

STATE OF WISCONSIN

CIRCUIT COURT

COUNTY OF PEPIN

POESCHEL HIDDEN VALLEY, LLC,
POESCHEL BROTHERS, LLC,
ROLLIN' RIDGES, INC.,
JR FAMILY REALTY, LLC,
RONALD E. POESCHEL and JANE M. POESCHEL,

Plaintiffs,

-vs-

IND #2018CV000027

NORTHERN STATES POWER COMPANY,
d/b/a XCEL ENERGY,

Defendants.

Deposition of DANIEL ANESHANSLEY,
Ph.D., held at the offices of PRECISION
REPORTERS, LLC, Syracuse, New York, on
August 13, 2021, before PAMELA PALOMEQUE,
RPR, CRR, and Notary Public in and for the
State of New York.

1 APPEARANCES:

2 For the Plaintiffs:

3 BIRD, STEVENS & BORGEN, P.C.

Attorneys at Law

4 300 Third Avenue

Suite 305

5 Rochester, MN 55904

BY: CHARLES A. BIRD, ESQ.

6 507.282.1503

charles@bsbjustice.com

7

8 For the Defendant:

9 WHEELER TRIGG O'DONNELL, LLP

Attorneys at Law

10 370 17th Street

Suite 4500

11 Denver, CO 80202-5647

BY: KATE MERCER-LAWSON, ESQ.

12 303.244.1891

mercerlawson@wtotrial.com

13

14 Also Present: (By Videoconference)

15 RONALD E. POESCHEL

16

* * *

17

18

19

20

21

22

23

24

25

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

EXAMINATIONS

		Page	Line
1.	Daniel J. Aneshansley, Ph.D.		
	EXAMINATION BY MR. BIRD	6	13
	EXAMINATION BY MS. MERCER-LAWSON	231	1
	EXAMINATION BY MR. BIRD	235	7

* * *

EXHIBITS

No.	Description	Page	Line
619	Curriculum Vitae of Daniel J. Aneshansley	6	1
620	Summary of Opinions in Poeschel .. v NSP Case, Daniel J. Aneshansley, PhD,	6	4
621	Effects of Neutral --.....	6	7
622	"Effects of Neutral-to-Earth Voltage on Animal Health and Reproduction in Cattle," 87-3035,	129	21
623	"AC Voltages on Water Bowls: Effects on Lactating Holsteins,"	129	25
624	Transcript pages 2899-3292, PSC .. of Wisconsin hearing, 4/15/88,	167	16
625	"Effects of Electrical Voltage/Current on Farm Animals"	178	6
626	3/28/94 letter, Gustafson to Lefcourt	199	5
627	"Comments on Stray Voltage Technical Issues", 6/22/92 by Bodman	199	25
628	4/6/94 letter, Bodman to Gustafson	201	19
629	90-3502, "Milk Production With ... Voltage Exposure During Entire	206	6

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

630	90-3503, "Holsteins'	206	10
	Reproductive Performance During		
	Long-Term Voltage Exposure,		
631	"Effects of Voltages on Cows	206	14
	over a Complete Lactation. 2.		
	Health and Reproduction,		
632	"Effects of Voltages on Cows	206	18
	over a Complete Lactation. 1.		
	Milk Yield and Composition,"		
633	"Stray Voltage Research Fraud" ...	226	21
	by Michael Behr, Ph.D., 4/2/97		

* * *

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

REQUESTS

1. Page 57, Line 15:

Q. Was there -- when you did these, you know, studies -- I mean training sessions, did you have handouts for that?

A. We had a booklet that went along with it.

Q. I'm going to ask you to look.

A. There was a workbook. I can go see if I can dig that out from someplace if you'd like.

Q. I'd like to do that and see, also, if you have the methodology or the protocol that you used for your testing and if you can locate those.

* * *

1 (Exhibit 619, Curriculum Vitae of
2 Daniel J. Aneshansley marked for
3 identification, this date.)

4 (Exhibit 620, Summary of Opinions in
5 Poeschel v NSP Case, Daniel J. Aneshansley,
6 PhD, marked for identification, this date.)

7 (Exhibit 621, Effects of Neutral --
8 marked for identification, this date.)

9
10 D A N I E L A N E S H A N S L E Y, Ph.D., having
11 been called as a witness, being duly sworn by the notary
12 public present, testified as follows:

13 EXAMINATION BY MR. BIRD:

14 Q. Good morning.

15 A. Good morning.

16 Q. My name is Charlie Bird. I'm an attorney for
17 the Plaintiffs in this case. I'm here to ask you some
18 questions today about your opinions as a proffered
19 expert. You understand that's why we're here?

20 A. I understand that's why we're here.

21 Q. And the subject matter is stray voltage of
22 which you've written quite a bit in the past?

23 A. Yes.

24 Q. What we've done, Dr. Aneshansley -- first of
25 all, let me ask -- just tell you a couple things that

1 I'm sure the attorney has told you, but let me finish my
2 question before you start your answer because the Court
3 Reporter has to get down everything and two people
4 talking at the same time, it's difficult.

5 On the other hand, and if I step on an answer
6 of yours, you let me know and I'll let you finish; okay?

7 A. Okay.

8 Q. It's important that you answer out loud,
9 especially because we have masks on and nodding and
10 shaking the heads and ah-ha and uh-uh are things that
11 don't come through very clear.

12 The third thing is if you don't understand
13 any question that I ask you, you can ask me to repeat it
14 or rephrase it. It's important to me that you and I are
15 tracking and that we're understanding what I'm asking
16 you and I'm understanding what you're answering.

17 To the extent I use technical phrases that
18 have importance to you in your line of work,
19 professional work, I would like to have you use your own
20 understanding of those words and phrases; okay?

21 A. Okay.

22 Q. And if you're asking me for definitions, I'm
23 going to probably come back to you and just say: What's
24 your definition? Because I want to use your definition;
25 okay?

1 A. All right.

2 Q. So the first thing we did here today was to
3 mark as an exhibit your curriculum vitae?

4 A. Mm-hmm.

5 Q. And so I just wanted to ask you some
6 questions about that.

7 A. Sure.

8 Q. I'm not going to belabor it a lot but -- let
9 me see here. Okay, so, first of all, it looks like you
10 graduated from University of Cincinnati in '65. If I
11 did my arithmetic correct, you're 78 or just a little
12 bit older or what?

13 A. I'm 78. I was born in 1942.

14 Q. Okay. And so you'll be 79 what, shortly
15 here?

16 A. In November. November 24th.

17 Q. And is it okay if I call you Dr. Aneshansley?

18 A. You can call me Dan if you'd like.

19 Q. Dan. Well --

20 A. Or Dr. Aneshansley if you prefer.

21 Q. I see you have a cane for walking; is that
22 true?

23 A. Well, I did that on the streets here, under
24 repair, what have you. It's not instability. It lets
25 me go faster.

1 Q. Do you have any other health conditions that
2 you think might interfere with your ability to give
3 truthful testimony today?

4 A. I don't believe so.

5 Q. You're not taking any medications that
6 would --

7 A. I'm taking medications for hypertension
8 and --

9 Q. Yeah, so am I.

10 A. -- other things but I don't think those have
11 any effect on my ability to answer questions truthfully.

12 Q. Okay, good. So your CV says you're an
13 Emeritus Professor in the Department of Biological and
14 Environmental Engineering as of 2018.

15 A. That's correct.

16 Q. Does that mean that you stopped working at
17 that time?

18 A. That means I retired -- I officially
19 retired.

20 Q. "Officially retired" means you don't work at
21 Cornell?

22 A. I do not spend a regulated time at Cornell
23 at this point.

24 Q. You're not teaching classes?

25 A. I'm not doing anything, particularly over

1 the past three years since I retired. It's been a lot
2 of other things take up my time at this point.

3 Q. Sure, I understand. Grandkids and all that I
4 suppose?

5 A. My wife's had some serious health problems.

6 Q. I'm sorry to hear that.

7 A. That requires a lot of effort so --

8 Q. It looks like you became Chair of the
9 department in, what was it, 2008?

10 A. Somewhere in there, yes. I could go back
11 and look, it's on here.

12 Q. It seems like a lot of your teaching duties
13 sort of went down when you became Chair. I assume you
14 had more administrative responsibilities?

15 A. My teaching -- I still taught one course. I
16 always taught a course in biological instrumentation.

17 Q. You continued with that up to 2018?

18 A. Yes.

19 Q. You're not teaching any courses at all now?

20 A. No.

21 Q. Now, it indicates at the bottom of the first
22 page, if you take a look, that you've been an expert
23 witness and consultant in the area of stray voltage
24 1991- and which means that at least at the time you
25 wrote this, it was ongoing?

1 A. It continues. Yes.

2 Q. Is it still ongoing?

3 A. I'm here.

4 Q. Okay. How many times have you testified
5 either in deposition or at trial in a stray voltage
6 case?

7 A. I don't know. Probably two or three cases
8 I've done at a trial. I was deposed maybe six or seven
9 times, given testimony at state hearings.

10 Q. Right. One of them being the Public Service
11 Commission of Wisconsin?

12 A. Yes.

13 Q. You testified twice?

14 A. I believe that's correct, yes.

15 Q. Once for Docket 106 and once for Docket 115?

16 A. It's been a long time ago.

17 Q. Sure. You recall testifying?

18 A. Yes.

19 Q. I think with Docket 106 you and --

20 A. Dr. Gorewit.

21 Q. Yeah, Dr. Gorewit, were called as a pair; I
22 guess both of you were on the witness stand at the same
23 time and they were asking you questions. Do you recall
24 that?

25 A. That's correct, yes.

1 Q. And you were under oath?

2 A. Yes.

3 Q. And so you had been sworn to tell the truth
4 just as you were today?

5 A. Yes.

6 Q. Do you believe you gave truthful testimony at
7 that time?

8 A. Absolutely.

9 Q. Now, that testimony was, as I recall, in
10 19 -- was it 1988? Is that when it was, April of '88?
11 You don't recall?

12 A. I don't recall exactly. I don't know if I
13 got a date on here or not. I don't recall the exact
14 date.

15 Q. The point is that you testified before the
16 Public Service Commission of Wisconsin before Docket 106
17 was adopted in Wisconsin?

18 A. I believe we testified for information for
19 that docket.

20 Q. Right, and so you understood that the
21 Commission there was looking for your input and in terms
22 of what would be the protocols and standards, if you
23 will, that would be adopted in the State of Wisconsin
24 with respect to exposure of animals to current and
25 voltage?

1 A. I don't know that we were given those --
2 that whole scenario of what they were going to do with
3 it. They were interested in what we had done with stray
4 voltage and that's why we were there.

5 Q. I certainly understood that you and
6 Dr. Gorewit, being really Ph.D. level individuals who
7 had studied and published a lot in the area of stray
8 voltage up to that time, correct?

9 A. Dr. Gorewit had been involved with it for a
10 lot longer time than I have.

11 Q. But they were looking to the two of you to --
12 as sort of some of the most knowledgeable people in the
13 country to provide them with input on the questions they
14 had?

15 A. We had some publications with respect to
16 stray voltage and I think that's pretty much what we
17 went through with the docket.

18 Q. You testified about some of those
19 publications?

20 A. Yes.

21 Q. Particularly you testified about the water
22 bowl testing that you did?

23 A. Yes.

24 Q. That's that 49-day test?

25 A. Yep.

1 Q. One with two weeks before, three weeks of
2 treatment, and two weeks after?

3 A. Correct.

4 Q. Then you had not yet performed at that point
5 in time the full lactation studies?

6 A. I think that's correct, yes.

7 Q. That took place in the following --

8 A. That took place over about a two-year plus
9 period.

10 Q. And then for the water bowl testing, you
11 published two papers with ASAE, one being 87-3034?

12 A. I don't keep those numbers on the top of my
13 head.

14 Q. Well, do you recall doing two papers and the
15 other one was 87-3035? I'll just tell you the one had
16 to do with the milking performance generally and water
17 consumption, and the other one had to do with health
18 effects?

19 A. Yes, I think that's correct, yes.

20 Q. Those two papers were the same dataset, same
21 experiment?

22 A. Same experiment but different sets of data.

23 Q. And then that was followed up with a Journal
24 of Dairy Science article --

25 A. Yes.

1 Q. -- in 1989?

2 A. It was followed up by, certainly by the
3 Journal of Dairy Science article. I don't know what the
4 date of that was. If that's important, I can look.

5 Q. Sure. You don't need to look. I'll show it
6 to you later.

7 A. Okay.

8 Q. So and then the full lactation studies were
9 also done.

10 A. There was two ASAE papers and that was
11 followed up by two Journal of Dairy Science papers.
12 That's correct.

13 Q. All right. So I see you belong to the ASAE,
14 correct?

15 A. Yes. ASAE is now the ASABE I think, changed
16 its name from the Association of Agricultural Engineers
17 to include biology under it, biological end of it.

18 Q. At the time it was American Society --

19 A. Of Agricultural.

20 Q. -- of Agricultural Engineers?

21 A. Yes.

22 Q. Now, the name has been changed to the
23 American Society of Agricultural and Biological
24 Engineers?

25 A. Yes. I believe that's correct.

1 Q. Same organization?

2 A. Same organization, just shifting what their
3 direction was I think.

4 Q. The two ASAE papers were published when that
5 was the name. Those are not peer-reviewed?

6 A. That's correct.

7 Q. The Journal of Dairy Science papers are
8 peer-reviewed?

9 A. That's correct.

10 Q. It says here on page 2 of your CV that you've
11 been a reviewer for the Journal of Animal Sciences.

12 A. I may have reviewed one or two papers for
13 them.

14 Q. Were any of those related to stray voltage?

15 A. I don't recall.

16 Q. You also reviewed for ASAE?

17 A. Over a wide variety of subjects from -- I
18 don't know that I ever reviewed a stray voltage paper.

19 Q. You don't recall doing that for any journal?

20 A. For any journal right off.

21 Q. Have you met --

22 A. To the best of my knowledge.

23 Q. Have you met Professor Reinemann at the
24 University of Wisconsin?

25 A. Yes.

1 Q. Where did you meet him?

2 A. He was a student at Cornell, graduate
3 student.

4 Q. So was he one of your students?

5 A. He was not one of my students.

6 Q. Is that when you first met him though?

7 A. At Cornell, when he was a graduate student.
8 Yeah, that's the first time I knew of him. He was a
9 student under Michael Timmons, as I recall, Professor.

10 Q. How did you meet him? Just casually?

11 A. Probably just casually. I don't think I had
12 him in any classes.

13 Q. Okay. And then you went to Wisconsin. Did
14 you ever run into him after that?

15 A. I've run into him a number of times over the
16 stray voltage issue.

17 Q. At various conferences and things?

18 A. Yeah.

19 Q. Like, I know you both spoke at the Camp Hill,
20 Pennsylvania meeting in 2003?

21 A. Yes, I think that's correct.

22 Q. Where you published a summary of the Cornell
23 research?

24 A. Yeah.

25 Q. You spoke about the Cornell research?

1 A. Okay. I don't recall that right off but
2 I -- I'm sure that happened, yeah.

3 Q. It's in your CV.

4 A. Yeah.

5 Q. That's why I pointed it out.

6 A. Yeah.

7 Q. So it looks like at retirement you had -- in
8 2018, did you resign then?

9 A. No, I didn't -- I wasn't required to resign.
10 I was required to retire. I don't know that I -- and I
11 applied for what's called the Emeritus Professorship,
12 and so then I was awarded that, which simply gives me
13 some possibilities to work with students after I retire.

14 Q. I just wanted to -- if you could turn to
15 page 4 of your CV, please.

16 A. Mm-hmm.

17 Q. I just want to -- the way you've laid this
18 out in terms of publications, the first thing is books
19 or chapters, and item 2 there references chapter 3 of
20 USDA Handbook 696?

21 A. That's correct.

22 Q. And so were you an author of Chapter 3?

23 A. Together with Dr. Gorewit.

24 Q. So in terms of Chapter 3 -- we'll get to
25 this, but I think you will have an opinion here that

1 that represents current thinking and that you stand by
2 the things that are written in Chapter 3 today?

3 A. Yes.

4 Q. Okay. And then the second item there that's
5 of interest is item 7 where you did some stray voltage
6 research and that was not new research, right?

7 A. No.

8 Q. That was just a summary of past research?

9 A. Yeah, that -- the NRAES, I don't know if I
10 can tell you what -- it's Northeast Regional
11 Agricultural Extension Service, but I'm not sure that's
12 what it is. Basically a publication for -- that
13 provides information to a wide variety of people.

14 Q. That's what you presented at Camp Hill,
15 Pennsylvania?

16 A. That could be where that was presented.
17 That's from 2003, yeah.

18 Q. Okay.

19 A. I can't verify the -- I don't remember where
20 it was presented right off.

21 Q. Actually I think it is in here somewhere.

22 A. The publication will tell you where it was
23 published from but I --

24 Q. Then there's refereed publications. By that,
25 you mean peer-reviewed, right?

1 A. Yes.

2 Q. Going through this, if we can turn to page 6,
3 it looks like there's three refereed articles having to
4 do with stray voltage that you either wrote or co-wrote;
5 would that be true?

6 A. Yeah.

7 Q. That would be 25, 31 and 32?

8 A. 25, yeah, 31, 32, 33. Those were all in the
9 Journal of Dairy Science, all with Dr. Gorewit and
10 others?

11 Q. I missed 33. You haven't done any -- you
12 haven't published anything peer-reviewed related to
13 stray voltage since 1992; is that true?

14 A. That could be true, yes.

15 Q. Do you know of anything?

16 A. I don't -- I think that's correct.

17 Q. I see you have one article, page 8, and that
18 would be item 64 there, which has to do with magnetic
19 fields but not stray voltage?

20 A. That's correct.

21 Q. Okay. Then if we could turn to the Invited
22 Technical Papers at the bottom of page 8, it looks like
23 you have four invited technical papers related to stray
24 voltage, and that's item 4, item 8, item 10, and
25 item 12?

1 A. Mm-hmm.

2 Q. Now, which of these, if any, involved new
3 research as opposed to simply writing an article on
4 previously conducted research?

5 A. I think most of this was -- I don't know.
6 I'd have to go back and look at them.

7 Q. Well, looking at them now --

8 A. '89 -- let's see. '89, probably not. What
9 were the other ones? '91. 2003 might have had some
10 stuff that we did that was published in the articles,
11 that we did at ASAE.

12 Q. Right. But, I mean, we already talked about
13 that.

14 A. Yeah.

15 Q. That was a summary of previous research and
16 so that 2003 is the same as the --

17 A. We had some -- we were doing some minor
18 things. Let me go back and look at the time on that.

19 Q. What I'm trying to say is that item 7 on page
20 4 publication is the same as item 16 on page 9?

21 A. Say that again, please?

22 Q. Item 7 on page 4 --

23 A. Okay.

24 Q. -- is the same item as item 16 on page 9.

25 A. I think one of those was a publication. The

1 other one -- which item on page 9?

2 Q. I'm looking at the ISBN number.

3 A. Yeah, those are identical but --

4 Q. All right.

5 A. I think we gave a presentation as well as
6 wrote a paper.

7 Q. Correct. You wrote something but also you
8 gave an oral presentation?

9 A. Yeah.

10 Q. And we'll get to that. Do you recall if
11 Bodman from Nebraska was there at that meeting and asked
12 some questions?

13 A. I know who Gerry Bodman is. I don't
14 remember the details of that. He may have.

15 Q. Well, apparently you had made some comment
16 that on one of the tests at 4 volts, the production
17 actually went up.

18 A. That could be what the data showed.

19 Q. So he was asking, well, are you trying to
20 tell dairy farmers to electrify their farm so their milk
21 production goes up? And you said, no, that's probably
22 not a good idea; correct?

23 A. That sounds like an answer I would have
24 given.

25 Q. That would have been the truthful answer?

1 A. I was certainly not advocating -- I never
2 have advocated 4 volts as a level.

3 Q. So you haven't had any technical papers other
4 than this last summary since 1991?

5 A. Peer-reviewed?

6 Q. No, you're calling them -- you created the
7 category. I'm on this category of Invited Technical
8 Papers (Nonrefereed).

9 A. Yeah.

10 Q. I think you must have had in your mind what
11 that meant.

12 A. That generally means that somebody invited
13 us to give the paper and probably -- invited papers
14 generally can be new things and they can be a review of
15 things you've done in the past. That's that category.

16 Q. We've gone through, again on page 9, items 4,
17 8, 10, 12 and 16, and you haven't identified any of
18 those as involving new research or new experiments?

19 A. Give them to me again. I can't keep track
20 of all the numbers you're throwing at me.

21 Q. I'm sorry.

22 A. Looking on page what?

23 Q. Page 9, sir.

24 A. Too many pages in this thing. Page 9.
25 Okay. A lot of stuff.

1 Q. Page 9 and I'm referring to items 4 --

2 A. 4.

3 Q. 8.

4 A. Let me go back and see what the category
5 we're talking about is. This is invited papers?

6 Q. Correct.

7 A. Got you. 4.

8 Q. 8.

9 A. 8.

10 Q. 10 and 12.

11 A. And the question was?

12 Q. None of those involved new experiments?

13 Instead they were reporting on other experiments for
14 which you already had knowledge? You were putting
15 things together in a report, if you will?

16 A. I don't know whether that's entirely true.
17 There's some things -- we worked on a variety of things;
18 the instrumentation, the monitoring stray voltage. We
19 might have had some things that weren't in the other
20 things that we talked about.

21 Q. That would relate to item 12?

22 A. Item 12. We had formed a group in
23 New York State and we did training, and some of this may
24 have been about that. I'd have to go back and look at
25 the paper. Roger Pellerin would have been involved in

1 that.

2 Q. Okay.

3 A. Guidelines on Stray Voltage on Dairy Farms
4 was probably pretty much a review of the stuff that
5 we've done.

6 Q. That's item 10?

7 A. 10. Item 8 would be a review of recent
8 research in stray voltage. I don't think we would have
9 provided anything new in that view of what -- of stray
10 voltage, but I could go back and look at that in detail.
11 And then the other one was 4?

12 Q. Right.

13 A. That's -- again, I don't think there's
14 anything new in that from other things that we
15 published.

16 Q. Again, I want to go to the next category
17 which is Non-Refereed Technical Publications?

18 A. Mm-hmm.

19 Q. And you can turn to page 10.

20 A. Mm-hmm.

21 Q. I think we've talked about some of these but
22 if you can go to item 6, 7, and 8.

23 A. Okay. That was an ASAE paper.

24 Q. 3032?

25 A. Yeah.

1 Q. 3034?

2 A. Yeah.

3 Q. And 3035, okay? And item 7 and 8 were part
4 of the same experiment, correct?

5 A. Yeah. 3035 was part of what went into the
6 peer-reviewed article and we've already talked about
7 that.

8 Q. We've already talked about that.

9 A. And the Behavior, Production, Water Intake
10 is part of what was a peer-reviewed science paper, and
11 the Ludington one, Dave looked at a whole variety of
12 neutral currents in barns and we were part of that.

13 Q. Okay. But to just --

14 A. That was probably new information.

15 Q. 7 and 8, just so I can crystalize this, which
16 is 87-3034 and 87-3035, ASAE, is the same experiment as
17 shown on page 6 -- page 6, item 25?

18 A. I think that's correct, page 6, item 25.

19 Q. Right up at the top?

20 A. Yeah, I saw it. I want to go back and see
21 what -- yeah, it was. Typically we would report in
22 these papers and then put them together for publication
23 and peer review.

24 Q. I just want to get a yes to my question,
25 that's all.

1 A. Okay. And the yes is whether --

2 Q. Whether 7 and 8 on 10 --

3 A. 7 and 8, the Effects of Neutral-to-Earth
4 Voltage on Behavior Production and Water Intake in dairy
5 cattle and 8 is Effects of Neutral-to-Earth Voltage on
6 Animal Health and Reproduction in Cattle, and those
7 occur in -- those occurred in animal science
8 publications. Effects of voltages on cows, that's a
9 complete lactation.

10 Q. No.

11 A. No, that's not the one.

12 Q. Item 25?

13 A. Yeah, it says 25. Yeah, that was part of
14 it.

15 Q. It's Journal of Dairy Science.

16 A. Yeah.

17 Q. 72:2184 --

18 A. Yeah.

19 Q. -- to 2192.

20 A. Yeah, that's correct.

21 Q. And so just to be clear, 25 on page 6, the
22 Journal of Dairy Science article is the same experiment
23 as item 7 and 8 which you -- the title to which you read
24 on the record on page 10?

25 A. 25 is the Effects on Lactating Holsteins.

1 Yeah, '89 would have been one of those. There's also a
2 health and reproduction of cattle.

3 Q. But there's not two articles for that.
4 There's two articles for the full lactation but not for
5 that one. Are we in agreement there?

6 A. I don't know. I'm trying to remember and
7 figure out what -- all right. Let me go back here. So
8 7 was Effects on Neutral-to-Earth Voltage on Behavior,
9 Production and Water Intake. 8 was on Animal Health and
10 Reproduction, and 25 is Effects on -- we're not talking
11 about 25, are we?

12 Q. Yeah, we are.

13 A. 25 is AC Voltage Effects on Lactating
14 Holsteins. Yeah, that --

15 Q. Does it help you to look at those?

16 A. Yeah, it would help to look at that. Give
17 me 25 -- if you've got 25, I can look at that and tell
18 whether with that's what we did with those two articles
19 and it probably is.

20 Q. Yeah, let me just get through your CV and
21 then I'll go back to that.

22 A. Yeah.

23 Q. Seems like we're having trouble on those two.

24 A. Well, I just don't know what we had in all
25 of that. These two articles are on health and I don't

1 recall what was in that paper exactly. It might have
2 been more or less. It might have been the combination
3 of those two or just one of the two. I just don't
4 remember. I'd have to look at them to answer that
5 question.

6 Q. All right. On page 10 again and, again,
7 we're on the category of Non-Refereed Technical
8 Publications?

9 A. Sure.

10 Q. You talk about 6, 7, 8. There's two more --
11 let's see, seven more articles on that page that have to
12 do with stray voltage and those would be items 10 and
13 11, 14, 15, 16, 17 and 18; is that true?

14 A. I'm looking. 10 is the Effects of
15 Discontinuous Voltages on water. 11 is Modified
16 Drinking Behavior Due to AC Voltages on Water. 12 is
17 not what we're looking at.

18 Q. Well, it's a summary of the USDA Handbook.
19 Not 12. 12 doesn't have anything to do with it. I'm
20 talking about 14.

21 A. 14 was the Summary of the USDA Handbook. 15
22 was a report on full lactations, and 16 was a report on
23 the full lactations. Okay. Yes, and we did a
24 sensitivity report and that was 1990.

25 Q. 18?

1 A. And 18 was Complex Impedances.

2 Q. Okay.

3 A. Okay?

4 Q. So after that -- and that -- up to there, up
5 to 18, other than, of course, the summary of the Red
6 Book, which is item 14, that was all based upon
7 experiments, new research, if you will?

8 A. Yeah. Yes.

9 Q. Correct? After that time you didn't conduct
10 any new research, did you?

11 MS. MERCER-LAWSON: Object to the form,
12 vague.

13 Q. Let's move to -- let me move to 12.

14 A. We did 9 -- 95 we did Holstein Cow Impedance
15 Muzzle.

16 Q. Was that an experiment?

17 A. Yeah.

18 Q. It was new research; okay.

19 A. Yeah. In '90 we did some experiments of
20 Measuring Short Duration Animal Contacts Voltages and
21 Currents.

22 Q. That was '96?

23 A. That was in '96 with Stringfellow.

24 Q. 53, would that be new research?

25 A. On 53 was the new research.

1 Q. Okay. And what about 54 on the next page?

2 A. That would have been new research.

3 Q. Okay. 55?

4 A. Yes.

5 Q. Is that new research?

6 A. Yes.

7 Q. That wasn't a summary of --

8 A. No, that's not a summary.

9 Q. Okay. And then 59?

10 A. 59. Let's see, Effects of Steady State
11 Voltage on Mastitis. That might have been a review, and
12 60 was new research, 1999, and I think that's the last
13 of it.

14 Q. Okay. If you can turn to page 14.

15 A. Mm-hmm.

16 Q. Under the category of Reports.

17 A. Mm-hmm.

18 Q. And item 3 there, you did a stray voltage --
19 some kind of a publication research report, 85-39?

20 A. It's a report that we did -- is that '92?
21 That would have been a report through Empire State
22 Electric Energy Corporation who funded some of the
23 research that we did.

24 Q. What is that outfit? Is that a utility?

25 A. The Empire State Electric Energy Research

1 Corporation was an agency that was funded by, as I
2 recall, by fines that the State had put onto the
3 electric utilities for violations that they had
4 incurred.

5 I don't know exactly how that all worked but
6 it was -- that's how the fines went to that, and they
7 had an organization which funded researched, but it
8 would have funded research that was related to electric
9 energy.

10 Q. So is this referred to -- I'm seeing these
11 letters, ESEERC. Is that --

12 A. ESEERC is that organization.

13 Q. Okay. So that's an acronym that was picked
14 up?

15 A. Yeah.

16 Q. Okay. The abstract -- it looks like you've
17 done a number of abstracts?

18 A. Yeah.

19 Q. But the last that you did was item 7 on page
20 15 in terms of an abstract?

21 A. Yeah, I think that's true.

22 Q. But that was magnetic fields, not stray
23 voltage?

24 A. That's correct.

25 Q. And the last one that actually has to do with

1 stray voltage would be item 5 there on page 12 -- on
2 page 15?

3 A. Yes. That was called an abstract.

4 Q. Then if you want to turn to the last page, it
5 lists the testimonies that you gave?

6 A. Yes.

7 Q. And you testified four times, twice before
8 the Public Service Commission of Wisconsin, correct?

9 A. That's correct.

10 Q. And twice for the Public Service Commission
11 of Michigan?

12 A. That's correct.

13 Q. And the Docket 106 had to do with determining
14 an action level, correct, animal contact voltages?

15 A. Yes.

16 Q. And then Docket 115, which was in 1993, it
17 was determining an action level for animal contact
18 voltages?

19 A. Yes.

20 Q. So what happened between '89 and 1993 was the
21 Red Book, correct?

22 A. The Red Book was published in 1990 I think.
23 Let me look.

24 Q. It says December of '91.

25 A. Yeah.

1 Q. It's on page 4 of your CV.

2 A. Okay. Page 91.

3 Q. December of '91 is what I said.

4 A. So that would have been before '93.

5 Q. Correct. So did you understand that the
6 Public Service Commission of Wisconsin was coming back
7 to reevaluate the standards that had been adopted in
8 Docket 106 in lieu of the Red Book, what had been the
9 conclusions or the consensus of the authors of the Red
10 Book?

11 MS. MERCER-LAWSON: Object to the form.
12 Ambiguous, vague.

13 A. I don't know why they were coming back and I
14 don't know if -- it seems to me there were a lot of
15 people that were giving testimony to the Wisconsin
16 Public Service Commission other than from exactly the
17 Red Book.

18 Q. Okay. Now I want to turn to -- you have it
19 in front of you but, it's Exhibit 620, and that is what
20 we received from the defense law firm as being a summary
21 of your opinions in this case.

22 A. It looks correct.

23 Q. Okay. So we -- I was told last night, after
24 I arrived here, that a bunch of new documents came that
25 were inadvertently not provided to us and I, frankly,

1 you know, haven't had any chance to even look at those,
2 so I just wanted to make a record of that; that I
3 haven't had a chance to look at them.

4 Do you know what those are?

5 MS. MERCER-LAWSON: I need to make a
6 note to the record as well. What was
7 produced last night was not anything new. It
8 was inadvertently omitted from the file.
9 Dr. Aneshansley had a thumb drive that we had
10 forgotten was part of his file, and it
11 consisted of a couple of items from
12 Mr. Neubauer that you've already seen.

13 A. Is that what we're talking about, the two
14 thumb drives?

15 Q. I don't know what we're talking about. I
16 don't know when you got them. Did you get two thumb
17 drives?

18 A. I got two thumb drives. I got a thumb drive
19 back in 19 -- 2019 and I got a thumb drive in terms of
20 preparation for the deposition probably within the past
21 two weeks. I don't remember exactly when I got them.

22 Q. Okay. When you say within the last two
23 weeks, you mean like yesterday?

24 A. No. I got them -- I got it at least ten
25 days ago. I could go back and look. I've been working

1 on it for the past week and a half. I've been reading
2 what's in it in the past week and --

3 Q. That new information. Let me see if I can
4 say what it is.

5 MS. MERCER-LAWSON: For the record, what
6 he's talking about with the second thumb
7 drive is the file that was produced to
8 counsel ten days before this deposition.

9 MR. BIRD: How do you know what he's
10 talking about? Are you just telling him?
11 That's what -- I'm confused.

12 MS. MERCER-LAWSON: That's what he's
13 telling you.

14 MR. BIRD: He's saying that he
15 reviewed -- I don't know what you're talking
16 about.

17 MS. MERCER-LAWSON: I'm objecting to
18 your characterization that it was new
19 information. Nothing was new.

20 Q. So I have here the files that were produced
21 yesterday or at least a list of them and I'll just read
22 them into the record: Agrivolt Report regarding
23 Poeschel Hidden Valley, October 2012. Did you look at
24 that?

25 A. I scanned through that. Whose report was

1 that?

2 Q. Neubauer April 2016 Testing Binder and that's
3 something close to 450 pages. Did you look at that?

4 A. I looked -- I went through and looked at a
5 number of the recordings that were there that I couldn't
6 make much sense of.

7 Q. Okay. And then Loud technical report with
8 Power Quality Analysis from April 12th, 2017?

9 A. Yes.

10 Q. Did you look at it?

11 A. I briefly scanned through that.

12 Q. Neubauer Testing Report, May of 2018, which
13 contained approximately 800 pages. Did you look at
14 that?

15 A. I, again, looked at some of the recordings.
16 They were mostly just images of oscilloscopes.

17 Q. And then there's Neubauer Testing Report, May
18 of 2018, Book 2, which was approximately 180 pages. Did
19 you look at that?

20 A. I looked at all of those things that are --
21 if that's a list of things that were on the thumb drive,
22 I reviewed all the items on the thumb drive in some
23 fashion.

24 Q. Okay. I'm just trying to get it in the
25 record what you got here.

1 A. I understand.

2 Q. And you're talking about the thumb drive you
3 got within the last two weeks?

4 A. I'm talking about the thumb drive I got
5 within the last two weeks.

6 Q. And then the next item is a July 10, 2019
7 Neubauer Voltage Regulators Data Binder and that is
8 approximately 450 pages. Did you look at that?

9 A. I looked at all of them but not in great
10 detail. And I scanned through more than 50 of the
11 images that were in most of those.

12 Q. Well, so far -- I mean, as we've gone through
13 this, I don't see any of this as having any bearing on
14 the fundamental opinions you have, where you're
15 defending the Red Book.

16 A. Nor do I.

17 Q. Okay. And so at least the stuff that I've
18 listed so far doesn't play a role one way or another in
19 your opinions?

20 A. That's correct.

21 Q. You just looked at it.

22 A. I looked at it.

23 Q. Would that hold true for everything on that
24 second thumb drive that you got?

25 A. I'd have to -- I would need a list to --

1 Q. You want me to read the rest of them?

2 A. Let me think. I don't know that --

3 Q. Would you prefer I finish the list?

4 A. Sure. Go ahead and finish the list.

5 Q. Because we can cut it short. Plaintiff's
6 Second Supplemental Answers to NSP's First Set of
7 Interrogatories, fully executed. Do you remember that?

8 A. Whose interrogatories?

9 Q. Plaintiff's Second Supplemental Answers to
10 NSP's First Set of Interrogatories, fully executed.

11 A. Yes.

12 Q. Do you recall getting it or looking at it?

13 A. I looked at all the things on there. I
14 don't remember the titles of them but there were
15 probably 20 items or so that were on the thumb drive.

16 Q. All right. I'm just -- again, I just want to
17 make sure that none of these have really much to do, if
18 anything, with your fundamental opinion, which is the
19 defense of the Red Book?

20 A. That's correct.

21 Q. So Annotated Diagrams and Photos Prepared by
22 Neubauer IDing Test Locations, and that would have been
23 something like 40 pages. Do you remember looking at
24 that?

25 A. I looked at all of them.

1 Q. Well, why don't I read them all into the
2 record. The next one, the BINDER, Plaintiff's Second
3 Supplemental Answers to NSP's Interrogatories.

4 Then the June 12, 2019 Testing Reports of
5 Neubauer and Lopez, which was a little over 1,000,
6 probably about 1,200 pages.

7 Plaintiff's Second Supplemental Answers to
8 NSP Interrogatories. So that's the list of everything
9 that was produced to us yesterday that --

10 A. The second thumb drive --

11 Q. That would be on that thumb drive, right?

12 A. The second thumb drive had a number of
13 papers on it.

14 Q. What do you mean, "papers"?

15 A. Papers, publications.

16 Q. Papers that you wrote?

17 A. A couple of them were papers I wrote. We
18 talked about them. Some of them, Norell was on there,
19 the -- it was a review of some of the publications that
20 were used in the Red Book.

21 Q. I see. Okay.

22 A. I'm not recognizing some of the stuff you're
23 talking about as being on the thumb drive that I had,
24 the second thumb drive that I have.

25 Q. The second thumb drive --

1 A. Is that the first thumb drive or the second
2 thumb drive?

3 Q. That's what I'm trying to figure out because
4 what you're telling me -- because the papers that were
5 previously disclosed, and if you just got those recently
6 to look at, and that was stuff that I had as part of the
7 disclosure ten days ago.

8 A. Yes.

9 MR. BIRD: You think that's correct,
10 Counsel?

11 MS. MERCER-LAWSON: I do.

12 Q. So what you're describing is that the old
13 thumb drive apparently was inadvertently the one that
14 you had, you know, a year or so ago?

15 A. Yeah.

16 Q. That's the one you forgot about that you had.

17 A. How did I forget about it?

18 Q. Well, apparently somebody forgot about it
19 because I didn't get it and you must have, you know,
20 misplaced it or something and realized --

21 A. I had it all along. I guess I wasn't aware
22 that it was my responsibility to provide that.

23 Q. Right. I wouldn't think it would be either
24 but for whatever -- for what it's worth, I don't know
25 what the dialogue was.

1 A. I didn't spend a lot of time on that first
2 thumb drive.

3 Q. Okay. So let's go to the other stuff that I
4 do have -- I did have ten days ago, because I think some
5 of that also is like why would they even have you look
6 at it because it doesn't really relate to your opinion.

7 MS. MERCER-LAWSON: Objection to the
8 form, calls for a legal conclusion. Keep
9 going.

10 Q. One would be the transcript and exhibits of
11 Ron Poeschel's deposition. I take it you might have
12 looked at that?

13 A. Yeah, I read through that.

14 Q. That doesn't make any difference to you in
15 terms of your opinion?

16 A. In terms of the Red Book, no.

17 Q. And I'm looking at your opinion and it's two
18 things: Defense of the Red Book and then Neubauer's
19 methodology.

20 A. My concerns about that.

21 Q. But the depositions of the two Plaintiffs,
22 Ron and Jane, really --

23 A. Have nothing to do with the Red Book.

24 Q. Same thing with Mark Cook deposition? That
25 doesn't play any role in forming your opinions?

1 A. No.

2 MS. MERCER-LAWSON: Object to the form.

3 Q. And the human sensitivity testing that there
4 were some videos there, that doesn't play any role in
5 your opinions?

6 A. No, it does not.

7 Q. Okay. And then there were, in some papers,
8 one was a Craine 1970, of course the Gorewit and you,
9 the AC voltage in water bowls which we talked about.
10 There's Whittlestone article from 1975. There's effects
11 of any V on behavior, production, and water, which I
12 think was your -- something you participated in.
13 There's a Lefcourt 1982?

14 A. Mm-hmm.

15 Q. Behavioral Responses, Norell 1983 --

16 A. Yeah.

17 Q. -- you're familiar with that? Henke
18 Drenkard, in '85?

19 A. Yeah.

20 Q. Lefcourt in 1985?

21 A. Yeah.

22 Q. Aneshansley-Gorewit, Effects on AV and
23 Behavior, which we talked about. Gorewit and
24 Aneshansley, Delays in Drinking. Gorewit and
25 Aneshansley, Effects N-to-E V on Animal Health.

1 Those would all be things that would provide
2 some basis for your fundamental opinion on the
3 continuing validity of the Red Book, correct?

4 A. Yes.

5 Q. Those reports?

6 A. Those were reviewed in the Red Book.

7 Q. Right, and are part of the bibliography?

8 A. Yes.

9 Q. Then let's see, there's Lawrence Neubauer
10 Responses to Hooper, 5/7/21. I take it that doesn't
11 make your opinions one way or the other either as to the
12 validity of the Red Book or your concerns with
13 Neubauer's methodology?

14 A. That's correct.

15 Q. The same holds true with Neubauer Responses
16 to Hooper, item number 5 there; same answer?

17 A. Yes.

18 Q. And then Loud Poeschel Technical Report, that
19 doesn't play any role on any of your opinions here?

20 A. No.

21 Q. Then the Poeschel Rendell Expert Report, does
22 that play any roles in any of your opinions? He's a
23 statistician.

24 A. Yeah, that's part of the review of the Red
25 Book.

1 Q. That would be something that we should talk
2 about?

3 A. Yeah, we should probably talk about that.

4 Q. Okay. And the Reference Manual On Scientific
5 Evidence, I take it you didn't really look to that to --

6 A. I did look at it, actually, and I went
7 through and read the engineering part of it. It was
8 only a thousand pages. I wasn't going to read a
9 thousand page document.

10 Q. Okay. All right. But is there anything in
11 there --

12 A. No.

13 Q. -- that you were relying on? Then of course
14 the Red Book, we know we're going to talk about that.

15 A. Yeah.

16 Q. At least gives me a scope here that would
17 help me, I think pare down a lot of questions on these
18 things that really don't have any importance to you in
19 terms of your opinion.

20 All right. So looking at your exhibit --
21 what's that number, 620?

22 A. 620. My opinions?

23 Q. Those are your opinions or a summary of your
24 opinions?

25 A. A summary of opinions.

1 Q. Do you have any other opinions that aren't
2 expressed in this document?

3 A. No.

4 Q. So to be clear, I'm going to ask you some
5 questions about your opinions but, I mean, you've given
6 me kind of broad categories here. You don't have any
7 opinions on anything else that relates to this case?

8 A. No, not at this time.

9 Q. All right. When did you first become
10 involved in the case?

11 A. 19 -- 2019, probably summer/fall, somewhere
12 in there.

13 Q. Who contacted you?

14 A. I don't recall who contacted me. It may
15 have been Jim Hooper but I don't remember exactly.

16 Q. Okay. What were you asked to do?

17 A. I was asked to discuss with John Loud some
18 experiments he was preparing to do.

19 Q. Did you do that?

20 A. Yes, I did.

21 Q. Did you have discussions with John Loud?

22 A. I had discussions with John Loud.

23 Q. Did you make any notations of those
24 conversations?

25 A. No, I did not.

1 Q. And when did you speak with Mr. Loud?

2 A. It was in the -- during the fall, fall into
3 probably November, thereabouts.

4 Q. Was it a series of conversations over time?

5 A. It was a series of maybe two or three
6 conversations. I could go back and figure out what it
7 is.

8 Q. How could you go back and figure it out?

9 A. I could go back and figure out when I had
10 the phone calls with him.

11 Q. Okay. Do you have any memory of what you
12 talked about?

13 A. Well, the things that we talked were John
14 Loud was preparing to do some experiments with water
15 bowls and contact resistance and cow resistance, and I
16 provided some knowledge about how we had gone about it
17 in our experimental behavior process and had some things
18 that -- talked to him about some things that he might
19 look out for, and that was about it.

20 Q. Was this where he was planning on doing some
21 experiments at some farm in Wisconsin?

22 A. I believe it was a farm. I'm not sure where
23 the farm was. I never knew the name of it but I --
24 either it was Minnesota or -- I don't recall.

25 Q. Does the name Dutch Dairy ring a bell?

1 A. Never heard Dutch Dairy until recently.

2 Q. Who told you about that recently?

3 A. It was in some of this documentation, I
4 think, somewhere along the line.

5 Q. Have you talked to anybody other than John
6 Loud about this case and of course the lawyers?

7 A. No.

8 Q. All right. So you haven't talked to David
9 Reed or --

10 A. I don't know who David Reed is.

11 Q. Before I forget, where is Dr. Gorewit these
12 days?

13 A. Dr. Gorewit has been retired for some time.
14 I believe he's still in Ithaca. The last time I was
15 there to see him was when my wife and my 50th wedding
16 anniversary, and we had a party and I talked to him
17 briefly at that time.

18 He lives around Ithaca and I haven't been in
19 contact with many people over the past year and half.

20 Q. When was your 50th?

21 A. 2019.

22 Q. Okay. So you saw him last in 2019?

23 A. 2019.

24 Q. And have you talked to him at all about this?

25 A. No.

1 Q. Do you know if he's still testifying for
2 utilities?

3 A. I do not know. I have no idea. You'd have
4 to ask him that question.

5 Q. And have you testified in litigation before?

6 A. I've testified in litigation, yes.

7 Q. I think you testified in a case involving
8 Bonneville and Kauch was the name of the plaintiff. Do
9 you remember that?

10 A. Where was this?

11 Q. State of Washington?

12 A. Yes.

13 Q. You testified at several trials in that case?

14 A. I testified in one trial in that case. I
15 think they had multiple trials. I just testified at the
16 first one.

17 Q. You didn't testify at the second one?

18 A. No.

19 Q. And you testified on behalf of the utility in
20 that case?

21 A. Yes.

22 Q. Have you testified in any other cases, either
23 deposition or at trial?

24 A. Yes.

25 Q. Have you testified always for the utility?

1 A. I -- yeah, for the most part. I think
2 there's been -- one of the first cases that I provided
3 some opinion on was the one about -- for a horse that
4 came in contact with electrodes on a gas pipeline,
5 corrosion electrodes, but other than that, no.

6 Q. Okay. And I'm not sure I understand what
7 that last answer is. A horse got electrocuted?

8 A. A horse got shocked. That was my first
9 experience with the legal system in terms of -- all I
10 did was provide an opinion for a lawyer for that.

11 Q. Okay. That was back in '91?

12 A. Oh, that was probably before then.

13 Q. In your CV that we just went through, you
14 indicated you were a consultant for stray voltage
15 litigation starting in 1991.

16 A. Yeah.

17 Q. Since then, since 1991, have you -- your
18 testimony to the extent you've given it has been on
19 behalf of utilities?

20 A. Those are the ones -- people who contacted
21 me and asked for that, yeah.

22 Q. How many cases were you involved in?

23 A. Oh, I'd have to do a guesstimate as to that.
24 I was involved in a number of cases in Michigan,
25 probably 10 to 15.

1 Q. In Michigan?

2 A. In Michigan. One in Washington. I've been
3 involved in one in Pennsylvania, one in Ohio, and
4 neither one of those got to the point after deposition.
5 I don't believe any of the ones in Michigan ever got to
6 a deposition or, therefore, trial. Washington one did
7 get to trial.

8 I was involved in one recent, in the past
9 ten years, in Utah and that got to deposition and trial.
10 That's about it I think.

11 Q. Is that where you first met Mr. Hooper?

12 A. That's where I first met Mr. Fitzpatrick and
13 Mr. Hooper.

14 Q. In that Utah trial?

15 A. In the Utah trial.

16 Q. Okay. You gave a deposition and trial
17 testimony in that particular case?

18 A. Yes, I did.

19 Q. Okay. Have you gone to farms as a consultant
20 at any time?

21 A. We -- by consultant, are you -- I'm not
22 quite sure what you're -- let's work on our definition.
23 What do you mean by "consultant"?

24 Q. Well, have you -- Cornell's got an extension
25 service?

1 A. That's correct.

2 Q. Do they have anybody that goes out and tests
3 for stray voltage?

4 A. Sure.

5 Q. Have you ever done that?

6 A. Yes.

7 Q. And was that part of an extension obligation
8 or duty?

9 A. I did not have an extension obligation but
10 one of the things I referred to earlier was that we had
11 a group that -- most of the people that were involved in
12 the stray voltage research, and we did training for the
13 utilities. We did training for the mastitis control or
14 whatever --

15 Cornell has a group which goes out and does
16 mastitis testing and other things, and we trained those
17 people to go out, how to make measurements on dairy
18 farms as part of their routine practice of doing
19 mastitis control and milk quality. I think that's the
20 Mastitis Control and Milk Quality Group.

21 So we spent time doing that. We went to a
22 number of different farms in that process because we
23 would take the people out to real farms to have them
24 make measurements and then discuss all of that at a
25 point in time. We had a three-day or about three-day

1 seminars that we did that over.

2 I was also asked on one occasion to go out
3 and do some testing on a farm up -- by a consumer group,
4 a state consumer group who had a complaint about -- over
5 something. The people from -- a guy from milk --
6 Mastitis Control and Milk Quality and I went out and did
7 some tests on that farm and reported for it.

8 Q. Was that in New York?

9 A. That was in New York. There was a complaint
10 to the -- to some organization within it and it went --
11 and it came back through to us because we were doing
12 work with mastitis control -- the Mastitis Control and
13 Milk Quality group.

14 Q. Did you -- I don't mean to finish -- I mean,
15 are you finished?

16 A. Yeah, I'm finished.

17 Q. You're going a little beyond my question but
18 that's okay. So did you develop a methodology for doing
19 your testing?

20 A. During this group we developed -- we
21 developed a methodology that pretty much followed what
22 was produced by the Red Book.

23 Q. Okay. You used a 500 ohm resistor then?

24 A. Yes.

25 Q. And are you familiar with the Docket 106 and

1 Docket 115 protocols?

2 A. I was at one time, and I don't know that I
3 can give that to you verbatim.

4 Q. All right. So I mean, there was phase 1 and
5 phase 2 testing as part of that?

6 A. Yeah.

7 Q. Did you follow that or did something like it?

8 A. We probably did something like it. I don't
9 know that I know the explicit procedures that were
10 involved in phase 1 and phase 2, but I would assume
11 they're very similar to what we were doing.

12 Q. Now, your testing methodology, was it written
13 somewhere?

14 A. We probably had it in a handbook somewhere.

15 Q. Do you happen to have that?

16 A. I don't have it with me right now.

17 Q. I know.

18 A. I don't know whether I have a copy of that
19 anymore or not. This is stuff we did in the '90s.

20 Q. Does Cornell still do that?

21 A. No. This -- that came from a group which we
22 also formed to look at stray voltage issues that
23 involved -- it involved the utilities, dairy farmers,
24 the cable industry, the telephone industry. The gas
25 companies all had some kind of representation on it.

1 Public Service member from the State of New York was on
2 it as well, and we held regular meetings to address some
3 of the issues.

4 One of the issues with all those different
5 utilities was they all connect to the neutral, and with
6 the isolation things going on, it was easy for them to
7 come in and bypass the isolation device. So we
8 developed some protocols for that, for labeling for all
9 those industries.

10 Q. Did you participate in the rule making in
11 New York?

12 A. No. I don't know that there was any rule
13 making in New York. I don't know that --

14 Q. Well, they adopted some action levels in
15 New York. Do you know that?

16 A. Not at the state level that I'm aware of.

17 Q. That at a half a volt, there was mandatory
18 isolation on demand. Did you know that?

19 A. No. In New York?

20 Q. In New York. Don't they call this the Empire
21 State?

22 A. They call it the Empire State. When did
23 that happen?

24 Q. I don't know. I mean --

25 A. I don't remember.

1 Q. I thought you'd know about it.

2 A. Maybe we did that. I don't remember the
3 mandatory part of that.

4 Q. Okay. How much do you charge for your
5 services?

6 A. I charge for my services over the years,
7 anywheres from \$100 an hour to \$350 an hour.

8 Q. What am I getting charged today?

9 A. \$350 an hour.

10 Q. And do you have the same rate for work on the
11 file as you do for doing depositions or is it a
12 different rate?

13 A. I have the same rate.

14 Q. Okay. So how much time have you put in on
15 this case at this point in time?

16 A. At this point in time I probably have 30 to
17 35 hours in it.

18 Q. Have you done any billings on it?

19 A. I haven't done any billings on it.

20 Q. So do you think you might have a copy of the
21 protocol at your home or somewhere?

22 A. I can go look but pretty much in the moves
23 around, that's the -- and the fact we weren't doing
24 workshops anymore, it's probably gone to pass. It's at
25 least 20 -- pushing 20 years since we've done any kind

1 of work -- that I've done any kind of workshop.

2 Q. So 20 years gets you back to what, around
3 2000?

4 A. Around 2000.

5 Q. Is the last time -- did the funding dry up
6 for that or what?

7 A. Partially the funding dried up for that.
8 Partially we had difficulty getting facilities -- we
9 used a facility for a lot of our experimentation, and
10 there was a lot of demand on it, a little four-stall
11 thing that's called LARTU. We had a lot more
12 competition for that and I don't know that we had
13 anything in particular that we had planned beyond where
14 we ended up.

15 Q. Was there -- when you did these, you know,
16 studies -- I mean training sessions, did you have
17 handouts for that?

18 A. We had a booklet that went along with it.

19 Q. I'm going to ask you to look.

20 A. There was a workbook. I can go see if I can
21 dig that out from someplace if you'd like.

22 Q. I'd like to do that and see, also, if you
23 have the methodology or the protocol that you used for
24 your testing and if you can locate those.

25 MS. MERCER-LAWSON: I will say that that

1 should go through the attorney. So go ahead
2 and come to the attorney instead of
3 Dr. Aneshansley.

4 MR. BIRD: Sure. And you give it to
5 Ms. Mercer-Lawson here and then I'll -- I
6 wouldn't get it directly from you.

7 MS. MERCER-LAWSON: You'll have to serve
8 something on us.

9 A. My wife had a stroke a year and a half ago
10 and we had to turn what was my office into a hospital
11 room for her and my papers and what I had taken back
12 from Cornell are scattered around wherever, so I'll try
13 to see if I can find something associated with that.

14 Q. Okay. We've been going a bit.

15 MS. MERCER-LAWSON: Want to take a
16 restroom break?

17 (A recess was then taken.)

18 BY MR. BIRD:

19 Q. Okay. So do you happen to have any of the
20 depositions or other testimony that you gave in your
21 possession, written copies of it?

22 A. Those are not things that I've kept.

23 Q. And then what is your current address?

24 A. 105 Southfield Drive, Fayetteville,
25 New York.

1 Q. How far is that from here?

2 A. 15 minutes.

3 Q. Okay.

4 A. 20 minutes.

5 Q. You would come in on a freeway or something?

6 A. Yeah. It's east of Syracuse.

7 Q. So how many miles, 10 miles, 15?

8 A. It's probably 10 miles, less than 10 miles
9 or so.

10 Q. Now, if you can look at Exhibit 620, I had
11 some questions.

12 A. Sure.

13 Q. We're going to get to the Red Book in a
14 minute. Well, I hope it's -- maybe not a minute but
15 definitely, but the Red Book is what you describe as
16 USDA Handbook number 696, Effects of Electrical
17 Voltage/Current on Farm Animals: How to Detect and
18 Remedy Problems. Correct?

19 A. Correct.

20 Q. And you are one of --

21 A. People refer to that as the Red Book. I
22 don't think we ever referred to it.

23 Q. So I say Red Book in this deposition, you
24 know what I'm talking about?

25 A. I know what you're talking about.

1 Q. Okay. I won't have to repeat that title
2 every time. The reason it was called a Red Book is
3 because it originally had a red cover.

4 A. That's correct.

5 Q. You're one of a group of University folks and
6 USDA people that got together, first at Cornell and then
7 in Minneapolis, to reach what was called a consensus on
8 certain things related to stray voltage, correct?

9 A. I think it was a group that got together
10 initially at -- within the ASAE organization and the
11 idea was that there had been a lot of work done on stray
12 voltage. This was an issue. We needed to provide some
13 kind of document, handbook, whatever, that summarized
14 what the knowledge was associated with this and see if
15 we can draw any conclusions on it that would be helpful.

16 Q. Before that first meeting, Dr. Gorewit, he
17 had been already testifying for utilities; is that true?

18 A. I don't know whether that's true or not.
19 I'm not aware of his -- I know that he testified for
20 utilities for a long period of time but I don't know
21 when it started.

22 Q. Okay. All right. I wanted to talk to you
23 about the first bullet point there and the statement you
24 make. Second sentence, first bullet point is: "Its
25 contents are, to this day, reliable, sound, verifiable,

1 and generally accepted within the scientific community."

2 That's the sentence I want to ask you about,
3 okay?

4 A. Okay.

5 Q. Who currently generally accepts that it's in
6 the scientific community?

7 A. I think the people who have worked on the
8 science associated with this are people that believe in
9 it, people involved in the Red Book.

10 Q. You mean the people that are authors still
11 believe in it?

12 A. Still believe in it I believe.

13 Q. If they're still alive?

14 A. If they're still alive.

15 Q. Anybody else?

16 A. I think if a person -- a person in the
17 scientific community evaluates what's in that, I think
18 it's scientifically acceptable.

19 Q. No, I'm asking you a slightly --

20 A. I don't know who -- I can't tell you who
21 exactly believes in it but I would --

22 Q. You know that Dr. Norell no longer believes
23 in it?

24 A. I don't know that.

25 Q. Do you know Dr. Norell?

1 A. I've never met Dr. Norell.

2 Q. You know he did some studies out in Idaho
3 that determined what cow resistance was?

4 A. I saw that he replicated some of the same
5 studies that he had done in -- and I've seen that paper.

6 Q. That abstract that he --

7 A. The abstract that he sent. I have probably
8 more questions about it, but it was similar to what he
9 had done, and I didn't see much different from what he
10 had done from his original work.

11 Q. Back in 1983?

12 A. Back in '83, and what we looked at based on
13 what I could see from the abstract.

14 Q. Right. He wouldn't be a person that would
15 still accept 500 ohms as the --

16 A. I don't know.

17 Q. -- worst-case source impedance?

18 MS. MERCER-LAWSON: Foundation.

19 Q. You don't know whether he does or doesn't?

20 A. That's correct.

21 Q. He's within the scientific community --

22 A. Yes.

23 Q. -- right; that you're talking about here in
24 this opinion? Okay.

25 Anybody else that you're aware of that

1 accepts this paper within the scientific community
2 besides the authors and potentially Dr. Norell?

3 A. I don't know that -- certainly I haven't
4 gone out and surveyed the scientific community, so all I
5 can base that on is what I believe that the scientific
6 quality of that work was.

7 Q. Are you aware that, you know, Merck Manual
8 adopted some of the lingo of the Red Book?

9 A. No.

10 Q. Do you know what the Merck Manual is?

11 A. I've heard of the Merck Manual.

12 Q. Were you involved at all in getting that, the
13 part regarding stray voltage published in part of the
14 Merck Manual?

15 A. I don't believe so.

16 Q. Did you work at all with Doug Reinemann in
17 connection with his research on stray voltage?

18 A. What do you mean by work with?

19 Q. Had conversations with him, had conversations
20 with him about to set up his experiments?

21 A. I don't know that I've had any -- we've had
22 a number of conversations over the years, not a whole
23 lot. I don't know that he ever asked for any advice on
24 his experiments in particular, in terms of the design.
25 We've --

1 Q. Where would you meet with him? Where did you
2 see him?

3 A. The only place I would have run into him is
4 at an ASAE meeting or he visited Cornell for some
5 reason. I might have run into him at some point. I
6 don't have a lot of contact with Doug but we've talked
7 over the years.

8 Q. So let's go to the second bullet point there
9 where the statement is: The USDA Red Book's age does
10 not distract from its validity. It has been used to
11 assist in developing policies and procedures.

12 A. Mm-hmm.

13 Q. Where has it been used to assist in
14 developing policies and procedures?

15 A. Well, certainly in Wisconsin.

16 Q. As part of their protocols?

17 A. As part of their protocols.

18 Q. Docket 106 -- Docket 115?

19 A. That's my assumption. I don't know exactly
20 how they developed or what their rationale was for
21 developing the policies but they certainly heard about
22 things that were in the Red Book from us and others.

23 Q. All right. And I have to -- let me withdraw
24 that last question because I said Docket 106 and we know
25 or we talked about earlier that Docket 106 came out

1 before the Red Book, and so as it developed policies, it
2 was in Docket 115.

3 A. Okay.

4 Q. It came out after?

5 A. But they certainly heard information that
6 was in the Red Book.

7 Q. Do you hold an opinion to a reasonable degree
8 of scientific certainty that the Public Service
9 Commission of Wisconsin was relying on the Red Book in
10 whole or in part in adopting Docket 115?

11 A. I don't know what they relied on.

12 Q. Okay. So that would be an opinion that, at
13 least with respect to Wisconsin you would withdraw that
14 opinion to a reasonable degree of scientific
15 probability?

16 MS. MERCER-LAWSON: Object to the form.
17 Misstates testimony. Go ahead.

18 Q. Correct?

19 A. Repeat that question.

20 Q. The answer is you didn't know whether they
21 did or didn't.

22 A. That's right.

23 Q. So what other place or places have developed
24 policies and procedures based upon the Red Book?

25 A. I think we have -- in terms of the stuff

1 that we did with training people, I think Wisconsin and
2 the people who have done workshops out there relied on
3 that information as well.

4 Q. But do you hold that opinion to a reasonable
5 degree of scientific certainty?

6 A. I think I can hold that to a reasonable
7 degree of certainty.

8 Q. What people in Wisconsin are you talking
9 about? The utilities?

10 A. Well, Doug Reinemann and his group out there
11 that have done that stuff.

12 Q. Anybody else?

13 A. The people in Michigan have made --

14 Q. Michigan Energy people?

15 MS. MERCER-LAWSON: He's not finished
16 with his answer.

17 A. It's a -- it's a handbook that's been out
18 there from the USDA available to a wide variety of
19 people, and I have some belief that -- maybe not great
20 certainty of it, that it's been a very useful document.

21 Q. And -- okay.

22 A. And in determining how to proceed with doing
23 investigations.

24 Q. So I was talking about Wisconsin. Who in
25 Wisconsin other than Doug Reinemann would have developed

1 policies and procedures relying on the Red Book?

2 A. The State.

3 Q. The State in what capacity?

4 A. The Public Service Commission, I guess,
5 is --

6 Q. That was the question I asked you before,
7 when -- you think it played a role. To a reasonable
8 degree of scientific probability, do you think it played
9 a role in developing the protocol laid out in the order
10 in Docket 115?

11 A. I answered that question I don't know
12 exactly how they did that but my expectation is that
13 they used that information.

14 Q. Now you're saying to a reasonable degree of
15 scientific probability the Public Service Commission of
16 Wisconsin was relying, at least in part on the Red Book
17 in Docket 115?

18 A. I would believe that they took it into
19 consideration in determining their -- in making their
20 determination.

21 Q. That's not the question I asked.

22 MS. MERCER-LAWSON: Object to the form,
23 argumentative. Go ahead.

24 Q. Did they rely on it, in your opinion, to a
25 reasonable degree of scientific probability in issuing

1 the order on Docket 115; yes or no?

2 MS. MERCER-LAWSON: Form. Asked and
3 answered.

4 A. I don't know what they did.

5 Q. All right. Any other place or governmental
6 entity or organization that you're aware of that adopted
7 policies or procedures in reliance upon the Red Book?

8 A. I don't have any others.

9 Q. All right. So you were -- you say the next
10 bullet point, you're prepared to describe the reasons
11 why the Red Book came into existence and further
12 prepared to defend the methodology of our work
13 referenced in the Red Book, notably Chapter 3 of the
14 handbook. Correct?

15 A. Correct.

16 Q. I read that right?

17 MS. MERCER-LAWSON: Misstates testimony.
18 You left out USDA Red Book a couple times.
19 You asked if you read it right so that's why
20 I was --

21 Q. What are the reasons the Red Book came into
22 existence?

23 A. What are the reasons it came into existence?

24 Q. Yeah.

25 A. I think I answered that question. It was a

1 group of the ag engineers from the -- ag engineering and
2 the American Society of Agricultural Engineers that were
3 aware of this issue, were dealing with this issue
4 throughout the country and felt it would be a useful
5 document to have for a whole variety of people,
6 particularly farmers, as well as the utilities.

7 Q. I notice in the preface of the Red Book that
8 it says that no funding was accepted from outside
9 sources. Do you remember that?

10 A. For the preparation -- for what?

11 Q. For the Red Book? I can go to the preface.

12 A. For the preparation of the Red Book?

13 Q. Yes.

14 A. That's correct.

15 Q. However, at least initially this energy thing
16 from New York, they were going to provide the funding,
17 right?

18 A. No. That was for research that we did, not
19 the Red Book.

20 Q. Okay. So you're saying it's not true that in
21 the lead-up to this meeting that you had at Cornell,
22 which I think was May of '89 -- we'll get to it later.

23 A. Yeah.

24 Q. That your belief was that you were going to
25 get funding from this New York energy group?

1 A. No.

2 Q. You're denying that?

3 A. I don't know that that had anything to do
4 with the Red Book.

5 Q. Okay.

6 A. The funding -- those are two separate --

7 Q. Let me just back up and tell you where I'm
8 going.

9 MS. MERCER-LAWSON: Were you finished
10 with your answer?

11 A. They're two separate things. One was
12 research that was being done and the other one was a
13 group of people who decided to get together to look at
14 all the research that had been done, and that was done
15 without any funding.

16 Q. Okay. I understand.

17 A. And --

18 Q. All right. And you say you're "prepared to
19 defend the methodology of our work." What was the
20 methodology of your work?

21 A. The methodology of our work was pretty much
22 how you would go about reviewing the literature and
23 putting together in some kind of package that we felt
24 was acceptable, was useful, and that meant having a
25 number of different chapters in there that addressed a

1 whole variety of issues associated with stray voltage.

2 Q. So I'm not sure I quite understand that; that
3 you and the other authors got together and you looked at
4 literature and then you tried to synthesize that in some
5 way to come up with the Red Book.

6 A. There were a group of people who were
7 working in agriculture, with dairy farmers on the issue
8 of stray voltage, and it was a complex issue, and when
9 we came together, the -- we tried to break that down
10 into the different categories -- different areas of
11 study or engineering or biology and address that in a
12 series of chapters.

13 So there are a number of chapters in the Red
14 Book and they address a whole variety of things
15 surrounding the stray voltage issue. So that's where we
16 started.

17 Q. Okay. I got it, and have you fully described
18 the methodology that you used?

19 A. Well, the methodology was then one that you
20 use in standard engineering or in terms of science, so
21 the -- there were chapters in there that are pretty
22 much all about -- there were things about distribution
23 to measurement.

24 Q. I'm talking about the methodology of the book
25 itself. You're talking about the underlying documents

1 that you relied upon. I'm talking about what was the
2 methodology of coming up with the book itself, and I
3 just wanted to know if you finished your answer.

4 A. I think I've finished my answer.

5 Q. The Red Book does not involve any new
6 research, correct?

7 MS. MERCER-LAWSON: Object to the form,
8 vague.

9 Q. Is that true?

10 A. All the research that was in the Red Book
11 was new at some time.

12 Q. But you didn't engage in any new experiments
13 to create the Red Book?

14 A. No.

15 Q. It was based upon literature that --

16 A. It was based --

17 Q. -- was published in the past?

18 A. That's correct.

19 Q. And it's not a peer-reviewed document; is
20 that true?

21 A. It's peer-reviewed in that the members of
22 the committee all reviewed the entire book.

23 Q. But it's not peer-reviewed?

24 MS. MERCER-LAWSON: Object to the form,
25 vague.

1 Q. Peer review --

2 A. Yeah. Yeah, no, it's not peer reviewed.

3 Q. Peer reviewed, just so we're clear, is when
4 an author submits something to a referee journal --

5 A. The authors don't peer review the journal,
6 yes.

7 Q. And there's blind reviewers, then that --

8 A. Absolutely, so it's not peer-reviewed.

9 Q. And you happened to write Chapter 3?

10 A. Dr. Gorewit and I wrote Chapter 3.

11 Q. Did you participate in writing all of
12 Chapter 3?

13 A. I did not participate in writing all of
14 Chapter 3.

15 Q. Did you review and approve all of Chapter 3?

16 A. We all reviewed all of the chapters and gave
17 our approval of them.

18 Q. That would include Chapter 7?

19 A. It would include all the chapters.

20 Q. Chapter 7, you're familiar with Chapter 7?

21 A. I would have to review what Chapter 7 is. I
22 don't know it right off.

23 Q. So let's go to the next bullet point. It
24 says: Experimental tests and field experience support
25 the conclusion that 500 ohms is a conservative estimate

1 of worst-case animal plus contact impedance value and
2 1000 ohms is a more realistic animal plus contact plus
3 path to source impedance.

4 A. Okay.

5 Q. So what experimental tests supported the
6 500 ohms as a conservative estimate of worst-case animal
7 plus contact impedance?

8 A. There were tests taken of what the animal --
9 the cow impedance was, and those were done under
10 situations which pretty much eliminated the contact
11 resistance that you would normally find in ordinary
12 conditions of the farm.

13 Q. What were the ordinary conditions on a farm?

14 A. The ordinary -- they could be a whole
15 variety of things.

16 Q. Would it include mouth to four-hoof contact?

17 A. It could.

18 Q. In other words, water to wet concrete?

19 A. Water to a wet concrete.

20 Q. So I mean, if I were to show you the Red Book
21 now, would you be able to tell me by looking at the
22 bibliography, which studies you were relying upon when
23 you came up with this 500 ohms?

24 A. The studies that we were relying on were
25 based upon the resistances that had been measured, and

1 there were a whole set of different studies on that.
2 There's a table that goes through those.

3 Q. Is it the --

4 MS. MERCER-LAWSON: Were you finished
5 with your answer?

6 THE WITNESS: Yes.

7 Q. Was it the resistances in those tables that
8 you were relying upon?

9 A. That's one part of what we were relying on.

10 Q. What else were you relying on?

11 A. Well, we were relying on the fact that there
12 was contact resistance associated with all of those as
13 well.

14 Q. And --

15 A. And I think it was the Minnesota people, the
16 Gustafson and Appleman who had a lot of experience,
17 field experience with cows and cow contacts, and what
18 have you, who pushed for the -- made the argument for
19 the 500 ohm resistance in terms of what their experience
20 was within their testing of -- in the field.

21 Q. So you would rely on Professor Gustafson for
22 the contact part of that?

23 A. He was the one that pushed the 500 ohm and I
24 would rely on -- we all relied, I think, on his
25 arguments associated with that 500 ohm being a -- a

1 minimal kind of resistance for the cow and the cow
2 contacts.

3 Q. Okay. And I'm trying to separate this out
4 between the cow and the contact because those are two
5 separate things.

6 A. There's really never been any good studies
7 made of the cow contacts.

8 Q. So you were relying upon Professor
9 Gustafson's field experience?

10 A. I think that's -- Appleman, Gustafson, they
11 were the ones who were most influential in terms of
12 pushing the 500 ohms as a cow contact -- of the total
13 cow resistance plus the contact resistance.

14 Q. What is the resistance of a cow's mouth with
15 water that's electrified?

16 MS. MERCER-LAWSON: Object to the form.
17 Incomplete hypothetical.

18 A. Ask that question again, please.

19 Q. What is the resistance of the mouth of a cow
20 when it's drinking with water when that water is
21 energized or electrified?

22 MS. MERCER-LAWSON: Form, incomplete
23 hypothetical.

24 A. I think that's one of the problems that
25 existed in terms of data available to characterize the

1 contact resistances.

2 Q. Okay. You did -- you did your water bowl
3 testing?

4 A. That's correct.

5 Q. And you came up with calculated resistances?

6 A. A wide variety of calculated resistances,
7 yeah.

8 Q. Most of them were less than 500 ohms with
9 some contact with water to the mouth and the metal
10 grate?

11 A. Maximum, minimum.

12 Q. The minimums were less than 500 ohms?

13 A. It was -- I'd have to go back and look at
14 that.

15 Q. We'll get to those.

16 A. Some of them were bigger. The minimum
17 values were larger than 500 ohms.

18 Q. Is it your opinion that your tests were
19 shading the resistance to something other than farm
20 conditions because of --

21 A. We have laboratory conditions that did not
22 reflect what goes on in a dairy farm. I think they were
23 artificial.

24 Q. No, I understand that, but a cow is drinking
25 out of water, that happens all the time.

1 A. Yeah.

2 Q. What was unusual about yours was that the
3 back feet of the cows were on a metal grate?

4 A. They were on metal rods.

5 Q. Metal rods. Is it your view then that that
6 resistance, the rear hooves of the cows to the metal
7 rods didn't reflect on farm conditions?

8 A. I think the situation that we had didn't
9 reflect entirely with what on-farm conditions are.

10 Q. So the mouth to the water, that's normal
11 everyday on a farm?

12 MS. MERCER-LAWSON: Form, incomplete
13 hypothetical.

14 Q. Cows drink water all the time?

15 A. Yes, they drink water all the time. They
16 drink it.

17 MS. MERCER-LAWSON: He's not finished
18 yet. Go ahead.

19 Q. Go ahead. If you're not done, let me know.

20 A. I'm done.

21 Q. To the extent that the water has minerals in
22 it would be less resistance than some purified water?

23 MS. MERCER-LAWSON: Form, incomplete
24 hypothetical.

25 A. I don't have a response to that.

1 Q. You don't know?

2 A. I don't -- I don't know.

3 Q. But can we agree at least on this; that cows
4 drinking out of a water cup is something that happens
5 everyday on dairy farms all over the country?

6 MS. MERCER-LAWSON: Form, incomplete
7 hypothetical, asked and answered. Go ahead.

8 A. I don't know if I can answer that question.
9 They certainly drink water.

10 Q. Cows drink out of water cups still today?

11 A. They drink out of troughs. They drink out
12 of tanks. They drink out -- sometimes they drink out of
13 water cups.

14 Q. Sure. If those water cups are electrified,
15 then you're going to have a resistance with the mouth of
16 the cow and the water. That's the contact point?

17 A. Yes.

18 Q. And if the hooves of the animal are on wet
19 concrete, you're going to have a resistance there?

20 A. That's correct.

21 Q. Those would be the two contact points,
22 correct?

23 A. Well, they would be five contact points.

24 Q. Are you familiar with any peer-reviewed
25 publications or other publications having to do with

1 what the resistance is between cows' hooves and wet
2 concrete?

3 A. I'm not familiar with anything that isolates
4 that particular contact.

5 Q. So you're referring with Surbrook and Reese,
6 that research that shows it was an ohm or less.

7 MS. MERCER-LAWSON: Form, vague.

8 Q. You're not familiar with it?

9 A. I'm familiar with Surbrook and Reese. I
10 don't recall when that occurred, when that research
11 occurred. When was that published?

12 Q. I believe it was 1988, I think. I'm sure
13 somebody will text me and give me the specific cite
14 but --

15 A. Yeah.

16 Q. But the point I'm making here is that did --
17 are you aware that Dr. Gustafson has testified about
18 what the resistance is between cows' hooves and wet
19 concrete with the manure/urine combination? Are you
20 familiar with his testimony?

21 A. I'm not familiar with that testimony.

22 Q. You would accept his under-oath testimony as
23 being truthful, I take it?

24 MS. MERCER-LAWSON: Assumes facts not in
25 evidence.

1 A. Repeat the question, please.

2 Q. Would you accept his under-oath testimony as
3 truthful?

4 MS. MERCER-LAWSON: Assumes facts not in
5 evidence. Go ahead and answer.

6 A. Yes.

7 Q. If I were to tell you that he's testified
8 that it was very low, 5 ohms or less, would you agree
9 that that sounds realistic to you for a contact
10 resistance?

11 MS. MERCER-LAWSON: Same objection.

12 A. For each hoof?

13 Q. Pardon?

14 A. For each hoof? Was there separation of the
15 different hooves or was that just a contact resistance
16 for all four hooves?

17 Q. That's for one hoof.

18 A. For one hoof.

19 Q. Reasonable? Sound reasonable to you?

20 A. I've never -- never made that measurement so
21 I don't know whether that's reasonable or not.

22 Q. Okay. Are you aware of any -- as you sit
23 here today, any published research, peer-reviewed or
24 not, that concludes that the resistance of a cow's hoof
25 and wet concrete is 5 ohms or less?

1 A. I'm not aware of any research on that.

2 Q. And you're not aware of any research that
3 describes the resistance that exists at the contact
4 point for a cow's muzzle and water that it's drinking
5 that may be the contact point?

6 A. No.

7 Q. Okay. And you're aware of there's
8 consistently then reports in the literature, and the
9 literature that existed back at the time the Red Book
10 was published, that shows that the impedance of the
11 animal, without the contact, was as low as 244 ohms,
12 excluding the bottom 10 percent?

13 MS. MERCER-LAWSON: Form, vague.

14 A. I remember 244 from some study.

15 Q. That was Norell.

16 A. I'd have to go back and look at that. I've
17 seen that. Yeah, there are values in that range there.

18 Q. And what you're trying to solve for when
19 you're providing this recommendation of 500 ohms is
20 worst-case circuit impedance, correct?

21 A. What's worst case?

22 Q. It was defined in the Red Book, worst-case
23 circuit impedance is cow plus contact.

24 A. Yes.

25 Q. It includes source and path?

1 A. That's right.

2 Q. Source and path is determined to be zero --

3 A. Yes.

4 Q. -- for worst-case circuit impedance?

5 A. Yeah.

6 Q. The objective there is to solve the problem
7 so that no cows get affected by stray voltage, not just
8 the average or median cows; is that true?

9 MS. MERCER-LAWSON: Form, incomplete
10 hypothetical. Assumes facts. Go ahead.

11 A. What are we talking about the objective of?
12 The objective of all these studies?

13 Q. No. The objective of the Red Book was to
14 come up with a recommendation for what would be a test
15 or a measurement but you were trying to say, well, what
16 resistor should be used --

17 A. Yes.

18 Q. -- in lieu of the animal when we're doing
19 tests?

20 A. That's correct.

21 Q. And the worst-case circuit impedance and the
22 recommendation was 500 ohms?

23 A. That's correct.

24 Q. Correct?

25 A. Correct.

1 Q. And what you thought you were doing or wanted
2 to achieve was that -- to pick a resistor that give
3 results that would protect all cows from current; isn't
4 that true?

5 MS. MERCER-LAWSON: Form.

6 A. I'm not sure that that was -- if you're
7 going for the minimal one, that would probably be true,
8 yes.

9 Q. When you -- you didn't want to pick a
10 resistor that would be the average, you know, so people
11 or cows that were less than 500 ohms might get shocked
12 and cows that were over 500 ohms of resistance would
13 not?

14 A. Yes.

15 Q. You were trying to give a recommendation to
16 protect all the cows, which would be reasonable. I'm
17 not --

18 A. Yeah, I think that's a reasonable approach
19 to that, yes.

20 Q. Up to that point in time, the Red Book -- the
21 primary method of cow housing was still the stanchion
22 facilities with the hay and the central alley and the
23 milking in place. Are you familiar with that? In other
24 words, free stalls weren't abundant back at the time
25 that this research was going on in the '80s?

1 A. We didn't have parlors, you're saying, back
2 in the '80s?

3 Q. I'm not saying you didn't have some parlors.
4 I'm just saying that the research that was done before
5 the Red Book was done almost exclusively in either
6 stanchions or tie-stall facilities?

7 A. That's probably true.

8 Q. I know that -- I think you folks, when you
9 did the full lactation, you, I think, used or had those
10 animals milked in the parlor?

11 A. Parlor, yes.

12 Q. Right?

13 A. They were in pens. They went from the pens
14 to the parlor and back, yes.

15 Q. That research wasn't one of the research
16 articles that was cited in the Red Book, right?

17 A. I think it's cited in the Red Book.

18 Q. You do? Okay.

19 A. I thought it was. I thought I went through
20 that and read that.

21 Q. Maybe -- I'll stand corrected because we'll
22 get to it. Okay. So then as you sit here today, you
23 don't know if we have a 244 ohm cow drinking water
24 standing with four hooves on concrete, whether that cow
25 has a real world resistance of close to 244 ohms? You

1 don't know the answer to that one way or the other, I
2 think?

3 A. Well, I think the 244 ohm had a -- the mouth
4 connection was through a -- I can go back and look at
5 it, a metal piece -- what do they call it?

6 Q. A metal bit?

7 A. A bit, I think, in the mouth. That is not
8 typical of what you would find in the real world.

9 Q. Sure, it isn't, but you don't know what the
10 resistance of the metal bit is, right?

11 A. Exactly. We don't know what the resistance
12 of the metal bit is. We don't know a lot of things
13 about that surface contact. They're different --
14 they're contrived for that experimental situation.

15 Q. Right. So I'm just going to follow this
16 through because this is where -- you're the electrical
17 engineer and I'm just a guy -- I've never had -- I had a
18 basic physics course but, you know, not really very good
19 at electrical engineering.

20 But if you got -- assume we have a 244 ohm
21 ohm. You know one exists because Norell tested for it.

22 A. Okay.

23 Q. And in Norell's tests it went from 244 to 525
24 in 1983, right?

25 A. I'd have to go back and look for the exact

1 numbers.

2 Q. And he excluded the top 10 percent and the
3 bottom 10 percent.

4 A. Okay.

5 Q. That was footnote --

6 A. I know he had percentiles that he looked at.
7 I'd have to go back and look. In some cases he did
8 percentile. I don't know if he did it in all of those.
9 I can go back and look at it if we have to.

10 Q. The one I'm taking about is the 1983 Norell,
11 which is cited in the Red Book, and it's reported in the
12 Red Book that it goes from 244 ohms to 525 ohms
13 excluding the bottom 10 percent and excluding the top 10
14 percent.

15 A. Okay.

16 Q. Does that ring a bell for you?

17 A. It rings a bell that he had separated them
18 into 10 percent categories, yeah.

19 Q. But the bottom number that he reports,
20 excluding the bottom 10 percent, is 244 ohms.

21 A. Yeah.

22 Q. Do you agree that such a cow exists even
23 today?

24 MS. MERCER-LAWSON: Form, incomplete
25 hypothetical.

1 Q. Maybe I'll restate. Do you agree that there
2 are cows that are in the range of 200 to 250 ohms,
3 excluding contact resistance?

4 MS. MERCER-LAWSON: Same objection.

5 A. I believe that you could make a measurement
6 that might give you that kind of resistance.

7 Q. And when you say "might," I mean, you know
8 Norell did it.

9 A. Yeah.

10 Q. He did it in a recent abstract and he
11 published all his numbers.

12 A. I did -- he just gave percentages. I -- I'd
13 have to go back and look at that. It was just a
14 paragraph long and I wasn't sure -- we didn't even know
15 whether it was AC resistance. I assume it was 60 hertz
16 resistance.

17 Q. You know Neubauer has done this to thousands
18 of animals.

19 A. Sure.

20 Q. He's tested them and he's coming up with
21 cow-resistant values?

22 A. Yeah. I've seen lots of Mr. Neubauer.

23 Q. But they're in the 200 to 250 ohm range.

24 A. I've seen levels there, yeah.

25 Q. So can I ask you to assume for the purposes

1 of this question that we're dealing with a 250 ohm cow?
2 What I want to ask you is about contact resistance.

3 A. Okay.

4 Q. Where do you come up with the other 250 ohms
5 to get the 500?

6 A. Through the contact resistances.

7 Q. Okay. So there we go because it's either the
8 muzzle or the feet. I'm looking mouth to four hooves.

9 A. Okay.

10 Q. And you don't know what the contact
11 resistance is for the four hooves. You've told me that,
12 correct?

13 A. Yes. Yeah.

14 Q. You don't know what the muzzle resistance is
15 for the water.

16 A. That's right.

17 Q. All right. So you don't know what -- how --
18 what is the make-up of that other 250 ohms.

19 A. That's correct.

20 Q. All right. And if the contact resistance is
21 less than 250 ohms, then 500 ohms wouldn't be a good
22 resistor to use in making a test, correct?

23 A. Yes.

24 Q. You'd want to use a lower resistor?

25 A. Yes.

1 Q. And then in -- when you're saying 1000 ohms
2 is a more realistic animal plus contact plus path to
3 source impedance. We talked about the animal plus
4 contact.

5 And the path to source, in order to determine
6 that, would you want a tester to do a source resistance
7 test?

8 A. Yes.

9 Q. And that's what 7 is equivalent or is that
10 what it's called?

11 A. Basically you put the -- you do that with
12 the 500 ohms.

13 Q. It's with and without the resistor --

14 A. With and without the resistor, yes.

15 Q. And you do that calculation?

16 A. Yeah.

17 Q. With that you can come up with that other
18 number when somebody does the source resistance.

19 A. That's right.

20 Q. Then that would get added to the contact and
21 the cow and the source which is -- includes a path.

22 A. That's correct.

23 Q. And then you come up with that number. Did
24 you folks do any of that?

25 A. We do that all the time in terms of making

1 cow contact measurements. You're always -- you need the
2 test not only for what the voltage is of the contact
3 points but what that resistance is between the contact
4 points and the source.

5 Q. Is it your belief that Neubauer doesn't test
6 or try to figure out what source resistance is?

7 A. I don't know. I see a lot of open circuit
8 measurements.

9 Q. Okay.

10 A. I --

11 Q. When he is measuring an animal that is in
12 contact with the earth, with the hooves on the concrete,
13 does that include source and path?

14 MS. MERCER-LAWSON: Form, vague. Are
15 you talking about Neubauer?

16 A. Everything includes a source and a path.

17 Q. So his result of the testing, that is where
18 the bit in the mouth and the animal with four feet on
19 concrete, that would include source and path?

20 A. That includes -- you make a connection,
21 which is a source resistance, which is a source -- which
22 is a contact point resistance. I think he uses a knows
23 clip rather than a -- on the nasal passages.

24 Q. Sure.

25 A. That's certainly not something that occurs

1 with cows drinking normally in the barn.

2 Q. Sure.

3 A. I think there's -- and I have a concern
4 about what the pressure is that goes on that nose and on
5 the septum in between. You can actually -- could
6 actually damage that, do physical damage to it which
7 would change the internal impedance of the cow.

8 Q. So you're saying if there's injury to the
9 animal --

10 A. Yeah, you break down the barrier that's
11 there, you're going to decrease the resistance.

12 Q. Have you seen the nose clip that he uses?

13 A. I've not seen him make measurements.

14 Q. It has little sharp points on it is that what
15 you're thinking?

16 A. No, I'm thinking the pressure it puts on a
17 nasal passage. I think he uses a fixed distance.

18 Q. So what's the resistance there? It would be
19 close to zero I assume?

20 A. At that particular point?

21 Q. Right.

22 A. Yeah, it's going to be very -- I don't know
23 what it's going to be.

24 Q. Do you know what resistance -- think you've
25 already told me you don't know what the resistance is

1 mouth to water that's electrified?

2 A. Yeah.

3 Q. That's what you used in a bunch of your
4 tests?

5 A. That's what we measured. We measured the
6 current to the water bowl, yeah.

7 Q. You came up and those animals were -- had
8 their feet -- their rear feet on a metal grate?

9 A. And they had their mouth in the water bowl
10 or had their mouth on the plate in the water bowl and
11 that causes differences as well.

12 Q. You came up with resistances, calculated
13 resistances based upon your set-up which was using an
14 isolation transformer, right?

15 A. Yes.

16 Q. You came up with resistances that were in the
17 range of 250 ohms for that particular test, correct?

18 A. I think at one point in that test we came up
19 with that, yeah.

20 Q. Okay. And yet you went along with this 500
21 ohms and I'm trying to figure out your test didn't
22 involve knows clips. It involved the mouth through the
23 water?

24 A. Yeah.

25 Q. So that's a realistic, non-Larry Neubauer

1 test; that's your test, and the only difference then is
2 that it was on these metal bars?

3 A. Metal bars, yeah.

4 Q. And you don't know what the contact --

5 A. I don't know what the contact resistance was
6 there.

7 Q. One of the things that I was -- just use of a
8 term here I wanted to clarify what you meant.

9 A. Okay.

10 Q. Is the -- in the last bullet point,
11 Dr. Aneshansley, fourth line down, you use the word
12 "cow's internal impedance." What did you mean? Is that
13 any different than the cow's impedance?

14 A. No.

15 Q. You meant the impedance of the animal. So
16 when we're --

17 A. Excluding cow contact.

18 Q. Are you the one who came up with the Z1 plus
19 Z2, plus Z3, plus Z4? That's your contribution?

20 A. That was one of my contributions.

21 Q. So we have source, path, cow, contact,
22 correct?

23 A. You have source, path --

24 Q. Cow?

25 A. -- cow, contact, cow, contact, path --

1 Q. Right.

2 A. -- back to the source, yes.

3 Q. So there's -- so the contact is -- there's
4 two contact points.

5 A. Yes.

6 Q. There has to be otherwise you can't get a
7 current flow?

8 A. Current, yeah.

9 Q. So it's source, path, cow, contact 1, and
10 contact 2?

11 A. Well, it's source, path, contact 1, cow,
12 contact 2, path back to the source.

13 Q. Okay.

14 A. That's the complete circuit.

15 Q. All right. So when you're doing source
16 resistance testing and using an element or someone;
17 you're getting both paths in there?

18 A. You're assuming that you -- you make it a
19 simpler circuit, which is source, the path, the cow,
20 contact, the cow contact, and then a direct connection
21 back to the source. You combine that into one
22 resistance. That's what it allows you to do that.

23 Q. Just so we're clear, impedance is not the
24 same as resistance?

25 A. Yes.

1 Q. Is that true?

2 A. Correct.

3 Q. It will -- tell us in laymen's terms what's
4 the difference.

5 A. Impedance can involve -- there are three
6 basic components in electricity; a resistor, capacitor,
7 and an inductor, and if you look at models of the human
8 system, and one of the papers that we did later on in
9 the '90s looked at whether this was true for cows as
10 well, but the impedance of a human being has been shown
11 to be a resistor and capacitor in parallel at the
12 contact points. Generally a fixed resistance, body
13 resistance, and then another capacitor/resistor in
14 parallel at the other contact point.

15 So that means it has some capacitance
16 associated with it as well as resistance, and capacitors
17 change their value, their resistance, in quotes, with
18 frequency.

19 Q. So --

20 A. A capacitor is an open circuit, means it's a
21 huge resistance because it's an open circuit.

22 Q. Right.

23 A. As you -- if you go to high frequency, it
24 becomes a short circuit.

25 Q. Open circuit, you mean the current --

1 A. The capacitor is two plates separated by an
2 insulator, and those have electrical characteristics.

3 Q. Okay. However, for purposes of testing,
4 you're using a resistor and then the solution, the
5 calculation would be an R value rather than an I or
6 impedance value?

7 A. You can calculate what the resistance value
8 is for that whole circuit by plugging -- there's a
9 formula for what the impedance of a capacitor is, and
10 you put 60 hertz into that, you can come up with a
11 magnitude for the impedance, and the -- and use that as
12 the total resistance -- just a resistant characteristic.

13 Q. So Ohm's Law, you recognize that as the law
14 of physics?

15 A. Law of electricity, yes.

16 Q. As well?

17 A. Yeah.

18 Q. Well, electricity, physics. And this is
19 volts equals resistance times current, right?

20 A. That's correct.

21 Q. That's the general formula. Or impedance
22 times current depending --

23 A. You're talking about AC circuits?

24 Q. Right. So that's not a debatable topic
25 anymore; that Ohm's Law is something that is an accepted

1 among all scientists as being a law on electricity,
2 right?

3 A. Yes.

4 Q. Okay. So people can use -- if you have two
5 knowns, you can solve for the unknown?

6 A. I hope that still works.

7 Q. I mean, yeah.

8 A. Yeah.

9 Q. It's a linear equation is what I'm trying to
10 say. You know --

11 A. Volts, A equals B times C is a linear
12 equation, as long as A, B and C are linear.

13 Q. Okay. Believe it or not, I'm done with that.
14 I'm going to move on then.

15 MS. MERCER-LAWSON: Good time to take a
16 short break?

17 MR. BIRD: If you'd like.

18 (A recess was then taken.)

19 BY MR. BIRD:

20 Q. I want to ask you about this paper. This is
21 what I referred to as your water bowl study?

22 A. Yes.

23 Q. Are you familiar with that?

24 A. Yes.

25 Q. Can I use that lingo to reference it?

1 A. It doesn't separate it from many of the
2 other studies, but if you want to do that, that's fine.

3 Q. Well --

4 A. This is the three-week study.

5 Q. Yeah.

6 A. Yeah.

7 Q. Well, actually I think you said it was 49
8 days --

9 A. The exposure was three weeks so, yeah,
10 7-week study or 49-day study, yeah.

11 Q. Okay. So this is a study in which you
12 brought cows from the Cornell herd over to the LARTU?

13 A. The Large Animal Research and Teaching Unit
14 of Animal Science.

15 Q. At that location you constructed four, like
16 compartments or something?

17 A. At that site there were -- there was a test
18 facility there that had four stalls in it.

19 Q. All right.

20 A. That was part of the physical structure of
21 LARTU.

22 Q. So I'm trying to just get some of the basics
23 on what happened, if you can follow me. Do you have a
24 memory of that, what happened?

25 A. Yeah.

1 Q. Were you there on a daily basis to observe?

2 A. I was there on a daily basis.

3 Q. So the animals you were looking for were, as
4 I understand it, either animals in the rise up to the
5 peak of the normal lactation or on the way down and that
6 is it. So it was like from 44 to 120 days; is that
7 true?

8 A. The numbers are in there, yeah. I think
9 most of them --

10 Q. But you could only do four at a time?

11 A. Could only do four at a time.

12 Q. And your object was to do a total of 30,
13 right?

14 A. The object -- the objective was to do zero,
15 a half, one, two, and four.

16 Q. Yeah, the treatments. I'm talking about the
17 total number of animals.

18 A. And we were going to do six animals in each
19 treatment.

20 Q. So six times --

21 A. Five is 30.

22 Q. So that meant that you had to have, for 30
23 animals and four stalls, okay, that meant you had to
24 have seven and a half or eight sessions --

25 A. Yeah.

1 Q. -- of 49 days?

2 A. Yes.

3 Q. So the total length of this would have been
4 49 days times 8 --

5 A. Yes.

6 Q. -- correct? Doing that arithmetic --

7 A. Close to 400 days.

8 Q. It comes to about 400 days?

9 A. Probably a little bit longer, given movement
10 of the cows back and forth, yeah.

11 Q. So it would have been over a period of more
12 than a year?

13 A. Yeah.

14 Q. And the cows that were -- there was cows and
15 heifers, right?

16 A. Yes.

17 Q. You're trying to do cows --

18 A. First-calf heifers I think they were.

19 Q. Well, once a cow -- after they have their
20 first one, they don't call them --

21 A. Well, these were first -- I'm not --
22 that's -- that terminology I left to the animal
23 scientists, and Dr. Gorewit, and what have you, and --

24 Q. So two of the heifers reacted violently and
25 refused to drink for 36 hours?

1 A. I don't know that they reacted violently but
2 they refused to drink for 36 hours.

3 Q. And that -- are you confident that that
4 refusal to drink had to do with the fact that they were
5 getting shocked?

6 A. Am I confident with that fact? I'm pretty
7 sure that was the only thing that changed. They were
8 drinking before that.

9 Q. Some of the others weren't drinking for up to
10 21 hours or --

11 A. We looked at the delay to which -- the
12 number of minutes it was before they drank a gallon of
13 water. This was from the control period to when the
14 voltage was turned on, from that period on how long did
15 it take them to drink a gallon of water.

16 Q. So with those heifers you took them out of
17 the treatment, out of the experiment?

18 A. We did. We gave them water. Made sure that
19 they were all right, and we didn't -- we were required
20 to take them out of the -- which was good.

21 Q. Humanitarian?

22 A. Well, I think we say humanitarian but part
23 of the whole process of doing these experiments, we had
24 to get approval from the animal group -- whenever you do
25 an experiment on animals, you set down a protocol for

1 them.

2 There was a veterinarian that came over and
3 looked at some pretests of what we were doing to approve
4 us to be able to do this, and one of the constrictions
5 they put on it was if an animal doesn't drink for 36
6 hours, you have to give them water. 36 hours -- my
7 understanding of the 36 hours was that's the maximum
8 period of time that they'll leave an animal go without
9 water before surgery or some kind of a procedure.
10 That's where the 36 hours came from.

11 Q. All right. But you had two animals that were
12 heifer that didn't drink for 36 hours. They
13 were removed --

14 A. That's correct.

15 Q. -- from the experiment and their data not
16 counted.

17 A. The data was reported that they didn't drink
18 for 36 hours.

19 Q. I mean that --

20 A. We didn't have any data for them after that
21 because we couldn't -- they couldn't be part of the
22 experiment.

23 Q. Nothing about those two heifers was included
24 in the final dataset that you evaluated?

25 A. In terms of -- yes, that's correct.

1 Q. Okay. Now --

2 A. But it was reported -- that was a
3 significant part -- result of the experiment was those
4 two not drinking.

5 Q. But then you also lost some other animals to
6 disease during that time; isn't that true?

7 A. I don't think so. I don't recall that. We
8 would have reported it if we did.

9 Q. I thought you reported it and I'll get to
10 your report.

11 A. I'd have to go back and look at that.

12 Q. So you really -- what you had is not a single
13 experiment involving 30 animals. You had a single
14 experiment -- strike that.

15 When the two heifers were taken out, were
16 there replacements put in for them that were part of the
17 experiment.

18 A. No.

19 Q. So then you were down to 28 animals?

20 A. That's correct.

21 Q. And what you had then was seven -- well, for
22 those two animals, were they in the same group of four
23 or were they in different groups of four?

24 A. I don't recall.

25 Q. Do you want to look at your phone?

1 A. No, I want to turn it off. I thought I had
2 done that. Sorry.

3 Q. No problem.

4 A. I don't recall what groups the two were in,
5 whether they were in the -- we would only have had -- in
6 any set of four, we would only have had one who was on
7 the four-hole trial, okay? So in any of the set of four
8 that we had there, it would only have been one of them.

9 Q. For those animals that weren't drinking -- in
10 other words, they didn't drink for a period of time but
11 they ultimately got a gallon of water before the 36
12 hours was up, the reason those animals were delaying
13 drinking had to do with the electricity?

14 A. Yes.

15 Q. Okay.

16 A. That's our conclusion.

17 Q. And would you say then it's logical to
18 conclude that those animals were stressed because of
19 getting shocked by the electricity or fear of the
20 electricity?

21 MS. MERCER-LAWSON: Object to the form.
22 Vague. Outside the scope. Go ahead.

23 A. They -- my observation is that they didn't
24 drink. As to whether they were stressed, all those
25 other things -- there are things you can do to measure

1 for stress and what have you, and I'm not sure we did
2 that with these. There were other cases where we looked
3 at that, the stress cortisol and other things.

4 Q. I understand that but you believe that cows
5 that are getting shocked are stressed?

6 MS. MERCER-LAWSON: Object to the form.
7 Vague.

8 A. Again, it's going to depend upon -- I'd have
9 to go back and look. There's literature that I'm
10 recalling and it's going to be literature or tests that
11 have done blood samples and looked at that in terms of
12 whether an animal is under stress.

13 There were some other experiments done prior
14 to this by -- I think it was Gorewit and Dan -- I can't
15 think of her name right now. But that did look at that,
16 put the electrodes on the udder, and I think they
17 found -- I'd have to go back and look at that. That's
18 the way to measure whether or not the animal is
19 stressed.

20 Q. Do you know -- I mean, you're an electrical
21 engineer. You're not a --

22 A. I'm not an animal scientist.

23 Q. Okay. So do you know what stress is
24 generally? They talk about heat stress.

25 A. There's a whole bunch of different kinds of

1 stress. I know -- heat stress, I'm familiar with and
2 reduction of milk production with that.

3 Q. And then there's comfort issues --

4 A. Comfort issues.

5 Q. -- and/or get poked with something. Is it
6 logical that a cow that's getting shocked is stressed?

7 MS. MERCER-LAWSON: Objection. Outside
8 the scope of --

9 A. I'm saying there are ways to measure that in
10 terms of hormone levels and I think some of that has
11 been done and there's been some indication that there
12 can be stress at higher levels, as I recall. I'd have
13 to go back and look at that.

14 Q. Okay. So all right. Let's move on to your
15 paper here then. I want to go to page 1 and the authors
16 are listed there.

17 A. Yes.

18 Q. Which of those handled the statistics?

19 A. The person that handled the statistics is
20 acknowledged on page 2 -- oh, you're looking at page 1.
21 In the acknowledgements, Ted Rounsaville was the person
22 who was dealing with the statistics. From Animal
23 Science had their own statistician that dealt with
24 all -- I don't know, they dealt with all of it.

25 Q. He handled it, not you?

1 A. I did some of the calculations of things
2 that he said we should do. But he handled the
3 statistics.

4 Q. Do you know what statistical model he chose?

5 A. I think we looked at just -- the model we
6 chose for this was a comparison of the -- the assumption
7 that the cows were on the -- I don't know if it was
8 assumption or reality but that the cows were on the
9 decline in the lactation cycle.

10 Q. Well, they weren't at 44 days.

11 A. Okay. I don't know what --

12 Q. They weren't at 44 days.

13 MS. MERCER-LAWSON: Form.

14 Q. You're familiar with the lactation curve?

15 A. Yes.

16 Q. Would you agree with me that typical peak
17 occurs in the 60 to 90 day range?

18 A. I'm not an expert on lactation curves but
19 I -- that sounds like what I've heard before.

20 Q. So if a cow entered this --

21 A. On the 40th?

22 Q. -- 44 days here, that cow is on the way up to
23 peak and not past the peak.

24 A. Yeah.

25 Q. You agree with that?

1 MS. MERCER-LAWSON: Form. Outside the
2 scope.

3 Q. Do you have the question --

4 A. I don't know whether we had lactation curve
5 data on these or not. That would have been something
6 Gorewit could address but that looks like that was on
7 the way up, yeah.

8 Q. And the animals that you had in this were --
9 ranged from 44 to 120 days in milk.

10 A. Yeah. They averaged 71 days in milk.

11 Q. And 71 days -- 71 days is right in peak or
12 not quite, 60 to 90 days.

13 A. That's what they were. The data is -- the
14 data shown there is 44 to 122 days.

15 Q. So the average you say was 71 days?

16 A. That's what average, 71 days with a range of
17 44 to 122.

18 Q. The average wouldn't be on the way down; it
19 would be either on the way up or maintaining peak for a
20 period of time?

21 MS. MERCER-LAWSON: Form, outside the
22 scope.

23 Q. Correct?

24 A. I'm not an expert on lactation so -- that's
25 a question for my friend, Ron Gorewit. I can tell you

1 what my knowledge of the experimental plan was that --
2 the analysis was to combine the last two days -- last
3 two weeks and the first two weeks and compare it against
4 the middle three weeks.

5 Q. Okay. So all right. Let me see if I have
6 this straight because --

7 A. So that model would say that -- in
8 prediction that, that they -- that model would be used
9 if you were on the downside of the lactation curve.

10 Q. But I thought what you did, at least as
11 reported in this paper, was to eliminate the first week
12 completely?

13 A. We did eliminate the first -- did we
14 eliminate the first week? Maybe we did. We eliminated
15 the first week.

16 Q. I'm trying to find out what you did.

17 A. I'm trying to remember.

18 Q. Well, I can --

19 A. Let me --

20 Q. Maybe it would be simpler if I went through
21 it with you.

22 A. Yeah, let's do that. It should say what we
23 did. I thought I'd gone through this.

24 Q. Here, I'm going to withdraw the question and
25 move on. I can't have you --

1 A. Okay.

2 Q. We got to get out of here. Going to page 2,
3 you've -- and this is typical, is that you go through
4 the history of what's known about the certain problems
5 and then you quote from it, and I wanted to focus on
6 paragraph 2 there for a moment where --

7 A. Okay.

8 Q. -- it says: Feeding behavior were modified
9 and escape behaviors employed in an increasing fashion
10 from 1 milliamp to 5 milliamp and that's Norell '83?

11 A. This is the second paragraph? We're on page
12 2, is it?

13 Q. Page 2, second paragraph, in the middle.

14 A. Average thresholds?

15 Q. Next sentence.

16 A. Oh, Norell. (Witness reading.)

17 Q. And some animals responding at 1 milliamp.

18 So --

19 A. Yep.

20 Q. -- the literature -- and this is
21 peer-reviewed published literature that supports the
22 fact that the animals were having behavior responses at
23 current levels as low as a milliamp?

24 A. Yeah, Lefcourt's work.

25 Q. And Norell?

1 A. Norell did some, you're right, from 1 to 5
2 milliamp increasing current. He increased currents from
3 1 milliamp to 5 milliamps. Okay. Yeah.

4 Q. And going to the bottom or towards the
5 bottom, the second-to-the-last paragraph right before
6 the word Objectives, the statement is made: As milk is
7 87 percent water, it is imperative that lactating cows
8 obtain adequate supplies of water for milk production,
9 correct?

10 A. Yeah.

11 Q. And then the last sentence: Proper water
12 intake is also necessary for normal feed intake. Is
13 that something that you agree with today?

14 A. That's something that was written by Gorewit
15 and I agree with that.

16 Q. Okay. It's not -- neither of those are
17 debatable points in science, correct?

18 A. I don't know.

19 Q. Well, proper water intake --

20 A. You need proper water intake and you need
21 the proper amount of food. The last thing -- the -- the
22 indication of water intake and feed intake, proper
23 intake, water intake, and also is necessary for a normal
24 feed intake. I guess that's true.

25 Q. Well --

1 A. True for all of us.

2 Q. -- if you don't drink enough water -- the cow
3 doesn't drink water, it's not going to produce milk.

4 MS. MERCER-LAWSON: I was just getting
5 in a form objection. Incomplete
6 hypothetical. Go ahead, Doctor.

7 A. Yes, you need to drink water to make milk.

8 Q. If the cow doesn't eat, it's not going to get
9 proper nutrition.

10 A. That's right.

11 Q. The idea here is that those two things are
12 not something that scientists debate about.

13 A. Those two facts.

14 Q. They're accepted?

15 A. The last statement was water and feed
16 combination --

17 Q. Yeah.

18 A. -- is something that I'm not sure is
19 obvious --

20 Q. Okay.

21 A. -- to me as a layperson, but that's --

22 Q. All right. Then you refer in the last
23 sentence on the objectives. It says: The effect on
24 animal health and reproduction are described elsewhere,
25 and you cite Gorewit, et al., and that would be at

1 87-8035?

2 A. That's the companion.

3 Q. That's the companion study from the same
4 test?

5 A. Yes.

6 Q. Okay. And what you were doing for this
7 particular paper was drinking behavior, consumption, and
8 drinking patterns, quantity and quality of milk,
9 nutritional intake and animal health and reproduction?

10 A. Yes.

11 Q. So going to page 3, you used 15 first-calf
12 heifers and 15 second to fourth lactation cows.

13 A. Mm-hmm.

14 Q. You selected those or somebody selected those
15 from the herd. Who did that selection?

16 A. That was Ron Gorewit's team.

17 Q. And those animals were transported in sets of
18 four or less to the LARTU for the experimental period,
19 correct?

20 A. That's correct.

21 Q. When you did the first four animals, Gorewit
22 went over there and picked these cows and heifers out,
23 the first four?

24 A. He gave -- he didn't go out and go into the
25 Animal Science pens and say, I want this one, this one,

1 and this one. He gave some information about what he
2 wanted for cows for this experiment to the people at the
3 farm and they went through the records and provided --
4 my understanding is that they provided those to him.
5 They may have given him a selection to look at.

6 Q. His criteria were what?

7 A. His criteria was that they should have been
8 in --

9 Q. Well, it's stated there. I don't want to
10 leave you in suspense. It says, the last sentence of
11 the first paragraph says: Animals were selected based
12 upon, one, their stage of lactation.

13 A. There you go.

14 Q. Two, previous health and productions, more
15 than 40 days in milk; three, no history of significant
16 health problems, and, four, milk production greater than
17 20 kilograms per day.

18 A. Good.

19 Q. You were looking for animals that were more
20 than 40 days in milk at the start of the two-week
21 period?

22 A. Mm-hmm. That's what it says.

23 Q. You're willing to accept cows that were on
24 their -- in the two-week period preceding, they were
25 increasing production -- if they were less than 90 days,

1 they would be increased, or at peak at the beginning of
2 the experiment. Unless they were 120 days in milk, in
3 which case they'd be on the way down.

4 A. Yeah, I don't -- it is what it says.

5 Q. Okay. I do have it. Do you have the ages of
6 these animals or where are the statistics for this?
7 University still have them?

8 A. I doubt that they have them at this point.

9 Q. Okay. Did you ever see the statistics, the
10 data?

11 A. I didn't see the statistics in terms of the
12 selection. That was handled by the Animal Science team.

13 Q. So it would have been Gorewit, not you?

14 A. Yeah.

15 Q. You were more involved in just setting up the
16 electrical aspects?

17 A. And the collection of the data.

18 Q. And so the animals, they were milked twice a
19 day?

20 A. Correct.

21 Q. And who did the milking?

22 A. We had a -- Linda Price for the most part.

23 Q. Who?

24 A. Linda Price.

25 Q. Did she do both -- they were done on 12-hour

1 intervals. Was she doing the morning and evening
2 milking?

3 A. As I recall, yes.

4 Q. She did all the milkings for all the animals?

5 A. I can't tell you that for sure.

6 Q. They were milked at the place where they were
7 getting shocked?

8 A. That's correct.

9 Q. And so they used what, a -- was it an
10 automatic milker, bucket type thing?

11 A. A bucket milker.

12 Q. But it was automatic?

13 A. Automatic, yeah.

14 Q. They weren't milked by automatic --

15 A. No, no, it was a regular --

16 Q. Was it a portable unit?

17 A. Portable unit.

18 Q. And it had a vacuum hose?

19 A. And a vacuum hose.

20 Q. And the bucket was taken and the milk was
21 weighed?

22 A. That's correct.

23 Q. So you had production records for individual
24 animals?

25 A. For each milking.

1 Q. For each milking. But then you also had
2 totals, and the idea was to have two weeks pretreatment,
3 three weeks treatment, and then two weeks post
4 treatment?

5 A. That's right.

6 Q. And the idea was to compare whether or not
7 there were any changes?

8 A. Correct.

9 Q. And then you did a bunch of charts at the
10 end. And then there's a schematic diagram attached to
11 this and that's on page 11, right? Figure 1?

12 A. Correct.

13 Q. It's 11, yes. And the transformer you were
14 using, was that an isolation transformer?

15 A. Yes.

16 Q. So in the upper left-hand corner where it
17 says Transformer (0-4 volts), that was an isolation
18 transformer?

19 A. Yes.

20 Q. And it wasn't grounded?

21 A. That's correct.

22 Q. The metal mat was grounded?

23 A. The metal mat was on the floor and grounded,
24 was --

25 Q. And so then the cow was -- the water was

1 there in a little sort of semi-circle there?

2 A. Yeah.

3 Q. And you were measuring from the mouth to the
4 rear hooves?

5 A. That's correct.

6 Q. And then you were getting -- applying certain
7 voltages? You were able to calculate cow resistance and
8 also determine current?

9 A. Yes.

10 Q. So --

11 A. We had a water meter on the waterline.

12 Q. Meter on the waterline. Now, the waterline,
13 that would be a parallel path?

14 A. No.

15 Q. Well, the water came from somewhere.

16 A. Yeah, there was a 50-foot hose, garden hose
17 that connected to the water system to isolate that.

18 Q. The water itself would be a parallel path?

19 A. The water would be a parallel path.

20 Q. And --

21 A. But a very high resistant path.

22 Q. Right, but, you know, under the normal
23 thing --

24 A. Yes.

25 Q. -- the current is going to take all paths in

1 reverse order of resistance or there's some rule of
2 electricity that's says that. It's going to take all
3 paths that are available?

4 A. Yes.

5 Q. So the metal mat, what was that made of,
6 metal?

7 A. Metal mat was actually -- this was a set of
8 rods that went across and when the cow defecated, it
9 went through those rods, down into a holding container
10 for the waste, and then that container was removed
11 periodically to get rid of that but -- so it had slots
12 in it.

13 Q. So then it had some -- it did have
14 100 percent surface contact with it because there were
15 spaces in between where the urine and feces would go
16 down?

17 A. That's correct.

18 Q. So this was not an experiment to get current
19 through all four but instead just the two rear hooves?

20 A. Yes. For cow comfort reasons, we had to
21 have some matting in the front part.

22 Q. Okay. Let's go to page 4.

23 A. Page 4. Okay.

24 Q. It was divided into a two-week pretest
25 period, three-week treatment period and two-week

1 posttest period?

2 A. That's right.

3 Q. You gave five treatments with 0, 5, 1 --

4 A. .5, 1, 2, and 4.

5 Q. And you -- you were using 60 hertz?

6 A. Yes, that's what it says.

7 Q. Okay. Now, if the four animals were in
8 there, did one of the four get 0 or did -- because you
9 got five things you're trying to test and only four
10 spots.

11 A. That's right.

12 Q. So were there times when you would test and
13 none of the four cows got zero?

14 A. I think that's the case. That has to be a
15 time -- so we have five treatments. Back to the 30
16 animals, we have to do six runs. Yeah, I think that's
17 true, yes.

18 Q. You can only do four --

19 A. Yeah, I don't --

20 Q. So how were those treatments determined?
21 Were they randomly assigned or were they predetermined
22 how many -- which treatments are given to a group of
23 cows or heifers would get? Who made that decision?

24 A. That was made by Ron, by Dr. Gorewit and the
25 statistician, and I'm not sure how they did that.

1 Q. Was there the same number of zero tests as 1,
2 as 2, as 4 or .5 or don't you know?

3 A. All cows received one of the treatments.

4 Q. Okay.

5 A. Not all cows. A cow received a treatment.

6 Q. Okay.

7 A. And at one time we could only do four
8 treatments -- at any one time you could only do four
9 treatments, and I don't recall exactly how we set that
10 up so that we got through all of the 30 treatments that
11 we had to do. But obviously we weren't doing all five
12 treatments every time.

13 Q. Right.

14 A. We were only doing four.

15 Q. Right. And so when four animals would go in,
16 somebody decided which treatments they were going to
17 get?

18 A. That's right.

19 Q. Do you know how that got decided?

20 A. I don't recall how that got decided other
21 than on the Animal Science side.

22 Q. I don't see that explained in here. That's
23 the reason I'm asking.

24 A. Yeah, I don't either so --

25 Q. Okay. All right. Then the thing that causes

1 me to think that you added two animals was that
2 second-to-last paragraph there on page 4.

3 A. Yeah.

4 Q. There were eight experimental sessions. The
5 last session was planned for two animals but actually
6 had four animals, two of which were replacements for
7 animals from previous sessions that had to be dropped
8 from the study because of injuries and sickness.

9 So that's different than not drinking water
10 for 36 hours. Do you agree with me on that?

11 A. That's right.

12 Q. So there was two -- the two animals were
13 taken out of the study in the initial 36 hours or around
14 that time because they wouldn't drink. So now we're
15 down from 30 to 28?

16 A. Yes.

17 Q. And I think you said those animals were not
18 replaced but then --

19 A. They were not replaced.

20 Q. But then at the end, two animals were
21 replacements for animals from previous sessions that had
22 to be dropped because of injuries or sickness; is that
23 true?

24 A. Yes, I guess. I don't remember that.

25 Q. Okay. Well, I'm just reading what it says.

1 A. Yeah.

2 Q. Injury or sickness is not the same as not
3 drinking water.

4 A. Yeah.

5 Q. I think your testimony is that those two, two
6 heifers that didn't drink for 36 hours, they went back
7 to drinking and weren't affected.

8 A. That's right.

9 Q. They were just completely removed from the
10 experiment.

11 A. Yeah.

12 Q. Correct?

13 A. Correct.

14 Q. They didn't rejoin the group; is that
15 correct?

16 A. That's right.

17 Q. So when we -- what happened then was that
18 somewhere two -- one of the sessions, two or maybe one
19 or more -- two heifers were lost, which brings your
20 total animals down to 28, and then at some other
21 session, two other animals had to be removed, and then
22 they were replaced at the end with two more animals.

23 A. Yes.

24 Q. So we're still at 28 animals?

25 A. Yeah, we still had the 28.

1 Q. You never actually got back to 30 animals --

2 A. That's right.

3 Q. -- that were tested?

4 A. 30 animals were tested but two of them were
5 removed.

6 Q. And there was two of the 28 --

7 A. There were two other but there were
8 replacements for those, so we're back at 30.

9 Q. So the data for the two animals that had to
10 be removed for injuries or sickness, was that data not
11 included?

12 A. No, that was included. The two animals that
13 were removed? Was that included?

14 Q. Yes.

15 A. No, because I think they were removed well
16 before we got into the -- well, I don't remember exactly
17 what the injuries or sicknesses were for those two but
18 they were obviously taken out for those injuries and
19 sickness.

20 Q. Well, I mean, it wouldn't be unusual for --

21 A. They could have fallen down and had a cut or
22 whatever, but there was something going on with a couple
23 of them and they took them out and just put in two for
24 them.

25 Q. There were no cows with clinical mastitis

1 going in, as far as you know?

2 A. As far as I know.

3 Q. A lot of the animals developed mastitis while
4 they were in the treatment; isn't that true?

5 A. I'd have to look at the data for that. Did
6 we do mastitis in this one? That would be in the
7 following analysis.

8 Q. No, but if the cows were identical, was the
9 treatment stopped and then they're removed --

10 A. If they had mastitis?

11 Q. Yeah.

12 A. Not that I know of.

13 Q. Were they given treatment?

14 A. They were given treatment.

15 Q. But stayed in the study?

16 A. Stayed in the study. That would be my --
17 that's stuff that was done by the Animal Science people,
18 and I'm guessing as to exactly how we did that; okay?

19 Q. All right. So --

20 A. I may have known at one time but I don't
21 recall at this point.

22 Q. It says daily values were averaged by week?

23 MS. MERCER-LAWSON: What page are you
24 on?

25 MR. BIRD: I'm on page 5, second

1 paragraph.

2 BY MR. BIRD:

3 Q. And comparisons were made between these
4 weekly averages to determine differences between the
5 animals, correct? Did I read that correctly?

6 A. Where are you?

7 Q. Page 5, second paragraph, last sentence.

8 A. Daily values were averaged by week.

9 Q. Then going to the next paragraph is where
10 this issue on week 1 comes up?

11 A. Water consumption.

12 Q. It says week 1 of all animals, for all
13 voltages, is significantly higher than almost all the
14 other weeks. And there was an increase in water intake
15 for almost all animals, particularly heifers during
16 their first week in the LARTU and is presumed to be part
17 of the adjustment period; therefore, data from week 1
18 was not used as part of the pretest baseline, only data
19 from week 2 was used.

20 A. Yes.

21 Q. Okay. So what you had then was not -- your
22 data was not two weeks pretest, it was one week pretest?

23 A. One.

24 Q. And two weeks post test?

25 A. Right, and three weeks of test.

1 Q. When this was published in the Journal of
2 Dairy Science, it was described as ten and a half days
3 pretest and ten and a half days posttest. How did that
4 happen? Where did that change come from?

5 A. I don't know. That was probably made by
6 Gorewit and Rounsaville in terms of doing their
7 analysis.

8 Q. I mean, those numbers don't really -- because
9 you got 14 and 14 days. At the Journal -- I mean, did
10 you just decide to switch the statistics from one week
11 and two weeks at the end to ten and a half days
12 before and --

13 MS. MERCER-LAWSON: Object to the form.

14 A. It sounds like --

15 Q. You got to let me finish my question. She's
16 going to object to the form.

17 MR. MERCER-LAWSON: First of all --

18 Q. I want to get my question out before she
19 objects. Listen to my question. Let her object and
20 then you can answer; okay? All right.

21 So what you just described to me was we had
22 an initial experiment and two weeks pretest and two
23 weeks posttest, three weeks of test and a total of
24 seven. In this paper, 3034, it's stated that statistics
25 from week one were not included so now we're evaluating

1 statistics from one week pretest, three weeks test, and
2 two weeks posttest. Do you have that in mind?

3 A. Yes.

4 Q. Then in the Journal of Dairy Science article
5 what you said is you had statistics, you evaluated them
6 for ten and a half days before and ten and a half days
7 after. Do you know how that happened?

8 MS. MERCER-LAWSON: Object to the form
9 and perhaps you'd like to show him the Dairy
10 Science article.

11 MR. BIRD: I'm sorry, what?

12 MS. MERCER-LAWSON: Perhaps you'd like
13 to show him the Dairy Science article you
14 referred to.

15 BY MR. BIRD:

16 Q. Do you remember that happened?

17 A. I don't remember that that was how --

18 Q. Let me show it to you?

19 MR. BIRD: Why don't we mark 30352 at
20 the same time.

21 (Exhibit 622, "Effects of
22 Neutral-to-Earth Voltage on Animal Health and
23 Reproduction in Cattle," 87-3035, marked for
24 identification, this date.)

25 (Exhibit 623, "AC Voltages on Water

1 Bowls: Effects on Lactating Holsteins,"
2 marked for identification, this date.)

3 BY MR. BIRD:

4 Q. So I'm going to go to -- just in order to
5 answer this question, I'm going to get off of 3034 for
6 the moment and just show you where the ten and a half
7 days come from. The Journal of Dairy Science article,
8 what exhibit is that?

9 A. 623.

10 Q. Okay. Exhibit 623 is Journal of Dairy
11 Science, 1989, 72:2184-2192, and I'm on page 2185, left
12 column, bottom where it says: "The experimental period
13 was divided into three periods, 10.5 day pretest
14 period -- "

15 A. Sorry, what page are you on?

16 Q. 2185. It's the second page.

17 A. Yeah.

18 Q. Left column, bottom.

19 A. Yep.

20 Q. Okay.

21 A. See it.

22 Q. It says: A ten and a half pretest period, a
23 21-day treatment period and a ten and a half day
24 posttest period. How did that occur?

25 A. That was a decision made by the statistician

1 and Gorewit.

2 Q. So is that what happened?

3 A. This is a process where we present a paper
4 at the ASAE conference and get feedback on it, and I
5 don't know what the feedback was, whether it was
6 feedback on that part of the process or not. When it
7 came time to write this, Rounsaville and Gorewit decided
8 to change the periods that we were comparing. I don't
9 know what the reason for that was exactly.

10 Q. Well, nobody ever told you? I mean, what ten
11 and a half days before did you pick?

12 MS. MERCER-LAWSON: Foundation, asked
13 and answered. Go ahead.

14 MR. BIRD: It's not asked and answered.

15 Q. The ten and a half days just before the
16 treatment period or was it the first ten and a half
17 days?

18 A. No. My understanding was it was the ten and
19 a half days prior to the start of the treatment, ten and
20 a half days after the treatment.

21 Q. So you -- what was lopped off then for each
22 period that was not treatment was the beginning, three
23 and a half days of pretest was taken off, that data, and
24 then at the backside, three and a half --

25 A. The three and a half days added -- there

1 were three and a half days added in the beginning
2 because we were getting rid of the first week. We just
3 did the first week in the ASAE paper. We're in the
4 second week in the ASAE paper. So they added three and
5 a half days there and they took three and a half days
6 off of the backside.

7 Q. But you had data from all two weeks before
8 and data for two weeks after?

9 A. That's right.

10 Q. And the final article then was based upon ten
11 and a half days before and ten and a half days after and
12 you don't know the reason why that was done?

13 A. I think it's ten and a half days and ten and
14 a half days at each end and I --

15 Q. To balance it out?

16 A. To balance it out, but I don't know. The
17 answer to your question is I don't know or I don't
18 recall.

19 Q. All right. So now looking at the authors of
20 Exhibit 623, none of those authors is a statistician?

21 A. No. But, again, you'll find in the
22 acknowledgements Rounsaville's name.

23 Q. I don't think there's anything in here to
24 indicate there was a statistician that was involved.
25 Wait, at the end --

1 A. At the end, Rounsaville, for his guidance in
2 analyzing the data. He was the in-house statistician
3 for Animal Science.

4 Q. The study was financed by the groups that are
5 listed there?

6 A. Yeah. I can go through this if you like.
7 What page again?

8 Q. Page 2192, the acknowledgements at the end?

9 A. The Empire State Electric Energy Research
10 Corporation, the Wisconsin Electric Utility Research
11 Foundation, and the New York State Agricultural Research
12 Experiment Station.

13 Q. And do you know if that was the statistician
14 that told him to do it that way or was it somebody from
15 the Journal of Dairy Science on a review told them to do
16 it that way?

17 A. I don't know.

18 Q. Now, the same statistician, Rounsaville, he
19 was the statistician for 3034, right?

20 A. Yes.

21 Q. You didn't change statisticians?

22 A. No.

23 Q. Now, for the two animals that were removed
24 for sickness or injury that we talked about, were there
25 placeholders put in to -- for them or not?

1 A. I don't recall.

2 Q. When those animals were removed, was -- how
3 did you account -- if you did have replacements, how did
4 you account for the water consumption? You were
5 measuring that --

6 A. Individually.

7 Q. Okay. Individually?

8 A. Yes. There was a water meter on each of the
9 stalls.

10 Q. I know but if there was no animal in the
11 stall, then they weren't drinking any water.

12 A. There wasn't any water available.

13 Q. I'm just wondering how the statistics were
14 handled. Was it divided by the same number or did you
15 decrease --

16 A. Every stall -- every water bowl had its own
17 water meter, so if there was a cow in the stall that was
18 drinking, we were monitoring the water consumption. We
19 didn't -- we didn't monitor total water consumption for
20 all cows. We monitored individually for each stall.

21 Q. What about the water that had been consumed
22 by those animals up until the time they were removed?

23 A. They were not -- that's not -- didn't get
24 included.

25 Q. It didn't get included?

1 A. No. They weren't part of the study.

2 Q. And their milk production wouldn't have been
3 included either?

4 A. No.

5 Q. Okay. Let's go back to 3034. You can go to
6 the bottom of page 5. I'm just reading from the bottom
7 last three lines: The other 28 animals drank but the
8 time taken to begin drinking directly related to
9 voltage. There is not a significant difference between
10 0 and .5 volt but there are significant differences
11 between zero and all other voltage levels.

12 A. Correct.

13 Q. So that the delay in drinking is something
14 that had a significant difference when voltage was
15 applied?

16 A. Yeah, I think that was one of the findings
17 of the --

18 Q. If a cow doesn't drink, it's not going to
19 make milk?

20 A. That's correct.

21 Q. And if a cow, you know, doesn't drink for 35
22 hours as opposed to 36 hours, it's -- there's an
23 interruption in its milking. Do you know enough from
24 the science to say whether or not that cow is going to
25 have reduction in milk production as a result of that?

1 A. It's certainly going to have reduction in
2 the milk production in the short-term.

3 Q. Sure. Okay. So that -- and that's what you
4 found here?

5 A. Yes.

6 Q. And the farmers are in a slightly different
7 situation. You were monitoring when they were starting
8 to drink but the farmer, with a herd of animals, unless
9 he's got an eyeball on every animal, isn't going to know
10 what cows are refusing to drink?

11 MS. MERCER-LAWSON: Form. Assumes facts
12 not in evidence. Incomplete hypothetical.
13 Foundation. Go ahead.

14 A. Repeat the question, please.

15 Q. Typical farmer, you've got a hundred cows and
16 he brings them into a parlor twice a day to get them
17 milked. He's not out there watching what every
18 individual cow is doing with respect to drinking?

19 A. Absolutely.

20 Q. If that cow is getting a milliamp and that
21 particular cow isn't drinking, he's not going to know
22 it. He's going to find out when he brings that cow into
23 the parlor and all of a sudden milk production is down,
24 but he doesn't at that point in time know the cause of
25 that?

1 MS. MERCER-LAWSON: Form. Compound
2 hypothetical. Assumes facts not in evidence.
3 Foundation. Go ahead.

4 A. I'm not quite sure what the question -- when
5 the cow comes into the parlor and the milk production is
6 down, you want to find the reason for it. And --

7 Q. It might be the cow didn't drink?

8 A. If you're not monitoring current and water
9 bowls, not monitoring water that each cow is drinking,
10 you don't know whether or not that's a factor in it.

11 Q. Correct. That's true, right?

12 A. Or any other factor, yeah.

13 Q. Right. In this particular study, you folks
14 just happened to be watching when the cows started
15 drinking but that's not a normal on-farm thing that
16 farmers do. They're not out there watching when their
17 cows are drinking water.

18 MS. MERCER-LAWSON: Object to the form
19 and to counsel's testimony. Go ahead and
20 answer the question.

21 A. I'm not sure what that has to do with the
22 study.

23 Q. I'm not either. I'm asking a question how
24 that gets related and how the findings of this get
25 related to the real world.

1 A. This gives us an idea of when a cow begins
2 to receive current.

3 Q. Right. What I'm trying --

4 A. You can follow it through to see at that
5 level, does it affect water consumption?

6 Q. You found a significant difference between
7 zero and all groups, except for .5, in terms of the
8 delay in starting milking, correct?

9 A. The delay in --

10 Q. Starting drinking.

11 A. In starting drinking. We found out how
12 long -- when we made the change from control period to
13 the treatment period, and we look at it for the -- all
14 the stages, we compared how long it took for them to
15 drink the first gallon of water, and there was a
16 correlation between that, the length of time, and the
17 magnitude of the treatment.

18 Q. Did any of these cows that you tested have
19 shocks leading out to parturition or calving?

20 A. We're in the position of the farmer I think
21 at that point. How do we know?

22 Q. Do you think that the Cornell herd had stray
23 voltage, a problem with stray voltage?

24 A. I don't know of any that they had.

25 Q. Was it ever tested? Did you ever test the

1 facilities?

2 A. I think we -- I don't recall. But I think
3 we certainly, when we went out to do the full lactation
4 studies, we did a variety of tests to make sure there
5 was no background stray voltage.

6 Q. But not --

7 A. I don't know that we did that prior to this.

8 Q. Are you aware of any study that tested
9 animals where in the pre-calving period, the animals
10 were getting electrical shocks; they were getting
11 electrical shocks immediately upon giving birth; and
12 then continued to have shocks for 365 days after that
13 time, minimum?

14 A. No, I can't recall any.

15 Q. The study you like to refer to as the New
16 Liskeard study came closest to that. Do you remember
17 that study?

18 A. I recall that.

19 Q. The New Liskeard study, they started applying
20 shock at some point after calving, and do you know how
21 many days after calving --

22 A. I haven't -- I haven't looked at that study.
23 I'd have to review that. But I remember the New
24 Liskeard study, yes.

25 Q. You were communicating with that fellow up

1 there in Ontario, weren't you?

2 A. I think Ron Gorewit was communicating.

3 Q. That wasn't you?

4 A. I don't recall.

5 Q. So in terms of conclusions, the impedance are
6 in line with reported body impedances for cows. I'm on
7 page 7.

8 A. Yeah.

9 Q. Go to page 7. So number 1 -- I'm on
10 number 1.

11 A. Yeah.

12 Q. They received shocking currents that are in
13 line with reported body impedances, correct?

14 A. Yeah.

15 Q. The amount of water consumed does not change
16 with voltage treatment in those animals that drank,
17 correct?

18 A. Yes.

19 Q. I want to ask you about that but there were
20 two that didn't.

21 A. That's right.

22 Q. Of those animals that drank, they didn't
23 drink -- there were some that didn't drink for a period
24 of time but then resumed drinking at pretreatment levels
25 after that?

1 A. Yes.

2 Q. Does your statement here in number 2 mean
3 they drank enough that they made up for but they missed
4 or are you just simply saying that they resumed drinking
5 at the same level?

6 A. I think both of those things happened.

7 Q. Both of what things happened?

8 A. They resumed drinking and within the milking
9 period, got enough water in. Whether they had a long
10 enough delay that it was going to affect milking
11 production over the short-term.

12 Q. But they would have lost milk production when
13 they weren't drinking.

14 A. If they didn't drink for a long enough
15 period, yes.

16 Q. So some animals will not drink from an
17 electrified water bowl, because of a cow and heifer that
18 refused to drink for 36 hours during a 4 volt treatment;
19 is that true?

20 A. Yes, that's what it found.

21 Q. That it was your belief that animals adapt to
22 voltage in different ways at different voltage levels.

23 A. Yes.

24 Q. So item 5, that milk production is not
25 significantly reduced by voltage as might be expected as

1 there is no difference in water consumption; however,
2 there is a trend towards more animals having significant
3 reductions and there being larger reductions with
4 increased voltage. Is that a true statement?

5 A. Yes.

6 Q. Okay. The number of animals were too small
7 and the variation in milk production too large to find
8 significant differences.

9 I'm having trouble understanding that last
10 sentence. Do you understand it? Can you explain it to
11 me?

12 A. That was -- I think we had such large
13 variations in the differences that for the short periods
14 that we looked at, there were -- we had some, at least
15 in the analysis that we had done here, had trouble
16 finding significant differences in the milk production.

17 Q. So what are you saying? Your --

18 A. I think part of this is -- part of this
19 study is what led us to the full lactation study.

20 Q. Okay.

21 A. There were some indications that were saying
22 there was no difference in milk production but there
23 were variations in the short-term that caused some
24 significant differences in that -- in the variation that
25 didn't allow us to pick out where the milk production

1 changes occurred. I think that's what we're saying.

2 Q. But there were changes in milk production.

3 A. Yeah, I think that's what we're saying.

4 There were changes in milk production.

5 Q. It wouldn't be truthful to say there weren't
6 changes in milk production?

7 A. The statistics lead you to believe that but
8 there were large variations, so that's what that
9 statement is about is that, yeah, we can show some
10 time-wise temporal variations, large -- over the large
11 run. Those temporal variations were affected by the
12 initial changes in the amount of water that they drink
13 and over the long-term those variations affected the
14 whole process of trying to find significant differences.

15 Q. And I'm trying to maybe draw a fine line
16 here. The study showed that there were large variations
17 in milk production according to the level, increasing
18 level of voltage; isn't that true?

19 A. It showed there are differences in milk
20 production, part of which were in the model that was
21 used in terms of comparing the end result -- the two
22 control periods before and after to the averages for the
23 whole period.

24 Q. Right. And --

25 A. But if you looked at short -- week 1, week

1 2, week 3 of the production period, there were -- there
2 were cases where you could be -- you could be able to
3 show but overall, in the end with that, there was -- and
4 with the model that was used, that we were not seeing
5 significant differences in milk production for the whole
6 experiment.

7 Q. Well, and that's because of the strength of
8 the -- it was inconclusive then?

9 A. Yeah.

10 Q. You didn't reach a conclusion that there
11 wasn't a change in milk production --

12 A. We showed differences in milk production
13 over the initial -- during the different time periods of
14 the test period.

15 Q. Right. During the treatment period?

16 A. During the treatment period, but if we
17 looked at it overall, where some of those initial
18 changes, caused by the fact that they didn't drink for
19 long periods of time between the treatments, showed
20 initially there were some reductions in milk production.

21 Q. So you're showing a more dramatic decline
22 with ever increasing voltage in this study, correct?

23 A. Yes.

24 Q. Except that what you're saying is that the
25 experiment as was set up wouldn't permit you to conclude

1 that it was true that you would have an overall, because
2 of the statistical model that was chosen?

3 A. Because of the statistical model that we
4 chose and the way the data was analyzed for the whole
5 period, you could draw the conclusion that there was no
6 significant difference in -- in the long-term, the three
7 week period, with the milk production.

8 Q. It's true then that the best you can conclude
9 from this is while we found significant changes in milk
10 production, they were not statistically significant
11 because of the model that we chose?

12 A. I don't know whether it was the model or
13 whether it was the variation that we had in all the
14 milk. I think my explanation, it was the variation that
15 we had would allow that.

16 Q. My point is that it wouldn't be truthful to
17 say we didn't see changes in milk production. You
18 couldn't make that flat statement?

19 A. I don't think we made that flat statement.
20 We showed the changes in the graphs and what have you,
21 compared and showed there were periods of time where
22 there were significant differences in the milk
23 production during the different weeks.

24 Q. So if someone was testifying about what you
25 concluded here, it wouldn't be truthful to say that this

1 study concluded there was no decrease in milk production
2 related to voltage. The best that could be said is we
3 couldn't conclude one way or the other?

4 A. No, I think we could conclude for the total
5 period of three weeks, that the animals drank enough
6 water over the latter part of it to begin to make up for
7 what it lost at the beginning.

8 Q. But the milk production still went down?

9 A. It went down, yeah, and -- but for a short
10 period of time.

11 Q. Once it went down, it kept going down, right?

12 A. No, it went back up. It varied between
13 cows.

14 Q. You have a graphic in here that shows this?

15 A. I have the graph that shows it.

16 Q. And I don't see -- let's go to that graph.
17 First of all, before I get there, one of the references
18 was Bodman and Stetson. Those are two credible
19 scientists from Nebraska?

20 A. That's correct.

21 Q. And in fact Stetson was one of your
22 collaborators in the full lactation study, wasn't he?

23 A. That's -- no, he was on the -- he was in the
24 Red Book.

25 Q. Oh, in the Red Book?

1 A. Yeah.

2 Q. Let's go first to page 10. So I've gone
3 through this and calculated and you can do the same, if
4 you like. I can give you a calculator but --

5 A. I've done these calculations. I know what
6 you're going to show me.

7 Q. But if we're going current maximum and at the
8 1.15, the resistance there was 434. Would you agree
9 with me that my arithmetic --

10 A. Sorry, which one? Heifers .5, 1.15 were
11 below 500.

12 Q. Below 500. And 1.0?

13 A. Is 250.

14 Q. 250. And then the 3.0 is 304?

15 A. It's about a third so, yeah, somewhere in
16 that.

17 Q. And then the 12.18 at 4 volts is 328 ohms?

18 A. Yeah.

19 Q. Then if we go down to the cows, I'm just
20 going to read off those numbers for .5, it's 385. The
21 1.0 is 346. The 2.0 is 254 ohms. And the 4.0 is
22 331 ohms?

23 A. Mm-hmm.

24 Q. None of those animals are above 500, correct?

25 A. Yeah, these are one second measurements.

1 Yeah, that's correct.

2 Q. And so -- I mean, and anybody can do that
3 just by doing the calculations for Ohm's Law. You can
4 do it for the minimums, too?

5 A. Yeah.

6 Q. And when you get to the minimums, you have a
7 few that are -- I guess the majority are over 500 but
8 there's still some --

9 A. Yeah.

10 Q. -- that are less than 500 ohms?

11 A. Yeah, that's what it says.

12 Q. So I don't understand table 2. Can you
13 explain that?

14 A. Well, that's looking at the ratio of animals
15 with significant declines and it shows a broad pattern
16 of declines in between week 2 and week 3 treatments.

17 Q. Week 2 was no voltage. Week 3, 4 and 5, they
18 got voltage --

19 A. Yeah.

20 Q. -- right? And then they didn't get any
21 voltage on 7 and 8?

22 A. Yeah, and that's just looking at the raw
23 data.

24 Q. When it says zero out of 6, what does that
25 even mean? There's six animals that got zero -- that

1 got zero treatment in week 3?

2 A. So zero, it says, out of 6 for -- at zero
3 voltage the -- there were no significant differences.
4 At 4 volts, for which half of them showed significant
5 differences, and at the third week, again half of them
6 showed significant differences in the zero treatment.

7 Q. What kind of threw me was this asterisk for
8 4 volts because it says it includes two animals which
9 stopped drinking. I thought you told me that those
10 numbers weren't included but now it's saying --

11 A. Yeah. So --

12 Q. -- they didn't drink anything.

13 MS. MERCER-LAWSON: Can you read back
14 the question?

15 (Whereupon, the pending question was
16 then read back by the Reporter.)

17 A. I -- so what we're saying is 1 and 4
18 showed -- let's forget about the two animals that didn't
19 drink. Because within a day and a half of week 3, they
20 were out of the study, because they didn't drink for a
21 day and a half.

22 Let's just look at the first ones. One out
23 of the four animals that were left showed a significant
24 drop in the first week, three out of four in the second
25 in week 4, and three out of four in week 5.

1 Then in parentheses after the one out of
2 four is three out of six, because it's obvious that the
3 two that were taken out of the study had signif -- would
4 have significant difference in production.

5 Q. Okay, I got it.

6 A. I added those in. The numbers go up by two
7 for each one of those because if we're going to look at
8 those two that stopped drinking, they obviously had
9 significant differences in milk production. So if we
10 include those two, then we get the three out of six,
11 five out of six, five out of six.

12 I put those in to include what was obvious
13 in terms of those two cows were going to have
14 production --

15 Q. It's you that did the asterisk thing?

16 A. Yeah. I put those in just to demonstrate
17 that obviously not only one out of four but -- so there
18 were two other ones that obviously would have had
19 reduction in milk production even if we let them go onto
20 drink most probably. So I have those in there just to
21 highlight that they were part of the study that we could
22 talk about in terms of milk production.

23 Q. So if I can go to figure 2B on page 12,
24 please. So in the Water Consumption 0 Volts compared to
25 Water Consumption All Animals All Voltages, there are

1 quite significant differences between 0 volts in terms
2 of water consumption and all animals all voltages.

3 Would you agree with me there?

4 A. So we're comparing week one, figure 2B with
5 figure 2B. Is that your question?

6 Q. Well, all seven weeks are represented there,
7 Dr. Aneshansley, for both charts and you can compare
8 them however you want, but I don't see any of the all
9 voltages animals ever returning to that level that they
10 had in week 1. But maybe you can show me where that --
11 it doesn't appear to me to be true based upon that
12 chart.

13 MS. MERCER-LAWSON: Form, compound.

14 A. No, and I think part of that is that
15 adjustment period to the -- this includes that week 1,
16 which we talked about, as an adjustment period.

17 Q. Sure, but the adjustment period for the zero
18 volts was --

19 A. It doesn't show the same increase that were
20 shown in the other ones.

21 Q. Right. So the animals that had zero volts
22 never went down close to where the voltage animals went
23 down to and in fact --

24 A. So the drop from week 1 to week 2 is not
25 during a treatment period.

1 Q. I got it.

2 A. And if we take that as the -- a prediction
3 of water consumption that stays -- the only thing
4 significantly different from it is the week 1.

5 Q. No, all the rest of the weeks, it seems to
6 me, are higher at zero volts than at --

7 A. The averages for weeks 2, 3 and 4 are lower
8 than at week 1.

9 MS. MERCER-LAWSON: Form, argumentative.
10 Go ahead.

11 Q. I'm seeing week 2, 3 and 4 being averaged at
12 somewhere around the 24 and a half gallon.

13 A. They're almost all the same average, hardly
14 different.

15 Q. Week 2, 3 and 4 are below 23 and a half and
16 23 gallons. 2, 3 and 4?

17 A. These are different animals.

18 Q. Sure.

19 A. Okay? The week 2 --

20 Q. These are animals that got voltage and the
21 other ones are animals that didn't?

22 A. That's right, and there's a difference
23 between week 1 and week 2 in these animals.

24 Q. Sure.

25 A. And that was not a time they had

1 electricity.

2 Q. Correct.

3 A. So that was part of the argument of the
4 adjustment period to the new stalls when they came in.

5 Q. I got it.

6 A. So now you compare week 2 across and it's
7 pretty much consistent.

8 Q. It's not because zero voltage animals never
9 went down after week 2?

10 MS. MERCER-LAWSON: Object to the form.
11 Argumentative.

12 A. But they're not significantly different.

13 Q. Okay. They went down.

14 A. The averages went down, yeah --

15 Q. All voltages from week 2 --

16 A. -- but not significantly.

17 Q. Let me just finish my question. They went
18 down in week 3, they were lower in week 4, and they went
19 down in week 5, and they rebounded in week 6?

20 A. That's correct.

21 Q. Okay.

22 A. But none of those are significantly
23 different from one another. These are -- one is -- they
24 have to be separated -- well, they're not significantly
25 different from one another.

1 Q. "Significantly" meaning in a statistical
2 sense?

3 A. In a statistical sense. If you look at the
4 variation and the means, these means are not
5 significantly different.

6 Q. Okay. That's what -- you are saying that or
7 are you saying the statistician told you that?

8 A. I can say that by looking at the way this
9 data is plotted.

10 Q. Let's go to Delay To Drink 1 Gallon, which is
11 on figure 3.

12 A. Got you.

13 Q. And you can see an increase in the delay from
14 no treatment to .5, for 1 to 2, and then a big spike at
15 4.

16 A. Sure.

17 Q. And that's a trend. I mean --

18 A. Absolutely.

19 Q. So you were seeing significant differences
20 between delay to drink a gallon between zero voltage and
21 .5 in the voltage application; is that true?

22 A. There's no significant difference between
23 those.

24 Q. But it's showing a trend upward?

25 A. It shows a larger value but there isn't

1 any -- if you compare what they drank -- the times at
2 zero to the times at .5, there's no significant
3 difference between them. There is a significant
4 difference between zero and 1 volt, zero and 2 volts and
5 zero and 4 volts, and that's pretty obvious from that.
6 There's no overlap of these bars in any of these cases.

7 Q. Okay.

8 A. This is a good indication between a half a
9 volt and a volt, there's some kind of sensitivity to
10 that that caused their delay in drinking.

11 Q. Delay in drinking was due to the electricity?

12 A. Yeah. That's our assumption in that, yes.
13 Not assumption. That's what the data shows.

14 Q. That's what you were out to figure out?

15 A. That's where -- this has nothing to do with
16 production or data at all. This is a delay to drink.

17 Q. I got it.

18 A. This is solid data that says something about
19 sensitivity of the cow between the half a volt, 1 volt,
20 2 volts and 4 volts.

21 Q. And a cow that is delaying for -- I think
22 1 volt is just around 200 minutes or is it a little bit
23 north of that?

24 A. I'd have to go -- yeah, we can look at that.
25 So it generally took -- so 200 minutes for a volt.

1 After two minutes it was a little bigger. There's a
2 difference between 1 and 2, but when you got to 4 volts
3 we're talking about an average value which is up about
4 850 or thereabouts, 850 minutes.

5 Q. And as high as 1,100 minutes?

6 A. And as high as 1,100 minutes.

7 Q. Okay. So you're saying -- I mean, I don't
8 know if that roughly describes something that's kind of
9 logarithmic in terms of --

10 A. It's typical. We've got a somewhat
11 logarithmic scale at the bottom, .5 to 1 is a doubling,
12 1 to 2 is a doubling, 2 to 4 is a doubling.

13 Q. I got it. If we can move to the next chart,
14 the Number Of Drinks at 0 volts and --

15 A. Yeah.

16 Q. -- and Drinking Time?

17 A. Yeah.

18 Q. So you have the same scales for the other
19 animals, correct?

20 A. Same scales? I don't know what you mean by
21 "scales."

22 Q. I mean, if I'm going to go to zero volts,
23 number of drinks, all animals, and go to the next page,
24 the number of animals at .5 volts, you're going to
25 see --

1 A. The scales on the sides are all the same.

2 Q. The scales are the same?

3 A. I think so, all of these, yeah.

4 Q. What we have here for weeks 1 and 2 is that
5 those animals --

6 A. Where are we looking?

7 Q. On page 14.

8 A. Okay.

9 Q. Number Of Drinks, All Animals, 0 volts.

10 A. Yeah.

11 Q. Those animals were not drinking as often as
12 the .5 volts -- drinking less often than the .5 animals.

13 A. These are somewhere in the range of 40 and
14 these are kind of -- yeah. In the control period they
15 took a lot of drinks for some reason, much more than
16 what we had in the control period for the zero and those
17 are basically the same thing.

18 Q. And then the drinking time --

19 A. Drinking time was down and the drinking time
20 is up for those zero -- time and number is kind of how
21 much they drink. In the control period they weren't
22 drinking -- the time that they drank was not as long as
23 the zero and they drank more times. And during the
24 control period, what we had was they took longer to
25 drink but they drank fewer times in the treatment

1 period.

2 Q. Are you ascribing this then to just
3 variations between cows?

4 A. No, I think that part of this is the
5 adaptation to the treatments. They took longer drinks
6 and less frequently under the treatments. That's what I
7 would look at in terms of this, and when you came back
8 to the amount of water that they drank, that was pretty
9 even between what we saw.

10 This is -- I don't know what we can draw for
11 it other than to see there are different strategies that
12 one can use in terms of dealing with things that have --
13 that are perceived.

14 Q. Go to page 19, Milk Production.

15 A. Okay.

16 Q. Milk production for the cows with zero volts
17 compared to the milk production for the cows at all
18 voltages.

19 A. Page 19?

20 Q. Yeah.

21 A. So the second week, we have the little trend
22 down.

23 Q. Both of them are trending down in the first
24 two weeks?

25 A. Yeah.

1 Q. Both the zero volts --

2 A. But they tended to drink more during that
3 week number 1, which might have something to do with the
4 production for number 1. Again, looking at week 2 as
5 compared, they've adjusted now.

6 Q. So if you eliminate week 1, the zero -- the
7 zero volts cows started out at an average of something
8 like 30 and a half kilograms and the --

9 A. 29. Well, week 1, they were 30 but we're
10 going to neglect that.

11 Q. Yeah.

12 A. So they're at 29 and a half.

13 Q. 29 and a half and the no voltage cows were
14 north of 31?

15 A. And the -- so these scales are the same, so
16 the -- all the cows under voltage were at a little over
17 31.

18 Q. Right.

19 A. Yeah.

20 Q. Well, actually for the voltage cows they were
21 over 32 -- or over 31. And the voltage cows continued
22 to go down with some flip up in week 6?

23 A. Yeah.

24 Q. And they went down all the way to an average
25 of something in the area of --

1 A. 28.

2 Q. -- approximately 28 kilograms and the no
3 voltage cows were about 29 kilograms?

4 A. Yeah.

5 Q. The no voltage cows did better in terms of
6 milk production at least compared to the all voltage
7 cows, right?

8 A. Yeah, according to this data. That could be
9 related to other things as well. Lactation period.

10 Q. It could be related to lactation period,
11 sure. So I mean, the heifers, it's comparing the zero
12 volts. They actually went up in week 2, continued to go
13 up in week 3, and then started declining; whereas, the
14 voltage cows went down in week 3 and continued to go
15 down and then stabilized and went up a little bit in
16 week 6 and 7 after the treatment was over?

17 A. But the variation in that all said that none
18 of those were significantly different.

19 Q. Then let's go to figure 11 because this is
20 the one that holds my interest.

21 A. Okay.

22 Q. And I think if I were to compare zero volt,
23 starting at zero, that's the top line you see?

24 A. Yeah.

25 Q. And then the other lines are showing what's

1 happening over time with the voltage animals.

2 A. Yeah.

3 Q. That being the .5 volts, the 1 volt, 2 volts,
4 and 4 volts, those lines are declining over time faster
5 than the zero volt animals. Do you agree with that?

6 A. We didn't do any curve fitting on this but
7 it -- you got some variations in the milk decline that
8 are up and down.

9 Q. Sure, they are, but the voltage animals are
10 holding their milk in this period where they're, you
11 know, later lactation. Where they're expected to be
12 going down, the voltage cows seem to be going down
13 faster.

14 A. These declines would indicate that there's a
15 difference between the zero and the 1. I don't know
16 whether there's a significant -- whether that's
17 significant or not. I can't tell from this.

18 Q. What I'm saying is that you're seeing a --
19 let me tell you how I interpret it and see if you agree.
20 What we're seeing is that in later lactation than the
21 normal lactation curve would be going down, the one with
22 the voltage is going down faster, on average.

23 A. Well, we don't know what the lactation
24 curves are, what -- okay. Give me that statement again.

25 MS. MERCER-LAWSON: Can you read it

1 back?

2 MR. BIRD: No, I'll restate it.

3 Q. I think the explanation you folks have
4 given -- I think it's in the report but also in your
5 testimony that you've given on this is that the
6 production -- the animals that were tested had
7 reductions in milk production, at least in part that was
8 inspected -- expected because they were after peak milk?

9 A. Yes.

10 Q. And that's I think what you had testified to.
11 Would you agree with that?

12 A. Yes.

13 Q. And what I'm saying is that with voltage, the
14 production seems to be going down faster with the
15 voltage than it does with zero volts, according to this
16 graph?

17 MS. MERCER-LAWSON: Objection to form,
18 vague.

19 A. According to this graph, yeah, but we don't
20 know how the lactation curves are going down for each of
21 these animals as well.

22 Q. What I'm saying is it wouldn't be truthful to
23 interpret your study as saying there was no declines and
24 no production according to voltage. The best that could
25 be said is that there were declines in milk production

1 but they weren't statistically significant?

2 MS. MERCER-LAWSON: Object to the form.

3 A. I think that's what we said, isn't it?
4 That's what the conclusions were.

5 Q. I've had people tell me and respected people
6 tell me that this study stands for the proposition that
7 there's no decline in milk production from 0 to 4 volts.
8 Between zero volts and application of voltage --

9 MS. MERCER-LAWSON: There's no question
10 pending.

11 Q. Okay. And I don't think that's a fair
12 interpretation of this study and you agree with me on
13 that?

14 MS. MERCER-LAWSON: Misstates prior
15 testimony.

16 A. I think the conclusion we got from this was
17 that one really needed to do more tests and that's what
18 led us to the full lactation study.

19 Q. It was an inconclusive study as it relates to
20 milk --

21 A. It wasn't particularly inconclusive. There
22 are a lot of things that delayed drinking was a pretty
23 strong, I think, conclusion that between .5 volts and
24 1 volt there was some sensitivity that the cows had to
25 that, and that it continued further on up.

1 There also shows that -- the fact they
2 didn't drink for long periods of time had an impact
3 on -- an immediate impact on the significant --
4 significant changes in milk production and overall for
5 the full three-week period, the -- there was no
6 significant difference that we could see to the model
7 that was used and -- but at the same time, the variation
8 in all of this might have been the reason -- the
9 variation that we got due to all these short-term
10 changes may have been significant to keep us from seeing
11 a significant overall change.

12 Q. Okay.

13 MS. MERCER-LAWSON: Would it be a good
14 stopping point for a 5, 10 minute?

15 MR. BIRD: Let me finish this line.

16 BY MR. BIRD:

17 Q. I'm just looking at your graph here on
18 figure 11.

19 A. Yeah.

20 Q. And it's telling me that the curve for the --

21 A. For volt 1 --

22 Q. For zero volts is above the rest of the line
23 at the end of the day and that the others are below it
24 and --

25 A. There's one that pops there above it.

1 Q. It pops up but then it goes back down again.

2 A. Which one was that? That was the -- I think
3 that's the 2 volt one. That was the 1 volt.

4 MS. MERCER-LAWSON: What's the question,
5 Counsel?

6 MR. BIRD: Pardon me?

7 MS. MERCER-LAWSON: Is there a question?

8 MR. BIRD: Yeah.

9 BY MR. BIRD:

10 Q. The question is simply that if I were to look
11 at this graph without having some explanation about
12 statistics and the power of the model to show anything
13 or validity, that it looks to me like application of
14 voltage makes things drop faster in late lactation --

15 MS. MERCER-LAWSON: Form, compound.

16 Q. -- agreed?

17 A. If that's the only thing you look at, the
18 declines appear to be greater with voltage, but there
19 are other factors that need to be taken into account in
20 doing a statistical analysis of this.

21 Q. So it wouldn't be truthful to say you didn't
22 see changes in milk production. You would have to say
23 you didn't see changes in milk production that were
24 statistically significant. The latter would be a
25 truthful statement. The first one wouldn't?

1 MS. MERCER-LAWSON: Form, compound,
2 asked and answered. Go ahead.

3 A. I think we're talking about long-term versus
4 short-term.

5 Q. I'm talking about this study.

6 A. This study. With the model that we used --
7 that was used on it, it said there was no significant
8 difference in milk production.

9 Q. Statistically?

10 A. Statistically significant, yes. Okay.

11 Q. The data in itself showed a decrease in
12 production. It's just you didn't have the power to make
13 it statistically significant.

14 A. That's a possibility.

15 Q. Well, that's the truth.

16 MS. MERCER-LAWSON: Form, argumentative.

17 A. I don't know whether that's the truth or not
18 until we do -- until we do more experimentation.

19 Q. I'm just trying to describe what this study
20 shows.

21 A. Okay.

22 Q. Standing alone, before you did your full
23 lactation, it is something that if you were to look at
24 it, that data would be concerning enough, because you're
25 seeing those declines in production, that it caused you

1 and Professor Gorewit to say, we got to do something
2 more long-term to sort this, and it wouldn't be truthful
3 to report this as showing no reduction in milk; isn't
4 that true?

5 MS. MERCER-LAWSON: Form, compound.

6 Misstates prior testimony. Asked and
7 answered. Go ahead.

8 A. Statistically it shows no significant
9 difference in the production. It also shows wide
10 variation and it shows that there's need for more
11 numbers, but that this is a study that took a year-plus
12 to do. Getting more numbers is always an issue so I
13 think that's why we went to the full lactation study.

14 Q. All right. That's all I got. 624, I want to
15 get this marked and identified.

16 (Exhibit 624, Transcript pages
17 2899-3292, PSC of Wisconsin hearing, 4/15/88,
18 marked for identification, this date.)

19 Q. Do you recognize that this is the testimony
20 that you and Professor Gorewit gave to the Public
21 Service Commission of Wisconsin on April 15th of 1988?

22 A. That's what it says it is.

23 Q. You can flip through it and make sure it
24 looks like what you recall.

25 A. I'm not sure what I recall from 1988.

1 Q. They called you both?

2 A. Yeah, I remember being there.

3 Q. This is a transcript from it that we've been
4 provided.

5 A. Yeah.

6 Q. I asked you if this looks like the testimony
7 you gave, you and Professor Gorewit gave?

8 MS. MERCER-LAWSON: Are you asking him
9 to verify its completeness?

10 MR. BIRD: Pardon?

11 MS. MERCER-LAWSON: Are you asking him
12 to verify its completeness?

13 MR. BIRD: I'm asking him to verify if
14 that's what it is, start to finish. Go to
15 the last page and see that they're done.

16 THE WITNESS: Are we talking now?

17 MS. MERCER-LAWSON: I think -- what's
18 the question? I think it's a little vague.

19 A. I have a recollection of where the 10 and a
20 half days come from. You add 10 and a half and 10 and a
21 half and it comes to 21. That gives a comparative
22 period to the 21 days of treatment.

23 Q. Sure. I understand.

24 A. So that's --

25 Q. Does that appear to be --

1 A. I see it has Aneshansley and Gorewit there.
2 Appears to be the record.

3 Q. Okay. All right. I may not ask you any
4 further questions on that. I just wanted to get that
5 confirmed. I wanted to move to the second part --

6 A. What were you trying to get confirmed?

7 Q. That this is the transcript of the testimony
8 you gave in 1988, and I think what you're saying is that
9 it appears to be that testimony that you and Professor
10 Gorewit gave, right?

11 MS. MERCER-LAWSON: Foundation.

12 A. It appears to be.

13 Q. Now we've marked 3035. That's 3035?

14 A. Yes.

15 Q. What exhibit is that?

16 A. 622.

17 Q. I want to ask you a couple questions about
18 it. This is part of that same study and reports on some
19 different findings.

20 A. Animal Health and Reproduction In Cattle.

21 Q. I think you told me that all the cows were
22 healthy and didn't have clinical mastitis going in,
23 correct?

24 A. If that's what this says, that would have
25 been something that the animal scientist people took

1 care of. I didn't collect that data.

2 Q. A lot of the animals in the study became --
3 they showed clinical mastitis, correct?

4 A. I've got to look at this back here. I just
5 was going to go back and look at the -- it shows number
6 of clinical mastitis. So there were one in the pretest.
7 2, 4. There were 5 out of 14, it looks like there, and
8 there were 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. I don't know
9 whether those are 11 different cows or if they're
10 just -- they are certainly cases of mastitis.

11 Q. Well, this says there were 51 cows. I'm not
12 sure -- let me just ask you a question here. I'm
13 looking at page 8 -- page 2.

14 A. Page 2.

15 Q. Looking in the paragraph right before it says
16 Statistical Analysis?

17 A. Yeah. (Witness reading.) Yeah, okay.

18 Q. It says: Milk samples from cows showing
19 clinical mastitis were routinely cultured for bacterial
20 identification and subsequent antibiotic sensitivity
21 testing. Cows with mastitis were treated for four
22 consecutive milkings with the appropriate antibiotic for
23 the affecting organism. After this interval, their
24 recovery was further evaluated. Those cows not
25 responding completely were retreated until the clinical

1 signs were no longer present.

2 A. Okay.

3 Q. What does that mean they were "retreated"?
4 Does that mean they were given more antibiotics?

5 A. Yeah, that would be my interpretation of
6 that, but this is not part of what I was involved with
7 doing. So I -- that's how I would read that; that they
8 continued some kind of antibiotic treatment with that
9 but I don't know that for a fact.

10 Q. Were they kept in the study?

11 A. Yeah. That would -- it's kind of indicated,
12 I think -- they tracked them through the study.

13 Q. I think you have testified that -- well,
14 first of all, one of the reasons for conducting the
15 study was to determine whether or not cows that got
16 electricity would get mastitis?

17 A. Well, that was part of this study, yeah.
18 Part of this evaluation was to look at animal health,
19 and animal health --

20 Q. But then you later testified that the set-up
21 you had was a perfect storm for getting mastitis because
22 they couldn't lay down like they would normally in a dry
23 stall and had to lay down on the metal grate?

24 MS. MERCER-LAWSON: Form. Misstates
25 prior testimony.

1 A. That is not part of what I was involved with
2 the study. I mean, this is Gorewit's interpretation of
3 the -- what happened in the study, okay? So I don't
4 know what.

5 Q. But the point I'm making, if you're trying to
6 study whether or not you get mastitis, you don't want to
7 set it up so you create conditions to get mastitis --

8 MS. MERCER-LAWSON: Form, calls for an
9 opinion outside the scope.

10 Q. -- correct?

11 A. I would --

12 Q. Well, can you answer that question?

13 A. I don't know that I can answer that. If you
14 want to study mastitis, you might want to set it up so
15 you have cases of mastitis. I don't know if that
16 occurred here.

17 Q. You wouldn't -- however, healthy, which means
18 when they entered --

19 A. Yeah.

20 Q. -- and that means they didn't have clinical
21 mastitis?

22 A. Yeah.

23 Q. And then cows, when they were in the study,
24 developed clinical mastitis, right?

25 A. Apparently, yes.

1 Q. And they developed clinical mastitis when
2 they were on voltages?

3 A. Mm-hmm.

4 Q. But then the excuse for that was: Well, we
5 set it up so they would get mastitis because this metal
6 grate didn't let them lay down, and it was like, you
7 know -- if you could set things up to create mastitis,
8 this would be the way to do it?

9 MS. MERCER-LAWSON: Form, compound.

10 Vague. Misstates prior testimony. Go ahead.

11 Q. Is that what happened?

12 MS. MERCER-LAWSON: Same objection.

13 A. I don't know that I could answer that
14 question.

15 Q. Okay. Let me --

16 A. That's not part of what I was involved with
17 in setting this up.

18 Q. All right. Let me just -- do you have that
19 transcript in front of you?

20 A. Transcript. Which transcript?

21 Q. The one I just had you take a look at. That
22 testimony, wherever that is. Right there. If you go to
23 page 3127 --

24 A. Got it, I think.

25 Q. Are you there?

1 A. I'm there.

2 Q. And the question by one of these farmers was:
3 And also you would agree that -- starting on line 10 --
4 as you just said, mastitis is mastitis, cows have it, so
5 the record showed, and I'm sure you agree, then -- and
6 do you agree, I'm sure -- or do you agree? That 27
7 percent of the cattle that went on your test had
8 mastitis at the beginning or during the test period?

9 And Professor Gorewit said: I can't recall.
10 I'd have to look at the paper.

11 Question: 10 out of 28 kind of comes out to
12 27 percent.

13 And Professor Gorewit said: That's what you
14 read there.

15 Question: And, of course you have to
16 agree --

17 Answer: May I make a comment?

18 And the Commissioner said -- the questioner
19 said: Absolutely.

20 Commissioner Edgar said: Go ahead,
21 absolutely.

22 And then the answer here starting on line 25,
23 3127: We are giving these cows these voltage
24 treatments. The cow is standing on a metal grid. We
25 use no bedding. It's probably the worst case scenario

1 with regard -- I mean, if mastitis is going to come up,
2 it's going to come up. So they have to make electrical
3 contact on that mat.

4 In other words, when they touch the nose to
5 the pole, they're completing a circuit from the nose to
6 the rear hooves. And in order for that circuit to be
7 completed, we have to have contact resistance as low as
8 possible.

9 A. They're all Gorewit.

10 Q. I know they're Gorewit. But that was his
11 testimony; that somehow the presence of the metal grid
12 without bedding increases the incidence of mastitis.

13 MS. MERCER-LAWSON: Misstates what the
14 document says. Go ahead.

15 A. I'm not a mastitis expert.

16 Q. Okay. But this study concluded there were no
17 adverse health effects, except that the incidence of
18 mastitis went up, but according to you and Professor
19 Gorewit, it went up because of the metal grid, not
20 because of the voltages.

21 A. And that could be the truth. That is the
22 truth according to --

23 Q. Professor Gorewit?

24 A. -- Professor Gorewit.

25 Q. But he's the guy that testified for years and

1 years in favor of utilities at numerous trials. You
2 were aware he was doing that?

3 MS. MERCER-LAWSON: Form, argumentative.

4 A. At some point I was aware that he was doing
5 that.

6 Q. Okay. The incidence of mastitis is laid out
7 there on page 4 of 3035.

8 A. Page 4, yeah.

9 Q. Okay. I'm just pointing it out to you. I
10 don't have any question about it. Going to Reproductive
11 Performance on page 5, the first paragraph, it says:
12 Two of the 10 heifers displayed normal reproductive
13 cycles.

14 Do you see that statement?

15 A. Two of the ten heifers had normal
16 reproductive cycles, okay.

17 Q. Does that mean 8 out of the 10 did not
18 display normal reproductive cycles?

19 A. I don't know. I didn't monitor reproductive
20 cycles. He says something about what the other two did
21 right below that, didn't he?

22 Q. The third paragraph there: One cow out of 14
23 showed a normal reproductive cycle. This cow was in the
24 zero volt treatment group. Three cows did not cycle.
25 One was in the 1.0 volt group, two cows were in the 2.0

1 volt group. Two animals in the .5, one in the 1 volt,
2 and one in the 4 volt group displayed irregular
3 reproductive cycles, and one of the goals -- I read that
4 correct, right?

5 A. Yes.

6 Q. One of the goals was to determine whether or
7 not reproduction was affected by this short-term study.
8 According to what you wrote there, there were some
9 changes in reproduction but at the end it's reported
10 that there were no changes statistically significant in
11 reproduction.

12 MS. MERCER-LAWSON: What's the question?

13 Q. Is that what you reported out from this?

14 A. This is what -- all this reproductive stuff
15 is what Gorewit reported on.

16 Q. Okay.

17 A. I didn't report this out in particular. I'm
18 the one here because I set up the electrical stuff for
19 the equipment. I'm not a animal physiologist.

20 Q. Okay. So that wasn't your part of this?

21 A. The evaluation of that was certainly not
22 anything I had any influence over or did any collection
23 of data, and those would be better questions for him.

24 Q. I know this has been marked before but it's
25 the Red Book. I want to give you a copy and I don't

1 know what exhibit to call it. Do you know?

2 MS. MERCER-LAWSON: No, I don't.

3 MR. BIRD: I'm going to mark it again.
4 I hate cluttering the record with paper but I
5 have to do it.

6 (Exhibit 625, "Effects of Electrical
7 Voltage/Current on Farm Animals", marked for
8 identification, this date.)

9 BY MR. BIRD:

10 Q. Do you recognize this as the Red Book?

11 A. I recognize this as the agricultural
12 handbook number 696, the Effects of Electricity, Voltage
13 and Current on Farm Animals.

14 Q. The one question -- there's many questions I
15 have about this but I just want to get it out of the
16 way. I haven't seen any evidence that full lactation
17 studies were referred to or relied upon in this book.

18 A. I thought I checked that. Maybe I misread.
19 (Witness reading.) So on page 3-13, it says: Cornell
20 University: Researchers exposed 40 cows in group of 10
21 (2nd to 5th lactation) to 0, 1, 2, or 4 volts for a full
22 lactation.

23 Q. Is that a reference to the full lactation
24 study?

25 A. I think it is.

1 Q. I didn't see it in the bibliography.

2 A. It may be in there simply because we're in
3 the middle of it. It's not in the bibliography?

4 Q. No.

5 A. We may have done it and not finished
6 analyzing the reporting of that.

7 Q. If you can see it in the bibliography -- I
8 don't see it there, but you're saying what's on 3-13,
9 that's a reference to it?

10 A. That's a reference to it. That's probably a
11 reference because -- if it's not in the bibliography, we
12 hadn't reported it. But we were in process. It was
13 there, for the record. I don't see it. I don't see it
14 either. Let me look. No, I don't see it in the
15 bibliography.

16 Q. If I can go to page 3-14 --

17 A. Mm-hmm.

18 Q. -- there's a listing of some symptoms a
19 farmer should look out for?

20 A. Yep.

21 Q. And on Behavior, it would be excessive or
22 unusual nervousness in milking parlor or stall barn at
23 milking?

24 A. Mm-hmm.

25 Q. It would include reluctance to enter and/or

1 eagerness to flee the milking parlor, correct?

2 A. Well, I'm -- you're jumping around.

3 Q. I'm just going to the next --

4 A. The next one, yeah, okay.

5 Q. They are italicized.

6 A. Yes.

7 Q. And up at the top of the next column:

8 Increased frequency of defecation and/or urination in
9 the milking parlor?

10 A. Yes.

11 Q. The last thing is reluctance to consume water
12 or feed, correct?

13 A. Yeah. These are symptoms attributed to
14 stray voltage.

15 Q. They're things you're telling farmers to look
16 out for, based on observations?

17 A. I don't -- I'm not sure what we're -- these
18 are certainly some things that have been reported.

19 Q. It says: The following are the most common
20 symptoms reported in field observations.

21 MS. MERCER-LAWSON: What's the question?

22 A. Where does it say that?

23 Q. Do you see where it says Symptoms Attributed
24 to Stray Voltage?

25 A. Yes.

1 Q. The sentence just before that.

2 A. Yeah, okay.

3 Q. So what you're reporting there is what the
4 field observations are telling you and you're attempting
5 to list those for people that are interested; that these
6 are things you -- that -- field observations associated
7 with stray voltage?

8 A. Yeah. This is what Gorewit is telling.

9 Q. It's not you; it's Gorewit?

10 A. Yeah.

11 Q. But you signed off on it?

12 A. I signed off on it, yeah. I --

13 Q. Gorewit, is he also telling you about the
14 milking characteristics?

15 A. This is a section that he wrote and I think
16 I've seen other literature that related to this, so
17 milking characteristics is something that is his
18 bailiwick. He's a lactation physiologist.

19 Q. Then he's saying: Poor milk let-down,
20 incomplete milk-out, which in parentheses (leaving
21 abnormal amounts of residual milk in one or more
22 quarters) and increased milking time are common symptoms
23 noted by dairy farmers having stray voltage/current
24 problems, right?

25 A. That's what it says.

1 Q. Then in the -- I'm just going to talk to you
2 about the italicized paragraphs that follow. These
3 things are poor milk let-down or incomplete or uneven
4 milk-out, right?

5 A. Yeah.

6 Q. Increased milking time?

7 A. Yeah.

8 Q. Production performance?

9 A. Mm-hmm.

10 Q. You have to answer out loud and say yes.

11 A. Yes, sorry.

12 Q. Increased somatic cell count and incidence of
13 clinical mastitis?

14 A. Yes.

15 Q. Lowered milk production?

16 A. Yes.

17 Q. Now, this is the chapter that you and
18 Professor Gorewit wrote?

19 A. Yes.

20 Q. According to you, it has continued validity
21 to date and is trusted by scientists in the field,
22 right?

23 A. I think that they are reported. This says
24 the things that have been reported and these are
25 symptoms attributed to stray voltage, and I think that's

1 still happening, but I'm not sure what this is -- this
2 is a report of problems that people think they have.

3 Q. Sure, but, I mean, it's things that they're
4 based upon observations in the field?

5 A. I'm sure people -- yeah.

6 Q. Okay. So now I want to just go real quickly
7 to the figure 3-4 on 3-22. Where you have the line,
8 that dotted line that goes at an angle --

9 A. Yeah.

10 Q. -- is there some kind of -- is that just like
11 an absolute line or are you indicating that's sort of a
12 generalized belief; you can have some losses before or
13 above?

14 A. We were trying to come up with a
15 representation of how we might show what was known at
16 that particular point in time, and my contribution to it
17 was the -- basically the behavioral response and milk
18 production response, current and voltage being the
19 general axes, and then we set the -- the whole group sat
20 down and tried to figure out a way to put it in that
21 form, and this is what we ended up with.

22 Q. Okay. Well, I was trying to figure out, what
23 did you put in there? I mean, you know --

24 A. What did I put in there? This was a
25 consolidation of what the whole group put together as a

1 product in terms of how we're going to break up
2 behavioral response.

3 Q. If I were to go to a farmer and say, hey, you
4 got 4 milliamps --

5 A. Okay.

6 Q. -- and the behavioral response was perception
7 only --

8 A. No, 4 milliamps would go out to that line
9 and you'd be in the moderate area.

10 Q. 1 milliamps is in the moderate area. That's
11 moderate for behavioral and if I had -- if I was a
12 farmer and I had 7 milliamps but didn't have severe
13 behavioral response, then I wouldn't have a problem. I
14 wouldn't have any production loss.

15 MS. MERCER-LAWSON: Form, compound. I
16 need to get my objection in. Form, compound,
17 vague. Go ahead, Doctor.

18 A. Well, I have to remember how this is
19 interpreted. So the line that comes down and hits that
20 dotted line there on the None -- let's just figure out
21 how do you interpret this again? So one would expect up
22 to 1 milliamp here, that there was no behavioral
23 response. And from 1 to 3, Perception Only.

24 So where those two lines connected to the
25 dotted line give you the range of -- tell you what the

1 current is and what people thought were the perception
2 levels.

3 Q. So right on the next page you're writing that
4 Norell found behavioral problems at 1 milliamp and then
5 on this chart it says that 1 milliamp, you can't get --

6 A. It says it can be perceived.

7 Q. Okay.

8 A. I can go back and look at Norell again.

9 Q. So go to page 3-23 and go up to the
10 right-hand column.

11 A. Okay.

12 Q. And it starts at actually the bottom on the
13 left-hand column: Minnesota researchers found --

14 A. 323?

15 Q. 323, bottom: Minnesota researchers found
16 that mouth opening is a specific, current-elicited
17 response for the mouth-to-all-hooves pathway. No
18 responses were observed during control (no current)
19 trials; specific avoidance responses were exhibited,
20 13.8 percent of the time at 1 milliamp of current,
21 30 percent of the time at 2 milliamps, 92.3 percent of
22 the time at 4 milliamps, and 98.4 percent of the time at
23 5 milliamps.

24 How does that statement there square with
25 your chart there? I can't fit what's written on 323

1 into your milk production chart.

2 A. I have to go back and look at what the
3 avoidance response was exhibited.

4 Q. See, the problem is lawyers, when they're
5 looking at this, this chart right here, they're saying,
6 look, if you're below the line, nothing happens, and
7 that's what utilities are telling their customers when
8 they --

9 A. It doesn't say nothing happened. It says
10 there's perception, and perception could be detected by
11 an avoidance behavior. So those are the kind of
12 behavioral responses you look at from perception.

13 Q. You're not going to get any loss of
14 production up to --

15 A. This study didn't show any milking response.
16 It just showed an avoidance response.

17 Q. Okay.

18 A. Turned its head.

19 Q. That means the cow --

20 MS. MERCER-LAWSON: Were you finished?

21 Go ahead.

22 A. Had a behavioral response that wouldn't
23 impact a -- our interpretation of that as a group was no
24 loss of production would be anticipated in that even
25 though there was an avoidance behavior.

1 Q. Right.

2 A. So it's a perception. So between 1 and 3, I
3 think this jives with what we have in this -- on this
4 chart.

5 Q. All right. So what I'm trying to say,
6 avoidance response for 13.8 percent of the animals -- if
7 they're avoiding the water --

8 A. It doesn't say they're avoiding water. It
9 says avoidance response.

10 Q. What are they avoiding?

11 A. I'd have to go back and look at his
12 experiment. It was a feeding type of experiment.

13 Q. They're avoiding the current, right?

14 A. Yeah, they're perceiving the current and
15 they're avoiding it.

16 Q. And if the --

17 MS. MERCER-LAWSON: Were you finished?

18 A. Current.

19 Q. If the current happened to be in the water,
20 then that would mean they're avoiding the water?

21 MS. MERCER-LAWSON: Form.

22 A. We just showed you data where there was
23 current in the water and they didn't avoid the water.
24 There were currents well over a milliamp, well over the
25 3 milliamps where they didn't avoid the water.

1 Q. Some did, some didn't?

2 A. All of them. In the end they didn't. It's
3 only when we got to 4 volts, that we got --

4 Q. Okay. All right.

5 A. I mean --

6 MS. MERCER-LAWSON: You got to let him
7 finish his answer. Go on.

8 Q. Are you talking about the water bowl test
9 that we just went through for an hour?

10 A. Yes.

11 Q. I think your testimony on that is sufficient
12 at this point. Let me just move on.

13 I -- is there any other basis for creating
14 that chart? What specific research were you relying
15 upon in creating that chart?

16 A. This chart was created by the entire group
17 and they relied on all the research that they had done,
18 research that other people had done, and this was a
19 consensus of what we thought was a good chart to
20 represent that.

21 Q. I'm trying to find out if there were specific
22 scientific studies that were relied upon in creating
23 that chart?

24 A. Sure, and I'm sure Norell was one of them.
25 Gustafson and Appleman were part of this. Norell was a

1 student of Appleman -- of Gustafson. He knew about that
2 research. He agreed with this particular chart. There
3 were other people that had done experiments along the
4 line. The whole group did experiments. They're listed
5 in this chapter -- for this chapter.

6 Q. Can you tell me which ones they are by
7 looking at the bibliography? They're not --

8 A. I don't know if I can or not. I'm not -- I
9 can't tell you exactly which -- people had opinions
10 about this and agreed to this based upon their
11 background, their knowledge of the research that had
12 been done, and this was where -- this is where we came
13 out.

14 Q. Who wrote it? Who drew it?

15 A. All of us.

16 Q. Did you?

17 A. There was a blackboard there we put up and
18 there was a conversation amongst the whole group as to
19 how we should draw these lines.

20 Q. Somebody went up, this on this axis, and then
21 we're going to draw this line, and everyone nodded and
22 said yes?

23 A. Not quite. There was more discussion that I
24 recall. This is how many years ago?

25 Q. Was this in Minneapolis that you did that?

1 A. What?

2 Q. Minneapolis?

3 A. This was in our first meeting at Cornell --

4 Q. Okay.

5 A. -- we started to put this stuff together
6 like that.

7 Q. That chart got created at the first meeting?

8 A. I'm not sure when we finalized it but it got
9 created at the first meeting, and we may have gone back
10 to it a few times to make adjustments and what have you.

11 Q. If you can go to the preface that Lefcourt
12 did?

13 A. In the beginning of this?

14 Q. Yeah. It's right at the beginning in the
15 preface.

16 A. On the back of the Red?

17 Q. No. Turn over a couple more pages. Right
18 there. It says in the first paragraph, about halfway
19 down, it says: For these reasons we met at Cornell in
20 May of '88 -- May of '88 to review our opinions and
21 concerns and to discuss the possibility of publishing a
22 white paper on stray voltage. At this meeting we
23 concluded there was an excellent possibility that a
24 consensus could be reached and a second meeting was
25 scheduled for October in Minneapolis.

1 A. Okay.

2 Q. And I think what you told me before, earlier
3 today was that the whole idea of doing the white paper
4 actually came up at an ASAE conference amongst the
5 electrical engineering folks. Is that true?

6 A. That's my understanding. David Ludington,
7 Bob Gustafson, other people who were doing stuff on
8 rural electricity and other things, threw that idea out.
9 That was my understanding of how -- the genesis of the
10 whole process.

11 Q. Then you met in -- this was in May of '88.
12 You had that first meeting and then the second meeting
13 was October of '88 in Minneapolis?

14 A. Mm-hmm.

15 Q. You're saying it was at this first meeting
16 that somebody got up on a blackboard and people were
17 talking and somebody created the X and Y axis and that's
18 how the whole chart --

19 A. That was the beginning of that chart; okay?
20 I'm positive of that because I'm the one who put the
21 thing on the blackboard with the squares and the labels
22 and what have you.

23 Q. You're the one that did that?

24 A. I did the outline of the chart; okay?

25 Q. Okay.

1 A. This is how we can show behavior. This is
2 how we show milk production, current, voltage. How do
3 we put this together to make a diagram which describes
4 the state of the world in stray voltage at this point?

5 Q. In terms of -- what I'm not seeing on there
6 is any evidence of a bell-shaped curve of what we can
7 expect. You have a sharp line that just divides it.

8 A. Yeah.

9 Q. And if you're above or below, that's --
10 you're doomed with recovering anything, if you're below
11 that sharp line that you drew on the board. This isn't
12 intended --

13 A. No.

14 MS. MERCER-LAWSON: I got to object to
15 the form. This is vague, compound, more of a
16 conversation than a question and misstates
17 testimony.

18 Q. Go to the chart on 3-22 or 22. Got it?

19 A. Yeah. 3-22, right with the chart.

20 Q. Yeah. I see a line that runs diagonally from
21 zero in the lower left-hand corner all the way up --

22 A. It's a diagonal across the graph.

23 Q. What is that line intended to be?

24 A. That gives us a point -- bring a line down
25 from the top or up from the bottom to indicate where

1 milk production -- so we got a milk production response.
2 We would expect no loss -- the comment was no loss in
3 production anticipated, and that goes up to the
4 4 milliamp line. You get above that, it says: Any loss
5 of production may not be due to changes -- any loss of
6 production is not due to any changes in animals.
7 Production, and you get up to the 6 milliamp line:
8 Production losses may be due to changes in the animal.

9 Q. Okay. But you can have production losses due
10 to stray voltage but no change in the animals?

11 MS. MERCER-LAWSON: Object to the form,
12 vague.

13 A. Above that it says they're severe change in
14 behavioral response.

15 Q. Okay. Maybe -- I just want to know where the
16 words are written, any loss in production is not due to
17 change in animals? Do you see where those words are
18 written?

19 A. Yeah.

20 Q. That's below the dotted line?

21 A. It's below the dotted line.

22 Q. Does that mean that a farmer could experience
23 loss of production from stray voltage but it wouldn't be
24 due to change in the animals?

25 MS. MERCER-LAWSON: Could you read the

1 question back?

2 (Whereupon, the pending question was
3 then read back by the Reporter.)

4 A. I think what that means is production loss
5 may be due to change in the animal. So if you get to
6 that level, you've changed the behavior of the animals
7 with the electricity such that that will produce a loss
8 in production. It won't drink. It won't eat, whatever,
9 and that's a severe behavioral response.

10 Q. I'm not in that box. I'm in the one just to
11 the left of it where it says: Any loss in production is
12 not due to change in animals.

13 A. Yeah. I think that is where we're at the
14 moderate level and the loss in production would not be
15 due to a behavioral change from the animal.

16 Q. But they still could have loss of production
17 there, correct?

18 A. Yes.

19 Q. Okay. If they had loss of production --

20 A. That relates to the behavioral response
21 being significant enough to cause problems with a
22 variety of problems associated with how production can
23 go down because you can't deal with the animals.

24 Q. So at that -- in that -- where the printing
25 exists, are you and I on the same page? I'm talking

1 about where it says: Any loss in production is not due
2 to the change in the animals.

3 A. Yes.

4 Q. Just focus on that for purposes of the
5 question. Can there be production losses due to stray
6 voltage where that --

7 A. Yes.

8 Q. All right. Now, if you just get into -- if
9 you go a little bit to the right of that, it says: No
10 loss in production anticipated.

11 In that particular area, can you have any
12 losses from stray voltage according to this chart?

13 A. According to this chart it says no loss in
14 production anticipated.

15 Q. It says it's not but, I mean, if it
16 happens -- if there's a loss of production, even though
17 it's not anticipated, can there be a loss in production
18 from stray voltage?

19 A. What the chart says is there is not a loss
20 in stray voltage, not a loss in production due to stray
21 voltage.

22 Q. That's what that --

23 A. That is what that's supposed to mean.

24 Q. That's what that means, correct?

25 A. Yes.

1 Q. And so that vertical line which is some
2 gradation of moderate response is an absolute bar in
3 proving anything with stray voltage; is that right?

4 MS. MERCER-LAWSON: I'm going to object
5 to the form and terminology.

6 Q. Do you understand what I'm saying?

7 A. I understand what you're saying and I think
8 we got to look at what the purpose of this was, is to
9 give a guideline of where -- what we were being told by
10 the data that was there at this point in time, and I
11 don't know that it's a definitive thing.

12 You talk about a bell curve. We could have
13 made this much more complicated. We were trying to make
14 it simple and give some guidelines.

15 Q. Nothing is simple for us lawyers. We see
16 those lines --

17 A. Well, we tried. I mean, I don't think there
18 was anything that was -- these were all estimates based
19 upon the best that we could come up with.

20 Q. You knew this was going to be showed to
21 juries.

22 MS. MERCER-LAWSON: Object to the form,
23 argumentative, misstates facts.

24 A. I don't know that.

25 Q. Let's go back to the preface then. And you

1 guys wrote this in response to litigation.

2 A. No.

3 MS. MERCER-LAWSON: Misstates testimony.

4 A. That's not true.

5 Q. Okay.

6 A. We wrote this as a guide to people that were
7 involved in this and what the data was showing, as best
8 we could interpret it, as to where you start -- to start
9 take action with respect to stray voltage.

10 Q. Okay.

11 A. Some people would like to have zero current
12 on the -- available, zero neutral-to-earth voltage.
13 This is a handbook.

14 Q. You go to the top of the preface: There were
15 two primary reasons for publishing this handbook.
16 First, we, as scientists, were distressed that our
17 research results were being misinterpreted and
18 misconstrued in media and in courtrooms; correct?

19 A. That's what it says, yes. I wasn't
20 disturbed by that but, yeah. Okay.

21 Q. So when the Red Book came out -- and by the
22 way, let's go to the bibliography. If you can go to the
23 back of that?

24 A. Yeah.

25 Q. Go to page 8-2.

1 A. Yeah.

2 Q. I'm counting -- I'm looking at under
3 G.R. Bodman, one, two, three, four, five articles by him
4 and others that were quoted in the bibliography?

5 A. Mm-hmm.

6 Q. So and you know Gerry Bodman?

7 A. Yeah. I knew Gerry. I met him. I don't
8 know that I know him.

9 Q. Well --

10 A. I know who he is.

11 Q. You testified in the cage trial, I think we
12 already talked about that, and he was on the other side?

13 A. Could be. I don't remember.

14 Q. I think you recognize that there are
15 reasonable, competent scientists that differed with your
16 opinions as it related to the Red Book, correct?

17 MS. MERCER-LAWSON: Could you read the
18 question back?

19 (Whereupon, the pending question was
20 then read back by the Reporter.)

21 A. There are other scientists that disagreed
22 with the conclusions of some of the Red Book, yeah.

23 Q. And they were -- there are scientists out
24 there that you would respect as having credible
25 reputations but simply disagreed with the conclusions of

1 the Red Book, correct?

2 A. Yeah.

3 Q. And Mr. Bodman was one of them?

4 A. Yes.

5 (Exhibit 626, 3/28/94 letter, Gustafson
6 to Lefcourt, marked for identification, this
7 date.)

8 A. I would just note that the Bodman articles
9 are all extension type articles. They aren't
10 peer-reviewed.

11 Q. No, but if you see 626, it's Dr. Gustafson
12 running by, you know, some of the authors of the -- on
13 the Red Book a response to Gerry Bodman's comments about
14 the Red Book; true?

15 A. Yes.

16 Q. Do you recall that controversy?

17 A. Yes, I do.

18 Q. And so that means you must have read the
19 comments on stray voltage technical issues before you
20 gave your approval to Professor Gustafson to send out
21 that letter?

22 MS. MERCER-LAWSON: Form, assumes facts.
23 Go ahead.

24 A. Yes.

25 (Exhibit 627, "Comments on Stray Voltage

1 Technical Issues", 6/22/92 by Bodman, marked
2 for identification, this date.)

3 Q. And do you recognize 627 as being the
4 comments of Mr. Bodman to the Minnesota Department of
5 Public Service that refers to -- that was discussed by
6 Dr. Gustafson in his letter back to the Public Service
7 or Minnesota Public Utilities Commission and which you
8 approved? You approved Gustafson's letter back, right?

9 A. Yeah, I contributed to it in some fashion.

10 Q. And then what he was responding to was this
11 Exhibit --

12 A. Yeah.

13 Q. -- 627? So you must have read the comments
14 by Gerald Bodman, who's an author quoted six times in
15 the Red Book, in the bibliography that discussed the
16 USDA study, correct?

17 A. Yes.

18 Q. And the first page, he's saying the recent
19 publication by the United States Department of
20 Agriculture, handbook 696, was mentioned in the
21 Minnesota PUC notice. So he was responding to that?

22 A. Yeah.

23 Q. And so you -- did you look at that and talk
24 to Dr. Gustafson and the others about Gerry Bodman's
25 comments?

1 A. I don't recall how all of the communications
2 went around that but we simply decided we knew to make a
3 response to it.

4 Q. Okay. All right. Did you, yourself, did you
5 create any kind of detailed response to this statement
6 that Mr. Bodman gave to the Minnesota Department of
7 whatever it is, Public Utilities Commission? Did you do
8 anything on your own to take a look at that or provide a
9 response?

10 A. I looked at it to provide a response to
11 Gustafson.

12 Q. Did you write anything to him or did you talk
13 to him on the phone?

14 A. I don't recall.

15 Q. And then in response to that, Mr. Bodman
16 responded to Dr. Gustafson. Are you aware of that?

17 A. I don't know that I ever saw his response.
18 I may have. This is back when, 1994?

19 (Exhibit 628, 4/6/94 letter, Bodman to
20 Gustafson, marked for identification, this
21 date.)

22 Q. Have you seen that before?

23 A. I don't know.

24 Q. That doesn't ring a bell for you?

25 A. Doesn't ring any particular bells for me but

1 there's a lot of material that goes across my desk, has
2 over the years. May have seen it, may not have seen it.
3 May not have responded to it. I don't recall.

4 MS. MERCER-LAWSON: Want to go ahead and
5 read it then?

6 THE WITNESS: Sure. (Witness complies.)

7 BY MR. BIRD:

8 Q. Does that refresh your memory?

9 A. No. This is the first time I've seen this.

10 Q. Is it true that the videotape that was taken
11 of the animals that showed such violent reactions that
12 the Research Institute's legal counsel advised that the
13 videotape be destroyed? Do you recall that?

14 MS. MERCER-LAWSON: Can you point to
15 what you're talking about?

16 MR. BIRD: Page 2, item 3.

17 A. This letter to Gustafson.

18 Q. Page 2. It says 2 at the bottom of the page.
19 You're on page 1. It's this page here -- are you
20 actually not following?

21 A. This is page 1, page 2.

22 MS. MERCER-LAWSON: Looking at
23 Exhibit 628, a letter to Gustafson dated able
24 April 6, page 3 is something very different.

25 A. Are you looking at the technical contents?

1 Q. I'm looking at something different, my
2 mistake. Let me finish this as long as you've got that.
3 Is it true on the comments that there was this -- a
4 violent reaction from the two animals?

5 A. Page 2? So it says: Each of the two
6 studies reported in USDA publications began with at
7 least two additional cows. In each instance, at least
8 two animals reacted.

9 So I don't know what two studies is he
10 talking about? Is that outlined?

11 Q. Listen, let me go onto another question.

12 A. I can tell you there were not violent
13 reactions from -- if you're referring to the two cows in
14 the study that we've been talking about, there was no
15 violent reaction.

16 Q. Was there ever an instance where a videotape
17 showed a violent reaction?

18 A. I have no recollection of a videotape.

19 Q. Okay. So he states, and I'm talking about
20 this letter you just read now, the one of April 6th,
21 1994?

22 A. Gustafson?

23 Q. Yeah, Gustafson, on page 2, and according to
24 LaVerne Stetson, it says: The graph is supposed to
25 represent a trend line of animal response that suggests

1 that the line was fitted to the available data. Is that
2 true?

3 MS. MERCER-LAWSON: I'm going to object
4 to the form, vague.

5 Q. Are you having trouble finding it?

6 A. I'm having trouble finding where you're
7 talking about. Second paragraph?

8 Q. No.

9 A. Where are we talking about?

10 Q. Right here.

11 A. Since the graph is supposed to represent a
12 trend line of animal response suggests a line was fitted
13 to available data.

14 Q. Is that true?

15 MS. MERCER-LAWSON: Object to the form,
16 vague.

17 A. No.

18 Q. You did not try to fit the data to the line?

19 A. Yeah, we tried to do it to fit the data to
20 the line but we didn't do a trend volume. We didn't do
21 an analysis -- we didn't do a linear regression analysis
22 on a bunch of data.

23 Q. So you didn't assemble the data and attempt
24 to interpret it from a statistical standpoint?

25 A. That's correct.

1 Q. You just realized or looked at the studies
2 and came up with this?

3 A. We looked at the studies that had shown
4 significant differences and --

5 Q. And then did you believe that there would be
6 a standard deviation from this? In other words, if the
7 thing could fall on either side of that line, that
8 either might be troubling or might not be troubling
9 based upon the way you had written the line?

10 MS. MERCER-LAWSON: Object to the form.
11 Vague in terms of terminology, assumes facts
12 not in evidence. Go ahead.

13 A. In my opinion they're to provide some
14 guidelines.

15 Q. Not a hard and fast --

16 A. Not a hard and fast rule.

17 Q. Okay. So got some new exhibits here I wanted
18 to ask you some questions about.

19 MS. MERCER-LAWSON: Do you need a quick
20 break?

21 THE WITNESS: I'm okay.

22 MS. MERCER-LAWSON: Are you sure?

23 Q. So let's go to 3502. I'm going to give you
24 all of these at once, 3503 and 3504 -- not 3504. I
25 didn't give you the exhibit. I'm kind of getting weary

1 myself. It's Exhibit 629 which is 93-502, ASAE. 630,
2 which is 95-303, and then the third thing I'm giving you
3 is Exhibit 631, which is the Journal of Dairy Science
4 article having to do with health and reproduction. And
5 there's another one.

6 (Exhibit 629, 90-3502, "Milk Production
7 With Voltage Exposure During Entire
8 Lactation", marked for identification, this
9 date.)

10 (Exhibit 630, 90-3503, "Holsteins'
11 Reproductive Performance During Long-Term
12 Voltage Exposure, marked for identification,
13 this date.)

14 (Exhibit 631, "Effects of Voltages on
15 Cows over a Complete Lactation. 2. Health
16 and Reproduction, marked for identification,
17 this date.)

18 (Exhibit 632, "Effects of Voltages on
19 Cows over a Complete Lactation. 1. Milk
20 Yield and Composition," marked for
21 identification, this date.)

22 BY MR. BIRD:

23 Q. Let me just hold onto those for a second
24 because I want to exhibit them to you. The ASAE papers
25 at 629 and 630 correspond to the Journal of Dairy

1 Science articles -- which one is Health and
2 Reproduction?

3 A. 35 -- 630 is Reproductive Performance.

4 Q. So this -- what I'm trying to say is 629 goes
5 with the 632 and 630 goes with 631?

6 A. Okay.

7 Q. It's all the same, full lactation study for
8 all four of these, right?

9 A. Yeah.

10 Q. Okay.

11 A. Yeah.

12 Q. And what you're doing is reporting it out
13 first in the ASAE publication and second in the Journal
14 of Dairy Science?

15 A. That's typically how we did things.

16 Q. Now, how many cows actually went through the
17 test, either full or partial lactation?

18 A. I don't understand your question. How many
19 cows were there in the study?

20 Q. I want to know how many cows were part of the
21 testing that was done --

22 A. There were a large number of cows that were
23 part of this.

24 Q. A whole bunch of them, way more than 40?

25 A. Way more than 40 cows, so -- and the reason

1 for that is that this study was probably over two and a
2 half years in the making. There was a criteria for the
3 cows. And so as cows came up, we could begin to fill
4 pens up for the treatments, and we always put other cows
5 into that -- we always kept ten cows in each of the
6 pens.

7 So if we got three cows that we could use
8 for the 40, they went into the treatment -- into the
9 treatment pen and there were seven other cows that were
10 put in there with them.

11 Q. And the data was --

12 A. And once you got done with the cow -- there
13 was always ten cows in each of the pens throughout the
14 whole -- and the pens weren't all started out all at the
15 same time. So there were -- I don't know whether we
16 kept track of them, whether we had the -- I don't know
17 the number off the top of my head, how many cows were
18 used.

19 Q. Well, there were hundreds, wasn't there?

20 A. I don't know. I just -- it could be.

21 Q. How many cows actually -- I'm talking about
22 individual cows now, actually went through a full
23 lactation?

24 A. Probably 40. The rest of them were just
25 cows that came in -- that went in and out, that didn't

1 come in at the beginning of the lactation. Just they
2 were there to be in the pen with them, and if they went
3 dry, then another cow was put in with it.

4 Q. All right.

5 A. In that pen.

6 Q. Let's say a cow went -- was a cow that you
7 were doing the experiment on and that a month later it
8 died. Was that data reported?

9 A. I don't know that there were any of the 40
10 cows that died --

11 Q. I'm just asking --

12 A. -- or replaced.

13 Q. Cows get sick?

14 A. Yeah, but I think we were able to get the 40
15 cows that we had through this -- we would have reported
16 it.

17 Q. I'm just trying to understand what you did.
18 You said you got 40 cows and you're saying you filled
19 one pen with ten cows.

20 A. No. We started to put 40 cows that we were
21 looking for that have just given birth. So whatever
22 period of time, we waited until we could start the study
23 on that. The criteria that says, okay, cow gives birth.
24 At some point after that, it can come into the study.

25 So if we only got one cow, we put it into

1 the pen. We put nine cows in there with it from out of
2 the herd; okay? We weren't keeping record of those nine
3 cows. We only kept records on the cow that was just
4 starting its lactation.

5 Q. And what if that cow didn't make it to the
6 full lactation?

7 A. I think it made it. They all made it to the
8 end.

9 Q. Every cow you picked made it to the full --

10 A. That's my recollection. I'd have to come
11 back and read the papers to see. I do remember we did
12 have a couple of the replacement -- the replacement cow,
13 cows that weren't part of the study that came in that
14 didn't drink water for a day and a half or for part of a
15 day, because we could tell that from the milk production
16 stuff that we had to replace, but I think those are the
17 only two that we had to remove from the cow population.

18 None of the 40 -- I think all 40 went
19 through but that's just my recollection right now.

20 Q. You're saying the data for those animals that
21 were just in there was not kept?

22 A. Yeah, it was data kept.

23 Q. But it was not reported on as part of the
24 study?

25 A. Well, we did -- the data on the replacement

1 cows? I don't know that we kept data on the replacement
2 cows because sometimes they were in and out.

3 Q. When you started this study, was there one
4 cow?

5 A. There was probably more than one cow that we
6 got but not very many more, but there was probably one
7 or two. I don't remember exactly.

8 Q. Are you telling me that you got a cow; you
9 waited 7 to 10 days to make sure it was free of any
10 metabolic problems, correct?

11 A. I have to remind myself of all that.

12 Q. What was your definition of a full lactation?

13 A. Full lactation was until it was dried off.

14 Q. Which could be how long?

15 MS. MERCER-LAWSON: Form. Calls for
16 speculation, outside the scope.

17 A. That was determined by the procedure that
18 LARTU used to dry cows off. I don't know what that was.

19 Q. Were there some cows 250 days?

20 A. The data should be here on the number of
21 days in lactation that each of the cows that were in the
22 study were.

23 MS. MERCER-LAWSON: Would it help you to
24 read the study?

25 MR. BIRD: I'm not going to have him

1 read the study.

2 MS. MERCER-LAWSON: You're asking
3 questions about it.

4 MR. BIRD: I understand, sure.
5 But good move.

6 BY MR. BIRD:

7 Q. I'm just asking you a question. If you don't
8 remember, you can tell me you don't remember.

9 A. Yeah. I'm telling you what I remember.

10 Q. Okay. So the way it worked was you would
11 begin this experiment with a single pen and you would
12 put one or two cows in it?

13 A. Put whatever cows you could get in a point
14 in time into that pen, and it may have been two or three
15 days, whatever, and then there were another set. If
16 there were three cows like that, there were another
17 seven cows that could be put in the pen with it. We had
18 the ten cows.

19 Q. Then there were comfort stalls?

20 A. Yes. As I remember, there were comfort
21 stalls.

22 Q. The comfort stalls there were on both sides
23 of where the water was and the cow could access the
24 water on either side?

25 A. The water was at the end of the set of

1 comfort stalls, as I recall, and they could -- only one
2 at a time could access it.

3 Q. And did cows become sick and were taken out
4 of the study that were part of the experiment?

5 A. I can't answer that. I don't recall.

6 Q. If the cows were sick --

7 A. If we had sick cows, they would have been
8 taken out of the study.

9 Q. Then they would be replaced?

10 A. If the sick cow was one of the 40 cows?

11 Q. Yes.

12 A. They would have been replaced but I don't
13 recall that we had to do that.

14 Q. But if that happened, they would be replaced.
15 You're saying you don't recall. Is there something out
16 there, some data out there that's going to answer that
17 question?

18 A. It should be in the report.

19 Q. Okay. Go to the 93-502. That's the one that
20 reported on production?

21 A. Okay.

22 Q. What Exhibit number is that?

23 A. 629.

24 Q. So we're talking about 629. So that none of
25 the authors is a statistician, correct?

1 A. No.

2 Q. But you got some help from somebody by the
3 name of Bert Klei?

4 A. Yes.

5 Q. Do you know who that is?

6 A. That was a statistician in Animal Science.

7 Q. It says: One group of ten Holstein cows was
8 not exposed to voltage, while three other groups of ten
9 cows were exposed to 1, 2 or 4 volts at the water.

10 MS. MERCER-LAWSON: What page are you
11 on?

12 MR. BIRD: In the summary page on 1.

13 A. Okay.

14 Q. What you're saying is -- and you're talking
15 about groups. That's the 10 Holstein cows over the
16 whole two-year period; you're calling that a group that
17 had zero volts. Then there would be another group --

18 A. The group -- I think we just went 0, 1, 2,
19 and 4, and so the first ten cows that we had went into
20 the zero group.

21 Q. Okay. So --

22 A. But they came in sequentially and -- but at
23 all times there were ten cows in there.

24 Q. That's what I'm trying to figure out. So you
25 decided you're going to do zero volts with the first ten

1 cows.

2 A. I think that's what we did, yeah.

3 Q. Let's say the first day of the whole
4 experiment you had maybe two cows that fit your
5 criteria?

6 A. Yeah.

7 Q. What you're saying is that you put in eight
8 other cows in one part of the experiment just to fill up
9 the pen?

10 A. Just to make sure we always had ten cows in
11 the pen.

12 Q. Then if you got a third cow --

13 A. One of the replacement cows came out, we put
14 it in.

15 Q. So then gradually as time went on --

16 A. Time went on --

17 Q. As time went on, you had more and more
18 treatment cows in the pen until you had it full with
19 ten cows --

20 A. That's correct.

21 Q. -- that were all getting treatment, and then
22 as time went on, after that it would gradually get
23 reduced?

24 A. They would, yeah.

25 Q. And did you have another pen existing at the

1 same time with 1 volt?

2 A. Once we got the ten into the zero, we
3 started on the next one, doing the same thing.

4 Q. So that's what I was trying to figure out.

5 A. And so when we got the 11th cow in the
6 study, it went into the 1 volt pen and another nine went
7 with it, and then we got another one that fit the
8 criteria, it would come in and one of the replacement
9 cows would go out until eventually we fill it up, and
10 then the reverse process takes place; that the cow that
11 went through full lactation, it would come out and a
12 replacement cow would go in.

13 Q. This would be over the period of several
14 seasons? Several years?

15 A. Two and a half years, as I remember, or
16 something like that.

17 Q. Did you have four pens --

18 A. We had four pens.

19 Q. -- that were identical?

20 A. There were four pens that were identical in
21 terms of the layout of the water and the -- I have to go
22 back and check that. I'm not sure they were identical.

23 Q. Can you go to figure 1?

24 MS. MERCER-LAWSON: Were you finished
25 with your answer?

1 THE WITNESS: Yes.

2 Q. Figure 1.

3 A. Yeah.

4 Q. It says here you have comfort stalls for all
5 ten cows?

6 A. I believe that was the case.

7 Q. I counted the stalls in the diagram and there
8 looks like there's nine. Is that just a bad diagram?

9 A. Could be a bad diagram. Probably a bad
10 diagram.

11 Q. I see nine in the diagram. There was ten?

12 A. There's ten there if you count the one, the
13 grain -- that's grain. Could be a bad diagram.

14 MS. MERCER-LAWSON: Can you point on the
15 paper where it says there's ten stalls?

16 MR. BIRD: Page 2: Each pen contained
17 ten elevated comfort stalls, (figure 1.)

18 MS. MERCER-LAWSON: Thank you.

19 A. I'm pretty sure we had a comfort stall for
20 each of the pens.

21 BY MR. BIRD:

22 Q. Are you the one that drew that diagram or
23 blame that one on Gorewit?

24 A. I'm not going to blame it on anybody. My
25 understanding is we had -- and my recollection is we had

1 a comfort stall for each cow in each of the pens.

2 Q. And then the second to fifth lactation cows,
3 there were no heifers?

4 A. Yes.

5 Q. And treatment was delayed for seven to ten
6 days to make sure that the animals were free of any
7 health-related issues, specifically including metabolic
8 problems?

9 MS. MERCER-LAWSON: Can you read the
10 pending question?

11 A. Was that a question?

12 Q. Yes. I'm asking you if that's what you did.

13 A. That was a protocol for the test -- for the
14 animal scientists, yeah.

15 Q. It's described on page 3 on the Animals.

16 A. That's what we did.

17 Q. The criteria for selection were that the cows
18 had (A) to be healthy, have just calved and be free of
19 metabolic calving disorders; (B) to be free of major
20 health problems during previous lactations; (C), to be
21 free of recurring health problems such as mastitis and
22 lameness; and (D), to have been open (not pregnant) less
23 than 120 days in previous lactation; (E), to have a peak
24 milk of more than 27 kilograms and a total milk
25 production of more than 6,350 kilograms during the

1 previous lactation; and (F), to not have been subjected
2 to voltage in any previous stray voltage experiment?

3 A. That sounds right. This is all stuff that
4 was done on the Animal Science side.

5 Q. You said the study lasted about two and a
6 half years?

7 A. That's kind of what I remember.

8 Q. It took five months for 40 cows to calve and
9 meet the criteria, correct?

10 A. Yeah.

11 Q. If you have those pens full with 40 cows
12 after five months, that study could have been done, on
13 average, about 305 days from then. So that doesn't
14 compute. Do you agree?

15 A. That doesn't compute, that's right. So
16 maybe I'm not remembering that correctly.

17 Q. Because, on average, cows are going to
18 lactate for 305 days; true?

19 A. Yeah.

20 Q. And five months is 150 days, which is -- when
21 you add them together, is way less than two and a half
22 years. So something happened.

23 A. That's how long it took them to get 40 in,
24 plus you have another 305 days from there as well. So
25 it's over a year I guess.

1 Q. But you told me numerous times --

2 A. Yeah, I did because I thought it was that.

3 Maybe I'm --

4 Q. So what that means, that some of these
5 treatment cows were taken out and replaced; isn't that
6 true?

7 A. No. It just means that I didn't calculate
8 the two and a half years right.

9 Q. So what you were looking for at item E is
10 they have a milking of more than 27 kilograms and
11 that's -- peak milk of 60 pounds, 27 times 2.2?

12 MS. MERCER-LAWSON: Are you asking him
13 the math question?

14 MR. BIRD: Yes.

15 A. Well, 2.7 is 54 plus another 5, so it's
16 about 6 pounds.

17 Q. That's what I said. That's not a very
18 significant peak and those would be low producing cows
19 in terms of if that was your minimum, correct?

20 MS. MERCER-LAWSON: Form, calls for an
21 opinion outside the scope of qualifications.
22 He's not a milk production expert. Go ahead.

23 A. Yeah, I --

24 Q. Right?

25 MS. MERCER-LAWSON: Same objection.

1 A. Again, I'm not the milk production person
2 here.

3 Q. Okay.

4 A. I would say it sounds not like the maximum,
5 100 pounds, so it's not a high producing value, but that
6 was a minimum.

7 Q. Go to page 4, top of page 4, and I'm going to
8 read from there: When an experimental cow got mastitis,
9 she was removed from the experimental pen and placed
10 with other mastitic herd cows, and the number of cows in
11 a pen was reduced by one. Also, the waterer for any
12 mastitic cows was not connected to any voltage.

13 So you did have mastitic cows.

14 A. Yeah.

15 Q. And when they got mastitis, they were removed
16 from the experiment.

17 A. They were removed from the pen, removed from
18 the treatment.

19 Q. So their data, during the time they were
20 being treated, was not counted because they weren't
21 getting voltage?

22 MS. MERCER-LAWSON: Form.

23 A. I don't know how they were treated. They
24 were still being milked but at a different time.

25 Q. But they weren't being treated?

1 A. They didn't get the treatment at that time.

2 Q. And were there some that -- strike that.

3 After they were treated successfully, were
4 they put back in the pen or were they replaced by
5 another experimental cow?

6 A. I think they were put back in the pen.

7 Q. You don't know for sure?

8 A. But I don't know for sure.

9 Q. So if they were removed and treated and their
10 data not counted and then they went back in the pen,
11 that would mean you didn't have data for a full
12 lactation for that cow?

13 MS. MERCER-LAWSON: Form.

14 A. For a few days for that cow, that's what we
15 did.

16 Q. It depends on how long it's treated?

17 A. Yeah.

18 Q. Do you know how long it takes to treat a cow
19 that has clinical mastitis?

20 MS. MERCER-LAWSON: Object to the form,
21 calls for an opinion outside the scope. Go
22 ahead.

23 A. Not my forte.

24 Q. So the answer is no?

25 A. No. We just rest up for four days but, no,

1 I don't know how.

2 Q. Then if you can go to page 5, under the
3 Results, it says: Currents delivered at the waterer
4 were variable, was due to changes in environmental
5 conditions and differences between cows and within cows
6 over time.

7 MS. MERCER-LAWSON: I don't think you
8 got the reading of that exactly right, just
9 so you know.

10 MR. BIRD: What did I miss?

11 MS. MERCER-LAWSON: It just wasn't a
12 literal reading of the paragraph.

13 MR. BIRD: Let me read it again.

14 BY MR. BIRD:

15 Q. Currents delivered at each waterer were
16 variable. This variability was due to changes in
17 environmental conditions at the metal mat and
18 differences between cows and within cows over time. Is
19 that a true statement?

20 A. Yes.

21 Q. So then were you comparing data for the
22 complete lactation or whatever data you had for each cow
23 in the test?

24 MS. MERCER-LAWSON: Form, vague.

25 A. Repeat the question.

1 Q. The data that you kept, was it -- was it
2 reported out at 305 or was it reported out until the end
3 of that cow's lactation, whether that be before or after
4 305 days?

5 A. I think we had the data from the milkings
6 for whichever one of those periods we wanted to examine.

7 Q. What was reported in terms of the study and
8 your conclusions?

9 A. Well, it says: A comparison of the 305
10 actual values in the previous lactation for the four
11 groups. So we compared 305 values it looks like.

12 Q. Okay. And what if you didn't have all the
13 data?

14 MS. MERCER-LAWSON: Form, incomplete
15 hypothetical. Go ahead.

16 A. I'm not sure how they handled that.

17 Q. I guess what I'm asking, if you're putting in
18 a cow 7 to 10 days after it gives birth to the calf, it
19 means you're missing the first 7 to 10 days of milk.

20 A. That's right.

21 Q. By definition, that's going to mean it's not
22 a complete or full lactation, correct?

23 A. Okay.

24 Q. Because you're missing the first 7 to 10
25 days.

1 A. I don't know how lactations are counted
2 but -- so I don't know whether that's true or not but
3 they're certainly missing -- you're not getting data for
4 the first 10 days.

5 Q. You're comparing that to the previous 305,
6 which is a calculated number and not necessarily
7 reflecting the milk over the entire lactation of the
8 cow, correct?

9 A. The whole process of how all of that stuff
10 is calculated is not something that I'm overly familiar
11 with. It was not something I dealt with.

12 Q. Go to page 6, the bottom there. It says: In
13 this study --

14 A. Bottom where?

15 Q. Bottom of page 6.

16 A. Page 6.

17 Q. In this study?

18 A. In this study where? Okay. The
19 last sentence, the bottom paragraph.

20 Q. Did I not say that bottom paragraph?

21 A. No.

22 Q. I think I said it.

23 A. You said on this page.

24 Q. Are you there?

25 A. Yes, I got it.

1 Q. One first-calf heifer, out of a total of 51
2 animals placed in the 4 volt pen, had to be removed.
3 Okay?

4 A. Mm-hmm.

5 Q. It was a herd animal?

6 A. Mm-hmm.

7 Q. "This is the only animal that had a problem."
8 So there were 51 animals placed in the 4 volt pen and
9 how do we know which -- are you saying 10 of those
10 animals were experimental animals?

11 A. That's correct, so one of the replacement
12 animals, is not replacement.

13 Q. One of the first-calf heifers?

14 A. One of the -- yeah.

15 Q. All right. Were the animals, did they have
16 cow numbers, those that were --

17 A. Cow numbers, ID systems.

18 Q. All right.

19 MS. MERCER-LAWSON: Off the record.

20 (Discussion off the record.)

21 (Exhibit 633, "Stray Voltage Research
22 Fraud" by Michael Behr, Ph.D., 4/2/97, marked
23 for identification, this date.)

24 BY MR. BIRD:

25 Q. I show you what's called Stray Voltage

1 Research Fraud by Michael Behr. You've heard of him?

2 A. Yes.

3 Q. You knew him when he published this document?

4 A. I heard about it.

5 Q. You know Dr. Gorewit sued him or a lawsuit
6 about it?

7 A. I heard about Michael Behr from Dr. Gorewit.
8 I didn't know he sued him.

9 Q. Is that something you ever looked at in the
10 past?

11 A. I don't think so.

12 Q. There are some allegations made in here and I
13 just want to see if you agree or disagree. So if you
14 can go to page 33?

15 A. Okay.

16 Q. It gives a listing of animals that were
17 subjected to different voltages and the number of days
18 that they were subjected to those voltages; okay?

19 A. Okay.

20 Q. Now, is it your testimony that this wouldn't
21 be an accurate chart?

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

23 Q. According to this, the maximum number of days
24 of animals exposed to voltage would have been 356 days
25 and --

1 A. Let me look at this. I've never seen this.

2 MS. MERCER-LAWSON: Let's have him read
3 it before he answers questions.

4 MR. BIRD: I'm not going to have him
5 read the whole thing.

6 MS. MERCER-LAWSON: If you want him to
7 answer questions about Table 6, look at Table
8 6.

9 A. What was your question? Is there a
10 question?

11 BY MR. BIRD:

12 Q. Under the data that's shown here, the maximum
13 number of days that any individual cow, and it was cow
14 3846, received treatment, in this case it was 1 volt,
15 was 356 days.

16 MS. MERCER-LAWSON: Tell him where
17 you're looking, please.

18 Q. The right-hand column, the bottom of page 33.

19 A. I'm getting three digit numbers on this
20 instead of four.

21 Q. Right there, 356?

22 A. For cow?

23 Q. 3846.

24 A. Okay.

25 Q. And then you can go -- I want you to count

1 the number of cows from 356 up to where it says 305.

2 MS. MERCER-LAWSON: What do you mean by
3 count the number of cows?

4 Q. Okay. There's -- how many cows does it take
5 to get to the one that was 305 days?

6 A. Ten cows.

7 Q. Do you agree with me that you had, in this
8 research you had ten cows that were 305 days in milk or
9 more that were part of the study?

10 A. I don't know where this data came from.

11 Q. Have you ever seen the data?

12 A. I've not seen this data before.

13 Q. Have you ever seen the data?

14 MS. MERCER-LAWSON: Object to the form.

15 A. Ever seen what data?

16 Q. The data on the number of days that those
17 cows were exposed to the level of voltages?

18 MS. MERCER-LAWSON: Object to the form,
19 vague.

20 A. No.

21 Q. If you could turn to page 35, Dr. Behr is
22 commenting on notebook entries. Did you ever see the
23 notebook entries?

24 MS. MERCER-LAWSON: Object to the form.
25 Wait until he gets there and he knows what

1 you're talking about.

2 A. 35, right.

3 Q. Bottom of page 35, he's referring to notebook
4 entries that were provided to him and he's commenting
5 upon. Do you recognize there was somebody keeping a
6 notebook entry?

7 A. I know there was somebody keeping a notebook
8 entry on the cows, on the animals, Animal Science side.
9 Somebody who was looking -- who was observing the cows.
10 I don't know whether I knew they were taking notes or
11 not.

12 Q. Did you ever see the notebook entries?

13 A. No.

14 Q. So you can't tell me if these are true or
15 not?

16 A. That's correct.

17 Q. Where would those notebooks be?

18 MS. MERCER-LAWSON: Form.

19 A. I don't know.

20 MR. BIRD: Okay. I'm done. Thank you.

21 MS. MERCER-LAWSON: Off the record for a
22 couple minutes. Take a short break. I want
23 talk to you in the other room.

24 (A recess was then taken.)

25

1 EXAMINATION BY MS. MERCER-LAWSON:

2 Q. Dr. Aneshansley, can you get out Exhibit
3 number 620, please? It should be the second one here.
4 Here we go.

5 A. Okay.

6 Q. Exhibit 620, this is a one-page document
7 called Daniel J. Aneshansley, Ph.D., Summary of Opinions
8 in Poeschel versus NSP case; true?

9 A. Yes.

10 Q. If asked to testify at trial as to all of the
11 opinions that are bullet pointed in Exhibit 620, will
12 you testify consistently with what is in Exhibit 620?

13 A. Yes.

14 Q. In other words, are you walking back any of
15 your opinions today as you sit here?

16 A. I don't -- no.

17 Q. You're not, correct?

18 A. Correct.

19 MR. BIRD: Object to the form.

20 Q. You'll testify consistently with the opinions
21 in this bullet-point document; is that true?

22 A. Yes.

23 Q. If you look at the bottom bullet point, you
24 see where you write: I'm generally familiar with
25 Lawrence Neubauer's methodology for determining

1 resistance values of individual cows for purposes of
2 stray voltage lawsuits. Do you see where I'm reading,
3 sir?

4 A. Yes.

5 Q. You then say you have some concerns about
6 Mr. Neubauer's measurements. Do you see that?

7 A. Yes.

8 Q. You weren't asked very many questions about
9 that, if any, at your deposition. Do you intend to
10 express your concerns about Mr. Neubauer's measurements
11 and methodology at trial?

12 A. Yes.

13 Q. You would testify consistent with what is in
14 Exhibit 620?

15 A. Yes.

16 Q. You were asked some questions about some
17 involvement in prior litigation. Do you remember that
18 generally?

19 A. Generally.

20 Q. Why did you become involved in litigation?

21 A. There were requests for my services. I
22 picked and chose pretty much what I wanted to do. I
23 never advertised for this. As in my role at the
24 university, I thought it was important for me to keep up
25 with all the new variations that were coming out with

1 respect to stray voltage, and when I saw opportunities
2 to do that, I would participate in litigation.

3 This one was one in which robotic milking
4 came up. That's the first time I'd seen that or had an
5 opportunity to find out about it and was interested in
6 the ifs, ands, and buts of all that.

7 Q. Was one of the reasons you decided to be
8 involved in litigation to defend what you believe to be
9 reliable science?

10 MR. BIRD: Object to the form, leading.

11 A. That's part of it.

12 Q. You were asked some questions about an
13 exhibit that purported to be a compilation of papers by
14 a Michael Behr, Ph.D.?

15 A. Yes.

16 Q. Who do you understand Michael Behr, Ph.D. to
17 be? And that's B-E-H-R.

18 A. An economist was my understanding.

19 Q. Do you understand Michael Behr, Ph.D. to have
20 any expertise in electrical engineering?

21 A. I don't believe so.

22 Q. Do you understand Dr. Behr to have any
23 expertise in veterinary medicine or animal health?

24 A. I don't think so.

25 Q. Was Dr. Behr involved in the creation of the

1 USDA Red Book?

2 A. No.

3 Q. What is your knowledge of how it is that
4 Dr. Behr alleged that fraud was going on with respect to
5 stray voltage research?

6 MR. BIRD: Object to the form,
7 foundation.

8 A. I don't know if I became aware of fraud. I
9 became aware of the fact that requests had been made for
10 all of our data and that it had been turned over to him.
11 He had requested that from Dr. Gorewit and the only
12 thing I had a memory of is that Dr. Gorewit indicated
13 that there was places -- the data that he had given that
14 he hadn't recorded entirely; he missed some of the
15 places on the backside. He only copied the front --
16 whatever was copied for him only copied the front sides.
17 I don't know if that's true.

18 That is what -- that's about the only
19 involvement I had with Behr in terms of that document.

20 Q. Would you ever, in any stray voltage lawsuit,
21 rely upon anything published by Michael Behr, Ph.D.?

22 A. That's a pretty broad question. I'm not --
23 probably not but I'd have to look at what he had to say.

24 Q. Has anything about the questioning that was
25 posed to you by Mr. Bird concerning Dr. Behr caused you

1 to lose any faith in the strength and reliability of the
2 Red Book?

3 A. No.

4 Q. I don't have any further questions, so unless
5 Mr. Bird has some.

6

7 EXAMINATION BY MR. BIRD:

8 Q. You know, I thought I understood your
9 concerns about Neubauer's method and I thought it had to
10 do with the contact points, the bit in the mouth, and --

11 A. Yeah, we talked about that.

12 Q. That's the extent of your concerns?

13 A. Yeah.

14 Q. It has to do with how he's setting up the
15 animals?

16 A. And I think some of the concerns also are
17 there are errors associated with each of those
18 resistances he calculates.

19 Q. What do you mean errors?

20 A. The values have plus and minus values. The
21 voltage you measure has an error associated with it, and
22 the current has one major error associated with it, and
23 to determine the error of what the resistance is, you
24 got a value which is 250 Ohms, plus or minus something,
25 and those values can be computed if you know the errors

1 associated with your voltmeter and your amp meter.

2 It's a process called linear error analysis
3 that can be used to do it. I've never seen any
4 indication in the numbers that I've seen reported by him
5 of what that -- what those errors are, what the spread
6 in values are. I think that's an important part of it.

7 Q. Anything other than that?

8 A. Not that I can think of right now.

9 Q. I'm done, thanks.

10 MS. MERCER-LAWSON: I'll just put on the
11 record what's going to happen next,
12 Dr. Aneshansley, is Pam will type all of this
13 up into a transcript and she will send you a
14 copy. You'll be able to read the copy,
15 review it for any typographical errors, and
16 then if there are any typos, you're entitled
17 to make those changes before you sign.

18 THE WITNESS: Okay.

19 MS. MERCER-LAWSON: Do you understand?

20 THE WITNESS: Understood.

21 MS. MERCER-LAWSON: Thank you.

22

23

24

* * *

25

1 SIGNATURE PAGE OF DANIEL J. ANESHANSLEY, Ph.D.

2 PAGE LINE SHOULD BE CHANGED REASON FOR CHANGE

 # # TO READ

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

13 _____

14 _____

15 _____

16 _____

17 I, Daniel J. Aneshansley, Ph.D., hereby certify that I

18 have read the transcript of my testimony taken under oath

19 and that the transcript is a true and complete record of

20 my testimony and that the answers on the record as given

 by me are true and correct.

Daniel J. Aneshansley, Ph.D.

21

Sworn to before me this

22 ___ day of _____ 20__

23

24 Notary Public

25

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

REPORTER'S CERTIFICATE

I, PAMELA PALOMEQUE, Registered Professional Reporter, certify:

That the foregoing proceedings were taken before me at the time and place therein set forth, at which time the witness was put under oath by me;

That the testimony of the witness and all objections made at the time of the Examination were recorded stenographically by me and were thereafter transcribed;

That the foregoing is a true and correct transcript of my shorthand notes so taken;

I further certify that I am not a relative or employee of any attorney or of any of the parties, nor financially interested in the action.

PAMELA PALOMEQUE, RPR, CRR
Notary Public

A	61:1 69:8	55:2 58:23	ages	65:17	140:15
ability	97:25	71:11,14	116:5	67:23	143:12
9:2,11	113:14	109:6	ago	78:18,19	158:8
able	accepts	addressed	11:16	79:7 81:5	amounts
74:21	61:5 63:1	70:25	35:25	83:10	181:21
103:4	access	adequate	41:7,14	105:22	amp
119:7	212:23	112:8	42:4 58:9	113:6	236:1
144:2	213:2	adjusted	189:24	131:13	analysis
202:23	account	159:5	agree	136:13	37:8 110:2
209:14	134:3,4	adjustm...	79:3 81:8	137:3,19	126:7
236:14	165:19	127:17	87:22	152:10	128:7
abnormal	accurate	151:15,16	88:1	166:2	142:15
181:21	227:21	151:17	108:16,25	167:7	165:20
absolute	achieve	153:4	112:13,15	173:10	170:16
183:11	84:2	adjustm...	123:10	174:20	204:21,21
196:2	acknowl...	190:10	147:8	175:14	236:2
absolutely	107:20	administ...	151:3	184:17	analyzed
12:8 73:8	acknowl...	10:14	161:5,19	186:21	145:4
136:19	107:21	adopted	162:11	199:23	analyzing
154:18	132:22	12:17,23	163:12	202:4	133:2
174:19,21	133:8	34:7	174:3,5,6	205:12	179:6
abstract	acronym	55:14	174:6,16	220:22	and/or
32:16,20	32:13	63:8 68:6	219:14	222:22	107:5
33:3 62:6	action	adopting	227:13	224:15	179:25
62:7,13	33:14,17	65:10	229:7	al	180:8
88:10	55:14	adverse	agreed	113:25	ands
abstracts	197:9	175:17	165:16	alive	233:6
32:17	238:15	advertised	189:2,10	61:13,14	Aneshan...
abundant	actual	232:23	agreement	allegatio...	1:13 3:4
84:24	224:10	advice	28:5	227:12	3:13,15
AC	adapt	63:23	agricultu...	alleged	6:2,5,24
3:18 28:13	141:21	advised	15:16,19	234:4	8:17,20
29:16	adaptation	202:12	15:20,23	alley	35:9
43:9	158:5	advocated	19:11	84:22	43:24,25
88:15	add	23:2	69:2	allow	58:3
97:23	168:20	advocati...	133:11	142:25	94:11
129:25	219:21	23:1	178:11	145:15	151:7
accept	added	affect	agricultu...	allows	169:1
62:15	90:20	138:5	71:7	95:22	231:2,7
80:22	123:1	141:10	200:20	Ambiguo...	236:12
81:2	131:25	ag	Agrivolt	34:12	237:1,17
115:23	132:1,4	69:1,1	36:22	American	237:20
acceptable	150:6	age	ah-ha	15:18,23	Aneshan...
61:18	additional	64:9	7:10	69:2	43:22
70:24	203:7	agency	ahead	amount	angle
accepted	address	32:1	39:4 58:1	112:21	183:8

animal	3:20 12:24	150:25	75:5 79:8	anymore	approxi...
3:16 16:11	59:17	151:2,9	81:5 86:1	54:19	37:13,18
27:6,7	85:10	151:21,22	128:20	56:24	38:8
28:9	88:18	152:17,20	130:5	97:25	160:2
30:20	93:7	152:21,23	132:17	anywheres	April
33:14,17	100:3,4	153:8	137:20	56:7	12:10 37:2
43:25	100:17,18	156:19,23	172:12,13	apparently	37:8
74:1,2,6	100:23	156:24	173:13	22:15	167:21
74:8	102:25	157:5,9	174:17,22	41:13,18	202:24
79:18	103:11	157:11,12	182:10	172:25	203:20
82:11	104:5,13	161:1,5,9	188:7	appear	area
83:18	104:19,22	162:6,21	213:5,16	151:11	10:23 13:7
90:2,3	105:9,12	170:2	216:25	165:18	159:25
91:11,18	105:18	177:1	222:24	168:25	184:9,10
92:9	109:8	178:7,13	228:7	APPEAR...	195:11
94:15	111:17,22	187:6	answered	2:1	areas
99:13,14	114:17,21	193:6,10	67:11 68:3	appears	71:10
101:22	115:11,19	193:17,24	68:25	169:2,9,12	argument
102:24	116:6,18	194:6,12	79:7	Appleman	75:18
103:5,8	117:4,24	194:23	131:13,14	75:16	153:3
106:12,18	121:7,16	195:2	166:2	76:10	argumen...
106:22	122:15	202:11	167:7	188:25	67:23
107:22	123:1,5,6	203:4,8	answering	189:1	152:9
113:24	123:7,12	210:20	7:16	applicati...	153:11
114:9,25	123:17,20	218:6,15	answers	154:21	166:16
116:12	123:21	226:2,8	39:6,9	163:8	176:3
122:21	124:20,21	226:10,10	40:3,7	165:13	196:23
126:17	124:22,24	226:12,15	228:3	applied	arguments
129:22	125:1,4,9	227:16,24	237:18	18:11	75:25
133:3	125:12	230:8	antibiotic	135:15	arithmetic
134:10	126:3	235:15	170:20,22	applying	8:11 101:6
136:9	127:5,12	annivers...	171:8	119:6	147:9
169:20,25	127:15	48:16	antibiotics	139:19	arrived
171:18,19	133:23	Annotated	171:4	approach	34:24
177:19	134:2,22	39:21	anticipat...	84:18	article
193:8	135:7	answer	186:24	appropri...	14:24 15:3
194:5,15	136:8	7:2,5,8	193:3	170:22	20:17
203:25	139:9,9	9:11	195:10,14	approval	21:3 26:6
204:12	140:16,22	22:23,25	195:17	73:17	27:22
214:6	141:16,21	29:4	anybody	102:24	43:10
218:14	142:2,6	44:16	48:5 52:2	199:20	129:4,10
219:4	146:5	50:7	61:15	approve	129:13
226:5,7	147:24	65:20	62:25	73:15	130:7
230:8	148:14,25	66:16	66:12	103:3	132:10
233:23	149:8,18	70:10	148:2	approved	206:4
animals	149:23	72:3,4	217:24	200:8,8	articles

20:3	asking	199:22	76:25	69:3	101:10
21:10	7:15,22	205:11	120:3	80:17	104:11
28:3,4,18	11:23	assuming	134:12	81:22	106:9,17
28:25	22:19	95:18	197:12	82:1,2,7	107:13
29:11	61:19	assumpt...	204:1,13	139:8	121:15
85:16	122:23	64:19	Avenue	176:2,4	124:6
198:3	137:23	108:6,8	2:4	201:16	125:1,8
199:8,9	168:8,11	155:12,13	average	234:8,9	135:5
207:1	168:13	asterisk	83:8 84:10	axes	146:12
artificial	209:11	149:7	109:15,16	183:19	149:13,16
77:23	212:2,7	150:15	109:18	axis	158:7
ASABE	218:12	attached	111:14	189:20	162:1
15:15	220:12	118:10	152:13	191:17	165:1
ASAE	224:17	attempt	156:3		170:4,5
14:11	aspects	204:23	159:7,24	B	185:8
15:10,13	116:16	attempti...	161:22	B	186:2
15:15	assemble	181:4	219:13,17	98:11,12	187:11
16:4,16	204:23	attorney	averaged	218:19	190:9,16
21:11	assigned	6:16 7:1	109:10	B-E-H-R	194:1,3
25:23	121:21	58:1,2	126:22	233:17	196:25
26:16	assist	238:14	127:8	back	197:23
60:10	64:11,13	Attorneys	152:11	7:23 10:10	198:18,20
64:4	associated	2:3,9	averages	21:6,18	200:6,8
131:4	58:13	attributed	127:4	24:4,24	201:18
132:3,4	60:14	180:13,23	143:22	25:10	210:11
191:4	61:8 71:1	182:25	152:7	26:20	216:22
206:1,24	75:12,25	August	153:14	28:7,21	222:4,6
207:13	96:16	1:16	avoid	34:6,13	222:10
ascribing	181:6	author	187:23,25	35:19,25	231:14
158:2	194:22	18:22 73:4	avoidance	47:6,8,9	backgro...
asked	235:17,21	200:14	185:19	50:11	139:5
22:11	235:22	authors	186:3,11	53:11	189:11
46:16,17	236:1	34:9 61:10	186:16,25	57:2	backside
50:21	Associati...	63:2 71:3	187:6,9	58:11	131:24
53:2	15:16	73:5	avoiding	62:11,12	132:6
63:23	assume	107:15	187:7,8,10	70:7	234:15
67:6,21	10:13	132:19,20	187:13,15	77:13	bacterial
68:2,19	54:10	199:12	187:20	78:3 82:9	170:19
79:7	86:20	213:25	awarded	82:16	bad
131:12,14	88:15,25	automatic	18:12	84:24	217:8,9,9
166:2	92:19	117:10,12	aware	85:1,14	217:13
167:6	assumes	117:13,14	41:21	86:4,25	bailiwick
168:6	80:24 81:4	AV	55:16	87:7,9	181:18
231:10	83:10	43:22	60:19	88:13	balance
232:8,16	136:11	available	62:25	95:2,12	132:15,16
233:12	137:2	66:18	63:7 68:6	95:21	bar

barn 92:1 179:22	began 203:6	233:19,22 233:25	best 16:22 145:8 146:2 162:24 196:19 197:7	129:11,15 129:19 130:3 131:14 162:2 164:15,16 165:6,8,9 168:10,13 178:3,9 202:7,16 206:22 211:25 212:4,6 214:12 217:16,21 220:14 223:10,13 223:14 226:24 228:4,11 230:20 231:19 233:10 234:6,25 235:5,7	73:7 blood 106:11 board 192:11 Bob 191:7 Bodman 3:23,23 22:11,13 146:18 198:3,6 199:3,8 200:1,4 200:14 201:6,15 201:19 Bodman's 199:13 200:24 body 96:12 140:6,13 Bonneville 49:8 book 30:6 33:21 33:22 34:8,10 34:17 37:18 38:15 39:19 40:20 42:16,18 42:23 44:3,6,12 44:25 45:14 53:22 59:13,15 59:21,23 60:2 61:9 63:8 64:22 65:1,6,9
barns 26:12	beginning 116:1 131:22	234:4,19 234:21,25	belabor 8:8		
barrier 92:10	132:1 146:7	believe 66:19 69:24 91:5 141:21 183:12	better 160:5 177:23		
bars 94:2,3 155:6	174:8 190:13,14 191:19 209:1	believe 9:4 11:14 12:6,18 15:25 47:22 48:14 51:5 61:8 61:11,12 61:12 63:5,15 67:18 80:12 88:5 98:13 106:4 143:7 205:5 217:6 233:8,21	beyond 53:17 57:13	bibliogra... 44:7 74:22 179:1,3,7 179:11,15 189:7 197:22 198:4 200:15	
base 63:5	begins 138:1	believe 9:4 11:14 12:6,18 15:25 47:22 48:14 51:5 61:8 61:11,12 61:12 63:5,15 67:18 80:12 88:5 98:13 106:4 143:7 205:5 217:6 233:8,21	bigger 77:16 156:1	birth 139:11 209:21,23 224:18	
based 30:6 62:12 65:24 72:15,16 74:25 93:13 115:11 132:10 151:11 180:16 183:4 189:10 196:18 205:9	behalf 49:19 50:19	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	big 154:14	bit 6:22 8:12 58:14 86:6,7,10 86:12 91:18 101:9 155:22 160:15 195:9 235:10	
baseline 127:18	behavioral 43:15	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	billings 56:18,19	blackboa... 189:17 191:16,21	
basic 86:18 96:6	behavioral 43:15	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	Binder 37:2 38:7 40:2	blame 217:23,24	
basically 19:12 90:11 157:17 183:17	183:17 184:2,6 184:11,13 184:22 185:4 186:12,22 193:14 194:9,15 194:20	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	biological 9:13 10:16 15:17,23	blind	
basics 99:22	behavioral 43:15	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	biology 15:17 71:11		
basis 44:2 100:1 100:2 188:13	behavioral 43:15	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6	Bird 2:3,5 3:5,6 6:13,16 36:9,14 41:9 58:4 58:18 98:17,19 126:25 127:2		
bearing 38:13	behaviors 111:9	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6			
bedding 174:25 175:12	Behr 4:6 226:22 227:1,7 229:21 233:14,16	behavior 26:9 27:4 28:8 29:16 43:11,23 47:17 111:8,22 114:7 179:21 186:11,25 192:1 194:6			

65:24	135:6,6	BROTHERS	90:15 97:5	cane	87:18
67:1,16	156:11	1:4	calculati...	8:21	category
68:7,11	185:12,15	brought	108:1	capacita...	23:7,7,15
68:13,18	192:25	99:12	147:5	96:15	24:4
68:21	202:18	bucket	148:3	capacitor	25:16
69:7,11	225:12,14	117:10,11	calculator	96:6,11,20	29:7
69:12,19	225:15,19	117:20	147:4	97:1,9	31:16
70:4 71:5	225:20	bullet	calf	capacito...	cattle
71:14,24	228:18	60:23,24	224:18	96:13	3:17 27:5
72:2,5,10	230:3	64:8	call	capacitors	27:6 28:2
72:13,22	231:23	68:10	8:17,18	96:16	129:23
74:20	bowl	73:23	55:20,22	capacity	169:20
82:9,22	13:22	94:10	86:5	67:3	174:7
83:13	14:10	231:11,23	101:20	care	cause
84:20	77:2 93:6	bullet-p...	178:1	170:1	136:24
85:5,16	93:9,10	231:21	called	case	194:21
85:17	98:21	bunch	6:11 11:21	3:14 6:5	caused
87:11,12	134:16	34:24 93:3	18:11	6:17 11:6	142:23
146:24,25	141:17	106:25	33:3	34:21	144:18
177:25	188:8	118:9	57:11	46:7,10	155:10
178:10,17	bowls	204:22	60:2,7	48:6 49:7	166:25
197:21	3:18 43:9	207:24	90:10	49:13,14	234:25
198:16,22	47:15	but	168:1	49:20	causes
199:1,13	130:1	233:6	226:25	51:17	93:11
199:14	137:9	bypass	231:7	56:15	122:25
200:15	box	55:7	236:2	82:21	cell
234:1	194:10		calling	116:3	182:12
235:2	break	C	23:6	121:14	central
Book's	58:16 71:9	C	214:16	174:25	84:22
64:9	92:10	98:11,12	calls	217:6	certain
booklet	98:16	218:20	42:8 47:10	228:14	60:8 111:4
5:4 57:18	184:1	cable	172:8	231:8	119:6
books	205:20	54:24	211:15	cases	certainly
18:18	230:22	cage	220:20	11:7 49:22	13:5 15:2
BORGEN	briefly	198:11	222:21	50:2,22	23:1 63:3
2:3	37:11	calculate	calve	50:24	64:15,21
born	48:17	97:7 119:7	219:8	87:7	65:5 79:9
8:13	bring	220:7	calved	106:2	91:25
bottom	192:24	calculated	218:18	144:2	136:1
10:21	brings	77:5,6	calving	155:6	139:3
20:22	124:19	93:12	138:19	170:10	170:10
82:12	136:16,22	147:3	139:20,21	172:15	177:21
87:3,13	broad	225:6,10	218:19	casually	180:18
87:19,20	46:6	calculates	Camp	17:10,11	225:3
112:4,5	148:15	235:18	17:19	categories	certainty
130:12,18	234:22	calculation	19:14	46:6 71:10	65:8 66:5

66:7,20	19:2	191:24	clinical	59:5 71:5	200:4,13
CERTIFI...	68:13	192:18,19	125:25	83:14	200:25
238:1	73:9,10	195:12,13	169:22	89:4	203:3
certify	73:12,14	195:19	170:3,6	90:17,23	Commiss...
237:17	73:15,18	227:21	170:19,25	97:10	11:11
238:4,13	73:20,20	charts	172:20,24	128:4	12:16,21
Chair	73:21	118:9	173:1	130:7	33:8,10
10:8,13	182:17	151:7	182:13	168:20	34:6,16
chance	189:5,5	check	222:19	175:1,2	65:9 67:4
35:1,3	chapters	216:22	clip	183:14	67:15
change	18:19	checked	91:23	196:19	167:21
92:7 96:17	70:25	178:18	92:12	209:1,24	200:7
128:4	71:12,13	chose	clips	210:10	201:7
131:8	71:21	108:4,6	93:22	216:8,11	Commiss...
133:21	73:16,19	145:4,11	close	comes	174:18,20
138:12	characte...	232:22	37:3 85:25	101:8	committee
140:15	97:12	chosen	92:19	127:10	72:22
144:11	characte...	145:2	101:7	137:5	common
164:11	97:2	Cincinnati	151:22	168:21	180:19
193:10,13	181:14,17	8:10	closest	174:11	181:22
193:17,24	characte...	circuit	139:16	184:19	commun...
194:5,12	36:18	1:2 82:20	cluttering	comfort	139:25
194:15	characte...	82:23	178:4	107:3,4	140:2
195:2	76:25	83:4,21	co-wrote	120:20	commun...
237:2	charge	91:7	20:4	212:19,20	201:1
changed	56:4,6	95:14,19	collabor...	212:22	commun...
15:15,22	charged	96:20,21	146:22	213:1	61:1,6,17
102:7	56:8	96:24,25	collect	217:4,17	62:21
194:6	CHARLES	97:8	170:1	217:19	63:1,4
237:2	2:5	175:5,6	collection	218:1	companies
changes	charles@...	circuits	116:17	coming	54:25
118:7	2:6	97:23	177:22	34:6,13	compani...
143:1,2,4	Charlie	cite	column	72:2	114:2,3
143:6,12	6:16	80:13	130:12,18	88:20	COMPANY
144:18	chart	113:25	180:7	232:25	1:9
145:9,17	151:12	cited	185:10,13	comment	compara...
145:20	156:13	85:16,17	228:18	22:15	168:21
164:4,10	185:5,25	87:11	combina...	174:17	compare
165:22,23	186:1,5	clarify	29:2 80:19	193:2	110:3
177:9,10	187:4	94:8	113:16	commen...	118:6
193:5,6,8	188:14,15	classes	combine	229:22	151:7
223:4,16	188:16,19	9:24 17:12	95:21	230:4	153:6
236:17	188:23	clear	110:2	comments	155:1
chapter	189:2	7:11 27:21	come	3:22	160:22
18:19,22	190:7	46:4 73:3	7:11,23	199:13,19	compared
18:24	191:18,19	95:23	55:7 58:2	199:25	138:14

145:21	30:1 71:8	conclusion	119:17	127:11	contacts
150:24	complica...	42:8 73:25	184:24	134:4,18	30:20
158:17	196:13	105:16	221:12	134:19	75:17
159:5	complies	144:10	connection	138:5	76:2,7
160:6	202:6	145:5	63:17 86:4	142:1	contained
224:11	compon...	163:16,23	91:20	150:24,25	37:13
comparing	96:6	conclusi...	95:20	151:2	217:16
131:8	Composi...	34:9 60:15	consecut...	152:3	container
143:21	4:5 206:20	140:5	170:22	contact	120:9,10
151:4	compound	163:4	consensus	33:14,17	contents
160:11	137:1	198:22,25	34:9 60:7	47:15	60:25
223:21	151:13	224:8	188:19	48:19	202:25
225:5	165:15	concrete	190:24	50:4 64:6	continued
compari...	166:1	74:18,19	conserva...	74:1,2,7	10:17
108:6	167:5	79:19	73:25 74:6	74:10,16	139:12
224:9	173:9	80:2,19	consider...	75:12,22	159:21
compari...	184:15,16	81:25	67:19	76:4,12	160:12,14
127:3	192:15	85:24	consisted	76:13	163:25
compart...	compute	91:12,19	35:11	77:1,9	171:8
99:16	219:14,15	conditions	consistent	79:16,21	182:20
competent	computed	9:1 74:12	153:7	79:23	continues
198:15	235:25	74:13	232:13	80:4 81:9	11:1
competit...	concern	77:20,21	consiste...	81:15	continuing
57:12	92:3	78:7,9	82:8	82:3,5,11	44:3
compilat...	concerni...	172:7	231:12,20	82:23	contribu...
233:13	166:24	223:5,17	consolid...	86:13	200:9
complaint	234:25	conduct	183:25	88:3 89:2	contribu...
53:4,9	concerns	30:9	constrict...	89:6,10	94:19
complete	42:20	conducted	103:4	89:20	183:16
4:3,4 27:9	44:12	21:4	construc...	90:2,4,20	contribu...
95:14	190:21	conducti...	99:15	91:1,2,3	94:20
206:15,19	232:5,10	171:14	consultant	91:12,22	contrived
223:22	235:9,12	conferen...	10:23	94:4,5,17	86:14
224:22	235:16	131:4	50:14	94:21,25	control
237:18	conclude	191:4	51:19,21	94:25	52:13,19
completed	105:18	conferen...	51:23	95:3,4,9	52:20
175:7	144:25	17:17	consume	95:10,11	53:6,12
complet...	145:8	confident	180:11	95:12,20	53:12
110:12	146:3,4	102:3,6	consumed	95:20	102:13
124:9	concluded	confirmed	134:21	96:12,14	138:12
170:25	145:25	169:5,6	140:15	120:14	143:22
complet...	146:1	confused	consumer	175:3,7	157:14,16
168:9,12	175:16	36:11	53:3,4	235:10	157:21,24
completi...	190:23	connect	consump...	contacted	185:18
175:5	concludes	55:5	14:17	46:13,14	controve...
complex	81:24	connected	114:7	50:20	199:16

conversa...	15:12,14	117:8,22	219:16	48:6	136:21,22
189:18	15:25	118:8,12	correlation	86:18	137:5,7,9
192:16	16:6,9	118:21	138:16	174:15	138:1
conversa...	17:21	119:5	correspo...	courses	141:17
46:24 47:4	18:21	120:17	206:25	10:19	155:19,21
47:6	20:16,20	124:12,13	corrosion	Court	174:24
63:19,19	22:7,22	124:15	50:5	1:2 7:2	176:22,23
63:22	24:6 26:4	127:5	cortisol	courtroo...	186:19
Cook	26:18	135:12,20	106:3	197:18	208:12
42:24	27:20	137:11	counsel	cover	209:3,6,6
copied	30:9	138:8	36:8 41:10	60:3	209:23,25
234:15,16	32:24	140:13,17	165:5	cow	210:3,5,9
234:16	33:8,9,12	144:22	202:12	30:14	210:12,17
copies	33:14,21	146:20	counsel's	47:15	211:4,5,8
58:21	34:5,22	147:24	137:19	62:3 74:9	212:23
copy	38:20	148:1	count	75:17	213:10
54:18	39:20	153:2,20	182:12	76:1,1,4	215:12
56:20	41:9 44:3	156:19	217:12	76:7,12	216:5,10
177:25	44:14	169:23	228:25	76:13,19	216:12
236:14,14	52:1	170:3	229:3	77:24	218:1
Cornell	59:18,19	172:10	counted	79:16	221:8
9:21,22	60:4,8	177:4	103:16	82:23	222:5,12
17:2,7,22	62:20	180:1,12	217:7	84:21	222:14,18
17:25	65:18	194:17	221:20	85:23,24	223:22
52:15	68:14,15	195:24	222:10	86:3,21	224:18
54:20	69:14	197:18	225:1	87:22	225:8
58:12	72:6,18	198:16	counting	89:1	226:16,17
60:6 64:4	77:4	199:1	198:2	90:21	228:13,13
69:21	79:20,22	200:16	country	91:1 92:7	228:22
99:12	82:20	204:25	13:13 69:4	94:17,21	cow's
138:22	83:20,23	211:10	79:5	94:24,25	76:14
178:19	83:24,25	213:25	COUNTY	94:25	81:24
190:3,19	89:12,19	215:20	1:2	95:9,11	82:4
Cornell's	89:22	219:9	couple	95:19,20	94:12,13
51:24	90:22	220:19	6:25 35:11	101:19	224:3
corner	93:17	224:22	40:17	107:6	cow-resi...
118:16	94:22	225:8	68:18	108:20,22	88:21
192:21	96:2	226:11	125:22	113:2,8	cows
Corporat...	97:20	230:16	169:17	118:25	4:2,4 27:8
31:22 32:1	101:6	231:17,18	190:17	119:7	75:17
133:10	103:14,25	237:19	210:12	120:8,20	78:3,6,14
correct	104:20	238:11	230:22	122:5	79:3,10
8:11 9:15	109:23	corrected	course	134:17	83:7,8
11:14,25	112:9,17	85:21	10:15,16	135:18,21	84:3,11
13:8 14:3	114:19,20	correctly	30:5 43:8	135:24	84:12,16
14:6,19	116:20	127:5	45:13	136:18,20	88:2 92:1

96:9	208:13,17	created	147:7	34:1	106:14
99:12	208:21,22	23:6	178:13	50:13	Daniel
101:10,14	208:25	188:16	183:18	cycle	1:13 3:4
101:14,17	209:10,13	190:7,9	185:1,18	108:9	3:13,14
106:4	209:15,18	191:17	185:20	176:23,24	6:2,5
108:7,8	209:19,20	creating	187:13,14	cycles	231:7
112:7	210:1,3	188:13,15	187:18,19	176:13,16	237:1,17
114:12,22	210:13	188:22	187:23	176:18,20	237:20
115:2,23	211:1,2	creation	192:2	177:3	data
121:13,23	211:18,19	233:25	197:11		14:22
122:3,5	211:21	credible	235:22	D	22:18
125:25	212:12,13	146:18	current-...	D	38:7
126:8	212:16,17	198:24	185:16	6:10	76:25
134:20	212:18	criteria	currently	218:22	103:15,17
136:10,15	213:3,6,7	115:6,7	61:5	d/b/a	103:20
137:14,17	213:10	208:2	currents	1:9	109:5,13
138:18	214:7,9	209:23	26:12	daily	109:14
140:6	214:15,19	215:5	30:21	100:1,2	116:10,17
146:13	214:23	216:8	112:2	126:22	125:9,10
147:19	215:1,4,8	218:17	140:12	127:8	126:5
150:13	215:10,13	219:9	187:24	dairy	127:17,18
158:3,16	215:18,19	CRR	223:3,15	14:24 15:3	127:22
158:17	216:9	1:17	curriculum	15:11	131:23
159:7,13	217:5	238:18	3:13 6:1	16:7 20:9	132:7,8
159:16,20	218:2,17	crystalize	8:3	22:20	133:2
159:21	219:8,11	26:15	curve	25:3 27:4	145:4
160:3,5,7	219:17	cultured	108:14	27:15,22	148:23
160:14	220:5,18	170:19	109:4	47:25	154:9
161:12	221:10,10	cup	110:9	48:1	155:13,16
163:24	221:12,13	79:4	161:6,21	52:17	155:18
169:21	223:5,5	cups	164:20	54:23	160:8
170:9,11	223:18,18	79:10,13	192:6	71:7	166:11,24
170:18,21	229:1,3,4	79:14	196:12	77:22	170:1
170:24	229:6,8	current	curves	79:5	177:23
171:15	229:17	12:24 19:1	108:18	128:2	187:22
172:23	230:8,9	58:23	161:24	129:4,9	196:10
174:4,23	232:1	84:3 93:6	162:20	129:13	197:7
176:24,25	cows'	95:7,8	customers	130:7,10	204:1,13
178:20	80:1,18	96:25	186:7	133:15	204:18,19
203:7,13	Craine	97:19,22	cut	181:23	204:22,23
206:15,19	43:8	111:23	39:5	206:3,25	208:11
207:16,19	create	112:2	125:21	207:14	209:8
207:20,22	72:13	119:8,25	CV	damage	210:20,22
207:25	172:7	120:18	9:12 16:10	92:6,6	210:25
208:3,3,4	173:7	137:8	18:3,15	Dan	211:1,20
208:5,7,9	201:5	138:2	28:20	8:18,19	213:16

221:19	215:3	229:5,8	92:11	154:20	56:11
222:10,11	237:22	229:16	134:15	155:10,11	58:20
223:21,22	days	deal	146:1	155:16	describe
224:1,5	35:25 36:8	194:23	166:11	delayed	59:15
224:13	41:7 42:4	dealing	defecated	163:22	68:10
225:3	48:12	69:3 89:1	120:8	218:5	166:19
228:12	99:8	107:22	defecation	delaying	described
229:10,11	100:6	158:12	180:8	105:12	71:17
229:12,13	101:1,4,7	dealt	defend	155:21	113:24
229:15,16	101:8	107:23,24	68:12	Delays	128:2,21
234:10,13	108:10,12	225:11	70:19	43:24	218:15
dataset	108:22	debatable	233:8	delivered	describes
14:20	109:9,10	97:24	Defendant	223:3,15	82:3 156:8
103:24	109:11,11	112:17	2:8	demand	192:3
date	109:12,14	debate	Defenda...	55:18	describing
6:3,6,8	109:15,16	113:12	1:10	57:10	41:12
12:13,14	110:2	December	defending	demonst...	Descripti...
15:4	115:15,20	33:24 34:3	38:15	150:16	3:12
129:24	115:25	decide	defense	Denver	design
130:2	116:2	128:10	34:20	2:11	63:24
167:18	128:2,3,9	decided	39:19	denying	desk
178:8	128:11	70:13	42:18	70:2	202:1
182:21	129:6,6	122:16,19	defined	departm...	destroyed
199:7	130:7	122:20	82:22	9:13 10:9	202:13
200:2	131:11,15	131:7	definitely	200:4,19	detail
201:21	131:17,19	201:2	59:15	201:6	25:10
206:9,13	131:20,23	214:25	definition	depend	38:10
206:17,21	131:25	233:7	7:24,24	106:8	detailed
226:23	132:1,5,5	decision	51:22	depending	201:5
dated	132:11,11	121:23	211:12	97:22	details
202:23	132:13,14	130:25	224:21	depends	22:14
Dave	139:12,21	decline	definitions	222:16	Detect
26:11	168:20,22	108:9	7:22	deposed	59:17
David	211:9,19	144:21	definitive	11:8	detected
48:8,10	211:21	161:7	196:11	deposition	186:10
191:6	212:15	163:7	degree	1:13 11:5	determi...
day	218:6,23	declines	65:7,14	35:20	67:20
60:25	219:13,18	148:15,16	66:5,7	36:8	determine
108:17	219:20,24	161:14	67:8,14	42:11,24	90:5 119:8
115:17	222:14,25	162:23,25	67:25	49:23	127:4
116:19	224:4,18	165:18	delay	51:4,6,9	171:15
130:13,23	224:19,25	166:25	102:11	51:16	177:6
136:16	225:4	declining	135:13	59:23	235:23
149:19,21	227:17,23	160:13	138:8,9	232:9	determi...
164:23	227:24	161:4	141:10	depositi...	62:3 83:2
210:14,15	228:13,15	decrease	154:10,13	42:21	121:20

211:17	135:9,14	145:23	226:20	45:9 46:2	183:8
determi...	138:6	152:4,14	discussi...	60:13	184:20,25
33:13,17	142:1,22	152:17	46:21,22	66:20	193:20,21
66:22	145:6	153:12,23	disease	69:5	doubling
67:19	150:4	153:25	104:6	72:19	156:11,12
231:25	152:22	154:5	disorders	175:14	156:12
develop	154:22	158:11	218:19	227:3	doubt
53:18	155:3,4	160:18	display	231:6,21	116:8
developed	156:2	169:19	176:18	234:19	Doug
53:20,21	161:15	170:9	displayed	docume...	63:16 64:6
55:8	164:6	202:24	176:12	48:3	66:10,25
64:20	166:8	203:1	177:2	docume...	downside
65:1,23	167:9	221:24	distance	34:24	110:9
66:25	differenc...	227:17	92:17	71:25	Dr
126:3	93:11	difficult	distract	doing	6:24 8:17
172:24	127:4	7:4	64:10	9:25 14:14	8:20
173:1	135:10	difficulty	distressed	16:19	11:20,21
developi...	142:8,13	57:8	197:16	21:17	13:6,9
64:11,14	142:16,24	dig	distribut...	47:20	18:23
64:21	143:14,19	5:6 57:21	71:22	52:18,21	20:9 35:9
67:9	144:5,12	digit	disturbed	53:11,18	48:11,13
deviation	145:22	228:19	197:20	54:11	58:3
205:6	149:3,5,6	direct	divided	56:11,23	60:16
device	150:9	95:20	120:24	66:22	61:22,25
55:7	151:1	direction	130:13	83:18	62:1 63:2
diagonal	154:19	16:3	134:14	84:1	73:10
192:22	205:4	directly	divides	95:15	80:17
diagonally	223:5,18	58:6 135:8	192:7	101:6	94:11
192:20	different	disagree	docket	102:23	101:23
diagram	14:22	227:13	11:15,15	103:3	121:24
118:10	52:22	disagreed	11:19	114:6	151:7
192:3	55:4	198:21,25	12:16,19	117:1	199:11
217:7,8,9	56:12	disclosed	13:17	122:11,14	200:6,24
217:10,11	62:9	41:5	33:13,16	128:6	201:16
217:13,22	70:25	disclosure	34:8	136:18	227:5,7
Diagrams	71:10,10	41:7	53:25	148:3	229:21
39:21	75:1	Disconti...	54:1	165:20	231:2
dialogue	81:15	29:15	64:18,18	171:7	233:22,25
41:25	86:13	discuss	64:24,25	176:2,4	234:4,11
died	94:13	46:17	65:2,10	191:3,7	234:12,25
209:8,10	104:23	52:24	67:10,17	207:12	236:12
differed	106:25	190:21	68:1	209:7	dramatic
198:15	123:9	discussed	Doctor	216:3	144:21
difference	136:6	200:5,15	113:6	doomed	drank
42:14 94:1	141:22,22	discussion	184:17	192:10	102:12
96:4	144:13	189:23	document	dotted	135:7

140:16,22	149:12,19	35:9,18,19	52:8	130:1	98:1
141:3	149:20	36:7		175:17	105:13,19
146:5	150:20	37:21,22	E	178:6,12	105:20
155:1	154:10,20	38:2,4,24	E	206:14,18	120:2
157:22,23	155:16	39:15	1:6 2:15	effort	153:1
157:25	157:21,25	40:10,11	6:10,10	10:7	155:11
158:8	159:2	40:12,23	6:10	eight	171:16
draw	164:2	40:24,25	218:23	100:24	178:12
60:15	194:8	41:1,2,13	220:9	123:4	191:8
143:15	210:14	42:2	eagerness	215:7	194:7
145:5	drinking	58:24	180:1	either	electrified
158:10	29:16	drives	earlier	11:5 20:4	76:15,21
189:19,21	43:24	35:14,17	52:10	41:23	79:14
Drenkard	76:20	35:18	64:25	44:11	93:1
43:18	77:24	drop	191:2	47:24	141:17
drew	79:4 82:4	149:24	earth	49:22	electrify
189:14	85:23	151:24	91:12	85:5 89:7	22:20
192:11	92:1	165:14	east	100:4	electroc...
217:22	102:8,9	dropped	59:6	109:19	50:7
dried	104:4	123:7,22	easy	122:24	electrodes
57:7	105:9,13	dry	55:6	135:3	50:4,5
211:13	114:7,8	57:5	eat	137:23	106:16
drink	123:9	171:22	113:8	179:14	element
78:14,15	124:3,7	209:3	194:8	205:7,8	95:16
78:16	134:11,18	211:18	economist	207:17	elevated
79:9,10	135:8,13	due	233:18	212:24	217:17
79:11,11	136:18,21	29:16	Edgar	227:22	eliminate
79:12,12	137:9,15	155:11	174:20	electric	110:11,13
101:25	137:17	164:9	effect	31:22,25	110:14
102:2,4	138:10,11	193:5,6,8	9:11	32:3,8	159:6
102:15	140:24	193:9,16	113:23	133:9,10	eliminated
103:5,12	141:4,8	193:24	effects	electrical	74:10
103:17	141:13	194:5,12	3:15,16,18	3:20 59:16	110:14
105:10,24	149:9	194:15	3:20 4:2	86:16,19	Emeritus
113:2,3,7	150:8	195:1,5	4:4 6:7	97:2	9:13 18:11
123:14	155:10,11	195:20	14:18	106:20	Empire
124:6	156:16	223:4,16	27:3,5,8	116:16	31:21,25
135:18,21	157:11,12	duly	27:25	139:10,11	55:20,22
136:8,10	157:18,19	6:11	28:8,10	175:2	133:9
137:7	157:19,22	Duration	28:13	177:18	employed
138:15	163:22	30:20	29:14	178:6	111:9
140:23,23	drinks	Dutch	31:10	191:5	employee
141:14,16	156:14,23	47:25 48:1	43:10,22	233:20	238:13
141:18	157:9,15	duties	43:25	electricity	ended
143:12	158:5	10:12	59:16	96:6 97:15	57:14
144:18	drive	duty	129:21	97:18	183:21

energized 76:21	230:6,8	evening 117:1	excessive 179:21	205:17	212:11
energy 1:9 31:22 31:25 32:9 66:14 69:15,25 133:9	environ... 9:14 223:4 223:17	eventually 216:9	excluded 87:2	existed 76:25 82:9	213:4 215:4,8 219:2 221:16
engage 72:12	equals 97:19 98:11	everyday 78:11 79:5	excluding 82:12 87:13,13 87:20 88:3 94:17	existence 68:11,22 68:23	experim... 47:17 73:24 74:5 86:14 110:1 114:18 123:4 130:12 221:8,9 222:5 226:10
engineer 86:17 106:21	equation 98:9,12	evidence 45:5 80:25 81:5 136:12 137:2 178:16 192:6 205:12	excuse 173:4	exists 82:3 86:21 87:22 194:25	86:14 110:1 114:18 123:4 130:12 221:8,9 222:5 226:10
engineer... 9:14 45:7 69:1 71:11,20 86:19 191:5 233:20	equipment 177:19	exact 12:13 86:25	executed 39:7,10	expect 184:21 192:7 193:2	86:14 110:1 114:18 123:4 130:12 221:8,9 222:5 226:10
engineers 15:16,20 15:24 69:1,2	error 235:21,22 235:23 236:2	exactly 12:12 29:1 32:5 34:16 35:21 46:15 61:21 64:19 67:12 86:11 122:9 125:16 126:18 131:9 189:9 211:7 223:8	exhibit 6:1,4,7 8:3 34:19 45:20 59:10 129:21,25 130:8,10 132:20 167:16 169:15 178:1,6 199:5,25 200:11 201:19 202:23 205:25 206:1,3,6 206:10,14 206:18,24 213:22 226:21 231:2,6 231:11,12 232:14 233:13	expectat... 67:12	experim... 57:9 166:18 experim... 23:18 24:12,13 30:7,19 46:18 47:14,21 63:20,24 72:12 102:23 106:13 189:3,4 expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entire 3:25 72:22 188:16 206:7 225:7	escape 111:9	Examina... 3:5,5,6 6:13 231:1 235:7 238:9	EXAMIN... 3:1	experim... 50:9 73:24 75:16,17 75:19 76:9 193:22 experim... 14:21,22 26:4,16 27:22 30:16 102:17,25 103:15,22 104:3,13 104:14,17 115:2 116:2 120:18 124:10 128:22 133:12 144:6,25 187:12,12 209:7	23:18 24:12,13 30:7,19 46:18 47:14,21 63:20,24 72:12 102:23 106:13 189:3,4 expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	ESEERC 32:11,12	estimate 73:25 74:6	examined 224:6	experienced 185:19 186:3	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	especially 7:9	ESQ 2:5,11	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	ESQ 2:5,11	estimated 196:18	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	estimate 73:25 74:6	et 113:25	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluated 103:24 129:5 170:24	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluates 61:17	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluating 128:25	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluation 171:18 177:21	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluation 171:18 177:21	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...
entirely 24:16 78:9 234:14	evaluation 171:18 177:21	EXAMIN... 3:1	examined 224:6	exhibits 3:10 42:10	expert 6:19 10:22 44:21 108:18 109:24 175:15 220:22 expertise 233:20,23 explain 142:10 148:13 explained 122:22 explanat...

145:14	146:21	farm	fear	155:14	135:16
162:3	151:23	3:20 22:20	105:19	160:19	137:24
165:11	164:1	47:21,22	feces	164:18	169:19
explicit	171:9	47:23	120:15	183:7,20	fine
54:9	234:9	53:3,7	feed	183:22	99:2
exposed	factor	59:17	112:12,22	184:20	143:15
178:20	137:10,12	74:12,13	112:24	214:24	finer
214:8,9	factors	77:19,22	113:15	216:4,23	32:2,6
227:24	165:19	78:7,11	180:12	217:2,17	finish
229:17	facts	115:3	feedback	file	7:1,6 39:3
exposure	80:24 81:4	178:7,13	131:4,5,6	35:8,10	39:4
3:25 4:2	83:10	farmer	feeding	36:7	53:14
12:24	113:13	136:8,15	111:8	56:11	128:15
99:9	136:11	138:20	187:12	files	153:17
206:7,12	137:2	179:19	feet	36:20	164:15
express	196:23	184:3,12	78:3 89:8	fill	168:14
232:10	199:22	193:22	91:18	208:3	188:7
expressed	205:11	farmers	93:8,8	215:8	203:2
46:2	fair	22:20	fellow	216:9	finished
extension	163:11	54:23	139:25	filled	53:15,16
19:11	faith	69:6 71:7	felt	209:18	66:15
51:24	235:1	136:6	69:4 70:23	final	70:9 72:3
52:7,9	fall	137:16	fewer	103:24	72:4 75:4
199:9	47:2,2	174:2	157:25	132:10	78:17
extent	205:7	180:15	field	finalized	179:5
7:17 50:18	fallen	181:23	73:24	190:8	186:20
78:21	125:21	farms	75:17,20	financed	187:17
235:12	familiar	25:3 51:19	76:9	133:4	216:24
eyeball	43:17	52:18,22	180:20	financially	firm
136:9	53:25	52:23	181:4,6	238:14	34:20
	73:20	79:5	182:21	find	first
	79:24	fashion	183:4	58:13	6:24 8:2,9
F	80:3,8,9	37:23	fields	74:11	10:21
219:1	80:20,21	111:9	20:19	86:8	17:6,8
facilities	84:23	200:9	32:22	110:16	18:18
57:8 84:22	98:23	fast	fifth	132:21	39:6,10
85:6	107:1	205:15,16	218:2	136:22	41:1 42:1
139:1	108:14	faster	figure	137:6	46:9
facility	225:10	8:25 161:4	28:7 41:3	142:7	49:16
57:9 99:18	231:24	161:13,22	47:6,8,9	143:14	50:2,8
fact	FAMILY	162:14	91:6	188:21	51:11,12
56:23	1:5	165:14	93:21	233:5	60:6,16
75:11	far	favor	118:11	finding	60:23,24
102:4,6	38:12,18	176:1	150:23	142:16	101:20,21
111:22	59:1	Fayettev...	151:4,5	204:5,6	110:3,11
144:18	126:1,2	58:24	154:11	findings	110:13,14

110:15	121:15	footnote	173:9	133:11	34:25
114:21,23	122:11	87:5	176:3	136:13	fraud
115:11	150:11,11	foregoing	183:21	137:3	4:5 226:22
127:16	198:3	238:5,11	184:15,16	169:11	227:1
128:17	219:8,12	forget	187:21	234:7	234:4,8
131:16	219:20	41:17	192:15	four	free
132:2,3	fixed	48:11	193:11	20:23 33:7	84:24
138:15	92:17	149:18	196:5,22	81:16	211:9
146:17	96:12	forgot	199:22	85:24	218:6,18
147:2	flat	41:16,18	204:4,15	89:8,11	218:19,21
149:22,24	145:18,19	forgotten	205:10	91:18	freeway
158:23	flee	35:10	211:15	99:15,18	59:5
165:25	180:1	form	220:20	100:10,11	frequency
171:14	flip	30:11	221:22	100:15,23	96:18,23
176:11	159:22	34:11	222:13,20	104:22,23	180:8
190:3,7,9	167:23	42:8 43:2	223:24	105:6,7	frequently
190:18	floor	65:16	224:14	114:18,21	158:6
191:12,15	118:23	67:22	229:14,18	114:23	friend
197:16	flow	68:2 72:7	229:24	115:16	109:25
200:18	95:7	72:24	230:18	120:19	front
202:9	focus	76:16,22	231:19	121:7,8,9	34:19
207:13	111:5	78:12,23	233:10	121:13,18	120:21
214:19,25	195:4	79:6 80:7	234:6	122:7,8	173:19
215:3	folks	82:13	formed	122:14,15	234:15,16
224:19,24	60:5 85:8	83:9 84:5	24:22	123:6	full
225:4	90:24	87:24	54:22	149:23,24	14:5 15:8
233:4	137:13	91:14	forming	149:25	28:4
first-calf	162:3	105:21	42:25	150:2,17	29:22,23
101:18	191:5	106:6	formula	170:21	85:9
114:11	follow	108:13	97:9,21	198:3	139:3
226:1,13	54:7 86:15	109:1,21	forte	207:8	142:19
fit	99:23	113:5	222:23	216:17,18	146:22
185:25	138:4	128:13,16	forth	216:20	163:18
204:18,19	182:2	129:8	101:10	222:25	164:5
215:4	followed	136:11	238:6	224:10	166:22
216:7	14:23 15:2	137:1,18	found	228:20	167:13
fitted	15:11	151:13	106:17	four-hole	178:16,21
204:1,12	53:21	152:9	136:4	105:7	178:23
fitting	following	153:10	138:6,11	four-hoof	207:7,17
161:6	14:7 126:7	162:17	141:20	74:16	208:22
Fitzpatrick	180:19	163:2	145:9	four-stall	210:6,9
51:12	202:20	165:15	185:4,13	57:10	211:12,13
five	follows	166:1,16	185:15	fourth	215:18
79:23	6:12	167:5	foundation	94:11	216:11
100:21	food	171:24	62:18	114:12	219:11
121:3,9	112:21	172:8	131:12	frankly	222:11

224:22	23:12,14	103:6	47:6,8,9	155:24	goes
fully	61:1,5	147:4	52:17	156:22,23	22:21 52:2
39:7,10	96:12	161:24	53:2	158:14	52:15
71:17	106:24	177:25	56:22	159:22	75:2
fundame...	155:25	184:25	57:20	160:12,14	77:22
38:14	231:24	196:9,14	58:1,1	160:19	87:12
39:18	232:18,19	205:23,25	64:8	166:2	92:4
44:2	genesis	given	65:17	167:7	165:1
funded	191:9	11:9 13:1	67:23	168:14	183:8
31:22 32:1	Gerald	22:24	69:11	170:5	193:3
32:7,8	200:14	46:5	70:22	173:10,22	202:1
funding	Gerry	50:18	73:23	174:20	207:4,5
57:5,7	22:13	101:9	77:13	175:14	going
69:8,16	198:6,7	115:5	78:18,19	179:16	5:5 7:23
69:25	199:13	121:22	79:7 81:5	183:6	8:8 13:2
70:6,15	200:24	126:13,14	82:16	184:3,8	20:2 42:9
further	getting	162:4,5	83:10	184:17	45:8,14
68:11	39:12 56:8	171:4	86:4,25	185:8,9,9	46:4
163:25	57:8	209:21	87:7,9	186:2,21	53:17
169:4	63:12	234:13	88:13	187:11	55:6
170:24	95:17	237:18	89:7	188:7	57:19
235:4	102:5	gives	96:23	190:11	58:14
238:13	105:19	18:12	103:8	192:18	59:13
	106:5	45:16	104:11	194:23	69:16,24
G	107:6	138:1	105:22	195:9	70:8
G.R	113:4	168:21	106:9,17	196:25	79:15,19
198:3	117:7	192:24	107:13,15	197:14,22	84:7,25
gallon	119:6	209:23	111:3	197:22,25	86:15
102:12,15	132:2	224:18	113:6	199:23	92:11,22
105:11	136:20	227:16	114:24,24	202:4	92:23
138:15	139:10,10	giving	115:13	203:11	98:14
152:12	167:12	34:15	120:15,22	205:12,23	100:18
154:10,20	171:21	139:11	122:15	213:19	106:8,10
gallons	205:25	174:23	130:4	216:9,12	110:24
152:16	215:21	206:2	131:13	216:21,23	111:2
garden	221:21	go	133:6	220:22	112:4
119:16	225:3	5:5 8:25	135:5,5	221:7	113:3,8
gas	228:19	10:10	136:13	222:21	114:11
50:4 54:24	give	21:6,18	137:3,19	223:2	119:25
general	9:2 23:13	24:4,24	140:9	224:15	120:2
97:21	23:19	25:10,16	146:16	225:12	122:16
183:19	28:16	25:22	147:2,19	227:14	125:22
generali...	54:3 58:4	26:20	150:6,19	228:25	126:1
183:12	80:13	28:7,21	150:23	231:4	127:9
generally	84:2,15	35:25	152:10	goals	128:16
14:16	88:6	39:4 42:3	154:10	177:3,6	130:4,5

135:18,24	155:8	215:15,22	69:1,25	205:14	152:12,15
136:1,9	164:13	graduate	70:13	Gustafson	155:8,19
136:21,22	188:19	17:2,7	71:6	3:21,24	159:8,12
141:10	212:5	graduated	102:24	75:16,21	159:13
146:11	Gorewit	8:10	104:22	76:10	168:20,20
147:6,7	11:20,21	grain	121:22	80:17	168:21
147:20	13:6,9	217:13,13	124:14	188:25	208:2
150:7,13	18:23	Grandkids	176:24,25	189:1	210:14
156:22,24	20:9 43:8	10:3	177:1,2	191:7	216:15
159:10	43:23,24	graph	178:20	199:5,11	219:6,21
161:12,12	48:11,13	146:15,16	183:19,25	199:20	220:8
161:21,22	60:16	162:16,19	186:23	200:6,24	halfway
162:14,20	73:10	164:17	188:16	201:11,16	190:18
169:22	101:23	165:11	189:4,18	201:20	hand
170:5	106:14	192:22	214:7,16	202:17,23	7:5
175:1,2	109:6,25	203:24	214:17,18	203:22,23	handbook
176:10	112:14	204:11	214:20	Gustafso...	18:20
178:3	113:25	graphic	groups	76:9 200:8	29:18,21
180:3	114:21	146:14	104:23	guy	54:14
182:1	116:13	graphs	105:4	53:5 86:17	59:16
184:1	121:24	145:20	133:4	175:25	60:13
186:13	128:6	grate	138:7	guys	66:17
189:21	131:1,7	77:10 78:3	214:8,15	197:1	68:14
196:4,20	140:2	93:8	224:11		178:12
204:3	167:1,20	171:23	guess	H	197:13,15
205:23	168:7	173:6	11:22	H	200:20
211:25	169:1,10	great	41:21	6:10	handled
213:16	174:9,13	38:9 66:19	67:4	half	107:18,19
214:25	175:9,10	greater	112:24	36:1 48:19	107:25
217:24	175:19,23	115:16	123:24	55:17	108:2
219:17	175:24	165:18	148:7	58:9	116:12
221:7	177:15	grid	219:25	100:15,24	134:14
224:21	181:8,9	174:24	224:17	128:2,3	224:16
228:4	181:13	175:11,19	guessing	128:11	handouts
234:4	182:18	grounded	126:18	129:6,6	5:4 57:17
236:11	217:23	118:20,22	guessti...	130:6,22	happen
good	227:5,7	118:23	50:23	130:23	54:15
6:14,15	234:11,12	group	guidance	131:11,15	55:23
9:12	Gorewit's	24:22	133:1	131:16,19	58:19
22:22	114:16	52:11,15	guide	131:20,23	128:4
76:6	172:2	52:20	197:6	131:24,25	236:11
86:18	governm...	53:3,4,13	guideline	132:1,5,5	happened
89:21	68:5	53:20	196:9	132:11,11	18:2 33:20
98:15	gradation	54:21	guidelines	132:13,14	73:9
102:20	196:2	60:5,9	25:3	149:4,5	99:23,24
115:18	gradually	66:10	196:14	149:19,21	124:17

129:7,16	233:23	45:17	holding	hour	idea
131:2	health-r...	211:23	120:9	56:7,7,9	22:22 49:3
137:14	218:7	214:2	161:10	188:9	60:11
141:6,7	healthy	helpful	holds	hours	113:11
172:3	169:22	60:15	44:15	56:17	118:2,6
173:11	172:17	Henke	160:20	101:25	138:1
186:9	218:18	43:17	Holstein	102:2,10	191:3,8
187:19	hear	herd	30:14	103:6,6,7	identical
213:14	10:6	99:12	214:7,15	103:10,12	22:3 126:8
219:22	heard	114:15	Holsteins	103:18	216:19,20
happening	48:1 63:11	136:8	3:18 27:25	105:12	216:22
161:1	64:21	138:22	28:14	123:10,13	identific...
183:1	65:5	210:2	130:1	124:6	6:3,6,8
happens	108:19	221:10	Holsteins'	135:22,22	129:24
77:25 79:4	227:1,4,7	226:5	4:1 206:10	141:18	130:2
186:6	hearing	hertz	home	housing	167:18
195:16	3:19	88:15	56:21	84:21	170:20
hard	167:17	97:10	hoof	huge	178:8
205:15,16	hearings	121:5	81:12,14	96:21	199:6
hate	11:9	hey	81:17,18	human	200:2
178:4	heat	184:3	81:24	43:3 96:7	201:20
hay	106:24	Hidden	Hooper	96:10	206:8,12
84:22	107:1	1:4 36:23	44:10,16	humanit...	206:16,21
head	heifer	high	46:15	102:21,22	226:23
14:13	103:12	96:23	51:11,13	hundred	identified
186:18	141:17	119:21	hooves	136:15	23:17
208:17	226:1	156:5,6	78:6 79:18	hundreds	167:15
heads	heifers	221:5	80:1,18	208:19	IDing
7:10	101:15,18	higher	81:15,16	hyperten...	39:22
health	101:24	107:12	85:24	9:7	ifs
3:16 4:3	102:16	127:13	89:8,11	hypothet...	233:6
9:1 10:5	103:23	152:6	91:12	76:17,23	images
14:17	104:15	highlight	119:4	78:13,24	37:16
27:6 28:2	114:12,22	150:21	120:19	79:7	38:11
28:9,25	121:23	Hill	175:6	83:10	immediate
43:25	124:6,19	17:19	hope	87:25	164:3
113:24	127:15	19:14	59:14 98:6	113:6	immedia...
114:9	147:10	history	hormone	136:12	139:11
115:14,16	160:11	111:4	107:10	137:2	impact
129:22	176:12,15	115:15	horse	224:15	164:2,3
169:20	218:3	hits	50:3,7,8		186:23
171:18,19	226:13	184:19	hose	I	impedance
175:17	held	hold	117:18,19	ID	30:14
206:4,15	1:14 55:2	38:23 65:7	119:16,16	226:17	62:17
207:1	help	66:4,6	hospital	Idaho	74:1,3,7
218:20,21	28:15,16	206:23	58:10	62:2	74:9

82:10,20	149:10	132:24	initial	interest	46:10
82:23	includes	161:14	123:13	19:5	50:22,24
83:4,21	82:25	192:25	128:22	160:20	51:3,8
90:3 92:7	90:21	indicated	143:12	interested	52:11
94:12,13	91:16,20	50:14	144:13,17	13:3 181:5	54:10,23
94:15	149:8	171:11	initially	233:5	54:23
95:23	151:15	234:12	60:10	238:15	61:9
96:5,10	including	indicates	69:15	interfere	63:12
97:6,9,11	218:7	10:21	144:20	9:2	93:22
97:21	incompl...	indicating	injuries	internal	116:15
140:5	76:17,22	183:11	123:8,22	92:7 94:12	132:24
impedan...	78:12,23	indication	125:10,17	interpret	171:6
30:1 140:6	79:6 83:9	107:11	125:18	161:19	172:1
140:13	87:24	112:22	injury	162:23	173:16
imperative	113:5	155:8	92:8 124:2	184:21	197:7
112:7	136:12	236:4	133:24	197:8	232:20
importa...	181:20	indications	input	204:24	233:8,25
7:18 45:18	182:3	142:21	12:21	interpret...	involve...
important	224:14	individual	13:13	163:12	232:17
7:8,14	inconclu...	117:23	inspected	171:5	234:19
15:4	144:8	136:18	162:8	172:2	involving
232:24	163:19,21	208:22	instability	186:23	23:18 49:7
236:6	increase	228:13	8:24	interpret...	104:13
in-house	127:14	232:1	instance	184:19	irregular
133:2	151:19	individu...	203:7,16	interrog...	177:2
inadvert...	154:13	134:6,7,20	Institute's	39:7,8,10	ISBN
34:25 35:8	increased	individuals	202:12	40:3,8	22:2
41:13	112:2	13:6	instrume...	interrupt...	isolate
incidence	116:1	inductor	10:16	135:23	119:17
175:12,17	142:4	96:7	24:18	interval	isolates
176:6	180:8	industries	insulator	170:23	80:3
182:12	181:22	55:9	97:2	intervals	isolation
include	182:6,12	industry	intake	117:1	55:6,7,18
15:17	increases	54:24,24	26:9 27:4	investig...	93:14
73:18,19	175:12	influence	28:9	66:23	118:14,17
74:16	increasing	177:22	112:12,12	invited	issue
91:13,19	111:9	influential	112:19,20	20:21,23	17:16
150:10,12	112:2	76:11	112:22,22	23:7,12	60:12
179:25	115:25	informat...	112:23,23	23:13	69:3,3
included	143:17	12:18	112:24	24:5	71:7,8,15
103:23	144:22	19:13	114:9	involve	127:10
125:11,12	incurred	26:14	127:14	72:5 93:22	167:12
125:13	32:4	36:3,19	intend	96:5	issues
128:25	IND	65:5 66:3	232:9	involved	3:22 54:22
134:24,25	1:8	67:13	intended	13:9 21:2	55:3,4
135:3	indicate	115:1	192:12,23	24:12,25	71:1

107:3,4	237:1,17	42:8	17:8 47:23	63:3,7,10	136:24
199:19	237:20	164:10	189:1	63:21,23	137:10
200:1	Jane	232:24	196:20	64:19,24	138:21,24
218:7	1:6 42:22	keeping	198:7	65:11,20	139:7,20
issuing	Jim	210:2	201:2	67:11	145:12
67:25	46:15	230:5,7	227:3	68:4 70:3	147:5
italicized	jives	kept	230:10	72:3	156:8,20
180:5	187:3	58:22	know	73:22	158:10
182:2	John	146:11	5:3 7:6	78:19	161:11,15
item	46:17,21	171:10	11:7	79:1,2,8	161:23
18:19 19:4	46:22	208:5,16	12:12	81:21	162:20
19:5	47:13	210:3,21	13:1 15:3	84:10	166:17
20:18,24	48:5	210:22	16:18	85:8,23	170:8
20:24,24	journal	211:1	17:19	86:1,9,11	171:9
20:25	14:23 15:3	224:1	18:10	86:12,18	172:4,13
21:19,20	15:11	kilograms	19:9	86:21	172:15
21:22,24	16:7,11	115:17	20:15	87:6,8	173:7,13
21:24	16:19,20	159:8	21:5	88:7,14	175:10
22:1	20:9	160:2,3	22:13	88:17	176:19
24:21,22	27:15,22	218:24,25	24:16	89:10,14	177:24
25:6,7,22	73:4,5	220:10	28:6,24	89:17	178:1,1
26:3,17	128:1,9	kind	32:5	91:7	183:23
26:18	129:4	31:19 46:6	34:13,14	92:22,24	189:8
27:12,23	130:7,10	54:25	35:1,4,15	92:25	193:15
30:6	133:15	56:25	35:16	94:4,5	196:11,24
31:18	206:3,25	57:1	36:9,15	98:10	198:6,8,8
32:19	207:13	60:13	39:2	102:1	198:10
33:1 38:6	JR	70:23	41:14,19	106:20,23	199:12
44:16	1:5	76:1 88:6	41:24	107:1,24	201:17,23
141:24	July	103:9	45:14	108:4,7	203:9
202:16	38:6	149:7	48:10	108:11	207:20
220:9	jumping	155:9	49:1,3	109:4	208:15,16
items	180:2	156:8	54:2,9,9	112:18	208:20
23:16 24:1	June	157:14,20	54:17,18	119:22	209:9
29:12	40:4	171:8,11	55:12,13	122:2,19	211:1,18
35:11	juries	174:11	55:15,18	126:1,2	214:5
37:22	196:21	183:10	55:24	126:12	221:23
39:15		186:11	56:1	128:5	222:7,8
Ithaca	K	201:5	57:12,15	129:7	222:18
48:14,18	KATE	205:25	59:24,25	131:5,9	223:1,9
	2:11	219:7	60:18,19	132:12,16	225:1,2
	Kauch	kinds	60:20	132:17	226:9
	49:8	106:25	61:20,22	133:13,17	227:5,8
J	keep	Klei	61:24,25	134:10	227:22
3:4,13,14	14:12	214:3	62:2,16	135:21,23	229:10
6:2,5	23:19	knew	62:19	136:9,21	230:7,10
231:7					

230:19	108:18	142:7,12	216:21	51:22	135:11
234:8,17	109:4,24	143:8,10	layperson	64:8	140:24
235:8,25	110:9	143:10,16	113:21	73:23	141:22
knowledge	114:12	207:22	lead	107:14	185:2
16:22	115:12	larger	143:7	110:22	lieu
24:14	139:3	77:17	lead-up	120:22	34:8 83:18
47:16	142:19	142:3	69:21	135:5	Linda
60:14	146:22	154:25	leading	146:16	116:22,24
110:1	160:9,10	LARTU	138:19	147:2	line
189:11	161:11,20	57:11	233:10	149:18,22	3:2,12 5:2
234:3	161:21,23	99:12,21	leave	154:10	7:18 48:4
knowled...	162:20	114:18	103:8	160:19	94:11
13:12	163:18	127:16	115:10	184:20	140:6,13
known	165:14	211:18	leaving	196:25	143:15
111:4	166:23	lasted	181:20	197:22	160:23
126:20	167:13	219:5	led	205:23	164:15,22
183:15	178:16,21	late	142:19	209:6	174:3,22
knowns	178:22,23	165:14	163:18	215:3	183:7,8
98:5	181:18	LaVerne	Lefcourt	228:2	183:11
knows	206:8,15	203:24	3:21 43:13	let-down	184:8,19
91:22	206:19	law	43:20	181:19	184:20,25
93:22	207:7,17	2:3,9	190:11	182:3	186:6
229:25	208:23	34:20	199:6	letter	189:4,21
<hr/>	209:1	97:13,13	Lefcourt's	3:21,23	192:7,11
L	210:4,6	97:15,25	111:24	199:5,21	192:20,23
L	211:12,13	98:1	left	200:6,8	192:24
6:10,10	211:21	148:3	68:18	201:19	193:4,7
labeling	216:11	Lawrence	101:22	202:17,23	193:20,21
55:8	218:2,23	44:9	130:11,18	203:20	196:1
labels	219:1	231:25	149:23	letters	203:25
191:21	222:12	lawsuit	194:11	32:11	204:1,12
laboratory	223:22	227:5	left-hand	level	204:12,18
77:21	224:3,10	234:20	118:16	13:6 23:2	204:20
lactate	224:22	lawsuits	185:13	33:14,17	205:7,9
219:18	225:7	232:2	192:21	55:16	237:2
lactating	lactations	lawyer	legal	138:5	linear
3:18 27:25	29:22,23	50:10	42:8 50:9	141:5	98:9,11,12
28:13	218:20	lawyers	202:12	143:17,18	204:21
112:7	225:1	48:6 186:4	length	151:9	236:2
130:1	laid	196:15	101:3	194:6,14	lines
lactation	18:17 67:9	lay	138:16	229:17	135:7
4:3,4 14:5	176:6	171:22,23	let's	levels	160:25
15:8 27:9	lameness	173:6	21:8 29:11	55:14	161:4
28:4 85:9	218:22	laymen's	30:13	88:24	184:24
100:5	large	96:3	31:10	107:10,12	189:19
108:9,14	99:13	layout	42:3 44:9	111:23	196:16

lingo 63:8 98:25	119:1 155:22	longer 13:10	154:3 155:24	21:7 22:2 23:22	loss 184:14
Liskeard 139:16,19 139:24	156:1 158:21 159:16	61:22 101:9 157:24	158:7 165:10,17 166:23	29:14,17 39:12,23 42:17	186:13,24 193:2,2,4 193:5,16
list 36:21 37:21 38:25 39:3,4 40:8 181:5	160:15 168:18 195:9	158:5 171:1	170:4,5 171:18 173:21	45:20 74:21 89:8	193:23 194:4,7 194:11,14 194:16,19
listed 38:18 107:16 133:5 189:4	lives 48:18	look 5:5 10:11 10:22	174:10 179:14,19 180:15	100:3 107:20 115:19	195:1,10 195:13,16 195:17,19 195:20
listen 128:19 203:11	LLC 1:4,4,5,15	15:4,5 21:6,18 24:24 25:10 28:15,16 28:17	185:8 186:2,6 186:12 187:11 196:8	132:19 148:14,22 154:8 157:6 159:4	losses 183:12 193:8,9 195:5,12
listing 179:18 227:16	LLP 2:9	29:4 33:23 35:1,3,25 36:23 37:3,10 37:13,19 38:8 41:6 42:5 45:5 45:6	200:23 201:8 228:1,7 231:23 234:23	164:17 170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	lost 104:5 124:19 141:12 146:7
lists 33:5	locate 5:7 57:24	47:19 54:22 56:22 57:19 59:10 70:13 77:13 82:16 86:4,25 87:7,9 88:13 96:7 104:11,25 106:9,15 106:17 107:13 115:5 126:5 138:13 149:22 150:7	looked 26:11 37:4 37:4,15 37:20 38:9,21 38:22 39:13,25 42:12 62:12 71:3 87:6 96:9 102:11 103:3 106:2,11 108:5 139:22 142:14 143:25 144:17 201:10 205:1,3 227:9	170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	lot 8:8 10:1,7 10:12 13:7,10 23:25 34:14 42:1 45:17 57:9,10 57:11 60:11 63:23 64:6 75:16 86:12 91:7 126:3 157:15 163:22 170:2 202:1
literal 223:12	location 99:15	Locations 39:22	201:8 228:1,7 231:23 234:23	164:17 170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	lots 88:22
literature 70:22 71:4 72:15 82:8,9 106:9,10 111:20,21 181:16	logarith... 156:9,11	logical 105:17 107:6	201:8 228:1,7 231:23 234:23	164:17 170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	loud
litigation 49:5,6 50:15 197:1 232:17,20 233:2,8	long 11:16 60:20 88:14 98:12 102:14 138:12,14 141:9,14 144:19 157:22 164:2 203:2 211:14 219:23 222:16,18	long-term 4:2 143:13 145:6 166:3 167:2 206:11	201:8 205:1,3 227:9	164:17 170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	
little 8:11 40:5 53:17 57:10 92:14 101:9			looking 12:21 13:11	164:17 170:13,15 186:5 189:7 198:2 202:22,25 203:1 209:21 220:9 228:17 230:9	

7:8 37:7	90:25	170:21	57:16	220:4,7	60:16
44:18	172:5	171:16,21	61:10	224:19	64:4
46:17,21	208:2	172:6,7	63:18	meant	69:21
46:22	mandatory	172:14,15	74:20	23:11	190:3,7,9
47:1,14	55:17 56:3	172:21,24	88:7	70:24	190:22,24
48:6	Manual	173:1,5,7	94:12	94:8,15	191:12,12
182:10	45:4 63:7	174:4,4,8	96:25	100:22,23	191:15
low	63:10,11	175:1,12	98:7	measure	meetings
81:8 82:11	63:14	175:15,18	103:19	105:25	55:2
111:23	manure/...	176:6	106:20	106:18	member
175:7	80:19	182:13	125:20	107:9	55:1
220:18	mark	218:21	128:8,9	235:21	members
lower	8:3 42:24	221:8,15	131:10	measured	72:21
89:24	129:19	222:19	141:2	74:25 93:5	memory
152:7	178:3	mat	148:2,25	93:5	47:11
153:18	marked	118:22,23	154:17	measure...	99:24
192:21	6:2,6,8	120:5,7	156:7,20	71:23	202:8
Lowered	129:23	175:3	156:22	81:20	234:12
182:15	130:2	223:17	160:11	83:15	mentioned
Ludington	167:15,18	material	171:3,4	88:5	200:20
26:11	169:13	202:1	172:2	measure...	Mercer-L...
191:6	177:24	math	175:1	52:17,24	2:11 3:5
<hr/>	178:7	220:13	176:17	91:1,8	30:11
M	199:6	matter	183:3,23	92:13	34:11
M	200:1	6:21	187:20	147:25	35:5 36:5
1:6	201:20	matting	188:5	232:6,10	36:12,17
magnetic	206:8,12	120:21	193:22	measuring	41:11
20:18	206:16,20	maximum	195:15,23	30:20	42:7 43:2
32:22	226:22	77:11	196:17	91:11	57:25
magnitude	masks	103:7	222:11	119:3	58:5,7,15
97:11	7:9	147:7	224:21	134:5	62:18
138:17	mastitic	221:4	229:2	media	65:16
maintain...	221:10,12	227:23	235:19	197:18	66:15
109:19	221:13	228:12	meaning	median	67:22
major	mastitis	mean	154:1	83:8	68:2,17
218:19	31:11	5:3 9:16	means	medicati...	70:9 72:7
235:22	52:13,16	19:25	9:18,20	9:5,7	72:24
majority	52:19,20	21:12	10:24	medicine	75:4
148:7	53:6,12	35:23	23:12	233:23	76:16,22
make-up	53:12	38:12	96:15,20	meet	78:12,17
89:18	125:25	40:14	154:4,4	17:1,10	78:23
making	126:3,6	46:5	172:17,20	64:1	79:6 80:7
55:10,13	126:10	51:23	186:19	219:9	80:24
67:19	169:22	53:14,14	194:4	meeting	81:4,11
80:16	170:3,6	54:4	195:24	17:20	82:13
89:22	170:10,19	55:24	199:18	22:11	83:9 84:5

83:9 84:5	193:11,25	211:10	50:24	163:7,20	220:10
87:24	196:4,22	218:7,19	51:1,2,5	164:4	233:3
88:4	197:3	metal	66:13,14	165:22,23	milkings
91:14	198:17	77:9 78:3	middle	166:8	117:4
98:15	199:22	78:4,5,6	110:4	167:3	170:22
105:21	202:4,14	86:5,6,10	111:13	170:18	224:5
106:6	202:22	86:12	179:3	181:19,21	milliamp
107:7	204:3,15	93:8 94:2	miles	182:3,15	111:10,10
108:13	205:10,19	94:3	59:7,7,8,8	183:17	111:17,23
109:1,21	205:22	118:22,23	milk	186:1	112:2,3
113:4	211:15,23	120:5,6,7	3:24 4:5	192:2	136:20
126:23	212:2	171:23	22:20	193:1,1	184:22
128:13,17	214:10	173:5	52:19,20	206:6,19	185:4,5
129:8,12	216:24	174:24	53:5,6,13	210:15	185:20
131:12	217:14,18	175:11,19	107:2	218:24,24	187:24
136:11	218:9	223:17	109:9,10	220:11,22	193:4,7
137:1,18	220:12,20	meter	112:6,8	221:1	milliamps
149:13	220:25	119:11,12	113:3,7	224:19	112:3
151:13	221:22	134:8,17	114:8	225:7	184:4,8
152:9	222:13,20	236:1	115:15,16	229:8	184:10,12
153:10	223:7,11	method	115:20	milk-out	185:21,22
161:25	223:24	84:21	116:2	181:20	185:23
162:17	224:14	235:9	117:20	182:4	187:25
163:2,9	226:19	methodo...	135:2,19	milked	mind
163:14	228:2,6	5:7 42:19	135:25	85:10	23:10
164:13	228:16	44:13	136:2,23	116:18	129:2
165:4,7	229:2,14	53:18,21	137:5	117:6,14	minerals
165:15	229:18,24	54:12	141:12,24	136:17	78:21
166:1,16	230:18,21	57:23	142:7,16	221:24	minimal
167:5	231:1	68:12	142:22,25	milker	76:1 84:7
168:8,11	236:10,19	70:19,20	143:2,4,6	117:10,11	minimum
168:17	236:21	70:21	143:17,19	milking	77:11,16
169:11	mercera...	71:18,19	144:5,11	14:16	139:13
171:24	2:12	71:24	144:12,20	84:23	220:19
172:8	Merck	72:2	145:7,9	116:21	221:6
173:9,12	63:7,10,11	231:25	145:14,17	117:2,25	minimums
175:13	63:14	232:11	145:22	118:1	77:12
176:3	met	Michael	146:1,8	135:23	148:4,6
177:12	16:21,23	4:6 17:9	150:9,19	138:8	Minneap...
178:2	17:6	226:22	150:22	141:8,10	60:7
180:21	51:11,12	227:1,7	158:14,16	179:22,23	189:25
184:15	62:1	233:14,16	158:17	180:1,9	190:2,25
186:20	190:19	233:19	160:6	181:14,17	191:13
187:17,21	191:11	234:21	161:7,10	181:22	Minnesota
188:6	198:7	Michigan	162:7,8	182:6	47:24
192:14	metabolic	33:11	162:25	186:15	75:15

185:13,15	Mm-hmm	monitori...	89:8,14	Neubauer	30:18,24
200:4,7	8:4 18:16	24:18		35:12 37:2	30:25
200:21	21:1	134:18	N	37:12,17	31:2,5,12
201:6	25:18,20	136:7	N	38:7	34:24
minor	31:15,17	137:8,9	6:10,10,10	39:22	35:7 36:3
21:17	43:14	month	N-to-E	40:5 44:9	36:18,19
minus	64:12	209:7	43:25	44:15	53:8,9
235:20,24	114:13	months	name	88:17,22	55:1,11
minute	115:22	219:8,12	6:16 15:16	91:5,15	55:13,15
59:14,14	147:23	219:20	15:22	93:25	55:19,20
164:14	173:3	morning	16:5	Neubaue...	58:25
minutes	179:17,24	6:14,15	47:23,25	42:18	69:16,25
59:2,4	182:9	117:1	49:8	44:13	72:5,11
102:12	191:14	mouth	106:15	231:25	72:12
155:22,25	198:5	74:16	132:22	232:6,10	133:11
156:1,4,5	226:4,6	76:14,19	214:3	235:9	139:15,19
156:6	MN	77:9	nasal	neutral	139:23
230:22	2:5	78:10	91:23	3:15 6:7	153:4
misconst...	model	79:15	92:17	26:12	205:17
197:18	108:4,5	86:3,7	Nebraska	55:5	232:25
misinter...	110:7,8	89:8	22:11	neutral-t...	night
197:17	143:20	91:18	146:19	3:16 27:3	34:23 35:7
misplaced	144:4	93:1,9,10	necessar...	27:5 28:8	nine
41:20	145:2,3	93:22	225:6	129:22	210:1,2
misread	145:11,12	119:3	necessary	197:12	216:6
178:18	164:6	185:16	112:12,23	never	217:8,11
missed	165:12	235:10	need	23:1 47:23	nodded
20:11	166:6	mouth-t...	15:5 35:5	48:1 62:1	189:21
141:3	models	185:17	38:25	76:6	nodding
234:14	96:7	move	91:1	81:20,20	7:9
missing	moderate	30:13,13	112:20,20	86:17	non-Larry
224:19,24	184:9,10	98:14	113:7	125:1	93:25
225:3	184:11	107:14	165:19	151:22	Non-Ref...
misstates	194:14	110:25	167:10	153:8	25:17 29:7
65:17	196:2	156:13	184:16	228:1	Nonrefer...
68:17	modified	169:5	205:19	232:23	23:8
163:14	29:15	188:12	needed	236:3	Norell
167:6	111:8	212:5	60:12	new	40:18
171:24	moment	movement	163:17	1:15,18	43:15
173:10	111:6	101:9	neglect	19:6 21:2	61:22,25
175:13	130:6	moves	159:10	23:14,18	62:1 63:2
192:16	monitor	56:22	neither	23:18	82:15
196:23	134:19	multiple	51:4	24:12,23	86:21
197:3	176:19	49:15	112:16	25:9,14	87:10
mistake	monitored	muzzle	nervous...	26:14	88:8
203:2	134:20	30:15 82:4	179:22	30:7,10	111:10,16

111:25	notes	207:22	72:7,24	observat...	oh
112:1	230:10	208:17	76:16	105:23	50:12,23
185:4,8	238:12	211:20	100:12,14	observat...	107:20
188:24,25	notice	213:22	105:21	180:16,20	111:16
Norell's	69:7	221:10	106:6	181:4,6	146:25
86:23	200:21	225:6	128:13,16	183:4	Ohio
normal	November	227:17,23	128:19	observe	51:3
78:10	8:16,16	228:13	129:8	100:1	ohm
100:5	47:3	229:1,3	137:18	observed	53:23
112:12,23	NRAES	229:16	153:10	185:18	75:19,23
119:22	19:9	231:3	163:2	observing	75:25
137:15	NSP	numbers	192:14	230:9	80:6
161:21	3:14 6:5	14:12	193:11	obtain	85:23
176:12,15	40:8	23:20	196:4,22	112:8	86:20
176:18,23	231:8	87:1	204:3,15	obvious	88:23
normally	NSP's	88:11	205:10	113:19	89:1
74:11 92:1	39:6,10	100:8	222:20	150:2,12	Ohm's
171:22	40:3	128:8	229:14,18	155:5	97:13,25
north	number	147:20	229:24	obviously	148:3
155:23	17:15 22:2	149:10	231:19	122:11	ohms
159:14	32:17	150:6	233:10	125:18	62:15
Northeast	37:5	167:11,12	234:6	150:8,17	73:25
19:10	40:12	226:16,17	objecting	150:18	74:2,6,23
NORTHE...	44:16	228:19	36:17	occasion	76:12
1:9	45:21	236:4	objection	53:2	77:8,12
nose	50:24	numerous	42:7 81:11	occur	77:17
92:4,12	52:22	176:1	88:4	27:7	81:8,25
175:4,5	59:16	220:1	107:7	130:24	82:11,19
notably	63:22	nutrition	113:5	occurred	83:22
68:13	70:25	113:9	162:17	27:7 80:10	84:11,12
notary	71:13	nutritional	173:12	80:11	85:25
1:17 6:11	87:19	114:9	184:16	143:1	87:12,12
237:24	90:18,23		220:25	172:16	87:20
238:18	100:17	O	objections	occurs	88:2 89:4
notations	102:12	O'DONN...	238:8	91:25	89:18,21
46:23	122:1	2:9	objective	108:17	89:21
note	134:14	oath	83:6,11,12	October	90:1,12
35:6 199:8	140:9,10	12:1	83:13	36:23	93:17,21
notebook	141:2	237:17	100:14	190:25	147:17,21
229:22,23	142:6	238:7	objectives	191:13	147:22
230:3,6,7	156:14,23	object	112:6	office	148:10
230:12	156:24	30:11	113:23	58:10	235:24
notebooks	157:9,20	34:11	objects	offices	okay
230:17	159:3,4	43:2	128:19	1:14	7:6,7,20
noted	170:5	65:16	obligation	officially	7:21,25
181:23	178:12	67:22	52:7,9	9:18,20	8:9,14,17

9:12 11:4	86:22	164:12	41:12	65:14	16:1,2
15:7	87:4,15	166:10,21	older	66:4	32:7,12
17:13	89:3,7,9	169:3	8:12	67:24	53:10
18:1 19:4	91:9	170:17	omitted	77:18	60:10
19:18	93:20	171:2	35:8	172:9	68:6
20:21	94:9	172:3	on-farm	205:13	original
21:23	95:13	173:15	78:9	220:21	62:10
23:25	97:3 98:4	175:16	137:15	222:21	originally
25:2,23	98:13	176:6,9	once	opinions	60:3
26:3,13	99:11	176:16	11:15,15	3:14 6:4	oscillosc...
27:1	100:23	177:16,20	101:19	6:18	37:16
29:23	104:1	180:4	146:11	34:21	outfit
30:2,3,18	105:7,15	181:2	205:24	38:14,19	31:24
31:1,3,9	106:23	183:6,22	208:12	42:25	outline
31:14	107:14	184:5	216:2	43:5	191:24
32:13,16	108:11	185:7,11	one-page	44:11,19	outlined
34:2,18	110:5	186:17	231:6	44:22	203:10
34:23	111:1,7	188:4	ones	45:22,23	outside
35:22	112:3,16	190:4	21:9 50:20	45:24,25	69:8
37:7,24	113:20	191:1,19	51:5	46:1,5,7	105:22
38:17	114:6	191:24,25	76:11	189:9	107:7
40:21	116:5,9	193:9,15	149:22	190:20	109:1,21
42:3 43:7	120:22,23	194:19	150:18	198:16	172:9
45:4,10	121:7	197:5,10	151:20	231:7,11	211:16
46:16	122:4,6	197:20	152:21	231:15,20	220:21
47:11	122:25	201:4	189:6	opportu...	222:21
48:22	123:25	203:19	ongoing	233:1	overall
50:6,11	126:18	205:17,21	10:25 11:2	opportu...	144:3,17
51:16,19	127:21	207:6,10	Ontario	233:5	145:1
53:18,23	128:20	209:23	140:1	opposed	164:4,11
56:4,14	130:10,20	210:2	open	21:3	overlap
58:14,19	134:7	212:10	91:7 96:20	135:22	155:6
59:3 60:1	135:5	213:19,21	96:21,25	oral	overly
60:22	136:3	214:13,21	218:22	22:8	225:10
61:3,4	142:6,20	221:3	opening	order	
62:24	150:5	224:12,23	185:16	67:9 68:1	P
65:3,12	152:19	225:18	opinion	90:5	P.C
66:21	153:13,21	226:3	18:25	120:1	2:3
69:20	154:6	227:15,18	39:18	130:4	package
70:5,16	155:7	227:19	42:6,15	175:6	70:23
71:17	156:7	228:24	42:17	ordinary	page
74:4 76:3	157:8	229:4	44:2	74:11,13	3:2,12
77:2	158:15	230:20	45:19	74:14	10:22
81:22	160:21	231:5	50:3,10	organism	16:10
82:7	161:24	236:18	62:24	170:23	18:15
85:18,22	163:11	old	65:7,12	organiza...	20:2,17

20:22	194:25	63:1	182:2	135:1	189:2
21:19,20	197:25	98:20	parallel	142:18,18	195:11
21:22,24	200:18	107:15	96:11,14	143:20	201:25
22:1	202:16,18	110:11	119:13,18	146:6	particula...
23:16,22	202:18,19	114:7	119:19	150:21	9:25 13:21
23:23,24	202:19,21	128:24	Pardon	151:14	69:6
24:1	202:21,24	131:3	81:13	153:3	127:15
25:19	203:5,23	132:3,4	165:6	158:4	163:21
26:17,17	214:10,12	174:10	168:10	162:7	parties
26:18	217:16	178:4	pare	169:5,18	238:14
27:21,24	218:15	190:22	45:17	171:6,17	parturition
29:6,11	221:7,7	191:3	parenthe...	171:18	138:19
31:1,14	223:2	217:15	150:1	172:1	party
32:19	225:12,15	papers	181:20	173:16	48:16
33:1,2,4	225:16,23	14:11,14	parlor	177:20	pass
34:1,2	227:14	14:20	85:10,11	188:25	56:24
45:9	228:18	15:10,11	85:14	207:20,23	passage
107:15,20	229:21	16:4,7,12	136:16,23	210:13,14	92:17
107:20	230:3	20:22,23	137:5	210:23	passages
111:2,11	237:1,2	23:3,8,13	179:22	213:4	91:23
111:13	pages	24:5	180:1,9	215:8	path
114:11	3:19 23:24	26:22	parlors	229:9	74:3 82:25
118:11	37:3,13	40:13,14	85:1,3	233:11	83:2 90:2
120:22,23	37:18	40:15,16	part	236:6	90:5,21
123:2	38:8	40:17	26:3,5,10	partial	91:13,16
126:23,25	39:23	41:4 43:7	26:12	207:17	91:19
127:7	40:6 45:8	58:11	27:13	Partially	94:21,23
130:11,15	167:16	96:8	35:10	57:7,8	94:25
130:16	190:17	206:24	41:6 44:7	participate	95:9,11
133:7,8	pair	210:11	44:24	55:10	95:12,19
135:6	11:21	233:13	45:7 50:1	73:11,13	119:13,18
140:7,9	PALOME...	paragraph	52:7,18	233:2	119:19,21
147:2	1:16 238:3	88:14	54:5 56:3	participa...	paths
150:23	238:18	111:6,11	63:13,13	43:12	95:17
156:23	Pam	111:13	64:16,17	particular	119:25
157:7	236:12	112:5	65:10	51:17	120:3
158:14,19	PAMELA	115:11	67:16	57:13	pathway
168:15	1:16 238:3	123:2	75:9,22	63:24	185:17
170:13,13	238:18	127:1,7,9	99:20	80:4	pattern
170:14	paper	170:15	102:22	92:20	148:15
173:23	16:18 22:6	176:11,22	103:21	93:17	patterns
176:7,8	23:13	190:18	104:3,16	114:7	114:8
176:11	24:25	204:7	116:22	136:21	peak
178:19	25:23	223:12	120:21	137:13	100:5
179:16	26:10	225:19,20	127:16,18	177:17	108:16,23
185:3,9	29:1 62:5	paragra...	131:6	183:16	108:23

109:11,19	17:20	1:2	114:18	61:16,16	86:5
116:1	19:15	perceived	115:21,24	62:14	pipeline
162:8	51:3	158:13	120:25,25	107:19,21	50:4
218:23	pens	185:6	121:1	221:1	place
220:11,18	85:13,13	perceiving	127:17	Ph.D	14:7,8
peer	114:25	187:14	130:12,14	1:14 3:4	64:3
26:23 73:1	208:4,6	percent	130:22,23	4:6 6:10	65:23
73:2,3,5	208:13,14	82:12 87:2	130:24	13:6	68:5
peer-rev...	216:17,18	87:3,13	131:16,22	226:22	84:23
16:5,8	216:20	87:14,18	138:12,13	231:7	117:6
19:25	217:20	87:20	139:9	233:14,16	216:10
20:12	218:1	112:7	140:23	233:19	238:6
23:5 26:6	219:11	120:14	141:9,15	234:21	placed
26:10	people	174:7,12	143:23	237:1,17	221:9
72:19,21	7:3 13:12	185:20,21	144:1,14	237:20	226:2,8
72:23	19:13	185:21,22	144:15,16	phase	placehol...
73:8	34:15	187:6	145:5,7	54:4,5,10	133:25
79:24	48:19	percenta...	146:5,10	54:10	places
81:23	50:20	88:12	151:15,16	PhD	65:23
111:21	52:11,17	percentile	151:17,25	3:15 6:6	234:13,15
199:10	52:23	87:8	153:4	phone	plaintiff
Pellerin	53:5	percentil...	157:14,16	47:10	49:8
24:25	59:21	87:6	157:21,24	104:25	Plaintiff's
pen	60:6 61:7	perception	158:1	201:13	39:5,9
208:9	61:8,9,10	184:6,23	160:9,10	Photos	40:2,7
209:2,5	66:1,2,8	185:1	161:10	39:21	Plaintiffs
209:19	66:13,14	186:10,10	164:5	phrases	1:7 2:2
210:1	66:19	186:12	168:22	7:17,20	6:17
212:11,14	69:5	187:2	174:8	physical	42:21
212:17	70:13	perfect	209:22	92:6 99:20	plan
215:9,11	71:6	171:21	214:16	physics	110:1
215:18,25	75:15	perform...	216:13	86:18	planned
216:6	84:10	4:1 14:16	periodic...	97:14,18	57:13
217:16	98:4	176:11	120:11	physiolo...	123:5
221:9,11	115:2	182:8	periods	177:19	planning
221:17	126:17	206:11	130:13	181:18	47:20
222:4,6	163:5,5	207:3	131:8	pick	plate
222:10	169:25	performed	142:13	84:2,9	93:10
226:2,8	181:5	14:4	143:22	131:11	plates
pending	183:2,5	period	144:13,19	142:25	97:1
149:15	185:1	14:9 60:20	145:21	picked	play
163:10	188:18	101:11	164:2	32:13	38:18
194:2	189:3,9	102:13,14	224:6	114:22	42:25
198:19	191:7,16	103:8	permit	210:9	43:4
218:10	197:6,11	105:10	144:25	232:22	44:19,22
Pennsylv...	PEPIN	109:20	person	piece	played

67:7,8	84:20	poor	preceding	127:22	139:7
please	91:22	181:19	115:24	128:3,22	163:14
18:15	92:20	182:3	PRECISI...	129:1	167:6
21:21	93:18	pops	1:14	130:13,22	171:25
76:18	94:10	164:25	predeter...	131:23	173:10
81:1	96:14	165:1	121:21	170:6	232:17
136:14	116:8	population	prediction	pretests	probability
150:24	126:21	210:17	110:8	103:3	65:15 67:8
228:17	136:24	portable	152:2	pretreat...	67:15,25
231:3	138:21	117:16,17	preface	118:2	probably
plotted	139:20	posed	69:7,11	140:24	7:23 11:7
154:9	145:16	234:25	190:11,15	pretty	17:11
plugging	164:14	position	196:25	13:16 25:4	21:8
97:8	172:5	138:20	197:14	53:21	22:21
plus	176:4	positive	prefer	56:22	23:13
14:8 74:1	183:16	191:20	8:20 39:3	70:21	25:4
74:2,2,7	188:12	possessi...	pregnant	71:21	26:14
76:13	192:4,24	58:21	218:22	74:10	28:19
82:23	196:10	possibili...	preparat...	102:6	35:20
90:2,2,3	202:14	18:13	35:20	153:7	39:15
94:18,19	209:24	possibility	69:10,12	155:5	40:6 45:3
94:19	212:13	166:14	prepared	158:8	46:11
219:24	217:14	190:21,23	39:21	163:22	47:3
220:15	231:23	possible	68:10,12	217:19	50:12,25
235:20,24	pointed	175:8	70:18	232:22	54:8,14
Poeschel	18:5	post	preparing	234:22	56:16,24
1:4,4,6,6	231:11	118:3	46:18	previous	59:8 62:7
2:15 3:14	pointing	127:24	47:14	21:15	84:7 85:7
6:5 36:23	176:9	posttest	presence	115:14	101:9
44:18,21	points	121:1	175:11	123:7,21	128:5
231:8	79:21,23	128:3,23	present	218:20,23	150:20
Poeschel's	91:3,4	129:2	2:14 6:12	219:1,2	174:25
42:11	92:14	130:24	131:3	224:10	179:10
point	95:4	potentially	171:1	225:5	208:1,24
9:23 10:2	96:12	63:2	presenta...	previously	211:5,6
12:15	112:17	pounds	22:5,8	21:4 41:5	217:9
14:4 51:4	235:10	220:11,16	presented	Price	234:23
52:25	poked	221:5	19:14,16	116:22,24	problem
56:15,16	107:5	power	19:20	primary	83:6 105:3
60:23,24	pole	1:9 37:8	pressure	84:21	138:23
64:5,8	175:5	165:12	92:4,16	197:15	184:13
68:10	policies	166:12	presumed	printing	186:4
73:23	64:11,14	practice	127:16	194:24	226:7
79:16	64:21	52:18	pretest	prior	problems
80:16	65:1,24	pre-calvi...	120:24	106:13	10:5 59:18
82:4,5	67:1 68:7	139:9	127:18,22	131:19	76:24

111:4	3:24 22:16	192:2	163:6	167:20	78:22
115:16	22:21	193:1,1,3	protect	200:5,6,7	purported
181:24	26:9 27:4	193:5,6,7	84:3,16	201:7	233:13
183:2	28:9	193:8,9	protocol	237:24	purpose
185:4	43:11	193:16,23	5:7 56:21	238:18	196:8
194:21,22	107:2	194:4,8	57:23	publicati...	purposes
211:10	112:8	194:11,14	67:9	19:12,22	88:25 97:3
218:8,20	115:16,25	194:16,19	102:25	21:20,25	195:4
218:21	117:23	194:22	218:13	26:22	232:1
procedure	135:2,25	195:1,5	protocols	31:19	pushed
103:9	136:2,23	195:10,14	12:22 54:1	200:19	75:18,23
211:17	137:5	195:16,17	55:8	207:13	pushing
procedur...	141:11,12	195:20	64:16,17	publicati...	56:25
54:9 64:11	141:24	206:6	provide	13:15,19	76:12
64:14	142:7,16	210:15	13:13	18:18	put
65:24	142:22,25	213:20	41:22	19:24	26:22 32:2
67:1 68:7	143:2,4,6	218:25	44:1	25:17	56:14
proceed	143:17,20	220:22	50:10	27:8 29:8	90:11
66:22	144:1,5	221:1	60:12	40:15,19	97:10
proceedi...	144:11,12	producti...	69:16	79:25,25	103:5
238:5	144:20	115:14	201:8,10	203:6	104:16
process	145:7,10	professi...	205:13	published	106:16
47:17	145:17,23	7:19 238:3	provided	13:7 14:11	125:23
52:22	146:1,8	Professor	25:9 34:25	16:4	133:25
102:23	150:4,9	9:13 16:23	47:16	17:22	150:12,16
131:3,6	150:14,19	17:9	50:2	19:23	183:20,23
143:14	150:22	75:21	115:3,4	20:12	183:24,25
179:12	155:16	76:8	168:4	21:10	189:17
191:10	158:14,16	167:1,20	230:4	25:15	190:5
216:10	158:17	168:7	provides	33:22	191:20
225:9	159:4	169:9	19:13	63:13	192:3
236:2	160:6	174:9,13	providing	72:17	208:4,10
produce	162:6,7	175:18,23	82:19	80:11	209:3,20
113:3	162:14,24	175:24	proving	81:23	209:25
194:7	162:25	182:18	196:3	82:10	210:1
produced	163:7	199:20	PSC	88:11	212:12,13
35:7 36:7	164:4	Professo...	3:19	111:21	212:17
36:20	165:22,23	18:11	167:17	128:1	215:7,13
40:9	166:8,12	proffered	public	227:3	222:4,6
53:22	166:25	6:18	1:17 6:12	234:21	236:10
producing	167:9	proper	11:10	publishing	238:7
220:18	182:8,15	112:11,19	12:16	190:21	puts
221:5	183:18	112:20,21	33:8,10	197:15	92:16
product	184:14	112:22	34:6,16	PUC	putting
184:1	186:1,14	113:9	55:1 65:8	200:21	24:14
production	186:24	propositi...	67:4,15	purified	70:23

224:17	172:12	quickly	reacted	170:17	reasona...
	173:14	183:6	101:24	178:19	65:7,14
Q	174:2,11	quite	102:1	223:8,12	66:4,6
qualifica...	174:15	6:22 51:22	203:8	232:2	67:7,14
220:21	176:10	71:2	reaction	real	67:25
quality	177:12	109:12	203:4,15	52:23	81:19,19
37:8 52:19	178:14	137:4	203:17	85:25	81:21
52:20	180:21	151:1	reactions	86:8	84:16,18
53:6,13	192:16	189:23	202:11	137:25	198:15
63:6	194:1,2	quote	203:13	183:6	reasons
114:8	195:5	111:5	read	realistic	68:10,21
quantity	198:18,19	quoted	27:23	74:2 81:9	68:23
114:8	203:11	198:4	36:21	90:2	120:20
quarters	207:18	200:14	39:1 40:1	93:25	171:14
181:22	212:7	quotes	42:13	reality	190:19
question	213:17	96:17	45:7,8	108:8	197:15
7:2,13	218:10,11		68:16,19	realized	233:7
24:11	220:13	R	85:20	41:20	rebounded
26:24	223:25	R	127:5	205:1	153:19
29:5 49:4	228:9,10	97:5	147:20	really	recall
53:17	234:22	randomly	149:13,16	13:6 39:17	11:17,23
64:24	questioner	121:21	161:25	42:6,22	12:9,11
65:19	174:18	range	171:7	45:5,18	12:12,13
67:6,11	question...	82:17 88:2	174:14	76:6	14:14
67:21	234:24	88:23	177:3	86:18	16:15,19
68:25	questions	93:17	193:25	104:12	17:9 18:1
76:18	6:18 8:6	108:17	194:3	128:8	22:10
79:8 81:1	9:11	109:16	198:17,20	163:17	29:1 32:2
89:1	11:23	157:13	199:18	REALTY	39:12
109:3,25	13:13	184:25	200:13	1:5	46:14
110:24	22:12	ranged	202:5	rear	47:24
128:15,18	45:17	109:9	203:20	78:6 93:8	80:10
128:19	46:5	rate	210:11	119:4	104:7,24
130:5	59:11	56:10,12	211:24	120:19	105:4
132:17	62:8	56:13	212:1	175:6	107:12
136:14	169:4,17	ratio	218:9	reason	117:3
137:4,20	177:23	148:14	221:8	60:2 64:5	122:9,20
137:23	178:14	rationale	223:13	105:12	126:21
149:14,15	205:18	64:20	228:2,5	122:23	132:18
151:5	212:3	raw	236:14	131:9	134:1
153:17	228:3,7	148:22	237:2,17	132:12	139:2,14
163:9	232:8,16	reach	reading	137:6	139:18
165:4,7	233:12	60:7	36:1	157:15	140:4
165:10	235:4	144:10	111:16	164:8	167:24,25
168:18	quick	reached	123:25	207:25	174:9
170:12	205:19	190:24	135:6	237:2	189:24

199:16	210:2	70:4 71:5	referee	63:13	65:11 66:2
201:1,14	226:19,20	71:13	73:4	Regional	72:1
202:3,13	230:21	72:5,10	refereed	19:10	75:24
213:1,5	236:11	72:13	19:24 20:3	Registered	178:17
213:13,15	237:18,18	74:20	reference	238:3	188:17,22
recalling	recorded	82:9,22	45:4 98:25	regression	reluctance
106:10	234:14	83:13	178:23	204:21	179:25
receive	238:9	84:20	179:9,10	regular	180:11
138:2	recordings	85:5,16	179:11	55:2	rely
received	37:5,15	85:17	referenced	117:15	67:24
34:20	records	87:11,12	68:13	regulated	75:21,24
122:3,5	115:3	146:24,25	references	9:22	234:21
140:12	117:23	177:25	18:19	Regulators	relying
228:14	210:3	178:10	146:17	38:7	45:13 65:9
recess	recovering	190:16	referred	Reinema...	67:1,16
58:17	192:10	197:21	32:10	16:23	74:22,24
98:18	recovery	198:16,22	52:10	63:16	75:8,9,10
230:24	170:24	199:1,13	59:22	66:10,25	75:11
recognize	recurring	199:14	98:21	rejoin	76:8
97:13	218:21	200:15	129:14	124:14	188:14
167:19	red	234:1	178:17	relate	Remedy
178:10,11	30:5 33:21	235:2	referring	24:21 42:6	59:18
198:14	33:22	reduced	24:1 80:5	related	remember
200:3	34:8,9,17	141:25	203:13	16:14	19:19
230:5	38:15	215:23	230:3	20:12,23	22:14
recogniz...	39:19	221:11	refers	32:8 60:8	28:6 29:4
40:22	40:20	reduction	200:5	135:8	35:21
recollect...	42:16,18	107:2	reflect	137:24,25	39:7,14
168:19	42:23	135:25	77:22 78:7	146:2	39:23
203:18	44:3,6,12	136:1	78:9	160:9,10	46:15
210:10,19	44:24	150:19	reflecting	181:16	49:9
217:25	45:14	167:3	225:7	198:16	55:25
recomm...	53:22	reductions	refresh	relates	56:2 69:9
82:19	59:13,15	142:3,3	202:8	46:7	82:14
83:14,22	59:21,23	144:20	refusal	163:19	110:17
84:15	60:2,3	162:7	102:4	194:20	123:24
record	61:9 63:8	Reed	refused	relative	125:16
27:24 35:2	64:9,22	48:9,10	101:25	238:13	129:16,17
35:6 36:5	65:1,6,9	Reese	102:2	reliability	139:16,23
36:22	65:24	80:5,9	141:18	235:1	168:2
37:25	67:1,16	reevaluate	refusing	reliable	184:18
40:2	68:7,11	34:7	136:10	60:25	198:13
169:2	68:13,18	refer	regard	233:9	210:11
174:5	68:21	59:21	175:1	reliance	211:7
178:4	69:7,11	113:22	regarding	68:7	212:8,8,9
179:13	69:12,19	139:15	36:22	relied	212:20

216:15	210:25	Reporter	176:23	197:17	96:16,17
219:7	211:1	7:3 149:16	177:3,14	202:12	96:21
232:17	215:13	194:3	206:11	226:21	97:7,12
rememb...	216:8,12	198:20	207:3	227:1	97:19
219:16	226:11,12	238:3	reputati...	229:8	119:7
remind	replace...	REPORT...	198:25	234:5	120:1
211:11	104:16	238:1	requested	research...	147:8
remove	123:6,21	REPORT...	234:11	32:7	175:7
210:17	125:8	1:15	requests	research...	232:1
removed	134:3	reporting	5:1 232:21	178:20	235:23
103:13	replicated	24:13	234:9	185:13,15	resistan...
120:10	62:4	179:6	required	residual	74:25 75:7
124:9,21	report	181:3	18:9,10	181:21	77:1,5,6
125:5,10	24:15	207:12	102:19	resign	89:6
125:13,15	26:21	reports	requires	18:8,9	93:12,13
126:9	29:22,22	31:16 40:4	10:7	resistance	93:16
133:23	29:24	44:5 82:8	research	47:15,15	235:18
134:2,22	31:19,20	87:19	4:5 17:23	62:3	resistant
221:9,15	31:21	169:18	17:25	74:11	97:12
221:17,17	36:22,25	represent	19:6,6,8	75:12,19	119:21
222:9	37:7,12	188:20	21:3,4,15	76:1,13	resistor
226:2	37:17	203:25	23:18	76:13,14	53:23
Rendell	44:18,21	204:11	25:8 30:7	76:19	83:16
44:21	104:10	represen...	30:10,18	77:19	84:2,10
repair	162:4	54:25	30:24,25	78:6,22	89:22,24
8:24	167:3	183:15	31:2,5,12	79:15,19	90:13,14
repeat	177:17	represen...	31:19,23	80:1,18	96:6,11
7:13 60:1	183:2	151:6	31:25	81:10,15	97:4
65:19	213:18	represents	32:8	81:24	respect
81:1	reported	19:1	52:12	82:3	12:24
136:14	53:7 87:11	reproduc...	63:17	84:12	13:15
223:25	103:17	3:17 4:3	69:18	85:25	65:13
rephrase	104:2,8,9	27:6 28:2	70:12,14	86:10,11	136:18
7:14	110:11	28:10	72:6,10	88:3,6,15	197:9
replace	140:6,13	113:24	80:6,10	88:16	198:24
210:16	177:9,13	114:9	81:23	89:2,11	233:1
replaced	177:15	129:23	82:1,2	89:14,20	234:4
123:18,19	179:12	169:20	84:25	90:6,18	respected
124:22	180:18,20	177:7,9	85:4,15	91:3,6,21	163:5
209:12	182:23,24	177:11	85:15	91:22	responded
213:9,12	203:6	206:4,16	99:13	92:11,18	201:16
213:14	209:8,15	207:2	133:9,10	92:24,25	202:3
220:5	210:23	reproduc...	133:11	94:5	responsi...
222:4	213:20	4:1 176:10	188:14,17	95:16,22	111:17
replace...	224:2,2,7	176:12,16	188:18	95:24	170:25
210:12,12	236:4	176:18,19	189:2,11	96:12,13	200:10,21

response 78:25 183:17,18 184:2,6 184:13,23 185:17 186:3,15 186:16,22 187:6,9 193:1,14 194:9,20 196:2 197:1 199:13 201:3,5,9 201:10,15 201:17 203:25 204:12 responses 43:15 44:10,15 111:22 185:18,19 186:12 responsi... 10:14 responsi... 41:22 rest 39:1 152:5 164:22 208:24 222:25 restate 88:1 162:2 restroom 58:16 result 91:17 104:3 135:25 143:21 results 84:3 197:17	223:3 resumed 140:24 141:4,8 retire 18:10,13 retired 9:18,19,20 10:1 48:13 retirement 18:7 retreated 170:25 171:3 returning 151:9 reverse 120:1 216:10 review 23:14 25:4 25:7 26:23 31:11 40:19 44:24 73:1,5,15 73:21 133:15 139:23 190:20 236:15 reviewed 16:12,16 16:18 36:15 37:22 44:6 72:22 73:2,3,16 reviewer 16:11 reviewers 73:7 reviewing	70:22 rid 120:11 132:2 RIDGES 1:5 right 8:1 11:10 12:20 15:13 16:20 18:1 19:6 19:20,25 21:12 22:4 25:12 26:19 28:7 29:6 39:16 40:11 41:23 44:7 45:10,20 46:9 48:8 54:4,16 60:22 62:14,23 64:23 65:22 68:5,9,16 68:19 69:17 70:18 73:22 83:1 85:12,16 86:10,15 86:24 89:16,17 89:20 90:19 92:21 93:14 95:1,15 96:22 97:19,24	98:2 99:19 100:13 101:15 102:19 103:11 106:15 107:14 109:11 110:5 112:1,5 113:10,22 118:5,11 119:22 121:2,11 122:13,15 122:18,25 123:11 124:8,16 125:2 126:19 127:25 128:20 132:9,19 133:19 137:11,13 138:3 140:21 143:24 144:15 146:11 148:20 151:21 152:22 159:18 160:7 167:14 169:3,10 170:15 172:24 173:18,22 176:21 177:4 181:24 182:4,22 185:3	186:5 187:1,5 187:13 188:4 190:14,17 192:19 195:8,9 196:3 200:8 201:4 204:10 207:8 209:4 210:19 219:3,15 220:8,24 223:8 224:20 226:15,18 228:21 230:2 236:8 right-hand 185:10 228:18 ring 47:25 87:16 201:24,25 rings 87:17 rise 100:4 robotic 233:3 Rochester 2:5 rods 78:4,5,7 120:8,9 Roger 24:25 role 38:18 42:25 43:4	44:19 67:7,9 232:23 roles 44:22 ROLLIN' 1:5 Ron 42:11,22 109:25 114:16 121:24 140:2 RONALD 1:6 2:15 room 58:11 230:23 roughly 156:8 Rounsav... 107:21 128:6 131:7 133:1,18 Rounsav... 132:22 routine 52:18 routinely 170:19 RPR 1:17 238:18 rule 55:10,12 120:1 205:16 run 17:14,15 64:3,5 143:11 running 199:12 runs 121:16
---	---	---	---	--	--

192:20	214:14	209:23	130:7,11	second	44:9
rural	215:7	214:7	133:3,15	19:4 36:6	48:15
191:8	226:9	217:4,15	135:24	38:24	57:20,22
<hr/>	says	223:3	206:3	39:6,9	58:13
S	9:12 16:10	224:9	207:1,14	40:2,7,10	60:14
S	27:13	225:12	214:6	40:12,24	62:9,13
6:10,10	33:24	229:1	219:4	40:25	64:2 91:7
samples	69:8	scale	230:8	41:1	110:5
106:11	73:24	156:11	233:9	49:17	116:9,11
170:18	111:8	scales	Sciences	60:24	122:22
sat	113:23	156:18,20	16:11	64:8	130:21
183:19	115:10,11	156:21	scientific	111:11,13	138:4
saw	115:22	157:1,2	45:4 61:1	114:12	145:17
26:20	116:4	159:15	61:6,17	126:25	146:16
48:22	118:17	scanned	62:21	127:7	151:8
62:4	120:2	36:25	63:1,4,5	130:16	154:13
158:9	121:6	37:11	65:8,14	132:4	156:25
201:17	123:25	38:10	66:5 67:8	147:25	158:11
233:1	126:22	scattered	67:15,25	149:24	160:23
saying	127:12	58:12	188:22	158:21	161:19
36:14	130:12,22	scenario	scientific...	169:5	164:6
67:14	148:11,24	13:2	61:18	190:24	165:22,23
69:20	149:2,8	174:25	scientist	191:12	168:15
85:1,3,4	155:18	scheduled	106:22	204:7	169:1
90:1 92:8	167:22	190:25	169:25	206:23	176:14
107:9	169:24	schematic	scientists	207:13	179:1,7,8
141:4	170:11,15	118:10	98:1	218:2	179:13,13
142:17,21	170:18	science	101:23	231:3	179:14
143:1,3	175:14	14:24 15:3	113:12	second-t...	180:23
144:24	176:11,20	15:11	146:19	123:2	186:4
149:10,17	178:19	16:7 20:9	182:21	second-t...	192:20
154:6,7	180:19,23	26:10	197:16	112:5	193:17
156:7	181:25	27:7,15	198:15,21	section	196:15
161:18	182:23	27:22	198:23	181:15	199:11
162:13,22	185:5,6	61:8	218:14	see	210:11
162:23	186:9	71:20	scope	5:5,6 8:9	217:11
169:8	187:9	99:14	45:16	8:21	227:13
179:8	190:18,19	107:23	105:22	15:13	229:22
181:19	193:4,13	112:17	107:8	20:17	230:12
186:5	194:11	114:25	109:2,22	21:8 24:4	231:24
191:15	195:1,9	116:12	172:9	26:20	232:2,6
196:6,7	195:13,15	122:21	211:16	29:11	seeing
200:18	195:19	126:17	220:21	31:10	32:10
209:18	197:19	128:2	222:21	36:3	144:4
210:20	202:18	129:4,10	seasons	38:13	152:11
213:15	203:5,24	129:13	216:14	40:21	154:19

161:18,20	112:11	100:24	sharp	147:6	167:10
164:10	113:23	123:4,7	92:14	151:10,19	170:5
166:25	115:10	123:21	192:7,11	165:12	sick
192:5	127:7	124:18	shifting	183:15	209:13
seen	142:10	set	16:2	186:15	213:3,6,7
35:12 62:5	181:1	39:6,10	shock	192:1,2	213:10
82:17	225:19	63:20	139:20	226:25	sickness
88:22,24	separate	75:1	shocked	showed	123:8,22
92:12,13	70:6,11	102:25	50:8 84:11	22:18	124:2
178:16	76:3,5	105:6,7	102:5	143:16,19	125:10,19
181:16	99:1	120:7	105:19	144:12,19	133:24
201:22	separated	122:9	106:5	145:20,21	sicknesses
202:2,2,9	87:17 97:1	144:25	107:6	149:4,6	125:17
228:1	153:24	172:7,14	117:7	149:18,23	side
229:11,12	separation	173:5,7	shocking	166:11	122:21
229:13,15	81:14	177:18	140:12	170:3	198:12
233:4	septum	183:19	shocks	174:5	205:7
236:3,4	92:5	212:15,25	138:19	176:23	212:24
selected	sequenti...	238:6	139:10,11	186:16	219:4
114:14,14	214:22	set-up	139:12	187:22	230:8
115:11	series	93:13	short	196:20	sides
selection	47:4,5	171:20	30:20 39:5	202:11	157:1
114:15	71:12	sets	96:24	203:17	212:22
115:5	serious	14:22	98:16	showing	234:16
116:12	10:5	114:17	142:13	144:21	sign
218:17	serve	setting	143:25	154:24	236:17
semi-cir...	58:7	116:15	146:9	160:25	SIGNAT...
119:1	service	173:17	230:22	167:3	237:1
seminars	11:10	235:14	short-term	170:18	signed
53:1	12:16	seven	136:2	197:7	181:11,12
send	19:11	11:8 29:11	141:11	shown	signif
199:20	33:8,10	100:24	142:23	26:17	150:3
236:13	34:6,16	104:21	164:9	96:10	significant
sense	51:25	128:24	166:4	109:14	104:3
37:6 154:2	55:1 65:8	151:6	177:7	151:20	115:15
154:3	67:4,15	208:9	shorthand	205:3	135:9,10
sensitivity	167:21	212:17	238:12	228:12	135:14
29:24 43:3	200:5,6	218:5	shortly	shows	138:6
155:9,19	services	severe	8:14	80:6 82:10	142:2,8
163:24	56:5,6	184:12	show	146:14,15	142:16,24
170:20	232:21	193:13	15:5 74:20	148:15	143:14
sent	session	194:9	129:9,13	154:25	144:5
62:7	123:5	shading	129:18	155:13	145:6,9
sentence	124:21	77:19	130:6	164:1	145:10,22
60:24 61:2	sessions	shaking	143:9	166:20	148:15
111:15	5:3 57:16	7:10	144:3	167:8,9	149:3,4,6

149:23	232:3	133:14	Southfield	100:23	starting
150:4,9	sit	189:20	58:24	134:9	50:15
151:1	81:22	191:16,17	spaces	153:4	136:7
154:19,22	85:22	214:2	120:15	212:19,21	138:8,10
155:2,3	231:15	230:5,7,9	speak	212:22	138:11
161:16,17	site	someplace	47:1	213:1	160:23
163:1	99:17	5:6 57:21	specific	217:4,7	174:3,22
164:3,4,6	situation	somewhat	80:13	217:15,17	210:4
164:10,11	78:8 86:14	156:10	185:16,19	stanchion	starts
165:24	136:7	sorry	188:14,21	84:21	185:12
166:7,10	situations	10:6 23:21	specifica...	stanchions	state
166:13	74:10	105:2	218:7	85:6	1:1,18
167:8	six	129:11	speculati...	stand	11:9
177:10	11:8	130:15	211:16	11:22 19:1	12:23
194:21	100:18,20	147:10	spend	85:21	24:23
205:4	121:16	182:11	9:22 42:1	standard	31:10,21
220:18	148:25	sort	spent	71:20	31:25
significa...	150:2,10	10:13	52:21	205:6	32:2
127:13	150:11,11	13:12	spike	standards	49:11
141:25	200:14	119:1	154:14	12:22 34:7	53:4 55:1
152:4	slightly	167:2	spoke	standing	55:16,21
153:12,16	61:19	183:11	17:19,25	85:24	55:22
153:22,24	136:6	sound	spots	166:22	67:2,3
154:1,5	slots	60:25	121:10	174:24	133:9,11
160:18	120:11	81:19	spread	standpoint	192:4
signs	small	sounds	236:5	204:24	stated
171:1	142:6	22:23 81:9	square	stands	115:9
similar	Society	108:19	185:24	163:6	128:24
54:11 62:8	15:18,23	128:14	squares	start	statement
simple	69:2	219:3	191:21	7:2 115:20	60:23 64:9
196:14,15	solid	221:4	stabilized	131:19	112:6
simpler	155:18	source	160:15	168:14	113:15
95:19	solution	62:17 74:3	stage	197:8,8	141:2
110:20	97:4	82:25	115:12	209:22	142:4
simply	solve	83:2 90:3	stages	started	143:9
18:12 21:3	82:18 83:6	90:5,6,18	138:14	60:21	145:18,19
141:4	98:5	90:21	stall	71:16	161:24
165:10	somatic	91:4,6,13	134:11,16	137:14	165:25
179:2	182:12	91:16,19	134:17,20	139:19	176:14
198:25	somebody	91:21,21	171:23	159:7	185:24
201:2	23:12	94:21,23	179:22	160:13	201:5
single	41:18	95:2,9,11	217:19	190:5	223:19
104:12,13	80:13	95:12,15	218:1	208:14	states
212:11	90:18	95:19,21	stalls	209:20	1:9 200:19
sir	114:14	sources	84:24	211:3	203:19
23:23	122:16	69:9	99:18	216:3	Station

133:12	stenogra...	139:5	17:2,3,7,9	166:5,6	subject
statistical	238:10	180:14,24	189:1	166:19	6:21
108:4	step	181:7,23	students	167:11,13	subjected
145:2,3	7:5	182:25	17:4,5	169:18	219:1
154:1,3	Stetson	190:22	18:13	170:2	227:17,18
165:20	146:18,21	192:4	studied	171:10,12	subjects
170:16	203:24	193:10,23	13:7	171:15,17	16:17
204:24	STEVENS	195:5,12	studies	172:2,3,6	submits
statistic...	2:3	195:18,20	5:3 14:5	172:14,23	73:4
145:10	stopped	195:20	15:8	175:16	subsequ...
163:1	9:16 126:9	196:3	57:16	177:7	170:20
165:24	149:9	197:9	62:2,5	178:24	successf...
166:9,10	150:8	199:19,25	74:22,24	186:15	222:3
166:13	stopping	219:2	75:1 76:6	200:16	sudden
167:8	164:14	226:21,25	83:12	203:14	136:23
177:10	storm	232:2	99:2	207:7,19	sued
statistici...	171:21	233:1	139:4	208:1	227:5,8
44:23	straight	234:5,20	178:17	209:22,24	sufficient
107:23	110:6	Street	188:22	210:13,24	188:11
121:25	strategies	2:10	203:6,9	211:3,22	suggests
130:25	158:11	streets	205:1,3	211:24	203:25
132:20,24	stray	8:23	study	212:1	204:12
133:2,13	3:22 4:5	strength	71:11	213:4,8	Suite
133:18,19	6:21	144:7	82:14	216:6	2:4,10
154:7	10:23	235:1	98:21	219:5,12	summari...
213:25	11:5 13:3	stress	99:4,10	224:7	60:13
214:6	13:7,16	106:1,3,12	99:10,11	225:13,17	summary
statistici...	16:14,18	106:23,24	114:3	225:18	3:14 6:4
133:21	17:16	107:1,1	123:8,13	229:9	17:22
statistics	19:5 20:4	107:12	126:15,16	stuff	19:8
107:18,19	20:13,19	stressed	133:4	21:10	21:15
107:22	20:23	105:18,24	135:1	23:25	23:4
108:3	24:18	106:5,19	137:13,22	25:4	29:18,21
116:6,9	25:3,8,9	107:6	139:8,15	38:17	30:5 31:7
116:11	29:12	strike	139:16,17	40:22	31:8
128:10,24	31:18	104:14	139:19,22	41:6 42:3	34:20
129:1,5	32:22	222:2	139:24	54:19	45:23,25
134:13	33:1	Stringfel...	142:19,19	65:25	214:12
143:7	50:14	30:23	143:16	66:11	231:7
165:12	52:3,12	stroke	144:22	126:17	summer...
stayed	54:22	58:9	146:1,22	177:14,18	46:11
126:15,16	60:8,11	strong	149:20	190:5	Supplem...
stays	63:13,17	163:23	150:3,21	191:7	39:6,9
152:3	71:1,8,15	structure	162:23	210:16	40:3,7
Steady	83:7	99:20	163:6,12	219:3	supplies
31:10	138:22,23	student	163:18,19	225:9	112:8

support 73:24	161:9 167:23,25	50:9 96:8 119:17	237:17 238:5,12	72:1 83:11	14:15 19:10,22
supported 74:5	168:23 170:12	systems 226:17	takes 216:10 222:18	91:15 97:23 100:16	22:20 28:17 61:20
supports 111:21	174:5,6 180:17	<hr/> T <hr/>	talk 29:10 45:1	156:3 166:3,5	70:7 74:21
suppose 10:4	183:1,3,5 188:24,24	table 75:2	45:3,14 60:22	168:16 188:8	81:7 96:3 109:25
supposed 195:23 203:24 204:11	190:8 202:6 205:22 211:9	148:12 228:7,7 tables 75:7	106:24 150:22 182:1	191:17 194:25 202:15	117:5 161:17,19 163:5,6
Surbrook 80:5,9	212:4 215:10	take 10:2,22	196:12 200:23	203:10,14 203:19	184:25 189:6,9
sure 7:1 8:7 10:3 11:17 15:5 18:2 19:11	216:22 217:19 218:6 222:7,8 224:16	42:11 44:10 45:5 52:23 58:15 80:23	201:12 230:23 talked 21:12 24:20 25:21	204:7,9 208:21 213:24 214:14 230:1	203:12 210:15 212:8 228:16 230:14
29:9 39:4 39:17 47:22 50:6 51:22 52:4 58:4 59:12 71:2 79:14 80:12 84:6 86:9 88:14,19 91:24 92:2 102:7,18 106:1 113:18 117:5 121:25 136:3 137:4,21 139:4 151:17 152:18,24 154:16 160:11	surface 86:13 120:14 surgery 103:9 surroun... 71:15 surveyed 63:4 suspense 115:10 switch 128:10 sworn 6:11 12:3 237:21 symptoms 179:18 180:13,20 180:23 181:22 182:25 synthesize 71:4 Syracuse 1:15 59:6 system	98:15 102:15,20 119:25 120:2 152:2 173:21 197:9 201:8 229:4 230:22 taken 58:11,17 74:8 98:18 104:15 117:20 123:13 125:18 131:23 135:8 150:3 165:19 202:10 213:3,8 220:5 230:24	26:6,8 40:18 43:9,23 47:12,13 47:18 48:5,8,16 48:24 64:6,25 90:3 133:24 151:16 198:12 235:11 talking 7:4 24:5 28:10 29:20 35:13,15 36:6,10 36:15 38:2,4 40:23 59:24,25 62:23 66:8,24 71:24,25	tanks 79:12 taught 10:15,16 teaching 9:24 10:12 10:15,19 99:13 team 114:16 116:12 technical 3:22 7:17 20:22,23 23:3,7 25:17 29:7 37:7 44:18 199:19 200:1 202:25 Ted 107:21 telephone 54:24 tell 6:25 12:3	telling 36:10,13 41:4 164:20 180:15 181:4,8 181:13 186:7 211:8 212:9 temporal 143:10,11 ten 35:24 36:8 41:7 42:4 51:9 128:2,3 128:11 129:6,6 130:6,22 130:23 131:10,15 131:16,18 131:19 132:10,11 132:13,13 176:15

208:5,13	156:9	13:18,21	175:11	47:3 156:4	52:10,16
209:19	158:7,12	33:7 49:5	188:11	they'd	55:6
212:18	160:5	49:6,7,13	192:17	116:3	58:22
214:7,8	184:1	49:14,15	197:3	thing	60:8
214:19,23	192:5	49:19,22	227:20	7:12 8:2	64:22
214:25	205:11	49:25	237:17,18	18:18	70:11
215:10,19	216:21	60:19	238:8	23:24	71:14,22
216:2	220:19	80:17	testing	42:24	74:15
217:5,11	224:7	81:7	5:7 13:22	57:11	76:5
217:12,15	234:19	162:10	14:10	69:15	86:12
217:17	test	171:13,20	37:2,12	102:7	94:7
218:5	13:24	175:25	37:17	112:21	105:25,25
229:6,8	39:22	198:11	40:4 43:3	117:10	106:3
tended	83:14	testify	52:16	119:23	108:1
159:2	89:22	49:17	53:3,19	122:25	113:11
term	90:7 91:2	227:22	54:5,12	137:15	121:9
94:8	91:5	231:10,12	57:24	150:15	141:6,7
terminol...	93:17,18	231:20	75:20	152:3	158:12
101:22	93:21	232:13	77:3	157:17	160:9
196:5	94:1,1	testifying	91:17	165:17	163:22
205:11	99:17	11:17 49:1	95:16	180:11	165:14
terms	114:4	60:17	97:3	191:21	173:7
12:21	121:9,12	145:24	170:21	196:11	180:15,18
18:18,24	127:24,25	testimon...	207:21	205:7	181:6
32:20	128:23	33:5	tests	206:2	182:3,24
35:19	129:1	testimony	22:16 52:2	216:3	183:3
42:15,16	138:25	9:3 11:9	53:7	228:5	191:8
45:19	144:14	12:6,9	73:24	234:12	207:15
50:9	174:7,8	34:15	74:5,8	things	think
63:24	188:8	50:18	77:18	6:25 7:10	9:2,10
65:25	207:17	51:17	83:19	9:10 10:2	11:19
71:20	218:13	58:20	86:23	17:17	13:16
75:19	223:23	65:17	93:4	19:2	14:6,19
76:11,25	tested	68:17	106:10	21:18	15:15
90:25	86:21	80:20,21	122:1	23:14,15	16:3
96:3	88:20	80:22	139:4	24:15,17	17:11,21
103:25	125:3,4	81:2	163:17	24:17,19	18:25
106:11	138:18,25	124:5	text	24:20	19:21
107:10	139:8	137:19	80:13	25:14	20:16
116:11	162:6	162:5	Thank	37:20,21	21:5,25
128:6	tester	163:15	217:18	39:13	22:5
138:7	90:6	167:6,19	230:20	42:18	23:10
140:5	testified	168:6	236:21	44:1	25:8,13
143:21	6:12 11:4	169:7,9	thanks	45:18	25:21
150:13,22	11:13	171:25	236:9	47:13,17	26:18
151:1	12:15,18	173:10,22	thereabo...	47:18	31:12

32:21	125:15	227:11	135:7	14:5	157:19,20
33:22	132:13,23	233:24	145:6	15:18	157:22
39:2 41:9	135:16	235:16	146:5	17:8	161:1,4
41:23	138:20,22	236:6,8	149:24,25	21:18	164:2,7
42:4	139:2,2	thinking	150:2,10	30:9 42:1	181:22
43:12	140:2	19:1 92:15	176:24	46:8 47:4	182:6
45:17	141:6	92:16	198:3	48:13,14	183:16
48:4 49:7	142:12,18	third	208:7	48:17	185:20,21
49:15	143:1,3	2:4 7:12	212:14,16	51:20	185:22,22
50:1	145:14,19	147:15	214:8	52:21,25	196:10
51:10	146:4	149:5	228:19	54:2	202:9
52:19	151:14	176:22	three-day	56:14,15	208:15
56:20	155:21	206:2	52:25,25	56:16	209:22
59:22	157:3	215:12	three-w...	57:5 60:2	212:14
60:9 61:7	158:4	thought	99:4	60:20	213:2
61:16,17	160:22	56:1 84:1	120:25	72:11	215:15,16
65:25	162:3,4	85:19,19	164:5	77:25	215:17,22
66:1,6	162:10	104:9	thresholds	78:14,15	216:1
67:7,8	163:3,11	105:1	111:14	82:9	221:19,24
68:25	163:16,23	110:10,23	threw	84:20,24	222:1
69:22	165:2	149:9	149:7	90:25	223:6,18
72:4	166:3	178:18	191:8	98:15	233:4
75:15,24	167:13	185:1	throwing	100:10,11	238:6,6,9
76:10,24	168:17,18	188:19	23:20	103:8	time-wise
77:22	169:8,21	220:2	thumb	104:6	143:10
78:8	171:12,13	232:24	35:9,14,16	105:10	times
80:12	173:24	235:8,9	35:18,18	109:20	11:4,9
84:18	178:25	thousand	35:19	121:15	17:15
85:8,9,17	181:15	45:8,9	36:6	122:7,8	33:7
86:2,3,7	182:23,25	thousands	37:21,22	122:12	68:18
91:22	183:2	88:17	38:2,4,24	123:14	97:19,22
92:3,17	187:3	three	39:15	126:20	98:11
92:24	188:11	10:1 11:7	40:10,11	129:20	100:20
93:18	191:2	14:1 20:3	40:12,23	131:7	101:4
99:7	194:4,13	47:5 96:5	40:24,25	134:22	121:12
100:8	196:7,17	99:9	41:1,2,13	135:8	155:1,2
101:18	198:11,14	110:4	42:2	136:24	157:23,25
102:22	209:14	115:15	tie-stall	138:16	190:10
104:7	210:7,16	118:3	85:6	139:13	200:14
106:14,15	210:18	127:25	time	140:24	214:23
106:16	214:18	128:23	7:4 9:17	144:13,19	220:1,11
107:10	215:2	129:1	9:22 10:2	145:21	Timmons
108:5	222:6	130:13	10:24	146:10	17:9
121:14,16	223:7	131:22,24	11:16,23	152:25	title
123:1,17	224:5	131:25	12:7 13:8	156:16	27:23 60:1
124:5	225:22	132:1,4,5	13:10	157:18,19	titles

39:14	218:24	treatment	158:21	84:7 85:7	165:21,25
today	226:1	14:2	203:25	96:1,9	167:2
6:18 8:2	totals	100:19	204:12,20	100:7	truthfully
9:3 12:4	118:2	102:17	trending	104:6	9:11
19:2 56:8	touch	118:3,4	158:23	112:24	try
79:10	175:4	120:25	trial	113:1	58:12 91:6
81:23	track	122:5	11:5,8	121:17	204:18
85:22	23:19	126:4,9	49:14,23	123:23	trying
87:23	208:16	126:13,14	51:6,7,9	126:4	21:19
112:13	tracked	130:23	51:14,15	137:11	22:19
191:3	171:12	131:16,19	51:16	141:19	28:6
231:15	tracking	131:20,22	105:7	142:4	37:24
told	7:15	138:13,17	198:11	143:18	41:3 76:3
7:1 34:23	trained	140:16	231:10	145:1,8	82:18
48:2	52:16	141:18	232:11	151:11	83:15
89:11	training	144:15,16	trials	154:21	84:15
92:25	5:3 24:23	149:1,6	49:13,15	167:4	93:21
131:10	52:12,13	151:25	176:1	191:5	98:9
133:14,15	57:16	154:14	185:19	197:4	99:22
149:9	66:1	157:25	tried	199:14	101:17
154:7	transcrib...	160:16	71:4,9	202:10	110:16,17
169:21	238:10	168:22	183:20	203:3	121:9
191:2	transcript	171:8	196:17	204:2,14	138:3
196:9	3:19 42:10	176:24	204:19	219:18	143:14,15
220:1	167:16	208:8,9	TRIGG	220:6	166:19
top	168:3	215:18,21	2:9	223:19	169:6
14:12	169:7	218:5	trouble	225:2	172:5
26:19	173:19,20	220:5	28:23	230:14	183:14,22
87:2,13	173:20	221:18	142:9,15	231:8,21	187:5
160:23	236:13	222:1	204:5,6	234:17	188:21
180:7	237:17,18	228:14	troubling	237:18,19	196:13
192:25	238:11	treatme...	205:8,8	238:11	207:4
197:14	transfor...	100:16	troughs	trusted	209:17
208:17	93:14	121:3,15	79:11	182:21	214:24
221:7	118:13,14	121:20,22	true	truth	216:4
topic	118:17,18	122:3,8,9	8:22 20:5	12:3	turn
97:24	transpor...	122:10,12	20:13,14	166:15,17	18:14 20:2
total	114:17	122:16	24:16	175:21,22	20:21
76:12	treat	144:19	29:13	truthful	25:19
97:12	222:18	148:16	32:21	9:3 12:6	31:14
100:12,17	treated	158:5,6	38:23	22:25	33:4
101:3	170:21	174:24	44:15	80:23	34:18
124:20	221:20,23	208:4	60:17,18	81:3	58:10
128:23	221:25	trend	69:20	143:5	105:1
134:19	222:3,9	142:2	72:9,20	145:16,25	190:17
146:4	222:16	154:17,24	83:8 84:4	162:22	229:21

turned 102:14 186:18 234:10	124:19,21 124:22 125:4,6,7 125:9,12 125:17,23 127:22,24 128:11,22 128:22 129:2 132:7,8 133:23 140:20 143:21 146:18 149:8,18 150:3,6,8 150:10,13 150:18 156:1 158:24 176:12,15 176:20,25 177:1 184:24 197:15 198:3 203:4,5,7 203:8,9 203:13 208:1 210:17 211:7 212:12,14 215:4 216:15 219:5,21 220:8	199:9 236:12 typical 86:8 108:16 111:3 136:15 156:10 typically 26:21 207:15 typograp... 236:15 typos 236:16	<hr/> U <hr/> udder 106:16 uh-uh 7:10 ultimately 105:11 under-o... 80:22 81:2 underlying 71:25 understa... 6:19,20 7:12 10:3 34:5 38:1 50:6 70:16 71:2 77:24 100:4 106:4 142:10 148:12 168:23 196:6,7 207:18 209:17 212:4 233:16,19 233:22	236:19 understa... 7:15,16,20 103:7 115:4 131:18 142:9 191:6,9 217:25 233:18 understo... 12:20 13:5 235:8 236:20 uneven 182:3 unit 99:13 117:16,17 United 200:19 university 8:10 16:24 60:5 116:7 178:20 232:24 unknown 98:5 unusual 78:2 125:20 179:22 upper 118:16 upward 154:24 urination 180:8 urine 120:15 USDA 18:20 29:18,21 59:16 60:6 64:9	66:18 68:18 200:16 203:6 234:1 use 7:17,19,24 71:20 89:22,24 94:7,11 97:11 98:4,25 158:12 174:25 208:7 useful 66:20 69:4 70:24 uses 91:22 92:12,17 Utah 51:9,14,15 utilities 32:3 49:2 50:19 52:13 54:23 55:5 60:17,20 66:9 69:6 176:1 186:7 200:7 201:7 utility 31:24 49:19,25 133:10	vague 30:12 34:12 72:8,25 80:7 82:13 91:14 105:22 106:7 162:18 168:18 173:10 184:17 192:15 193:12 204:4,16 205:11 223:24 229:19 validity 44:3,12 64:10 165:13 182:20 Valley 1:4 36:23 value 74:1 96:17 97:5,6,7 154:25 156:3 221:5 235:24 values 77:17 82:17 88:21 126:22 127:8 224:10,11 232:1 235:20,20 235:25 236:6 variability 223:16
---	---	---	---	---	--	--

variable 223:4,16	veterina... 103:2	4:2,5 6:21	154:20,21 159:13,16	119:7 127:13	W
variation 142:7,24 145:13,14 154:4 160:17 164:7,9 167:10	veterinary 233:23 Videoco... 2:14 videos 43:4 videotape 202:10,13 203:16,18 view 25:9 78:5 violations 32:3 violent 202:11 203:4,12 203:15,17	10:23 11:5 12:25 13:4,8,16 16:14,18 17:16 19:5 20:4 20:13,19 20:24 24:18 25:3,8,10 27:4,5 28:8,13 29:12 31:11,18 32:23 33:1 38:7 43:9 50:14 52:3,12 54:22 60:8,12 63:13,17 71:1,8,15 83:7 91:2 102:14 129:22 135:9,11 135:14 138:23,23 139:5 140:16 141:22,22 141:25 142:4 143:18 144:22 146:2 148:17,18 148:21 149:3 151:22 152:20 153:8	159:20,21 160:3,5,6 160:14 161:1,9 161:12,22 162:13,15 162:24 163:8 165:14,18 174:23 178:12 180:14,24 181:7 182:25 183:18 190:22 192:2,4 193:10,23 195:6,12 195:18,20 195:21 196:3 197:9,12 199:19,25 206:7,12 214:8 219:2,2 221:12,21 226:21,25 227:24 232:2 233:1 234:5,20 235:21 voltage/... 3:20 59:17 178:7 181:23 voltages 3:18 4:2,4 27:8 29:15,16 30:20 33:14,18	129:25 150:25 151:2,9 153:15 158:18 173:2 175:20 206:14,18 227:17,18 229:17 voltmeter 236:1 volts 22:16 23:2 97:19 98:11 118:17 147:17 149:4,8 150:24 151:1,18 151:21 152:6 155:4,5 155:20,20 156:2,14 156:22,24 157:9,12 158:16 159:1,7 160:12 161:3,3,4 162:15 163:7,8 163:23 164:22 178:21 188:3 214:9,17 214:25 volume 204:20 vs- 1:8	Wait 132:25 229:25 waited 209:22 211:9 walking 8:21 231:14 want 7:24 18:17 25:16 26:20,24 33:4 34:18 39:1,16 58:15 61:2 84:9 89:2,24 90:6 98:20 99:2 104:25 105:1 107:15 114:25 115:9 128:18 137:6 140:19 151:8 167:14 169:17 172:6,14 172:14 177:25 178:15 183:6 193:15 202:4 206:24 207:20 227:13 228:6,25 230:22
varied 146:12					
variety 16:17 19:13 24:17 26:11 66:18 69:5 71:1 71:14 74:15 77:6 139:4 194:22	violently 101:24 102:1 visited 64:4 vitae 3:13 6:1 8:3 volt 55:17 135:10 141:18 155:4,9,9 155:19,19 155:22,25 160:22 161:3,5 163:24 164:21 165:3,3 176:24,25 177:1,1,2 216:1,6 226:2,8 228:14 voltage 3:16,22,25				
various 17:17					
verbatim 54:3					
verifiable 60:25					
verify 19:19 168:9,12 168:13					
versus 166:3 231:8					
vertical 196:1					

wanted	76:20	151:2	ways	25:5,21	158:21
8:5 18:14	77:2,9,25	152:3	107:9	26:6,8	159:3,4,6
35:2	78:10,14	158:8	141:22	38:12	159:9,22
60:22	78:15,21	180:11	we'll	56:25	160:12,13
72:3 84:1	78:22	187:7,8	18:24	58:14	160:14,16
94:8	79:4,9,10	187:19,20	22:10	63:21,25	weekly
111:5	79:13,14	187:23,23	69:22	64:6	127:4
115:2	79:16	187:25	77:15	156:10	weeks
169:4,5	82:4	188:8	85:21	168:3	14:1,1,2
205:17	85:23	210:14	we're	169:13	35:21,23
224:6	89:15	212:23,24	6:19,20	203:14	38:3,5
232:22	93:1,6,9	212:25	7:15 24:5	weary	99:9
Washing...	93:10,23	214:9	28:10,23	205:25	110:3,3,4
49:11 51:2	98:21	216:21	29:7,17	wedding	118:2,3,3
51:6	102:13,15	waterer	35:13,15	48:15	127:14,22
wasn't	102:18	221:11	45:14	week	127:24,25
18:9 31:7	103:6,9	223:3,15	59:13	36:1,2	128:11,22
41:21	105:11	waterline	73:3	110:11,14	128:23,23
45:8	112:7,8	119:11,12	83:18	110:15	129:1,2
85:15	112:11,19	119:12	89:1	126:22	132:7,8
88:14	112:20,22	way	94:16	127:8,10	145:23
118:20	112:23	18:17	95:23	127:12,16	146:5
134:12	113:2,3,7	38:18	111:11	127:17,19	151:6
140:3	113:15	44:11	123:14	127:22	152:5,7
144:11	118:25	71:5 86:1	124:24	128:10,25	157:4
146:22	119:11,15	100:5	125:8	129:1	158:24
163:21	119:17,18	106:18	128:25	132:2,3,4	weighed
177:20	119:19	108:22	132:3	143:25,25	117:21
197:19	123:9	109:7,18	138:20	144:1	went
208:19	124:3	109:19	143:1,3	145:7	5:4 10:13
223:11	127:11,14	116:3	147:7	148:16,16	13:17
waste	129:25	133:14,16	149:17	148:17,17	17:13
120:10	134:4,8	145:4	150:7	149:1,5	22:17
watching	134:11,12	146:3	151:4	149:19,24	26:5 32:6
136:17	134:16,17	154:8	156:3	149:25,25	37:4 45:6
137:14,16	134:18,19	159:24	159:9	151:4,10	50:13
water	134:21	173:8	161:20	151:15,24	52:21
3:18 13:21	137:8,9	178:16	166:3	151:24	53:6,10
14:10,16	137:17	183:20	179:2	152:4,8	57:18
26:9 27:4	138:5,15	192:21	180:17	152:11,15	85:13,19
28:9	140:15	197:22	184:1	152:19,23	86:23
29:15,16	141:9,17	205:9	189:21	152:23	93:20
43:9,11	142:1	207:24,25	194:13	153:6,9	110:20
47:14	143:12	212:10	213:24	153:15,18	114:22
74:18,19	146:6	219:21	we've	153:18,19	115:3
76:15,20	150:24,25	227:22	6:24 23:16	153:19	120:8,9

124:6	208:14	167:17,21	111:24	186:22	21:14
139:3	210:2,13	withdraw	workbook	193:23	22:3,9
146:8,9	221:20,25	64:23	5:5 57:20	227:20	23:9
146:11,12	232:8	65:13	worked	write	25:25
151:22,22	wet	110:24	24:17 32:5	73:9 131:7	26:2,5,20
153:9,13	74:18,19	witness	61:7	201:12	26:21
153:14,17	79:18	6:11 10:23	212:10	231:24	27:13,13
153:18	80:1,18	11:22	working	writing	27:16,18
159:24	81:25	75:6	9:16 35:25	21:3 73:11	27:20
160:12,14	WHEELER	111:16	71:7	73:13	28:1,12
160:15	2:9	168:16	works	185:3	28:14,16
167:13	whichever	170:17	98:6	written	28:20,22
174:7	224:6	178:19	workshop	6:22 19:2	30:8,17
175:18,19	white	202:6,6	57:1	54:12	30:19
188:9	190:22	205:21	workshops	58:21	32:15,18
189:20	191:3	217:1	56:24 66:2	112:14	32:21
201:2	Whittles...	236:18,20	world	185:25	33:25
207:16	43:10	238:7,8	85:25 86:8	193:16,18	41:15
208:8,22	wide	wondering	137:25	205:9	42:13
208:25	16:17	134:13	192:4	wrote	43:16,19
209:2,6	19:13	word	worst	10:25 20:4	43:21
210:18	66:18	94:11	82:21	22:6,7	44:24
214:18,19	77:6	112:6	174:25	40:16,17	45:3,15
215:15,16	167:9	words	worst-ca...	73:10	50:1,16
215:17,22	wife	7:20 74:18	62:17 74:1	177:8	50:21
216:6,6	48:15 58:9	84:24	74:6	181:15	53:16
216:11	wife's	105:10	82:20,22	182:18	54:6 59:6
222:10	10:5	175:4	83:4,21	189:14	68:24
weren't	willing	193:16,17	worth	197:1,6	69:23
24:19	115:23	205:6	41:24		73:2,2
56:23	Wisconsin	231:14	wouldn't	X	77:7 78:1
84:24	1:1 3:19	work	41:23 58:6	X	80:15
102:9	11:11	7:18,19	62:14	191:17	82:17
105:9	12:16,17	9:20	89:21	XCEL	83:5
108:10,12	12:23	18:13	109:18	1:9	84:18
117:14	16:24	51:22	123:14		87:18,21
122:11	17:13	53:12	125:20	Y	88:9,22
124:7	33:8 34:6	56:10	135:2	Y	88:24
134:11	34:15	57:1	143:5	6:10	89:13
135:1	47:21	60:11	144:25	191:17	90:16
140:1	64:15	62:10	145:16,25	yeah	92:10,22
141:13	65:9,13	63:6,16	162:22	9:9 11:21	93:2,6,19
143:5	66:1,8,24	63:18	165:21,25	17:8,18	93:24
149:10	66:25	68:12	167:2	17:24	94:3 95:8
157:21	67:16	70:19,20	172:17	18:2,4,6	97:17
163:1	133:10	70:21	184:13,14	19:9,17	98:7,8
				20:6,8	

99:5,6,9	161:2	58:9	Z3	163:7	202:19,21
99:10,25	162:19	101:12	94:19	178:21	206:19
100:8,16	164:19	219:25	Z4	214:18	214:9,12
100:25	165:8	year-plus	94:19	0-4	214:18
101:10,13	168:2,5	167:11	zero	118:17	216:1,6
108:24	170:17,17	years	83:2 92:19	1	216:23
109:7,10	171:5,11	10:1 51:9	100:14	1	217:2,17
110:22	171:17	56:6,25	121:13	3:4,5,13	228:14
111:24	172:19,22	57:2	122:1	4:4 54:4	1,000
112:3,10	176:8	63:22	135:11	54:10	40:5
113:17	180:4,13	64:7	138:7	95:9,11	1,100
116:4,14	181:2,8	175:25	148:24,25	107:15,20	156:5,6
117:13	181:10,12	176:1	149:1,2,2	111:10,17	1,200
119:2,16	182:5,7	189:24	149:6	112:1,3	40:6
121:16,19	183:5,9	202:2	151:17,21	118:11	1.0
122:24	187:14	208:2	152:6	121:3,4	147:12,21
123:3	190:14	216:14,15	153:8	122:1	176:25
124:1,4	192:8,19	219:6,22	154:20	127:10,12	1.15
124:11,25	192:20	220:8	155:2,4,4	127:17	147:8,10
126:11	193:19	Yep	155:5	140:9,10	1.Page
130:17	194:13	13:25	156:22	143:25	5:2
133:6	197:20,24	111:19	157:16,20	149:17	10
135:16	198:1,7	130:19	157:23	151:10,15	4:1 20:24
137:12	198:22	179:20	158:16	151:24	23:17
140:8,11	199:2	yesterday	159:1,6,7	152:4,8	24:10
140:14	200:9,12	35:23	160:11,22	152:23	25:6,7,19
143:3,9	200:22	36:21	160:23	154:10,14	27:2,24
144:9	203:23	40:9	161:5,15	155:4,19	29:6,12
146:9	204:19	Yield	162:15	155:22	29:14
147:1,15	207:9,11	4:5 206:20	163:8	156:2,11	38:6
147:18,25	209:14	York	164:22	156:12	50:25
148:1,5,9	210:22	1:15,18	176:24	157:4	59:7,8,8
148:11,19	212:9	24:23	192:21	159:3,4,6	82:12
148:22	215:2,6	53:8,9	197:11,12	159:9	87:2,3,13
149:11	215:24	55:1,11	214:17,20	161:3,15	87:13,18
150:16	217:3	55:13,15	214:25	163:24	87:20
153:14	218:14	55:19,20	216:2	164:21	147:2
155:12,24	219:10,19	58:25	0	165:3	164:14
156:15,17	220:2,23	69:16,25	0	167:1	168:19,20
157:3,10	221:14	133:11	121:3,8	178:21	168:20
157:14	222:17	Z	135:10	184:10,22	170:8
158:20,25	226:14	Z1	150:24	184:23	174:3,11
159:11,19	235:11,13	94:18	151:1	185:4,5	176:12,17
159:23	year	Z2	156:14	185:20	178:20
160:4,8	41:14	94:19	157:9	187:2	211:9
160:24	48:19				214:15

224:18,19	33:1 40:4	23:17	1990	159:4	2018
224:24	150:23	29:13,22	29:24	160:12	9:14 10:17
225:4	12-hour	167	33:22	161:3	18:8
226:9	116:25	3:19	1991	165:3	37:12,18
10.5	12.18	17	23:4 50:15	170:7,8	2018CV0...
130:13	147:17	29:13	50:17	170:13,14	1:8
100	120	178	1991-	178:21	2019
56:7	100:6	3:20	10:24	185:21	35:19 38:6
120:14	109:9	17th	1992	202:16,18	40:4
221:5	116:2	2:10	20:13	202:18,21	46:11
1000	218:23	18	1993	203:5,23	48:21,22
74:2 90:1	122	4:4 29:13	33:16,20	206:15	48:23
105	109:14,17	29:25	1994	214:9,18	2021
58:24	129	30:1,5	201:18	217:16	1:16
106	3:16,18	180	203:21	2.0	206
11:15,19	12th	37:18	1999	147:21	3:24 4:1,2
12:16	37:8	19	31:12	176:25	4:4
33:13	13	3:23 12:10		2.2	21
34:8	1:16 3:5	35:19	2	220:11	3:16 4:5
53:25	13.8	46:11	2	2.7	102:10
64:18,24	185:20	158:14,19	4:3 16:10	220:15	168:21,22
64:25	187:6	1942	18:19	20	21-day
11	14	8:13	37:18	39:15	130:23
29:13,15	4:2 29:13	1970	54:5,10	56:25,25	2185
118:11,13	29:20,21	43:8	95:10,12	57:2 59:4	130:11,16
160:19	30:6	1975	107:20	115:17	2192
164:18	31:14	43:10	111:2,6	237:22	27:19
170:8,9	128:9,9	1982	111:12,13	200	133:8
115	157:7	43:13	121:4	88:2,23	22
11:15	170:7	1983	122:2	155:22,25	192:18
33:16	176:22	43:15	127:19	2000	226
54:1	15	62:11	141:2	57:3,4	4:5
64:18	5:2 29:13	86:24	144:1	2003	23
65:2,10	29:21	87:10	148:12,16	17:20	152:15,16
67:10,17	32:20	1985	148:17	19:17	231
68:1	33:2	43:20	151:24	21:9,16	3:5
11th	50:25	1988	152:7,11	2008	235
216:5	59:2,7	12:10	152:15,16	10:9	3:6
12	114:11,12	80:12	152:19,23	201	24
20:25	150	167:21,25	153:6,9	3:23	152:12
23:17	219:20	169:8	153:15	2012	244
24:10,21	15th	1989	154:14	36:23	82:11,14
24:22	167:21	15:1	155:4,20	2016	85:23,25
29:16,19	16	130:11	156:2,12	37:2	86:3,20
29:19	3:19 21:20	199	156:12	2017	86:23
30:13	21:24	3:21,22	157:4	37:8	87:12,20

24th	178:21	104:13	185:25	385	4/2/97
8:16		121:15	328	147:20	4:6 226:22
25	<u>3</u>	122:10	147:17		4/6/94
3:18,22	3	123:15	33	<u>4</u>	3:23
20:7,8	18:19,22	125:1,4,8	20:8,11	4	201:19
26:17,18	18:24	159:8,9	227:14	3:14 18:15	40
27:12,13	19:2	185:21	228:18	20:24	39:23
27:21,25	31:18	300	331	21:20,22	115:15,20
28:10,11	68:13	2:4	147:22	22:16	157:13
28:13,17	73:9,10	303.244....	346	23:2,16	178:20
28:17	73:12,14	2:12	147:21	24:1,2,7	207:24,25
174:22	73:15	3032	35	25:11	208:8,24
250	114:11	25:24	56:17	34:1	209:9,14
88:2,23	144:1	3034	135:21	120:22,23	209:18,20
89:1,4,18	148:16,17	26:1	207:3	121:4	210:18,18
89:21	149:1,19	128:24	229:21	122:2	213:10
93:17	152:7,11	130:5	230:2,3	123:2	219:8,11
147:13,14	152:15,16	133:19	350	141:18	219:23
211:19	153:18	135:5	56:7,9	147:17	400
235:24	154:11	3035	3502	148:17	101:7,8
254	160:13,14	26:3,5	205:23	149:4,8	40th
147:21	170:8	169:13,13	3503	149:17,25	108:21
27	184:23	176:7	205:24	152:7,11	434
174:6,12	187:2,25	30352	3504	152:15,16	147:8
218:24	202:16,24	129:19	205:24,24	153:18	44
220:10,11	218:15	304	356	154:15	100:6
28	3-13	147:14	227:24	155:5,20	108:10,12
104:19	178:19	305	228:15,21	156:2,12	108:22
123:15	179:8	2:4 219:13	229:1	161:4	109:9,14
124:20,24	3-14	219:18,24	36	163:7	109:17
124:25	179:16	224:2,4,9	101:25	170:7,8	450
125:6	3-22	224:11	102:2	176:7,8	37:3 38:8
135:7	183:7	225:5	103:5,6,7	177:2	4500
160:1,2	192:18,19	229:1,5,8	103:10,12	178:21	2:10
174:11	3-23	31	103:18	184:4,8	49
2899-32...	185:9	20:7,8	105:11	185:22	99:7 101:1
3:19	3-4	159:14,17	123:10,13	188:3	101:4
167:17	183:7	159:21	124:6	193:4	49-day
29	3.0	3127	135:22	214:9,19	13:24
159:9,12	147:14	173:23	141:18	221:7,7	99:10
159:13	3/28/94	174:23	365	226:2,8	
160:3	3:21 199:5	32	139:12	4.0	<u>5</u>
2B	30	20:7,8	370	147:21	5
150:23	56:16	159:21	2:10	4/15/88	3:21 33:1
151:4,5	100:12,21	323	3846	3:19	44:16
2nd	100:22	185:14,15	228:14,23	167:17	81:8,25

111:10	90:12	170:8	3:21 199:5	26:3,15	176:17
112:1,3	93:20	193:7	199:11	27:2,3,23	8-2
121:3,4	147:11,12	202:24	627	28:8	197:25
122:2	147:24	220:16	3:22	29:10	800
126:25	148:7,10	225:12,15	199:25	32:19	37:13
127:7	507.282....	225:16	200:3,13	73:18,20	80202-5...
135:6,10	2:6	228:7,8	628	73:20,21	2:11
138:7	50th	6,350	3:23	90:9	80s
141:24	48:15,20	218:25	201:19	140:7,9	84:25 85:2
147:10,20	51	6/22/92	202:23	148:21	83
148:17	170:11	3:22 200:1	629	160:16	62:12
149:25	226:1,8	60	3:24 206:1	170:8	111:10
153:19	525	31:12	206:6,25	184:12	85
154:14,21	86:23	88:15	207:4	211:9	43:18
155:2	87:12	97:10	213:23,24	224:18,19	85-39
156:11,24	53	108:17	630	224:24	31:19
157:12,12	30:24,25	109:12	4:1 206:1	7-week	850
161:3	54	121:5	206:10,25	99:10	156:4,4
163:23	31:1	220:11	207:3,5	71	87
164:14	220:15	619	631	109:10,11	112:7
170:7,8	55	3:13 6:1	4:2 206:3	109:11,15	87-3034
176:11	31:3	620	206:14	109:16	14:11
177:1	55904	3:14 6:4	207:5	72:2184	26:16
185:23	2:5	34:19	632	27:17	87-3035
220:15	57	45:21,22	4:4 206:18	72:2184...	3:17 14:15
223:2	5:2	59:10	207:5	130:11	26:16
5/7/21	59	231:3,6	633	78	129:23
44:10	31:9,10	231:11,12	4:5 226:21	8:11,13	87-8035
50	5th	232:14	64	79	114:1
38:10	178:21	621	20:18	8:14	88
50-foot	<hr/>	3:15 6:7	65	<hr/>	12:10
119:16	6	622	8:10	8	190:20,20
500	6	3:16	696	8	191:11,13
53:23	3:5,13,14	129:21	18:20	20:17,22	89
62:15	3:15,20	169:16	59:16	20:24	21:8,8
73:25	3:24 20:2	623	178:12	23:17	28:1
74:6,23	25:22	3:18	200:20	24:3,8,9	33:20
75:19,23	26:17,17	129:25	6th	25:7,22	69:22
75:25	26:18	130:9,10	203:20	26:3,15	<hr/>
76:12	27:21	132:20	<hr/>	27:2,3,5	9
77:8,12	29:10	624	7	27:23	9
77:17	148:24	3:19	7	28:9	21:20,24
82:19	149:2	167:14,16	3:6,15	29:10	22:1
83:22	153:19	625	19:5	101:4	23:16,23
84:11,12	159:22	3:20 178:6	21:19,22	148:21	23:24
89:5,21	160:16	626	25:22	170:8,13	24:1

30:14 170:8 90 30:19 108:17 109:12 115:25 90-3502 3:24 206:6 90-3503 4:1 206:10 90s 54:19 96:9 91 21:9 33:24 34:2,3 50:11 92 31:20 92.3 185:21 93 34:4 93-502 206:1 213:19 95 30:14 95-303 206:2 96 30:22,23 98.4 185:22					
--	--	--	--	--	--