lymphoma in 3 3 this highest dose group, up to as much as MR. LASKER: I'm sorry. 4 4 Q. So table two of Eriksson shows that seven years of daily glyphosate exposure, was 5 5 also reduced; correct? their breakout for the low exposure group and 6 the high exposure group is ten days; correct? A. Yes. 7 7 A. Yes. Q. De Roos 2005 also analyzed 8 8 Q. So, the lowest exposure group in -dose-response for glyphosate based upon the 9 9 or the highest exposure group in the Eriksson intensity of glyphosate exposure; correct? 10 10 study included -- would be within the lowest A. Yes. 11 11 exposure group in De Roos 2005; correct? Q. And De Roos 2005 calculated 12 12 A. Well, maybe yes or maybe no. It intensity of exposure based upon factors like 13 how glyphosate was used and whether the 13 could have been --14 14 applicator used protective gear; correct? O. Partially. 15 A. Yes. 15 A. Overlapped it. 16 16 Q. The highest exposure group in the Q. None of the case-control studies in 17 17 McDuffie study, and if you need to, I will the glyphosate literature included any 18 18 show you that study, was greater than two measure of the intensity of exposure to 19 19 days per year; correct? glyphosate. 2.0 A. Yes. 20 MR. TRAVERS: Objection, misstates 21 21 MR. TRAVERS: I'm going to object. evidence. 22 22 If we are going to ask about the specific A. None of the --23 23 figures in a study, I think we need to --O. None of the case-control studies in 24 Q. If at any time, you need to refer 24 the glyphosate epidemiological literature 25 to a study, let me know. 25 include any measure of the intensity of Page 133 Page 131 1 1 A. That one I remember. exposure to glyphosate; correct? 2 Q. Okay. So, the middle exposure 2 MR. TRAVERS: Same objection. 3 3 group and the dose response analysis in A. I don't believe they do. 4 4 De Roos 2005, and this is the De Roos 2005 O. De Roos 2005 also reported that 5 5 there were lower risks of non-Hodgkin's paper at 52, table three, that middle 6 6 exposure group had between 21 and 56 days of lymphoma with increased duration and 7 7 exposure; correct? intensity of glyphosate exposure; correct? 8 8 A. Yes. A. Yes. 9 9 Q. And compared to this lowest dose Q. There is no data anywhere in the 10 10 group, individuals with this higher duration epidemiologic literature reporting a higher 11 11 of glyphosate exposure had a risk of non-Hodgkin's lymphoma with greater 12 non-statistically significant 30 percent 12 intensity exposures to glyphosate; correct? 13 13 lower risk of non-Hodgkin's lymphoma; MR. TRAVERS: Objection, misstates 14 14 correct? evidence. 15 A. Yes. 15 A. I'm sorry. 16 Q. The highest exposure group in 16 Q. There is no data anywhere in the 17 17 De Roos 2005, in the dose-response analysis, epidemiologic literature reporting a higher 18 had between 57 and 2,678 days of glyphosate 18 risk of non-Hodgkin's lymphoma with greater 19 19 intensity exposure to glyphosate; correct? exposure; correct? 20 20 A. Not to my knowledge. A. Yes. 21 21 Q. So, there was at least one Q. So, there is no such data; correct? 22 individual in the De Roos 2005 study that had 22 MR. TRAVERS: Objection, asked and 23 23 the equivalent of more than seven years' answered. 24 24 worth of daily glyphosate exposure; correct? A. Again, to my knowledge, no. 25 25 A. Yes. Q. Now, in your expert report, you

Page 134 Page 136 identify four criticisms of De Roos 2005; 1 Q. Well, correct, but there is no 2 2 correct? And we can go -- it's on your differential with farmers. There is farmers 3 report at pages 12 to 13. 3 in the numerator and there's farmers in the A. Yeah, I mean --4 denominator; correct? 5 5 Q. If you want to pull your report MR. TRAVERS: Objection. I think 6 6 out, we can walk through this. And in your that misstates the study design. 7 7 report on page 12, you identify four A. Yes, but it's harder to see a -- to 8 8 limitations in the De Roos 2005 paper; see an elevation when you are starting off 9 with a higher -- from a higher platform, or correct? 10 10 A. Yes. it may be -- it may be harder to see an 11 Q. I would like to talk with you a bit 11 elevation when you are starting off from a 12 12 about those criticisms. higher platform. 13 Q. Well, I'm a little bit confused 13 First, I believe I am correct that 14 about that. If you were, for example, to do 14 three of these criticisms relate in some way 15 15 to the length of follow-up in the study, and a study of -- an epidemiological study of 16 16 when exposures to glyphosate would have asbestos and smoking, to be able to do that 17 study, you might want to start off with a 17 occurred in comparison to the development of 18 full cohort of smokers and then look at 18 non-Hodgkin's lymphoma. Correct? Criticisms 19 19 one, two, and four? asbestos in the differential; right? 20 A. Yes, but -- well, four is more 20 A. You are right. 21 Q. Having smokers be your entire 21 complicated, but the one and two, you are 22 population doesn't undercut the study. It 2.2 correct. 23 23 Q. Okay. Well, we will get to four in actually allows you to look at the exposure you are interested in; right? 2.4 24 a minute, and we will also get to one and two 25 25 A. It -in a minute. Page 135 Page 137 1 1 Let's start with number three. I Q. Dr. Neugut, is that correct? 2 2 A. I'm thinking. want to understand that one first. I'm 3 putting those into one category and three in Q. Okay. No, continue. I'm sorry. I 4 the other. didn't know if your mind was turning to 5 something else. A. Okav. 6 Q. So, with respect to your third 6 A. So, even in the context of 7 7 criticism, and this is set forth on page 13, multicausal phenomena, which is essentially 8 in this criticism you are, if I understand what we are in a sense talking about, it is 9 correctly, raising the concern that there may 9 still a little harder to see elevated risk 10 be an elevated risk of non-Hodgkin's lymphoma 10 ratios in that. While ves, you can still 11 in the control group due to exposure to 11 account for an elevated risk in the context 12 another pesticide; correct? 12 of other causes, like other herbicides or 13 13 A. As you stated earlier, farmers are other risk factors that farmers may have for 14 at elevated risk -- forget about why, whether 14 lymphoma, but it's still harder to see it on it's because of other pesticides, herbicides, 15 15 top of that elevated risk than if you were in 16 16 et cetera, farmers are at elevated risk of a population where there was no elevated risk 17 17 lymphoma. I mean, I think it's a good study of non-Hodgkin's lymphoma. 18 design to use farmers as the overall sample 18 O. Well, all populations have 19 population, mainly because it's a population 19 different risk factors that could impact an 20 2.0 outcome. What you are trying to do in an in which you are going to get a large number of people exposed. That's why it's a good 21 21 epidemiological study is -- and specifically 22 22 sample, you know, sample universe, but then with glyphosate, is to tease out the 23 when you are looking for a risk ratio, you 23

are already starting off with a higher risk

in the unexposed group.

24

25

24

25

A. Correct.

glyphosate impact; correct?

Q. And in that context, you don't want

Page 138 Page 140 1 to have different -- you know, where you have correct? 2 2 more farmers in the numerator and less A. Well, more if they are 3 3 misclassified between the two of them, but farmers in the denominator. 4 A. No, that is true, but it's a 4 5 5 tradeoff of sorts. You know, you also Q. And your concern here is that have -- you're comparing high exposed to low 6 because there are 2,4-D exposure --7 exposed, which is different than comparing 53 percent of the control group has exposure 8 8 high exposed to unexposed. to 2,4-D, that can result in De Roos O. Yes, I understand. That is a 9 reporting an underestimation of the true NHL 10 10 risk with respect to glyphosate; correct? different issue, but not the issue we are 11 11 That's what you state in your report. talking about on page 13 of your report. 12 Correct? 12 A. Yes. 13 Q. Now, you were able to determine 13 A. No. 14 that 53.3 percent data point for the use of Q. Okay. So, specifically on page 13 of your report, this third criticism, though, 15 2,4-D in controls from De Roos 2005; correct? 15 16 16 the concern you are mentioning is that the That's data you got from the De Roos study? 17 control group, the individuals not exposed to 17 A. I believe so. 18 18 glyphosate, would have had exposures to other Q. Let's pull out the De Roos study 19 19 pesticides, and specifically you mentioned again. That is page -- Exhibit 14-12, and 2.0 2,4-D; correct? 20 it's on page 50, table one, I believe. And 21 21 the data point for never exposed to A. Um-hum, yes. 22 22 glyphosate and exposure to 2,4-D is in that Q. And the point you are making there 23 first column of table one, towards the 23 is that 2,4-D might be associated with 2.4 non-Hodgkin's lymphoma. 2.4 bottom: correct? 25 A. Yes. 25 A. Yes. Page 139 Page 141 1 1 Q. And therefore, the cases, the Q. And there it reports that 2 denominators that are in the -- in the risk 2 individuals never exposed to glyphosate, 3 ratio, would have a higher incidence of 53.3 percent of them were exposed to 2,4-D; 4 4 non-Hodgkin's lymphoma that is not correct? 5 attributable to glyphosate; correct? A. Yes. 6 6 A. Yes. Q. Now, directly to the right of that, 7 Q. And the reason that would occur is, the second column reports the prevalence of 8 as you hypothesize in your expert report, if exposure to 2,4-D among individuals with the 9 individuals -- individuals who use glyphosate lowest exposure level of glyphosate; correct? 10 are less likely to use 2,4-D; correct? 10 A. Yes. 11 11 A. Okay. Yes. Q. And they actually had a higher 12 12 exposure rate to 2,4-D than those who were Q. And that is because you would have 13 fewer 2,4-D exposure, less 2,4-D exposure in 13 never exposed; correct? 14 the glyphosate-exposed individuals that could 14 A. Yes. push their risk up; correct? As compared to 15 Q. And in the highest exposure group 15 16 for glyphosate, the third column, those the cases. Strike that. 17 A. I don't know. 17 individuals had an even higher exposure rate 18 18 to 2,4-D; correct? 85 percent? O. I will restate that. 19 19 A. Um-hum, yes. The concern that you are raising in 20 2.0 your report is that if there are -- if there Q. So, based upon the analysis in your 21 21 is a difference in the incidence of exposure expert report, if 2,4-D was associated with 22 to 2,4-D between the glyphosate exposed and 22 an increased risk in non-Hodgkin's lymphoma, 23 23 the glyphosate non-exposed, that would then that means that the effect reported by 24 24 De Roos for glyphosate would actually be an potentially bias your outcome for the 25 25 glyphosate -- reported glyphosate risk ratio; overestimation of the NHL risk, not an

	Page 142		Page 144
1	underestimation; correct?	1	A. No.
2	A. If 2,4-D is associated with	2	Q. The follow-up time is just the
3	non-Hodgkin's lymphoma, correct.	3	number of years after AHS had gathered
4	Q. So, your expert report analysis	4	information on prior exposures; correct?
5	here, your criticism number three was	5	A. Had gathered
6	incorrect; right?	6	Q. Information on prior exposures.
7	A. It's probably not a problem.	7	A. Yes.
8	Q. If I could ask you to turn back to	8	Q. At the time of that the AHS
9	table one for De Roos 2005. There is also	9	gathered information on prior exposures, the
10	data on one, two, three, four, five, six,	10	cohort on average had 15 years of prior
11	seven, eight I think nine other	11	exposure; correct?
12	pesticides; correct?	12	A. I don't know, but I I believe
13	A. Yes.	13	they certainly had exposure prior to the time
14	Q. And in every instance, with each	14	of entry.
15	one of these pesticides, individuals who have	15	Q. You read Dr again, Dr. Blair's
16	exposure to glyphosate also have higher	16	deposition.
17	exposures to those other pesticides; correct?	17	A. Yes.
18	A. Yes.	18	Q. Do you recall him testifying about
19	Q. And in every instance, individuals	19	this?
20	with the highest level of exposure to	20	A. Yes.
21	glyphosate have the highest level of exposure	21	
22		22	
23	to each of those other pesticides; correct?	23	time AHS gathered information at the
24	A. Yes.	24	inception, the cohort on average had 15 years
25	Q. And based upon your the analysis	25	of prior exposure; correct?
25	you presented in your expert report, that	25	A. I don't recall that it was on
	Page 143		
	rage 143		Page 145
1	would also create a bias that could	1	Page 145 average. I know some had that much exposure.
1 2		1 2	
	would also create a bias that could		average. I know some had that much exposure.
2	would also create a bias that could artificially suggest a dose-response analysis	2	average. I know some had that much exposure. I don't know the distribution.
2	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?	2	average. I know some had that much exposure.  I don't know the distribution.  Q. Okay. Why don't we look at
2 3 4	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.	2 3 4	average. I know some had that much exposure. I don't know the distribution. Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And
2 3 4 5	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be	2 3 4 5	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to
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2 3 4 5 6 7	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other	2 3 4 5 6 7	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.
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2 3 4 5 6 7 8 9	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was	2 3 4 5 6 7 8 9	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.
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2 3 4 5 6 7 8 9 10 11	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL,	2 3 4 5 6 7 8 9 10 11	average. I know some had that much exposure.  I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection
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2 3 4 5 6 7 8 9 10 11 12 13 14	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your	2 3 4 5 6 7 8 9 10 11 12 13	average. I know some had that much exposure.  I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information A. Yes. Q there is an average of 15 years
2 3 4 5 6 7 8 9 10 11 12 13 14 15	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On	2 3 4 5 6 7 8 9 10 11 12 13 14	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information A. Yes.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information A. Yes. Q there is an average of 15 years of prior exposure; correct?
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page? Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information A. Yes. Q there is an average of 15 years of prior exposure; correct? A. Yes. Q. And at the time that the
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years;	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page? Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information A. Yes. Q there is an average of 15 years of prior exposure; correct? A. Yes. Q. And at the time that the Agricultural Health Study gathered
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years; correct?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information  A. Yes.  Q there is an average of 15 years of prior exposure; correct?  A. Yes.  Q. And at the time that the Agricultural Health Study gathered information on the cohort's prior exposures,
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years; correct?  A. Yes.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information  A. Yes.  Q there is an average of 15 years of prior exposure; correct?  A. Yes.  Q. And at the time that the Agricultural Health Study gathered information on the cohort's prior exposures, which was over the mid 1990s, glyphosate had
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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	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years; correct?  A. Yes.  Q. And just so I am clear, you weren't stating here that De Roos 2005 only	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information  A. Yes.  Q there is an average of 15 years of prior exposure; correct?  A. Yes.  Q. And at the time that the Agricultural Health Study gathered information on the cohort's prior exposures, which was over the mid 1990s, glyphosate had been on the market for about 20 years or more; correct?
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	would also create a bias that could artificially suggest a dose-response analysis with glyphosate exposure; correct?  A. Yes.  Q. So, the results in the study, to be clear, because exposure to glyphosate is associated with higher exposures to other pesticides, if you were to look simply at exposure to glyphosate and not adjust for exposures to other pesticides, you could find an apparent dose-response that in fact was due to confounding; correct?  A. If they were associated with NHL, yes.  Q. Now, I want to move to some of your other criticisms of the AHS study. On page 12 of your report, you talk about the follow-up period for the De Roos study, a median follow-up period of 6.7 years; correct?  A. Yes.  Q. And just so I am clear, you weren't	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	average. I know some had that much exposure. I don't know the distribution.  Q. Okay. Why don't we look at Dr. Blair's deposition testimony again. And this is at pages 96 page 96, lines 11 to 15. If you can read that and see if that refreshes your recollection.  A. I'm sorry, the page?  Q. Ninety-six. And lines 11 through 15.  Does that refresh your recollection that at the time that the AHS started gathering information  A. Yes.  Q there is an average of 15 years of prior exposure; correct?  A. Yes.  Q. And at the time that the Agricultural Health Study gathered information on the cohort's prior exposures, which was over the mid 1990s, glyphosate had been on the market for about 20 years or

	Page 146		Page 148
1	sufficient latency period between exposure to	1	A. Then I guess it's a good word.
2	glyphosate and potential NHL; correct?	2	Q. So, the age of the cohort at the
3	A. Yes.	3	time of De Roos 2005 is right in that spot
4	Q. And the potential latency period in	4	where we are seeing that exponential
5	the De Roos 2005 study is up to 27 years;	5	increase.
6	correct?	6	A. But it's just starting at it's
7	A. Yes, I think yeah, I don't think	7	still a young group.
8	· · · · · · · · · · · · · · · · · · ·	8	
9	latency period is a major problem.  Q. Now, your concern, if I understand	9	Q. But again, the issue is, you want
10		10	to get enough cases of NHL; correct?
11	correctly, regarding the follow-up period in	11	A. And there are too few to really
	the AHS study is that longer follow-up would	12	have enough power.
12	have resulted in more cases of non-Hodgkin's		Q. So, now the now, the NHL I'm
13	lymphoma; correct?	13	sorry. The De Roos study 2005 has 92 cases
14	A. Yes.	14	of non-Hodgkin's lymphoma; correct?
15	Q. And that relates back to this issue	15	A. Yes.
16	about power; correct? More cases of NHL	16	Q. And the De Roos study in fact is
17	would give the study more power.	17	one of the most powerful epidemiologic
18	A. Yes.	18	studies of glyphosate and non-Hodgkin's
19	Q. And that's also your point with	19	lymphoma, isn't it?
20	respect to the age of the cohort. If the	20	A. I don't know offhand, but does it
21	cohort was older, then would have more cases	21	have the tightest confidence limits?
22	of NHL; correct?	22	Q. Well, let's look at your expert
23	A. Yes.	23	report. You have that information there,
24	Q. Now, also, just to be clear, when	24	don't you?
25	you state in your expert report the age of	25	Have you let me ask this
	Page 147		Page 149
1	the cohort, that is data that is based upon	1	question. Have you looked to determine the
1 2	the cohort, that is data that is based upon the age at enrollment; correct?	1 2	
	the cohort, that is data that is based upon		question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for
2	the cohort, that is data that is based upon the age at enrollment; correct?	2	question. Have you looked to determine the relative power of the De Roos 2005 study as
2	the cohort, that is data that is based upon the age at enrollment; correct?  A. At study entry, yes.	2 3	question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for
2 3 4	the cohort, that is data that is based upon the age at enrollment; correct?  A. At study entry, yes.  Q. So, the age of the cohort at the	2 3 4	question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for glyphosate in non-Hodgkin's lymphoma?
2 3 4 5	the cohort, that is data that is based upon the age at enrollment; correct?  A. At study entry, yes.  Q. So, the age of the cohort at the time of the actual De Roos analysis would be	2 3 4 5	question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for glyphosate in non-Hodgkin's lymphoma?  A. I haven't done power analyses on
2 3 4 5 6	the cohort, that is data that is based upon the age at enrollment; correct?  A. At study entry, yes.  Q. So, the age of the cohort at the time of the actual De Roos analysis would be a median of 6.7 years older; correct?	2 3 4 5 6	question. Have you looked to determine the relative power of the De Roos 2005 study as compared to the case-control studies for glyphosate in non-Hodgkin's lymphoma?  A. I haven't done power analyses on them, but in the you know, the
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Page 150 Page 152 1 1 do not know whether in fact the Agricultural identification, as of this date.) 2 2 Health Study, De Roos 2005, is the most Q. And in particular, if you can look powerful of all the epidemiologic studies to 3 3 at table three on page 1159 of McDuffie. I'm 4 sorry, table three. No, it's table two. 4 answer the question of whether glyphosate 5 5 Sorry, table two. causes non-Hodgkin's lymphoma. 6 A. I did not do a power analysis. And they have the odds ratio for 7 Q. Let's look at -- you mentioned that glyphosate of 1.2, which is the odds ratio 8 8 one way you can determine the power of a you report on in your expert report and on 9 page 43; correct? About midway through the 9 study is by looking at the confidence 10 10 intervals and the range of the confidence table, the farthest to the right column. 11 intervals. We talked about that earlier; 11 A. Okay. 12 12 right? Q. And you can see that odds radio 13 13 adjusted footnote B; correct? A. Yes. 14 A. Yes. Q. And in your expert report, you actually provide information on that on 15 Q. And the footnote on the bottom 15 16 16 page 43, particularly where there is these explains what the odds ratio is adjusted for; 17 forest plots of the different studies; 17 correct? 18 18 correct? A. Yes. 19 A. Yes. 19 Q. It's not adjusted for exposure to 2.0 Q. And those forest plots, both the 20 other pesticides; correct? 21 21 A. Yes. forest plot from Schinasi and Leon and the 22 22 forest plot in Chang and Delzell, would allow Q. So, of the odds ratios adjusted for you to look and see the relative weight of 23 other pesticide exposure, De Roos 2005 is the 23 24 these different epidemiological studies and 24 most powerful study that exists for 25 the different power -- relative power; 25 glyphosate and non-Hodgkin's lymphoma; Page 153 Page 151 1 correct? 1 correct? 2 2 A. Yes. A. I may or -- I don't know. Perhaps. 3 Q. Not perhaps. You have the numbers Q. And of the case-control studies, 4 right here. De Roos 2005 is the most 4 the only case-control study that has -- is 5 5 powerful study with respect to non-Hodgkin's reported in these forest plots as having higher power than De Roos 2005 is the 6 lymphoma and glyphosate adjusted for exposure 6 7 7 McDuffie study; correct? to other pesticides; correct? 8 8 A. Is what? MR. TRAVERS: Objection, asked and 9 9 O. Is McDuffie. answered. 10 10 A. Okay. That may be. A. I'm sorry, is? Q. McDuffie. 11 11 Q. It is; correct? 12 12 A. You are talking about in Chang and MR. TRAVERS: Objection to the 13 13 testimony of counsel. Delzell? 14 14 A. Again, it's a little hard for me to O. Either one. 15 be definitive as I sit here now and trying to 15 A. Yes. 16 16 Q. And the McDuffie study, the risk make a decision in 30 seconds, in a minute, 17 17 ratio there is not adjusted for other but okay, I will agree. But --18 pesticides; correct? 18 Q. This is not something that you 19 A. I don't know offhand. 19 considered in preparing your expert report 2.0 20 Q. Okay. Should we go to McDuffie and and your criticism of the Agricultural Health check that out? 21 21 Study. 22 MR. LASKER: And this is 14-14. 22 A. That doesn't mean -- whether it has 23 23 (Exhibit 14-14, Cancer the most or the least, it doesn't have 24 24 Epidemiology, Biomarkers & Prevention by adequate power. 25 Q. And so then I take it your 25 McDuffie, et al marked for

Page 154 Page 156 1 1 testimony would be that none of the concerned with the power of that study? 2 2 case-control studies have adequate power. MR. TRAVERS: Objection, asked and 3 3 MR. TRAVERS: Objection. answered. 4 O. Correct? 4 A. So, of course, if you are talking 5 5 about a sample size where you get down to the MR. TRAVERS: Misstates the 6 level of six cases versus one, then you can testimony. 7 consider it, and an epidemiologist would use A. Having power, having a positive 8 8 finding is -- a posteriori is really enough. his logic and his common sense, his or her 9 9 If you have a positive finding, the question logic or common sense to evaluate the study 10 10 of whether you had statistic power up front and all of that. 11 is really -- sort of begs the question. 11 But the answer is, if you have a 12 12 Q. So, is it your testimony then that positive finding and it's statistically 13 significant, then the consideration of 13 an epidemiologist would only consider the 14 power of a study if the finding of a study is statistical power in the context of a 15 positive finding is less of a concern than it 15 null? 16 is in the context of a null finding. 16 A. I would say that in designing a 17 17 And the issue of statistical power study, you would be concerned about the 18 18 statistical power in designing the study, but is an issue in the design of a study up front 19 19 once you have a positive finding, the and whether you should be doing the study in 2.0 question of how much power you had up front 20 the first place or whether you have enough 21 is much less of a concern. 21 power to do the study and whether it's going 22 22 Q. So, if a study has -to give you the ability to define an outcome 23 23 with enough confidence that you are going to A. Statistical power is -- statistical 24 power is a concern in the context of the null 24 get an answer. 25 25 If you end up with a null finding find. Page 155 Page 157 1 Q. So, if you have a study with very 1 and wide confidence limits, then you haven't 2 low power, very wide confidence intervals, 2 answered the question that you started out 3 with, which is basically what happened at but it's a positive finding, it's your 4 least in the first report, in this report 4 testimony that you would not be concerned 5 about the power of the study in weighing the 5 from 2005 with glyphosate. 6 importance of that study? 6 Q. Dr. Neugut, there is no 7 epidemiological study anywhere in the A. I'm sorry, can you repeat the 8 8 literature which reports in its most fully question? 9 9 Q. Sure. adjusted model a statistically significant 10 10 increased risk of non-Hodgkin's lymphoma with If you have a study that reports a 11 11 positive finding with very, very wide glyphosate, is there? 12 MR. TRAVERS: Objection, misstates 12 confidence intervals, a very low power study, 13 13 is it your testimony as an epidemiologist the evidence. 14 that you are no longer concerned about the 14 A. I'm unaware when you go up to the 15 higher levels, maybe not with the ever/never 15 power of that study? 16 analyses, but I think in some of the A. Of course you are. Then you don't 17 17 dose-responses, there are. What about De have a positive finding. 18 Q. No, no, let me strike that. Let me 18 Roos 2003? 19 repeat it to make sure I am clear. 19 O. De Roos 2003 did not have a 2.0 dose-response -- the fully adjusted model, 2.0 If you have a study that reports a 21 2.1 statistically significant result with very which is set forth on page 43 of your report, 22 wide confidence intervals, so it's a study 22 is not statistically significant. 23 23 MR. TRAVERS: Move to strike with very low power but a statistically 24 24 significant result, is it your testimony that testimony of counsel. 25 25 as an epidemiologist, you are no longer Q. That's correct; right?

Page 158 Page 160 A. Yes. A. Yes. 2 2 Q. So, again, and you're talking about Q. And this is that concept that we 3 3 dose-response analyses, the only were talking about earlier, you want to have dose-response analysis anywhere in the 4 some period of time that has passed between 5 epidemiological literature for glyphosate and the exposure and the outcome to account for 5 6 6 non-Hodgkin's lymphoma adjusted for other this latency period for the development of 7 7 exposures is De Roos 2005; right? the cancer: correct? 8 8 A. Yes. A. Yes. 9 MR. TRAVERS: Objection, misstates Q. Okay. And your criticism here is 10 that there might not be sufficient latency, 10 the evidence. 11 11 or there is not -- there is not a way to tell Q. So it is correct to state --12 A. I'm sorry. Say the last point 12 whether there is latency between exposure and 13 diagnosis; correct? 13 again before I say yes to that one. 14 Q. The only dose-response analysis A. Yes. 14 Q. Now, the De Roos 2005 study, 15 15 adjusted for exposures to other pesticides 16 though, takes exposure data from that period anywhere in the literature --16 17 of 1993 to 1997; correct? It considers 17 A. Um-hum. 18 exposures back in that 1990s time period; 18 Q. -- in the epidemiological 19 correct? 19 literature, is De Roos 2005; correct? 20 MR. TRAVERS: Objection, misstates 20 A. Yes. 21 Q. And so, there is in effect a lag 21 evidence. 22 time in that study, because you are looking 2.2 A. I don't know, but it sounds right. 23 at cancers that developed later in time than Q. There is no odds ratio anywhere in 24 the epidemiological literature that reports 24 the exposures, than the latest possible 25 exposure that you are looking at; correct? 25 for glyphosate and non-Hodgkin's lymphoma an Page 159 Page 161 1 1 adjusted odds ratio positive association A. I don't follow the question. 2 statistically significant; correct? 2 Q. So, at the time of enrollment, we 3 MR. TRAVERS: Objection, misstates had data for De Roos 2005 of exposures from 4 4 the evidence. the mid '90s back; correct? 5 A. Not that -- correct, for the 5 A. Back? 6 herbicides, for the -- um-hum. 6 Q. Into history. It could be as early 7 Q. So, going back now to the issue of as whenever they first were exposed. 8 8 power, to the extent that you have a A. I see. 9 Q. So, your exposure period is mid 9 criticism of power with respect to the 10 Agricultural Health Study, that same 10 1970s to the mid 1990s. 11 criticism in your mind applies to all of the 11 A. Yeah. 12 case-control studies for glyphosate and 12 Q. Correct? 13 non-Hodgkin's lymphoma; correct? 13 And then you are looking at 14 A. All of them have difficulties with 14 non-Hodgkin's lymphomas that can develop as late as December 31, 2001; correct? 15 15 power, yes. Non-Hodgkin's lymphoma is a rare 16 16 outcome, and glyphosate is -- in many of them A. Yes. 17 is an uncommon exposure, too. 17 O. And to deal with the issue of 18 O. So, let's look now at the -- I 18 latency, studies often will have this sort of 19 think it's your -- I think it's your final 19 lag period where they are looking for 2.0 criticism, maybe your second. Go back to 2.0 development of cancer at some period of time 21 2.1 page 12 of your expert report. after the period of exposure; correct? 22 2.2 So, your second criticism is A. Yes. 23 23 talking about the inability to determine O. That is what De Roos 2005 in effect 24 disease latency for NHL in the AHS cohort; 24 did: correct? 25 2.5 correct? A. How did they do it?

Page 162 Page 164 1 1 Q. By having exposures that were up to would have -- again, in the context of a null 2 2 the mid 1990s and having cancer study -- if a null study, again, because 3 3 development -epidemiologic analyses are conservative, they 4 A. I see. mitigate against positive findings, so 5 5 non-differential misclassification attenuates O. -- at that later date: correct? A. Yes. I don't think the latency 6 6 risk ratios, so, having a null finding could 7 thing is necessarily a problem here. easily arise from having significant 8 8 O. Okay. So, criticism two in your misclassification of exposure. report is not really as much of an issues as 9 9 Q. I have a few follow-ups on that. 10 10 it might be otherwise. First of all, let me make sure, you said A. So, it will vary from -- depending 11 11 there are two issues here. One is 12 on the -- if you say -- if everyone truly had 12 non-differential misclassification. 13 15 years of exposure on average beforehand, 13 A. That's in the first place, from the 14 then latency is probably not going to be a time of enrollment. 15 Q. And the second one is intensity of 15 major problem. 16 16 Q. Okay. So, again, this is -- for exposure. 17 your criticism two, I just want to make sure 17 A. Well, but --18 18 we are clear on your testimony. The second Q. I'm just trying to understand if 19 criticism you have of the AHS De Roos 2005 19 those are the two. 2.0 study in your report at 12, pages 12 to 13, 20 A. Those two. One is that, in the 21 it's probably not a major concern; is that 21 first place, when they filled out the questionnaires at enrollment, that they 22 22 fair? 23 incorrectly stated their exposure. 23 A. I won't speak for the Weisenburger, 24 but again, I will be -- you know, to my 24 Q. Okay. So that let me make sure I 25 knowledge, I will say I am agnostic on the 25 understand this. I just want to break out Page 165 Page 163 1 1 the two opinions, so I understand them. The subject. 2 2 first opinion is that there would have been Q. Okay. Let's talk about your final 3 criticism then, your fourth criticism of the more intensity of exposure if they had 4 AHS study. And this is -- you are dealing 4 subsequent measure -here with non-differential exposure 5 A. More or less, or if they weren't 6 misclassification, and I think your point, 6 exposed to glyphosate and confused it with a 7 7 your point here -- let me make sure I different --8 understand your -- your criticism. Q. Well --9 You state that intensity of A. -- herbicide, or vice versa. 10 exposure to glyphosate was collected only for 10 MR. TRAVERS: You have to let him enrollment from 1993 to 1997; correct? 11 11 finish answering. 12 12 Q. Okay. I just want to break it out. A. Yes. 13 13 You said there is two. O. And your concern here is that there 14 would have been a dramatic increase in the 14 A. So one is that -- so, when you fill intensity of exposure potentially after that 15 out -- when you are asked about were you 15 16 exposed to glyphosate, some people are going 16 time period; correct? 17 17 to say no when it's a yes; some people are A. Well, I really have two concerns, 18 and I may not have stated it correctly here. 18 going to say yes when it's a no. That's not 19 I think we have been talking primarily about 19 recall bias, but just fill out the 20 questionnaire wrong. 2.0 biases, but in a cohort study, you also 21 21 have -- in every study, you also have the Q. I understand. 22 2.2 problem, as we said earlier, of A. So, in general on questionnaires 23 23 like that, there is a 10, 20 percent kind of non-differential misclassification, and I 24 think there is probably enough 24 error. If I ask you how much broccoli do you 25 25 non-differential misclassification that it eat, you know, you are not going to --

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Page 166

Q. Well, I eat a lot of broccoli, but I get your point.

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A. So, you are not going to fill it out -- you are not going to be right about -and that degree of misclassification, when we are talking about a risk ratio of 1.3 or something of that sort, is enough to -- to nullify a -- a risk ratio in the realm of 1.3 or 1.4, again. So, when you get -- again, as I said, epidemiologic analysis is conservative. It -- errors generally attenuate -- generally are biased towards giving you a null finding. So that kind of an error or random misclassification -again, this is not biased error, this is just people are just making innocent errors in filling out a form, that are random -- will bias the error toward -- will bias the estimate towards one.

Q. So, I understand that point, and I want to ask you questions about that, but I want to make sure I am clear. Is there any other criticism that you were trying to address in this paragraph four?

A. If you filled out -- if you entered

do have the actual intensity data for that cohort. Whether they had other intense exposures in the future after the enrollment period, we do know the intensity of exposure

Page 168

Page 169

at the time of enrollment; correct?

A. Yes.

Q. So, we are able to, and in fact De Roos 2005 does do an assessment of actual intensities of exposure to determine whether more intense exposures give rise to a greater risk of non-Hodgkin's lymphoma; correct?

A. Yes, but I believe there was some -- as I mentioned here. I believe there was some change in 1996 that actually, there was some secular change that actually caused a change in the overall use of Roundup, in 1996, in the middle of this study, that may have made a more dramatic or may have occasioned a more dramatic impact.

And how much it may or may not have affected risk, I don't know. I'm just raising it as a potential issue.

Q. Okay. But just so I am clear, the -- first of all, the fact that there was a change in the use pattern in '96, '97 would

Page 167

not alter the findings in De Roos 2005 with respect to the analysis that they had and the data they had that more intense exposures did

not increase the risk of non-Hodgkin's

the study in 1993 or 1994, something like 2 3 herbicide may have changed subsequently, and

lymphoma; correct?

that may have a change -- that may affect your subsequent risk of developing the disease. I realize that there were -- I think there were subsequent attempts to fill

out follow-up questionnaires to kind of re- -- reestimate the -- to requantify the,

the -- I don't know, call it the true

that, that your use of the -- of the

exposure or the -- certainly if we are talking about the intensity of exposure, we are not talking now about never-ever, but say

the quantity, but that wasn't reflected, at least in the De Roos 2005 paper. If there are subsequent analyses, then that may play a

role.

But again, if someone changed their exposure pattern over time, that would be -that would be something significant and may be important in terms of their risk.

Q. So let me just -- I'm going to take each one of those in turn.

First of all, with respect to the intensity of exposure of the 2005 cohort, we MR. TRAVERS: Objection, compound.

A. I don't know. I mean, it wouldn't have -- I guess it depends on how much change there was in the farmers, in the pesticide applicators' use of the agents, you know, of Roundup, and in the 6.7 years, it depends how many cases you are getting subsequently and what the latency period is.

It's a complicated issue. We are not talking about a lot of cases here either. You know, change of a few subjects is going to change -- change of a few cases, one way or another, exposure and outcome, is going to change the risk ratio fairly substantially.

Q. And with respect to this latency issue, the time period you are talking about of -- after 1996, of a potential change in the pattern of use of glyphosate, if Dr. Weisenburger is correct with respect to latency, that would be irrelevant to the

Page 170 Page 172 1 1 findings for De Roos 2005; correct? filling out the questionnaires, that the 2 2 A. If Dr. Weisenburger is correct, you degree of misclassification was sufficient to 3 3 mean with regard to a ten-year latency -have attenuated a risk ratio in the -- in the 4 Q. Yes. 4 realm that we are talking about, to null. 5 5 A. -- then yes, it would be irrelevant That's why I was saying earlier, 6 to what I am saying. 6 when you get null findings, you have to be Q. And we will get to --7 very suspicious, that there -- that they're 8 8 A. It would be irrelevant for the not meaningful in a sense, that they're--9 9 De Roos 2005 analysis. that they're-- that they arise out of errors 10 Q. We have also talked about, there is or out of -- that's why there's publication 10 11 a subsequent analysis, and we will get to 11 bias and things like that. 12 that in a moment. 12 Q. Let me just make sure I understand 13 13 this concept of bias towards the null. Now, With respect to the first point 14 about exposure and misclassification, that's, 14 in the AHS study, when they looked at the 15 15 if I understand correctly, an issue that dose-response analysis, they were finding arises in every study that obtains exposure 16 risk ratios below 1.0 for the higher exposure 16 17 data through questionnaire; correct? There 17 groups; correct? 18 18 is nothing unusual about --A. Yes. 19 19 A. You mean like recall bias? O. So, a bias towards the null then 2.0 Q. Well, no. Here you are talking 20 would mean that those risk ratios were 2.1 about exposure misclassification. Maybe I 21 actually increased as compared to what they 22 22 misunderstood. You not talking about recall would have been; correct? 23 2.3 bias in --A. Yes. 24 A. No. But I'm saying that it arises 24 O. So, the issue of differential 2.5 in every cohort study, like recall bias 25 exposure misclassification for the Page 171 Page 173 1 1 arises in every case-control study? Agricultural Health Study would not have 2 Q. No. As in -- let's start that 2 lowered those odds ratios, it would have again. I will restate the question. 3 increased them: correct? The issue that you talked about 4 4 A. I'm -- I can't follow that logic. 5 with respect to exposure misclassification 5 That is too complicated for me to --6 would be an issue not only with De Roos 2005, 6 Q. Okay. Let me step back. Maybe but every case-control study for glyphosate; 7 7 it's the way I asked the question. I will correct? They are all based on 8 8 frame it correctly. 9 9 questionnaires. In the De Roos 2005 paper, if there 10 10 was this non-differential exposure A. So, I am saying that if you are going to start to throw around recall bias 11 11 misclassification, that would mean that the 12 for every case-control study, then you have 12 odds ratios reported for that dose-response 13 13 to throw around non-differential below one were actually lower than the 14 misclassification for every cohort study. 14 reported numbers; correct? 15 But it's been assessed, and there is a paper 15 A. It would not solely be from 16 16 on it by Blair which assessed it and shows exposure misclassification. 17 that the degree of misclassification would 17 Q. Right. But any differential --18 have been sufficient -- they estimated it to 18 non-differential error, including the 19 some degree, and it suggests that it would 19 exposure misclassification error you identify 20 2.0 as your concern for the Agricultural Health have been -- even a reasonable amount. 21 21 reasonable meaning even a, shall we say a --Study, would have increased those odds ratios 22 22 what one would expect under normal as reported in the De Roos 2005 23 circumstances of everyone doing it correctly, 23 dose-response: correct? 24 and doing even a decent quality, recruitment 24 A. Yes. 25 of subjects, and everyone doing their best 25 Q. So, that is not a concern, then,

Page 174 Page 176 1 1 that the De Roos study is missing a positive A. Yes. 2 2 association. It's that the De Roos study That's what you state in your Q. 3 3 might be missing a negative association; report. correct? 4 A. Absolutely. 5 5 Q. If there is -- and in fact, we know A. That's getting too complicated for 6 6 me to -- again, to work out sitting here. for a fact that there is, that the AHS study 7 Q. Okay. But it is correct then, in its dose-response analysis reports risk 8 8 though, that in the AHS study, if there was ratios for the higher exposure groups below 9 1.0, a bias towards the null would be pushing 9 non-differential misclassification, including 10 10 non-differential exposure misclassification, those numbers up, not down; correct? 11 11 MR. TRAVERS: Objection, asked and the risks of glyphosate in association with 12 non-Hodgkin's lymphoma would have been 12 answered. 13 13 overestimated: correct? A. The glyphosate analysis, as I 14 14 recall it, is still above 1.0 in the AHS MR. TRAVERS: Objection, asked and 15 15 answered. study for ever/never, and for most of the 16 16 A. Would have been overestimated? No, exposure categories. I don't think it really 17 17 it would have been -- it would have been comes out that --18 18 attenuated. It would have been --O. Let's look back at 2005 De Roos. 19 Q. Or not? 19 MR. TRAVERS: Eric, just whenever 2.0 A. Why would it have been --20 you get a break in a subject, we have 21 21 got -- lunch is here. Q. You're biasing towards the null; 22 22 correct? It's going closer to 1.0; correct? MR. LASKER: Yes. Once we get 2.3 23 through this. 24 Q. The reported odds ratios were below 24 Q. I just want to make sure we are 25 25 clear, because I thought we had discussed 1.0; correct? Page 175 Page 177 1 A. Now we are getting into it, but --1 this previously. The -- on page 52 --2 2 so I -- it's getting too complicated to, A. I'm sorry. 3 like, tease out now what that means in real Q. -- of the De Roos study, 2005 4 4 terms, so you are going to tell me that study. glyphosate has a protective effect on -- we 5 5 A. Fifty-two? 6 should all be taking glyphosate so we don't 6 Q. Page 52. The odds ratios for 7 7 get lymphoma? glyphosate and non-Hodgkin's lymphoma, for 8 Q. I'm trying to understand your the two -- for the increased dose groups, as 9 9 criticism, Dr. Neugut. you increase cumulative exposure, and as you 10 A. It's really -- it's getting too 10 increase intensity-weighted exposure, those complex to -- you know, there are too many 11 11 odds ratios are below 1.0; correct? 12 variables involved in this and too many 12 A. Yes, but --13 assumptions to really make a -- to, as we sit 13 O. If there is non-differential 14 here, make a -- make a meaningful statement 14 misclassification, those numbers have been 15 about what a -- what a 0.9 means as opposed 15 biased upwards toward the null of 1.0; 16 16 to a 1.0, or whether it's just, you know, correct? 17 17 within the bounds of statistical analysis. A. Yes. 18 Q. Dr. Neugut, this is your criticism 18 Q. Which means that the true 19 number four on page 13 of your expert report. 19 relationship between glyphosate and 2.0 And in your expert report, you state that 2.0 non-Hodgkin's lymphoma as you increase dose 21 21 because of this non-differential exposure is an even lower odds ratio, a greater 22 22 misclassification, there could be a bias reduced risk than is reported; correct? 23 23 MR. TRAVERS: Objection, asked and towards the null, and that the reported 24 association between glyphosate and NHL would 24 answered. 25 25 be underestimated. A. So, I was referring to

misclassification in terms of being exposed at all, not talking about the all, not talking about the much intensity or how long people were exposed. I don't know - I didn't think through or analyze the exposure intensity part of it, and I don't know how that would affect the attenuation here.  Q. Dr. Neugut, if there was non-differential misclassification biasing these numbers towards the null, as you is suggest would occur in your expert report, for AHS - for the De Roos 2005 paper, that would have resulted in an overstatement or overestimate of the odds ratio that increased dos of exposure, not an underestimation; correct?  MR. TRAVERS: Objection, asked and answered.  A. Could you say the question again.  Page 179  misclassification, then  A. It's not my criticism. If's Aaron  Blair's. I'm just quoting a paper. But go ahead.  Q. Okay, No, uor criticism then of the AHS puper, of the De Roos 2005, is there could be this non-differential exposure  page 179  misclassification, then  A. No, no, no. The paper is good. Q. Okay, Well, okay, But is it not your opinion in here? A. No, no, no, or The paper is good. Q. Okay, No, our criticism then of the AHS puper, of the De Roos 2005, is there could be this non-differential exposure  misclassification and if that in fact occurred, the dose-response analysis that is reproduct in the 2005 De Roos paper; is auctually overestimating the risk of lymphoma, and not underestimating it; correct?  MR. TRAVERS: Objection, misclassification with non-Hodgkin's lymphoma and not underestimating it; correct?  MR. TRAVERS: Objection, misclassification with non-Hodgkin's lymphoma would associution with non-Hodgkin's lymphoma and sociution with non-Hodgkin's lymphoma would associution with non-Hodgkin's lymphoma		Page 178		Page 180
at all, not talking about the misclassification, or classification, or classification or classification or classification there was through or analyze the exposure intensity part of it, and I don't know how that would affect the attenuation here.  9	1	misclassification in terms of being exposed	1	be underestimated, because there is a bias
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sexposed. I don't know. – I didn't think though or analyze the exposure intensity part of it, and I don't know how that would affect the attenuation here.  Q. Dr. Neugut, if there was non-differential misclassification biasing these numbers towards the null, as you suggest would occur in your expert report, for AIS – for the De Roos 2005 paper, that would have resulted in an overstatement or overestimate of the odds ratio that increased dose of exposure, not an underestimation; correct?  MR. TRAVERS: Objection, asked and answered. A. Could you say the question again. G. Sur. Jif your – again, we are talking about your criticism of AIS, the De Roos Jupon non-differential exposure  Page 179  misclassification, then – A. It's not my criticism. If there is this non-differential exposure  Page 179  misclassification, then – A. It's not my criticism. If s Aaron Blair's. I'm just quoting a paper. But go ahead. Q. Okay, Well, okay, But is it not your opinion in here? A. No, no, no. The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure  misclassification, and if that in fact your opinion in here? A. No, no, no, no-The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure misclassification, and if that in fact correct, A. Well, I can't answer with regard to the exposure. That's on-that's a differential exposure misclassification, and interestination gain.  Page 179  misclassification, and if that in fact your opinion in here? A. No, no, no, no. The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure misclassification, and if that in fact your opinion in here? A. No, no, no, no and that in fact your opinion in here? A. No, no, no, no and your expert report accounted the proposed propose	3		3	
sexposed. I don't know. – I didn't think though or analyze the exposure intensity part of it, and I don't know how that would affect the attenuation here.  Q. Dr. Neugut, if there was non-differential misclassification biasing these numbers towards the null, as you suggest would occur in your expert report, for AIS – for the De Roos 2005 paper, that would have resulted in an overstatement or overestimate of the odds ratio that increased dose of exposure, not an underestimation; correct?  MR. TRAVERS: Objection, asked and answered. A. Could you say the question again. G. Sur. Jif your – again, we are talking about your criticism of AIS, the De Roos Jupon non-differential exposure  Page 179  misclassification, then – A. It's not my criticism. If there is this non-differential exposure  Page 179  misclassification, then – A. It's not my criticism. If s Aaron Blair's. I'm just quoting a paper. But go ahead. Q. Okay, Well, okay, But is it not your opinion in here? A. No, no, no. The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure  misclassification, and if that in fact your opinion in here? A. No, no, no, no-The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure misclassification, and if that in fact correct, A. Well, I can't answer with regard to the exposure. That's on-that's a differential exposure misclassification, and interestination gain.  Page 179  misclassification, and if that in fact your opinion in here? A. No, no, no, no. The paper is good. Q. Okay, So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure misclassification, and if that in fact your opinion in here? A. No, no, no, no and that in fact your opinion in here? A. No, no, no, no and your expert report accounted the proposed propose	4	much intensity or how long people were	4	
7 part of it, and I don't know how that would affect the attenuation here. 9 Q. Dr. Neugut, if there was non-differential misclassification biasing these numbers towards the null, as you is utagest would occur in your expert report, for AHS — for the De Roos 2005 paper, that would have resulted in an overstament or overestimate of the odds ratio that increased dose of exposure, not an underestimation; correct?  3 MR. TRAVERS: Objection, asked and answered. 4 A. Could you say the question again. 9 A. Could you say the question again. 10 A. Could you say the question again. 11 If your — again, we are talking about your criticism of AHS, the De Roos 2005, your fourth criticism. If there is this non-differential exposure  1 misclassification, then — 1	5		5	·
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9 Q. Dr. Neugut, if there was non-differential misclassification biasing the exposure. That's not – that's a different categorization. Q. So, stiting here today, if there is non-differential misclassification pour expert report, as the exposure. That's not – that's a different categorization. Q. So, stiting here today, if there is non-differential exposure misclassification, you cannot state what biasing towards the null would mean with respect to the numbers reported in the 2005 De Roos paper? MR. TRAVERS: Objection, asked and answered. A. Could you say the question again. Q. So, with respect to the numbers reported in the 2005 De Roos paper? MR. TRAVERS: Objection, asked and answered. A. Could you say the question again. Q. So, with respect to the numbers reported in the 2005 De Roos paper? MR. TRAVERS: Objection, asked and answered. A. That's correct. Q. So, with respect to the dose-response analysis then in De Roos 2005, am I correct in my understanding that you do not have a criticism of that finding based upon non-differential exposure misclassification, then Page 179  misclassification, then A. It's not my criticism. It's Aaron Blair's. I'm just quoting a paper. But go ahead. Q. Okay. Well, okay. But is it not you opinion in here? A. No, no, no. The paper is good. Q. Okay. So, your criticism then of the AHS paper, of the De Roos 2005, is there could be this non-differential exposure 10 misclassification, and if that in fact 11 misclassification, and if that in fact 11 occurred, the dose-response analysis that is 12 reported in the 2005 De Roos paper is 13 actually overestimating the risk of 14 glyphosate exposure for non-Hodgkin's 19mphoma, and not underestimating it; 16 correct?  MR. TRAVERS: Objection, 18 mischaracterizes his testimony. It's 19 asked and answered. 20 A. No, to state in your expert report 21 that if there is a bias towards the null, the 20 asked and answered. 21 A. It's overestimating? 21 that if there is a bias towards the null, the 20 asked and answered. 22 that if there is a bi	7	part of it, and I don't know how that would	7	table three.
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Page 182 Page 184 1 1 AFTERNOON SESSION Dr. Blair's deposition testimony on this. 2 And if you have Dr. Blair's deposition before 2 THE VIDEOGRAPHER: The time is 3 3 you, pages -- on page 168. 1:50 p.m. We are on the record. 4 BY MR. LASKER: 4 A. What page? 5 5 Q. 168. And specifically lines six to Q. Dr. Neugut, good afternoon. 6 6 We talked previously about line 16. 7 7 Dr. Blair's deposition that you have read. And having reviewed Dr. Blair's 8 8 And you are aware from that deposition, I deposition testimony, does that refresh your take it, that there is a 2013 update of the 9 recollection that the 2013 AHS analysis had 9 10 Agricultural Health Study data that contains an additional seven years of follow-up for 10 11 additional data for glyphosate and 11 NHL beyond De Roos 2005? 12 12 non-Hodgkin's lymphoma; correct? A. Yes. 13 13 Q. The 2013 analysis of the AHS data A. Yes. 14 14 Q. You have not offered any expert was three to four times larger than the 15 De Roos 2005 study; correct? 15 opinion regarding that study in your expert 16 MR. TRAVERS: Objection, 16 report; correct? 17 17 mischaracterizes the study. A. Yes. 18 18 A. Can -- I don't know. If it's in Q. You are aware, though, that the 19 19 2013 AHS analysis included five years of Dr. Blair's testimony, then I read it at some 20 additional exposure data beyond the data in 20 point, but --21 De Roos 2005; correct? 21 Q. Let me refer you to page 171, 22 specifically lines 21 through 24. Dr. Blair 2.2 MR. TRAVERS: Objection, testifies here that the 2013 cohort study, 23 23 mischaracterizes the study. 24 A. I am aware that it exists. Is that 24 with results for glyphosate and non-Hodgkin's 25 what you are asking me? 25 lymphoma, is more than four times larger than Page 183 Page 185 1 Q. No. My question is, are you aware 1 the De Roos 2005 study; correct? 2 that the 2013 analysis included five years of 2 A. Yes. 3 3 additional exposure data beyond the data in Q. The answer is yes. You have no 4 4 De Roos 2005? reason to disagree with Dr. Blair on that; 5 5 MR. TRAVERS: Same objection. correct? 6 6 A. What is -- am I aware of it? A. No. 7 7 Q. I will ask the question again. Q. The 2013 study, with even longer 8 8 A. I'm sorry. follow-up, also analyzes applicators that had 9 9 Q. You are aware that the 2013 even higher levels of cumulative exposure to 10 analysis of the Agricultural Health Study 10 glyphosate than in De Roos 2005; correct? 11 data includes five years of additional 11 A. I believe so. 12 exposure data beyond the data in De Roos 12 Q. That goes to one of the issues you 13 13 2005; correct? had talked about in your report, about 14 A. Yes. 14 additional years and different uses of 15 15 You are also aware that the 2013 glyphosate and more intense exposures; 16 16 analysis had an additional seven years of correct? 17 follow-up for non-Hodgkin's lymphoma; 17 A. I don't recall offhand, but yes, 18 correct? 18 I -- I don't recall. 19 MR. TRAVERS: Objection, 19 Q. And according -- Dr. Blair was one 20 mischaracterizes the study. 2.0 of the listed investigators that prepared 21 A. I don't know the details, but I 21 that 2013 analysis; correct? 22 know that it has additional follow-up. I 22 A. I wouldn't know. don't know -- I couldn't quote you the 23 23 Q. Dr. Blair testified -- well, let me 2.4 numbers, but --24 just state -- let me just ask this. The 25 Q. Okay. Let's take a look at 25 ever/never risk ratio for glyphosate and NHL

	Page 186		Page 188
1	in this larger 2013 AHS analysis was below	1	Q. And Dr. Blair also reports that
2	1.0. It was around 0.9; correct?	2	there was in fact, in one of the
3	A. I don't know.	3	dose-response analyses, a statistically
4	Q. Let's look at Dr. Blair's testimony	4	significant negative finding for diffuse
5	on page 172, line 16 to line 24.	5	large B-cell lymphoma; correct?
6	A. Okay.	6	MR. TRAVERS: What page is that?
7	Q. Dr. Blair reports that this 2013	7	A. I don't recall.
8	analysis of the AHS data reported an	8	Q. I will refer you to page 195.
9	ever/never odds ratio or risk ratio for	9	A. 195?
10	glyphosate and non-Hodgkin's lymphoma of	10	Q. Yes. And particularly lines nine
11	approximately 0.9; correct?	11	through 21.
12	MR. TRAVERS: Objection, that	12	The 2013 AHS data finds a
13	misstates his testimony.	13	statistically significant negative
14	A. "Reports" means what?	14	association between increased glyphosate
15	Q. Dr. Blair states	15	exposure and diffuse large B-cell lymphoma;
16	MR. LASKER: And if we are going to	16	correct?
17	have speaking objections, we can switch	17	A. Yes.
18	you and you can be the witness, but	18	Q. Now, the 2013 AHS analysis that
19	otherwise, please do not provide speaking	19	Dr. Blair testified to, that was attached as
20	objections, counsel.	20	an exhibit to Dr. Blair's deposition;
21	MR. TRAVERS: Well, you can't	21	correct?
22	misrepresent	22	A. I don't know.
23	MR. LASKER: Dr. Neugut can respond	23	Q. You have reviewed Dr. Blair's
24	to the questions. You cannot.	24	deposition; correct?
25	MR. TRAVERS: I'm just giving	25	A. Yes.
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	Page 187		Page 189
1	Page 187 reasonable objections. You are	1	Page 189  Q. Did you, in reading his deposition,
1 2	reasonable objections. You are misstating the testimony.	1 2	
	reasonable objections. You are misstating the testimony.  MR. LASKER: Well, if you continue,		Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?
2	reasonable objections. You are misstating the testimony.	2	Q. Did you, in reading his deposition, note that that study was marked as an exhibit
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2 3 4	reasonable objections. You are misstating the testimony.  MR. LASKER: Well, if you continue, we'll have a whole record of this	2 3 4	Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?  A. I don't notice things like that
2 3 4 5	reasonable objections. You are misstating the testimony.  MR. LASKER: Well, if you continue, we'll have a whole record of this  MR. TRAVERS: Okay, it's on the	2 3 4 5	<ul><li>Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?</li><li>A. I don't notice things like that when I read depositions. I don't look at the</li></ul>
2 3 4 5	reasonable objections. You are misstating the testimony.  MR. LASKER: Well, if you continue, we'll have a whole record of this  MR. TRAVERS: Okay, it's on the record.	2 3 4 5	Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?  A. I don't notice things like that when I read depositions. I don't look at the index. I don't look at the supplements.
2 3 4 5 6 7	reasonable objections. You are misstating the testimony.  MR. LASKER: Well, if you continue, we'll have a whole record of this  MR. TRAVERS: Okay, it's on the record.  MR. LASKER: And we can bring this to the judge if you want, but your objections have been ridiculous all day.	2 3 4 5 6 7	<ul> <li>Q. Did you, in reading his deposition, note that that study was marked as an exhibit to the deposition?</li> <li>A. I don't notice things like that when I read depositions. I don't look at the index. I don't look at the supplements.</li> <li>Q. Well, in the testimony, as we are</li> </ul>
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Page 190 Page 192 1 1 regard to the 2013 AHS analysis? again, it's a while ago. But if I recall, it 2 2 A. It didn't play a role in my was the fourth follow-up from the same study, 3 3 and it was not -- I did not rely upon it in opinions. Q. Now, you have previously, I think 4 actual litigation subsequently in any of the 5 5 we have discussed, been retained as an expert testimony that I gave in any of the trials. 6 witness by the same attorneys who are Q. Just to be clear, Dr. Neugut, in 7 representing the plaintiffs in this case; this deposition testimony we just reviewed, 8 8 correct? In other litigation? you stated that you were going to be relying 9 9 A. Only for the Actos, I believe for upon the non-published, non-peer-reviewed 10 10 results of a nested case control, and your the Actos litigation. 11 Q. And in that litigation, like in 11 answer was yes; correct? 12 this one, you were retained to provide an 12 A. So I -- yes, it is, but I do not 13 recall in what way I did rely on it and how I 13 opinion based upon epidemiologic evidence 14 that a substance, there it was a drug, caused did or did not. 15 15 cancer: correct? Q. But just for the record, in other 16 litigation in which you were represented by 16 A. Yes. 17 17 this same plaintiffs' counsel who represents Q. And in that litigation, you relied 18 18 upon a non-published, non-peer-reviewed you here today, in which you were asked to 19 assess the epidemiology for exposure causing 19 epidemiological study in support of your 2.0 opinion, didn't you? 20 cancer, you relied upon a non-published, 21 A. I don't recall. 21 non-peer-reviewed study, and in this case, 22 22 you chose not even to look at the 2013 AHS Q. Okay. Let's go back to your 23 January 7, 2013 deposition, and it should be 23 data: correct? 2.4 in front of you. Dr. Neugut, it looks like 2.4 A. Yes. 2.5 25 Q. Let's take a look at some of the this. Page 191 Page 193 1 1 If I could direct you to page 157, case-control studies for the glyphosate and 2 158, and you can, I think -- it starts on 2 non-Hodgkin's lymphoma. One of those was a 3 study by Cantor in 1992; correct? page 157, line 20, to 158, line six. You may recall this -- well, you will recall this 4 A. I'm sorry, I am -- I was -- my mind 4 5 better than I would. I wasn't there. was wandering. 6 But does this testimony refresh 6 Q. That's all right. 1992 Cantor 7 7 your recollection -study. 8 A. Which line, which page? A. What about it? 9 9 Q. From page 157, line 20, through Q. That was one of the studies you 10 158, line six. 10 looked at in your analysis; correct? 11 11 A. Yes. A. Yes. 12 12 Q. Does that refresh your MR. LASKER: And let's mark the 13 13 Cantor study as Exhibit 14-15. recollection, Dr. Neugut, that in the Actos litigation, where you were represented by the 14 (Exhibit 14-15, Cancer Bulletin, 14 same plaintiffs' counsel that you are 15 May 1, 1992, Pesticides and Other 15 16 represented here today, in offering your Agricultural Risk Factors for 17 17 Non-Hodgkin's Lymphoma among Men in Iowa opinion as to whether exposure can cause 18 cancer, you relied upon a non-published, 18 and Minnesota marked for identification, 19 non-peer-reviewed study? 19 as of this date.) 20 2.0 O. And for the record, this is the A. I wasn't aware at the time that it 21 2.1 wasn't published, I think, or I was in error Cantor 1992 study that you discussed in your 2.2 at the time, or I had some confusion about 22 report; correct? 23 23 it, as I say here. This was a series. It A. Yes. 24 was in the same context of a cohort study, 24 Q. What was the testable hypothesis 25 25 where this was the fourth, if I recall -for this study?

Page 194 Page 196 1 A. I'm sorry, ask your question again. still in front of you. Can you just pull out 2 2 Q. What was the testable hypothesis in Dr. Ritz's expert report. 3 3 the Cantor 1992 study? It's thicker than that, about this A. What does "testable hypothesis" 4 thick. 5 5 mean? A. Is this it? 6 Q. Well, I was, I thought, taking that 6 Q. No. Maybe on the bottom. 7 7 from you. You had described your methodology A. The very bottom. I'm sorry. 8 8 for reviewing epidemiological studies, and Q. Always the way. 9 9 you talked about the fact that you first So, Dr. Ritz, she is another expert 10 10 formulated a hypothesis. witness epidemiologist on behalf of 11 11 A. You mean the primary hypothesis? plaintiffs in this litigation; correct? 12 Q. If that's what you meant. Just to 12 A. Yes. Q. And if you could turn to page 18 13 13 make sure we are talking on the same page 14 14 here, in your expert report on -- let's see, and 19 of her report. Dr. Ritz states that where was it? Page six. You talk about this 15 15 "the findings of Cantor are less informative 16 multistep process to establish causal 16 because there was not sufficient time to 17 inferences: correct? 17 account for the latency of non-Hodgkin's 18 18 lymphoma." A. Um-hum. Do you see that? 19 Q. And so you -- you first formulate a 19 20 testable hypothesis, and then you design 20 A. Yes. 21 21 studies to test the hypothesis; correct? O. And she states that "one would like 22 2.2 A. Yes. to see a medium potential latency period of 23 Q. So, my question for you with 23 at least ten years for an epidemiologic study 2.4 24 respect to Cantor 1992 is, what was the of glyphosate and non-Hodgkin's lymphoma to 25 25 be informative." Correct? testable hypothesis of that study? Page 195 Page 197 1 1 A. I guess it was being a farmer, or A. Yes. 2 2 being a -- having a farming occupation, or Q. Do you agree with Dr. Ritz on that? 3 however you want to phrase the -- however you 3 A. I stated earlier that I am agnostic 4 4 want to phrase that. with regard to the question of latency 5 Q. Okay. Would it be fair to say that period. We have spoken earlier about 6 Cantor 1992 was not designed to test the 6 Weisenburger's opinion. I don't know what 7 hypothesis whether glyphosate can cause 7 the latency period is, so I don't know the 8 8 non-Hodgkin's lymphoma? answer. 9 9 A. Yes. That was a secondary --Q. Do you agree that this question of 10 secondary aim, analysis, however you want to 10 latency period is important in analyzing what 11 11 one can glean from the Cantor 1992 study with phrase it. 12 12 respect to glyphosate? Q. Now, the Cantor study looks at 13 13 individuals who are diagnosed with A. If one knew what the latency 14 non-Hodgkin's lymphoma between 1980 and 1983; 14 period -- if one knew what the mechanism is 15 15 correct? And if you look at the methods of how glyphosate -- if one was -- one knew 16 16 section for case selection on the first page. definitively how glyphosate causes lymphoma, 17 17 A. Yes. Um-hum, yes. so that one could definitively establish the 18 18 Q. So, the cases of NHL in this study latency period, then yes, it would be very 19 were diagnosed somewhere between -- well, 19 important. But otherwise, it's difficult to 20 20 certainly less than ten years after be able to know how to apply it in this 21 glyphosate first became available for use in instance. 22 2.2 the market; correct? Q. If Dr. Weisenburger is correct that 23 23 A. Something less than that, yes. the latency period is ten years for 24 Q. Now, we talked earlier about 24 glyphosate and non-Hodgkin's lymphoma, do you 25 25 Dr. Ritz, and I believe her expert report is agree with Dr. Ritz that that would mean that

Page 198 Page 200 1 1 the Cantor study is not informative with because you didn't have enough statistical 2 2 respect to glyphosate and non-Hodgkin's power to be able to find the positive 3 3 lymphoma? association. Q. With respect to power, is it your A. I would say that it would be 4 5 5 difficult to say how it would have enough opinion then that power only matters for a 6 6 cases to be able -- how it would be finding of a positive association and doesn't 7 7 matter with respect to reaching an opinion informative. 8 8 about a causal relationship? O. That's because the individuals in 9 9 MR. TRAVERS: Objection, asked and the study would have been exposed too close 10 10 in time to their diagnosis for latency to answered. 11 have occurred and for the exposure to have 11 A. That question doesn't make sense. 12 been related to non-Hodgkin's lymphoma; 12 Q. Okay. Let me restate. 13 If a study is insufficiently 13 correct? 14 powered, in your opinion does that severely 14 A. It wouldn't have been impossible limit your ability to reach a causal opinion 15 15 for a few of them to have been, but for at 16 based upon that study? 16 least for some -- for a large number of them, 17 A. If a power is insufficiently -- if 17 it would have been probably not possible. 18 a study is insufficiently powered, then you 18 Q. And in your expert report, you 19 have to interpret a null finding with extreme 19 state that Cantor had again low power because 20 2.0 there were only 26 cases of NHL with exposure caution or with -- or -- or not be able to 21 draw a -- not be able to draw a definitive 21 to glyphosate; correct? 22 conclusion from it. In other words, if there 2.2 A. Yes. 23 23 Q. And this goes back to our earlier was insufficient power to start with, and you 2.4 24 have a null finding, then you certainly are discussion. The key number for power is the 25 limited in being able to conclude that there 25 number of individuals who were both exposed Page 199 Page 201 1 1 and had the outcome of interest; correct? is no positive association. 2 2 A. Yes. Q. Okay. I understand that, but I'm 3 asking the other direction as well. Is it Q. And you believe that a study that 4 4 has only 26 individuals with exposure to fair to say that if a power -- if a study is glyphosate and NHL does not have sufficient 5 insufficiently powered, it is severely 6 power to provide reliable information 6 limited in providing you with the type of 7 7 regarding any potential causal relationship evidence that you would want to have as an 8 between glyphosate and non-Hodgkin's epidemiologist to reach a causation opinion? 9 9 lymphoma; right? MR. TRAVERS: Objection, asked and 10 MR. TRAVERS: Objection, misstates 10 answered. 11 11 A. I'm not sure that isn't saying the his testimony. 12 12 A. I didn't say that. same thing. How is that question different? 13 13 O. The answer may be yes, but let me Q. Let me make sure I understand your 14 testimony then. Okay. So let me -- let me 14 just make sure I understand in my own mind. 15 15 rephrase the question. A. If I -- if I had an 16 Do you believe that a study with insufficiently -- if I had a study that 17 only 26 individuals with exposure to 17 a priori was -- had poor -- was small, so it 18 glyphosate and NHL is severely limited in its 18 didn't have sufficient power in the first 19 ability to provide information regarding any 19 place that I was happy doing it, but having 2.0 2.0 potential causal relationship between then conducted the study, I had a positive 21 2.1 glyphosate and NHL? association, I would still take the 22 2.2 A. If you have a -- if you have a null positive -- I would still have to take the 23 23 finding, then you have to -- then I think you positive association at least -- seriously, 24 have to be limited in terms of how you 24 and take it -- because, as I said in our 25 25 interpret a null finding in that context, morning discussion, I think positive

Page 202 Page 204 1 1 associations always have to be at least lymphoma discussed in your report had even 2 2 seriously entertained and analyzed, less power than the Cantor study; correct? 3 3 because -- because the system, the structure A. I would think so, yes. 4 of epidemiologic and statistical analysis 4 Q. The Hardell study in 2002, that has 5 5 militates against positive findings. less power than the Cantor study; correct? Of course, if the numbers are 6 A. Yes. 7 Q. The Cocco study, the Cocco, really tiny, then you can take that into 8 8 consideration and say it's really so small, C-O-C-C-O, study we looked at earlier, that that even though it's statistically 9 has less power than the Cantor study; 10 10 significant, that the numbers are so small, correct? 11 I'm not going to really give it that much 11 A. Yes. 12 12 credit, or maybe it's a statistical artifact Q. The Orsi study, that has less power 13 13 or maybe it's bias. than the Cantor study; correct? 14 But that's why we are given brains, A. Yes. and we are supposed to use our logic and our 15 15 Q. And the Eriksson study, that one, judgment and our common sense, and that is 16 let's look at that one, because that is a 16 17 what epidemiology is all about. Epidemiology 17 little bit more involved. I think I marked 18 18 is the ultimate in judgment, causal that Exhibit 14-13, so you should have that 19 19 considerations, the application of logic, in front of you. Exhibit 14-13. 2.0 common sense, and intelligence to taking data 20 A. That's -- oh, I see. That's and trying to analyze it, and to be able to 21 21 Eriksson? interpret what you find, because you will 22 22 O. Yes. 14-13. Eriksson 2008, and 23 23 never have pure, unadorned, perfect data the information is -- can be determined from 2.4 to -- well, you will almost never have pure, 24 table two for all exposures with glyphosate, 25 absolute data that you can interpret without 25 table two on page 1659. That study involved Page 203 Page 205 1 having to use your brain to, to analyze. 1 29 individuals with exposure to glyphosate 2 So you have -- as with everything 2 who had non-Hodgkin's lymphoma; correct? 3 else, you have to apply your, your logic and A. Yes. 4 4 thinking to what you see, and to come up with O. And the Eriksson -- so that's -- I 5 the best interpretation you can. Reasonable think there is three more cases in Eriksson 6 people may reasonably disagree, as in every 6 than there was in Cantor 1992; correct? 7 other -- as in many other walks of life, but A. Yes. 8 in epidemiology, that is particularly a --O. The Eriksson study had only 9 more so than in most other scientific 18 controls, though; correct? 10 10 A. Yes. Exposed controls, you mean. endeavors, that is a particularly crucial 11 Or am I mischaracterizing it? 11 part of what we do in our daily endeavors. 12 Q. Dr. Neugut, let me ask the question 12 Q. You're looking at the study. 13 13 again, because I still don't understand the A. Am I looking at table two? 14 14 Q. Yes. 18 exposed controls -- 18 answer. 15 controls for 29 cases; correct? 15 Do you believe, if a study has 16 16 insufficient power, that that is a A. This is the number of exposed cases 17 significant limitation in your ability to use 17 and number of exposed controls. 18 that study to reach a causation opinion? 18 Q. And in Cantor 1992, they actually 19 MR. TRAVERS: Objection, asked and 19 had, I believe, 49 controls. Correct? And 2.0 2.0 you can look back to that, if you need to. answered. 21 21 A. I think it certainly limits the Do you need to look back at the Cantor study 2.2 ability of the study to be able to give you a 22 to confirm if they had 49 controls for 23 2.3 glyphosate? It's on table six. correct answer. 24 Q. Now, many of the other case-control 24 A. Table six? 25 25 studies of glyphosate and non-Hodgkin's Okay.

	Page 206		Page 208
1	Q. And the power of a case-control	1	
2	study is determined both by the number of	2	<ul><li>Q. And that's your opinion; correct?</li><li>A. It's limited by that, yes.</li></ul>
3	cases and the number of controls; right?	3	Q. And you have I think you
4	A. Yes.	4	testified earlier that this lack of
5	Q. And so from this data, it appears	5	adjustment for other exposures to pesticides
6	that Eriksson also had lower power than	6	limits a study's ability to tell us anything
7	Cantor with respect to glyphosate and	7	about the true association between glyphosate
8	non-Hodgkin's lymphoma; correct?	8	and non-Hodgkin's lymphoma; correct?
9	A. Which one has lower power?	9	A. I didn't say "anything about." I
10	Q. Eriksson.	10	said it limits our ability to tell us
11	A. A priori, yes.	11	precisely what's going on.
12	Q. Now, to put these numbers into	12	Q. And as you already discussed
13	context, we have been talking about 26	13	strike that.
14	exposed cases or 29 exposed cases, the	14	Well, as you already discussed, the
15	updated 2013 Agricultural Health Study	15	McDuffie study does not adjust for exposures
16	analysis, depending on which definition of	16	to other pesticides; correct?
17	non-Hodgkin's lymphoma you used, was studying	17	A. No.
18	between 250 and 350 individuals with exposure	18	Q. It's correct that it doesn't;
19	to glyphosate and non-Hodgkin's lymphoma;	19	right? Let me restate that question, because
20	correct?	20	I gave you a double negative.
21	A. Yes.	21	The McDuffie study does not adjust
22	Q. So, that is somewhere between ten	22	for exposures to other herbicides or other
23	to maybe 13 times larger than any of these	23	pesticides; correct?
24	case-control studies; correct?	24	A. No, it does not.
25	A. Well, the statistical power doesn't	25	Q. And the Lee study, which you also
	A. Well, the statistical power doesn't		Q. This the Ecc study, which you also
	Page 207		Page 209
1		1	
1 2	exactly go by multiplication, but it's	1 2	address in your expert report, it does not
	exactly go by multiplication, but it's larger, certainly.		
2	exactly go by multiplication, but it's	2	address in your expert report, it does not adjust for exposures to other pesticides;
2	exactly go by multiplication, but it's larger, certainly.  Q. Mathematically, it's ten to 13	2 3	address in your expert report, it does not adjust for exposures to other pesticides; correct?  A. Correct.
2 3 4	exactly go by multiplication, but it's larger, certainly.  Q. Mathematically, it's ten to 13 times larger, the AHS 2013 study, than any of	2 3 4	address in your expert report, it does not adjust for exposures to other pesticides; correct?  A. Correct.
2 3 4 5	exactly go by multiplication, but it's larger, certainly.  Q. Mathematically, it's ten to 13 times larger, the AHS 2013 study, than any of these case-control studies	2 3 4 5	address in your expert report, it does not adjust for exposures to other pesticides; correct?  A. Correct. Q. And the Eriksson study, except
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Page 210 Page 212 1 1 top, page 13 to 14, you are talking about the A. Yes. 2 2 Q. That is a null finding for Cantor 1992 study. At the very top of 14, 3 3 the last line in your discussion of Cantor, glyphosate and non-Hodgkin's lymphoma; 4 4 you state that "interpretation of the results correct? 5 is also limited by lack of adjustments for 5 A. Not an elevated finding, yes. 6 6 Q. It's a null finding. other herbicides used by the cohort." 7 7 A. Essentially. Correct? 8 8 Q. And now you state here that -- in A. I guess I was referring 9 your expert report, that this finding was not 9 specifically to the one where he was using adjusted for other pesticide exposures, but 10 the 26 versus -- that that specific analysis, 10 11 Cantor adjusted for other high-risk 11 but perhaps in the other analyses --12 12 exposures; correct? Q. Well, table -- we look at the 13 13 analysis on table six; correct? In Cantor. And if you could look at the Cantor 14 study at page 2448, at the top of the second 14 A. I may have made an error. 15 15 column. Q. Just so we are clear, the criticism 16 16 A. He adjusted for other risk factors, in your expert report of the Cantor study, 17 17 that it was limited by lack of adjustment for if that's what you are asking. 18 Q. Well, for other exposures that he 18 other herbicides, that is incorrect. 19 looked at in the study; correct? 19 A. I missed that. 2.0 A. Yes. 20 Q. Let's turn to the McDuffie study. 21 21 And I think -- have we already marked this? Q. And to the extent that any of --22 Yeah. This was 14-14, so you have that 2.2 and he looked at a number of different 23 23 already in front of you. pesticides and herbicides and insecticides in And Dr. Neugut, the McDuffie study 24 this study; correct? You can look to table 24 2.5 three and table four and table five and table 25 also was not designed to test the hypothesis Page 211 Page 213 1 that glyphosate might be associated with 1 six. And table seven, table eight. 2 2 non-Hodgkin's lymphoma; correct? A. Yes. 3 Q. And by a high-risk exposure, A. Not specifically. 4 Dr. Cantor means that he adjusted for any Q. That would be a secondary finding 4 exposure with an odds ratio above 1.5 when it 5 in the study; correct? 6 was adjusted solely for age and state of 6 A. I'm not sure that that is accurate. 7 residence: correct? I mean, it was to look at pesticides and 8 non-Hodgkin's lymphoma. I mean, and if you A. Yes. 9 say that glyphosate was one of them -- I 9 Q. So, to the extent that the -- any 10 of these other pesticide exposures met that 10 don't think glyphosate was particularly the criteria, Dr. Cantor did control for those 11 one that they were targeting, but they were 11 looking at pesticides in general. 12 pesticide exposures; correct? 12 13 13 O. Well, McDuffie in their study A. Yes. 14 14 actually specifically discusses -- and I will Q. So, that limitation that you noted in your expert report is actually -- for the 15 refer you to page 1161. 15 Cantor study, is actually incorrect; right? 16 A. 11 --16 17 A. What limitation? 17 O. 1161. 18 18 O. You state that there was a lack of A. 61, um-hum. 19 19 Q. And this is in the second column of adjustments for other herbicides used by the 2.0 2.0 cohort, is the word you used in your expert the text on that page, the full bottom 21 21 report. paragraph on the right side, full complete paragraph that starts, "We reported results," 22 2.2 A. Did I make an error? 23 23 on the right-hand column. Q. That is my question of you. It's A. Um-hum. 24 on page 14 of your expert report. I think 24 25 25 your expert report is up there. And on the O. And the authors of the McDuffie

Page 214 Page 216 1 McDuffie adjusted for medical variables, age 1 paper themselves describe their analyses in 2 2 this study as exploratory; correct? and study area; correct? 3 3 A. Family history, but -- is that what A. And so? Q. I'm just asking if it's correct 4 you mean by "medical variables"? 5 Q. Yes. Yes. 5 that this was an exploratory study. We 6 talked about that before. 6 A. Um-hum. 7 A. That's -- that may or may not be Q. And that is set forth on table two 8 8 true, but that may -- their aim may have been in the odds ratio of 1.2 that you mentioned 9 9 to do a study to look at exploratory -- to do in your expert report for glyphosate; 10 10 an exploratory study. correct? 11 Q. Right. No, I'm not -- I just want 11 A. Yes. 12 to make sure I understand. The McDuffie 12 Q. Why would an epidemiologist, in 13 study with respect to glyphosate was an 13 this case Dr. McDuffie, adjust for medical exploratory study. 14 variables like family history of cancer or 15 A. That's -- yes. I mean, they may 15 specific medical conditions? 16 not have had a specific villain in mind when 16 A. Well, family history may or may not 17 they were looking -- when they were setting 17 be related to risk of lymphoma. I mean, 18 up the study, to say this particular agent is 18 conditions tend to run in families, so, if 19 what we are primarily focused on. We are 19 you had a family history of lymphoma, you may 2.0 looking in general at pesticides and 20 be at increased risk of getting a lymphoma, 21 lymphoma, and here is a list, and we will 21 so that is a fair variable to adjust for. 22 look at all of them and see what pops up 2.2 O. You agree with Dr. McDuffie then 23 associated or not associated with lymphoma. 23 that to try and zero in on whether there is a 24 Q. Right. That's what we were talking 24 true association for pesticide exposure and 25 about earlier this morning, that there are 25 non-Hodgkin's lymphoma, you would want to Page 215 Page 217 1 1 epidemiological studies that are exploratory adjust for medical variables like family 2 2 studies, and then there are -- that are not history and these medical conditions? 3 3 actually testing hypotheses, but they are A. Certain medical conditions that may 4 4 generating additional hypotheses. Correct? or may not be related to risk of -- of 5 5 A. Yes. getting lymphoma, yes. 6 6 Q. Now, in the -- in your expert Q. So, just so I am clear then, do you 7 7 report discussing McDuffie, you state, on believe that Dr. McDuffie's adjustment of her page 14, that the McDuffie odds ratio of 1.2 8 8 findings for medical variables like family 9 9 was adjusted for high-risk exposures. That history of cancer, and the specific 10 is on page 14 of your report. 10 conditions she lays out, improves the 11 11 A. Yes. reliability of the findings in her study? 12 12 Q. And so, this is the type of A. At worst, it doesn't hurt it. At 13 adjustment we were just discussing about 13 best, maybe it improves it. 14 with -- in the Cantor study; correct? 14 Q. Now, in your report, you point to 15 Yes. 15 an analysis of odds ratios for, I think less A. 16 16 Q. Now, in fact, the McDuffie study than or equal to two days per year and 17 did not adjust for high-risk exposures, did 17 greater than two days per year. Do you 18 it? 18 recall that? 19 19 A. No. A. We are talking now still about 20 Q. So that's another mistake in your 20 McDuffie? 21 21 report? O. Yes. 2.2 22 A. Okay. A. Yes, I believe so. 23 Q. Yes? 23 Q. And you rely on these findings from 2.4 A. Yes. 24 McDuffie in your expert report as evidence of 25 Q. In its most adjusted odds ratio, 25 a dose-response in support of your Bradford

Page 218 Page 220 1 1 Hill analysis; correct? on three different occasions, they would be 2 2 A. Yes. characterized in McDuffie as high exposure; 3 3 Q. Now, this analysis of less than or correct? 4 equal to two days versus greater than two 4 A. Yes. 5 5 days exposure for glyphosate, in McDuffie, Q. So under McDuffie, you could have 6 6 that was not adjusted for exposures to other in your dose-response analysis someone with 7 pesticides; correct? three days of exposure being classified as 8 8 A. Correct. high exposure and someone with 20 days of 9 9 cumulative exposure being classified as low Q. And as we were talking about this 10 morning, in the De Roos 2005 study, if that 10 exposure; correct? finding in De Roos 2005 is correct that there 11 11 A. Yes. 12 12 is greater exposures to other pesticides at Q. And in your own epidemiological 13 13 research, when you have looked at pesticides greater levels of glyphosate exposure, then 14 and you've looked at dose-response, you have 14 the failure to adjust for other pesticide 15 actually -- you looked at cumulative 15 exposures could confound and create an 16 exposure, not per time period exposure; 16 artificial appearing dose-response that 17 doesn't exist; correct? 17 correct? 18 18 A. Could or could not. I don't know. A. Have I done pesticide exposure? 19 19 Q. In your -- in your research, in Q. So, it's certainly possible that 20 2.0 confounding could artificially increase the your epidemiological research, when you do a study like this and you are doing a 2.1 21 reported odds ratios for high exposure to 22 22 dose-response analysis, you look at glyphosate in the McDuffie study; correct? 23 A. I would really not be able to say. cumulative exposure; correct? 23 24 Q. The -- now, the analysis in 24 A. Sometimes you do, sometimes -- I 2.5 McDuffie that you cite as evidence for 25 mean, you know, you never know what is the Page 219 Page 221 1 dose-response was not even adjusted for those 1 right -- what is the right way to analyze 2 other medical variables and family history 2 dose and dose-response. Sometimes you do 3 that we just discussed; correct? cumulative, sometimes you do it other ways. 4 A. Yes. 4 MR. LASKER: Let's mark as 5 5 Q. The analysis in McDuffie for Exhibit 14-16... dose-response also does not take into account 6 6 (Exhibit 14-16, American Journal of 7 duration of exposure; correct? Epidemiology, Reported Residential 8 8 Pesticide use and Breast Cancer Risk on A. Correct. 9 9 Q. So, if there was an individual who Long Island, New York marked for 10 used glyphosate twice a year, let's say, for 10 identification, as of this date.) each of ten years, they would be categorized 11 11 Q. And Dr. Neugut, Exhibit 14-16 is in the low exposure group with 20 cumulative 12 one of the epidemiological studies that you 12 13 13 days of exposure; correct? conducted: correct? 14 A. I'm sorry, I missed -- I didn't 14 A. Jesus Christ. Don't put that in follow the last question. 15 15 the record. 16 16 Q. If there is an individual in Q. She can't do that, unfortunately. 17 17 McDuffie who had used glyphosate every year She has to take everything down. 18 for ten years two times a year, they would be 18 Dr. Neugut, Exhibit 14-16 is one of 19 in the low exposure group; correct? 19 the studies that you were an investigator on; 2.0 2.0 A. Yes. correct? 21 21 Q. And they would have 20 days of A. Yes. 2.2 cumulative exposure; correct? 22 Q. Looking at pesticide exposure and 23 23 the potential risk of breast cancer; correct? A. Yes. 24 24 Q. If there was another individual who A. Yes. Yes. 25 25 used glyphosate for only one year but used it Q. And in this study, you conducted a

Page 222 Page 224 1 1 dose-response analysis; correct? study; correct? 2 2 A. Yes. A. Yeah, although I would say that in 3 3 O. And you used cumulative exposure as the studies of that type, it's not as big a 4 your measure for dose-response; correct? 4 differential as it may sound. I mean, you 5 5 A. Yes. get differentials like that in case-control Q. And we in fact know, going back to 6 studies. But yes, it's an issue. the glyphosate findings in McDuffie, that if Q. And the goal of the case-control 8 8 one were to look at cumulative exposure, study is not to have this sort of a 9 9 there is no increased risks in the high differential in your response rates between 10 10 exposure group; correct? cases and controls; correct? 11 MR. TRAVERS: Objection, 11 A. Correct. 12 misclassifies, or mischaracterizes the 12 Q. Let's talk about the Hardell study. 13 13 study. So this is a study -- Exhibit 14-17. 14 A. I'm sorry, can you repeat the (Exhibit 14-17, Exposure to 15 question? 15 Pesticides as Risk Factor for 16 Q. We know in fact that for the 16 Non-Hodgkin's Lymphoma and Hair Cell 17 McDuffie data, because the McDuffie data has 17 Leukemia: Pooled Analysis of Two Swedish 18 18 now been analyzed further by the North Case-control Studies marked for 19 American Pooled Project, that when you look 19 identification, as of this date.) 2.0 at cumulative exposure, there is no evidence 20 Q. And Dr. Neugut, this is, I think, 21 of increased risk of non-Hodgkin's lymphoma 21 one of the studies that we spoke about 22 with glyphosate; correct? 2.2 earlier that had very low power to analyze a 23 MR. TRAVERS: Objection, 23 question of an association between glyphosate 2.4 mischaracterizes the studies. 24 and non-Hodgkin's lymphoma; correct? 25 A. I don't know that study. 25 A. Yes. Page 223 Page 225 1 1 Q. You don't know the North American Q. And that is because there were only 2 2 eight cases and eight controls, I think, in Pooled Project study? 3 A. No. I haven't looked at it. this study. 4 4 O. Well, we will talk about that in a A. I don't remember the exact number. 5 5 but it was a very small number. moment. 6 6 Q. Now, when Hardell -- Hardell has in Now, in your expert report, you 7 7 his analysis, he has a multivariate analysis also note that McDuffie had a low response 8 8 that he presents in this study; correct? rate; correct? 9 9 A. Yes. A. Yes. 10 10 Q. And McDuffie had a 67 percent Q. What confounders did Hardell adjust 11 11 response rate among cases and only a 48 for in his multivariate analysis? 12 12 A. I think he adjusted for exposure to percent response rate among controls; 13 13 other herbicides or pesticides. correct? 14 14 Q. Where do you see that in A. Yes. 15 15 Dr. Hardell's study? O. And that is -- that differential 16 A. "When risk estimates for different 16 goes back to one of the potential concerns we 17 17 pesticides are analyzed" -discussed this morning about potential 18 selection bias: correct? 18 O. What page are you on? 19 19 A. 1045. The first paragraph. A. Yes. 2.0 2.0 O. In 1045? O. So that's an issue with the De Roos 21 2.1 study as well; correct? A. Top paragraph. 22 2.2 A. It's an issue, but I would say --Q. Okay. 23 23 Q. I'm sorry, let me go back. "When risk estimates for different 24 This issue of selection bias is an 24 pesticides were analyzed, only subjects with 25 no pesticide exposure were taken as unexposed 25 issue of concern for McDuffie, the McDuffie

		1	
	Page 226		Page 228
1	whereas subjects exposed to other pesticides	1	findings from two earlier case control
2	were disregarded."	2	studies, one by Hardell and Eriksson and one
3	I'm assuming that means they were	3	by Nordstrom; correct?
4	excluded from analysis.	4	A. I'm sorry, I was still I was
5	Q. They were excluded from the	5	still in the middle of this one.
6	definition of "unexposed."	6	Q. No, we're still with Hardell.
7	A. I am not exactly sure what he	7	A. Yeah.
8	means, but	8	Q. The Hardell study, Exhibit 14-17,
9	Q. What Dr. Hardell is stating here,	9	pools the data from two earlier case-control
10	and this is a methodology that carries	10	studies, one by Hardell and Eriksson and one
11	through in all the Swedish studies, is that	11	by Nordstrom; correct?
12	their definition of "unexposed" excluded not	12	A. Yes, um-hum.
13	only individuals unexposed to glyphosate, but	13	Q. And you do not discuss those
14	individuals unexposed to any pesticide;	14	earlier case-control studies in your expert
15	correct?	15	report; correct?
16	A. Correct. That's a different way	16	A. Right.
17	of that's a different way of adjusting for	17	Q. Is it fair to say once you pool
18	herbicide exposure.	18	those studies into a larger study, it's the
19	Q. Well, if you are taking out	19	later pooled study that provides all the data
20	information from the controls so that the	20	relevant to a causation theme?
21	cases have exposures to glyphosate and	21	A. Yes.
22	exposures to other herbicides, but the	22	Q. Let's turn to De Roos 2003, which
23	controls don't have exposure to any	23	is the De Roos case-control study. And this
24	pesticides	24	would be Exhibit 14-18.
25	A. No. I would assume then, you have	25	(Exhibit 14-18, Integrative
	D 005		- 000
	Page 227		Page 229
1	to take them out of both groups.	1	assessment of multiple pesticides as risk
2	to take them out of both groups.  Q. But it's not there is is	2	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among
2	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they	2 3	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for
2 3 4	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?	2 3 4	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)
2 3 4 5	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.	2 3 4 5	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of
2 3 4 5	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control	2 3 4	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm
2 3 4 5 6	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was	2 3 4 5 6 7	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that
2 3 4 5 6 7	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed	2 3 4 5 6 7 8	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's
2 3 4 5 6 7 8	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other	2 3 4 5 6 7 8	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?
2 3 4 5 6 7 8 9	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other pesticides to occur with the glyphosate	2 3 4 5 6 7 8 9	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.
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2 3 4 5 6 7 8 9 10 11	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other pesticides to occur with the glyphosate exposed cases, that would be a methodological flaw in the study; correct?	2 3 4 5 6 7 8 9 10 11	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.  Q. And this De Roos study has 2003 case-control study, has the same latency
2 3 4 5 6 7 8 9 10 11 12	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other pesticides to occur with the glyphosate exposed cases, that would be a methodological flaw in the study; correct?  A. Probably, yes.	2 3 4 5 6 7 8 9 10 11 12	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.  Q. And this De Roos study has 2003 case-control study, has the same latency issue or problem that Dr. Ritz identified
2 3 4 5 6 7 8 9 10 11 12 13	to take them out of both groups.  Q. But it's not there is is there anywhere where it's stated that they take that out of both groups?  A. Kind of ambiguous.  Q. If in fact the Swedish case-control studies defined unexposed so that there was no exposure to any pesticide and allowed other exposures, exposures to other pesticides to occur with the glyphosate exposed cases, that would be a methodological flaw in the study; correct?  A. Probably, yes.  Q. That would make it impossible to	2 3 4 5 6 7 8 9 10 11 12 13 14	assessment of multiple pesticides as risk factors for non-Hodgkin's lymphoma among men, Occup Environ Med 2003 marked for identification, as of this date.)  Q. And the De Roos paper pools all of the all of the prior North American I'm sorry, U.Sbased case-control studies that looked at glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.  Q. And this De Roos study has 2003 case-control study, has the same latency issue or problem that Dr. Ritz identified with respect to the Cantor study; correct?
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	Page 230		Page 232
1	populations, and when they were diagnosed.	1	diagnosed between June 1983 and June 1986?
2	Correct?	2	A. Yes.
3	A. Yes.	3	Q. So, even for these Nebraska cases,
4	Q. And so for Iowa and Minnesota and	4	they would not have had a median ten-year
5	Kansas, those exposures were between 1979 and	5	latency period to examine with respect to
6	1983; correct?	6	glyphosate and non-Hodgkin's lymphoma;
7	A. Yes.	7	correct?
8	Q. And if you look at table two in	8	A. They would have had just barely ten
9	the and that is just to step back, that	9	years.
10	is the problem that Dr. Ritz was highlighting	10	Q. That would have been the maximum,
11	in the Cantor study; correct? Those dates of	11	not the median; correct?
12	exposure?	12	A. It's hard for me to figure out, but
13	A. I don't recall what she was	13	if it was starting in '74 right? '75,
14	highlighting, but that is an issue, yes.	14	'74?
15	Q. And if you look at table two in	15	Q. Let's say we can talk about '74
16	De Roos 2003, the case control study, and you	16	or '75. I don't think it matters for this
17	look at the data that was included in the	17	question.
18	analysis for the pesticides, roughly	18	A. Um-hum.
19	82.6 percent of the cases would have been	19	Q. If the question is whether or not
20	diagnosed with non-Hodgkin's lymphoma between	20	there would be a median of ten years
21	1979 and 1983; correct?	21	A. Oh, I see.
22	A. Yes.	22	Q of latency, which Dr. Ritz
23	Q. And so, those exposures, those	23	identified
24	cases, again, at the very earliest, the very	24	A. So, I guess it would be about eight
25	earliest, still could not have been exposed	25	years, seven or eight years.
	earnest, still could not have been exposed		yours, seven or eight yours.
	Page 231		
	1430 101		Page 233
1		1	Q. Eight years would be maximum.
1 2	to glyphosate more than nine years prior to their diagnosis; correct?	1 2	
	to glyphosate more than nine years prior to		Q. Eight years would be maximum.
2	to glyphosate more than nine years prior to their diagnosis; correct?	2	<ul><li>Q. Eight years would be maximum.</li><li>A. Okay.</li></ul>
2	to glyphosate more than nine years prior to their diagnosis; correct?  A. Yes. Q. And so that did not come close to	2	<ul><li>Q. Eight years would be maximum.</li><li>A. Okay.</li><li>Q. Correct?</li><li>A. Yes.</li></ul>
2 3 4	to glyphosate more than nine years prior to their diagnosis; correct?  A. Yes.	2 3 4	<ul><li>Q. Eight years would be maximum.</li><li>A. Okay.</li><li>Q. Correct?</li></ul>
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2 3 4 5	to glyphosate more than nine years prior to their diagnosis; correct?  A. Yes.  Q. And so that did not come close to the median ten-year latency period that Dr. Ritz opined would be necessary to look for a potential association between	2 3 4 5	<ul> <li>Q. Eight years would be maximum.</li> <li>A. Okay.</li> <li>Q. Correct?</li> <li>A. Yes.</li> <li>Q. It wouldn't be a ten-year median latency, even for that smaller</li> <li>A. Yes.</li> </ul>
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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 23	to glyphosate more than nine years prior to their diagnosis; correct?  A. Yes. Q. And so that did not come close to the median ten-year latency period that Dr. Ritz opined would be necessary to look for a potential association between glyphosate and non-Hodgkin's lymphoma; correct?  A. Yes.  MR. TRAVERS: Objection, misstates Dr. Ritz's testimony. Q. And the remaining 17.4 percent of the cases were diagnosed between June 1983 and June 1986; correct?  A. Are you talking about the Kansas cases or Q. Yes. I'm sorry, the Nebraska cases. A. The Nebraska cases. Q. Let me just confirm, so that the record is clear, you can go back and look at	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Q. Eight years would be maximum. A. Okay. Q. Correct? A. Yes. Q. It wouldn't be a ten-year median latency, even for that smaller A. Yes. Q population; correct? A. Yes. Q. Now, de Roos 2003 A. And again, I'm not subscribing to the ten-year I told you, I'm personally not Q. You're agnostic. A. I'm agnostic on the latency period. Q. I understand. A. But I respect my colleagues. Q. Now, De Roos in the 2003 study presents results for a logistic and a hierarchal regression analysis; correct? A. Yes. Q. And those analyses are described on

Page 234 Page 236 1 1 A. Yes. indication of a true difference; correct? 2 2 Q. And as explained in that A. Yes. 3 3 statistical analysis section, De Roos O. What sort of analysis would you 4 controlled for other pesticide exposures in 4 need to see to determine whether there has 5 5 the hierarchal regression analysis; correct? been an actual meaningful difference between A. Yes. 6 two different groups in a study? 7 Q. Did not -- De Roos did not control A. Well, there is an analysis called 8 8 for these other pesticide exposures in the effect modification, which is some kind of --9 9 logistic regression analysis; correct? I'm not a statistician, but that analyzes for 10 10 A. No. whether the two analyses are statistically 11 Q. Again, the answer is unclear from 11 different from each other. It's basically 12 my question. Is it correct that Dr. De Roos 12 looking at whether subgroups differ from each 13 did not control for the other pesticide 13 other, and whether the fact that being exposures in the logistic analysis? 14 asthmatic would somehow make you more or 15 A. That's correct. 15 less, or being not asthmatic would somehow 16 O. Let's move on to the Lee study. 16 make you somehow respond differently, let's 17 MR. LASKER: And this will be 17 say, to an herbicide than being not --18 Exhibit 14-19. 18 than -- whether having asthma somehow plays a 19 (Exhibit 14-19, Non-Hodgkin's 19 role in your susceptibility to the exposure 2.0 Lymphoma Among Asthmatics exposed to 20 vis-a-vis the outcome. 21 Pesticides marked for identification, as 21 Q. So, if I understand correctly, as 22 of this date.) 22 an epidemiologist, when you see different Q. So, Lee, the Lee study likewise 23 23 point estimates for different groups that are 24 uses pooled data from the same case-control 24 being studied, to determine whether that is a 25 studies in the United States; correct? 25 meaningful difference, you would like to see Page 235 Page 237 1 A. Yes. 1 some sort of statistical analysis to see if 2 Q. So, Lee would have the same latency 2 they are -- those two groups are 3 issue as Cantor and De Roos 2003; correct? statistically significantly different; 4 4 correct? A. Yes. 5 5 Q. The odds ratio I think you have A. Correct. 6 6 already noted for Lee for glyphosate was not Q. Okay. I would like to refer you 7 7 adjusted for exposure to other pesticides; back again to Dr. Ritz's report, at pages 15 8 correct? to 16. 9 9 A. Yes. A. Dr. Ritz's report? 10 10 Q. Now, in your report, you discuss Yes. Q. 11 11 the fact that there was odds ratios provided A. Which page? for glyphosate for non-asthmatics and then 12 12 Q. Pages 15 and 16. And at these 13 13 pages in Dr. Ritz's report, she is discussing for asthmatics; correct? Page 15 of your 14 14 the findings of, as I call it, the North expert report. 15 American Pooled Project; correct? 15 A. Yes. 16 Q. And there are different point A. You mean on the bottom of 15? 17 17 Q. And over to -- and continuing on to estimates of 1.4 and 1.2 that were found in 18 18 that study, but you state that there was no page 16. 19 19 evidence or no indication of an effect A. Okav. 20 O. Now, the North American Pooled 2.0 modification in that study; correct? 21 Project was also discussed in Dr. Blair's 2.1 A. Yes. 22 deposition, which you read; correct? 22 Q. So, the fact that you have point 23 23 A. Yes. estimates of odds ratios that are different. 24 24 O. And the North American Pooled that in and of itself, just a different 25 25 Project pooled the data from all of the number, doesn't provide you with an

	Page 238		Page 240
1	case-control studies in the United States and	1	Dr. Blair testified, that the North American
2	Canada; correct?	2	Pooled Project pooled all the data from
3	A. I believe so, yes.	3	McDuffie 2001 and De Roos 2003, then you
4	Q. So, the North American Pooled	4	would no longer look at those earlier
5	Project contains all the data that is in	5	studies, you would look at the pooled
6	De Roos 2003 and then also the data in	6	analysis in the North American Pooled
7	McDuffie 2000; correct?	7	Project, to determine whether that data
8	A. McDuffie	8	provides evidence of an association between
9	Q. 2001.	9	glyphosate and NHL; correct?
10	A. Yes.	10	A. Since you are telling me this out
11	Q. So, just like we talked about	11	of a context that I don't know, I I
12	earlier with Hardell, the NAPP analysis now	12	it's difficult for me to answer the question
13	is a later study that pools all the data from	13	with any degree of confidence.
14	the earlier case-control studies, and that's	14	Q. As a methodological question,
15	the study that you can look to for the most	15	though, just so I am clear, when you have a
16	up-to-date data from all those studies.	16	case-control study that pools data from
17	Correct?	17	earlier case-control studies, you look at
18	A. I wouldn't know.	18	that later pooled analysis; correct? That's
19		19	what you did in your report; correct?
20	Q. As a general matter, if it is in strike that.	20	* *
21		21	A. That's what I did for those
22	If it is correct that the North	22	particular studies. Whether I would do it
23	American Pooled Project has pooled the data	23	for this other study, I don't know.
	from the De Roos 2003 and McDuffie 2001	24	Q. Do you agree with Dr. Ritz, and
24	study, then that study would provide the most		maybe you just don't have an opinion, that
25	fulsome information and would be the study	25	the findings in the North American Pooled
	Page 239		Page 241
1	that you would look to for any conclusions	1	Project are relevant to the causation
2	from all of those case-control studies;	2	analysis for glyphosate and non-Hodgkin's
3	correct?	3	lymphoma?
4	A. Again, I since I haven't looked	4	A. I have no way of knowing, since I
5	at it and I don't know what it exactly did, I	5	haven't looked at it, evaluated it or
6	wouldn't know.	6	assessed it. Aside from what I read in the
7	Q. Okay. Well I'm not talking	7	transcript from Dr. Blair, I think, I really
8	about let me just back up.	8	don't have any knowledge or information about
9	So, we already talked about the	9	it.
10	Hardell study and the fact that that pooled	10	Q. You are aware that the findings
11	two earlier studies, and so in your analysis,	11	from the North American Pooled Project have
12	you looked at the later pooled analysis from	12	been presented at a number of scientific
13	Hardell 2002; correct?	13	conferences; correct?
14	A. Yes.	14	A. I know they were presented at the
15	Q. And if in fact, and I will ask you	15	one meeting. I don't know that they keep
16	to assume, but you have read Dr. Blair's	16	repeating the same data at different
17	deposition as well, the NAPP pooled the data	17	meetings. That is not usually considered
18	in De Roos 2003 and McDuffie 2001, then you	18	kosher.
19	would look to that NAPP data for the to	19	Q. And why is it not considered kosher
20	analyze the full set of case-control	20	to keep
21	information from the North American	21	÷
22	case-control studies; correct?	22	8
23		23	over and over again?
24	A. I'm sorry, say that last question	24	Q. Yes.
25	again. Q. Okay. So, if it is correct, as	25	A. It's like, you know I guess that's like repeat publications, you know. I
	Q. Okay. So, if it is correct, as		mat s like repeat publications, you know. 1

Page 242 Page 244 1 1 mean, I'm not criticizing them. I'm simply with respect to this study. Correct? 2 2 saying, you know, you don't usually publish A. A while ago, but yes. 3 3 the same thing over and over again. Repeat Q. And if I could ask you to turn 4 publications. 4 to -- and I will represent to you that this 5 5 There may be different meetings slide deck is for the same conference, the 6 where, you know, under different 6 ISEE conference in Brazil, that Dr. Ritz is 7 circumstances, where, with modifications, you discussing in her expert report. On page 15, 8 8 know, and updates, different analyses are she talks about the presentation of ISEE. included, updated, variations. 9 Do you see that? 10 10 I'm not criticizing other A. Yes. 11 scientists. I'm simply saying you wouldn't 11 Q. So, the -- on the ninth --12 just repeat -- you wouldn't do the same thing 12 unfortunately, they are not numbered. If you several times at different places. That 13 13 could count nine pages into the slide 14 would be -- you know, it would be like -- I presentation, there is a data table of 15 glyphosate use and NHL risks. 15 don't know what word to use. It would be --16 16 it would be like publishing the same thing Do you see that? 17 two different places. You would get two 17 A. It's two-sided. 18 18 publications out of one, you know. Q. It's open, pointing up. Right 19 19 Q. So, in her expert report, Dr. Ritz there? 2.0 only discusses the odds ratios found by the 20 A. This one? 21 NAPP before it adjusted for the use of other 21 O. Yeah. 22 22 pesticides; correct? MR. TRAVERS: Eric, just to 23 A. Shall I read her paragraph? Is 23 clarify, do you recall which exhibit this 24 that --24 was from the Blair deposition? 25 Q. You don't know one way or the 25 MR. LASKER: I do not, I'm sorry. Page 243 Page 245 Q. This table presents an ever/never 1 other? 1 2 2 A. The question is, what does she say? overall odds ratio for glyphosate and NHL; 3 Q. The question is what she reported, correct? Both for NHL in total and for whether she reported adjusted odds ratios or 4 4 various subtypes; correct? 5 unadjusted odds ratios for other pesticide MR. TRAVERS: I'm just going to 5 6 6 object. He hasn't relied on this for his exposures. 7 7 MR. ADLER: You mean Dr. Ritz? expert opinion and hasn't previously 8 reviewed any of this data. MR. LASKER: Dr. Ritz. 9 9 A. So, I can't tell. She doesn't say. A. What he said. 10 10 She doesn't say what it's adjusted for. Q. Okay. Just so I am clear, I know 11 Q. Let's -- I'm going to have you take you haven't looked at this before, but I'm 11 a look at the next exhibit in line, and this 12 asking you, the data presented there --12 13 13 was --A. Yes. 14 MR. LASKER: We will mark this as 14 Q. -- is from the North American 15 Pooled Project for glyphosate use and NHL 15 Exhibit 14-20. 16 risks overall and for various subtypes; 16 (Exhibit 14-20, An Evaluation of 17 correct? 17 Glyphosate Use and the Risk of 18 18 Non-Hodgkin Lymphoma Major Histological A. Yes. 19 19 Sub-Types in the North American Pooled Q. And for the overall odds ratio, 20 they present one odds ratio that is not 2.0 Project marked for identification, as of 21 adjusted for other pesticide exposures; 21 this date.) 22 correct? That is ORA. 2.2 Q. And Dr. Neugut, this is a slide 23 23 A. Yes. presentation that was marked as an exhibit in 24 24 Dr. Blair's deposition, and I believe you O. And then another odds ratio, or 25 ORB, that is adjusted for the use of 2,4-D, 25 read his testimony about the data presented

Page 246 Page 248 1 dicamba and malathion; correct? A. Yes. 2 2 A. Yes. Q. We now have, with the North 3 3 O. For ever/never use, the odds ratio American Pooled Project pooling all of that 4 for glyphosate and non-Hodgkin's lymphoma, 4 data together, we have information on 5 5 after adjusting for exposure to 2,4-D, cumulative exposures, which multiplies 6 dicamba and malathion, is 1.13 and it is not frequency by duration; correct? 7 statistically significant; correct? A. Yes. 8 8 A. Yes. Q. So, that doesn't have the potential 9 misclassification issue for dose-response 9 Q. So, the NAPP, for its adjusted odds ratio, pooling all the case-control data from 10 10 that we talked about in McDuffie; correct? 11 North America, had a null finding for 11 A. Correct. 12 ever/never glyphosate use and non-Hodgkin's 12 Q. And when you look at the complete 13 pooled data from McDuffie and from De Roos 13 lymphoma; correct? 14 A. Had a positive but null finding, 2003, for this cumulative exposure 15 measurement, glyphosate does not show 15 yes. 16 evidence of a dose-response; correct? 16 Q. We talked earlier about your 17 definition of "positive." Under your 17 A. Which line are you looking at? 18 18 definition we talked about this morning, the Q. The bottom line, lifetime days. 19 19 North American Pooled Project, pooling all of That would be cumulative exposure; correct? 20 2.0 the data from the De Roos 2003 and the Duration times frequency. 21 McDuffie 2001 study, adjusted for use of 21 A. Yes. It doesn't show, um-hum. 22 22 Q. So, just to be clear, the complete other pesticides, had a null finding for 23 glyphosate and non-Hodgkin's lymphoma; data pooled from McDuffie and from De Roos 23 2.4 correct? 24 2003 for cumulative exposure to glyphosate, 25 MR. TRAVERS: Objection, misstates 25 does not provide evidence of a dose-response; Page 247 Page 249 1 1 his prior testimony. correct? 2 O. That's correct? 2 A. I wouldn't go that far. I mean, 3 you have the frequency showing -- showing a Yes. A. 4 4 O. If you could turn to -- and this is relationship. 5 Q. Again, let me -- let me state the 5 the slide that is the third slide from the 6 end of the entire deck, so go to the end of 6 question again. 7 7 the slide deck and count sort of three from You have -- you have duration, you 8 have frequency, and you have lifetime days; the end. You will see another table. It 9 9 says "Proxies versus Self-Respondents." It correct? 10 10 looks, Dr. Neugut, like this. Just go to A. Yes. 11 11 very end of the study, and then count back. Q. And lifetime days, that is a cumulative exposure measure of the type that 12 There you go. Do you see that? 12 13 13 So, here we see the results of the you used in that study in Long Island; 14 North American Pooled Project for this 14 correct? 15 15 dose-response analysis, and they have A. So, you know, you don't know what 16 duration, they have frequency, and they have is the right association or the right -- the variable to use in any given analysis. To 17 17 lifetime days; correct? 18 18 say because you did it in that study in 2006, A. Yes. 19 19 that's what you should be doing in this study Q. So, the frequency is the measure 20 in 2017, or that they should be doing with a 2.0 that McDuffie reported just for Canada, and 21 2.1 now we have the full pooled dataset. different outcome, that's-- that's foolish. 22 22 McDuffie reported frequency in her study; Q. Let me ask this question, and let's 23 23 see if I can get a clear answer. correct? For cumulative exposure --24 24 A. McDuffie reported --25 25 Q. Frequency, days per year. A. Hmm?

Page 252 Page 250 1 Q. For cumulative exposure --Q. So, after reviewing Dr. Blair's 2 2 A. Right. deposition and his testimony of the findings 3 3 O. -- the complete pool of data from of those -- of the North American Pooled 4 McDuffie and from De Roos 2003 does not show 4 Project and the 2013 AHS data --5 evidence of a dose-response for glyphosate A. Wait. I'm sorry. You are 5 6 and non-Hodgkin's lymphoma; correct? 6 mischaracterizing my statement. I didn't 7 7 A. So, cumulative exposure as measured look at the answers and then say I'm not 8 8 this way, and as they analyzed it here, and going to include it. A priori, I didn't 9 9 as I am not seeing in a fully published include anything that wasn't published. 10 10 report that is peer reviewed in a journal, The fact that he then happened to 11 and as I am not having the ability to analyze 11 then -- I happened to then read his 12 12 it carefully, then yes, as you are showing it transcript, and in his transcript there was a 13 to me in this table, you are correct. But to characterization or description of 13 14 14 say that this is the be all and end all of unpublished data didn't then come into --15 15 everything is not -- not fair. didn't then -- I didn't then say, oh, look at 16 16 Q. Just to be clear, the North that, I'm now not going to include that 17 because it either bears on or doesn't bear 17 American Pooled Project pooled together all 18 on. The decision up front was not to include 18 the data from McDuffie and from De Roos 2003; 19 unpublished data, up front. 19 correct? 2.0 20 Q. Were you aware prior to reading A. I don't know. I told you I haven't 21 Dr. Blair's deposition that there was 21 had a chance to look at it, and you are 22 22 additional data from the Agricultural Health giving it to me now for the first time to 23 23 look at in a slide like this. I didn't even Study? 2.4 get to hear the speaker say it out loud or go 24 A. No. 25 Q. Were you aware prior to reading 25 to Brazil. So, to -- you know. Page 251 Page 253 1 1 Q. Dr. Neugut, you did have the Dr. Blair's deposition that there was 2 2 opportunity to read Dr. Blair's deposition additional data that had been presented in 3 testimony when he talked about these scientific --4 4 findings; correct? A. No, I wasn't aware of the NAPP 5 5 A. But they weren't published, and I study. 6 didn't consider them in my report. 6 Q. -- conferences from the North 7 7 Q. You had the opportunity to review American Pooled Project? 8 these findings, if you wanted to. They were A. No, I was not, but as I said in my 9 9 exhibits to Dr. Blair's deposition. report, my takeoff for this entire evaluation 10 10 was from the original IARC study, and I have A. They weren't published. 11 11 tried to follow the -- take that as my --Q. You considered unpublished data for 12 12 these plaintiffs' attorneys, as an expert Q. I understand. 13 13 A. My, shall we say takeout point, and witness --14 A. I told you that was under other 14 to follow the guidelines of IARC and to stick 15 15 more or less closely or reasonably to, to circumstances and a different context. To 16 bring it now into this is a different issue. whatever their characterization has been, and 17 17 Here we are considering a different question I have -- and -- and if things have been 18 under different circumstances. 18 published subsequent to that, that's been 19 19 fair to include, and I have reviewed whatever O. And you made a decision not to 2.0 2.0 consider the data in the North American publications, et cetera, have emanated 21 2.1 Pooled Project or in the 2013 AHS analysis subsequent to that, peer-reviewed, et cetera. 22 But I have followed the IARC 2.2 after reading Dr. Blair's deposition, but 23 without actually yourself looking at the 23 guidelines, and I state that in my -- I 24 24 believe somewhere in my report, or say data; correct? 25 25 A. Yes. something to that effect, and I have stuck to

Page 256 Page 254 1 1 that, and -the epidemiological literature, sought to 2 2 adhere to the preamble and the guidelines as Q. That wasn't clear to me, so let 3 to how that data would be considered by IARC; 3 me --4 4 A. And I have been -- I believe I have 5 5 tried to be consistent with that. If A. Yes. I mean, if I may have 6 subsequently there were other unpublished deviated or made a few mistakes along the 7 7 things, and I -- it is stated specifically in way, a couple of mistakes, you know, in 8 8 my report, and I -- I believe, and I have interpreting a couple of the papers, that is 9 tried to adhere to that, and if you want to on my head, but -- and if I -- I may make 10 10 say that in a different litigation, that errors. I'm human, too. But then, that's on 11 11 wasn't the rules or that I in one particular me, but -- but I have tried to follow that 12 unpublished thing -- again, as I say, I 12 methodology, because I think it is a 13 13 believe that was an error on my part, because reasonable one, and I think it's a correct 14 I misunderstood that particular follow-up one for public policy. study, but that's a different issue. 15 15 Q. Okay. And for other cases, where 16 But -- but in general, I think 16 you were not starting off with an IARC 17 peer-reviewed published things should be, you 17 monograph, you employed a different 18 know, the name of the game. 18 methodology for reaching a causation opinion 19 Q. Let me just make sure I understand 19 from epidemiological studies. Is that fair? 20 your testimony then, because I didn't 20 A. Not necessarily. I mean, as I say, 21 appreciate this. 21 I am not sure in the Actos case that I didn't 22 Am I correct then in my -- let me 22 make an error with regard to the particular 23 just ask the question. Am I correct then in 23 instance where you pointed it out. I think I 24 my understanding, Dr. Neugut, that in 24 misread -- I think I may have 25 assessing the epidemiological evidence for 25 mischaracterized the follow-up data there. I Page 255 Page 257 1 1 this case, for glyphosate and non-Hodgkin's think I thought -- there was a fourth 2 lymphoma, you followed the methodology that 2 follow-up, and I think I thought, given how 3 3 is used by IARC? it was presented to me, I thought it was 4 4 A. I don't want to say I got 17 people actually a publication. 5 5 together and put them in a room and, you If you would have seen -- I mean, 6 know, talked to them that way. 6 this is a couple of years ago. I believe 7 7 Q. Fair enough. that the way the fourth -- that was the 8 A. But I tried to adhere -- since I --8 fourth follow-up to a large cohort study, and 9 9 I believe that they are the most I believe the way it was presented to me, it 10 authoritative and reasonable way to do this, 10 looked to me like a publication, and I 11 they were certainly the takeoff point. They 11 believe at the time I thought it was actually 12 were what initially, shall I say, convinced 12 a publication. 13 me or persuaded me that glyphosate and NHL 13 But putting that aside, I don't 14 had an association, and I have tried -- at 14 know that I was -- that I actually had a 15 15 least insofar as trying to subsequently form different attitude at the time, but it may 16 16 opinions in this case, since IARC was the well be that under other circumstances, I 17 17 original platform from which this all might use a different approach, depending on 18 18 emanated, I have tried to adhere to their the context or the circumstances and whatever 19 criteria and methodologies for establishing, 19 it might demand in a certain case. 20 20 I guess what I would consider to be public Q. And let's just take it outside of 21 21 policy, as well as judgments with regard to litigation altogether. When you are doing an 22 22 this issue. epidemiological analysis as part of your 23 23 independent scientific research, do you Q. Okay. So just -- that's fair. So, 24 I understand then that for your expert 24 follow the IARC methodology then, or do you

opinion in this case, you have, in analyzing

25

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have other methodologies that you use for

Page 258 Page 260 1 1 your independent assessments? THE VIDEOGRAPHER: The time is 2 2 A. It depends on the context. Again, 3:42 p.m. We are on the record. 3 3 for the purposes of public policy, and where BY MR. LASKER: 4 you are making true public health or issues 4 Q. Dr. Neugut, I just want to follow 5 5 that affect standard of care, public people, up on something you said before we went on public health, et cetera, then I think you 6 the break. I first want to put my microphone 7 have to adhere strictly to peer -- the IARC on, and then I'm going to say it again. 8 8 rules and public policy, peer-reviewed Before we took a break, you were 9 talking about reaching or conducting things. 10 10 assessments for public policy, public health If I am sitting around trying to 11 decide how to do my next study, then I can 11 issues; correct? I think that was one of the 12 have more informality and look at things that 12 things you mentioned. Where you are trying are not necessarily published. When I am 13 to reach an assessment for public health 13 14 talking to my peers or to my schleppers or determination, you would follow the IARC to -- you know, to my students, and we are 15 15 criteria: correct? looking at someone down the hall has data, so 16 16 A. Yes. 17 obviously that is not published, and we are 17 Q. And part of this public health 18 18 looking at someone's data from down the hall, analysis that you are doing is intended to to look at, so then I have -- I am entitled 19 19 provide a level of precaution for 2.0 to do whatever I want to do, but then I am 20 populations; correct? 21 not also publishing it in the public sphere 21 A. Yes. 22 22 necessarily. Q. And there is something called the 23 23 But occasionally, of course, you do precautionary principle. You are familiar 24 publish -- even in peer-reviewed 24 with that? 25 publications, you might publish something and 25 A. No. Page 259 Page 261 1 say it's un- --1 Q. Now, you also, though, in other 2 Q. Referring to unpublished data? 2 contexts would do an assessment of a 3 A. You may refer to unpublished data, potential causal inference where you are not 4 4 but then you say that it is, but then it looking at a public health question, but you 5 doesn't carry the same weight. It doesn't are trying to zero in on a scientific 6 carry the same weight, and it's subject to 6 assessment of what the true answer is, as 7 criticism, and you can never be certain about opposed to what it might be; correct? 8 it, and it doesn't have the same veracity or A. Possibly. 9 9 the same, you know, confidence, et cetera. Q. When you are conducting an 10 And as I have said, I have had my 10 assessment of the epidemiological literature 11 own articles. You know, I once thought I had 11 for this other purpose, for a scientific 12 the solution to colon cancer, you know, which 12 assessment, to dig down and be able to reach 13 13 got turned down by 12 journals in a row, and a scientific as opposed to a public health 14 before I finally got through my head that it 14 conclusion, you might have a different 15 15 really was wrong. methodology that you would use. Is that fair 16 16 MR. LASKER: Well, that's -- we are to say? 17 17 running out of tape, so why don't we take A. Possibly. 18 a break here, because the tape is going 18 O. With respect to the -- I just have 19 to run out, and if it's not being taped, 19 one more question on --2.0 A. I might add to that, that we are 2.0 it doesn't actually count. 21 21 So, let's take a break and we'll not in a scientific context here either.

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THE VIDEOGRAPHER: The time is

3:36 p.m. We are off the record.

(Recess taken.)

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start again.

Here we are -- we are in a legal context, and

But, for example, you know, when --

the rules for the law are different than the

rules for science. And I am not a lawyer.

Page 262 when IARC says that something is a probable carcinogen, that is well beyond what would be legalese, in my -- in my unexpert opinion, that would be well beyond what would be sufficient to define a causal association for legal purposes. So, if we are going to start fooling around with definitions of different causal definitions, based on different contexts, then you are going to have to change -- you are going to have to define what context we are standing in, to be able to define what are the rules by which we are going to play the game. Q. Okay. And it would be fair then

2.0

2.4

2.0

2.1

- Q. Okay. And it would be fair then for me to understand that you have followed a methodology in this case that is not a methodology that would be as -- what one would do for purposes of science, but is one that you -- in your understanding, is sufficient for purposes of the legal question in this case. Is that fair?
- A. I would say, if anything, it's more -- it's more rigorous than would be necessary for legal purposes, because again, the IARC rules are -- in my understanding,

Exhibit 14-20, because we were looking at the third page from the end, this proxies versus self-respondents, and there was another column here that I want to ask you about, because they have the results for proxy and self-respondents, and then they have a separate column that is self-respondents

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Page 265

A. Yes.

only. Do you see that?

Q. And do you agree with Dr. Blair, and he testified to this in his deposition, we can look at it if you would like, that in epidemiological analyses, information provided by cases are generally considered more reliable than information provided by proxies?

A. Yes.

- Q. So, when the NAPP investigators focused on the data without proxies and cases only, or the pooled data from McDuffie and De Roos 2003, they found an ever-never odds ratio for glyphosate and non-Hodgkin's lymphoma of 0.95; correct?
  - A. Yes.
  - Q. And so, this most reliable odds

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are beyond -- are more stringent than legal rules.

- Q. And that understanding has --
- A. That's my understanding, not as a lawyer, as a, I don't know, scientist or academic.
- Q. And that understanding has helped determine how you approached the question of -- in your analysis of the epidemiological literature for this case.
- A. I am approaching it from that perspective here. Again, whether that applies or does not apply for your purposes or for their purposes, or in the context of cases when they come up in subsequent litigation, is different, and if modifications will then be necessary in terms of how to use unpublished data or things like that, it -- because we'll then be in a different context or different framework, that may or may not be necessary or reasonable.
  - Q. Understood.

So, I just want to finish up, though, on the NAPP slide deck, which is

ratio for ever-never use of glyphosate from the U.S. and Canadian case-control studies is to the left, if you will, of the null finding or below 1.0; correct?

MR. TRAVERS: Objection to form.

- A. Well, you know, you give up something when you -- that's true, but you're also -- it means you have more empty spaces, too. You have more unanswered -- I don't know that -- again, as I said before, I don't know this data. I'm not looking at tables. That means there is going to be more empty boxes in your -- there are going to be more non-respondents in both the cases -- in the cases and the controls, so you have given up something as well.
- Q. Power. You have given up some power; correct?
- A. It goes beyond power. It goes -- again, we were talking before about random classification. You have empty cells. It's -- there is -- nothing is free.
- Q. But as between proxy and self-respondent data, and self-respondent data alone, you can have, at least with

Page 266 Page 268 1 1 respect to the information reported, more A. Yes. 2 2 confidence in the data that is reported by Q. Now, in fact, the only adjusted 3 3 the respondents: correct? odds ratio -- the only odds ratio that is A. The validity of the data is better. 4 4 reported in Eriksson that was controlled for 5 5 Q. And you are aware that the North the bounding by other pesticides is in that American Pooled Project has published in the 6 single table seven on page 1661 of the study; peer-reviewed literature its findings for the 7 correct? Where they have the multivariate 8 8 U.S. and Canadian case-control studies for findings. 9 9 glyphosate and multiple myeloma; correct? A. Yes. 10 10 A. I know they published some of their O. So, none of the other odds ratios 11 results. I don't know offhand specifically 11 reported in Eriksson, other than that 12 12 which. I will take your word for it. multivariate odds ratio reported in table O. And you are aware that the 13 seven, are adjusted for confounding by other 13 Agricultural Health Study has also published 14 pesticides: correct? 15 15 its findings, updated findings, for other A. That's correct. types of pesticides and non-Hodgkin's 16 16 Q. And if I could direct you to page 17 lymphoma; correct? 17 1658, in the left-hand column, all the way to 18 18 A. Yes. the bottom, when they are talking about their 19 19 statistical methods. Do you see that? Q. And sitting here today, you cannot say that any of the methodologies that were 2.0 20 A. Yes. 21 used in the 2013 AHS data that we discussed, 21 Q. And the last three lines on that 22 22 or in this North American Pooled Project column, in the univariate analysis, and that 23 slide deck that we just discussed for is the analysis that they use in presenting 23 2.4 glyphosate and non-Hodgkin's lymphoma, 24 all the other odds ratios in this report; 25 differs from the methodologies that were used 25 correct? Page 267 Page 269 1 in these peer-reviewed published studies; 1 A. Yes. 2 2 Q. In the univariate analysis, correct? 3 different pesticides were analyzed A. Correct. 4 separately, and the unexposed category 4 Q. Let's look at the Eriksson study. 5 consisted of subjects that were unexposed to 5 I know we have looked at it before, but I 6 have a few more questions. 6 all included pesticides. 7 7 A. Eriksson? Do you see that? 8 O. Eriksson, and I don't know what A. Yes. 9 O. That was the same issue we saw in 9 number that is. 14-13. 10 10 the Hardell 2002 study; correct? Now, this is also, like the 11 A. I don't recall, but okay. McDuffie study, an exploratory analysis; 12 12 Q. And that is, as you testified with correct? respect to Hardell, a methodological flaw, 13 13 A. Exploratory meaning that they did 14 not start off with a particular specific 14 because it prevents any analysis that accounts for other pesticide exposures; 15 15 pesticide or herbicide in mind to test, if 16 that's what you mean. correct? 17 17 Q. Correct. A. I'm not following. 18 A. Is that what you mean? 18 O. If the unexposed category is 19 19 defined as individuals unexposed to all O. Yes. 2.0 included pesticides, and the exposed category 2.0 A. Yes. 21 for glyphosate can include individuals with 2.1 Q. And in your expert report, you 22 state that the odds ratios in this study were 22 glyphosate exposures who were also exposed to 23 23 other pesticides, that is a methodological adjusted to account for possible confounding 24 from use of other pesticides; correct? It's 24 flaw in the study; correct? 2.5 25 page 16 of your report, if that helps. A. Why?

Case 3:16-md-02741-VC Document 546-3 Filed 10/06/17 Page 70 of 131 Page 270 Page 272 1 1 Q. Because in a case-control study, we say, the methodologically appropriate and 2 2 you are trying to pull populations of exposed sound way to do it. 3 individuals from the same population. You 3 Q. Okay. 4 want to have the controls be from the same 4 A. As opposed to, let's say, taking 5 5 people who live on -- in the 10021 area code, population as the cases; correct? 6 A. But that's not a flaw in the study. 6 where they are never going to see, you know, 7 7 That is simply the reality of the universe herbicides in any meaningful way, as the 8 8 and of people in the population. I mean, control group for farmers, so to speak. So, people are exposed or they are unexposed. 9 9 you want to take everybody, let's say, being Q. Well, I understand that. But if 10 10 a farmer, where everybody has an equal chance 11 you are defining "unexposed" to exclude 11 of being exposed to herbicides. 12 individuals with exposures to other 12 Now, it may well turn out that in 13 pesticides, and you are not doing that for 13 one particular farmer or that some group of 14 the cases --14 farmers isn't going to use herbicides, 15 A. Then that would mean then that --15 because they are organic --16 so, so that essentially what you are saying 16 Q. Understood, understood. 17 then is, if I may analogize, if you want 17 A. -- or something like that. So, 18 to -- let's say we took asbestos and 18 that's fine. They're still -- they're still 19 cigarette smoking and lung cancer --19 fine. They're still in the thing. To say 20 Q. Sure? 20 that therefore, they are screwing up your 21 A. -- as an analogy, and I said I 21 study in some methodological way is not fair. 22 wanted to know what the effect of asbestos 22 That's -- if that's what you are implying, 23 was on lung cancer, but I wanted to control 23 then --24 for tobacco use, so I could only take 2.4 Q. No. I think you are 25 cigarette smokers, I would have to have 25 misunderstanding me. Page 271 Page 273 1 everybody be a smoker both in the case group 1 A. Then I am misunderstanding you. 2 and the control group, because if I had 2 Q. Let's go back to this. 3 someone who wasn't exposed to cigarette The statement in the Eriksson study 4 4 smoking, I wouldn't know what to do with is that for the unexposed category, for the 5 5 them. unexposed group --6 Q. No, I think it would be a little 6 A. Unexposed to herbicides. 7 7 Q. Well, the unexposed for glyphosate bit --8 would be unexposed to glyphosate; correct? MR. TRAVERS: He is still talking, 9 9 I think. A. But I think here they are talking 10 10 about unexposed to any pesticide. A. No, I was finished. 11 11 Q. It would be a little bit different, Q. Right. 12 I guess. If you were to do a study of 12 So, each of the different 13 asbestos and tobacco, smokers, and you had 13 pesticides was analyzed separately, so you 14 for your exposed group individuals with 14 look at a group that was exposed to that 15 exposure to asbestos who might be exposed to 15 pesticide, and you are looking at, as your 16 16 cigarettes, but for your unexposed group you unexposed group, an individual that is not 17 17 excluded anybody who had exposure to exposed to any pesticides. So, there you 18 cigarettes, as a definition, that would be a 18 have farmers --19 problem; correct? 19 A. But he is a farmer and he chose not 2.0 A. I don't agree. I mean, I think the 2.0 to be exposed. That was his -- that's life.

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best you can do is, you can put the exposures

in everybody's way. You know, you can take a

group where everyone has got an equal chance

of being exposed to all the exposures.

That's the way to do a -- that's the, shall

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That's his lifestyle or whatever choice.

Q. Well, no, I understand if they

That is one thing. But here, in order to be

part of the analysis, they define "unexposed"

happen to have somebody who is not exposed.

Page 274		Page 276
as requiring that there is no exposure to	1	A. And no other herbicide.
other pesticides; correct? That's what	2	Q. Okay. So, if the exposed group is
Eriksson is stating here.	3	glyphosate and no other pesticide
A. The unexposed were not exposed to	4	A. Correct.
other pesticides, yes.	5	Q and the unexposed group is no
Q. Any pesticides.	6	pesticide, that's fine.
A. Any pesticides, right.	7	A. Correct. That's legal. That's,
Q. So, that would be taking a	8	that's that is wrong word. That's
non-farmer and putting them in the exposed	9	Q. Allowed.
group	10	A. Allowed.
A. No.	11	Q. If the exposed group, though, is
Q and having a farmer in the	12	exposure to glyphosate and other pesticides,
	13	then it would not be proper to
	14	A. Correct.
	15	Q define "unexposed" as having no
pesticides. Well, I don't know. What was	16	pesticide exposures.
-	17	A. Absolutely right.
misunderstanding what the control group is	18	Q. And if that's what was done in the
here.	19	Eriksson study, that would be a flaw.
O. Well, let me	20	A. Right. And, you know, recognizing
	21	that you're what word would I use
	22	manipulating or playing with the data to some
	23	degree or and since, as you said at the
	24	beginning when we picked up this paper, this
Q. If the analysis or case-control	25	is an exploratory study, the term that is
Page 275		Page 277
study allows for exposure to other pesticides	1	precisely what an exploratory study is all
	2	about. It allows you to explore to see
	3	what's going on and to do sort of the
	4	subgroup analyses to see what happens if you
2,4-D and malathion, but for your control	5	do this or if you do that, as long as you
for your unexposed, I'm sorry, you are not	6	adhere to some reasonable guidelines to make
allowing them to be counted if they have	7	everything kind of logical and
=	8	commonsensical, and not be too biased, if you
unexposed population now is not the same	9	will, in terms of how you play the data or
	10	play the subgroups against each other.
		play the subgroups against each other.
correct? You are drawing from different	11	Q. And so, for all of the analyses
correct? You are drawing from different populations now.	11 12	Q. And so, for all of the analyses
populations now.		Q. And so, for all of the analyses that are reported in Eriksson, other than
	12	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table
populations now.  A. So, but you are allowed to do that	12 13	Q. And so, for all of the analyses that are reported in Eriksson, other than
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So,	12 13 14	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you	12 13 14 15	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be	12 13 14 15 16	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.	12 13 14 15 16 17	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait.
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.  Q. If you define "unexposed," though,	12 13 14 15 16 17 18	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait.  Are we still in wait. Is this the first
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.  Q. If you define "unexposed," though, as not allowing for exposures to any other	12 13 14 15 16 17 18	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait. Are we still in wait. Is this the first one?
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.  Q. If you define "unexposed," though, as not allowing for exposures to any other pesticides at all	12 13 14 15 16 17 18 19 20	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait.  Are we still in wait. Is this the first one?  Q. Eriksson two thousand and
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.  Q. If you define "unexposed," though, as not allowing for exposures to any other pesticides at all  A. Except for glyphosate.	12 13 14 15 16 17 18 19 20 21	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait. Are we still in wait. Is this the first one?  Q. Eriksson two thousand and A. Yes.
populations now.  A. So, but you are allowed to do that as long as you create the same condition for both the cases and the controls. So, therefore, you could specify that, if you also specify that the case group cannot be exposed to any other herbicide.  Q. If you define "unexposed," though, as not allowing for exposures to any other pesticides at all	12 13 14 15 16 17 18 19 20 21	Q. And so, for all of the analyses that are reported in Eriksson, other than that one multivariate analysis on table seven, they have used this methodological design that you need to keep in mind and might be okay for an exploratory analysis; is that correct?  A. I think that's fair, yes. Wait.  Are we still in wait. Is this the first one?  Q. Eriksson two thousand and
	as requiring that there is no exposure to other pesticides; correct? That's what Eriksson is stating here.  A. The unexposed were not exposed to other pesticides, yes.  Q. Any pesticides.  A. Any pesticides, right.  Q. So, that would be taking a non-farmer and putting them in the exposed group  A. No.  Q and having a farmer in the exposed group.  A. I don't agree. It would be taking, as I said, a farmer who wasn't exposed to pesticides. Well, I don't know. What was the control group? Maybe I am maybe I am misunderstanding what the control group is here.  Q. Well, let me  A. Oh, I see. These are just general population controls. Okay. So, these are people who are not exposed to any pesticides, yeah.  Q. If the analysis or case-control  Page 275  study allows for exposure to other pesticides when you are measuring, let's say glyphosate, as an exposed case, you can have somebody who is exposed to glyphosate and also exposed to 2,4-D and malathion, but for your control for your unexposed, I'm sorry, you are not allowing them to be counted if they have exposures to any pesticide. Then your	as requiring that there is no exposure to other pesticides; correct? That's what  Eriksson is stating here.  A. The unexposed were not exposed to other pesticides, yes.  Q. Any pesticides.  A. Any pesticides, right.  Q. So, that would be taking a non-farmer and putting them in the exposed group  A. No.  Q and having a farmer in the exposed group.  A. I don't agree. It would be taking, as I said, a farmer who wasn't exposed to pesticides. Well, I don't know. What was the control group? Maybe I am maybe I am misunderstanding what the control group is here.  Q. Well, let me  A. Oh, I see. These are just general population controls. Okay. So, these are people who are not exposed to any pesticides, yeah.  Q. If the analysis or case-control  Page 275  study allows for exposure to other pesticides when you are measuring, let's say glyphosate, as an exposed case, you can have somebody who is exposed to glyphosate and also exposed to 42,4-D and malathion, but for your control for your unexposed, I'm sorry, you are not allowing them to be counted if they have exposures to any pesticide. Then your unexposed population now is not the same

Page 278 Page 280 1 because of the way they defined the unexposed actually cross-reference. You will see that 2 2 the univariate odds ratios in table seven, population, that that creates an issue as far 3 3 as how you can actually analyze the findings and the univariate is where they do the 4 4 in the study; correct? analysis defining "unexposed" that way --5 5 A. You can interpret, I would say. A. Okay. 6 Q. Why don't we just put that aside. Q. -- they match up. Correct? Let's start that again, and maybe you can 7 A. All right. 8 just put your wallet --8 O. So, I am correct that for all of A. I'm cool, I'm cool. I'm sorry. 9 the analyses other than the one multivariate 10 10 Q. So, for Eriksson 2008, because of analysis on table seven, Eriksson uses this 11 this fact, that they defined unexposed alone 11 sort of exploratory methodology in which they 12 as not having exposure to any other 12 define "unexposed" as unexposed to all other pesticides, that -- that fact has to be taken 13 pesticides: correct? 13 A. Yes, but -into account in how you interpret all of the 14 data reported in that study; correct? Q. And that's okay for an exploratory 15 15 16 analysis. Isn't that your testimony? 16 A. All the data? 17 O. Other than the multivariate 17 A. And it may well turn out that that 18 18 is, as I say -- depending on how you want to analysis on table seven. 19 think or how you want to analyze it, that may A. That is one analysis, and again, as 2.0 long as they apply the same rules to both the 20 be -- maybe this is the smartest analysis or 21 cases and the controls, they can do whatever 21 the best analysis. It depends on how -- how 22 they like, or that would be a legitimate 22 you think through how glyphosate operates or 23 23 how one -- I mean, if you are concerned about analysis, and then you -- as I told you 2.4 earlier, in epidemiology you have the freedom 24 confounding by other herbicide, then perhaps 25 to do whatever you like, as long as it has 25 taking all the herbicides out of the picture Page 279 Page 281 1 logic, common sense, and intellectual 1 in this way is the smartest. I'm not saying 2 2 validity to it. it is or it isn't. I'm saying at least that 3 is one approach to how to analyze the data Someone else may think it's silly. 4 They are welcome to think whatever they like. that addresses that question, and see what 5 5 And you can interpret or not, and think it the answer is, is one way to address that 6 reasonable or not think it reasonable, that 6 issue. 7 you are free -- that you are -- that's Q. Just to be clear, we are not taking 8 your -- that's your freedom, you know, to do. all the other pesticides out, because the 9 9 Q. Just so the record is clear, exposed population, exposed to glyphosate, 10 though, in the Eriksson study, the only 10 also has exposures to other pesticides; 11 analysis that does not define "unexposed" as 11 correct? 12 being unexposed to all pesticides is that one 12 A. If they did that, then I would say 13 13 data point in table seven for the it wasn't a legitimate analysis. I mean, as 14 multivariate analysis. All of the other data 14 I said, if you are going to take it out of 15 15 the control -- whatever you do to the presented in that table uses this 16 16 experimental approach of defining "unexposed" case-control group, you have to do to the 17 as unexposed to all pesticides; correct? 17 case group. You have to be consistent 18 MR. TRAVERS: Objection to form, 18 between cases and controls. 19 asked and answered. 19 Q. And between exposed and unexposed 2.0 2.0 A. So in table two, when they do the with respect to other pesticides; correct? 21 21 ten days versus greater than ten days, that A. So again, here, this is a 2.2 is excluding anyone with any other herbicide 22 case-control study. 23 23 exposure? Q. Right. 24 24 Q. Yeah. If you look at the A. So, again, whatever you do to the 25 2.5 univariate analysis on table seven, you can cases, you have to do to the controls.

Page 282 Page 284 1 1 herbicides and insecticides and rodenticides Q. Right. 2 2 and fungicides that are looked at in A. So, if you are taking all herbicide 3 3 Eriksson 2008 cause non-Hodgkin's lymphoma? exposures aside from glyphosate out of the 4 4 picture, you have to do it to both groups. A. I'm not addressing these other 5 5 agents, so I don't have testimony regarding Q. And with respect to the --6 A. Aside from glyphosate. them. 7 Q. And if you are doing that, by the Q. Is it your opinion, based upon the 8 8 same token, if you are taking all the other Eriksson study, based upon the findings of 9 9 pesticide exposures out of the unexposed that study, that all of the -- every one of 10 10 group in this study, you would need to take these 20 or so different herbicides, 11 11 all those other pesticide exposures out of insecticides, rodenticides and fungicides 12 12 the exposed group for your analysis; correct? cause non-Hodgkin's lymphoma? 13 13 A. Yes, but that wouldn't be the way A. DDT probably does. So, if we are 14 you would -- I would say in a case-control 14 going to add by analogy to the Bradford Hill study, you wouldn't -- that wouldn't be the 15 15 criteria -- I won't do that, but the answer logical way to approach it. 16 16 is, you know, I don't know, but it's not --17 17 O. Right. Q. Let me ask you this, Dr. Neugut. 18 18 A. I mean, you might get that as the When a study uniformly reports odds ratios in 19 19 out -- that might be the way it would end up, excess of 1.0, for every exposure that it 2.0 but that wouldn't be the way you would 20 reports out, without controlling for 21 21 logically approach it. confounding, that points to the possibility 22 Q. Okay. So, it wouldn't be logical 22 of a systematic bias in the study, doesn't 23 23 to define -- if you are going to have it? 24 exposed -- allow for exposure to other 24 A. Yes. 25 pesticides, it wouldn't be logical for your 25 O. And --Page 283 Page 285 1 unexposed to an individual pesticide to 1 A. It points to a concern. I mean, 2 2 exclude all other pesticides; correct? you know, again, if everything -- if all the 3 exposures are related to each other in some A. No. 4 4 Q. Okay. So, with respect to the significant way, or if most of them are, they 5 5 Eriksson study, the odds ratios, all the don't all have to be, but if most of them 6 6 other odds ratios that are reported, except are, then it's not totally inconceivable that 7 7 for this hierarchal odds ratio, are also -they do elevate some risk. 8 they are not adjusted for smoking or drinking But the answer is yes, generally 9 9 or any other lifestyle factors; correct? speaking, that the -- that's what is referred 10 10 A. No. to as specificity in the Bradford Hill 11 Q. They are only adjusted for age, sex 11 criteria, and it would -- it should raise a 12 12 and year of diagnosis; correct? concern that it's not purely -- that it's 13 13 A. Age, sex, year of -- yes. not -- that it's not -- well, that it's not a 14 Q. And virtually every one of the 14 causal association, that there is something 15 15 approximately 20 different pesticides that else going on that is methodological or 16 16 Eriksson looked at is reported to have statistical rather than causal. 17 17 unadjusted odds ratios above 1.0; right? Q. If there is confounding by other 18 A. So, are we now back in table two or 18 pesticide exposures, it's impossible from 19 19 this study results to identify any one of the table --20 2.0 Q. All of the tables. studied pesticides, including glyphosate, as 21 21 A. Huh? having a true association with non-Hodgkin's 22 Q. All of the tables. 22 lymphoma; correct? 23 23 A. Say that question again. A. Yes. 24 Q. Is it your testimony that every one 24 Q. If there is confounding by other 25 25 of, looks like maybe 20 or more different pesticide exposures, it's impossible from

Page 286 Page 288 1 1 That's why it's called exploratory or -- and this study to identify any one of 2 2 all of that, to see what makes sense within individually studied pesticides, including 3 3 glyphosate, as having a true association with the data. 4 non-Hodgkin's lymphoma; correct? 4 Q. But specifically with the Eriksson 5 5 A. I would not worry about confounding 2008 study, because of what we are seeing 6 here. That is not -- or at least that would 6 with elevated odds ratios, and if you look at 7 not be my -- I don't know that that would be table seven, glyphosate is in the middle, I 8 8 the issue I would be concerned about. I guess, of the different pesticides, as far as 9 9 the reported odds ratios, because of this mean, the --10 10 Q. What issue would you be concerned systemic bias in the Eriksson study, it's 11 11 impossible to reach any conclusion with about? 12 A. We have already said these are 12 respect to glyphosate; correct? 13 13 MR. TRAVERS: Objection to the farmers. Farmers have a higher risk of lymphoma than the general population. The 14 compound question. 15 A. I would say that with this paper in 15 control group is the general population. So, 16 16 you are seeing a slight increase in, if you general, I would be -- I might be concerned 17 want to call it an occupational risk, then --17 about all of these things, you know. 18 18 so, this is -- this is an occupational risk Q. Okay. 19 19 ratio. You are seeing that farmers have an A. These are pretty high risk -- we 2.0 elevated risk of lymphoma. 20 are already getting up into higher risk 21 Over and above that, the question 21 ratios than I might expect purely from biases 22 22 is, do herbicides, within the farming group, alone. or within the farmers, also convey an 23 23 Q. How about with respect to when you 24 additional risk ratio over and above being a 24 have every finding above 1.0, so you have 25 farmer. So, that is a question that the 25 evidence of a systemic bias in the study, Page 287 Page 289 1 study can address over and above. 1 it's impossible to reach a conclusion with 2 Q. But this study, because of its 2 respect to any individual exposure reported 3 design, can't provide you with that answer; out of this study; correct? 4 4 correct? A. I would say that that would be true 5 5 A. Because? of any -- I would have said that before I did 6 6 the study, or it would have been impossible Q. Because everything is above one in 7 7 the study, so you can't actually to reach a conclusion before I did the study differentiate any finding with respect to a 8 no matter what I found. 9 specific pesticide; correct? 9 Q. Because it's an exploratory study? 10 10 A. Well, you can see if the risk ratio A. Correct. 11 for specific subgroups are higher than they 11 Q. Now, with respect to the analysis 12 are for the over -- for the overall group. 12 here of latency, there is analysis of 13 exposures for the categories of one to ten 13 If farmers exposed to glyphosate have a 14 14 higher risk than farmers not exposed to years, and then there is a category of 15 greater than ten years; correct? And that is 15 glyphosate, I would worry about glyphosate. 16 16 reported, I believe, on -- where is this If -- again, we are talking about an 17 17 exploratory study. If, if -- if there is a document? Page 1659. 1658 and 1659. 18 18 dose -- if people who have five times the A. Yes. 19 Q. But for -- and they report here, or 19 amount of glyphosate as compared to those who 20 Eriksson reports here on MCPA, 2,4,5-T, 2.0 have one-tenth the amount of glyphosate, have 21 2,4-D, and glyphosate; correct? In this 21 a higher risk than those --22 22 O. I understand. Sure. analysis. 23 23 A. The question is what? A. -- then, as I said before, you have 24 Q. The Eriksson paper reports results 24 to apply your thinking and your logic and 25 in this latency analysis for glyphosate, for 25 your common sense to looking at the data.

Page 290 Page 292 1 MCPA, and for 2,4,5-T and 2,4-D; correct? A. Correct. 2 2 O. And if the data from De Roos 2005 A. Yes. 3 3 Q. But for MCPA, 2,4,5-T and 2,4-D, is correct in showing higher exposure levels 4 there were no exposed cases in that one- to to other pesticides with higher exposure 5 ten-year latency period; correct? That's on level to glyphosate, the finding of increased 5 6 6 the top of page 1659. odds ratios at higher exposure levels of 7 A. Yeah. glyphosate could be an artifact due to confounding; correct? 8 8 Q. So, we know for these pesticides at 9 A. Could be. 9 least that they could not have confounded the 10 10 results for glyphosate within one to ten Q. And Eriksson also does not report 11 years of diagnosis; correct? 11 any -- does not conduct any analysis to 12 12 A. Okay. Yes. Um-hum. determine whether the findings for glyphosate 13 Q. And the glyphosate odds ratio for exposure of less than ten days are 13 14 that one- to ten-year latency period was statistically different than the finding for 14 1.11. That's not even remotely close to 15 15 glyphosate, the odds ratio of greater than 16 statistical significance. That is a null ten days; correct? 16 17 A. I mean that's -- the numbers are 17 result: correct? 18 really too small to do anything 18 A. Yes. 19 statistically, to address what you just said. 19 Q. Now, for the latency period of 20 greater than ten years, the glyphosate odds 20 Q. And going back to what we were 21 discussing earlier, with respect to the Lee ratios reported by Eriksson could be 21 22 study, which had those two different odds confounded by exposures to MCPA, 2,4,5-T and 2.2 23 ratios or point estimates. 23 2,4-D; correct? 2.4 2.4 A. Right. A. Yes. 25 Q. There is really no way to tell from 25 Q. And in your expert report, you note Page 291 Page 293 1 1 in particular that MCPA is commonly used the glyphosate -- or from the data in 2 2 Eriksson whether there is any meaningful together with glyphosate; correct? 3 A. Yes. difference between the reported odds ratios 4 4 Q. Eriksson reported an odds ratio for for less than ten days exposure as opposed to 5 greater than ten days exposure of glyphosate; MCPA of 2.81 for that greater than ten-year 6 latency period, which is higher than the 6 correct? 7 unadjusted odds ratio reported for glyphosate A. No, but I mean, you can't 8 for that same greater than ten-year period; statistically confirm it. 9 9 correct? Q. And just like you said in the Lee 10 10 paper, when you can't statistically A. Yes. 11 11 differentiate the two groups. It's not Q. And it's impossible to tell from 12 Eriksson whether the odds ratio for 12 appropriate to say, as an epidemiologist, 13 13 that you have shown that they are actually glyphosate, if it had been controlled for the 14 use of MCPA, would be elevated at all for 14 different: correct? greater than ten years latency; correct? 15 15 A. You can't say with definitiveness. A. Yes. 16 Q. Let's talk about the meta-analysis, 17 17 and you talk about those on page 17. Q. Now, in your expert report, you 18 also point to the dose-response analysis in 18 First of all, the -- each of those 19 the Eriksson study for glyphosate; correct? 19 meta-analyses that were presented, and this 2.0 2.0 A. Yes. would be both Schinasi and the Chang and 21 2.1 Q. And this -- again, this Delzell 2016 paper, they limited their 22 2.2 dose-response analysis reported by Eriksson analyses only to the most updated and 23 23 is not controlled or not adjusted for comprehensive analysis of each epidemiology 24 24 study population; correct? potential confounding by exposure to other 25 25 pesticides; correct? A. Yes.

	Page 294		Page 296
1	Q. Now, you are aware, are you not,	1	that the NAPP data were not included in any
2	that Chang and Delzell have updated their	2	of the meta-analyses. Do you see that?
3	meta-analysis to include the data from the	3	A. Are you in the middle of 16 or
4	2013 Agricultural Health Study and from the	4	Q. Sort of the top, maybe one-third of
5	NAPP study; right?	5	the way down. The bottom of that last
6	A. I'm aware of it, but I haven't seen	6	carryover paragraph, the final sentence.
7	the I don't believe I have seen it.	7	A. Up here or down here?
8	Q. Were you not provided with the 2017	8	Q. Right up here, the top paragraph.
9	Chang and Delzell meta-analysis that was	9	At the very end, it says, "The study results
10	provided to your counsel with Monsanto's	10	were published in 2014, and as such were not
11	expert reports?	11	included in any of the meta-analysis."
12	A. I didn't read Monsanto's expert	12	Correct?
13		13	
14	reports.  Q. So, you have not looked at the	14	A. The study results of the NAPP is she referring to?
15		15	ē
16	Chang and Delzell study that is cited in	16	Q. Yes. Well, you should confirm that
17	those reports?	17	for yourself, because that's what is
18	A. No.	18	discussed on page 15 and 16, but that is my
19	MR. LASKER: Let me mark as the	19	understanding. I want to make sure that is
20	next exhibit in line, 14-21.	20	your understanding as well of Dr. Ritz's
21	(Exhibit 14-21, Exponent, May 24,	21	A. Okay. Yes, okay.
22	2017 Meta-Analysis of Glyphosate Use and	22	Q. So, Dr. Ritz is pointing to the
23	Risk of Non-Hodgkin Lymphoma marked for	23	fact that, as we have discussed, using the
23	identification, as of this date.)	23	methodology for meta-analyses that was used
25	Q. And Dr. Neugut, if you look to page	25	in the studies and was used both by Schinasi
25	seven of this document, Exhibit 14-21, this	25	and Chang and Delzell, you would use the most
	Dama 205		
	Page 295		Page 297
1	is	1	Page 297 recent updated complete dataset for the
1 2		1 2	
	is		recent updated complete dataset for the
2	is A. I'm sorry, where am I looking?	2	recent updated complete dataset for the meta-analysis; correct?
2	is A. I'm sorry, where am I looking? Q. Page seven.	2 3	recent updated complete dataset for the meta-analysis; correct?  A. Yes.
2 3 4	<ul><li>is</li><li>A. I'm sorry, where am I looking?</li><li>Q. Page seven.</li><li>A. Page seven.</li></ul>	2 3 4	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would
2 3 4 5	<ul> <li>is</li> <li>A. I'm sorry, where am I looking?</li> <li>Q. Page seven.</li> <li>A. Page seven.</li> <li>Q. This is analysis by Dr. Chang and</li> </ul>	2 3 4 5	recent updated complete dataset for the meta-analysis; correct?  A. Yes.  Q. And so the NAPP dataset then would be used as the pooled analysis as compared to
2 3 4 5 6	<ul> <li>is</li> <li>A. I'm sorry, where am I looking?</li> <li>Q. Page seven.</li> <li>A. Page seven.</li> <li>Q. This is analysis by Dr. Chang and Dr. Delzell; correct?</li> </ul>	2 3 4 5 6	recent updated complete dataset for the meta-analysis; correct?  A. Yes.  Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001
2 3 4 5 6 7	<ul> <li>is</li> <li>A. I'm sorry, where am I looking?</li> <li>Q. Page seven.</li> <li>A. Page seven.</li> <li>Q. This is analysis by Dr. Chang and Dr. Delzell; correct?</li> <li>A. Yes.</li> </ul>	2 3 4 5 6 7	recent updated complete dataset for the meta-analysis; correct?  A. Yes.  Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?
2 3 4 5 6 7 8	<ul> <li>is</li> <li>A. I'm sorry, where am I looking?</li> <li>Q. Page seven.</li> <li>A. Page seven.</li> <li>Q. This is analysis by Dr. Chang and Dr. Delzell; correct?</li> <li>A. Yes.</li> <li>Q. And if you look on page four, at</li> </ul>	2 3 4 5 6 7 8	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes.
2 3 4 5 6 7 8	<ul> <li>is</li> <li>A. I'm sorry, where am I looking?</li> <li>Q. Page seven.</li> <li>A. Page seven.</li> <li>Q. This is analysis by Dr. Chang and Dr. Delzell; correct?</li> <li>A. Yes.</li> <li>Q. And if you look on page four, at the very top, they state that for purposes of</li> </ul>	2 3 4 5 6 7 8	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me
2 3 4 5 6 7 8 9	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same	2 3 4 5 6 7 8 9	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you.
2 3 4 5 6 7 8 9 10	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as	2 3 4 5 6 7 8 9 10	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go
2 3 4 5 6 7 8 9 10 11	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and	2 3 4 5 6 7 8 9 10 11	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine
2 3 4 5 6 7 8 9 10 11 12	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct?	2 3 4 5 6 7 8 9 10 11 12	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine and page ten.
2 3 4 5 6 7 8 9 10 11 12 13	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct? A. Yes.	2 3 4 5 6 7 8 9 10 11 12 13 14	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine and page ten.  A. That is in the Exponent section?
2 3 4 5 6 7 8 9 10 11 12 13 14 15	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct? A. Yes. Q. And that is the meta-analysis that	2 3 4 5 6 7 8 9 10 11 12 13 14	recent updated complete dataset for the meta-analysis; correct?  A. Yes.  Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes.  Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine and page ten.  A. That is in the Exponent section?  Q. Yes. In Chang and Delzell, 2017.
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct? A. Yes. Q. And that is the meta-analysis that you cite to in your expert report; correct?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine and page ten.  A. That is in the Exponent section? Q. Yes. In Chang and Delzell, 2017. Pages nine and ten list all of the
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	is A. I'm sorry, where am I looking? Q. Page seven. A. Page seven. Q. This is analysis by Dr. Chang and Dr. Delzell; correct? A. Yes. Q. And if you look on page four, at the very top, they state that for purposes of this analysis, they are using "the same meta-analysis statistical methods as described in our publication Chang and Delzell, 2016." Correct? A. Yes. Q. And that is the meta-analysis that you cite to in your expert report; correct? A. Yes.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	recent updated complete dataset for the meta-analysis; correct?  A. Yes. Q. And so the NAPP dataset then would be used as the pooled analysis as compared to the De Roos 2003 and the McDuffie 2001 studies; correct?  A. Yes. Q. And if the NAPP data and let me actually go back to Exhibit 14-21 for you. That is the 2017 meta-analysis. If you go back if you can go to the pages, page nine and page ten.  A. That is in the Exponent section? Q. Yes. In Chang and Delzell, 2017.  Pages nine and ten list all of the epidemiological studies that we have been
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Page 298 Page 300 1 1 Yes. Health Study data and the NAPP data and then A. 2 2 Number four is Eriksson 2008. all of the other studies that you analyzed; Ο. 3 3 A. Um-hum. correct? 4 Number five is Hardell 2002. 4 A. I'm not -- are we talking about --5 5 Α. O. Model 21. Q. Number six is Hohenadel, and 6 A. Back here? 7 Hohenadel did an analysis of -- another Q. And you should reference it back, 8 8 analysis of McDuffie; correct? The same data so what they have done in this analysis, if I 9 9 set. Correct? understand it correctly, but you should 10 10 A. Yes. correct me if I am wrong, is that they used 11 Q. McDuffie 2001; correct? 11 the updated AHS analysis from 2013 in place 12 A. Yes. 12 of the 2005 analysis, and they have used the 13 O. Orsi 2009? 13 pooled analysis for the North American Pooled 14 14 A. Um-hum. Project in place of the studies that were Q. And then number nine is Pahwa, 15 15 pooled into that study, McDuffie and De Roos; 16 et al, 2015, and that is the NAPP data; 16 correct? 17 correct? 17 A. To be honest, I'm -- it's a little 18 A. Yes. 18 difficult for me to absorb all of this as I 19 Q. And so they then conduct, using the 19 sit here. 2.0 same methodology as they did in the 2016 20 Q. The reported finding at least, and 21 meta-analysis that you cite in your report, 21 I understand that you have not had a chance 22 they do meta-analysis looking at these 22 to look at this -- well, let me strike that. different studies and considering different 23 23 I understand that you haven't 2.4 studies for -- to determine what the 24 looked at this, but the analysis, as reported 25 meta-relative risk is with those different 25 by Chang and Delzell, 2017, for a Page 299 Page 301 studies; correct? And they identify which 1 1 meta-analysis, when you look at the most 2 2 updated AHS data and the most recent pooled studies they are including in the meta-analyses; correct? 3 3 data from North America, and in combination 4 A. Yes. with the rest of the glyphosate epidemiology, 5 5 your meta-relative risk is 1.0 with a Q. So, for their model 26, if you can 6 look at that, that's on page 11, using their 6 confidence interval of 0.86 to 1.2; correct? 7 7 same meta-analysis methodology that they used A. Yes. 8 8 for the 2016 publication, and they are Q. And that is a null finding for the 9 9 looking here now at studies three, four, meta-analysis; correct? 10 five, eight and nine, so they have used the 10 A. Yes. 11 NAPP data in place of De Roos 2003 and 11 Q. And that finding that Chang and 12 McDuffie, but then continuing to use the 2005 12 Delzell report is consistent with what 13 13 Agricultural Health Study data; correct? Dr. Blair testified that he would expect a 14 14 meta-analysis to show, using that updated AHS A. Yes. 15 15 data and updated Pooled Project data; Q. So, if you were to use the NAPP and 16 16 substitute that for -- for De Roos 2003 and correct? In his deposition testimony. 17 17 McDuffie per the -- per the normal A. Yes. 18 methodology for a meta-analysis, you find 18 O. So, this 2017 meta-analysis finding 19 that there is a meta-relative risk of 1.2 19 of Chang and Delzell with the most updated 20 2.0 that is not statistically significant; epidemiological data does not provide 21 21 correct? evidence of an association between glyphosate 22 2.2 A. Yes. and non-Hodgkin's lymphoma; correct? 23 Q. And if you look at model 21 of 23 MR. TRAVERS: Objection to form. 24 their meta-analyses, this is the finding if 24 A. I don't know that it does or it 25 2.5 you were to use both the 2013 Agricultural doesn't. Again, I am not -- I haven't

	Page 302		Page 304
1	incorporated it into my opinion and am not	1	understanding that you have basically taken
2	and you are putting into it data that I am	2	this data from the IARC, IARC monograph?
3	not including in my opinion, and so, if you	3	A. Primarily. I mean, some of it may
4	are asking me to form my opinion based on it,	4	have come also from some of Portier's stuff
5	I am not willing to.	5	or from other sources of a similar ilk.
6	Q. And that's because you are	6	Q. But it would be fair to say that
7	following the methodology prescribed by IARC;	7	this type of cited data is outside of your
8	correct?	8	expertise as an epidemiologist?
9	A. Plus this is also not peer reviewed	9	A. It's not what I deal with on a
10	or published or and it's including data	10	daily basis, but I am familiar with this sort
11	that wasn't itself peer reviewed or	11	of data, and certainly to the degree of being
12	published.	12	able to incorporate it into, say, biological
13	Q. And we went through this before,	13	plausibility arguments, and I have a Ph.D. in
14	but are you aware of any guidelines I know	14	chemical carcinogenesis, so, you know, at
15	your the meta-analysis guidelines that you	15	least going back, I have a fairly good
16	cite to in your report talk about using	16	familiarity with this sort of data, at least
17	unpublished data in the meta-analysis. Are	17	fundamental. I don't work in a lab anymore,
18	you aware of any guidelines for meta-analysis	18	and I wouldn't want to, but but I
19	that state you should not consider	19	understand it fair enough. But it's not
20	unpublished studies in a meta-analysis?	20	primarily what I deal with.
21	A. So, you run the risk of what	21	Q. Okay. And would I be correct in my
22	about the study that they didn't include?	22	understanding that you haven't actually read
23	Q. Let me let me ask the question	23	any of the toxicity studies or mechanistic
24	again, and let me see if I have an answer.	24	studies for glyphosate?
25	Are you aware of any guidelines for	25	A. I did read a couple of them, just
	Page 303		Page 305
1	meta-analyses that state that you should not	1	there were one or two that I probably went
1 2	meta-analyses that state that you should not consider unpublished studies in your	1 2	there were one or two that I probably went back and did read. But I did not I did
	consider unpublished studies in your		back and did read. But I did not I did
2		2	
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Page 306 Page 308 1 1 O. And that is the source of the first page in 295, Sir Bradford Hill, in 2 introducing his -- these criteria that we 2 Bradford Hill, what we know as the Bradford 3 3 Hill criteria; correct? will be discussing, states, "As a predicate, 4 A. Yes. our observations reveal an association 5 5 Q. And in that seminal article laying between two variables perfectly clearcut and 6 6 out his criteria, Sir Bradford Hill stated beyond what we would care to attribute to the 7 that you should not even consider the play of chance." Correct? 8 8 criteria he specifies for determining whether A. Yes. 9 or not there is causation unless you first 9 O. So, for Sir Bradford Hill, for --10 10 have a statistically significant finding that under his analysis, the first threshold cannot be explained by confounding or bias; 11 11 question is: Do you have a statistically 12 12 correct? significant finding; correct? 13 13 A. Yes. A. It's a long time from 1965 to 2017. 14 14 I mean, so, you know, that's like saying, you Q. And also, that you have a clearcut 15 know, we are still doing what George 15 finding that would not be explained by bias Washington told us to do, and then based on 16 or confounding; correct? 16 17 that is how we are now interpreting the 17 A. Yes. 18 18 Q. And then you would move on to the Constitution. 19 19 criteria that he lays out and you lay out in Q. Okay. There's two -- well, that is 2.0 a separate issue that I am not going to go 20 your expert report; correct? 21 into. But let's just make sure I understand 21 A. Yes. 22 22 the answer to my question. O. Let's move on then to -- well, 23 2.3 A. Yes. strike that. 2.4 Q. Because I think you are answering a 24 I'm correct in my understanding 25 different question. 25 that you did not apply that predicate Page 307 Page 309 1 1 So, Bradford Hill, when he set requirement for your decision then to 2 2 consider the Bradford Hill criteria: is that forth his criteria, it was his statement that 3 you should not go move on to consider those fair? other criteria unless you first have 4 4 A. I think Bradford Hill would be 5 epidemiological findings that are 5 absolutely appalled that about 90 percent of 6 statistically significant, positive findings 6 the causal things that are now commonplace in 7 7 that cannot be explained by confounding or modern epidemiology, if he were to apply 8 those criteria 50 years after the statement. bias; correct? 9 He was working with regard to tobacco and 9 A. I don't recall. I mean, I'm not 10 going to tell you I read the paper yesterday. 10 lung cancer, where the relative risk is ten 11 Q. You might not be surprised to learn 11 to 20, and would have been totally -- I 12 that we are going to be looking at the paper 12 think, you know, wouldn't have had any 13 13 right now. Expect nothing different. concept of thinking about risk ratios in even 14 A. Here we go down memory lane. 14 the two to three range, much less in the 15 15 under two range, to be able to talk about MR. LASKER: 14-22. 16 (Exhibit 14-22, Section of 16 such issues, if he wouldn't be able to read a 17 17 Occupational Medicine, Meeting January modern epidemiology textbook. 18 18 14. 1965. The Environment and Disease: So, to apply his -- this from 1965 19 19 to now, to make it some kind of criterion for association or Causation?, marked for 20 2.0 how to approach causal thinking, I mean, identification, as of this date.) 21 21 Q. And this is in fact the president's certainly if this were true, we wouldn't have 22 22 address by Sir Bradford Hill that sets forth to even be sitting here talking, but that's 23 the Bradford Hill criteria; correct? 23 out of -- it's so out of date --24 24 A. Yes. Q. Let me just break this down, 25 25 O. And in the second column on the because you are using the Bradford Hill

Case 3:16-md-02741-VC Document 546-3 Filed 10/06/17 Page 80 of 131 Page 310 Page 312 criteria in your expert report; correct? cannot be explained by confounding and bias. 2 A. I'm not -- I mean, that's like A. That doesn't exist. 3 saying I'm using Koch's postulates for O. Okav. So am I correct then that figuring out whether someone has an infection 4 you do not believe that you need to have an 5 with tuberculosis bacillus. observation that reveals an association 6 Q. My guess is that's not going to be between two variables that is perfectly 7 meaningful to anybody who listens to this, so clearcut and beyond what we would care to 8 let me ask the question again. attribute to the play of chance before You are using -- Bradford Hill in 9 considering the Bradford Hill criteria? this paper lays out various criteria for 10 MR. TRAVERS: Objection, asked and making a causation assessment; correct? 11 answered. A. Yes. 12 A. If there were a statistical Q. And you follow that methodology and 13 association between two variables that could 14 look at the same criteria in making your not be explained by bias or confounding, then 15 causation assessment: correct? it would almost -- you almost wouldn't have 16 to have the Bradford Hill criteria to discuss A. Yes. 17 Q. But in making your assessment in it further. 18 this case, you do not require as a predicate, the way Sir Bradford Hill would, that you 19 criteria are not criteria in the sense of start off with a statistically significant 20 increased risk that cannot be attributed to 21 22 chance or -- to confounding or bias; correct? 23 A. I think in modern epidemiology, 24

it's not necessarily required, and I will base it on the -- the meta-analysis that says

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It's -- secondly, the Bradford Hill requirements. They are guidelines in the sense of how to approach thinking about causality. Whether you are quoting some speech of his, the point is that they're -they're guidelines for how to think, how to think about causality, not how -- they are

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that there is an elevated association.

Q. Let me just make sure I understand your testimony. With respect to the Bradford Hill criteria, you are -- you do not consider there to be, or maybe you do, but in conducting your analysis, am I correct in my understanding that you do not believe you need to have a statistically significant increased risk that cannot be attributed to confounding or bias, to then consider the Bradford Hill criteria?

A. You would never know, you can never know ever whether something is causal or not with 100 percent surety. That is the whole point. So, when -- what would be causal or not?

Q. Well, I think we are missing each other. I'm asking a simple question here.

In applying the Bradford Hill criteria in this case, am I correct that you did not require for -- before reaching the criteria, the -- that you start off, as Sir Bradford Hill states in his setting forth of the methodology, with an association that is statistically significant, positive, that

not rules that are required, you have to have this, you have to have that, you have to have a third thing.

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Some, they -- are judgment criteria, rules of judgment that we apply in thinking about whether the association between an exposed -- putative association and outcome are associated with each other, that I can evaluate -- you can evaluate or some other -- your expert can evaluate, and we can agree or disagree about.

Q. But just so I am clear, because it's a pretty long answer, you do not consider in your approach to the Bradford Hill criteria, you do not believe that you would need to have this association between two variables that are perfectly clearcut and beyond what we care to attribute to the play of chance before then going to the criteria laid out. Is that correct?

MR. TRAVERS: Objection, asked and answered.

A. I think they need to have an association -- a putative association or a suspected association between an exposure and

Page 314 Page 316 1 an outcome, where there may or may not be the formed an opinion one way or the other on 2 2 possibility of bias or confounding, and I am latency; correct? 3 3 evaluating whether bias or confounding are A. With regard to how long the latency playing a role or whether causality or some 4 needs to be. 5 5 other association or some other factor is Q. Right. 6 leading to the association. So, depending on the answer to that 7 Q. So, your methodology then in question of latency, for non-Hodgkin's 8 8 applying the Bradford Hill criteria, at least lymphoma and glyphosate, temporality may be 9 9 to that extent, is different than the satisfied or it may not be satisfied for some 10 10 methodology that Dr. Bradford Hill would have of the glyphosate epidemiology; correct? 11 followed. Is that fair to say? 11 A. The question is whether there is --12 A. Different than Dr. Bradford Hill 12 if there is an association between glyphosate 13 and non-Hodgkin's lymphoma -- the question is 13 would have applied in 1965. O. Correct? 14 whether there is an association between 14 15 A. Possibly. 15 glyphosate and non-Hodgkin's lymphoma. If Q. Now, with respect to these 16 there is an association between the two, then 16 17 criteria, the first Bradford Hill criteria 17 either glyphosate precedes non-Hodgkin's 18 you discuss in your expert report is 18 lymphoma, or non-Hodgkin's lymphoma precedes 19 19 temporality; correct? glyphosate. 2.0 20 A. Yes. So either glyphosate is -- now, 21 21 Q. And you state in your expert report from all the studies that we seem to have that there is no doubt that this criteria was 22 2.2 been reading, people, as you yourself have 23 met with the glyphosate epidemiology; 23 pointed out, and for most of the studies, 2.4 24 15 years, ten years, five years, whatever, correct? 25 25 glyphosate exposure preceded the onset of the A. Yes. Page 315 Page 317 1 1 Q. But as we discussed earlier, with disease. Now, if there is an association, 2 2 indeed it seems like that would be consistent respect to cancer epidemiology, temporality 3 also has to consider latency issues; correct? with the causal association. 4 4 A. Does it? Our other interpretation or Plan B 5 Q. Well, that's a question to you. If would be to say that getting a lymphoma makes 6 there is a latent disease, like cancer, and 6 you want to have glyphosate. Monsanto could 7 you are trying to determine whether an have another remedy, could have another use 8 exposure is in the proper time frame to be a for using Roundup to give to people who have 9 9 causal association -- for a causal lymphoma, if that's their preference, but the 10 10 arrow has to go one way or the other. It's association to be --11 11 A. Well, since I don't -- again, since either glyphosate precedes lymphoma, or 12 12 lymphoma precedes glyphosate. I am agnostic on the subject of latency, 13 13 latency to me is not a key issue here O. Dr. Neugut, to be clear, what you 14 personally. Again, Dr. Weisenburger or 14 are purporting to try to do with Bradford 15 Dr. Ritz can address it in their own rules. Hill is answer the question of causation, not 15 16 16 To me, the question is, did association; right? glyphosate exposure precede the onset of 17 17 A. Association, I think what Bradford 18 non-Hodgkin's lymphoma. That's what 18 Hill was saying, or what you were 19 temporality means to me. And I think in at 19 interpreting in his paragraph earlier, is least all the studies that I am seeing, that 2.0 that there -- that the -- that to address the 2.0 21 21 was -- that was pretty clearcut. question of causality, first there has to be 22 2.2 Q. Okay. Well, if I -- just if I an association between the exposure and the 23 23 understand correctly, and I understand you outcome. 24 have said you are agnostic on the issue of 24 Q. And then you look at temporality as 25 25 latency, which means you don't -- you haven't one of the factors.

Page 318 Page 320 1 A. Then you look at these criteria to ambiguity. 2 2 see what the interpretation of the If you are talking about being 3 3 association is, whether it's causal or exposed to cigarette smoking and lung cancer, 4 confounding or bias or some other -- or 4 so either you are going to say that the 5 5 cigarette smoking causes the lung cancer, or whether the arrow goes in the opposite direction, protopathic bias or something of 6 you are going to say that having lung cancer 7 that sort. makes you -- cigarette smoking makes someone 8 8 Q. With respect to temporality for with lung cancer feel better when they smoke, 9 9 cancer outcome, for it to support a so you have your choice of which way to 10 conclusion of causation, you would want to 10 interpret the association between the two. consider latency; isn't that fair? 11 11 So, on some level, if you want to 12 A. Yes, but since latency can be 12 say that glyphosate follows -- glyphosate anything or can be -- I don't see that it's 13 13 exposure follows having a lymphoma, that may an issue in this particular case. 14 be your interpretation of the association 15 Q. When you did your breast cancer 15 between the two. But I don't think that is epidemiological research, if you were looking 16 16 the logical, or that is not what seems to 17 at somebody and they said I used pesticides arise from the various case-control and 17 18 yesterday and then today I went to the 18 cohort studies here. 19 doctor -- the first time I used it, and today 19 Q. Dr. Neugut, that wasn't what I 2.0 I went to the doctor and they diagnosed me 20 said, and I am not sure why we are 21 with breast cancer, would you say that 21 miscommunicating here. 22 temporality had been met for that exposure? 2.2 For purposes of cancer, when you A. Of course not. But now you are 23 23 are looking at epidemiological studies, and 24 talking about something absurd. 24 we have already discussed the fact that 25 Q. Okay. So, it's not just the case 25 cancer epidemiology studies will include Page 319 Page 321 1 1 that exposure has to be before the diagnosis. things like lag time; correct? 2 2 A. Yes. It has to be before the diagnosis in the 3 3 proper time frame for latency; correct? Q. In the analysis, and a variety of 4 different analyses, in cancer epidemiology in 4 A. I think in this particular 5 5 instance, with regard to glyphosate and particular, to make sure that you have taken 6 lymphoma, I think the criteria is fairly 6 into account --7 7 straightforward. A. Yes. Yes. 8 Q. And you say that without having any Q. -- latency; correct? 9 9 opinion one way or the other on what the MR. TRAVERS: Objection. 10 latency period is. 10 A. But latency can be as little as a 11 A. If it's more than a couple of year. 12 12 years, then I think that that is a fair Q. I understand that. But for you, 13 13 for glyphosate and non-Hodgkin's lymphoma, statement. The ambiguity with regard to 14 temporality in most cancer epidemiology 14 you don't have an opinion about what the 15 latency is. It could be a year, it could be 15 studies arises in the context of physiologic 16 phenomena, not in the context of external ten years, you don't know. Is that your 17 17 exposures. testimony? 18 18 A. That's correct, but --So, I mean, when you are talking 19 about something like weight loss, where you 19 Q. And --2.0 2.0 don't know if someone lost weight because A. But the key thing is that the 21 2.1 they had the disease or if the weight loss exposure to glyphosate was more than a year 22 22 somehow led to the disease, you can have prior to the development of lymphoma. 23 23 ambiguity with regard to what the direction Q. Or more than ten years prior. 24 of the arrow is, if the two are associated 24 A. Or more than ten years, fine. I'm 25 25 with each other. So, there you can have happy with that, too.

Page 322 Page 324 1 Q. And if that were the criteria, that You have stated in your report that 2 2 the exposure of glyphosate for temporality you believe the criteria for consistency to has to be more than ten years before 3 3 be met, because the reported odds ratios in exposure, then at least for De Roos 2003, we 4 each -- all of the reported odds ratios in 5 5 don't have temporality that has been the epidemiological literature that you 6 6 satisfied; correct? reviewed were above 1.0; correct? 7 MR. TRAVERS: Objection, asked and A. Yes. 8 8 O. Now, first of all, that would not answered. 9 9 include the dose-response analysis in the A. Disagree. 10 10 2005 De Roos study; correct? Q. There are no exposures in the De Roos or -- study, or that would have 11 11 A. In the --12 exposures more than ten years before 12 Q. The 2005 De Roos study, the 13 dose-response analysis, the highest exposures 13 diagnosis. 14 were below 1.0 for the odds ratio; correct? A. Temporality is not a question of 15 So that finding in De Roos 2005 is 15 whether latency applies. Temporality is a question of does the cause precede the 16 16 inconsistent. 17 effect. As long as the glyphosate exposure 17 A. Okay. 18 18 is prior to the disease, temporality is met. O. Is that correct? 19 19 Q. Let's talk about the next criteria A. Yes. 2.0 you mention, which is -- Bradford Hill 20 Q. And in order for you to also reach 21 criteria, which is consistency; correct? 21 the conclusion -- well, strike that. 22 A. Correct. 22 Your conclusion that all of the 23 23 Q. And this is -- now, again, Sir odds ratios are above 1.0 is based upon your 24 Bradford Hill in his assessment, when he was 24 analysis following the IARC methodology and 25 talking about consistency, he was looking to 25 not considering the updated Agricultural Page 323 Page 325 1 1 consistency across studies finding Health Study data; correct? 2 2 statistically significant results; correct? A. Yes. 3 A. Yes. Q. And it also doesn't consider the Q. You do not define in your 4 4 self-respondent data that we looked at for methodology "consistency" that way; is that 5 the North American Pooled Project; correct? 6 6 correct? A. Yes. 7 A. The modern epidemiologic -- in Q. And if those analyses are 8 8 modern epidemiology, statistical significance considered, there is no consistency among the 9 epidemiological studies; correct? 9 isn't considered essential. 10 10 MR. TRAVERS: Objection, Q. That is not my question. In your application of the Bradford Hill criteria, 11 11 mischaracterizes. you are defining "consistency" differently 12 12 A. I don't know. 13 than Bradford Hill did; correct? 13 O. Well, there would be then the AHS 14 MR. TRAVERS: Objection, asked and 14 study, updated study that's below 1.0; 15 15 correct? answered. 16 16 A. I don't know how he exactly defined A. So, again, I don't know the quality 17 17 of the study or whether to consider it or how it, but I would assume that he was more 18 strict about statistical significance. 18 to consider it. 19 Q. And you have stated in your report, 19 Q. I understand. 2.0 2.0 as a basis for your conclusion that there is A. So, I am not going to give credit consistency in the epidemiological studies, 21 21 to a study that I don't know anything about 22 2.2 that all of the reported odds ratios -or that I don't know much about. 23 23 (Telephone interruption.) Q. But just to understand your 24 24 consistency analysis, and I understand you A. Sorry. 25 25 Q. I will start again. can't opine, you didn't look at the AHS 2013,

Page 326 Page 328 1 1 you didn't look at the NAPP data, but I'm Q. Okay. Well, we will talk about 2 2 just understanding your definition of specificity then. 3 3 "consistency." In your opinion, you believe -- let 4 If we were to consider the updated 4 me see if I am correct. It's your opinion 5 5 that glyphosate has not been associated with AHS data from 2013, that has an odds ratio of 0.9, so that would be below 1.0; correct? 6 any cancer other than non-Hodgkin's lymphoma; 7 MR. TRAVERS: Objection, assumes correct? 8 facts not in evidence. 8 A. That is specificity? 9 9 Q. Well, I'm asking this question. A. Yes. 10 Q. And we would have the Orsi study, 10 A. Or is that strength? 11 which is exactly 1.0; correct? 11 Q. Is it your opinion that glyphosate 12 A. Yes. 12 and glyphosate-based herbicides have not been 13 O. And we would have the NAPP data, shown to be a cause of any type of cancer 13 14 which is either just above 1.0, if we include 14 other than non-Hodgkin's lymphoma? 15 proxy respondents, or just below 1.0, if we 15 A. That's my sense of the literature, 16 only look at self-respondents; correct? 16 yes. 17 A. Yes. 17 Q. So, if glyphosate or 18 O. And then we would have the Swedish 18 glyphosate-based herbicides causes any 19 case-control study, the Eriksson study, which 19 cancer, it would be non-Hodgkin's lymphoma. 20 would be slightly above 1.0; correct? 20 That is the only --21 A. Um-hum. Yes. 21 A. Based on the literature as I have 22 Q. So those data points, if those were 22 read it to date, yes. I mean, obviously, the correct data points, and I understand you 23 23 everything I am saying today is based on --24 have not reviewed some of them, but those Q. Your review. 24 25 data points would not be consistent; correct? 25 A. -- what I have read until today. Page 327 Page 329 1 1 A. Might or might not be. Again, I If anything changes --2 2 haven't looked at them, so I am not willing Q. Right, I understand that. 3 3 to opine on that. But you looked at, for example, the 4 4 O. But we would have some above one, IARC monograph, and they reviewed other types 5 5 of cancer as well, and you agree that there some below one, some directly at one; 6 6 correct? is no association shown there between 7 7 A. Um-hum. glyphosate and those other types of cancer, 8 8 Q. Yes? correct, besides NHL? 9 9 A. Yes. A. Yes. 10 10 Q. And we already talked about Q. So, then for you, is it -- am I 11 dose-response. We talked about biological 11 correct in my understanding that you think 12 plausibility, and biological plausibility, I 12 specificity has been met because if it causes 13 13 take it you defer to the toxicologists; any cancer, it only causes non-Hodgkin's 14 correct? 14 lymphoma? 15 15 A. To the degree that I am able to A. Yes. 16 opine, I think it seems decent to me, but I 16 Q. You would agree that there are lots 17 would defer. 17 of other causes for non-Hodgkin's lymphoma, 18 Q. And then the final criteria you 18 though; correct? 19 discuss is strength of association; correct? 19 A. I don't know lots. I mean, I have 20 In your expert report, that is the final 2.0 trouble thinking of more than a few, but I 21 criteria you mentioned. 21 don't know how many would apply generally, 22 A. Don't I mention specificity? 22 but --23 Q. You may mention specificity. You 23 Q. Non-Hodgkin's lymphoma, certainly 2.4 say that is not important. 24 it's not a signature disease for glyphosate; 25 A. I don't? 25 correct. Like mesothelioma or -- and

Page 330 Page 332 1 1 in other cases that that 1.3 to 1.5 is, I asbestos. 2 2 think the term you used was bupkis; right? A. I don't know how to answer that 3 3 A. Have I used that expression? auestion. 4 Q. Okay. Well, that's fair. 4 Q. You've used that expression with 5 5 Is it your opinion that respect to 1.3 to 1.5, haven't you? 6 non-Hodgkin's lymphoma may be a signature 6 A. I don't know. But as I say, it's 7 disease for glyphosate? 7 not a large number. 8 A. I don't know what a signature 8 Q. So, 1.3 to 1.5 is not what you 9 9 disease means. would -- well, strike that. 10 Q. Ah, okay. You would agree that 10 When you have a number like 1.3 to there are lots of other causes for 11 11 1.5, you would have concerns that those 12 non-Hodgkin's lymphoma, either known or 12 findings can be explained by something other unknown, besides glyphosate; correct? 13 13 than causation, such as bias and confounding: A. I think most lymphoma is 14 correct? 15 unexplained. 15 A. I would have that concern for even 16 Q. So, you can't say that if you see 16 larger numbers, but -- so, again, the number 17 NHL, you would think that it would have to be 17 that you see, we are talking about 18 glyphosate; correct? 18 ever/never, generally we are talking about 19 A. No, that's correct. 19 ever/never. You know, when you see a number 2.0 Q. All right. So then the -- you are 20 like that number, there is also the issue of 21 correct, the fifth, I think, of the criteria, 21 dose-response. So that means there are those you talk about analogy, which you say is not 22 22 who are more exposed and therefore 23 applicable, and then specificity. But before 23 potentially have higher risk. So that may 24 that, you talk about strength; correct? 24 reflect a subgroup that might have a 25 A. Yes. 25 significantly higher risk within it, but on Page 331 Page 333 1 Q. And that in fact is the first 1 the whole, it's a modest risk. 2 2 criteria that Dr. Bradford Hill, or Sir Q. I mean, we have talked about 3 Bradford Hill discusses, correct, in his dose-response. We can go back to that. That 4 4 is a separate criteria for Bradford Hill; criteria? 5 5 A. I didn't follow his order. correct? 6 Q. That's fine. 6 A. Yes. 7 And with respect to strength, you Q. But as far as the strength criteria 8 8 are pointing to that range of 1.3 to 1.5; is concerned, it would be fair to say that 9 9 correct? even with your understanding of the 10 A. Yes. 10 glyphosate literature, that is not a 11 11 particularly powerful finding for that Q. And that is based upon that earlier meta-analyses that you not take into account 12 criteria for Bradford Hill; correct? 12 the 2013 AHS data or the NAPP data; correct? 13 13 A. It's not a number that would --14 A. It did not take into account the 14 that would build your confidence that this 15 15 follow-up AHS data, correct. was a -- that there was a causal 16 16 Q. Now, with respect to that, that -relationship. It's enough, it's -- what do 17 17 they say -- it's sufficient, but not -- but those numbers, 1.3 to 1.5, you would agree 18 that that is not a very convincing number 18 not something that would add to your -- add 19 with respect to strength; correct? 19 to your confidence that there were a causal 20 2.0 A. Call it modest to moderate. association. 21 21 Q. You would agree it did not provide MR. LASKER: Why don't we take a 22 a strong push towards causality; correct? 22 break now? I'm just going to look and 23 23 A. It's not an overwhelming number, see what more questions I have. 24 24 MR. TRAVERS: Yeah, sure. no. 25 THE VIDEOGRAPHER: The time is 25 Q. In fact, I think you have testified

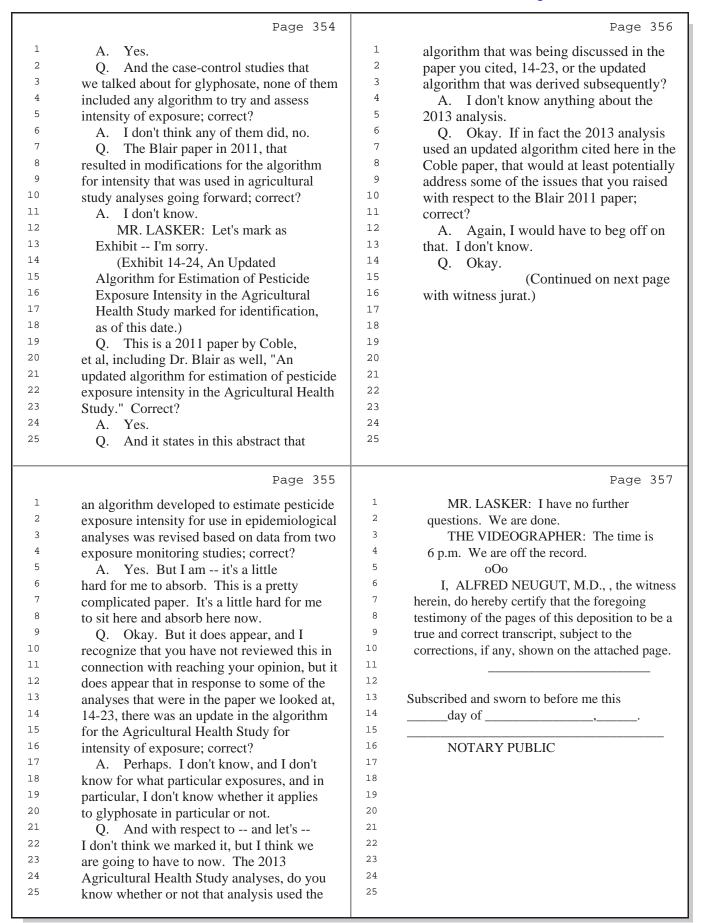
	Page 334		Page 336
1	5:12 p.m. We are off the record.	1	MR. TRAVERS: Sorry. The last
2	(Recess taken.)	2	paragraph, page six.
3	THE VIDEOGRAPHER: The time is	3	MR. LASKER: Okay. Starting,
4	5:27 p.m. We are on the record.	4	"First, the accuracy."
5	MR. LASKER: Dr. Neugut, I have no	5	MR. TRAVERS: Yeah.
6	further questions. Thank you very much.	6	MR. LASKER: Okay.
7	THE WITNESS: Oh, thank you.	7	BY MR. TRAVERS:
8	MR. TRAVERS: Excellent.	8	Q. Then it goes on to say, "Second,
9	I have just got a few follow-up	9	except in situations where exposure
10 11	questions. Let's see. Do we have	10	estimation is quite accurate, i.e.,
12	exhibit stickers?	12	correlations of .7 or greater with true
13	I want to enter as an exhibit, this	13	exposure, and true relative risk of 3.0 or
14	is the Blair paper from 2011.	14	more, pesticide misclassification may
15	MR. LASKER: So what number is	15	diminish risk estimates to such an extent
16	this?	16	that no association is obvious, which
17	MR. TRAVERS: 14-23. (Exhibit 14-23, NIH Public Access,	17	indicates false negative findings might be common."
18	Impact of Pesticide Exposure	18	Do you see that?
19	Misclassification on estimates of	19	A. Yes.
20	Relative Risks in the Agricultural Health	20	Q. And with that bias in the AHS
21	Study marked for identification, as of	21	study, how would that affect the findings on
22	this date.)	22	glyphosate from the De Roos 2005 study?
23	EXAMINATION	23	A. Well, since we are talking about a
24	BY MR. TRAVERS:	24	relative risk in a range of 1.3 or or
25	Q. And do you recognize this paper,	25	theoretically, a relative risk in the range
	Page 335		Page 337
1	Dr. Neugut?	1	of 1.3 to 1.5, and misclassification error,
2	A. Yes.	2	then it would be very easy, based on the
3	Q. And this paper deals with the	3	degree of misclassification error that they
4	non-differential misclassification bias; is	4	are talking about, for that kind of a risk
_		I -	
5	that correct?	5	ratio to be attenuated and to disappear in
5 6	A. Yes.	5	ratio to be attenuated and to disappear in this study, which is basically what they
6 7	<ul><li>A. Yes.</li><li>Q. And this paper authored by and</li></ul>	6 7	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.
6 7 8	<ul><li>A. Yes.</li><li>Q. And this paper authored by and you see that Aaron Blair is the lead author</li></ul>	6 7 8	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative
6 7 8 9	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?	6 7 8 9	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding
6 7 8 9	<ul><li>A. Yes.</li><li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li><li>A. Yes.</li></ul>	6 7 8 9	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding.
6 7 8 9 10 11	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study</li> </ul>	6 7 8 9 10	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding  A. A null finding.  Q. Okay. And you said you read the
6 7 8 9 10 11	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> </ul>	6 7 8 9 10 11 12	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct?
6 7 8 9 10 11 12 13	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> <li>A. Yes.</li> </ul>	6 7 8 9 10 11 12 13	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes.
6 7 8 9 10 11 12 13 14	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> <li>A. Yes.</li> <li>Q. And I would just like to refer you</li> </ul>	6 7 8 9 10 11 12 13	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author
6 7 8 9 10 11 12 13	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> <li>A. Yes.</li> <li>Q. And I would just like to refer you to the conclusion of this paper, and page</li> </ul>	6 7 8 9 10 11 12 13	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract?
6 7 8 9 10 11 12 13 14	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> <li>A. Yes.</li> <li>Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there.</li> </ul>	6 7 8 9 10 11 12 13 14	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes.
6 7 8 9 10 11 12 13 14 15	<ul> <li>A. Yes.</li> <li>Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct?</li> <li>A. Yes.</li> <li>Q. And it's referencing the AHS study cohort?</li> <li>A. Yes.</li> <li>Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there.</li> <li>The last paragraph on page six, it</li> </ul>	6 7 8 9 10 11 12 13 14 15	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on
6 7 8 9 10 11 12 13 14 15 16 17	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our	6 7 8 9 10 11 12 13 14 15 16 17	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study?
6 7 8 9 10 11 12 13 14 15 16 17	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the	6 7 8 9 10 11 12 13 14 15 16 17	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes.
6 7 8 9 10 11 12 13 14 15 16 17 18	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by	6 7 8 9 10 11 12 13 14 15 16 17 18	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes. Q. And it was still his opinion as the
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by farmers is comparable to that for many other	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes. Q. And it was still his opinion as the chair of the IARC working group that
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by farmers is comparable to that for many other factors commonly assessed by questionnaire	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes. Q. And it was still his opinion as the chair of the IARC working group that glyphosate was a probable human carcinogen;
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by farmers is comparable to that for many other	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes. Q. And it was still his opinion as the chair of the IARC working group that glyphosate was a probable human carcinogen; correct?
6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	A. Yes. Q. And this paper authored by and you see that Aaron Blair is the lead author on this paper; correct? A. Yes. Q. And it's referencing the AHS study cohort? A. Yes. Q. And I would just like to refer you to the conclusion of this paper, and page six. You have been there. The last paragraph on page six, it states, "We draw several conclusions from our methodological work in the AHS. First, the accuracy of reporting of pesticide use by farmers is comparable to that for many other factors commonly assessed by questionnaire for epidemiological studies."	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	ratio to be attenuated and to disappear in this study, which is basically what they are what they are describing.  Q. So, if there is a negative finding A. A null finding. Q. Okay. And you said you read the deposition of Aaron Blair; correct? A. Yes. Q. And do you recall he is an author of the NAPP abstract? A. Yes. Q. And he is a lead investigator on the AHS, AHS study? A. Yes. Q. And it was still his opinion as the chair of the IARC working group that glyphosate was a probable human carcinogen;

	Page 338		Page 340
1	Q. And do you recall at the end of his	1	for?
2	deposition, he stated that his opinion had	2	A. Not commonly.
3	not changed at all after questioning by	3	Q. Okay. Go back to Aaron Blair's
4	defense counsel? Do you recall that?	4	deposition. If you could go if you could
5	A. I recall that.	5	go to page 206.
6	Q. And does Aaron Blair's testimony	6	A. 206?
7	support your or support your opinion that	7	Q. Yes. If you go to line 20,
8	Roundup can cause cancer in humans?	8	Mr. Lasker asked of Aaron Blair:
9	A. Yes.	9	"But just so the record is clear,
10	Q. And after the almost seven hours of	10	IARC was not relying upon the most
11	questioning, do you stand by the conclusion	11	updated analysis that you are aware from
12	in your expert report?	12	the AHS data with respect to glyphosate
13	A. Yes.	13	and non-Hodgkin's lymphoma; correct?"
14	Q. Okay. I would like to get	14	And then Aaron Blair answers:
15	Exhibit 14-21, and this is the memo by	15	"Now you present it as if the
16	Exponent, the updated meta-analysis.	16	analysis were completed. Analyses were
17	MR. LASKER: Excuse me just a	17	done, manuscripts are in description, but
18	second.	18	the work wasn't finished, which means
19	Q. And is Exponent a peer-reviewed	19	it's incomplete, and that you don't want
20	journal?	20	to be reporting on, and we didn't."
21	A. Exponent is a company, to my	21	Does that support your decision not
22	knowledge.	22	to rely upon the 2013 unpublished manuscript?
23	Q. And you are not aware of this paper	23	A. Yes. You know, data that is not
24	being submitted for peer review?	24	peer reviewed or published is not peer
25	A. I don't know anything about it.	25	reviewed or published. You don't know why
	, C		
	Page 339		Page 341
1	Q. And I would like to ask, if you	1	it's not. It might not have been finished,
2	could, to read footnotes one and two. You	2	might not have been accepted by the journal,
3	don't have to read them out loud. If you can	3	it might not have been in good shape. You
4	review footnotes one and two.	4	have no idea why it's not published.
5	A. On the first page?	5	Q. I just want to clarify, when you
6	Q. Yes.	6	reference we talked a lot about the AHS
7	A. Okay.	7	study. But when you reference the AHS study
8	Q. And if you recall from earlier in	8	in your report, what are you referring to?
9	the testimony, this this memo to	9	A. 2005 paper.
10	Hollingsworth, or this meta-analysis, the	10	Q. Okay. And I would just like if
11	only updated information was the unfinished	11	you have got your report, I would like to go
12	draft manuscript of the 2013 AHS study and	12	to page three.
13	the abstract from the NAPP study; correct?	13	MR. LASKER: Just a moment. Page
14	A. Yes.	14	three?
15	MR. LASKER: Objection to form,	15	MR. TRAVERS: Yes.
16	misstates the document.	16	Q. And at the top, it says you were
17	Q. And reviewing footnotes one or two,	17	asked to review the scientific literature on
18	can you tell who provided those documents to	18	glyphosate and glyphosate-based formulations
19	Chang and Delzell?	19	and to provide an opinion to a reasonable
20	A. Mr. Lasker.	20	degree of medical and scientific certainty as
21	Q. And generally, when you are	21	to whether glyphosate and glyphosate-based
22	conducting a scientific study that you would	22	formulations can cause non-Hodgkin's
23	submit for peer review, if you are going to	23	lymphoma; correct?
		24	A Vac
24	update a study, would you rely solely on data		A. Yes.
24 25	provided by an attorney you are consulting	25	Q. If you were to do a literature

	Page 342		Page 344
1	review for scientific journals, say like the	1	Q. What percentage of cases would you
2	Lancet, would you rely on unpublished,	2	say are for defendant that you take are
3	unpeer-reviewed data?	3	for defendants compared to plaintiffs?
4	A. I might under certain circumstances	4	A. Nowadays, I do about two-thirds
5	report a fact or a bit of information, citing	5	plaintiff and about a third defendant.
6	it as un unpublished, but but as a	6	Q. All right. Have you ever turned
7	almost as a more in the context of a bit	7	down have you ever turned down cases from
8	of information, not in the context	8	plaintiffs' firms?
9	necessarily of, say, in a data table or	9	A. Sure. And from Miller.
10	something of that sort. So, I might express	10	Q. And defense counsel showed you an
11	an opinion by someone or that is not	11	article from 1965 by Bradford Hill. Let's
12	published, or a factoid, but I don't think I	12	see. Has the application of Bradford Hill
13	would express data per se that was not	13	been modified at all from 1965 to present
14	published.	14	time?
15	Q. And in your report, you also talk	15	MR. LASKER: Objection to form.
16	about meta-analyses, and there are	16	A. I mean, I don't want to say it's
17	meta-analyses in the IARC report as well;	17	been modified in terms of its skeletal
18	correct?	18	structure, but the interpretation of the
19	A. Yes.	19	nomenclature and the, the intent or the
20	Q. Those are in fact statistically	20	the interpretation of the criteria that are
21	significant; correct?	21	there have certainly been modified and
22	A. Yes.	22	adapted and adjusted over the years. They
23	Q. Okay. And in the and also in	23	are not the same as they were in 1965.
24	your report, you note that McDuffie shared an	24	I mean, remarkably, it's actually
25	odds ratio, a statistically significant odds	25	retained its the nomenclature has actually
	Daga 242		Daga 245
	Page 343		Page 345
1	ratio of 2.12 for people who used glyphosate	1	stayed more or less the same as for
2	greater than two days per year; correct?	2	50 1 41 1- 11111
3	Λ V <sub>0.0</sub>		50 years, but the words don't necessarily
	A. Yes.	3	are not applied the terminology and the
4	Q. And Eriksson showed an odds ratio	4	are not applied the terminology and the applications are not applied in the same way
5	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer	4 5	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.
5 6	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?	4 5 6	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are
5 6 7	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.	4 5 6 7	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general
5 6 7 8	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.	4 5 6 7 8	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?
5 6 7 8 9	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's	4 5 6 7 8 9	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.
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5 6 7 8 9 10	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's what you meant to say. More than ten years?	4 5 6 7 8 9 10	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.  A. Sure. I would think so, yes.  Q. Would you do you agree with the
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5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's what you meant to say. More than ten years?  MR. TRAVERS: Who used glyphosate longer than ten years.  MR. LASKER: Is that what he says in his report? Where are you reading?  MR. TRAVERS: Page 22.  MR. LASKER: Hmm. Okay. It is what he has in his report.  Q. And you have worked you have worked with the Miller Firm before on the Actos case; correct?	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.  A. Sure. I would think so, yes.  Q. Would you do you agree with the following statement? Would you I'm sorry.  Would you agree that IARC is a well-regarded international public health agency?  A. Sure.  Q. Would you agree that when IARC monographs are available, they are generally recognized as authoritative?  A. The ones on carcinogenesis, yes.  Q. Let's see. And would you agree
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's what you meant to say. More than ten years?  MR. TRAVERS: Who used glyphosate longer than ten years.  MR. LASKER: Is that what he says in his report? Where are you reading?  MR. TRAVERS: Page 22.  MR. LASKER: Hmm. Okay. It is what he has in his report.  Q. And you have worked you have worked with the Miller Firm before on the Actos case; correct?  A. Yes.	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.  A. Sure. I would think so, yes.  Q. Would you do you agree with the following statement? Would you I'm sorry.  Would you agree that IARC is a well-regarded international public health agency?  A. Sure.  Q. Would you agree that when IARC monographs are available, they are generally recognized as authoritative?  A. The ones on carcinogenesis, yes.  Q. Let's see. And would you agree that IARC is one of the most well-respected
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's what you meant to say. More than ten years?  MR. TRAVERS: Who used glyphosate longer than ten years.  MR. LASKER: Is that what he says in his report? Where are you reading?  MR. TRAVERS: Page 22.  MR. LASKER: Hmm. Okay. It is what he has in his report.  Q. And you have worked you have worked with the Miller Firm before on the Actos case; correct?  A. Yes.  Q. Have you ever worked for defendants	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.  A. Sure. I would think so, yes.  Q. Would you do you agree with the following statement? Would you I'm sorry.  Would you agree that IARC is a well-regarded international public health agency?  A. Sure.  Q. Would you agree that when IARC monographs are available, they are generally recognized as authoritative?  A. The ones on carcinogenesis, yes.  Q. Let's see. And would you agree that IARC is one of the most well-respected and prestigious scientific bodies?
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	Q. And Eriksson showed an odds ratio of 2.36 for people who used glyphosate longer than ten years; correct?  MR. LASKER: Objection to form.  A. Yes.  MR. LASKER: I don't think that's what you meant to say. More than ten years?  MR. TRAVERS: Who used glyphosate longer than ten years.  MR. LASKER: Is that what he says in his report? Where are you reading?  MR. TRAVERS: Page 22.  MR. LASKER: Hmm. Okay. It is what he has in his report.  Q. And you have worked you have worked with the Miller Firm before on the Actos case; correct?  A. Yes.	4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	are not applied the terminology and the applications are not applied in the same way now as they were 50 years ago.  Q. And that would be, what you are saying would be, that would be the general consensus of the scientific community?  MR. LASKER: Objection to form.  A. Sure. I would think so, yes.  Q. Would you do you agree with the following statement? Would you I'm sorry.  Would you agree that IARC is a well-regarded international public health agency?  A. Sure.  Q. Would you agree that when IARC monographs are available, they are generally recognized as authoritative?  A. The ones on carcinogenesis, yes.  Q. Let's see. And would you agree that IARC is one of the most well-respected

Page 346 Page 348 1 1 correct? have to have a concluding phrase. 2 2 Q. Would you agree that IARC is a A. Right. 3 3 well-respected and prestigious scientific Q. With respect to the 2013 AHS study, 4 4 did you rely upon anything that Dr. Blair body? 5 5 said in his deposition in deciding not to A. Yes. 6 MR. TRAVERS: Those are all the 6 consider or not to even look at that data? 7 questions I have got. A. What's the -- oh, the AHS 8 8 follow-up? **EXAMINATION** 9 9 Q. Yes. BY MR. LASKER: 10 10 Q. Just a few follow-ups, Dr. Neugut. A. No. 11 You do state in your expert report 11 Q. With respect to -- plaintiffs' 12 that Eriksson showed, on page 22, an odds 12 counsel asked you about the Chang and Delzell 13 ratio for -- of 2.36 for people who were --13 2017 analysis, and he pointed out that the 14 used glyphosate longer than ten years. Does 14 AHS 2013 analysis and the NAPP analysis were 15 Eriksson actually report that data? Because 15 provided to Exponent by myself. 16 I don't remember that from the glyphosate 16 Now, just to be clear, you agree 17 study. 17 that I did not create that data; correct? 18 A. What page are you on? 18 A. You did not --19 Q. In your report, page 22, you say 19 O. Create that data. 2.0 that Eriksson showed an odds ratio of 2.36 2.0 A. I assume not. 2.1 for people who used glyphosate longer than 21 O. And you have read Dr. Blair's 22 ten years. You were asked that by 22 deposition. You know that this was data that 23 plaintiffs' counsel and agreed that's what 23 Dr. Blair had in his files; correct? 24 Eriksson found. It's on page 22, under 24 A. Yes. 25 strength of association. 25 Q. And this was data that Dr. Blair Page 347 Page 349 1 1 A. If I said it, then I must have did not disclose to IARC; correct? 2 2 thought it. A. Yes. 3 Q. Okay. I believe, and you can --Q. And this is data that Dr. Blair did 4 4 you can correct me if I am wrong, that at not disclose to the EPA: correct? 5 5 least the number you are citing there is A. I don't recall offhand about EPA, 6 greater than ten days, not ten years, from 6 but -- I don't know about that. I don't 7 7 Eriksson's report, and this is table two. recall. 8 A. You are right. It's greater than Q. And there was no way for 9 9 ten days. I apologize, it's an error. investigators who were conducting a 10 Q. Just so we are clear, that is a 10 meta-analysis prior to the deposition of mistake in your expert report. 11 Dr. Blair, where this data became public, for 11 12 A. Um-hum. 12 any investigator at IARC or elsewhere doing a 13 13 meta-analysis to include that 2013 data or O. And that 2.36 number that we -- for 14 14 the NAPP data; correct? greater than ten days, that is the number 15 15 that we were talking about previously that A. Correct. 16 16 you agreed there is no measure or indication Q. With respect to Exhibit 14-23, 17 17 that that is statistically different than the which is the paper, the Blair paper on 18 odds ratio for less than ten days; correct? 18 exposure misclassification, plaintiffs' 19 19 counsel asked you a couple of questions about A. There is no number for that, but 2.0 that. Do you recall? 2.0 yes, it's larger. 21 2.1 Q. So, we don't know if -- we don't A. Which document? 22 22 have any statistical indication from this Q. This would be Exhibit 14-23, and it 23 23 study from Eriksson that there is a greater is a paper by Blair entitled "Impact of 24 24 pesticide exposure misclassification on odds ratio with greater exposure, because we 25 25 don't have that statistical analysis; estimates of relative risks in the

Page 350 Page 352 1 1 Agricultural Health Study." Correct? misclassification, if it occurred, to -- for 2 2 A. Yes. those numbers in the AHS studies for O. And this study again is referring 3 3 glyphosate and non-Hodgkin's lymphoma would 4 to the possibility of misclassification 4 actually push those numbers up; correct? 5 5 biasing results towards the null; correct? A. Yes. Q. The Blair paper, the 2011 paper, A. I wouldn't use the word "biasing." 6 7 I would say --7 Exhibit 14-23, also states that if the 8 8 Q. Shifting towards the null. relative risks are -- the true relative risk 9 9 A. Okay. is 1.0, misclassification -- the 10 Q. And as we discussed previously, if 10 misclassification that they are discussing the reported odds ratio is below 1.0, then 11 11 here does not actually impact the results at 12 this type of exposure misclassification would 12 all; correct? 13 bump those numbers up a little bit. 13 A. That's correct. MR. TRAVERS: Objection. 14 Q. And the other finding in this paper Q. And if it's above 1.0, this type of 15 15 is that the attempt to make some measurement 16 exposure misclassification might lower it. 16 of intensity of exposure, which is what is 17 Correct? 17 done in the Agricultural Health Study, does 18 MR. TRAVERS: Objection. 18 improve the study as compared to just asking 19 A. Yes. 19 whether or not an individual had used or been 2.0 MR. TRAVERS: Asked and answered, 20 exposed to pesticide in the past; correct? 21 mischaracterizes his previous testimony. 21 A. I'm sorry, say that one again. 22 Q. And with respect to the 22 Q. That the Blair 2011 paper reports Agricultural Health Study, to the extent that 23 23 that when they look to their intensity 24 there are odds ratios reported for glyphosate 24 measure in the Agricultural Health Study, 25 and non-Hodgkin's lymphoma below 1.0, the 25 intensity of exposure, that did correlate Page 351 Page 353 1 1 type of exposure misclassification that is with exposure levels better than simply 2 2 asking the individual whether they had been discussed in the Blair paper would bump those 3 numbers up; correct? exposed or not; correct? 4 4 MR. TRAVERS: Objection, asked and A. I don't recall that, but -- I don't 5 5 answered, mischaracterizes previous recall seeing that. 6 6 testimony. Q. Well, take a look to the last page, 7 A. A misclassification error would is actually where you were being asked 8 8 work on the opposite side as well. questions by plaintiffs' counsel, on page 9 O. It would work in both directions. 9 six. And it is right where he stopped off on 10 A. Yes. 10 his questioning of you. 11 It states, "Third, it appears that 11 Q. And in fact, in this paper, at page 11, they have tables that show that if 12 an algorithm that incorporates several 12 13 the risk ratio is below one, this 13 exposure determinants into an estimate of 14 misclassification would -- would tend to 14 exposure intensity predicts urinary levels 15 better than the individual exposure 15 increase those numbers to make them higher; 16 16 correct? determinants considered here and would result 17 17 A. Yes. in less attenuation of relative risk 18 Q. And so, with the Agricultural 18 estimates." Correct? 19 Health Study, both the 2005 study for their 19 A. Yes. 20 2.0 Q. One of the findings in this dose-response and the 2013 analysis for all 21 21 of its findings, they reported odds ratios analysis by Blair is that the AHS, through 22 22 for glyphosate and non-Hodgkin's lymphoma using an algorithm to try to estimate 23 that were below 1.0; correct? 23 intensity of exposure, does reduce this 24 24 potential bias as compared to studies that A. Yes. 25 25 Q. So, the impact of this don't include an intensity measure; correct?



<b>A</b>	act (2)	152:13,16,19,22	116:19 117:2,13	335:19 336:20
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