IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,	)
Plaintiff,	)
vs.	)4:05-CV-00329-TCK-SAJ
TYSON FOODS, INC., et al,	)
Defendants.	)

- -

VOLUME I OF THE VIDEOTAPED
DEPOSITION OF BERTON FISHER, PhD, produced as a witness on behalf of the Defendants in the above styled and numbered cause, taken on the 3rd day of September, 2008, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

Exhibit L

A P P E A R A N C E S

FOR THE PLAINTIFFS: Mr. Richard Garren
Attorney at Law
502 West 6th Street
Tulsa, OK 74119

FOR TYSON FOODS: Mr. Robert George
Attorney at Law
2210 West Oaklawn Drive
Springdale, AR 72762

FOR CARGILL: Ms. Theresa Hill
Attorney at Law
100 West 5th Street
Suite 400
Tulsa, OK 74103

FOR SIMMONS FOODS: Mr. John Elrod
Attorney at Law
211 East Dickson Street
Fayetteville, AR 72701

FOR PETERSON FARMS: Mr. Scott McDaniel
Attorney at Law
320 South Boston
Suite 700
Tulsa, OK 74103

FOR GEORGE'S: Mr. Woodson Bassett
Attorney at Law
221 North College
Fayetteville, AR 72701

FOR CAL-MAINE: Mr. Robert Sanders
Attorney at Law
2000 AmSouth Plaza
P. O. Box 23059
Jackson, MS 39225
(Via phone)

676c5b0b-4391-4682-9dda-575b4bc95703

FOR WILLOW BROOK: Ms. Jennifer Griffin
Attorney at Law
314 East High Street
Jefferson City, MO 65109
(Via phone)

676c5b0b-4391-4682-9dda-575b4bc95703

I N D E X

W I T N E S S	P A G E
BERTON FISHER, PhD	
Direct Examination by Mr. George	6
Signature Page	325
Reporter's Certificate	326

676c5b0b-4391-4682-9dda-575b4bc95703

(Whereupon, the deposition began at 9:04 a.m.)

VIDEOGRAPHER: We are now on the Record for the deposition of Berton Fisher. Today is September 3rd, 2008. The time is 9:05 a.m. Would counsel 09:04AM please identify themselves for the Record?

MR. GARREN: Richard Garren for the State of Oklahoma.

MR. GEORGE: Robert George for the Tyson defendants. 09:05AM

MR. McDANIEL: Scott McDaniel for Peterson Farms, Inc.

MR. ELROD: John Elrod for Simmons.

MR. BASSETT: Woody Bassett for the George's defendants. 09:05AM

MS. HILL: Theresa Hill for Cargill, Inc., and Cargill Turkey Production, LLC.

VIDEOGRAPHER: And on the phone?

MS. GRIFFIN: Jennifer Griffin for Willow Brook Foods. 09:05AM

MR. SANDERS: Bob Sanders for the Cal-Maine defendants.

VIDEOGRAPHER: Thank you. The witness may be sworn in.

BERTON FISHER, PhD

676c5b0b-4391-4682-9dda-575b4bc95703

having first been duly sworn to testify the truth, the whole truth and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. GEORGE: 09:05AM

Q Dr. Fisher, could you state your full name for the Record, please?

A John Berton Fisher.

MR. GARREN: And, Robert, may I make the announcement that we had on our pre-going on the 09:05AM Record conversation?

MR. GEORGE: You may.

MR. GARREN: Dr. Fisher has indicated, as we indicated earlier, in reviewing late yesterday afternoon for this deposition, under Opinion 18, the 09:05AM table and the figure that appear in there, appear at least initially to be possibly containing an error. We haven't yet run that to ground. He's not prepared today to speak to 18. We'll try and get that found or researched tonight. If we can't, then 09:06AM we'll bring him back for Opinion 18 at a later time.

Secondly, we gave you a temporary copy of a field workbook that was prepared by Dr. Fisher this weekend in anticipation of his deposition and his actually going to the edge of field sites and 09:06AM

676c5b0b-4391-4682-9dda-575b4bc95703

reviewing those sites and making some notes and taking pictures. So they will be -- that book will be properly processed and sent to you as all other documents have been. So when you receive it, you'll need to probably throw away the temporary copy we 09:06AM brought to you today.

Who made the announcement today or who else joined? Who joined on the phone?

MR. REDEMANN: It was Bob Redemann. I'm just listening in today. 09:07AM

MR. GEORGE: Thank you. Rick, I do want to make sure the Record is clear that the defendants are not -- we appreciate the disclosure regarding the possible error in Opinion 18, but we're not conceding that Dr. Fisher has the right or the 09:07AM ability to amend his opinion, particularly at this late juncture.

MR. GARREN: We don't anticipate there will be an amendment of opinion. We just think there will be some errata with regard to some calculation. 09:07AM We think it's a paste and cut error, moving from an Access or an Excel table or some other similar type of process.

MR. GEORGE: Okay.

Q Dr. Fisher, this is your second deposition in 09:07AM

676c5b0b-4391-4682-9dda-575b4bc95703

this case; is that correct?
A Yes.
Q Okay, and you've issued your second report in this case; is that correct?
A Yes. 09:07AM
Q Okay. Let me hand you what we've marked as Exhibit 1 to your deposition, Dr. Fisher, and ask you whether you can identify that as a true and correct copy of your expert report containing your -- the opinions that you intend to offer at the 09:07AM trial of this matter if you are permitted to testify.
A Okay. This is a true and correct copy of the report. The only reservation is with respect to Opinion 18, there may be some -- there are some 09:08AM errata that need to be dealt with.
Q With the exception of the issue with regard to Opinion 18, do you believe the opinions that are set forth in Exhibit No. 1 to reflect the full nature of the opinions that you intend to offer if you are 09:08AM permitted to testify at the trial of this matter?
A Barring the review of additional data, yeah.
Q Okay. Can you turn to Opinion 18, and at least for clarity of the Record, read the opinion that we've been referring to that may contain a 09:08AM

676c5b0b-4391-4682-9dda-575b4bc95703

possible error?
A Yes. Okay. The opinion itself I do not
believe contains an error, but there may be an error
in the graph and/or table that is presented in
support of that, that being Table 12 and/or Figure 09:09AM
8. The opinion itself, Opinion 18, begins on Page
39, and the opinion itself reads, the chemical
composition of poultry waste is distinctly different
from the chemical composition of cattle waste and
wastewater treatment plant effluent. 09:09AM
Q And Table 12 where you think there may be an
error, could you describe for the Record what that
table was intended to show?
A The table is intended to show some statistical
information concerning maximums, minimums, means, 09:09AM
medians, first and third quartile values for the
ratios of total zinc to total phosphorus, total
copper to total phosphorus, total arsenic to total
phosphorus and total zinc to total copper.
Q And does the statistical analysis and data 09:10AM
reflected in Table 12 support or was it intended to
support the opinion that you offer as Opinion 18
regarding the differences between the chemical
composition of poultry litter, cattle waste and
wastewater treatment effluent? 09:10AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q Tell me why you believe there may be an error in Table 12.
A Because in looking at Figure 8 in the Table 12, I think some of the ratios don't appear to be 09:10AM
coincident with what I see in the figure, and beyond that, it requires detailed review of the underlying information to be able to tell you more.
Q Can you give me an example just so I can follow your -- what brought this to your attention? 09:11AM
A Oh. Well, I'm thinking that the phosphorus, the total zinc over phosphorus ratios for wastewater treatment plant effluent, that's what caught my attention, are incorrect.
Q As we sit here today, do you have any reason 09:11AM
to think that the ratios in Table 12 with respect to cattle waste or poultry waste may be incorrect?
A Well, since I found one inconsistency in something that involved a spreadsheet calculation, I presume that there may be other errors because these 09:11AM
are typically done by making a formula that refers to a column and then pasting that formula to numerous other cells. So I'm just -- would prefer to review the information in its entirety and relook at all those computations. 09:11AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q When did you first discover that there's a possible error in Table 12 or Figure 8?
A Yesterday at about 3:00.
Q And is it your intention, Dr. Fisher, to review that information this evening and then be 09:12AM
prepared to testify regarding the results of that review tomorrow during the second half of your deposition?
A If I'm able to do that, it is my intent.
Q Okay. Did you note any other errors in your 09:12AM
review of your expert report?
A I noted a number of small typographical errors here and there.
Q Any errors with respect to statistics or analysis? 09:12AM
A None that I noted in the viewing yesterday.
Q Dr. Fisher, you were deposed I think the first time in this case in January or February of this year, and at that time you testified that you had been retained by the South Carolina law firm of 09:12AM
Motley Rice. Is that still true?
A Yeah. I'm not sure I'm retained by Motley Rice. Motley Rice does pay the bill, but I believe -- and I have a contract with them, but I believe I work for the State of Oklahoma. 09:13AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Has Motley Rice continued to pay for your services in this case subsequent to your deposition in January of this year?
A They have.
Q Okay, and I believe you testified at the first deposition that at that time you had been paid in excess of 500,000 but could not give an exact figure. Do you know today how much you have been paid for your services throughout the duration of this case? 09:13AM
A Well, it's still in excess of 500,000. I've not made a computation of that.
Q Have you submitted invoices in connection with your work in this case?
A Yes. 09:13AM
Q And have you retained copies of those invoices?
A I have.
Q I'll represent to you, Dr. Fisher, that I've tried to go through all of your materials produced in this case, and I think I've looked at all of them, but it's entirely possible that I've overlooked something. I'm going to hand you what I'll mark as Exhibit 2 to your deposition, which is the only invoice that I could find in my review of 09:13AM 09:14AM

676c5b0b-4391-4682-9dda-575b4bc95703

your expert materials, which for the Record is an invoice dated February 22nd of 2006. Do you recognize that as an invoice related to your work in this case?

A I do. 09:14AM

Q And this is surely not the only invoice you have issued, is it, Dr. Fisher?

A No, it is not.

Q Okay. It appears that as of February of 2006, which you'll agree with me, is about two and a half 09:14AM years ago?

A Correct.

Q You had outstanding invoices at that time of approximately 133,000; is that right?

A Yeah, generally about a month behind, but I 09:14AM think at that time it would be about right, yeah.

Q Okay, and I assume, and you tell me if I'm incorrect, that you would have billed for services prior to February of 2006 and that you billed for services subsequent to 2006? 09:15AM

A Yes, that's true.

MR. GEORGE: I'm going to ask on the Record, Rick, for a complete set of Dr. Fisher's invoices because I don't believe they've been produced. If they have been produced and you can 09:15AM

676c5b0b-4391-4682-9dda-575b4bc95703

direct me or Dr. Fisher can direct me to them in his considered materials, then obviously they don't need to be reproduced, but just by way of a suggestion, it might be just as easy to obtain them from Fred Baker at Motley Rice, to whom they are submitted, as 09:15AM
it would be from Dr. Fisher but I'll leave it to you.

MR. GARREN: Okay.

Q If you would look at Exhibit 2, Dr. Fisher, beginning on what is labeled Page No. 2 of the 09:15AM
invoice, there are references --

A Can you give me a Bates number?

Q I can, yes. At the bottom, the last four digits are 0004.

A Okay. 09:16AM

Q It appears that you were being billed for a series of interviews conducted by people, such as B. Barnes and keep turning, S. Rodriguez, G. Stansill, R. Hummel, L. Weatherly, T. Jones, S. Tuell, and T. Bracken. Do you see those interviews? 09:16AM

A I see the interview with B. Barnes on 1-30.

Q Okay. Turn over two more pages, you'll see S. Rodriguez?

A I don't see that. That's on page at the bottom at 6? 09:16AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Yes, 116, 2006.
A It says outside contract labor S. Rodriguez for work done 1-16 through 1-31 as per attached timesheets.
Q It's not an interview? 09:16AM
A No, sir. She was an employee.
Q Look down at January 11, 2006, G. Stansill, do you see that?
A Yes, G. Stansill.
Q Referred to as an investigator? 09:17AM
A Yes. Outside contract labor costs. He was an investigator.
Q Okay. R. Hummel is also referred to as an investigator?
A He's an investigator, that's correct. 09:17AM
Q You continue on the next page, the other individuals all of whom are referred to in your invoice as investigators?
A Correct.
Q Dr. Fisher, you're a geologist; correct? 09:17AM
A That's correct.
Q Okay. Why is a geologist hiring private investigators?
A Well, these are all -- were all off-duty Tulsa Police officers. Those individuals were hired for 09:17AM

676c5b0b-4391-4682-9dda-575b4bc95703

their observation skills, and they did work in identifying or ground truthing our air photo, and they also did work in identifying the locations of poultry waste disposal and the origins of those poultry waste that was being disposed. That's the 09:18AM work they were doing for me.

Q And is it true that the investigators, the Tulsa off-duty police officers that were hired, all ultimately reported to you in this case?

A No. They reported to Steve Steele, and Steve 09:18AM reported to me.

Q Who is Steve Steele?

A Steve Steele was at the time a major in the Tulsa Police Department and the chief of detectives. He is now retired. 09:18AM

Q And do I understand correctly from this invoice that you were responsible for actually paying for the time spent by investigators in the field?

A That's correct. 09:18AM

Q Okay, and why was that the case; why were you paying for investigators?

A Well, they were doing work at my request. I paid their bill, and then I was reimbursed by Motley Rice. 09:19AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Did you have a prior relationship with the Tulsa Police Department or Mr. Steele?
A Yeah. Mr. Steele is an acquaintance of mine. He's an individual who married a gal, who was -- the mother is always -- she was a mother of a friend of 09:19AM
my youngest daughter from school. I knew of her through a school -- him through a school association.
Q So you knew Mr. Steele socially?
A Yes. 09:19AM
Q Okay. Had you ever had occasion to work with Steve Steele or any of the other private investigators you hired for this case in another litigated matter?
A No. 09:19AM
Q Was it your suggestion that the investigators be hired or did someone else make that suggestion?
MR. GARREN: Object to the form.
A I suggested that the investigators be hired.
Q What type of reporting, if any, occurred from 09:19AM
the investigators to you as to the results of their investigations?
A There were oral reports. There were field sheets, which have been produced, and there were photographs, which have been produced. 09:20AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q With respect to the interviews, there's a reference to several folks being interviewed. Were there notes or audio recordings of interviews that were preserved?

A Are you referring to the item on 1-31 2006 on page that's Fisher 00254783.0004? 09:20AM

Q The interview of B. Barnes?

A Yes.

Q Yes.

A I took no notes at that interview. 09:20AM

Q Were you present at that interview?

A I was.

Q Who is B. Barnes?

A Barney Barnes.

Q Who is Barney Barnes? 09:20AM

A Barney Barnes was an individual who was a grower for Petersons. He was interested in the Attorney General's case.

Q How was Barney Barnes and his interest in this case identified? 09:21AM

A How was it identified?

Q How did you know Barney Barnes was interested in this case?

A I believe I was referred to Barney by his attorney, Chuck Shipley. 09:21AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Mr. Barnes, at this time did he raise chickens under contract with Peterson in the Illinois River watershed?

A He raised chickens under contract to Peterson but in the Eucha-Spavinaw watershed. 09:21AM

Q Why were you interviewing or your investigators interviewing growers from another watershed?

A Well, we were investigating -- or not investigating. We were interviewing Mr. Barnes or 09:21AM talking to Mr. Barnes to learn more about poultry operations in general since the operations don't appear to differ between Eucha-Spavinaw and the Illinois River watershed, and he was willing to be cooperative and instruct us a bit about the poultry 09:22AM business.

Q Is Mr. Barnes the only grower that to your knowledge has been interviewed by the investigators that you hired for this case?

MR. GARREN: Object to form. 09:22AM

A Mr. Barnes is the only grower who I have spoken with. I'm not sure if the investigators have spoken with other growers. I have never directed them to my knowledge or recollection to speak with other growers. 09:22AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Even if you didn't direct interviews, are you aware of other interviews by investigators of poultry growers?

A I'm trying to recollect. There may be, but I never directed that work and so don't have any 09:22AM present recollection of them.

Q What was the subject of discussion with Barney Barnes in this interview that occurred in January of 2006?

A Well, gosh. That was in January of 2006, so 09:22AM I'll give you my best recollection.

Q Please do.

A He discussed with us how or his view of how poultry was operated in his circumstance, that is, with respect to growth cycle, times between 09:23AM clean-outs, feed deliveries, frequency thereof, feed deliveries, normal waste disposal practices that he used and those that he was aware that others used, types of equipment that would be used in poultry growing, curtain wall houses versus central 09:23AM ventilation houses, that sort of thing, practices with respect to removing mortality on a regular basis, just any number of things with respect to the nuts and bolts of the poultry business, which I had some knowledge of but no direct knowledge of from a 09:23AM

676c5b0b-4391-4682-9dda-575b4bc95703

grower until I spoke with Mr. Barnes.
Q Did you and the investigator discuss with Mr. Barnes any grievances or complaints that he may have with his integrator, Peterson?
MR. GARREN: Object to form. 09:24AM
A I'm not sure. I think -- I believe Steve Steele was present at that interview but I can't be sure whether Steve was. I think there are at least two occasions which I spoke with Mr. Barnes on his property. So who knows. In the characterization of 09:24AM the investigator being there, I don't know whether he was or not for that particular get-together. I think that the only issue that I can recall that Mr. Barnes was -- expressed some concern with had to do, I believe, with some delivery trucks damaging his 09:24AM gate at one time. I believe that's true. He also had some -- just issues that related to compensation practices. I don't recall the exact nature of those. He was -- I think he pretty much was not real leveraged in his houses, so he didn't have 09:25AM concerns that many have.
Q You mentioned that the interviews were conducted on site at his poultry farm; is that correct?
A That's correct. 09:25AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q And other than gathering information verbally, did you collect any other data or information from Mr. Barnes such as samples?

A I did not personally collect samples, but part of the work that was done was to make arrangements with him to get him to agree to take some samples of soil and waste, and so that work was subsequently conducted. 09:25AM

Q And what was the purpose of collecting waste and soil samples from the Eucha-Spavinaw grower? 09:26AM

A Well, a Eucha-Spavinaw grower is really no different than an Illinois River grower, using the same kinds of feed, same kinds of practices. It was the ability to obtain samples of waste and soil from a location where we had some known history of application. 09:26AM

Q What were the waste and soil samples tested or analyzed for?

A Well, they were analyzed -- you'd have to take a look. I don't recall all the details. There was a rather extensive analytical list but -- 09:26AM

Q Generally what were you analyzing?

A We were looking for phosphorus, zinc, copper, arsenic. I can't remember whether there was bacterial work done, there may have been, but it 09:27AM

676c5b0b-4391-4682-9dda-575b4bc95703

would be a standard analytical list, and all the information should be available in the CDM report.

Q If I were to try to discover the actual lab reports that relate to this particular sample taken from Mr. Barnes' property, do you have any 09:27AM information that would assist me in finding that in terms of a sample ID number or nomenclature?

A Well, I might if I had the opportunity to look at the CDM Access Database. It's a fairly complex structure. I can't just say, yeah, I can help you 09:27AM right now. I'd have to look at it. I could find it I'm sure.

Q You don't recall, as you sit here today, whether the sample was identified as Barnes or some other name that would be obviously associated with 09:27AM this particular piece of property?

A I don't recall. There should be field books in the CDM production, references to laboratory sheets, chains of custody, that sort of thing.

Q Other than soil and litter samples, any other 09:28AM scientific or technical work or information gathered from the Barnes' property?

MR. GARREN: Object to form.

A There may have been. I can't recall specifically. I think Mr. Barnes may have provided 09:28AM

676c5b0b-4391-4682-9dda-575b4bc95703

a sample of feed, but that's what -- that's really what I recall. I mean, soils, wastes and possibly a feed sample if I recall correctly.

Q What was the purpose of securing a sample of feed? 09:28AM

A Well, the feed itself is, of course, what goes into the chickens and becomes their waste ultimately, and so what goes in more or less comes out, and it was -- the feed was a source of numerous constituents that are present in the poultry waste. 09:28AM

Q I'll hand you what we'll mark as Exhibit 3 to your deposition, which is an E-mail dated April 6th of 2005, from Steve Steele to yourself and Mr. Garren, who is seated beside you. I'll give you a moment to look at that and ask if you recognize this 09:29AM as indeed an E-mail you received from Mr. Steele.

A It was copied to me. I think it went directly to Rick, Mr. Garren.

Q You'll see I've highlighted some information I wanted to draw your attention to or a statement in 09:29AM the E-mail. There's a reference by Mr. Steele to needing some help from the rangers or our other informants. Do you see that?

A Yes, I do.

Q What is he referring to with respect to 09:29AM

676c5b0b-4391-4682-9dda-575b4bc95703

rangers?
A You know, my suspicion is that he may be referring to individuals working for the Scenic Rivers Commission, but if you want the actual answer, you should speak with Mr. Steele. 09:30AM
Q What about other informants; do you see that reference by Mr. Steele?
A Correct.
Q Do you know who he is referring to?
A I don't know specifically who he is referring to. Individuals who may be within the watershed who were willing to give information concerning, as I see here, disposal of waste is the main topic and finding those specific locations. 09:30AM
Q Fair to say that as of April of 2005, Mr. Steele was having some difficulty finding actual locations where poultry litter may have been land applied? 09:30AM
MR. GARREN: Object to form.
Q Do I read the E-mail correctly? 09:31AM
A This was quickly resolved early on. It was somewhat difficult to locate. That ultimately was solved.
Q Did you or did the investigators working under your direction maintain a list of informants in the 09:31AM

676c5b0b-4391-4682-9dda-575b4bc95703

watershed that they would draw upon for information regarding farming activities or litter application?

A I did not maintain a list of informants. I do not know what the investigators maintained.

Q Have you seen any reports of interviews or 09:31AM
correspondence or notes relating to conversations between the investigators and people that you would consider to be informants?

MR. GARREN: Object to the form.

A Would you repeat that question? Have I seen 09:31AM
these --

Q Have you seen any notes or received any correspondence that would identify informants or describe conversations that the investigators had with people you would consider to be an informant? 09:32AM

MR. GARREN: Same objection.

A Well, I know that Mr. Steele conducted some interviews with various folks in the watershed. They were not part of a technical investigation. So I didn't pay much attention to them and, in fact, 09:32AM
I'm really not sure just what the subject of the interview was. I, in passing, knew that.

Q Did you instruct the investigators to maintain file materials for this case that would show notes of interviews and perhaps a daily log of their 09:32AM

676c5b0b-4391-4682-9dda-575b4bc95703

activities?
A What I instructed the investigators to do was to provide us field notes and photographs and GPS coordinates which would be present in electronic form. So that would be their journal of their 09:32AM
activities, and then Mr. Steele would generate an invoice concerning the hours worked during a given month and provide that to me. So that would be the total, the sum total of the things I requested from them. 09:33AM
Q Were the investigators under instructions to send you copies of everything related to their work or just certain items?
MR. GARREN: Object to form.
A Well, with respect to my dealings with the 09:33AM
investigators, they were instructed to produce to me their photographs, their field notes, any field sheets, and they needed to give their time to Mr. Steele, and provide me back with the GPS units that contained their way point locations. 09:33AM
Q Did you have any protocol or understanding as to whether the investigators would retain a copy of their own file materials after they had sent certain information to you?
MR. GARREN: Object to form. 09:34AM

676c5b0b-4391-4682-9dda-575b4bc95703

A There was no protocol for them to maintain any file materials.
Q Are you aware of the fact that some of the investigators claim that they were told to destroy their files? 09:34AM
MR. GARREN: Object to form.
A I certainly never asked them to destroy any files, and I would be shocked to hear that that would be true.
Q You never gave that instruction? 09:34AM
A I certainly would never give that instruction.
Q I'll hand you what we'll mark as Exhibit 4 to your deposition, staying on the subject of investigators for a moment. Exhibit 4 is a -- appears to be either a transcript or summary, it's 09:34AM hard for me to tell, of an interview of a gentleman by the name of Bradley Rutherford conducted by Steve Steele. Do you recognize Exhibit 4?
A Well, this may come under the heading of things that Mr. Steele did but not at my request. 09:35AM It was not technical in nature, within my purview.
Q Well, to your knowledge were the investigators receiving instruction or direction from anyone other than you in connection with this case?
MR. GARREN: Object to form. 09:35AM

676c5b0b-4391-4682-9dda-575b4bc95703

A I think that the investigators received instructions for certain other tasks from counsel from time to time.

Q Do you know who Bradley Rutherford is?

A No. 09:35AM

Q Have you -- well, I'll represent to you that Exhibit No. 4 came from your considered materials produced in this case. So I assume that you've seen this document at some point in time. Do you agree?

A Well, sometime around November in 2005. The 09:35AM reason this would be in my materials is that at the time I had -- Steve can't type very well, and I had a gal who would just type up from his interview tape. So it probably has ended up on our disk. I never relied on this. 09:36AM

Q You actually received audio tapes of interviews from the investigators. Did I understand that correctly?

A I did not receive them.

Q Who did? 09:36AM

A They were given to Brenda Bradshaw, who was the gal doing the secretarial work for Mr. Steele, and she would have given those back to Mr. Steele.

Q Who hired Brenda Bradshaw?

A I set her up with Steele. 09:36AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Did she invoice you or Mr. Steele?
A She would have invoiced me.
Q So you hired Miss Bradshaw; do you agree?
A Well, I guess that's true. I paid her money and said could you handle this for Steve and she said sure. 09:36AM
Q Where is Brenda Bradshaw?
A I don't know. Somewhere in Tulsa. She can be a little hard to track down.
Q How did you find Miss Bradshaw? 09:36AM
A I worked with her previously.
Q In what position?
A She was I believe a file clerk at Gardere & Wynne when I worked there, and she's worked at numerous secretarial jobs and does quite a bit of freelance-type secretarial work. 09:37AM
Q So she's a former legal secretary; is that right?
A Well, I don't know if she is a former legal secretary. I think that she's worked as a legal secretary and she's worked as a file clerk. I'm not quite sure how to describe her. 09:37AM
Q You worked with her at a law firm, though?
A Yes.
Q And the procedure, as you understand it, was 09:37AM

676c5b0b-4391-4682-9dda-575b4bc95703

that Mr. Steele would send his audio tapes to Brenda Bradshaw and she would transcribe them into a document such as Exhibit 4?

MR. GARREN: Object to form.

A Yes. 09:37AM

Q Is it your understanding that that process was completed with respect to all of the interviews completed by the investigators?

MR. GARREN: Object to form.

A I don't know. I mean, that really wasn't 09:37AM anything that I had any concern with. That would be something that Mr. Steele was concerned with and whoever he was giving this to was concerned with.

Q Well, he gave this to you, correct, Exhibit 4?

A Well, it ended up on our system, but it 09:38AM certainly was nothing -- I mean in terms of considered documents, it was on the drive. That's about it.

Q Have you seen similar transcripts for any other interviews conducted by the investigators 09:38AM beyond the Bradley Rutherford interview reflected in Exhibit 4?

A I may have in my files. I sure don't recall them, but I know there was more than one interview conducted. 09:38AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Do you know if Miss Bradshaw still has in her possession copies of the audio tapes from which she was transcribing?

MR. GARREN: Object to form.

A I do not. 09:38AM

Q Do you know if she still has copies of transcripts that she created from those tapes?

MR. GARREN: Object to the form.

A I do not.

Q As part of your production in this case in connection with your work, did you contact Miss Bradshaw and ask her to provide copies of the audio tapes? 09:38AM

A No.

Q To your knowledge has anyone made that request of Miss Bradshaw? 09:39AM

A No.

Q Your immediate reaction to Exhibit No. 4 was this was not work that you had asked Mr. Steele to conduct. Can you explain why you so clearly identified this as something that was unrelated to -- 09:39AM

MR. GARREN: Object to form.

A I looked at -- I'm sorry.

Q Go ahead. 09:39AM

676c5b0b-4391-4682-9dda-575b4bc95703

A I looked at the top and saw this had to do
with a medical matter, Guillain-Barre syndrome.
Q What is Guillain-Barre syndrome?
A I don't know.
Q Do you know why Mr. Steele would have been 09:39AM
questioning a citizen in the watershed in November
of 2005 about Guillain-Barre syndrome?
A Because he was asked to.
Q Do you know who he was asked to do that by?
A Do I know? It may have been Louis Bullock but 09:39AM
I really don't recall.
Q Have you participated in any conversations
with the experts or members of the legal teams in
which medical conditions and possible relationships
of those conditions to poultry litter, such as 09:40AM
Guillain-Barre, were discussed?
A I don't recall any specific discussions other
than of the most general nature.
Q Tell me what you recall generally.
A Well, I mean, general nature, is, gee, is 09:40AM
there any illness associated with the presence of
such substantial amounts of poultry waste being
disposed of on the ground, and I said I don't know.
That's really not in my field of expertise.
Q Did anyone else answer that question in your 09:40AM

676c5b0b-4391-4682-9dda-575b4bc95703

presence?
A Not to my recollection.
Q Okay. Let's stay with medical conditions for a moment, Dr. Fisher. I'll hand you what I'll mark as Exhibit 5 to your deposition, which is an E-mail 09:41AM
that also came from your production of considered materials in this case. For the Record, it's an E-mail dated February 2nd of 2006 from a Christopher Marlowe at CDM to yourself and Roger Olsen. Take a moment and look over that E-mail. 09:41AM
A Okay.
Q Do you recall this conversation about a medical consultant's recommendation for medical surveillance?
A Well, I know that Chris Marlowe here is 09:41AM
identified as a health and safety manager, so I don't know if he's a medical consultant per se. He might be an environmental, health and safety guy. He refers to a medical consultant. So, I mean, what was your question? 09:42AM
Q I was asking whether you recalled this conversation about the possible need to have a medical surveillance program for employees of CDM who enter chicken houses.
A Oh, I think, yeah, I recall this conversation. 09:42AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q And tell me what you recall about it.
A Well, I recall that this was basically a CDM matter since none of my employees would enter chicken houses.
Q Do you know if there was any monitoring or 09:42AM
medical surveillance or testing of CDM employees who actually entered poultry houses in connection with their work in this case?
A I do not.
Q So you're not sure if this recommendation was 09:42AM
executed on or not?
A I do not.
Q Okay. There's a reference to a medical surveillance program for haz wopper employees; do you see that? 09:43AM
A Yes.
Q What is haz wopper?
A Hazardous waste operations.
Q Okay, and -- well, strike that. There's a direction in this E-mail that you're copied on for 09:43AM
Todd Burgesser to make appointments for exams for CDM employees; do you see that, last sentence first paragraph?
A Does request -- the statement is, Todd, can you help make the appointments for these exams. 09:43AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Correct.
A Yes.
Q Do you know if any CDM employees were actually examined after entering poultry houses?
A I do not. 09:43AM
Q There's a reference to Dr. Scott. Who is Dr. Scott?
A I don't know.
Q Have you worked with a Dr. Scott on this case?
A No. 09:44AM
Q I'll hand you what we'll mark as Exhibit 6, which is a document that was contained in your considered materials, and it is a table that is labeled Consultant Expert Contact Sheet, Oklahoma Poultry Litter Litigation. Do you see that? 09:44AM
A Yes.
Q Do you recognize this document?
A Yes, I do.
Q And describe what it is.
A It's a list of names and contact information 09:44AM of various individuals who -- I think all of which -- all of which have had some technical association with this current matter.
Q You're familiar with and have had opportunity to meet or have conversations with all of these 09:45AM

676c5b0b-4391-4682-9dda-575b4bc95703

individuals?

MR. GARREN: Object to form.

A Yes.

Q Who is Josh Lipton, PhD?

A Josh Lipton is, my recollection, an economics 09:45AM

consultant with Stratus Consulting.

Q And what role has Mr. Lipton served in this

case?

A I think he's a damages expert. It's really

not something I work on. 09:45AM

Q Okay. Have you had interactions with Mr.

Lipton or provided information to him as part of

your work in this case?

A Yes, I've had interactions with him.

Q What -- beyond just damages, what issues have 09:46AM

you consulted with Dr. Lipton on?

MR. GARREN: Object to form.

A My recollection of the interaction with Dr.

Lipton is -- had one meeting with him basically

explaining the case, explaining the transport of 09:46AM

waste into streams and what the injuries that might

accrue from that within the streams, within the

land, in the lake, did a watershed tour with him,

and the notion of integrating what the injuries are,

and then he works on the issue of what the damages 09:46AM

676c5b0b-4391-4682-9dda-575b4bc95703

might be stemming, flowing from those.
Q Okay. Is Mr. Lipton still working on this case to your knowledge?
A I don't know.
Q When was your last conversation or interaction with Mr. Lipton? 09:46AM
A Well, I can't recall, but it sure as heck wasn't this year and it may not have been -- probably early 2007. That would be almost speculative. 09:47AM
Q Have you seen any work product from Mr. Lipton?
A No, not that I recall. I sure don't remember anything, there's any big reports coming out of Stratus. 09:47AM
Q Well, do you remember any small reports coming out of Stratus?
A They're working on things I don't work on, so no, I don't recall. I may have them in my file and don't recall. 09:47AM
Q On Page 2 there's a reference to Dr. Peter Thomas?
A Yeah.
Q Who is Dr. Peter Thomas?
A Dr. Peter Thomas is a fish expert, who I think 09:47AM

676c5b0b-4391-4682-9dda-575b4bc95703

has had a pretty limited role in this matter, mainly due to scheduling issues. He's kind of a busy guy.

Q To your knowledge is Dr. Thomas still working on this case?

A I don't know. 09:48AM

Q What issues with respect to fish was Dr. Thomas evaluating to your knowledge?

MR. GARREN: Object to form.

A My recollection is that Dr. Thomas was examining relationships or was -- discussions were 09:48AM had with him regarding the possibility of examining relationships between low oxygen levels and fish reproductive success. That's my recollection.

Q Do you know if Dr. Thomas' work and analysis was more focused on the lake or the stream system? 09:48AM

A I'd be speculating if I answered that question one way or the other.

Q You don't know?

A I don't remember.

Q Turn to Page 3. There's a reference to Dr. 09:48AM Sheri Fritz with the University of Nebraska.

A Yes.

Q Who is Dr. Sheri Fritz?

A Dr. Sherry is a paleolimnologist who works on diatoms. 09:49AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You're going to have to help me, Dr. Fisher. What's a paleolimnologist?
A Well, these are individuals who study ancient lakes.
Q When you say ancient, how old is ancient? 09:49AM
A How old is ancient? Ancient is ancient. Well, that could be anywhere between, you know, hundreds to thousands of years in the past, tens of thousands to millions.
Q We agree, do we not, Lake Tenkiller is not an ancient lake? 09:49AM
A Yes, we definitely do agree.
Q Okay. Why then did your team need the expertise of a paleolimnologist on this case?
MR. GARREN: Object to form. 09:49AM
A At the time one possibility was to look at diatom assemblages in the lake in terms -- with respect to materials that were in the core samples to see if there was some biological signal among the diatoms that was interpretable. 09:50AM
Q Was there?
A Well, there was a signal. I'm not sure it was interpretable, but there's clearly a strong biological change in the lake, if I recall, around 1990. 09:50AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You are referring specifically to sediment cores?
A Yes.
Q Okay. So the sediment cores that you discuss in your expert report were also analyzed for a biological signal; is that correct? 09:50AM
A They're analyzed for biological signal. Ultimately it was something that didn't really help clarify things.
Q What, if anything, did it show? 09:50AM
A It showed a strong change in the biological community presence around 1990.
Q When you say biological community, what are you referring to?
A I'm referring to the diatom assemblies that would be present in the lake. 09:51AM
Q Give me a definition of diatom.
A Well, diatoms are both planktonic diatoms that live in the water column and there are also benthonic diatoms that live on the floor of the lake and on plants and so on in rivers. They form a siliceous test, a silicon dioxide test, and they're sometimes called brown algae, and from time to time during the year, and it's like cyclically, they become extremely abundant within lake and river 09:51AM 09:51AM

676c5b0b-4391-4682-9dda-575b4bc95703

systems.
Q And how did the diatoms or biological community change in or around 1990?
A Well, I don't recall the specifics of the change, aside to say that certain species became very abundant compared to what they had been in the past. 09:51AM
Q Which species; do you recall?
A I do not recall.
Q Is there some sampling data or lab reports associated with this biological signal analysis? 09:52AM
A Yeah, and it should have been produced to you.
Q What lab would have produced that?
A It would have been -- I'm sorry. Would have been the university -- from the University of Nebraska by Sheri Fritz, and I think the work was actually done by Erik Ekdahl, who is the next person on the list, who was her postdoctoral associate. 09:52AM
Q So the -- I'm sorry. The sediment samples or portions of those sediment samples were sent to the University of Nebraska for analysis; is that right? 09:52AM
A They were sent to Sheri Fritz, who is at the University of Nebraska.
Q Okay. You don't know whether she used the university lab or a commercial lab? 09:52AM

676c5b0b-4391-4682-9dda-575b4bc95703

A I know she used Dr. Ekdahl, and so I would
believe that she would have used university
equipment.
Q Okay, and you received back the results of
that analysis in the form of a report from Dr. 09:52AM
Fritz?
A I received the data back in the form of a
report, yes.
Q And is it your belief, Dr. Fisher, that you
produced that report in your considered materials, 09:53AM
or do you know?
A Well, there are a lot of considered materials.
I believe I produced them.
MR. GEORGE: Okay. I'm going to ask on the
record, Mr. Garren, for the production of that 09:53AM
report or that I be assisted in finding it. I don't
recall seeing it. Perhaps it's there and I just
overlooked it, in which case I would certainly
welcome being directed to the proper location, but
if it hasn't been produced, the defendants would 09:53AM
like to have it produced.
Q I think you mentioned Erik Ekdahl, but tell me
again, what is his role or was his role in this
case?
A Well, Erik Ekdahl would have been the 09:53AM

676c5b0b-4391-4682-9dda-575b4bc95703

individual who did the actual microscope work to identify and enumerate the diatoms. He would have worked under Dr. Fritz's direction.

Q And did you have conversations both with Dr. Ekdahl and Dr. Fritz? 09:54AM

A Yes.

Q Let me hand you what we'll mark as Exhibit 7 to your deposition, which is an E-mail produced from your considered materials from a Luis Monsalve. I'm sure I pronounced that incorrectly. 09:54AM

A Luis Monsalve.

Q Monsalve, to yourself in September of 2006. Do you recognize this E-mail?

A I recognize that it came to me.

Q Okay. Do you know Luis? 09:54AM

A I do.

Q And who is Luis?

A Luis Monsalve was one of my graduate students at the University of Tulsa. I employed him outside of his university responsibilities and he was -- 09:54AM primarily did GIS work for us. He's also Venezuelan, and his ability in written English is thin.

Q Okay. Luis mentions a Mr. Tim Cox. Do you see that reference in Exhibit No. 7? 09:55AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q And Luis is asking whether he has to send information to Tim Cox; is that correct?
A Yes.
Q Who is Tim Cox? 09:55AM
A Tim Cox is a CDM employee who assisted Bernie Engel in doing modeling work within the Illinois River watershed. Let me think. I think Tim also did or assisted and did much of the work of designing and setting up the high flow sampling 09:55AM stuff and was -- he basically did a lot of work with Bernie on modeling, as well as working on the high flow stuff. He's a hydrologist.
Q Did Mr. Cox assist you in connection with any of your work in this case? 09:56AM
A I'm not sure what you mean. Let's see if I can examine that a little bit. Did Tim Cox do work in the field that produced data that I used; is that what you're saying?
Q Well, that's one example of assistance. Did 09:56AM he do that?
A Yes, he did.
Q Okay. What -- give me some examples.
A Well, the primary example from Mr. Cox would have been putting the high flow stations in place 09:56AM

676c5b0b-4391-4682-9dda-575b4bc95703

and doing the hydrologic work associated with that.
Q What type of hydrologic work was associated with installing high flow samples?
A Well, high flow stations --
Q Sorry. 09:57AM
A -- there would be some form of analysis of the local topography of that channel so that the stream height could be interpreted, the gauge height he would have would be interpreted with respect to flow. He would have calibrated or set up the high 09:57AM flow samplers to trigger at specific levels. He would have interpreted the flow. He would have assigned flow stages to the chemical data, you know, when was the sample taken with respect to the flow stage. 09:57AM
Q Other than the hydrologic work and development of the high flow sampling program, did you have any other interactions with Mr. Cox related to your work in this case, and let me give an example, did you consult with him on any of your opinions or 09:58AM analysis?
A If I remember, we worked corroboratively -- not on my opinions and analysis. We did work collaboratively in assessing the high flow station information and in examining some of the sub, 09:58AM

subwatershed boundary issues that came up but, I mean, did he sit there and work on my opinion and final report, no.

Q Did he review your report?

A He didn't, not to my knowledge. 09:58AM

Q Let me hand you what I've marked as Exhibit 8 to your deposition, which is a map of the Illinois River watershed, and in the bottom right-hand corner it refers to high flow sampling site locations, final screening; do you see that? 09:59AM

A Yes.

Q What is this map?

A Well, there are a lot of maps that have been generated. I'll give you my interpretation of this particular map. This identifies in a fairly 09:59AM schematic sense the locations of high flow sampling locations and the boundaries of the watersheds associated with them in conjunction with a dot map showing the locations of poultry facilities or poultry houses. It identifies each of the basins by 09:59AM number. It assigns the area of the basins in square miles, and then there's a number below it that says CH per square mile which is poultry house or chicken house per square mile, and that's the chicken house density. It also identifies in the original map in 10:00AM

676c5b0b-4391-4682-9dda-575b4bc95703

color, as well as line thickness, stream order.
Q Why was this map put together and how was it used?
MR. GARREN: Object to form.
A Well, it was -- it was put together to 10:00AM
illustrate the location of the high flow sampling stations and to provide a listing of the chicken house densities that were associated with each one of those watersheds. I mean, how it was used would be this would be the reference and say, yeah, this 10:00AM
is Basin 16 or Basin 4, and it's this many square miles and has this many chicken houses per square mile.
Q Why was it necessary, if you know, to capture information regarding the poultry house density in 10:00AM
subbasins during any particular high flow sampling locations?
A Well, sure. From what had been reviewed in the literature and was subsequently proved up by other investigations is that the waste from poultry 10:01AM
houses is disposed very close to where they are, where the houses are located. So as a -- if you're taking a look at the chicken house density or the number of chicken house per square mile is a surrogate for how many tons of waste are disposed or 10:01AM

676c5b0b-4391-4682-9dda-575b4bc95703

how much waste is disposed. More chicken house per square mile, higher intensity of waste disposal. Fewer chicken house per square mile, lower intensity of waste disposal. So the underlying theory is that if you look within this basin, you could 10:01AM conceivabley find some areas, some sub subwatersheds, very small, small watersheds in which there were no chicken houses, a few, some, kind of a lot and a whole heck of a lot and the notion was then to spread our limited sampling resources 10:02AM because they are fairly extensive and expensive things to do, to spread those over that range of chicken house densities to evaluate that theory.

Q I'm sorry. Can you identify for the record the basins on this map that show no poultry house 10:02AM density, zero?

A According to the dataset that we have, we have Basin 14, Basin 13. Basin 13 is an upper -- an upstream portion of Basin 1. That's it.

Q Okay. Do you know which high flow sampling 10:02AM locations by number would correspond with the drainage areas referred to as Basin 14 and Basin 13; would it be high flow sample 13 and 14?

A I'd have to look at that. That might be true, that might be true, but that's generally not how I 10:03AM

676c5b0b-4391-4682-9dda-575b4bc95703

thought about those. That might well be true.
Q You don't know?
A I don't know just offhand. That's not
something I keep in my present recollection.
Q All right. What was the purpose of finding at 10:03AM
least two basins that had no poultry house density?
A Well, what you attempt to do here is cover the
waterfront from areas where we have no poultry
houses and ostensibly little or no waste disposal to
areas that had higher levels of waste disposal, over 10:03AM
a range.
Q Have you reviewed the high flow sampling data
from the stations that drain Basin 14 and Basin 13?
A I did at one time.
Q Do you have any recollection as to what those 10:04AM
sample results showed in terms of phosphorus or
bacteria concentrations?
A Not offhand. I recall what the overall
analysis showed. The overall analysis showed that
the amount of phosphorus and bacteria as I recall, 10:04AM
but I know for sure phosphorus, at high flow
stations increases during periods of peak flow with
chicken house density.
Q I'm sorry. Let's change the tape.
VIDEOGRAPHER: We're now off the Record. 10:04AM

676c5b0b-4391-4682-9dda-575b4bc95703

The time is 10:04 a.m.

(Following a short recess at 10:04 a.m., proceedings continued on the Record at 10:15 a.m.)

VIDEOGRAPHER: We are back on the Record. 10:15AM

The time is 10:15 a.m.

Q Dr. Fisher, when we broke, we were discussing Exhibit No. 8, and I was asking questions about the two basins that had zero chicken house density. Do you recall that? 10:15AM

A Yes.

Q Under the theory on which you are operating that poultry house density is a surrogate for waste application, would you agree with me that the results of the high flow samples taken in Basin 14 10:16AM and Basin 13 would reflect contributions of bacteria and phosphorus from sources other than litter?

MR. GARREN: Object to form.

A Not necessarily. All the basins will show contributions of materials from -- potentially from 10:16AM sources other than poultry, and Basins 13 and 14, which are listed here as zero chicken houses per square mile, might show in addition to that some level of poultry contribution since material does move from point to point. I mean, the theory is 10:16AM

676c5b0b-4391-4682-9dda-575b4bc95703

that the bulk of the waste is disposed of really close, but the data says that not all of it is. So something like 30 percent is disposed of within the same section, and 60 percent, I think that's right, 60 percent is disposed of within two miles and 10:17AM
something like 80 percent within five miles. So if some -- there can be contributions of poultry waste even in areas with no chicken houses, but it would be at least, under that theory, relatively low, but it says that we can't say, gee, there's nothing but 10:17AM
non-chicken there and in chicken -- the basins with chicken houses, you can't say it's only from chickens. I think that's accurate.

Q So even with respect to the basins that have a high density of poultry houses, you would agree that 10:17AM
the sampling data drawn from those high flow stations would reflect contributions from other sources?

A That's correct, and the interpretation of that information, however, is you really can't think of 10:17AM
this purely as a binary-type thing, whether it's only chicken or only something else. You need to take a look at the relative -- relevant potential contributions within the watershed as a whole, and then to the extent you can do that, within these 10:18AM

676c5b0b-4391-4682-9dda-575b4bc95703

subwatersheds. So more chickens, more phosphorus. I think that's quite accurate, but you can't say that all the phosphorus comes from chickens, nor do we I don't believe.

Q Let me hand you what we'll mark as Exhibit 9, 10:18AM which is an E-mail from your considered materials dated July 20th and then July 21st of 2005, and I want to focus on the beginning of the chain, which is an E-mail from Ron French to David Page and Roger Olsen, which was subsequently forwarded to yourself. 10:19AM Do you see that E-mail?

A It says from David Page to French and Roger Olsen, right, and then that's -- let's see if I understand. Oh, the first one is on the last page.

Q That's correct. Read from the bottom up. 10:19AM

A Yeah. Strangely I do know to do that but failed to. Ron French sends this note to David Page and Roger Olsen with respect to Peter Thomas.

Q Right, and that E-mail subsequently gets forwarded to you. Do you see that? 10:19AM

A Yeah, I do see that.

Q Okay. Who is Dr. Peter Thomas?

A I identified him before. Peter Thomas is talking here about endocrine studies. My recollection is he was -- he talked about 10:19AM

676c5b0b-4391-4682-9dda-575b4bc95703

reproductive success in fishes, which may in fact be related to endocrine studies.

Q Do you know whether there were any endocrine studies that were actually completed in the Illinois River watershed as part of this case? 10:20AM

A Well, I don't recall. I'm pretty sure that the answer to that is no, but that's not directly within the work that I would have been engaged with, so I wouldn't keep direct tabs on the biological work. What I knew here was that biological sampling 10:20AM was taking place and various folks were coming in and out of that, and roughly the schedule and within sort of a gross sense of what was going on, but did not have any super detailed knowledge, although I didn't go fly fishing. That's unfortunate. I think 10:20AM that was really the reason I got this is that Ron was going to take us fly fishing on the White River, and I don't think that ever worked out. In fact, I know it never worked out. That I can tell you with certainty. 10:20AM

Q Let's go back to the very first exhibit, which is a copy of your report in this case, Exhibit No. 1. Who drafted your report, Dr. Fisher?

A I did.

Q Did you have any assistance from a member of 10:21AM

676c5b0b-4391-4682-9dda-575b4bc95703

your staff or any member of Motley Rice's larger scientific team?

MR. GARREN: Object to form.

A In drafting the report?

Q Yes, sir. 10:21AM

A I think I may have requested -- I mean in terms of the people working for the Attorney General, I think I may have requested Robert van Waasbergen to do some data retrievals for me.

Q Who does Robert van Waasberg (sic) work for? 10:21AM

A Robert van Waasbergen works for the Attorney General, on behalf of the Attorney General.

Q What firm does he work for?

A He works for himself. I can find out what his company's name is. I think it's -- I'd just have to 10:21AM look. I can look that up right now if you'd like.

Q That's okay. He is local in Tulsa?

A No. He's in the Dallas area. My recollection from this is that I drafted and I asked Robert to do some of the -- prepare some of the graphics for me. 10:22AM

Q Which graphics?

A Well, the graphics would be the setup of the land use land cover underlayments, the graphs that look like Figure 2, for example, Mr. George.

Q Okay. 10:22AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Figure 2 uses as its underpinning a land use land cover map, which, Robert, was more easily to put together, and then we took the data and printed it in Tulsa.

Q Any other figures, graphs or tables that Robert van Waasbergen would have assisted in preparing that are shown in Exhibit No. 1? 10:22AM

A Yeah, Figure 6.

Q Any others?

A Oh, I'm sorry. 10:23AM

Q If you could, just identify all of them.

A Sure. I was waiting for the fusillade of questions. Figure 10, which is a digital elevation map, Figure 11, land use land cover map, Figure 12, major faults and structural features, Figure 18, 10:23AM locations for edge of field samples, Figure 21, groundwater collection locations, Figure 23, stream sediment collection locations, and that's my recollection the totality. Basically Robert was asked to do some things that were fairly data 10:24AM intensive and could get them done pretty quickly.

Q Did Mr. van Waasbergen have any input into the language or wording of your report?

A No.

Q Did anyone, other than you, have input into 10:24AM

676c5b0b-4391-4682-9dda-575b4bc95703

the words or language used in your expert report?
A No. I am solely to blame.
Q Did you have a draft of your expert report reviewed by any member of Motley Rice's larger scientific team? 10:25AM
A I didn't specifically ask anybody to review it, no.
Q Was it reviewed whether you asked them to or not?
A I don't know. I mean, I certainly had 10:25AM discussions concerning data items with Roger Olsen to be sure that we would select the appropriate fields within the data structure, but with respect to interpretive work, that would be mine.
Q Did you make a draft of your expert report 10:25AM available to any other member of Motley Rice's scientific team for review?
MR. GARREN: Object to the form.
A Well, I don't recall specifically sending a draft to anybody. Let's put it that way. I wrote 10:25AM the report and had telephone conversations regarding certain data items and then produced the final report.
Q Who did you have conversations with?
A I would have had conversations with -- well, I 10:26AM

676c5b0b-4391-4682-9dda-575b4bc95703

know him as Drew, and I can't remember his last name.

Q Edmondson?

A No, no. I did have a conversation with Mr. Edmondson, but not regarding this report, but I did 10:26AM have a conversation with Roger Olsen, conversations with Bernie Engel, conversations with Meagan Smith, conversations with Gordon Johnson. Gosh, I can't think. I had a conversation with various CDM employees with specific expertise. 10:26AM

Q Give me the names of the CDM employees as best you can recall.

A Drew, but let's find out his real name which we -- why don't we go off the Record briefly.

MR. GARREN: Santini. 10:27AM

A Yeah, Drew Santini, sorry.

Q Is that the only one you recall, Drew Santini with CDM, other than Roger Olsen?

A That's the only one I recall. Possibly Darren Brown. 10:27AM

Q What particular expertise does Drew Santini have?

A Drew was the person who was engaged in many of the field operations and he was also a person who had designed and maintained the Access database that 10:27AM

676c5b0b-4391-4682-9dda-575b4bc95703

the data was housed in and so sometimes if you are trying to retrieve information, it's easier to ask Drew if he's already written a query than to write it yourself.

Q Since preparing your report that's reflected as Exhibit No. 1, Dr. Fisher, have you undertaken any work in connection with this case other than producing your considered materials and preparing for your deposition today? 10:27AM

MR. GARREN: Object to form. 10:28AM

A I'm not sure I understand your question.

Q Are you still working on this case?

A Yes.

Q Okay. What are you working on?

A I've worked on preparing for this deposition. 10:28AM

Q Right.

A Over the weekend, I reviewed all the edge of field sites in the field, but I've not generated any new work product other than that field notebook that we gave you the rough copy of today. I know people in my shop are indexing things and so on, but that's what we're doing. 10:28AM

Q Do you have any analysis that you've been asked to complete that is on the horizon for you in this case? 10:28AM

676c5b0b-4391-4682-9dda-575b4bc95703

A No.
Q Do you anticipate, other than, you know, getting your file materials in order and preparing for ultimate testimony at the trial of this case, performing any additional scientific or technical 10:29AM work?
A At this time I certainly don't contemplate any.
Q All right. You made reference to the materials that were provided by Mr. Garren at the 10:29AM beginning of this deposition. Let's go ahead and discuss those for a moment. I've marked as Exhibit No. 10 what I think has been represented as field notebooks and photographs reflecting some work or investigation that you've done in the watershed over 10:29AM the past weekend; is that correct?
A That's correct.
Q Okay, and do I understand correctly that the focus of your investigation over the weekend in the watershed was around the location where edge of 10:30AM field samples that have already been produced in this case were collected?
A Yes. This focused on those locations where edge of field samples that were collected, analyzed and are currently analytical data for are presently 10:30AM

676c5b0b-4391-4682-9dda-575b4bc95703

within the CDM database, yes. That's the existing edge of field locations.

Q Now, were there field notebooks created by the actual sampling crews at the time the edge of field samples were collected? 10:30AM

A Yes.

Q Okay. In light of the fact that a field notebook already exists, why did you feel it necessary to go back out in the field as recently as a few days ago, revisit these sites and record 10:30AM additional information?

A Well, it's my understanding that Mr. Brown had been quizzed pretty extensively on edge of field materials, and Mr. Brown, in fact, never had much to do with that, except assisting in writing the 10:30AM protocol for edge of field collection, one.

Number two, I had not personally been to each of these sites previously. Although I had been to a number of them, I wanted to become familiar with those sites, those that I had not visited. 10:31AM

Q You actually offer opinions in your expert report regarding edge of field samples, do you not?

A Yes.

Q Okay, and you felt competent to offer those opinions in May of 2008 without actually having 10:31AM

676c5b0b-4391-4682-9dda-575b4bc95703

visited each of the edge of field locations?
A Well, I probably visited over 90 percent of them at one time in the past. I just wanted to do it completely.
Q Did you have an adequate basis in May of 2008 to offer an opinion regarding edge of field samples or not? 10:31AM
A Yes.
Q So then why did you go back out again?
A I wanted to refresh my memory concerning each and every location. 10:31AM
Q Why did you not just consult the field notebooks that were prepared at the time the edge of field samples were collected?
A For me, the most effective thing to do is to actually physically stand next to these sites in the field. 10:32AM
Q So do I understand then that you did not feel it was adequate for you to merely consult the field notebooks that had been provided to the defendants and familiarizing yourself with the edge of field locations? 10:32AM
MR. GARREN: Object to form.
A No. What I'm saying is that notes and photographs are reflective of what you see in the 10:32AM

676c5b0b-4391-4682-9dda-575b4bc95703

field, but they aren't necessarily what you actually see in the field. So it seemed to me that if this were something that seemed to be an issue, that I wanted to be as thoroughly familiar with the edge of field locations as I could possibly be. 10:32AM

Q So notes and photographs are not themselves reflective of field conditions; is that what you're saying?

MR. GARREN: Object to form.

A No, that's not what I said. What I said is 10:32AM that notes and photographs reflect field conditions, but they aren't necessarily what you see in the field. I mean, a good example of that would be in photographs it's very difficult to get a feeling for the degree of slope of a field. Even very, very 10:33AM steeply sloping fields can appear to be fairly flat in a photograph taken from a viewpoint on the slope.

Q Do the field notes and photographs reflected in Exhibit No. 10 contain additional information beyond that provided in the original field 10:33AM notebooks?

A I can't answer that question just offhand. I mean, they provide new -- there are references to new photographs, so that's certainly additional information, photographs taken at that time. 10:33AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Let me give you an example. The very first page, Exhibit No. 10, appears to try to describe the slope of the area in which this photograph was taken; correct?

A Uh-huh, that's correct. 10:34AM

Q Was that information for edge of field location 1 provided in the original field notebooks?

A I don't recall.

Q There's a reference on edge of field sampling location No. 1 of no cattle; is that your handwriting? 10:34AM

A Yes.

Q Was that information provided in the original field notebooks for edge of field sampling No. 1?

A Well, this reflects the observations made in this case on the 29th of August of 2008. So it couldn't -- 28th of August of 2008 could not be reflected in the original field note. 10:34AM

Q Okay. So is it -- is the premise of your comment that there might be changes over time in terms of whether cattle are present or not present at a particular location? 10:34AM

A Sure.

MR. GARREN: Object to form.

Q So what, if anything, did the photographs and 10:34AM

676c5b0b-4391-4682-9dda-575b4bc95703

your notations of a site visit on August 29th of 2008 tell us about whether cattle were present before or at the time the actual edge of field sample was collected?

A They tell me that there were no cattle present on August 29th. They tell me nothing about the time of actual collection. 10:35AM

Q You don't have, other than the original field notebooks, any data or information regarding the presence or absence of cattle at the time the edge of field samples were collected; right? 10:35AM

A That's correct. To my knowledge, that's correct.

Q Why did you make a deliberate attempt in the field notes from your site visits this past weekend to note the presence or absence of cattle? 10:35AM

A Well, I thought that the presence or absence of cattle would be of interest, although the cattle themselves are pretty much just recycling poultry waste on these fields. Whether or not they're present seems to be an issue in this matter and at least in August of -- in the end of August of this year a fairly small percentage of these locations had cattle present or at least observable when I was there. 10:36AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Is it your expert opinion, sir, in this case that all of the cattle shown in the edge of field locations from your investigation are merely recycling phosphorus from poultry litter; is that your opinion? 10:36AM

A It's my opinion that the cattle dominantly -- and it's also the opinion of experts at the University of Arkansas in a paper published in 2004, that's Slaton's paper, that in their mass balance with respect to phosphorus and nitrogen in Arkansas, 10:37AM they ignore cattle completely because the cattle are simply recycling manure nutrients put in from other species. So it would be their opinion, and it's also my opinion based on observation, the amount of supplementary feeding that you can observe is really 10:37AM small.

Q Do you think you answered my question?

A I do.

MR. GEORGE: Can we read it back, please?

Q Listen to it closely because my question was directed at these particular edge of field locations, and if you could constrain your answer to that, I would appreciate it.

(Whereupon, the court reporter read back the previous question.) 10:37AM

676c5b0b-4391-4682-9dda-575b4bc95703

MR. GARREN: Object to form.
A The answer to that is based upon consideration of work done by University of Arkansas experts and on my observations, yes.
Q The University of Arkansas experts studied these fields? 10:38AM
A You're speaking about specific fields.
Q That's right.
A And specific fields would have to be reflective of some of the average behavior within the entire watershed. 10:38AM
Q What did you do to investigate these specific fields to determine whether or not the nutrients being deposited by cattle were merely recycled nutrients from poultry litter? 10:38AM
A There was no need to do anything to do that.
Q You didn't do anything, did you?
A Well, there's no need to. You don't see any feeding stations. You didn't see any feed lots.
Q Did you talk with the landowners regarding their use of commercial fertilizers? 10:38AM
A No.
Q Do you agree that nutrients on a pasture can derive from commercial fertilizer as well as poultry litter; correct? 10:38AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes, that's true and, in fact, in looking at the mass balance of the watershed as a whole, something on the order of 7 percent of the phosphorus is from commercial fertilizers.

Q I know you want to talk about the watershed as a whole, but I want to talk about these particular field locations. What, if any, investigation, sir, did you conduct to test your theory that nutrients being deposited on these edge of field locations were merely the recycled nutrients from poultry litter? 10:39AM 10:39AM

A There was no specific investigation as to application of commercial fertilizers at specific sites.

Q And without that specific investigation, you can't offer a scientifically based opinion on that subject, can you? 10:39AM

MR. GARREN: Object to the form.

A I certainly can because you are looking at a population. The population as a whole within the Illinois River watershed, total mass of phosphorus that's put there, approximately 7 percent of the mass is from commercial fertilizer over the entire watershed. So what that tells me is that there is a very small chance of commercial fertilizer being put 10:39AM 10:40AM

676c5b0b-4391-4682-9dda-575b4bc95703

on any one of these fields. Maybe if you put fertilizer everywhere, maybe a 7 percent chance.

Q Some of the fields shown in your field notebook that you produced as Exhibit No. 10 are rather large fields, are they not? 10:40AM

A Well, some are large; some are small.

Q Some of them are more than 40 acres; correct?

A I'm not sure that's true, but that's possible.

Q Well, what did you do to investigate the presence of cattle throughout the property as 10:40AM opposed to simply the vantage point you had from the roadside?

A Well, in reaching these locations, I drove all the bordering roads and so I was able to get a pretty good feel for the presence of cattle. I 10:41AM could see them in photographs on the far horizon. You could see them in the field. You could see if there were facilities for handling cattle present.

Q What kind of facilities?

A Well, if there were any sort of loafing sheds, 10:41AM things of that nature, if there were areas that -- well, loafing sheds is what I was looking for. The observations speak to whether or not there were cows present or the fields were hayed. If they were hayed, then they hadn't had cattle grazing on them 10:41AM

676c5b0b-4391-4682-9dda-575b4bc95703

prior to the haying.
Q Just thumbing through your field notebooks, you found cattle at quite a few of the edge of field locations, did you not?
A I found horses at one location. I think I 10:42AM
found -- if I remember the count correctly, I think of the 64 individual locales, seven -- I think seven of those locales had cattle.
Q Who have you shared the information reflected in Exhibit 10 with other than me and Mr. Garren? 10:42AM
A I've provided it to Mr. Garren, who provided it to you, and so at this time with no one else.
Q You haven't provided that information to anyone at CDM?
A No, not yet. 10:43AM
Q Did you discuss with anyone at CDM or any other member of Motley Rice's expert team in this case the fact that you were going to be conducting site visits this past weekend?
MR. GARREN: Object to form. 10:43AM
A I didn't have any discussions with any of the CDM folks who work on behalf of the Attorney General that I was conducting any site visits this past weekend.
Q What about any other member of the expert team 10:43AM

676c5b0b-4391-4682-9dda-575b4bc95703

retained by Motley Rice?
A I had no discussions with any individuals working on behalf of the Attorney General in a technical capacity concerning this.
Q When you say individuals working on behalf of 10:43AM
the Attorney General in a technical capacity, are you referring to the experts hired by Motley Rice?
A I'm referring to the experts who are working on behalf of the Attorney General.
Q Who's paying their bills? 10:44AM
A Well, I know who pays my bills.
Q And who is that?
A Motley Rice.
Q Do you have any reason to think that other members of the expert team are being paid by someone 10:44AM
other than Motley Rice?
MR. GARREN: Object to form.
A I don't know who they're being paid by. I don't do their billings; I don't get their checks.
Q Let's go to your expert report. If we could 10:44AM
look at Opinion No. 1, and not on the table of contents, if you will, but the actual opinion that appears in the text, and Opinion No. 1 you state that the defendants' actions and practices have polluted surface water, groundwater, soil and 10:45AM

676c5b0b-4391-4682-9dda-575b4bc95703

sediment within the Illinois River watershed. Did I read that correctly?

A You did.

Q When you say defendants' acts, are you referring to the actions of integrators, the integrators that are named defendants in this lawsuit? 10:45AM

A I'm referring to the -- when I say the defendants, I'm referring to the integrators.

Q You're not referring to contract growers? 10:45AM

A I'm not referring to contract growers.

Q Okay. What specific acts of the integrators or practices have polluted surface water, groundwater, soil and sediment within the Illinois River watershed? 10:45AM

A Okay. Defendants' actions, which involve operating a large poultry business through contract growers, creates a circumstance in which waste is disposed, and that waste is disposed on land. That waste contaminates these environmental media. 10:45AM

Q Is it your opinion, sir, that a poultry company cannot operate without polluting?

MR. GARREN: Object to form.

A I've not considered that as a possibility. I'm pretty sure that it would be possible to do 10:46AM

that.
Q Okay. The reason I ask, when I asked you for the specific acts, you said the poultry companies are operating a large business in the Illinois River watershed, and so I guess my question again is, is 10:46AM
it possible to operate a large business in the Illinois River watershed, particularly a poultry business, without polluting the surface water, groundwater, soil and sediments?
MR. GARREN: Object to form. 10:46AM
A I think it would be.
Q Okay. So given that it's possible -- I'm sorry. Given that the mere operation of a business does not necessarily result in pollution, what specific acts of the integrators involved in this 10:46AM
case have resulted in pollution?
A Specific acts? The integrators themselves in the past have operated some farms, some integrators have, and have disposed of waste on the ground.
Q Let me stop you there. I want to give you a 10:47AM
chance to say others, but are you referring to company-owned or company-managed farms?
A Yes.
Q Okay, and can you identify for me any specific company-owned or company-managed farm for which you 10:47AM

have evidence poultry litter from that farm has been land applied in the watershed?

A I believe there are Tyson facilities in which that is true.

Q Which Tyson facilities? 10:47AM

A Have operated within the watershed. Do I have specific records of them disposing? I have records from some of them. I can't identify exactly which ones at this time, but I could look in my records and find them, of waste management plans which 10:47AM involve disposal within the watershed.

Q From company-owned or company-operated farms?

A Yes.

Q Let me ask the question one more time, and I understand you're limited to what you know at this 10:48AM moment, and if you can direct me to a record, I'd appreciate it. If you can't, then I'll move on. As we sit here today, Dr. Fisher, can you identify a single instance in which a poultry farm operated or managed by one of the named integrators in this case 10:48AM has had litter from that farm land applied in the watershed?

MR. GARREN: Object to form.

A Okay. The evidence that I have of that -- well, for a specific farm, no. 10:48AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q All right.
A I'd have to review the records and I would find them.
Q And you think those records would come in the form of nutrient management plans? 10:48AM
A Yes, and possibly other records, soil test information indicating that waste disposal had taken place in the past.
Q Did you say soil test records?
A Yes. 10:49AM
Q How would a soil test record tell you that waste disposal of poultry litter has taken place in the past?
A Well, you would do this with the fact that poultry litter waste disposal was contemplated on 10:49AM the field at a past time, that poultry litter waste --
Q Let me stop you there, if I could. How does the mere presence of a soil test or soil sample confirm that the land application of poultry litter 10:49AM was contemplated on a field?
A Well, if you had contemplation within a waste management plan, let's say a waste management plan indicating that this was a field to which there would be a plan or an intent to dispose of poultry 10:49AM

676c5b0b-4391-4682-9dda-575b4bc95703

waste, then soil tests from that particular field, that would indicate highly elevated levels of phosphorus and the presence of a farm generally on that property raising poultry. If you are looking for the smoking gun -- 10:50AM

Q Keep going.

A If you are looking for the smoking gun -- if we had a picture of a truck with a company employee and his particular ID in it, that would be useful, but you don't necessarily have those. 10:50AM

MR. GARREN: Who got on the conference call just now?

MR. SANDERS: Rick, this is Bob Sanders. My phone went dead and I had to dial back in.

MR. GARREN: Okay. Thank you. 10:50AM

Q Dr. Fisher, I'm not looking for a smoking gun. I'm looking for any evidence of land application of poultry litter from farms that are company owned or company managed in the watershed, and I believe what you've told me is that the only evidence you know 10:50AM of, that would be in the form of nutrient management plans; is that correct?

MR. GARREN: Object to form.

A Okay. Nutrient management plans, and there may be correspondence that I vaguely recall 10:50AM

676c5b0b-4391-4682-9dda-575b4bc95703

regarding waste disposal within the watershed.
Q But as we sit here today, you can't identify for me any particular company-owned farm or location where litter from a company-owned farm has been land applied in the watershed? 10:51AM
MR. GARREN: Object to form.
A If I reviewed -- not as I sit here. If I reviewed the records, I could point you to a Bates number or Bates number range.
Q And I apologize. I think I've asked this but 10:51AM just to make sure the Record is complete, the records you are referring to would be nutrient management plans or correspondence?
A Files related to those farms and dominantly the records of note would be nutrient management 10:51AM plans and correspondence regarding waste disposal.
Q Okay. I think I interrupted you when you were giving me the specific acts or practices of the integrators, as opposed to contract growers, that you believe has caused the pollution of surface 10:51AM water, groundwater, soil or sediments in the Illinois River watershed. Is there anything beyond land application that might be shown in a nutrient management plan?
A Okay. I'm not sure that I understand that 10:52AM

676c5b0b-4391-4682-9dda-575b4bc95703

question at all and, I'm sorry, Mr. George.
Q That's okay.
A Let's see -- let's try to back that up.
Q Sure. Other than land application, which
we've discussed, and you indicated that your 10:52AM
knowledge would be limited to the records from
nutrient management plans. Okay?
MR. GARREN: Object to form.
Q Are there any other practices of the
integrators, as opposed to contract growers, that 10:52AM
you believe have caused the pollution of surface
water, groundwater, soil or sediment?
A Now I'm confused. The first question was
whether or not I had knowledge of specific farms
that were specific operations run and controlled and 10:52AM
owned by an integrator where waste had been
disposed. That was the first issue. I think the
original question was kind of different from that,
from what you just asked. You asked what actions
the integrators have taken that have resulted in 10:53AM
disposal of waste.
Q Well, no.
A That's not what you've asked. I'm sorry.
Q I've asked for the basis for your Opinion No.
1, which is the actions of the integrators and the 10:53AM

676c5b0b-4391-4682-9dda-575b4bc95703

practices of the integrators that have polluted the surface water, groundwater, soil and sediment in the Illinois River watershed.

A Okay. The integrators have concentrated poultry production operations within portions of the Illinois River watershed. That concentration of operations combined with distancing themselves from the waste has resulted in the waste being disposed close by the farms and within the Illinois River watershed. 10:53AM 10:54AM

Q Can you give me -- other than the business model, which you seem to be talking about the business model, can you give me any specific acts of the integrators that have caused pollution of surface water, groundwater, soil and sediment? 10:54AM

A The specific act is the business model.

Q That's the entire basis for your Opinion No. 1?

A There are a tremendous number of poultry grown here. It is -- it has been considered costly to dispose of the waste over a broad area, and so it's disposed of in a small area. That's the basis in terms of defendants' actions. 10:54AM

Q Let's talk about contract growers for a moment, Dr. Fisher. Can you identify a single 10:55AM

676c5b0b-4391-4682-9dda-575b4bc95703

poultry farmer who contracts with Tyson or Cobb-Vantress for which you can show runoff of poultry litter into a stream, river or lake?

A I believe we can with respect to the edge of field work that was conducted in which we were able 10:55AM to identify specific origins of waste and specific locations of waste, such that we could achieve or collect an edge of field sample from that locality because that shows runoff that's heading into a drainage and going on into a stream and once it's in 10:55AM the stream, it heads on into the lake, so there are those instances. I've not -- I can't sit here and tell you it's Joe Blow from this farm right today.

Q As you sit here today, you cannot identify a single poultry farmer who contracts with Tyson or 10:56AM Cobb-Vantress for which you can show runoff into a stream, river or lake; correct?

A The data is in my records.

Q Can you go ahead and answer my question? As you sit here today, you can't identify such a 10:56AM grower?

A As I sit here today, I can't recall the identity of such a grower.

Q If I were to ask that same question for each of the other poultry companies that are named as 10:56AM

defendants in this lawsuit, would the answer be the same?

MR. GARREN: Object to form.

A I'm not sure. I think it might not be the same with respect to Peterson, and that's simply because there's a photograph that's produced in my reports showing waste disposal that is associated with a specific Peterson grower. 10:56AM

Q Does your photograph show runoff from that particular location into a stream, river or lake? 10:57AM

A The photograph does not but -- and I need to look at the information, but there may well be other data that does.

Q What would that other data be?

A If it exists -- I'll have to look to see if it does -- it would be edge of field information. 10:57AM

Q Was there an edge of field sample collected at the location described in -- I believe you are referring to the photograph in Figure 3 of your report? 10:57AM

A That's correct. I don't know. I'd have to review that because the nomenclature here is different. I'll have to look at the specific location. I've not done that specifically here. That would be work I would intend to do, by the way, 10:57AM

676c5b0b-4391-4682-9dda-575b4bc95703

would be to clean up some of the specifics.
Q Work you would intend to do?
A Yeah. The data already exists, but when you ask me can I associate individual integrators or contract growers, associate with individual 10:58AM
integrators and runoff, then I would intend to do that work. That data is existing.
Q Let's close the loop on this line of questioning, if I can. With the exception of your comment about the photograph in Figure No. 3, can 10:58AM
you identify a single poultry farmer who contracts with any of the other integrators named in this lawsuit that would show runoff of poultry litter into a stream, river or lake?
MR. GARREN: Object to form. 10:58AM
A Okay. Not without review of my base data, not as I sit here today.
Q Okay, and the way you would make that showing would be to review edge of field samples; do I understand that correctly? 10:58AM
A No, not completely.
Q Okay. Well, tell me how you would go about that.
A With respect to individual farms, the most specific information is to review the investigator 10:59AM

676c5b0b-4391-4682-9dda-575b4bc95703

data to find those locations where there was a known specific origin for poultry waste that was disposed, that is, the poultry waste was tracked from its point of origin to its point of land disposal, and then cross correlate that with the edge of field 10:59AM
samples and look at the edge of field samples in relationship to named streams, for example, or even unnamed streams, how does that relate to the drainage pattern within the area, but bottom line is it's going to be investigator data, edge of field 10:59AM
samples would be the clearest path.

Q As you sit here today, Dr. Fisher, you've not undertaken that analysis, have you, to track runoff from poultry litter from a particular site to a stream to the lake; correct? 10:59AM

MR. GARREN: Object to form.

Q Have you done that?

A Well, I certainly have collected the data to do that.

Q Well, my question is whether you have 11:00AM
completed that analysis.

A I have not completed that analysis.

Q Okay. Has any expert to your knowledge undertaken that analysis to actually track runoff from the edge of field location where litter has 11:00AM

676c5b0b-4391-4682-9dda-575b4bc95703

been applied to a stream or the lake?
A In the sense of doing a causation pathway analysis as Roger Olsen has done, yes. In terms of looking at a single field all the way to a stream or lake, no. 11:00AM
Q Okay. Now, with respect to edge of field samples, you'll agree with me that the mere fact that a constituent has run off of a pasture and been collected in an edge of field sample does not guarantee that that constituent reaches a stream, 11:00AM the Illinois River or Lake Tenkiller; correct?
A It says that constituent is on its way in that direction.
Q Do they all get there?
A They all get there eventually. 11:01AM
Q They all get there? Everything that runs off the edge of the field eventually makes its way to Lake Tenkiller; is that your opinion?
A I would say that everything that runs off the edge of a field ultimately gets into drainage 11:01AM because it --
Q My question --
A There's some fraction that does.
Q Some fraction from every field or some fraction from all of the fields? 11:01AM

676c5b0b-4391-4682-9dda-575b4bc95703

A What's the difference between some fraction from every field and some fraction from all the fields?

Q Well, the difference is between which a particular contract grower's actions are 11:01AM contributing or not.

MR. GARREN: Object to form.

A Some fraction of all runoff in my opinion would make it into the drainageways and into Lake Tenkiller. 11:01AM

Q What have you done to test that opinion?

A We certainly see that there are waste as you see the chain -- the pathway analysis. You see that material is disposed in fields. You see that edge of field samples contain high concentrations of 11:02AM phosphorus and certain metals that are indicative of poultry waste. You see that those materials are also in stream sediments. You see that the phosphorus numbers are going into Lake Tenkiller and you see an association between, for example, chicken 11:02AM house density and phosphorus in high flow samples. I think that the -- that that analysis is pretty conclusive that material that was put on the ground as poultry waste ends up in Lake Tenkiller. Now, if you look at any individual field, if any material 11:02AM

676c5b0b-4391-4682-9dda-575b4bc95703

escapes from that field into a drainageway, then it's on its way to Lake Tenkiller at some point.

Q But you've not done anything to test your theory that all edge of field runoff makes it to a stream, river or lake with respect to a specific field; is that correct? 11:03AM

A With respect to a specific field, no, but I just hasten to add when it rains, the rivers seem to rise and the ditches seem to be filled and waste is running off fields. I'm not sure how I see that doing it from any given field is significant in that regard. 11:03AM

Q So since it's not significant, you didn't undertake that analysis; is that right?

MR. GARREN: Object to form. 11:03AM

A Trying to -- I don't think there's any purpose in looking at an individual field.

Q Okay. Can you identify a single poultry farmer who contracts with Tyson or Cobb-Vantress for which you can show that surface applications of poultry litter have traveled through the soil and contaminated groundwater in the Illinois River watershed? 11:03AM

A I can't give you a name today.

Q If I ask that same question with respect to 11:03AM

676c5b0b-4391-4682-9dda-575b4bc95703

the other integrators named as defendants in this case, would I get the same answer?

A Yes, you would.

MR. GARREN: Object to form.

MR. McDANIEL: The objection was over the answer. Restate your answer, if you would, please. 11:04AM

MR. GARREN: It's in the Record.

MR. McDANIEL: You spoke over it for purposes of the video. That's all.

MR. GARREN: It's in the Record. 11:04AM

MR. McDANIEL: Restate your answer.

A So can I do -- let's be sure that we're real clear.

Q You want me to ask it again?

A Yes, please. I'm sorry. 11:04AM

Q If I ask the same question with regard to your ability to identify poultry farmers who contract with the other integrators named as defendants in this case for which you can show that surface application of poultry litter have traveled through the soil and contaminated groundwater in the Illinois River watershed, would your answer be the same? 11:04AM

MR. GARREN: Object to form.

A My answer would be the same. I can't, as I 11:04AM

676c5b0b-4391-4682-9dda-575b4bc95703

sit here today, give you a name or a specific location where that has happened. Clearly, though, it has happened.

Q How would you go about determining the answer to that question if you can't provide it today; what information would you consult? 11:04AM

MR. GARREN: Object to form.

A From a specific location?

Q Yes, sir.

A Gosh, you could do an experiment. You could place tracer materials on the ground of some type, probably a chemical tracer, and trace that chemistry into drainage and groundwater and surface water in the lake, which in effect for the whole watershed has been done because the poultry waste is in fact a tracer, but with respect to an individual field, you'd have to do that at every field. 11:05AM

Q Have you undertaken any such experiments in the Illinois River watershed?

A No, and, in fact, no one in their right mind would attempt to undertake that experiment. 11:05AM

Q Why not?

A That would cost an enormous sum of money.

Q With respect to a particular field would cost an enormous sum of money? 11:05AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Well, it would cost a lot of money to do it at a particular field. You'd also have to have the full cooperation of the landowner and possibly of adjacent landowners.

Q When you say an enormous sum of money, are you talking about a number higher than 18 million dollars? 11:06AM

A No, no.

Q It would be cheaper than that, wouldn't it?

A We would hope so, yeah. 11:06AM

Q Okay.

A But I think you're probably talking about something that's on the order of 2 to 4 million.

Q Is that an unreasonable expenditure for this case in your view? 11:06AM

MR. GARREN: Object to form.

A I don't know. I can't give an opinion as to that.

Q Turn to Page 9 of your report. In the first full paragraph, the last sentence of that paragraph, you state that these constituents would not be present as contaminants in soil, edge of field runoff, surface water and streams and in Lake Tenkiller, groundwater stream sediments and lake sediments, except for the actions and practices of 11:07AM 11:07AM

676c5b0b-4391-4682-9dda-575b4bc95703

the defendants. Do you see that?
A Yes.
Q What are these constituents?
A These constituents that are contaminants of
primary concern, became a primary concern here is 11:07AM
phosphorus. We would also be concerned with
bacteria that come from poultry, but chemically it
would be phosphorus.
Q You're not seriously claiming, are you, Dr.
Fisher, that we would be unable to find phosphorus 11:07AM
or bacteria in soils, streams, rivers, groundwater
in the Illinois River watershed or Lake Tenkiller
but for the land application of poultry litter?
A But for the land application of poultry
litter, you wouldn't be able to find these levels. 11:08AM
Q Well, but you didn't say levels on Page 9, did
you?
A Well, I did because I said their presence as
contaminants. So contaminants are materials that
are present at deleterious or potentially 11:08AM
deleterious levels.
Q Okay. Well, what's the deleterious levels of
phosphorus and bacteria in let's say groundwater?
A Okay. Well, in groundwater there wouldn't be
a deleterious level of phosphorus. I think our 11:08AM

676c5b0b-4391-4682-9dda-575b4bc95703

health experts would give you the deleterious expert levels of bacteria.

Q What levels did you have in mind when you were saying that contaminants would not be present above those levels but for the acts of the defendants? 11:08AM

A With respect -- I think my opinion with respect to bacteria derived from the surface, any bacteria in groundwater is bad, and so to the extent that bacteria from chickens is present in groundwater, it appears to be from the analysis that 11:09AM Valerie Harwood has done, then that contaminant would not have been present save for the presence of poultry operations in this area.

Q Let's pull that apart a little bit. So your level for bacteria in groundwater for purposes of 11:09AM this statement is zero; is that right?

MR. GARREN: Object to form.

A I think that's accurate, yes.

Q Okay. So then it is your opinion, sir, if I understand what you just told me, that there would 11:09AM be no bacteria in groundwater in the Illinois River watershed but for the land application of poultry litter; is that your opinion?

MR. GARREN: Object to form.

A That's really not my opinion. There may be 11:09AM

676c5b0b-4391-4682-9dda-575b4bc95703

other bacteria, but poultry litter is a substantial contributor to bacterial load within the Illinois River watershed.

Q Okay, but you agree, you would find bacteria in groundwater even in the absence of poultry litter? 11:09AM

A You might, yes.

Q Okay, and you would find bacteria in stream sediments and lake sediments and stream water even in the absence of poultry litter; correct? 11:10AM

A You would find some, and they would be less.

Q How much less?

A Well, if you take a look at the -- just the total gross loading of bacteria to the system that Dr. Teaf discussed -- 11:10AM

Q Let me -- if you're going to refer to another expert, I'm not terribly interested in that. Do you have an opinion as to how much less?

A You mean specifically?

Q Yeah. 11:10AM

A In the absence of Dr. Teaf's opinion, no.

Q Okay. What about phosphorus; you would find phosphorus in streams and soils and sediments even in the absence of poultry litter; correct?

A Phosphorus is a very common element. You, of 11:10AM

676c5b0b-4391-4682-9dda-575b4bc95703

course, would find it, but it would definitely be present at lower levels.

Q How low; do you know how low?

A Well, in soils, I think the background levels here would be below 30 parts per million. 11:10AM

Q Well, can you get phosphorus levels above 30 parts per million due to something other than poultry litter?

A You could.

Q What other? 11:11AM

A Well, application of commercial fertilizers would certainly be one way that you could achieve numbers greater than that.

Q Would you have bacteria and phosphorus in edge of field runoff even in the absence of land 11:11AM application of poultry litter?

MR. GARREN: Object to form.

A To say that you would have them present, yes. To say that the levels would be different, they would also probably be different. 11:11AM

Q Okay. Have you evaluated what the level would be absent poultry litter?

A Not as we sit here today, but I realize if you take a look at the edge of field samples, there's an array of values associated with that, so the 11:11AM

676c5b0b-4391-4682-9dda-575b4bc95703

minimums would be near the lowest levels of those values that we have in the current set of edge of field samples.

Q You agree with me, do you not, Dr. Fisher, that even if poultry had never been raised in the Illinois River watershed, not a single bird, the soil, sediments, streams, rivers and groundwater in the Illinois River and Lake Tenkiller would have phosphorus, metals and bacteria in them? 11:12AM

MR. GARREN: Object to form. 11:12AM

A Yes, as would every watershed within the United States and the globe. The issue here is amount, not presence.

Q Okay, but you didn't set out in your report the amounts that would be present absent poultry litter; correct? 11:12AM

MR. GARREN: Object to the form.

A I did not.

Q Can you point me to anything in your considered material that would give me the key to the answer to that question? 11:12AM

A No, that's not completely true. I think in my report I considered samples taken from areas in which, to our knowledge at least, no poultry litter was ever applied to those soils, and so that would 11:13AM

676c5b0b-4391-4682-9dda-575b4bc95703

be representative of background soils in the area.
Q Well, my question wasn't necessarily focused on background levels. There are non-background sources of phosphorus, metals and bacteria operating in this watershed that have nothing to do with 11:13AM
poultry; correct?
A That's correct.
Q So what would the levels be if you just took poultry out of the equation but you still had 250,000 people living in the watershed, 2 to 300,000 11:13AM
head of cattle, wastewater treatment plants and septic tanks?
MR. GARREN: Object to form.
MR. ELROD: Deer, don't forget deer.
Q Deer. 11:13AM
A Raccoons, armadillos, and the odd roadrunner. The values would be substantially less. Now, in terms of in soils, now, soils are a good place to look because the soils themselves are also going to be reflective of the sediments that are present 11:14AM
within Lake Tenkiller and within the streams and within stream sediments. If I can find the value -- sure.
Q Where are you at, please?
A I'm on Figure 29. 11:14AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Okay.
A And with respect to a total phosphorus -- I was thinking about 30 parts per million. That's really Mehlich III type phosphorus, but the total phosphorus, it appears that soils would have a mean 11:14AM of around, oh, say 390, 392 parts per million phosphorus, upper portion, total phosphorus.
Q And those are soils that are unimpacted by cattle?
A I think they may actually include some cattle 11:15AM soils, but cattle wouldn't have any impact on phosphorus levels in soils, absent substantial supplementary feeding. So if they are just grazing, they're simply recycling the phosphorus that's present in the field. 11:15AM
Q Can you give me a value for control levels, if you will, for phosphorus in streams?
A In stream sediments? Well, stream sediments should look really no greater, only slightly greater than control soils with respect to total phosphorus. 11:15AM
Q What about stream water?
A Stream water is a very complicated circumstance because phosphorus is taken up biologically. I think if you consider the data from the watershed itself, as well as EPA looking at this 11:16AM

676c5b0b-4391-4682-9dda-575b4bc95703

region, it's quite low. I'm not sure I have an opinion. If you ask Dr. Cooke or Dr. Stevenson, they would, but it's very much lower, certainly lower than we see here.

Q Okay. Let's change out our tape here. 11:16AM

VIDEOGRAPHER: We're now off the Record. The time is 11:16 a.m.

(Following a short recess at 11:16 a.m., proceedings continued on the Record at 11:23 a.m.) 11:23AM

VIDEOGRAPHER: We are back on the Record. The time is 11:23 a.m.

Q Dr. Fisher, do you consider yourself to be a historian?

A Actually I do consider myself to be a bit of a historian. 11:23AM

Q In what subjects?

A Well, in the subject of industrial history, and I would consider the poultry industry as being industrial history, and I was relying upon, if you are referring to Opinion No. 2 there -- 11:23AM

Q You are already ahead of me, Dr. Fisher. Hang on.

A No. I think of myself as someone who has studied poultry business for the last eleven years, 11:23AM

and I have a keen interest in history. So, yeah, I'm something of a historian.

Q Have you ever been qualified to testify as a historian?

A I've been qualified to testify in things related -- I don't think anybody has ever said historian, but I've been qualified to testify in the area of records review, which I would consider this to be. 11:24AM

Q Okay. Do you hold any degrees in history or industrial history? 11:24AM

A No.

Q Do you hold any degrees in agribusiness?

A No.

Q Have you ever worked for an agribusiness company? 11:24AM

A I have not.

Q Do you consider yourself to be a formation -- I'm sorry -- an expert on the formation or operation of corporations? 11:24AM

A Only from the practical sense of trying to track around who bought what when, yeah. You know, one thing I need to bring up is we need to go back to before the break because I think I need to amend an answer as I'm not sure I fully understood the 11:25AM

676c5b0b-4391-4682-9dda-575b4bc95703

question, so I'm going to state what I believe the question to be and then I'll state a little fuller answer.

You asked me with respect to demonstrating whether or not specific -- we'll call them specific 11:25AM operations, whether they be company owned or contract grower owned operations, disposed of waste at specific locations. That's one link in the chain, and the second link, would that waste have ended up -- would it have run off that location. 11:25AM Let's go to disposed of at specific locations first, and my response was that I would rely upon nutrient management plans and correspondence, and I think that that was -- that answer was given under a misimpression that you were asking about things 11:25AM solely within a context prior to, oh, let's say, the beginning of the Oklahoma Department of Agriculture, Food & Forestry's regulatory structure because in the general sense what I would rely on would be the documents that pertain to waste disposal in general, 11:26AM and so that would include nutrient management plans that might have existed. It would have included any correspondence related to those nutrient management plans, which could include transmission of soil samples back and forth and the results thereof, but 11:26AM

676c5b0b-4391-4682-9dda-575b4bc95703

in addition it could also include official records maintained by government agencies pertaining to specific waste location disposal. It would also pertain to investigator information that I have in my possession. So it's broader than just nutrient 11:26AM
management plans. I was thinking prior to the collection of more detailed information.

Q Based on that -- I'm sorry, were you through?

A Yes.

Q I didn't mean to cut you off.

A I think I am through.

Q Based on the broader universe of documents that you've described, sir, can you identify for me any location within the watershed where poultry litter that originated on a company-owned or 11:27AM
company-managed farm associated with any of the defendants named in this lawsuit has actually been land applied?

A As I sit here today, no. Once I've reviewed those records I've identified, I will be able to do 11:27AM
that.

Q Because you believe there are instances of that in the records?

A I do.

Q To the extent that information is shown in the 11:27AM

records, it's shown in ODAFF records?
A No, that's not what I said. You would consider all the records that would pertain to waste disposal, so those would include records that were produced by the defendants, which include nutrient 11:27AM
management plans and correspondence pertaining to those nutrient management plans and waste disposal. In addition to that, there are records maintained by governmental entities, such as ODAFF, and records that we have collected based upon investigator 11:28AM
observations.
Q Have you fully amended your answer now?
A I think I have.
Q Okay. Dr. Fisher, in your studies as a geologist, how many courses did you take that 11:28AM
focused on the history or development of the animal agricultural industry in the U.S. generally or northwest Arkansas specifically?
A None.
Q Have you ever worked in the poultry industry? 11:28AM
A No.
Q Ever been employed by any of the poultry companies that are named as defendants in this lawsuit?
A No. 11:28AM

Q In Opinion No. 2, you'll agree with me that you sought to describe the formation and history of each of the companies named in this lawsuit; is that a fair summary?

A I think that's accurate. 11:28AM

Q Okay. Do you consider these to be expert opinions on scientific or technical matters?

A These are a recitation of factual information presented in authoritative text. They've just been combined from -- one was an online text, Poultry in 11:29AM Arkansas and Arkansas Encyclopedia of History & Culture, newspaper articles, I think there's a press release from Willow Brook Foods, some press releases from Cargill, affidavits of various individuals, depositions of individuals, discovery documents that 11:29AM are identified in here, I think some stuff from Cobb-Vantress history on the Web, I think there's a book by Crisp about Peterson Farms and a book by Strausberg, From Hills and Hollers, a pretty good book. If you haven't read it, it's a good one. 11:30AM

So it's based on a number of sources, and it's not -- what those sources show is what I said, is the defendants have a long and substantial history of poultry production within the Illinois River watershed. 11:30AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q But the discussion in Pages 9 through 15 of your report is a factual discussion as opposed to a scientific or technical expert opinion; do you agree?

MR. GARREN: Object to form. 11:30AM

A Well, the opinion is that they've had a long and substantial history of poultry production that's based upon the facts that are discussed in 9 through 15, I think you just identified.

Q What scientific knowledge or expertise or technical training did you draw upon, Dr. Fisher, to support your Opinion No. 2? 11:30AM

A The ability to take information and correlate it.

Q You mean the ability to read information off the World Wide Web? 11:31AM

A Well, not solely. Also the ability to read discovery documents, affidavits and that sort of thing and pull out the information that's relevant to development of this opinion. 11:31AM

Q Okay, and do you believe, sir, that you have some particular expertise that makes you more qualified than others to extract information from public records?

A With respect to this particular topic, since 11:31AM

676c5b0b-4391-4682-9dda-575b4bc95703

I've been working on poultry-related matters for eleven years, I have some expertise in that, yes.

Q As between yourself and someone who's actually employed by Tyson Foods, who would be more qualified to discuss the history of Tyson Foods? 11:31AM

MR. GARREN: Object to form.

A It would depend on who the employee might be.

Q Say a management level employee who is familiar with the history of the company.

MR. GARREN: Object to form. 11:32AM

A We'd need to know the degree of their familiarity with the history of the company, their length of employment. I mean, there would be a lot of factors involved. You simply can't say it's a management employee familiar with the history of the company. 11:32AM

Q Well, even if they were a short-term employee, if they had the same information available to them and they were capable of reading and articulate, would you offer any expertise beyond their ability to describe the history of their company? 11:32AM

MR. GARREN: Object to form.

A I don't know.

Q On Page 11 of your report you're discussing Willow Brook Foods and Cargill; do you see that? 11:32AM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q And you provided some employee numbers or employment numbers. Willow Brook Foods employs a thousand people in southwest Missouri; do you see that? 11:32AM
A Yes.
Q And Cargill employs, oh, 2,000 people in Arkansas; do you see that?
A Yes.
Q Where did you get those employment numbers? 11:33AM
A Okay. Those employment numbers -- let me read the footnote here -- are going to be I believe -- the ones from the Springfield News Leader article with respect to Willow Brook Foods, I'd have to check that. I didn't make these up out of whole 11:33AM cloth, and the Cargill numbers is going to be from -- well -- okay. It might be from Willardsen's affidavit the way it's referenced there, but it's certainly from something. It's from a reference.
Q Dr. Fisher, did you include contract growers 11:33AM who raise poultry with either Cargill or Willow Brook in your count of employees?
A No, because there was no information concerning that in the information that I reviewed.
Q Well, you have information available to you, 11:34AM

do you not, about the number of contract growers for Willow Brook and Cargill, do you not?

A I'm not sure that that's specifically identified enough. I could review that. There may be a way to extract that information. 11:34AM

Q Let's keep going through your report. If I can, I want to talk about a group of opinions, if you'll indulge me for a moment, Opinions 3 through 5 of your report.

A Okay. 11:34AM

Q In each of these opinions, Dr. Fisher, do you agree with me that you cite the work of other experts retained by Motley Rice or the Attorney General?

A I agree with you that I have relied upon the opinions of other experts in this matter working on behalf of the Attorney General. 11:35AM

Q Okay. Let's go to Opinion No. 3. The contaminants of concern in the Illinois River watershed are phosphorus and bacteria. What sources do you cite for that opinion? 11:35AM

A Okay. The sources that I cite are the expert report of Cooke and Welch. I cite the expert report of Chris Teaf and that of Valerie Harwood and that of Roger Olsen and that -- an additional citation 11:35AM

676c5b0b-4391-4682-9dda-575b4bc95703

but does not directly -- well, it indirectly speaks to that is by Jan Stevenson.

Q Let's break Opinion 3 down, if we can. You've included a statement that the streams in the Illinois River watershed show excess algal growth that has adversely affected fish communities; do you see that? 11:36AM

A Correct.

Q And you cite to Cooke and Welch for that opinion? 11:36AM

A Cooke and Welch may be a miscitation in there and should -- maybe I think Stevenson probably needs to be in there as well.

Q Do Cooke and Welch offer any opinions regarding the quality of fish habitat or fish quality in streams? 11:36AM

A None.

Q Okay. So you believe the real source for this opinion should be Jan Stevenson?

A Right, and I apologize for the cutting and pasting nature of this. 11:36AM

Q Dr. Fisher, did you complete any independent scientific or statistical analysis of algal growth levels or fish communities in the Illinois River watershed to support this opinion? 11:36AM

676c5b0b-4391-4682-9dda-575b4bc95703

A You mean other than personally observing a lot of algae in stream bottoms?
Q Did you conduct any scientific or statistical analysis?
A No. 11:37AM
Q You're not an ecologist, are you?
A I have some background in ecology.
Q Are you a trained ecologist?
A When I graduated from college, I was, and I worked in that field in 1973-'74. 11:37AM
Q Do you have any specialized training or experience in assessing fish communities?
A No.
Q Okay. You're relying exclusively on Dr. Jan Stevenson for this opinion? 11:37AM
A I think upon Jan -- yeah, with respect to the actual opinion, Stevenson's opinion is who I relied upon.
Q Okay. Also in Opinion No. 3 you cite the work of three other experts retained by Motley Rice, 11:37AM Teaf, Harwood and Olsen, in support of your statement that the streams in the Illinois River watershed show high levels of fecal bacterial contamination during high flow; do you see that?
A Yeah, I see that I have cited with respect to 11:38AM

the bacterial contamination during periods of high flow the reports of Teaf, Harwood and Olsen.

Q Okay. Dr. Fisher, did you complete any independent scientific or statistical analysis yourself to support this statement or opinion? 11:38AM

A No.

Q I'm curious. You used the term high flow. Do you have an opinion, whether one of your own or one borrowed from one of the other experts, as to whether there are high levels of bacteria in streams 11:38AM during low or moderate flow?

A I don't really have an opinion I've developed. I know there are high levels during high flow, and at low flow, tends to have much lower levels.

Q When you say bacteria for purposes of this 11:39AM opinion, what kinds of bacteria are you specifically concerned about?

A It would be indicator bacteria, which would be things like -- well, be coliforms and fecal coliforms and fecal streptococcus-type bacteria, 11:39AM things that are used as indicator organisms.

Q You believe fecal streptococcus is used as an indicator?

A Well, I'd have to review that. I'm not an expert in that area. I just know that the fecal 11:39AM

676c5b0b-4391-4682-9dda-575b4bc95703

coliforms are an indicator, as are total coliforms in some instances.

Q You believe total coliforms are an indicator of what?

A Well, they're an indicator of contamination by animals that harbor coliform bacteria. Fecal coliforms are certainly an indicator of warm blooded animals contributing to contamination. 11:39AM

Q Are total coliforms an indicator of bacteria from a fecal source? 11:40AM

A Not necessarily.

Q Also in Opinion No. 3 you cite the work of another expert retained by the Motley Rice law firm, Jan Stevenson, in support of your opinion that Lake Tenkiller experiences decreased water clarity and excess algae growth that adversely affects fish communities; do you see that? 11:40AM

A Yes, I do, and that's incorrect as well. In fact, there's a switch. Footnote 40 should be the entry for Footnote 42 and the Footnote 42 should be Footnote 40. They're switched. 11:40AM

Q So really your opinion regarding decreased water clarity and the effects on fish communities in the lake rests upon the opinions and analysis of Cooke and Welch? 11:40AM

676c5b0b-4391-4682-9dda-575b4bc95703

A That's correct.
Q Did you complete any independent scientific or statistical analysis yourself, Dr. Fisher, to support that statement?
A No. 11:41AM
Q Let's go to opinion No. 4, which for the Record, your opinion as you've stated it is, poultry are the primary contributors to the phosphorus pollution of soils, surface waters, groundwaters and sediments within the Illinois River watershed. Did 11:41AM
I read that correctly?
A You did.
Q Okay. You cite in this opinion to the work of two other experts retained by the Motley Rice Law Firm, Dr. Engel and Roger Olsen; correct? 11:41AM
A I'm not seeing the Olsen citation in there. I see the Engel citation on the following page.
Q I think you have to go over to -- maybe I went too far -- 48, Footnote 48. I'm sorry.
A Yeah. The Olsen citation has to do with the 11:42AM
pathway sampling approach, yeah, yes.
Q All right. Are you relying upon the work and analysis of Dr. Engel and Olsen to support your statement that poultry is the primary contributor to phosphorus pollution in soils, surface waters, 11:42AM

676c5b0b-4391-4682-9dda-575b4bc95703

groundwater and sediments?
A Well, I'm relying upon that and the --
primarily on A, the mass balance report that's in
Bernie Engel's report, which was prepared by Meagan
Smith. 11:42AM
Q Who is another expert retained by the
plaintiffs in this case?
A Who is an expert working on behalf of the
Attorney General in this case, that's correct, and
in designing that particular work, I had numerous 11:42AM
conversations with Ms. Smith and with Dr. Engel
concerning the mass balance work. They did the
work. Bernie directed the work but I had input in
that work.
Q Dr. Fisher, did you yourself complete any 11:43AM
independent evaluation of the relative contribution
of poultry litter to phosphorus loads or
concentrations in surface water or soils in the IRW?
A Independently and in the absence of anyone
else doing work on that with me? 11:43AM
Q Well, you choose your own definition of
independent evaluation.
A Well, gosh, I don't think there's much that's
independent in most science. Did I sit down and do
my own mass balance, no. Meagan Smith did that mass 11:43AM

676c5b0b-4391-4682-9dda-575b4bc95703

balance under the direction of Bernie Engel with my input.

Q Did you undertake any statistical or scientific analysis that would allow you to offer an opinion of your own regarding the relative 11:43AM contribution of poultry litter to phosphorus loads?

A Well, simply reviewing the information that's present in the literature, reviewing the information from Meagan Smith and reviewing the data in the sediment cores, along with the population changes in 11:44AM poultry in the basin, I guess you could say I did because I looked at a coalescence or a concordance of information between what I saw in sediment cores, poultry populations and what I was getting in terms of mass balance issues from Meagan Smith and Bernie 11:44AM Engel, and so in that sense, yeah, I mean I have an independent line of evidence that supports the mass balance numbers.

Q Okay. Have you been asked to determine a quantitative contribution of poultry litter to the 11:44AM phosphorus loads in the Illinois River watershed?

A I was asked to assist in doing that. I wasn't asked to do it.

Q As we sit here today, Dr. Fisher, do you have a quantitative opinion as to the relative 11:45AM

676c5b0b-4391-4682-9dda-575b4bc95703

contribution of poultry litter to phosphorus loads in the Illinois River or Lake Tenkiller?

A I would adopt the opinions that have been expressed by the other experts in this matter.

Q Do you have an opinion that's based on your own independent evaluation of that question? 11:45AM

A With respect to --

MR. GARREN: Object to form.

A I would say based upon my sediment core information, that I have data that supports their estimates. 11:45AM

Q Well, what's your opinion as to the relative contribution of poultry litter as either a percentage or however else you want to quantify it?

A Overwhelmingly dominant. 11:45AM

Q Well, give me a number.

A In excess of 70 percent.

Q In excess of 70 percent, and you base that on what?

A I base that upon the mass balance work that was done by Meagan Smith under Dr. Engel's direction and with my input, and I base that upon the extremely strong correlation between total phosphorus concentration in the lake sediment cores over time that corresponds in time to the buildup in 11:45AM 11:46AM

676c5b0b-4391-4682-9dda-575b4bc95703

poultry population within the Illinois River watershed.

Q You discuss sediment cores in your expert report; correct?

A I do. 11:46AM

Q Can you point me in your report where you've expressed this 70 percent contribution --

A I've not expressed --

Q I'm sorry. Hang on. Let me finish. Based upon your review of the sediment cores? 11:46AM

A Okay. You asked me here if I would offer an opinion, and I did. Did I discuss the specifics with respect to contribution from the sediment cores, no.

Q Okay. That's an opinion that you came up with today? 11:46AM

A Well, that's an opinion that I have adopted and rely upon the opinions of others to generate that information.

Q One of the others you mentioned is Meagan Smith and her mass balance study? 11:47AM

A That's correct.

Q Have you reviewed that study?

A I have.

Q Does that study purport to show the relative 11:47AM

contribution of poultry litter to phosphorus loads in water?

A No.

Q In Opinion No. 4 you use the term primary to describe poultry litter, a primary or the primary contributor. Do you see that? 11:47AM

A Yes.

Q What do you mean by primary?

A Well, that they're the largest source of contamination of soils with phosphorus within the watershed. 11:47AM

Q So your definition of primary is the largest; is that fair?

A Source, that's fair.

Q So depending on how many sources you have, largest could be 70 percent or it could be 30 percent, just the largest? 11:47AM

A Well, sure. I mean, the largest is the largest, sort of a plurality, but in this instance, the number of poultry units is so enormous in this watershed, that there is no question, certainly in my mind, that they are the primary contributors to phosphorus in soils, surface waters, groundwaters and sediments. 11:48AM

Q And you base that on the number of poultry 11:48AM

676c5b0b-4391-4682-9dda-575b4bc95703

farms?
A I base that upon the mass of material disposed and the concentration of phosphorus in that material, as well as a consideration of other sources, not only the mass balance that Meagan Smith 11:48AM
did, and although it's not done in the same way, the same conclusions or essentially the same conclusions are drawn by University of Arkansas experts and the paper by Slaton and others in 2004 published in the Journal of Environmental Quality. I don't think 11:49AM
there's actually any, and I mean any, scientific controversy as to the source of phosphorus that's entering the Illinois River watershed from extrinsic sources.
Q There's no controversy that it originates from 11:49AM
multiple sources; correct?
A There's no controversy that the overwhelmingly dominant source is poultry. There also, Mr. George, would be no controversy that there are some other sources. 11:49AM
Q What other sources did you investigate, Dr. Fisher?
A The other sources that were investigated --
Q Hang on. What did you investigate?
A That I investigated? 11:49AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You investigated.
A Well, I relied upon the work done by Meagan Smith and I also looked at the work that was done by University of Arkansas scientists and I relied upon just my known experience within the watershed. 11:49AM
Q Did you personally investigate a single other source of phosphorus or bacteria in this watershed?
A Well, what would constitute a personal investigation thereof?
Q The type of investigation that you did with respect to poultry litter. 11:50AM
A The type of investigation that was conducted here by Meagan Smith and external to anyone retained on behalf of the Attorney General is -- for poultry litter, it's the same kind of investigation. I mean, you take a look at all inputs of phosphorus, how much fertilizer is sold, for example, how much -- how many animal units are present, where the phosphorus that's being -- where the manure is disposed, where the phosphorus comes from that's in that manure. I mean, all those things are considered. 11:50AM 11:50AM
Q You are referring to considered by Meagan Smith?
A Meagan Smith, and I'm referring to being 11:50AM

676c5b0b-4391-4682-9dda-575b4bc95703

1 considered by Slaton and others in 2004 at the
2 University of Arkansas.
3 Q Have you read Dr. Slaton's mass balance study?
4 A Yes, I have.
5 Q Have you talked with Dr. Slaton? 11:51AM
6 A I have not. Does he disagree with his study?
7 Q I don't know. Does he?
8 A I haven't spoken with him.
9 Q Dr. Fisher, what did you do to investigate
10 cattle defecating in or near streams? 11:51AM
11 A Well, I mean, I certainly won't dispute that
12 cattle do defecate in and near streams.
13 Q What did you do to investigate it?
14 A I didn't personally do anything, except see
15 them doing it from time to time. 11:51AM
16 Q Did you hire any homicide detectives to follow
17 cattle around and take pictures of them defecating
18 in streams?
19 A No, sir.
20 MR. GARREN: Object to form. 11:51AM
21 Q What did you do to investigate septic systems?
22 A I didn't personally make any investigation of
23 septic systems.
24 Q You didn't ask your homicide detectives that
25 were reporting to you to interview landowners in the 11:51AM

watershed about their septic tanks?
MR. GARREN: Object to form.
A No, that was never done.
Q What did you do to investigate the use of
fertilizer on lawns, commercial fertilizer? 11:52AM
A That was done -- that would be the work done
by Meagan Smith.
Q You didn't commission your private
investigators to surveil homeowners and catch them
in the practice of using commercial fertilizer on 11:52AM
their lawns?
MR. GARREN: Object to form.
A No, sir, no, sir.
Q What did you do to investigate erosion from
roads and construction sites? 11:52AM
A Erosion from roads and construction sites, no
specific investigation.
Q What did you do to investigate biosolid
applications in the watershed?
A I didn't make any specific investigation of 11:52AM
that. That would have been all considered work done
by Meagan Smith.
Q Let's go to Opinion No. 5, which for the
Record I'll read it and you tell me if I get it
right. Your opinion is that poultry are highly 11:53AM

676c5b0b-4391-4682-9dda-575b4bc95703

significant contributors to bacterial pollution of surface and groundwater within the Illinois River watershed.

A Yes, that's correct.

Q You cite in Opinion No. 5 to the work of three other experts retained by Motley Rice, Harwood, Olsen and Teaf; do you see that? You'll have to look to at the footnotes first. 11:53AM

MR. GARREN: Object to form.

A Yes. 11:53AM

MR. GEORGE: Mr. Garren, are you objecting because they were not retained by Motley Rice?

MR. GARREN: It was compound.

MR. GEORGE: Okay. Thank you. I wanted to correct it if it was something I could do. 11:53AM

MR. ELROD: He seems to actually pay attention to your objections.

MR. GEORGE: Sometimes.

Q Dr. Fisher, did you complete any independent scientific or statistical analysis yourself to support this opinion or statement? 11:54AM

A No.

Q You're relying upon Drs. Harwood, Olsen and Teaf to support that statement?

A I am. 11:54AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q What do you mean by the term highly significant, which is different than primary, the last statement?

A Well, highly significant is that with respect to bacteria, there is a different story because 11:54AM certainly in this instance, although based on the information that's been developed, cattle are not significant contributors to phosphorus. They are clearly contributors to bacterial load. I think the -- there's roughly an even split, poultry being 11:54AM a little less, 41 versus 44.4 percent as I state here, but roughly an even split between poultry and cattle as to bacterial load, with a substantial minority fraction of somewhere around 13 percent contributed by swine in terms of what's going on the 11:55AM land.

There were other studies done that I've not really looked at in great detail that have to do with leaching capability that suggests that the poultry may be a more effective source, but what I 11:55AM mean by it's substantial, they're large. They're one of the two big ones.

Q How can poultry litter applications in your opinion be the largest source of phosphorus in the water but not the largest source of bacteria in the 11:55AM

676c5b0b-4391-4682-9dda-575b4bc95703

water?
A Well, it works like this: The feed that is given to the poultry contains phosphorus that is imported into the watershed. That phosphorus comes from extrinsic sources. The cattle, on the other 11:56AM
hand, are dominantly living on forage that is being grown with phosphorus that's already been applied to fields largely or significantly through poultry waste. So the cattle are recycling phosphorus in terms of mass balance; whereas, the poultry waste is 11:56AM
a contribution from an external source. It's just like economics. You'd rather get money from outside the city than recycling it inside the city if you want to grow wealth, and that's pretty much what has happened here. 11:56AM
Q Let's go to Opinion No. 6, Page 18 of your report. Your Opinion No. 6 is that the population of poultry within the Illinois River watershed has shown an overall increase since at least 1950; correct? 11:57AM
A That's correct.
Q Do you agree that the population of cattle in the Illinois River watershed has shown an overall increase since at least 1950?
A The pattern is quite different. 11:57AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Hang on a second. I didn't ask about the pattern. Do you agree with my statement?
A No, because --
Q Go ahead.
A Let me give you a full answer. I'm not arguing with you. The question is ill posed because you need to look at the change in population over time. It is true that the number of cattle today are greater than they were in 1950. 11:57AM
Q Is that what you meant by overall increase since at least 1950 with respect to poultry? 11:57AM
A Well, it's part of what I mean by that.
Q Okay. Let's talk about overall increase first and then we'll talk about pattern. I'll give you a chance to talk about pattern, Dr. Fisher. You will agree with me that there's been an overall increase since at least 1950 in the number of cattle in the watershed? 11:58AM
A Number of cattle that are in the watershed today are greater than the number of cattle in 1950. 11:58AM
Q You'll also agree with me there's an overall increase since at least 1950 in the population of humans in the watershed?
A I will agree that the population today is larger than it was in 1950. 11:58AM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You'll agree with me there are more septic tanks in the Illinois River watershed today compared to 1950?
A I'm not sure I could reach that conclusion.
Q Do you think there might be less septic tanks? 11:58AM
A I don't know what the answer to that is.
Q Go ahead.
A I'm sorry, because it would depend upon the distribution of population growth, whether the population growth is within the urban rim or that 11:58AM along the very far northeastern or eastern rim of the watershed and/or along the main transportation corridor on 412, which would not be largely on septic tanks, especially in the urban rim, or where the population increase has been in rural, more 11:59AM rural settings. So I can't answer that question. It's possible, but I don't know.
Q Okay. You haven't investigated that particular question?
MR. GARREN: Object to form. 11:59AM
A No.
Q Performed no census of septic tanks in the watershed; correct?
A I have not performed any census of septic tanks.

676c5b0b-4391-4682-9dda-575b4bc95703

Q Has anyone on the team of experts retained by Motley Rice performed such an evaluation?
A I'm not sure. I think that the assumption that was made on the phosphorus mass balance issue by Meagan Smith was that all human beings in the 11:59AM watershed contributed phosphorus to the watershed. So, for example, if -- Fayetteville would be a good example. You have a large urban population. That urban population is passing their waste to a wastewater treatment plant but in fact the 12:00PM wastewater treatment plant may discharge outside of the Illinois River watershed, which does happen in Fayetteville. Then that population wouldn't be counted, except we did count them. That's what -- Meagan did put those into the mix. Since we 12:00PM couldn't tell if, you know, you or I were the contributors, we both were.
Q My question really was specific to septic tanks. Did Meagan Smith to your knowledge investigate or conduct a census of the number of 12:00PM septic tanks in the watershed over time?
A No, because it wasn't necessary.
Q Why wasn't it necessary?
A Because the assumption was that all humans in the watershed contributed every last molecule of 12:00PM

676c5b0b-4391-4682-9dda-575b4bc95703

phosphorus to the watershed. That is, the septic tanks would only be significant with respect to phosphorus load to streams or bacterial load, if that was considered, I don't think it was, but to phosphorus load if they were leaking. So to be 12:01PM completely fair and to take a very conservative approach, the count computation on mass balance was made as though every human was putting all of their waste into the watershed -- into the environmental media directly in the watershed. 12:01PM

Q Do you agree, sir, that the volume of human waste discharged daily from sewage treatment plants operating in the Illinois River watershed is greater today than it was in 1950?

A I don't have specific information on that, but 12:01PM I would suspect that that's true.

Q Let's look at Table 1. Tell me what Table 1 is.

A Okay. Table 1 is entitled Illinois River watershed bird production 2000 to 2007 as reported 12:02PM by defendants by year, and it is constructed from documents produced by the defendants in discovery, and there is some footnotes on that that for certain of the defendants, some years are partial years, and for all defendants, at least one of the years is a 12:02PM

676c5b0b-4391-4682-9dda-575b4bc95703

partial year report.
Q What is your understanding with respect to whether these numbers reflect all birds produced in a given year or just a snapshot inventory of birds in a given year at a given point in time? 12:02PM
A Okay. My understanding of these numbers, as I read the discovery documents, is that these are annualized figures.
Q So you do agree with me that, based on that understanding, you would not find at a given moment, 12:03PM say, in 2006, 150 million birds in the watershed?
A No. Integrated over the entirety of 2006 according to the documents produced by the defendants, 150 million and change would have been produced. 12:03PM
Q Okay. At a given moment in time the actual inventory would be less than that; correct?
A At any given time the actual inventory is less, that's correct.
Q Looking at the total number of birds produced 12:03PM during a year in the watershed, do you agree with me, sir, that based upon the information provided to you, the production of poultry in the watershed has decreased each of the last four years?
MR. GARREN: Object to form. 12:04PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Okay. With respect to 2007, I can't offer an opinion because that's a partial year for all defendants. I would say that there has been a decrease on the order of 10 million birds between -- per year between 2004 and 2006, which is -- which is 12:04PM a fairly small percentage since we're talking numbers between 160 and 150 million, but it's about a 10 million bird decrease.

Q But you do agree that assuming these numbers are correct, there's a downward trend in the number 12:04PM of birds produced in the watershed?

MR. GARREN: Object to form.

A I would say there's a diminution in the number of birds between 2004 and 2006. Whether that defines a trend, I don't -- in three years it's 12:04PM down. What is happening this year, I have no idea what has happened in 2008. What will happen next year, I don't know. It defines a 10 million bird decrease between those years, '04 and '06.

Q Let's go to Table 3. What is Table 3 of your 12:05PM expert report?

A Okay. Table 3, which is entitled Estimated Poultry Production Within the Illinois River Watershed, and it's based upon two types of information. One type of information is 12:05PM

676c5b0b-4391-4682-9dda-575b4bc95703

Agricultural Census data published by the U.S. Department of Agriculture, and the other is land use and land cover data, and so -- I'm sorry.

Q Go ahead.

A So it's an estimate of the total poultry 12:05PM produced in these years based upon those data sources.

Q In this section of your report leading up to Table 3, you cite exclusively to the report of Bernie Engel; is that correct; do you see Footnotes 12:06PM 54, 55 and 56 -- actually 55 and 56 are not leading up to but 54.

A Yes.

Q Is this estimate of poultry --

MR. GARREN: Let me -- did you amend your 12:06PM question to only limit it to the one footnote?

MR. GEORGE: Sure.

Q Did you understand it that way, Dr. Fisher?

A Yes, I did.

Q Okay. Footnote 54, which references Bernie 12:06PM Engel's report, is appended to the statement regarding an estimate of poultry production within the watershed based on land use and Agricultural Census data. That's what you were describing to me; correct? 12:07PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q Did Dr. Engel perform that review and derive the estimates that are reflected in Table No. 3 or did you?
A Dr. Engel directed that review. I 12:07PM
participated in that review. The full answer here is that the U.S. Department of Agriculture data is reported at the level of a county. The Illinois River watershed represents portions of the counties
in which these reports are made. So, for example, 12:07PM
Adair County may be something like 60 percent within the watershed and 40 percent out, whatever the number might be. So to adjust the information that's reported in the USDA records to a watershed
basis, some rational needs to be found to do that, 12:08PM
and one rationale should be simply to use it as proportional area of the county, 60 percent in, 40 percent out, and then 60 percent of birds were assigned to the watershed.
In discussions that I had with Dr. Engel and 12:08PM
also Meagan Smith, who was also involved in this work, and based upon a consideration of industry practices, it appeared that a better means of making that allocation would be to make that allocation
based upon the relative acreage of pasture inside 12:08PM

676c5b0b-4391-4682-9dda-575b4bc95703

the watershed in that county versus outside the watershed since -- or open space really, since the open space is where poultry waste is disposed, and so that was used to scale that data.

So the question is, did Bernie Engel make this? He certainly directed this. I assisted in part in discussions related to how that might be done, and Meagan Smith did the actual analysis. 12:08PM

Q Okay. So the actual computations that led to Table No. 3 were performed not by you, not by Dr. Engel, but by Meagan Smith? 12:09PM

A We directed her in how to perform them.

Q But she actually completed them; correct?

A Yes, she did.

Q Okay. 12:09PM

A I think I may have added them up as total poultry.

Q And who made the decision that the most appropriate means of allocating county-wide Agricultural Census data to the watershed was based on percentage pasture versus percentage county? 12:09PM

A That was -- I think Bernie Engel made the final decision, but that was based upon extensive discussions that he and I had with Meagan Smith, and I believe Gordon Johnson was involved in those 12:10PM

676c5b0b-4391-4682-9dda-575b4bc95703

discussions as well.
Q Do you need a pasture to have a poultry farm?
A Unfortunately, no.
Q Do poultry graze on pastures?
A No, but their waste is disposed of not in 12:10PM
pastures, disposed of in open spaces and pastures --
pasture acreage is an excellent example of that.
Q Can you point me to a single other scientific
study where populations of poultry in confined
animal feeding operations has been allocated based 12:10PM
on percentage of pasture in watershed?
A You know, I may be able to, but I can't do it
right now. There is a test, however, that's in
here. We take a look at our allocation. We come
out pretty close. We come out within 10 percent of 12:10PM
the numbers provided by the defendants for 2002, and
we come out a little low.
Q 10 percent is close enough?
A 10 percent is pretty much close enough.
Q Do you come out within 10 percent for the time 12:11PM
period of 2002 and prior?
A Okay. If you would be kind enough to produce
the records for before 2002, I would be happy to
make that test.
Q So is your answer you don't know how your 12:11PM

676c5b0b-4391-4682-9dda-575b4bc95703

methodology compares with actual numbers prior to 2002?

A Not with actual numbers, but based upon the 2002 records, it is pretty darned good.

Q It's pretty good for one year, 2002; correct? 12:11PM

A Right, and the fact that it was -- you know, it might be fortuitous, but it's unlikely that it's that fortuitous.

Q Did you read the qualifiers that the defendants placed on those bird population numbers 12:12PM and estimates?

A Where you said you didn't know either?

Q No. Did you read the qualifiers?

A Did I read the qualifiers?

Q Yes. 12:12PM

A I'm sure I did read the qualifiers. I mean, certainly when you are dealing with large numbers of animals or large numbers of anything else, there will be errors in estimates, but finding for one year a concordance that's within 10 percent is 12:12PM pretty remarkable, having spent a lot of my life looking at large numbers of things from different estimation points of view.

Q Dr. Fisher, with respect to the bird population or production, rather, estimates in Table 12:12PM

676c5b0b-4391-4682-9dda-575b4bc95703

No. 3, how did you allocate the USDA county statistics between integrators named in the lawsuit and those who are not?

MR. GARREN: Object to form.

A Well, there was no allocation made in the -- among integrators in past years. 12:13PM

Q So you cannot tell the court or me with respect to 1964 in your estimate of 62 million birds, how many of those birds were raised by the defendants that are named in this lawsuit? 12:13PM

MR. GARREN: Object to form.

A No.

Q I assume that would be true with respect to any year I picked from Table 3; is that correct?

A I think that would be fair, and pretty much neither can anyone else. 12:13PM

Q Did you investigate the extent to which in prior years, prior to 2002, there were other integrators operating in the Illinois River watershed? 12:13PM

A Only with respect to the historical work that was done in Hills and Hollers. Business organizations change over time, but it would appear that the primary integrators were individuals or companies acting as integrators are pretty well 12:14PM

676c5b0b-4391-4682-9dda-575b4bc95703

identified by that historical work.
Q Well, based on your review of that historical work, what integrators that are not at the table in this lawsuit were involved in the production of poultry back in the '80s, '70s, '60s or '50s? 12:14PM
A I think everybody is at the table. There may be outfits that are currently moribund. I don't know for sure.
Q I'm sorry, currently what?
A They're currently gone; they're dead. I've 12:14PM not made that careful analysis to look at who was in the past and who was out in the past.
Q So you weren't trying to present, were you, Dr. Fisher, Table No. 3 as a reflection of the presence of the integrators named as defendants in 12:14PM this lawsuit prior to 2002?
MR. GARREN: Object to form.
A Well, this table is just what it says it is. It's estimated poultry production. It has been -- it does not attach itself to specific entities which 12:15PM produce that poultry. That information specifically I did not have.
Q Let's go to Opinion No. 7, which I'll for the Record read. The amount of waste generated by poultry within the Illinois River watershed has 12:15PM

676c5b0b-4391-4682-9dda-575b4bc95703

increased since at least 1950. Did I correctly read your opinion?

A You did.

Q Okay. The only authority that you cite or support for Opinion No. 7, if I've read your report correctly, is the expert report of one of the other experts retained by Motley Rice, Bernie Engel; correct? 12:15PM

A That's true, and by reference I would incorporate the referencing material or the underlying referenced material he used in his report, which I would have -- could have cited at great length and with a bigger footnote. 12:16PM

Q Dr. Fisher, what independent scientific or statistical analysis did you complete to support Opinion No. 7? 12:16PM

A The analysis was the number of birds has increased by a substantial fraction from around 12 million in 1950 or -- around 12 million in 1950 to around 150 million or 152 million in 2002. So number of birds has gone up. 12:16PM

The information that I have reviewed concerning the size of birds, average size of bird coming to market, I combined with, you know, feed efficiency information, since feed efficiency has 12:16PM

676c5b0b-4391-4682-9dda-575b4bc95703

gotten better. It basically says that if I had the same number of birds in 1950, I would produce less waste today per bird produced. The birds are -- okay, because feed efficiency is better, but the birds are a little bigger. There are a lot more of 12:17PM
them, and so feed efficiency has not kept up with bird production number. So basically more birds, more waste. It's a little bit convoluted by the efficiency of food use but not tremendously so.

Q Dr. Fisher, what particular expertise do you 12:17PM
have in the area of feed efficiency within avian species?

A Well, you can read the literature concerning the conversion of food biomass.

Q I could read the literature? 12:17PM

A Well, I've never done an experiment on that, but as a scientist, I can read that information and make a determination if I believe that that's reasonable from data.

Q I'm sorry. I didn't mean to cut you off. 12:17PM
You've never been retained, have you, Dr. Fisher, in a prior case to offer an opinion about feed efficiency within the poultry industry, have you?

MR. GARREN: Object to form.

A No. 12:18PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Other than reading literature about feed efficiency, what independent scientific or statistical analysis did you conduct to support your opinion that the amount of waste generated by poultry within the Illinois River watershed has 12:18PM increased since at least 1950?

MR. GARREN: Object to form.

A Okay. I would have -- I did review the information that's published by USDA that relates things like bird weight and life span to waste 12:18PM generation. Basically there's the number of birds here. Birds go up, waste goes up.

Q Did you calculate waste in any prior years and compare that to subsequent years?

MR. GARREN: Object to form. 12:19PM

A Did I -- I did not do that. I think I may have made a computation like that at one time, but it's -- basically it's -- it's pretty much going to scale with bird number. I think Meagan Smith did all those computations on phosphorus production in 12:19PM past years based on census data. The challenge here is that there are different kinds of information that are available to you. You have an isochronous slice of information that tells you how many poultry houses are present and some reasonable assessment of 12:19PM

676c5b0b-4391-4682-9dda-575b4bc95703

how active they are and then some way of relating poultry houses to waste production, but that's at one time slice. To get back in time, then you're required to look at the number of poultry that are allocated in the watershed and then estimate the 12:20PM
waste produced by those birds based upon production conditions as they existed at that time, and that's something Meagan Smith worked on.

Q Dr. Fisher, have you quantified the amount of poultry litter generated in the Illinois River 12:20PM
watershed by farms under contract with the defendants named in this lawsuit?

A With respect to what we call the current state of 2005 roughly time horizon, I believe that's true, that I have. 12:20PM

Q Okay. Can you show me that figure in your report?

A It's Table 6.

Q It's the 354,000 figure?

A Yes, sir. 12:20PM

Q And what time period does that figure apply to?

A That figure applies to -- it's a conservative estimate. It's based -- well, we didn't talk about its basis. Its current time period, basically it's 12:21PM

676c5b0b-4391-4682-9dda-575b4bc95703

2005.
Q 2005?
A 2005.
Q Okay. Have you quantified the amount of
poultry litter generated in the Illinois River 12:21PM
watershed by farms under contract with the
defendants named in this lawsuit for any year other
than 2005?
A I have not.
Q Has anyone? 12:21PM
A To my knowledge, no, although it possibly
could be done with the information that were
provided by defendants.
Q But you haven't seen it done yet?
A I have not seen it done yet. 12:21PM
Q I think we need to change the tape.
VIDEOGRAPHER: We are now off the Record.
The time is 12:21 p.m.
(Following a lunch recess at 12:21
p.m., proceedings continued on the Record at 1:34
p.m.)
VIDEOGRAPHER: We are now on the Record.
The time is 1:34 p.m.
Q Dr. Fisher, could you turn to Page 21, Opinion
No. 8 in your expert report? 01:34PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q I believe we've already discussed part of this opinion, which is Table No. 6 and your estimate of 354,000 tons of poultry litter produced in 2005; correct? 01:34PM
A Yes, we've partially discussed this.
Q Do I understand correctly that that estimate of 354,000 tons produced is based in part on your determination of the number of active poultry houses in the watershed in 2005? 01:34PM
A In part, yes, an estimate of that.
Q What are the other parts to that estimate?
A There are two other parts to the estimate. The active house, the size of that house, the type of bird that was raised in that house and then 01:35PM ancillary data from the Eucha-Spavinaw watershed that's based upon nutrient management plans that were written by the watershed management team there, which allowed developing some coefficients, which would give us the ability to look at waste yield per 01:35PM unit area of house by bird type in similar operations, and I think the other piece of that is assessment of the integrator associated with those houses was the other piece of information that came from numerous correlation of numerous documents. 01:35PM

Q How many active poultry houses were you using for purposes of your calculation of the 354,000 tons of poultry litter?

A The number of active houses that we report here, which are present in Table 4, is 1,917 in 01:36PM roughly the time frame circa of 2005-2006. 2005 is kind of a shorthand for the time.

Q And that is the beginning point of your estimation process, is that right, the 1,917 active poultry houses? 01:36PM

A Yeah. House needs to be one that we identified as being active, that's correct.

Q If your number of active poultry houses in the Illinois River watershed is too high, then would you agree your estimate of poultry litter production 01:36PM would, likewise, be biased high?

MR. GARREN: Object to form.

A Not necessarily. There are a lot of pieces of estimation here. As you can see, in the discussion section this particular mode of estimation produces 01:37PM about 354,000 tons, estimating it based on bird count that Dr. Engel then gives us, about 500,000 tons. So it's higher. So they have to look at that within the context of the nature of the estimate and the fact that this is probably a conservative 01:37PM

676c5b0b-4391-4682-9dda-575b4bc95703

estimate. If I -- obviously if I say a house is active and it isn't, then that provides a number that's wrong. In the alternative, if I identify a house that -- I don't identify a house that's active and it is, then I'm wrong in the other direction. 01:37PM

With respect to being able to test that, we took a look at the information that was provided, for example, by Simmons, and it's discussed briefly on Page 22, that we have, you know, reasonable agreement within here -- I think for the two we're 01:38PM able to test, between 2 percent and 11 percent of the active house count seemed to fit there.

Q Why did you only test your house count, your active house count number against Simmons and George's? 01:38PM

A Because the documents produced by Simmons and George's allowed me for this particular time period to identify the number of houses. The documents produced by the other integrators did not permit an identification of the number of houses or did not 01:38PM give an independent estimate produced by the defendant of the number of houses.

Q So you have not seen, Dr. Fisher, house count figures or information from my client, Tyson Foods, for the Illinois River watershed? 01:39PM

676c5b0b-4391-4682-9dda-575b4bc95703

A I don't recall seeing them. Had I seen them, I would have incorporated them in this report.
Q Did you inquire of counsel that you were working with as to whether that information from the defendants as to the actual number of active houses 01:39PM
in the watershed was available for all of the companies?
A I asked for all the information that pertained to defendants' representation of houses and birds. There may be documents in the Tyson production that 01:39PM
speak to house count, but it was impossible to put -- in my opinion at the time was impossible to be able to constrain that in terms of timing to the relevant time period.
Q Sticking with the methodology that you used in 01:39PM
Table No. 6 for your 354,000 ton estimate, what would happen to your number, if instead of using 1,917 houses, you used 1,750?
A Well, not a whole heck of a lot. It would also depend upon distribution of those houses. If 01:40PM
you said 1,750 versus 1,900?
Q Yes, sir.
A 250 houses.
Q Would the number go up or down?
A Well, I don't know. The number, the number, 01:40PM

676c5b0b-4391-4682-9dda-575b4bc95703

the gross number would likely go down. The allocation number amongst the types of birds could change, would depend upon the distribution of those houses.

Q What is your per house average, if you will, across all of the houses, laying aside the fact that there are some differences because of bird type? 01:40PM

A I haven't calculated that. It could be easily calculated by dividing 354,000 by 1,900 and whatever it was. 01:40PM

Q I did that and got 184 tons per house. Does that sound about right?

A That sounds about right.

Q Okay. So if we took about 200 houses and we assume that average is reflective of the houses that were inactive as opposed to being active, if we took 200 houses out of the mix, we'd remove about 40,000 tons per year? 01:41PM

MR. GARREN: Object to form.

Q Is that close? 01:41PM

A That would be about right. You would be removing something like -- yeah, that would be about right, 40 out of 354, so, you know, roughly 12 percent, 15 percent.

Q Now, you made reference earlier to Dr. Engel's 01:41PM

676c5b0b-4391-4682-9dda-575b4bc95703

alternative method for calculating poultry litter production. Did you perform any calculations of annual poultry waste production based on bird populations?

A I did not. I assisted with those, but I did not actually perform those estimates. 01:41PM

Q Well, on Page 24 of your expert report, you say that your estimate is conservative because other estimation approaches discussed by Dr. Engel yield estimates that exceed 500,000 tons; do you see that? 01:42PM

A That's correct.

Q Does the mere fact that one of the other experts being paid by Motley Rice has come up with a higher number necessarily mean that your number is conservative? 01:42PM

MR. GARREN: Object to form.

A Well, I think that that mischaracterizes what I've said. What I've said is that my number is lower than this number from Dr. Engel. Dr. Engel's number is based upon standard computational methods used by the U.S. Department of Agriculture. 01:42PM

Q You're not saying, though, simply because Dr. Engel has developed an estimate that's higher than yours, that yours must be conservative?

MR. GARREN: Object to form. 01:42PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Do I understand you?
A Mine is conservative for some other reasons. Number one, we only considered houses that we believed, based on our knowledge and belief, were active. We did not make any -- we did not include 01:42PM
in this estimates for other houses that we could not ascertain or we did not believe were active or for houses whose status was unknown for various reasons. So within the context of all of this data, this is a conservative estimate because we excluded facilities 01:43PM
that might have been included.
Q Dr. Fisher, you're aware, are you not, that not all of the litter produced on a farm is used on that farm?
A Yes. 01:43PM
Q You're aware of the fact that litter is commonly in this watershed and other parts of eastern Oklahoma and western Arkansas sold by contract growers to third parties who may have no direct relationship with the companies, the 01:43PM
integrators?
A I know there are a number of relationships. There are sales relationships; there are gift relationships.
Q How much of your estimate of 354,000 tons 01:43PM

676c5b0b-4391-4682-9dda-575b4bc95703

produced in the Illinois River watershed was used in the watershed by someone who has a contractual or business relationship with one of the defendants?

A I have no estimate of that.

Q You can't offer an opinion at all on that subject? 01:44PM

A Nor can anyone else to my knowledge.

Q Why not; why can't anyone else?

A Because that would require knowledge of all those contractual relationships. 01:44PM

Q If you had interviewed the growers that are involved in this watershed and asked as to the disposition, a sale or otherwise, of their litter, would you then be able to answer the question?

MR. GARREN: Object to form. 01:44PM

A I'm not sure you would be able to answer that question even then.

Q Did you even attempt to gather that information as to what portion of this 354,000 tons of litter was being used by third parties? 01:44PM

MR. GARREN: Object to form.

A With respect to my work in this matter, that has no bearing.

Q You didn't attempt to discover that information? 01:44PM

MR. GARREN: Object to form.
A No.
Q Why does it have no bearing?
A Because the litter -- the waste is produced
and the waste is then disposed or transported. 01:44PM
After it is disposed, becomes incorporated within
environmental media, whether it be on the farm or
coming off the farm, and that has nothing to do with
the physics, chemistry or biology of poultry waste
disposal. 01:45PM
Q Are you operating on the premise that the
defendants named in this lawsuit should be
responsible for the use of litter by third parties
over whom -- with whom they have no relationship?
MR. GARREN: Object to form. 01:45PM
A I think that's a legal opinion and I'm not
going to offer that.
Q Let's go to Opinion No. 9, which for the
Record your Opinion No. 9 is the poultry waste is
disposed by land application without incorporation, 01:45PM
open paren, simple broadcast spreading, closed
paren. Did I read it correctly?
A You did.
Q In the very first sentence on Page 24 under
that opinion are you state that based on your 01:46PM

676c5b0b-4391-4682-9dda-575b4bc95703

personal observations, and then you go on to talk about what happens when poultry litter is land applied. Do you see that?

A Yes.

Q What personal observations are you referring to? 01:46PM

A I have personally observed poultry waste disposal on three occasions. One, because of its crossroads circumstances, I remember quite clearly. It's in Summers, Arkansas immediately north of the intersection of US 62 and Arkansas 59. 01:46PM

Q Can we take them one by one?

A That's the one I specifically remember.

Q Oh, okay.

A And I just remember that because it was at an intersection that's really easy to recall. 01:46PM

Q Is the location at Summers, Arkansas within the Illinois River watershed?

A It is.

Q Okay. What are the two other instances? 01:46PM

A Two other instances were other places in the watershed, but I don't recall the specific crossroads. That's just a major crossroad in a major town.

Q Who was land applying poultry litter in the 01:47PM

676c5b0b-4391-4682-9dda-575b4bc95703

instance that you recall in Summers, Arkansas?
A In Summers, Arkansas this was being applied by two trucks. I mean, that's really saying I don't know where the litter came from.
Q Okay, and you don't know who was operating the trucks? 01:47PM
A I do not.
Q The other two instances that you've actually seen poultry litter being applied in the Illinois River watershed, do you know where the litter came from that's being applied? 01:47PM
A I do not.
Q Do you know who was actually performing the application?
A I do not. 01:47PM
Q Did you seek to follow up with the people that you were observing to find out the answers to those questions?
A I did not.
Q Why not? 01:47PM
A They weren't very friendly.
Q Did you talk to them?
A They talked to me.
Q What did they say?
A They requested that I leave the area. 01:47PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Were you on their property?
A No.
Q Were you on a right-of-way or public highway?
A It was on a public roadway.
Q Did you have a camera? 01:48PM
A I had a camera on one occasion.
Q Did you take any photos?
A I believe I did.
Q Still camera or video?
A I believe there's -- I may have some video 01:48PM
that should have been produced, and there would have been still pictures.
Q What exactly did this person in Summers, Arkansas say to you when they saw you with a camera photographing them applying poultry litter? 01:48PM
A I don't recall exactly what they said, but I would say that I would characterize the -- I wouldn't say it's an exchange, as hostile.
Q You're going to have to give me some meat. How was it hostile? 01:48PM
A I felt threatened.
Q You felt threatened because they were brandishing a weapon?
A No. Because they had large vehicles and they looked very unhappy. 01:48PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Were they trying to run you over, Dr. Fisher?
A No, but they could have had they attempted it.
Q Did they do or say anything to suggest to you that they had the intent to physically harm you?
A I think I may have made that as an assumption. 01:49PM
Q You saw someone spreading poultry litter and assumed that that person might want to harm you?
MR. GARREN: Object to form.
A No, that's not true. I took pictures of that person. 01:49PM
Q Right.
A And that person stopped their vehicle and became -- looked agitated.
Q Did they come over to talk to you?
A No. I left. 01:49PM
Q Did they gesture to you in any way?
A Yes.
Q What was the gesture?
A It was a universal gesture of disdain. He gave me the finger. 01:49PM
Q Could be more than one of those.
A He gave me the finger.
Q And you feared for your life because someone gave you the finger?
A I feared for my health and safety. 01:49PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Did you report this unruly individual to the authorities?
A No.
Q Why not?
A There wasn't any point in it. That incident was over. 01:49PM
Q You said you felt threatened?
A I did.
Q How would I identify the photograph or video that relates to this land application by this individual that you believe was physically threatening you? 01:49PM
A I think I can identify it for you but not right now. I'll have to go look. It's in the production. There are thousands of photos. 01:50PM
Q I may not get another opportunity to question you between now and the trial, Dr. Fisher. Could you give me a tip as to how I would find it if I were looking at the records myself?
A I'll have to look at my notebook or have to look at whatever date it was from, but I would promise you I will, with Mr. Garren, provide you with the identity of that photograph. Make a note of that, Rick. 01:50PM
Q Great. I appreciate that. If it's possible 01:50PM

676c5b0b-4391-4682-9dda-575b4bc95703

to do that, I know you may have evening plans, but if you could find it this evening and then give me an opportunity to perhaps ask a question about it tomorrow, that would be helpful.

A Okay. 01:50PM

Q The other two instances where you observed poultry litter are apparently not as memorable to you; is that fair?

A They are not as memorable.

Q Okay. I assume there was no confrontation or 01:50PM fear on your part associated with those other two instances; is that correct?

A No. That's correct. They were incidental. I didn't photograph those. I was doing other things at the time. 01:51PM

Q On the bottom of Page 24 and then continuing on to Page 25, you make a point to say that poultry litter, excuse me, is broadcast spread on pastures and hayland within the watershed and is not incorporated into the soil surface by tilling; do 01:51PM you see that?

A Yes.

Q Okay. It seems to me you take issue with the fact that poultry litter is not incorporated into the soil surface by tilling. Am I reading that 01:51PM

676c5b0b-4391-4682-9dda-575b4bc95703

correctly?

MR. GARREN: Object to form.

A No, you're not reading that correctly. I'm simply recording the fact that it is not.

Q Is it your opinion that poultry litter should be tilled into the soil in the Illinois River watershed? 01:51PM

A I don't have an opinion as to whether or not it should be tilled into the soil. I simply observed that by not tilling it into the soil puts it in a circumstance where it may be more readily transported. 01:51PM

Q You, in connection with your work in this case, Dr. Fisher, have had an opportunity to review nutrient management plans issued by the Oklahoma Department of Ag as well as the Arkansas Natural Resources Department; correct? 01:52PM

A Yes, I have.

Q Do these plans advise users of poultry litter about what they can and cannot do in terms of using poultry litter? 01:52PM

A In a general sense, yes.

Q Have you seen in any of those plans where the Arkansas Natural Resources Commission or ODAFF has instructed users of poultry litter to till it into 01:52PM

676c5b0b-4391-4682-9dda-575b4bc95703

the soil?
A I have not.
Q Have you suggested to Attorney General Edmondson or any of the Oklahoma agencies, including the Oklahoma Department of Ag, that they should consider a requirement that poultry litter be tilled into the soil? 01:52PM
MR. GARREN: Object to form.
A No, I have not.
Q Let's look at Opinion No. 10, which I'll read. For the Record, your Opinion No. 10 is waste generated by poultry within the Illinois River watershed has been applied near to where it is generated. Did I read it correctly? 01:52PM
A You did. 01:53PM
Q Okay. Look at Page 26. You are referring to, in the second paragraph, to a dataset that you have reviewed. Do you see that reference for the dataset as a whole?
A No, I do not, Mr. George. 01:53PM
Q Perhaps I can help you. Right there.
A Oh. Yes.
Q What dataset are you referring to?
A Okay. That is the dataset that is based upon the ODAFF records, the Oklahoma Department of 01:53PM

676c5b0b-4391-4682-9dda-575b4bc95703

Agriculture, Food & Forestry records.
Q Okay, and based upon your review of that dataset, what, if any, opinions have you reached regarding the typical proximity of land application in reference to where litter is generated? 01:54PM
A Well, it's stated in the report, based upon review of those records, given the constraints on knowing the -- that you needed to know where the waste arose with respect to its public land survey section, where it was disposed knowing the section 01:54PM of disposal, knowing the date of application and how much was applied given in tons and not in any other units, that given those constraints, that approximately 30 percent of the waste that was generated is land disposed in the same square mile 01:54PM in which it was generated. About 60 percent of the waste was disposed within two miles of where it was generated, and 80 percent was disposed within five miles. This is for Oklahoma as a whole.
Q Oklahoma as a whole or the Oklahoma portion of 01:55PM the watershed?
A No. There's a second piece of this statement. That's Oklahoma as a whole. Going in the next sentence, it says, likewise, considering only waste generated within the Illinois River watershed. It's 01:55PM

676c5b0b-4391-4682-9dda-575b4bc95703

similar, but the wastes are generated or are disposed somewhat more closely to where they're generated. For sections that could be identified being clearly totally within the Illinois River watershed, about 30 percent of the waste generated 01:55PM was land disposed within the same square mile, so equivalent to the state as a whole, but only 67 and a half percent or 7 and a half percent more of the waste was disposed within two miles of where it was generated, and 80 percent was generated within 3.6 01:55PM millions, so a little more contiguous to its location of origin than the state as a whole.

Q So do I understand then that you hold the opinion that in the Oklahoma portion of the Illinois River watershed, 20 percent of the poultry litter is 01:56PM disposed at a location that's more than 3.6 miles from where it was generated?

A Yes.

Q Now, the dataset that you're referring to here, is it electronic data or paper records? 01:56PM

A Well, it's both really. The Oklahoma Department of Agriculture, Food & Forestry maintain an electronic dataset. They also retain paper records. In reviewing the electronic dataset, I think we determined that there seemed to be some 01:56PM

inconsistencies between that dataset and the paper records. As a consequence, all those paper records were then rekeyed in duplicate by different key operators into an electronic dataset. That allows to correct errors in keying. So the paper records 01:57PM
were retransformed into the same data structure that ODAFF uses but they were then keyed into it.

Q Who actually created this alternative electronic database from keying in Oklahoma Department of Ag records? 01:57PM

A That work was done by Robert van Waasbergen and people working for him.

Q And where is this database maintained?

A You have a copy of it.

Q Well, how would I find it? 01:57PM

A Well, it's in my production. I could identify it to you, not right now. I can give you a file name for it.

Q Is it an Access database?

A It is. 01:57PM

Q And do you know the file name?

A Not offhand.

Q Can you get me one?

A I can get you one.

Q Let's go ahead and close the loop on this 01:58PM

676c5b0b-4391-4682-9dda-575b4bc95703

while I'm thinking about it. I'll hand you what
I'll mark as Exhibit 11 to your deposition, which is
an E-mail from Mr. Garren, the attorney to your
right, to yourself and Mr. Page dated October 3rd of
2005. Do you recognize this E-mail? 01:58PM
A Yes, I do.
Q And do you see the highlighted language in the
E-mail that says, we have determined the electronic
database downloaded to us is full of errors created
when it was keyed in? 01:58PM
A Correct.
Q Is this a reference to the Department of Ag
land application database?
A It is.
Q Okay. Do you see the second sentence -- well, 01:58PM
let me keep reading. Given the problems with the
ODA database and the large task ahead to build a
verifiable database, I think the approach to get a
handle on the application ground truthing would be
to concentrate on those edge of field sampling sites 01:59PM
and let me identify the owner, grower, integrator
for each site and develop as much history on those
parcels first. Do you see that recommendation by
Mr. Garren?
A I do. 01:59PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Was that recommendation followed; did you ground truth the land application sites?
A I'm not sure what he means by ground truthing them. We certainly continued to identify land application sites and then tried to provide 01:59PM information that would assist in identifying where the waste was from.
Q What does that mean?
A Well, we try to follow the trucks back to where they came from, if you can do that. So I'm 01:59PM not exactly sure at this stage what Mr. Garren meant by posturing the edge of field testing sites. He may have meant a lot of things, and I would ask you to ask Mr. Garren.
Q I doubt he'll undergo a cross examination but 02:00PM maybe he will.
A Yeah. Ultimately, though, this was the motivation behind taking all of the -- this issue, the electronic database being somewhat error rich that ODA had, taking the paper records and rekeying 02:00PM them into the same data structure so that we could verify each of those records and it's traceable back to a Bates numbered record.
Q Looking at the last part of Mr. Garren's suggestion, did you go to these edge of field 02:00PM

testing sites and develop as much history on those parcels as possible?

A Well, we know where they are.

Q Well, did you go -- I'm sorry.

A We have -- I mean, did -- I don't know what 02:00PM
you mean by as much information as possible.

Q Well, did you interview the landowners associated with those edge of field locations to determine the nature of land uses, the history of commercial fertilizer applications, the history of 02:01PM
cattle production on those parcels?

A I did not.

Q Did anyone working for the State of Oklahoma undertake that sort of ground truthing?

A I don't believe so. 02:01PM

Q On Page 28 in the same section of your report you make a statement at the end of the first paragraph, and I think you're talking about -- well, I won't assume what you're talking about. You say, poultry waste was hauled no more than three miles 02:02PM
and was never hauled more than fifteen miles from its source. Do you see that; do you see that statement?

A I do.

Q Okay. You're not of the opinion, are you, 02:02PM

676c5b0b-4391-4682-9dda-575b4bc95703

sir, that in the Illinois River watershed poultry litter is never hauled more than fifteen miles from its source, are you?

A Okay. I think that there's a misunderstanding here that I helped propagate. This is material 02:02PM that's disposed within the watershed. It says, review of investigator records, which tracked waste disposal trucks, and this begins on page 27. Review of investigator records, which tracked waste disposal trucks from farms where poultry waste had 02:02PM been generated to poultry waste disposal sites, and that really means within the watershed, showed that 80 percent of the operations observed in Arkansas and Oklahoma poultry waste was hauled no more than three miles. There was one instance where it was 02:03PM hauled to a disposal site fifteen miles away.

Q But still within the watershed?

A But still within the watershed. Now, you're -- tell me what you are speaking to.

Q Well, I interpreted this statement to be a 02:03PM conclusion by you that poultry litter generated in the Illinois River watershed is never hauled more than fifteen miles away.

A No, and had you read on, and I'm sure you have, you would find that I don't agree with that 02:03PM

676c5b0b-4391-4682-9dda-575b4bc95703

either.
Q Okay. Why were the investigators given the instruction to not follow poultry litter transportation trucks when they left the watershed?
MR. GARREN: Object to form. 02:03PM
A Well, we established that trucks were leaving the watershed and that was beyond really their ability to haul. Some of those went quite far. I think we followed some for some substantial distance, just didn't have the resources to track 02:03PM them. Some were going out, and I figured that those -- that the material that had been hauled out would be very carefully enumerated by the defendants, and that proved to be correct.
Q Why did you believe the defendants would 02:04PM carefully enumerate the amount of litter that's hauled out of the watershed?
A Well, it would be -- it's a useful thing to haul litter out of the watershed.
Q And you believe the defendants are interested 02:04PM in doing useful things; is that what I read into your remark?
A We can all go to church and pray for that on Sunday, Mr. George.
Q Were you and your investigators not curious as 02:04PM

to where litter that was leaving the watershed was actually going?

A We did know where some of it went. Some of it went to sod farms outside of Wagoner. We did notice trucks, those live bottom trucks that were used to 02:04PM haul litter long distances that BMP, Inc., had under contract, we saw some of those on the Turner Turnpike from time to time, but all in all, although some litter is hauled, it's really a small fraction of what is generated. 02:05PM

Q Let's go to Figure 4.

A Figure 4?

Q Right.

A Okay.

Q Describe Figure 4 and what it is intended to 02:05PM show.

A Right. Figure 4 is a graphical representation of the distribution of waste disposal from generation locations, and they're plotted as cumulative frequency plots, distance hauled against 02:05PM cumulative tons disposed in percent. So the top graph is all data for land disposal of poultry waste in Oklahoma. The bottom graph is focusing in on the inner five miles because we get to -- once you get to 80 percent, there's a very long tail on that 02:06PM

676c5b0b-4391-4682-9dda-575b4bc95703

distribution, and these represent the disposal records for the entire state that fit the qualifications discussed earlier.

Q Why did you not present a chart of a similar fashion using only the data for the Illinois River watershed? 02:06PM

A I did.

Q Where is it?

A It's the next chart.

Q Okay. Gotcha. Let's focus on Figure 5 then. 02:06PM

Figure 5 is a chart that was put together based only on data reported to the Oklahoma Department of Ag in terms of litter transportation?

A Right.

Q Is that right? 02:06PM

A In fact, there are a couple of constraints on this, yes. So it's a true subset. This is only information reported to ODAFF. So if it wasn't reported to ODAFF, it's not in here. Number two, this is only data that corresponds to sections, 02:07PM that's public land survey sections of origin, which are entirely contained within the boundaries of the Illinois River watershed. Some public land survey sections are only partially contained. So they arise clearly within the watershed, and then we 02:07PM

676c5b0b-4391-4682-9dda-575b4bc95703

don't care where it's disposed; we're just going to measure that distance from centroid to centroid of the section. So only Oklahoma data, only ODAFF records, constrained by having certain data attributes that make the analysis complete and 02:07PM
constrained by geography.
Q Okay. Do you know, sir, whether or not all transportations of poultry litter out of the Oklahoma portion of the Illinois River watershed are reported to the Oklahoma Department of Ag? 02:07PM
A Well, I think they're supposed to be.
Q Well, do you believe they are?
A I am unsure. I think that there are -- a large number are reported, but since there really is no specific enforcement other than review of the 02:08PM
growers' records, you're only as good as people are honest.
Q Did you encounter instances within the dataset from the Oklahoma Department of Ag for the watershed where litter was clearly reported as sold but the 02:08PM
ultimate location of it was not clear from the information provided?
A There may have been instances of that. I'd have to review that.
Q But based on the data that was available to 02:08PM

676c5b0b-4391-4682-9dda-575b4bc95703

you from ODAFF that's shown in Figure No. 5, do I interpret your chart correctly to show that you found instances where poultry litter was transported approaching 50 miles out of the watershed?

A Well, yeah, that's true, yeah, a very small fraction. 02:08PM

Q Where is your analysis of similar data with respect to the approximately two-thirds of poultry farms in this watershed that are located in the Arkansas side of the basin? 02:09PM

A Well, in Arkansas there is no equivalent dataset. There's certainly not one that's publicly available or has been produced in requests of FOIAs or in discovery in this matter. It does not exist. It may be gathered but it is not available to us. 02:09PM

Q So you had no available to you on over two-thirds of the farms located in the Arkansas portion of the watershed in terms of where litter from those farms was actually applied?

A No, that's not true. There are two lines of evidence for that. One were the work done by our investigators certainly on a limited number of waste sorties, and the second is really shown in Figure 6 of a source of information. In Figure 6, the title of which is public land survey sections in which 02:09PM 02:10PM

poultry waste has been disposed within the Illinois River watershed based on records maintained by the Oklahoma Department of Agriculture, Food & Forestry, investigator reports and defendant documents. So the defendant documents there would be nutrient 02:10PM
management plans, which specifically identified sections or land -- fields, and we can know the public land survey location of those, and so those are mapped there.

And we do know from the Arkansas -- the type 02:10PM
of Arkansas records that are available that material is clearly -- from Arkansas is disposed within the Illinois River watershed, but I can't generate the same graph based on the same data because no such data exists in Arkansas or at least none exists 02:11PM
that's available to me, and as I understand -- I'm not a lawyer, but as reading the statute, that is not public information.

Q So help me understand on the Arkansas side of the basin how these red shaded plots appeared. Do I 02:11PM
understand that each red section -- this is a section; correct?

A It is.

Q Reflects a piece of information you have regarding litter being applied one time? 02:11PM

A Any record that showed from the investigators, we identify the public land survey section, and you can from their latitude and longitude, or a nutrient management plan that identifies a field and provides information that can be used to determine a public 02:11PM land survey section is met.

Q Or if an investigator hired by you was driving through the watershed and saw someone land applying poultry litter, they would provide you with the section information and you would shade the box red? 02:12PM

A They would provide me with the latitude and longitude and we'd determine the section and shade the box read, which is what it says. If we have any evidence of any application at any time, then that section would become red. 02:12PM

Q How many of these red boxes on the Arkansas side of the line that were provided to you by investigators reflect poultry litter that was brought into the watershed from an integrator who's not a defendant in this lawsuit? 02:12PM

A I would have no information as to that.

Q So you can't determine whether or not the litter that you have at least a one time record of being applied in Figure No. 6 on the Arkansas side of the line came from a farm under contract with 02:12PM

676c5b0b-4391-4682-9dda-575b4bc95703

these defendants or not; is that fair?
A Well, I do know that litter is imported from outside the watershed. Inside the watershed by defendant integrators. To the extent that then that would only apply to the investigator data, which is 02:13PM
a vanishingly small number of these, they can be broken out.
Q How many of these red boxes are investigator data?
A Well, I don't know offhand. I'd have to look 02:13PM
at that record.
Q Well, where is the underlying dataset that I have --
A You have every piece of underlying data.
Q Help me.
A You have the Access database. You have every piece of the discovery document that you produced and I produced back to you. It is all there. It is also in the ARKEY files that support this.
Q Is there a chart or a table or spreadsheet 02:13PM
somewhere that would show the section numbers for each of these red boxes and whether that land application record is provided by an investigator photograph versus a nutrient management plan?
A Yeah, I believe there would be. It's going to 02:13PM

be an ARKEY database.
Q Now, tell me how you used nutrient management plans on the Arkansas side of the line to identify places where poultry litter from farms under contract with one of the defendants was applied. 02:14PM
A Okay. Those nutrient management plans identify the locations and the number of amount of tons of waste, poultry waste that can be disposed at those locations. So you take that location and if it's in that section, the section becomes red once. 02:14PM
I mean, you don't -- this section could have one or 20 or 50 or a hundred instances, but it would still be the same shade.
Q Okay. Is Footnote 85 in your report? If you'll go back to Page 30, I'm sorry, you've listed 02:14PM
a bunch of Bates numbered documents here. Are these the nutrient management plans that you are referring to?
A Well, that would be the idea, yes, sir.
Q Okay, and I think you said that you would take 02:14PM
a nutrient management plan on one of these documents and it would identify a place where litter could be applied, and you would have the section number and you would shade that box red; do I understand the process? 02:15PM

A That's correct.
Q Okay. Are you operating under the belief, Dr. Fisher, that litter is applied at every location where there is a nutrient management plan?
A Well, I think that's the only presumption that you could make. 02:15PM
Q If they got a nutrient management plan, they must be applying litter; right?
A If they have a nutrient management plan, they certainly intent to apply litter; otherwise, there would be no point in having one. 02:15PM
Q Well, but now your chart on Figure No. 6 is not a list of places where people intend to apply litter, is it; it's where litter has been applied?
A Well, true, but the -- in nutrient management plans there can be supporting information where information might be soil test data pertaining to those fields, and you can tell with high levels of soil test whether or not phosphorus has been applied and given the fact that it's within a nutrient management plan, I think it's presumptive that it's from poultry waste. 02:15PM 02:16PM
Q Okay. I hand you what's been marked as Exhibit 12 to your deposition, which is a nutrient management plan, and I believe you can confirm by 02:16PM

676c5b0b-4391-4682-9dda-575b4bc95703

looking at Footnote 85, this is one of the plans that you used in constructing Figure No. 6 but you check me on that. These numbers get a little --

A Difficult?

Q Difficult. 02:16PM

A TSN115069SOK to TSN115 then 091.

Q You do see that in the Footnote 85?

A I do. You're missing a page.

Q Sorry. This particular nutrient management plan relates to Bates Mountain Breeders? 02:16PM

A Yes.

Q And was prepared by the Arkansas Natural Resources Commission; correct? Do you see on the front?

A Yes. 02:17PM

Q Okay, and there's a nutrient management plan for a farm located in Summers, Arkansas. This was the area in which you felt threatened; right?

A Yes.

Q Go to the Bates number that ends in 075. 02:17PM

A Yes.

Q And the description of the operation, the second paragraph, can you read the two sentences that begin with the word litter?

A Begin with the word litter? On which page is 02:17PM

676c5b0b-4391-4682-9dda-575b4bc95703

this again?
Q Page 075.
A Page 5 of 13?
Q Yes, sir. Next to the last paragraph, the
third sentence in, read those two sentences. 02:17PM
A Okay. Well, this would not have been mapped.
Q It's not mapped on Figure 6?
A No, would not have been mapped.
Q I thought you told me earlier that all of the
nutrient management plans on Footnote 85 -- 02:18PM
A No, I never said that, no, no. I never said
that.
Q Well, go ahead and --
A Nutrient management plans in discovery
documents. This is discovery documents and nutrient 02:18PM
management plan, but the data therein says they
didn't spread any. As a -- if they didn't spread
any, then at least this record, with respect to this
section, would not have caused that section to
become red. 02:18PM
Q Well, go ahead and read the two sentences for
me.
A Okay. Litter is not applied to any lands
included in this plan. All surplus is sold to
landowners with a current nutrient management plan 02:18PM

676c5b0b-4391-4682-9dda-575b4bc95703

are sold to haulers that transport outside the designated nutrient surplus areas. Is that what you want?

Q That's it, yeah.

A And what it says is the litter from this farm could be spread within the Illinois River watershed or it could be transported outside, but in either event, it says at the bottom, there is zero spreadable acres of pastureland and hayland on this farm. The farm is not managed for grass or cattle production. So this would have been considered but not have been mapped. 02:18PM 02:19PM

Q If indeed we determine that you mapped the section associated with this particular plan on Figure No. 6, that would be misleading, would it not? 02:19PM

MR. GARREN: Object to the form.

A Well, not necessarily because there could be other nutrient management plans attendant to operations that would spread within that same section or there could have been an observation, direct observation of spreading within that section. 02:19PM

Q When I go look at your database, I'll be able to determine, will I not, whether or not you mapped a section because of this nutrient management plan? 02:19PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q Okay. So the documentation will show whether or not you mapped this nutrient management plan or not; right?
A I hope so. 02:19PM
Q Okay, and if it does and you mapped it and no litter was being applied, then your Figure 6 is misleading; correct?
MR. GARREN: Object to form.
A Okay. If I mapped it and it's not supposed to 02:20PM be mapped, then it would need to be revised.
Q Okay. Let me hand you another nutrient management plan, which we'll mark as Exhibit 13 to your deposition, and ask you to take a moment and look at that. This is a nutrient management plan 02:21PM for Arlis and Doris Oxier?
A Yes.
Q Who I go to church with and represent are fine upstanding folks. Do you know the Oxiers?
A I do not, but I'm glad you do. 02:21PM
Q They operate a poultry farm under the name of Redbud Farm. Do you see that?
A Yes.
Q Okay. Is this one of the nutrient management plans you reference in Footnote No. 85? 02:21PM

676c5b0b-4391-4682-9dda-575b4bc95703

A I'm sure it's referenced, but this is also a plan that should not have been mapped because everything is transferred off site.

Q In fact, if you look on Page 4, it says, does it not, that all litter generated at this operation is sold; do you see that? 02:21PM

A It says it on Page 1, too, basically.

Q Okay. So once again, if I go to your underlying data for Figure No. 6 and I find that you mapped this particular section of property because of this nutrient management plan, that would be a mistake; correct? 02:22PM

MR. GARREN: Object to form.

A If it was solely mapped on the basis of this plan, it would be mistaken and need to be revised. 02:22PM

Q Okay. Do you have any idea how many of these nutrient management plans in Footnote 85 show litter being applied or sold outside of the watershed?

A Not as we sit here today.

Q Did you investigate that at some point? 02:22PM

A Mr. Hight, who was my employee, did this review.

Q And Mr. Hight works with your company, Lithochimeia?

A He's my business partner. 02:22PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You relied on him to do the review of nutrient management plans and create Figure No. 6?
A In part, yes. We discussed them. He is quite familiar with these.
Q Did you review any of these nutrient 02:22PM
management plans?
A I looked at them. Did I check his work? No, I did not check his work.
Q Let's go to Table 7 on Page 29 of your report.
Tell me what Table 7 is and how it was created. 02:23PM
A Okay. Table 7 is entitled Arkansas Soil & Water Conservation Commission Estimate of Poultry Waste Land Applied in the Illinois River Watershed, All Data in Tons. This is based upon the county
reports that were available from Washington and 02:24PM
Benton County for these years, 2004 through 2007, which give us some breakout or give us a breakout as to the number of tons that are accounted for of litter that's waste that is actually applied in the
watershed. 02:24PM
Q Okay. Are the estimates shown in Table No. 7 estimates for the entire county or just those portions of the county that are within the Illinois River watershed?
A As I recall, reviewing those records, these 02:24PM

pertain solely to the Illinois River watershed where it was broken out.

Q Did you create Table No. 7?

A I did.

Q Did you have any help? 02:24PM

A No. I simply looked at what's listed in Footnote 82, Arkansas Soil & Water Conservation Commission District Reports for Washington and Benton County, Arkansas, which I produced to you.

Q And it's your recollection, Dr. Fisher, that 02:25PM those reports actually broke these numbers out for the Illinois River watershed as opposed to the entire county?

A Yes, it is my recollection that there was a breakout by watershed. 02:25PM

Q Okay. Did you have to do anything with the data in terms of creating this estimate, or is this an estimate taken verbatim from the Arkansas Soil & Water Conservation Commission?

A Well, my recollection is that this is taken 02:25PM directly from their source. That's my recollection. I don't think there's any summing that had to take place there.

Q So have you added up the numbers for this four-year period? 02:25PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yeah. Look a little low.
Q What number did you come to?
A Well, I was looking here and they look -- in Benton County, that's not even reasonable, and in Washington County, it's probably not reasonable 02:25PM either in terms of the total -- the number of tons that are claimed to have been disposed and reported. I've added them up. I don't think they represent a census of the waste that's generated and disposed.
Q So you don't have any confidence in these 02:26PM numbers?
A Well, I only have confidence that they're reported by the Soil & Water Conservation Commission out of those counties.
Q Why did you present them in your expert report 02:26PM as part of the basis for your opinion if you didn't have confidence in them?
A Well, because those are official numbers.
Q Okay. So you're willing to go with those numbers? 02:26PM
A I'm willing to report them as official numbers. I'm not willing to say that they represent every ounce of poultry waste that was disposed within the Illinois River watershed within those counties. 02:26PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q For the four-year period from 2004 to 2007, based on my math of Table No. 7, Arkansas Natural Resources Commission had documented about 155,000 tons of poultry litter being applied as opposed to generated in the watershed. Do you have any reason to disagree with that? 02:27PM

A Wait a second.

MR. GARREN: Object to form.

A From --

Q Four years. 02:27PM

A Oh, for all counties, for both counties?

Q For both counties in the watershed.

A Well, I think that your math is probably -- if your math is correct, then that's what those numbers would reflect but they're way low. They've got to be low. 02:27PM

Q Do you have any actual records of litter application in the Arkansas portion of the basin other than Table 7?

A No, and evidently no one else does either. 02:27PM

Q So let's talk for a moment about what you can actually document with the Record in terms of poultry litter application. We have the figures in Table 7; correct?

A Uh-huh. 02:27PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q For the Arkansas side of the basin, and then where are your Oklahoma documented litter applications? I think it's back further.
A Those --
Q Table 8. I'm talking about applications, not generation. 02:27PM
A I'm looking for Table 8.
Q Page 33.
A Okay.
Q How would I get the total number of tons that you have documented in Table No. 8 as being land applied and the Oklahoma side of the watershed? 02:28PM
A Well, this is the road mileage chart. Let's look at your favorite defendant, Tyson Foods.
Q They are my favorite. 02:28PM
A The location of generation here where the waste is generated, either we don't know where it is. It wasn't listed. It was inside the Illinois River watershed. It was on the border, that is, in some public land survey section bisected by the watershed boundary or clearly outside the watershed. 02:28PM
Then we take location of waste disposal. If we take a look there, there is one column that's not given, so you don't know where -- the not given, not given, don't know where it came from, don't know where it 02:29PM

676c5b0b-4391-4682-9dda-575b4bc95703

went. You have inside -- generated inside the Illinois River watershed and then disposed on the border inside or outside. So if you wanted to look at the total, well, what we know to be or what is reported to have been disposed of completely within 02:29PM
a section within the boundaries of the Illinois River watershed, it would be the column total within Tyson Foods that's under inside Illinois River watershed, was clearly not disposed within the Illinois River watershed would be the column total 02:29PM
outside the Illinois River watershed, and what would be -- could be disposed is the border of the Illinois River watershed, could be and could be out, and what we don't know is, of course, the first column total. 02:30PM
Q Okay. So if I wanted to know -- strike that. What's the time period of record for Table 8?
A I have to look. It's -- the time period of record for Table 8 is basically a time period of record in which reporting of this was required. 02:30PM
Let's see. I know that that's mentioned in here. Oh, here we go. Disposal records extend from 1999 to 2004. That's on Page 31 under No. 12. That's the basis of that, and most of those are from the later period. 02:31PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q 1999 to 2004?
A Right, but the reporting in '99 is pretty desultory. It was not required at that time, and the number of reports seemed to increase a bit through time. So I don't think that these purport 02:31PM
to be a full census of disposal.
Q If you look on the preceding page at Page 32 --
A Uh-huh.
Q -- about six or seven lines up from the bottom 02:31PM
there's a statement by you that as a consequence a total of 116,401 tons were disposed entirely within the Oklahoma portion of the Illinois River watershed; do you see that?
A Right, according to these ODAFF records. 02:31PM
Q If I added up the column that you pointed me to on Table 8, the Illinois River watershed tons?
A I sincerely hope that you would get that number.
Q That is what was intended. 02:32PM
A Yeah.
Q The tally at the bottom of this chart should be 116,401 tons?
A That's correct.
Q Okay, and those are the sum total of tons 02:32PM

676c5b0b-4391-4682-9dda-575b4bc95703

within the Oklahoma portion of the basin for which you have documentation or record of land application of poultry litter from 1999 to 2004; correct?

A Okay. I would say that's the sum total of tonnage that has been reported to the Oklahoma Department of Agriculture, Food & Forestry for things that are clearly -- I mean, they're identified as to their location of disposal. 02:32PM

Q All right, but you don't have any records outside of the Oklahoma Department of Ag as to the tonnages that are land applied within the Oklahoma portion of the basin, do you? 02:32PM

A No.

Q Okay. So based on the records and information you have, this is the most that you've been able to document from those records as land applied from 1999 to 2004 in the Oklahoma portion of the basin? 02:32PM

A Right, remembering, of course, that the records in 1999 are very thin, and that this is probably not a census of -- well, it is not a census of disposal. 02:33PM

Q Okay. So if -- now that we've dealt with the Oklahoma portion, if you'll flip back to Table 7, this is the Arkansas records you have of land application in the Illinois River watershed in terms 02:33PM

676c5b0b-4391-4682-9dda-575b4bc95703

of tonnage; correct?
A Yes.
Q Okay. Now, I told you earlier and if you'll trust my math, it's about 155,000 tons over this four-year period. Okay? So do I understand 02:33PM
correctly then that if you add those two things together, out of the 354,000 tons that you estimate is produced every year, you can only identify a total of about 280,000 tons over a five-year period that has actually been land applied? 02:33PM
A Well, that's what's been reported.
Q That's the best you can do?
A It's the best anybody can do.
Q Let's change tapes.
VIDEOGRAPHER: We are now off the Record. 02:34PM
The time is 2:34 p.m.
(Following a short recess at 2:34 p.m., proceedings continued on the Record at 2:44 p.m.)
VIDEOGRAPHER: We are now on the Record.
The time is 2:44 p.m. 02:44PM
Q Dr. Fisher, I think you have something to say.
A Yeah, I did. In looking at Footnote 85, it jogged my memory when I looked down at the bottom, thinking about dry waste and volume, dates number for George's and also information pertaining to 02:44PM

Cal-Maine, and for those folks, those defendants, there are application records for liquid waste because that was regulated. There are at least records for application sites for George's as I recall, and then there are documents pertaining to application from Cal-Maine. I just wanted to amend that, that application records would also be considered, not just nutrient management plans. 02:45PM

Q Well, let's step away from that to a related topic. On Page 31, the opinion that you've expressed, and it's based on at least in part Table 8 that we've discussed at length now, is that all defendants have disposed of poultry waste within the Illinois River watershed; do you see that? 02:45PM

A Yes. 02:45PM

Q Okay. Other than perhaps the liquid application records for George's and Cal-Maine that you just referred to, do you have any evidence of the other integrators named in this lawsuit land applying poultry litter within the Illinois River watershed? 02:45PM

A Aside from whatever evidence might exist in the ODAFF records, no.

Q Okay, and as we sit here today, I think we've covered -- 02:46PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Well, the ODAFF records, investigator records, things of that nature.
Q As we sit here today, you cannot identify a particular instance in which an employee of Tyson Foods or Cobb-Vantress or Peterson Farms or Simmons 02:46PM
or George's has land applied poultry litter within the watershed?
A Not --
MR. GARREN: Object to the form.
A Not right at this moment. Well, let me think. 02:46PM
You said again -- name those integrators again.
MR. GEORGE: Can you read it back?
(Whereupon, the court reporter read back the previous question.)
A Well, poultry waste within the watershed with 02:46PM
respect to George's could be identified.
Q And the distinction you're making is that liquid poultry manure might not be poultry litter? I'm trying to understand the point.
A I think the common terminology is that it's 02:47PM
the liquid waste as opposed to a dry waste.
Q Okay.
A But if we could just agree -- I guess we could agree to not differentiate them. That would be fine, too. 02:47PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q All right. Let's go back for just a moment to Table 6 on Page 24, which is the table that supports your 354,000 ton annual estimate of poultry litter produced in the watershed; correct?

A Yes. 02:47PM

Q Okay. If we assume for a moment and for purposes of this question, at least, let's assume that that figure would be applicable for the period of 1999 through 2004, a five-year period, okay, 354,000 tons each year. That would mean that in 02:48PM that time period, if my calculator is correct, there would have been about 1.77 million tons of poultry litter produced; does that sound about right?

A Yes.

Q Okay. For that same period of record, 1999 to 02:48PM 2004, if you look at Table 8 and Table 7, how many tons of actual litter application in the watershed have you been able to document and quantify?

A I think, according to what we had discussed earlier about 300,000 tons total, but we know that 02:48PM these records are incomplete and inaccurate.

Q So you do not have accurate records that would allow you to offer an opinion as to the location of the missing 1.4 million tons of poultry litter produced in the watershed during that five-year 02:49PM

676c5b0b-4391-4682-9dda-575b4bc95703

period?

MR. GARREN: Object as to form.

Q Is that fair?

A I think that's quite fair. We can see in these records that things don't add up, that there 02:49PM are too many chickens for the waste reported or that the waste reported in terms of stored, transferred off site or disposed is at dissidence with the total produced. They produce less than they dispose.

Q In the watershed? 02:49PM

A Yes.

Q All right. On Opinion No. 14, let's move on to it beginning at Page 34 of your report, I'll read your opinion. The mass of poultry waste generated within the Illinois River watershed but disposed 02:50PM outside the watershed is a minority of the waste generated within the watershed; correct?

A Yes. As contorted as that sentence might be, that is correct.

Q Okay, and your support for that statement, if 02:50PM I've read your report correctly, is the information supplied by George's regarding its own hauling, as well as information obtained from BMPs, Incorporated; correct?

A That's correct. 02:50PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Any other source of information that you relied upon to try to quantify exports?
A No.
Q You did not conduct a survey of litter haulers or poultry farmers to determine the instances in 02:50PM which litter may be exported out of the watershed through a vehicle other than BMPs?
A That's correct.
Q Why not?
A Because at least from the knowledge of who 02:50PM BMPs contractors were and the fact that BMPs was quite active in this regard and George's was quite active, there wasn't any other information that I ever -- that I ran across at any time indicating that anyone else was exporting any significant 02:51PM amounts of material.
Q How did you investigate that question to see whether someone else might be exporting?
A We took a look at websites, web pages, bulletin boards. We were talking about trying to 02:51PM hook up litter haulers. There just wasn't any, as we would say, buzz on the street that there were other haulers. If you could show me that information, I'd be happy to consider it.
Q Okay. Did you talk to any other poultry 02:51PM

676c5b0b-4391-4682-9dda-575b4bc95703

litter haulers?
A No.
Q Okay. Is it your belief, sir, that no litter leaves this watershed unless it is hauled by George's or subsidized by BMPs, Inc.? 02:51PM
A Well, aside from that that goes down the Illinois River.
Q Does it leave the watershed?
A Some of it might.
Q That flippant comment aside, sir, is it your 02:51PM belief that no litter leaves this watershed unless it's hauled by George's or subsidized by BMPs, Inc.?
MR. GARREN: Object to form.
A I have no information that suggests otherwise.
Q Is that another way of saying you believe the 02:52PM only way it leaves is if BMPs hauls it or George's hauls it?
A What I'm saying is the information I have says that it leaves the watershed at George's or BMPs hauls it. I have no other information. That's 02:52PM exact -- I said what I meant to say.
Q Is it possible you have no other information because you didn't investigate that issue?
A There was no -- well, I just don't have any other information. I wouldn't say that I didn't 02:52PM

676c5b0b-4391-4682-9dda-575b4bc95703

investigate the issue. None of that information was produced by defendants.

Q Tell me all of the steps you took to identify operators in this watershed who make their living moving poultry litter and determine the extent to which they move litter out of the watershed. 02:52PM

A We know only a few. Those are BMP contractors.

Q Are those the only ones you know?

A Yes. 02:53PM

Q Did you ask any growers to identify people that they may have contracted with outside of BMPs?

A I have not personally asked, no.

Q Did you ask counsel to investigate that question? 02:53PM

A I did ask counsel to make specific inquiry of the defendants if they had such information.

Q By defendants, you mean the integrators?

A Yes.

Q You didn't ask counsel to follow up with actual poultry growers in depositions that were being taken in this case? 02:53PM

A I assume they did. I never received any information back that would suggest that individual growers of their own initiative were either 02:53PM

676c5b0b-4391-4682-9dda-575b4bc95703

organizing together or doing individual hauling.
Q Let me hand you what we'll mark as Exhibit 14 to your deposition, which is a comprehensive nutrient management plan for Linda Griffin in Summers, Arkansas, same location where you 02:54PM
encountered this individual earlier, correct, Summers?
A Summers is a little town on the border, yes, sir.
Q You see in the -- and by the way, this was a 02:54PM
document that was included in your considered materials. It's one of the ones referenced in Footnote 85 just for the Record. See the bottom of the second paragraph and it says that litter generated on the Griffin farm is given to Tony 02:54PM
Villines business where he deals with the distribution of the litter. Do you see that?
A I do.
Q Did you talk to Mr. Villines?
A I did not. 02:54PM
Q Did anyone working for the State of Oklahoma contact Mr. Villines to determine whether litter he received from the Griffin farm and other places in the watershed may have been exported?
A Not to my knowledge. 02:55PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Do you have any idea how many other Villines-type individuals there may be operating in the watershed?

MR. GARREN: Object to form.

A I do not. This is a very small operation. 02:55PM

Q Okay. You think Mr. Villines only receives litter from this one operation?

A I don't know.

Q On Table No. 9, your export table, why is there no information presented for 2007? 02:55PM

A Because I don't believe I had any information that covered the entire year of 2007 at the time this was written.

Q I'm sorry. I didn't mean to talk over you.

A I'm sorry.

Q Looking at the period of record in Table 9 for 2003 to 2006, is it a fair statement that from the information you have for the two haulers reflected here, that exports of poultry litter have gone up in the watershed? 02:56PM

A Yes.

Q So each year from 2003 to 2006, based on the information that you had available, there was more litter exported than the year before?

A That's correct. 02:56PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Did you share that information with Dr. Engel?
A I did.
Q Are you aware of the fact that Dr. Engel's phosphorus loading model assumes that the phosphorus load from poultry litter applications in the 02:56PM watershed for the next 50 years will be the same as it was in 2006?
A I am, and that's quite reasonable, given the fact that there's such a huge inventory of phosphorus and soils within the watershed. 02:56PM
Q Well, now you know a little bit more about Engel's model than that, don't you? He actually assumes in his model that the same amount of litter will be applied in the watershed each year for the next 50 years; isn't that right? 02:57PM
A I believe that that may be one of the scenarios that were modeled, and I'd have to review that, but I think there are other scenarios that were modeled as well that contemplate reduction.
Q Did you have any conversations with Dr. Engel 02:57PM about what your analysis showed in terms of the wisdom of assuming future litter application rates would be the same as opposed to decreasing?
A I don't think it's a matter of wisdom. I think if you look at the scenarios, the scenarios 02:57PM

676c5b0b-4391-4682-9dda-575b4bc95703

are all hypotheticals. So one assumes no change. Others assume, I think in one instance, there's no more litter applied within the watershed. So there's no -- it's not trying to model this. It's trying to model certain end member scenarios. 02:57PM

Q Are you aware of any scenario that would model reducing litter applications over time as opposed to a complete of litter application?

A Okay. There may be. I'm not -- I'm sitting here and not remembering it, but clearly the 02:58PM response would be somewhere between not changing -- well, increasing, not changing and getting rid of all of it.

Q The response? Response of --

A The response of the watershed. If you were 02:58PM trying to look at a modeled response, since you can't possibly model every possible scenario, you attempt to model some reasonable end members.

Q Let's move to Opinion 15, which begins on Page 35. Here you are discussing feed formulas. You 02:58PM actually reviewed information provided by the defendants regarding the composition of their feed; correct?

A That is correct.

Q Okay. First of all, Dr. Fisher, do you 02:58PM

recognize that there are differences in the feed ingredients of the individual companies named in this lawsuit?

A Well, there are differences without real -- without a whole lot of distinction. The gross 02:59PM
feeds, the feeds themselves have differences. The differences primarily -- from sort of a little anecdotal discussion here, the differences primarily revolve around whether or not there are various
medications added, whether or not there are specific 02:59PM
amino acids added, what proportions those things are added in, and then there are different kinds of feeds for different birds, but the gross story for all these feeds is very, very similar.

Q Similar but not identical? 02:59PM

A Similar but not identical, that's correct.

Q Are you aware, as a student of the industry as you told me earlier, that one of the instances in which integrators, such as those named in this
lawsuit, can secure a competitive advantage is 02:59PM
around differences in their feed formulas?

A Yes.

Q And your review of the records produced in this case confirms that there are some differences;
correct? 03:00PM

676c5b0b-4391-4682-9dda-575b4bc95703

A That's correct.
Q There are differences even with respect to the content of some of the particular chemical elements that you've identified on Page 35, namely arsenic; correct? 03:00PM
A That's correct. There are some feed formulas by some integrators that contain arsenic compounds and some by other integrators that do not.
Q Getting on the bottom of Page 36 -- I'm sorry, Page 35, the sentence that -- the last sentence 03:00PM carrying over says that the chemical compounds added to feeds by, and I want to focus on Tyson, and you go on to list others, include, and next to the last sentence you refer to Roxarsone; do you see that?
A I do. 03:01PM
Q When I look at your footnote for 93, you cite a record from Peterson Farms; is that right?
A Peterson Farms, correct.
Q Okay. Are you representing or trying to represent, Dr. Fisher, that the documentation on 03:01PM feed formulas that you received from Tyson Foods indicates that Tyson is using Roxarsone in its feed?
MR. GARREN: Object to form.
A No, and, in fact, if I carried that impression here, as I see I might have, I do not intend that 03:01PM

676c5b0b-4391-4682-9dda-575b4bc95703

impression.
Q This is a listing of the things that would be included in one or more of the defendants' feed formulas, correct, not all?
A Certainly with respect to arsenic, that's 03:01PM
correct. With respect to zinc and copper compounds, that's pretty much not correct since those are added.
Q Let's talk about the last thing that you refer to in this list of compounds added to feed. You 03:01PM
refer to antibiotic compounds; do you see that?
A Correct.
Q What type of antibiotics are you referring to?
A Pretty broad. Some of these are organic chemicals, and many of these are materials that are 03:02PM
added for worm resistance or protozoan suppression. There are things that we would normally -- that a layman would normally think of as an antibiotic but that they are compounds that are added for maintaining the health of bird, either 03:02PM
prophylactically or possibly therapeutically. That wasn't clear in the feeds. There are medicated feeds and unmedicated feeds.
Q You are referring to things that would be added to feed formulas as opposed to a vet 03:02PM

676c5b0b-4391-4682-9dda-575b4bc95703

administering an antibiotic to a particular flock?
A Yeah. These were in feed formulas.
Q Okay. Well, what records can you point me to, if any, to show me that Tyson has used antibiotics in its feed rations in the past four years? 03:02PM
A I'd have to go look at those records.
Q Pardon? Sorry.
A I'd have to look at that set of data with specificity, and I could tell you what that is if I looked at that. I was looking at this as a whole, 03:03PM not by individual integrators.
Q Are you under the impression or belief, as you sit here today, Dr. Fisher, that Tyson Foods has used antibiotic compounds in its feed formulas in the last four years? 03:03PM
A I specifically don't recall. I just have to look at that but, Mr. George, I can promise you an answer to that tomorrow. Is that reasonable?
Q Sure. If you want to do homework, Dr. Fisher, I will not stop you. 03:03PM
A Well, you know, I don't have anything better to do.
Q Let's go to Opinion No. 16, which I'll try to summarize and you see if you agree with it. I believe Opinion No. 16, your point is that poultry 03:04PM

676c5b0b-4391-4682-9dda-575b4bc95703

litter contains high levels of metals and phosphorus. Is that fair?

A Well, that's part of it. If you want to think of sodium, potassium and calcium as metals, then they are, but chemically speaking, that's correct, 03:04PM and they -- some poultry litters can also contain relatively elevated levels of arsenic due to the addition of arsenical compounds to the feed.

Q What is the data on which you are relying to support this characterization of the concentration 03:04PM of those constituents in poultry litter?

A On this particular -- this dataset that I'm relying upon is the data for the 25 samples of poultry waste that were obtained by Camp, Dresser, McKee and are summarized in Table 10 in this report. 03:04PM

Q What type of birds -- or I'm sorry, strike that. What bird types generated the poultry litter samples shown in Table 10 collected by CDM?

A Well, there are a mixture of bird types in here, dominantly broilers, some turkeys. It's a 03:05PM mixture.

Q Are there any pullets included in your summary in Table 10?

A I don't think so but I can't recall specifically. 03:05PM

Q Do you recall whether any of the 25 samples that underlies your analysis are Cornish litter samples?
A I think there may be some Cornish in there but I'd have to review that information. 03:05PM
Q What about breeders?
A That, I don't recall at all.
Q Okay. You are aware, are you not, sir, that some of the farms under contract with the defendants in this lawsuit are pullet farms, Cornish farms, 03:05PM breeder farms or turkey farms?
A Yes.
Q Okay, and are you aware, sir, that the diets of those bird types, Cornish, breeders, turkeys and pullets, differs from the diets of broilers? 03:06PM
A Yes, they differ -- they do differ a bit, but they all seem to be supplemented with variety of these materials that contain sodium, potassium, high salts, zinc, copper, high phosphorus.
Q Have you evaluated the extent to which there 03:06PM are differences in the composition or concentration of constituents across the different bird types in terms of poultry litter as a result of the differences in feed?
A I've not specifically done that work. In 03:06PM

676c5b0b-4391-4682-9dda-575b4bc95703

fact, that might be something I need to look at.
Q Is Table 10 representative of the typical concentrations of these constituents in, let's say, breeder litter?
A Well, Table 10, which is a summary of 25 observations, presents some statistical information concerning all 25 and does not purport to be a representation of any individual bird types' litter. 03:06PM
Q But if there are no breeder samples in there, is it still your opinion that the overall dataset is representative of the concentration of these constituents in breeder litter? 03:07PM
MR. GARREN: Object to form.
A I would say except for those constituents that would not be fed at all to breeders, yes. 03:07PM
Q What are those constituents?
A I believe that breeders are less likely to receive arsenical compounds, but that's a recollection.
Q Any other compounds that you believe would be less likely to be included in diets for breeders? 03:07PM
A Not as we sit here today. I'd have to review that information at that level. I'm sorry. Mr. George, we're just out of synch. I need to review that at that level of detail. 03:08PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Have you reviewed feed formulas for breeders for any of the companies?
A I believe there may have been breeder information among those feed formulas. Again, I'd have to look at those with more specificity. 03:08PM
Q Looking at Table 10, how many of these 25 poultry waste samples collected by CDM were taken from either a farm under contract with Tyson or Cobb-Vantress?
A Okay. I don't know. That wasn't of consequence to me at the time. 03:08PM
Q Do you believe, sir, that a single litter sample taken from a farm under contract with Tyson Foods is sufficient to declare that single sample representative of litter generated on all farms under contract with Tyson Foods? 03:08PM
A I think that the -- from looking at literature data concerning waste, poultry waste, and looking at the CDM information concerning poultry waste, it's a reasonable representation, in addition to looking at the significant amount of data on poultry waste with much level -- less detail, especially with respect to metals, but looking at phosphorus that was collected in the Eucha-Spavinaw watershed. So poultry waste has some characteristics. 03:09PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Let's set aside Eucha-Spavinaw a moment. What literature specific to poultry litter generated on farms under contract with Tyson Foods have you reviewed?

A Well, there would be none. Specifically this, again, would be looking at poultry waste as a whole. 03:09PM

Q Do you agree that the 25 samples in Table No. 10 is a small dataset?

MR. GARREN: Object to form.

A I think that I actually say that. In Table 11 I compare it to a much larger dataset, and in that comparison, there's no way to differentiate the numeric data in Table 1 from the larger set for Eucha-Spavinaw with respect to the materials that are measured. 03:10PM 03:10PM

Q What do you mean there's no way to differentiate?

A Well, that is, that I can't tell the difference in phosphorus concentration, total phosphorus concentration of Eucha-Spavinaw, whether statistically speaking, from the total -- the average phosphorus concentration in -- total phosphorus concentration in the 25 samples that were collected here, for example. 03:10PM 03:10PM

Q I want to come back to that, but let's get 03:10PM

676c5b0b-4391-4682-9dda-575b4bc95703

some foundational points first. The other dataset that you're referring to from Eucha-Spavinaw is considerably larger, 369 samples; correct?

A That's correct.

Q Okay. When you look back at the CDM dataset in Table 10, do you agree there was wide variability in the constituent concentrations amongst the 25 samples? 03:10PM

A There is variability. I don't know how we define wide. If you are looking -- you can define wide in a number of ways. 03:11PM

Q How would you define it?

A Well, it would sort of depend on the purpose of differentiation. So, for example, if I looked at total phosphorus and I take a look at the ratio, the standard deviation to the average, it's about 5,000 -- 5,600 to 15,000. So it's something like 35 percent or so variation, just guessing what the number might be. 03:11PM

Q Sure. Is that a wide variation or not in your opinion? 03:11PM

A Well, it's 35 percent of the mean. I mean, it sort of depends on what you are looking at as to whether or not it's wide variation.

Q Well, for purpose of your analysis regarding 03:11PM

676c5b0b-4391-4682-9dda-575b4bc95703

offering an opinion about the composition of all poultry litter in the watershed, is 35 percent variance around a particular constituent wide variance or not?

A Well, it's comparable to the variation that's 03:12PM around the total phosphorus values in the Eucha-Spavinaw watershed, which suggests that we actually have taken a pretty good representative sample of the materials here.

Q Because there was variation in another 03:12PM dataset?

A Well, we have the very similar degree of variation, about 25 percent versus 35 percent of the mean.

Q Is there a percentage of variation, average 03:12PM versus standard deviation, at which you would lack confidence in the data?

A That question is ill posed. You have to look at the specific dataset to be able to say that.

Q That's the second one. 03:12PM

A I mean, if you saw variation of 100 percent of the average, that might sort of suggest to you that there's an issue with variability.

Q Well, let's operate on that one for a moment and let's look at the dataset in Table 10. 03:13PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Uh-huh.
Q Do you see the ammonia -- ammonium? Sorry.
A Ammonium, water soluble, sure.
Q What is the -- in the CDM dataset, what is the average? 03:13PM
A Well, I mean, in that particular sense the average, in fact, is less than the standard deviation, which says that that number is not going to be -- well, it doesn't well define which would measure as ammonium, but again these samples weren't 03:13PM really collected to focus on ammonium, water soluble ammonium concentrations.
Q So they're representative with respect to some of the things that are analyzed but not others; is that what I hear you saying? 03:13PM
A Absolutely. Ammonium is a material that is quite labile. It can be easily lost from those samples. It undergoes continual addition and loss. You know, it's produced. Bacterially it's lost from the system as a gas phase. That's a tough thing to 03:14PM measure.
Q All right. Let's -- you jumped to the conclusion without going through the steps. On ammonium, you'll agree with me that the standard deviation in the 25 samples collected by CDM is 03:14PM

676c5b0b-4391-4682-9dda-575b4bc95703

actually greater than the average; right?
A That's correct.
Q Okay. So more than 100 percent variation sample to sample; correct?
A Correct. 03:14PM
Q Okay. Now, if you look at total arsenic, and total arsenic is important to your analysis, is it not?
A Total arsenic does have some import to the analysis. The other -- there are other measure of 03:14PM spread, by the way, that need to be looked at, but we can look at this one for the moment.
Q That's the one I want to look at.
A I figured it would be.
Q Okay. You'll agree with me, total arsenic is 03:14PM one of the constituents that you use in your ratio or fingerprint analysis in this case; correct?
A It's part of it, yes.
Q It's part of the data on which you rely to offer opinions regarding the source of certain 03:15PM things found in the water in the watershed; correct?
A That's correct.
Q And those comparisons involve comparisons of ratios back to poultry litter samples shown in Table 10; correct? 03:15PM

676c5b0b-4391-4682-9dda-575b4bc95703

A That's correct.
Q Okay. Total arsenic, the variation -- I'm sorry. The average is 16.14 and the standard deviation is 13.6; correct?
A That's correct. 03:15PM
Q So you've got about 80 percent standard deviation in comparison to the average around that particular parameter; correct?
A That's correct.
Q Is that too high? 03:15PM
A Well, you also need to look at the distribution of the observations. I mean, if you have what is called a skewed distribution, that is, most of my numbers are sitting either at a relatively high level or relatively low level, and I 03:15PM have one or two observations that are very, very different. So, for example, if Tyson produced a litter or a waste that contained no arsenic and Peterson Farms produced a waste that contained some arsenic in their material, you would have two 03:16PM circumstances. In fact, if you look at the arsenic data from this, there appear to be two populations, one that's low and one that's high. So I think that is -- you know, that's why looking at the averages can sometimes be problematic. 03:16PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Look at aluminum on Table No. 10. You agree with me that the standard deviation for aluminum is about 120 percent, the average?
A Yeah. It's very large.
Q Considerable variability within the dataset 03:17PM around that particular chemical; correct?
A Right, and that's not anything that would be unanticipated. The aluminum is going to have two potential sources. One would be any soil that might have -- this is total aluminum. Any soil that might 03:17PM have been taken up because of aluminum silicates, like clays that might have been present. In addition, aluminum could have been sourced from the addition of alum. So finding a circumstance where you have aluminum variability being that high is 03:17PM just -- that's not unreasonable at all.
Q You say one of the explanations for differences in aluminum is uptake by clay?
A Not uptake by clay. It's the presence of clay that might be present within dirt, soil. 03:17PM
Q How much clay is in poultry litter?
A Well, if -- there is some dirt in there. I mean, there could be dirt in there. If you dug into the floor a bit, if it was a soil-floored house, there could be dirt in there. 03:18PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Are they soil samples or are they litter samples?
A These are litter samples.
Q Okay.
A Probably the primary source of variation -- if you'll let me finish the answer -- 03:18PM
Q Go ahead.
A The primary source of variation is likely to be whether or not alum was added to those samples.
Q You don't really think clay accounts for the variation, do you? 03:18PM
A Well, no, but a very little bit of clay can go a long way, but I'm pretty sure that's alum.
Q How did you account for these differences in practices with respect to alum treatments and the use of arsenic in your fingerprint analysis that is not specific to an individual defendant or company? 03:18PM
MR. GARREN: Object to form.
A Not specific?
Q Well, all of your ratios that you compare for purposes of source identification are tied back to the overall composition of poultry litter; correct? 03:18PM
A That's correct.
Q You don't have a composition of poultry litter for Tyson who does not use Roxarsone, do you? 03:19PM

676c5b0b-4391-4682-9dda-575b4bc95703

A No.
Q Okay. So how did you account for the real-world differences between different feed ingredients that can affect the composition in your fingerprint analysis in this case? 03:19PM
A Well, in the real world, these materials are disposed of in field and are mixed in the environment, and so in the real world some of the key things to look at in this chain are what are added to feeds. What are added to feeds are copper 03:19PM and zinc salts, and those copper and zinc salts seem to be present at a reasonably consistent ratio of about one to one by mass copper to zinc. That's important.
Arsenic may not be sourced from Tyson's 03:19PM current waste, but in the past may have been, and certainly is sourced from others' waste. So the presence of somewhat elevated levels of arsenic is indicative of poultry waste. So my analysis would be looking at what's in the feed, what's in the 03:20PM waste, what's in the environment and how do those ratios compare and where there are differences, are those differences explainable by chemical process.
Q Your fingerprinting opinions and source identification opinions are directed at poultry 03:20PM

676c5b0b-4391-4682-9dda-575b4bc95703

litter as a class; is that fair?
A That's correct.
MR. GARREN: Object to form.
Q You've not attempted to identify a chemical fingerprint for poultry litter specific to any one 03:20PM
of the individual defendants named in this lawsuit?
A That's accurate.
Q On Page No. 38, I think you are making a statement with the comparison of the CDM data to the Eucha-Spavinaw data in Table 11. Do you see the 03:21PM
paragraph directly above the chart?
A Yes.
Q And you say that the CDM poultry waste data is comparable to and statistically not different from analytical data for moisture, calcium, total 03:21PM
nitrogen, total potassium, total phosphorus and total water soluble phosphorus for poultry waste samples obtained in support of nutrient management plans in the Eucha-Spavinaw watershed. Do you see that? 03:21PM
A Yes.
Q Okay. What does that mean?
A Well, just what it says. It says that if I apply a parametric statistical test to test for the difference between two means or two averages, that I 03:21PM

676c5b0b-4391-4682-9dda-575b4bc95703

find there's no difference between those means.
Q You'll have to help me, Dr. Fisher. What is a parametric statistical test?
A Well, it would be a t-test.
Q What is a t-test? 03:22PM
A Okay. A t-test is a sample -- it's a statistical test that applies statistical theories that look for whether or not the difference between two population measures of center, the means, are in fact different at a certain degree of confidence, so 03:22PM that they wouldn't be different by chance alone. You probably heard of a 95 percent confidence level.
Q How do you do that with two variables, t-test?
A With two variables?
Q Uh-huh.
A You mean between two populations?
Q Well, let's say this: You have a number for total phosphorus. Actually let's start with moisture. You have a number for moisture. Let's take the average in Table 11, 31.64; correct? 03:22PM
A Uh-huh.
Q That's the Eucha-Spavinaw number. What's the number for the average in the CDM set for moisture?
A 20.73.
Q All right. How do I compare those two numbers 03:23PM

676c5b0b-4391-4682-9dda-575b4bc95703

using a t-test and determine whether or not they are statistically differentiable?

A Okay. In that case, you would take the mean and you would calculate a confidence interval about the mean. Confidence interval is the mean plus or 03:23PM minus the T statistic for the -- and this would be a two-tailed statistics. The T statistics for that specific level of confidence times the standard deviation provided by the square root of the number of samples. 03:23PM

Q And have you actually performed those statistics on the two datasets shown in Table 11 and Table 10?

A Yeah.

Q Okay, and where would I find those? 03:23PM

A You should find those in my produced documents.

Q Why don't you report the results of that analysis in your expert report?

A I didn't see the need to do that. 03:23PM

Q Well, what -- what is the threshold level that you use to determine whether or not those computations placed confidence or did not place confidence in the statistics?

A I used the 95 percent confidence level 03:24PM

676c5b0b-4391-4682-9dda-575b4bc95703

interval.
Q And is it your testimony, sir, that if you did those calculations on the data in Table 10 and Table 11, in each instance you would come to an at or above 95 percent confidence level? 03:24PM
A Well, for these levels, moisture, the ones that they're jointly measured between the two.
Q What about the ones that are used in your fingerprint analysis that are not on Table 11?
MR. GARREN: Object to form. 03:24PM
A Well, Table 11 doesn't report copper, zinc or arsenic, so there's no way to test that.
Q Well, how do I test the reliability or confidence of those particular data points used in your analysis? 03:24PM
A You then compare the -- as I state on here, you would compare the data for the metals of interest to those of total elemental compositions of poultry waste, and I cite some places to look for that, some reference materials, hence, Footnote 99. 03:25PM
Q So for the --
A I mean, the question is, are they comparable to known values elsewhere, and they are.
Q So with respect to the four chemicals used in your source identification analysis, the only one on 03:25PM

676c5b0b-4391-4682-9dda-575b4bc95703

which you had the ability to compare data for
purposes of this t-test analysis is phosphorus;
correct?
A Yes. For purposes of this specific analysis
comparing Table 11 to Table 10, the data in each, 03:25PM
that's correct.
Q You were not able to test the confidence level
of the variables for total arsenic, total copper or
total zinc?
A Well, I wasn't able to test then against an 03:25PM
Eucha-Spavinaw dataset.
Q Did you test them against anything?
A I took a look at the range of values reported
in the literature for poultry waste, and they are
reasonable. 03:26PM
Q Where is the literature you are referring to;
is it cited here?
A In Cite No. 99.
Q Did you perform statistics on the values
reported in the literature for arsenic, copper and 03:26PM
zinc?
A No. I'm sorry.
Q Or did you just eyeball it?
A Well, there's no way to perform those because
those are summary information, so you would -- it's 03:26PM

676c5b0b-4391-4682-9dda-575b4bc95703

not just eyeballing it. It's taking a look at a range of materials and a range of values, and is that range of values consistent with the range of values that you see, and you can take a look at the measure of the, you know, the midpoint of that range 03:26PM and see if the midpoint of that range is similar to the midpoint of your range of values.

Q All right. Let's keep moving. Opinion 17, in which you state the chemistry of cattle diets differs from that of poultry diets; correct? 03:26PM

A That's correct.

Q Dr. Fisher, did you or anyone else on Motley Rice's team of experts actually collect cattle feed from beef cattle in the Illinois River watershed and analyze that feed for constituent concentrations? 03:27PM

A No. They did the next best thing because the cattle typically aren't eating feed; they're eating grass, and as a consequence, cattle waste was collected and analyzed.

Q Well, but in Opinion No. 17 you're not talking 03:27PM about cattle waste, are you; you're talking about cattle diets?

A That's true, and in literature that I relied upon with respect to cattle diets, cattle diets are depleted in copper with respect to zinc, which is 03:27PM

676c5b0b-4391-4682-9dda-575b4bc95703

the inverse of poultry diets.
Q Where did you gets the 10 milligrams of copper for kilogram of diet and the 30 milligrams of zinc for kilogram of diet for beef cattle?
A In Cite No. 100, which is Chapter 5 from the Natural Resource -- Research Council 2000 Nutrient Requirements For Beef Cattle. 03:28PM
Q Dr. Fisher, is that a study of the actual composition of beef cattle feed or is it a study of how much copper and zinc beef cattle need? 03:28PM
A It's a study of how much copper and zinc beef cattle need. So the second, which is carried on, is to analyze their waste.
Q Let's stay with feed for a moment. Other than this one study of the needs or requirements of beef cattle, what, if any, data do you have regarding the actual chemical composition of cattle diets in the watershed? 03:28PM
A The cattle diet is expressed in their excrement. 03:28PM
Q Well, you actually analyzed poultry feed in this case, didn't you?
A There was poultry. There are poultry feed data from the defendants. I think we have one poultry feed analysis. 03:29PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Let's look at that. Footnote 101 refers to a sample ID of FAC01 feed; do you see that? That's actually a sample of the chemical composition of poultry feed; correct?

A Correct. 03:29PM

Q Do you have a comparable sample for beef cattle feed?

A No.

Q Why didn't you collect some beef cattle feed and analyze it? 03:29PM

A Well, because beef cattle primarily eat grass.

Q Can you analyze grass?

A Well, one could analyze grass and, in fact, we did analyze grass and attached soil. Not attached. That's a flip comment. I'm sorry. You could 03:29PM analyze grass.

Q But you chose not to?

A Well, grass could also be, depending on what had been used to fertilize it, could look a good deal like poultry waste chemically. 03:29PM

Q That would kind of cut against your theory, would it not, that beef cattle diets are different from poultry feed if -- I'm sorry, than poultry waste if poultry waste reflects poultry feed?

A Well, it would, except that if you look at 03:30PM

676c5b0b-4391-4682-9dda-575b4bc95703

what comes out of the end of the cow, which is reflective of what they ate, plus whatever they did to process it, what you discover is those materials contain much higher levels of zinc compared to copper; whereas, poultry feed and poultry waste is 03:30PM elevated in copper with respect to zinc.

Q Dr. Fisher, are you aware of the fact that there are cattle ranchers in the watershed who provide mineral supplements to their cattle?

A I am aware that people put salt blocks out, 03:30PM which is sometimes laced with mineral supplements and that mineral supplements can be fed.

Q And can those mineral supplements affect the composition of beef cattle waste?

A Well, they evidently do because the 03:31PM recommended requirements for beef cattle is about a three-to-one ratio of zinc to copper; whereas, in their waste, it's somewhere between nine to one and four to one with an average of six to one. So evidently those are used, and there seem to be if 03:31PM they're being used by the folks whose waste has been analyzed here, then they're element rich in zinc.

Q You draw that conclusion based on the mere fact that the ratios of copper to zinc in waste are higher than the nutritive requirements of cattle? 03:31PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes.
Q So from those two data points you can divine that the difference is accounted for by mineral supplements?
A No. You asked me a hypothetical or you asked me the chain here did people feed mineral supplements and I do know that that takes place, and if they did feed mineral supplements and the supplements were different from -- different from what was required, they changed the ratio of zinc to copper from three to one to something greater. 03:31PM 03:32PM
Q On Page 39 you provide a contrast or a comparison between the zinc concentrations and copper concentrations in poultry feed compared to beef cattle diets and cattle waste; correct? 03:32PM
A That's talking about Opinion 18?
Q No, no. I'm looking at the sentence that begins in contrast, the analysis of poultry feed had measured zinc concentrations of 128 milligrams per kilogram, copper concentration of 119 milligrams per kilogram or a zinc to copper ratio of 1.076 to 1? 03:32PM
A Uh-huh.
Q And that is different from those of beef cattle waste diets or in cattle waste; right?
A That's correct. 03:33PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Okay, and the data you are using for that contrast or comparison with respect to poultry feed is a single sample; is that right?

A Well, kind of. I mean, you are using a single sample of poultry feed, but you have to look at the 03:33PM food and the waste. The feed, the single sample, is about one to one. The zinc to copper ratio that's observed in poultry waste, if you take a look at the average value of zinc and copper is about the same, 1.3 to 1. So we're looking at numbers that around 1 03:33PM to 1 versus numbers that are somewhere between 3 to 1 and 6 to 1. So what that says is they're different. One is enriched in zinc, and the other is enriched in copper, you know, one to the other. The ratio of zinc to copper is different between 03:33PM those two kinds of feed and feed requirements evidently and between the wastes.

Q Tell me about this one feed sample you collected and had analyzed.

A Well, I didn't collect that sample. 03:34PM

Q Well, who collected it?

A CDM was given that sample by Barney Barnes.

Q That came from the disgruntled Peterson grower we talked about earlier?

MR. GARREN: Object to the form. 03:34PM

A Well, I think you characterized him as disgruntled. I didn't characterize him as disgruntled. It came from the Peterson grower we discussed about this morning.

Q It came from a different watershed? 03:34PM

A It came from a Peterson Farmer and Peterson feed that's supplied by whoever is supplying Peterson feed and within some radius of that production facility.

Q And how exactly was that feed sample 03:34PM collected; did someone just scoop feed out of a bin?

A I would need to read the field notebook. I don't recall that right now, but the feed would have been collected from a bin, yes. Nonetheless --

Q Who actually collected it? You said it wasn't 03:34PM you.

A It wasn't me. I don't know.

Q Was it the investigator?

A I don't know.

Q Are you aware of any instances in which the 03:35PM homicide detectives from the City of Tulsa actually collected environmental samples?

A None that were analyzed chemically to my knowledge.

Q Well, did they collect some that weren't 03:35PM

analyzed chemically?
A They were visual exemplars. I think there were some poultry waste picked up from roadways. There are photographs taken of it, and the waste was picked up and kept in a bag or something like that, 03:35PM
but there was no -- that was not a sample that one would analyze chemically.
Q Did you sample any -- I'm sorry. Did you perform any chemical analysis on feed for any of the integrators other than Peterson Farms? 03:35PM
A No.
Q Why not?
A The feed samples were not available.
Q Did you ask?
A I didn't personally ask. 03:36PM
Q Did you realize that the State of Oklahoma, through its legal counsel, had gained access to numerous farms in the watershed for each of the poultry companies for the purposes of collecting samples? 03:36PM
A I do recall that, yeah.
Q Did you have any input into what ought to be sampled on those events?
A I did.
Q Did you suggest that feed samples be 03:36PM

676c5b0b-4391-4682-9dda-575b4bc95703

collected?
A I think that suggestion may have been made. I don't recall specifically.
Q It wasn't done for whatever reason; is that right? 03:36PM
A To my knowledge, no.
Q Let's go to Opinion No. 18.
A Okay. Well, Opinion No. 18 I'm not prepared to discuss today until we review that data table. I'm concerned that there's an error in there 03:37PM somewhere. It is unlikely to change the opinion, but it would be more fruitful once I've ascertained that the numbers are all correct.
Q Surely you're prepared to tell me what you've already done as opposed to what you may do; right? 03:37PM
A Interesting question. I may have done it wrong and I'd like to do it right. So I'm not going to talk about 18 right now.
Q Well, let me ask this, Dr. Fisher: The issue that you're concerned with with respect to Opinion 03:37PM No. 18 relates to the statistics; is that fair?
A It relates to the actual numbers that come in under those statistics, yeah.
Q Okay. I have a few questions that relate to the actual samples that underlie the statistics. 03:37PM

676c5b0b-4391-4682-9dda-575b4bc95703

Are you prepared to discuss at this moment those topics?

A Okay. Those samples were all collected by CDM. I could attempt to answer what I know about those samples. 03:38PM

Q Okay. Why don't we tiptoe into this, if we can. I'm not going to take you into the statistics on any of the particular ratios or Table No. 12 until you have an opportunity to review those statistics. Is that fair? 03:38PM

A If I feel that we're straying from that, I'll tell you.

Q Okay. I might be moved by your straying. I'm not sure. We'll see how it goes. My last comment was, of course, in jest. Did you use the 25 poultry waste samples analyzed by CDM in the comparisons that you are performing under Opinion No. 18 regarding the differences in poultry waste versus cattle waste and wastewater treatment plant effluent? 03:38PM 03:39PM

A Okay. If I used them, I would have used -- that would be the dataset, would be the CDM dataset, that's correct.

Q To the extent you're comparing the chemical composition of poultry waste in Opinion No. 18 to 03:39PM

676c5b0b-4391-4682-9dda-575b4bc95703

other things, the poultry waste piece of that derives from Table 10; correct?

A That's correct.

Q Okay. You did not use the dataset from Eucha-Spavinaw on poultry litter for purposes of your comparison of the chemical composition of poultry waste to cattle waste or wastewater treatment plant effluent; correct? 03:39PM

A That's correct.

Q Okay. How many waste -- I'm sorry, how many cattle waste samples did you use in developing the ratios that you set forth in your expert report under Opinion 18? 03:39PM

A Okay. Those cattle waste samples would have been the cattle waste samples gathered by CDM. 03:40PM

Q Thank you. Do you know how many there were?

A I'm going to count them for you.

Q Good, good. Tell me your source when you get there. I want to follow along.

A Okay. My source is in Figure 8 where I'm trying to count the number of points. I think there are somewhere around nine or ten. 03:40PM

Q Okay.

A I'm just counting points on a graph.

Q Okay. Where were those cattle waste samples 03:40PM

676c5b0b-4391-4682-9dda-575b4bc95703

obtained?
A Those cattle waste samples were obtained where CDM obtained them, and I'm not specifically sure where they were obtained. You'll have to ask CDM or the database that contains all the locations. I can 03:41PM
review that, but that wasn't material.
Q It wasn't material to you where they were obtained?
A No. They were in the vicinity -- in the watershed or the vicinity thereof. I don't know 03:41PM
specifically where they were.
Q You're not even sure if they came from within the watershed; right?
A Well, not as we sit here today, but I can determine that. 03:41PM
Q Okay. Do you know approximately when they were collected, these cattle waste samples; was this early on in the sampling program or most recent?
A I think they were most recently obtained, but I don't have the date. That's in the records I 03:41PM
produced to you.
Q Do you think it was this year, 2008?
A It's possible.
Q Okay. How were they collected?
A You'd have to ask CDM how they were collected. 03:42PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You didn't have any conversations with CDM about how they were going to collect fresh manure from a cow?
A I did not.
Q I believe you would avoid that subject. 03:42PM
Sounds interesting. Let's take a break and change tapes.
VIDEOGRAPHER: We are off the Record. The time is 3:42 p.m.
(Following a short recess at 3:42 p.m., 03:50PM
proceedings continued on the Record at 3:50 p.m.)
VIDEOGRAPHER: We are back on the Record. The time is now 3:50 p.m.
Q Dr. Fisher, I meant to follow up on this after lunch. Someone reminded me that I failed to call on 03:50PM
the Record for the production of the audio tapes that were transcribed or the actual transcribed interview notes by Brenda. I've forgotten her last name.
A Brenda Bradshaw. 03:50PM
Q Brenda Bradshaw. Is she someone, Dr. Fisher, with whom you still have contact?
A I still have my last phone number for her. She sort of changed what's going on I think.
MR. GEORGE: Could I ask, Rick, that you or 03:51PM

676c5b0b-4391-4682-9dda-575b4bc95703

Dr. Fisher follow up with Miss Bradford (sic) and/or Investigator Steele, if he may have access to the information, to obtain copies of those interview notes or recordings.

MR. McDANIEL: Or otherwise, let us know they don't exist. 03:51PM

MR. GEORGE: Right. If they don't exist, that would be good to know.

Q All right. Dr. Fisher, back to Opinion 18 and the origin of the cattle waste samples. Have you seen any field notes or photographs that would show the manner in which or the areas from which the cattle waste samples were obtained? 03:51PM

A Yes, Mr. George, I may have, but I don't recall them right now. That wasn't anything I focused on. 03:51PM

Q Okay. Do you know whether or not the cattle from which these waste samples were taken were grazing cattle as opposed to being located within a feed lot? 03:52PM

A These would have been grazing cattle.

Q Okay. Do you know how CDM got permission to get on the property to take a sample of cattle waste?

MR. GARREN: Objection to form. 03:52PM

676c5b0b-4391-4682-9dda-575b4bc95703

A That I don't know.
Q Do you know whether or not the waste samples for cattle manure were taken from the surface of the ground or if they were taken directly from the cow?
A I don't know. 03:52PM
Q Do the concentrations of constituents in cattle manure change as it sits on the ground and it's exposed to physical processes, such as sunlight and temperature and perhaps rainfall?
A Certain constituents may change; others may 03:52PM not.
Q Which ones could change?
A Well, the cattle waste, I've not made a careful study of the digenesis of a cow pie, but the material is going to be losing mass due to -- or 03:53PM changing mass. If you were drying out, it's going to lose moisture. If it gets rained on, it will gain moisture a bit. The organic material that's present will be undergoing decay. So there will be some differences in terms of its organic 03:53PM constituency depending upon how specifically, given materials might be chemically associated with that particular piece of cow waste, they may or may not change very much. So I can't tell you. There could be changes in some instances for some things and not 03:53PM

676c5b0b-4391-4682-9dda-575b4bc95703

so much for others.
Q Given that the results of the chemical analysis of the cattle waste were going to be used by you in your fingerprinting or ratio analysis, Dr. Fisher, what, if anything, did you do to ensure that 03:53PM
the ten cattle samples reflect concentrations of constituents when manure is deposited as opposed to perhaps just remaining concentrations after it's been subjected to physical processes?
MR. GARREN: Object to the form. 03:54PM
A It really wouldn't matter for this analysis because you're looking at -- we have samples of cattle waste. Cattle waste are the only samples that were available, and they're going to be assumed to be representative. As I recall, the chemical 03:54PM
variability within the cattle waste is relatively small, but I'd have to look at that again. So did I go out and look at the sites where the cattle waste was collected and try to determine whether they were truly representative of all cattle waste ever, no, 03:54PM
but they were the cattle waste that were available to us.
Q Well, did you give any instructions to the field personnel to try to ensure that a representative sample was selected? 03:54PM

676c5b0b-4391-4682-9dda-575b4bc95703

A My recollection is that there is a protocol that CDM followed in doing that.
Q Did you have any input into that protocol?
A I don't think I did, no.
Q Let's skip forward to Opinion 21, and actually 03:55PM
if you can just thumb through for a moment, I want to talk generally about Opinions 21 through 28 just to refresh your memory as to what those relate to.
A Okay.
Q My understanding of the opinions that you're 03:56PM
expressing in this part of your report would be to summarize those. You're of the opinion that runoff, groundwater, stream sediments and lake sediments are all contaminated by poultry waste; is that fair?
A I think what's fair to say is there's evidence 03:56PM
of poultry waste contamination in all of those materials.
Q And as --
A And more places.
Q I'm sorry. 03:56PM
A That's okay.
Q As a general proposition, it appears that your opinions regarding that contamination in each of those environmental compartments is based upon a
comparison of concentrations or ratios of zinc, 03:56PM

676c5b0b-4391-4682-9dda-575b4bc95703

copper, arsenic and phosphorus in each of those environmental compartments to those same substances in poultry litter; is that right?

A In part, yes, that is correct.

Q Well, other than your ratio analysis and comparison of those environmental compartments to poultry litter, what other data do you rely upon to support Opinions 21 through 28? 03:57PM

A Well, a good example would be in Figure 16.

Q Okay. 03:57PM

A Figure 16 is the result of all the litter application location soil sampled, all of the collection depth, zero to two inch, two to four inch, four to six inch of all the data, and what these are showing is relatively good looking mixing trends between two end members. So if I looked at, for example, the blue points, which are the zinc point, or the orange points, which are the copper points, I have two fairly distinct end members, one that is low in zinc and one that is high in zinc, and if I look at copper, I have a low copper and high copper. The arsenic is less definitive, but there's a low arsenic and high arsenic. So if you take a look then, you are mixing with something that contains high levels of those, and the -- we know 03:57PM 03:58PM 03:58PM

676c5b0b-4391-4682-9dda-575b4bc95703

that these are areas that have received various amounts of poultry waste and these trends are consistent with receiving poultry waste.

Q There's no mixing line on Figure 16, is there?

A Well, there's no -- these are lines showing 03:58PM that we have trends between something that's low in concentration and something that's high in concentration with respect to materials that are not found at these levels in soils commonly. So that's the mixing line. It's a trend of concentrations. 03:58PM So there are a number of things. It's not simply matching a ratio of what's found in an end member. It's also in looking at a series of environmental samples, which, if you get enough of them, as in the soil case here, are going to show if you're adding a 03:59PM material to them that has a component that's not classic or typically present at high concentrations, that those components will fall along a low to a high path, and that's what these show. They're showing that in the soils there is a material that 03:59PM contains substantial levels of zinc and substantial levels of copper and some level of arsenic, you know, certainly higher than you might anticipate, and that they all happen to correlate, that is, in a positive sense with total phosphorus, which we know 03:59PM

676c5b0b-4391-4682-9dda-575b4bc95703

for a fact to be extremely concentrated in poultry waste. So as a geochemist, I would tell you that that's pretty much incontrovertible evidence of mixing something with a lot of phosphorus with something that doesn't have much phosphorus, but in 04:00PM
addition to the phosphorus, it contains what appear to be very consistent ratios of copper, zinc and arsenic.

That was kind of a long answer, but that's looking at this without knowing an end member. If I 04:00PM
put an end member in there, I project the line out towards that particular end member.

Q Figure 16 compares the ratios of zinc, copper and arsenic to phosphorus in soil samples; correct?

A No. Figure 16 displays a cross plot of zinc, 04:00PM
copper and arsenic versus phosphorus. Now, you can interpret that as showing the ratios, but this is looking at a cross plot of these things.

Q Well, let's take an example because, candidly, I'm not following you. Let's look at the furthest 04:01PM
most to the left orange block. Do you see that on Figure 16?

A Right.

Q Which is a total copper to total phosphorus sample? 04:01PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Correct.
Q Okay. What does that sample tell us, if anything, about the relationship between total phosphorus to total copper in that sample?
A It tells us that that sample is an anomaly. 04:01PM
Q Well, give me some numbers. How much copper in comparison to how much phosphorus is in that sample?
A Okay. Well, it's on a log-log plot. So it looks like it's about 80 milligrams per kilogram 04:01PM phosphorus, and it looks like it's something like 8 milligrams per kilogram copper, but it also is off trend. So if you look at the bulk of the information, the bulk of the information that's to the right doesn't look like that at all. 04:02PM
Q Based on where that orange box is plotted, we know that this particular sample had a ratio of about 80 phosphorus to 8 copper; correct?
A Yes.
Q Okay, and that same analysis would hold true 04:02PM for each one of the dots on Figure 16; correct?
A With respect to their own individual ratios, that's correct.
Q That's right, that's right, but the purpose or the location of each sample or plot or dot, excuse 04:02PM

676c5b0b-4391-4682-9dda-575b4bc95703

me, on this plot is a function of the relative ratio of phosphorus to one of the other constituents?
A That's correct.
Q Okay. All right. Is it your opinion that evidence of contamination by poultry waste exists if samples from runoff water, groundwater, stream sediment or lake sediment exhibit relationships of phosphorus concentration to zinc, copper and arsenic concentration that are similar to those of poultry litter? 04:02PM 04:03PM
A Yes.
Q Okay. Dr. Fisher, are you aware of any other scientists in the world, other than those perhaps retained by Motley Rice in this case, that has tried to identify or fingerprint poultry waste as the source of contamination based on the ratio method that you've used in this case? 04:03PM
A Okay. I can speak only as a geochemist, and this is a standard geochemical methodology that is applied in looking at mixing problems globally by all geochemists in pretty much all time. 04:03PM
Q Are you through?
A You can apply it to poultry waste. I'm unclear as to anybody that's ever applied this to poultry waste, but it certainly is not a novel 04:03PM

676c5b0b-4391-4682-9dda-575b4bc95703

technique by any stretch of the imagination.
Q Let's try my question again. There was a lot of material in there beyond what I think was responsive to my question. Are you aware of any scientist in the world, other than those hired by 04:04PM
Motley Rice for this case, that has tried to fingerprint poultry waste as the source of contamination based on the ratio methods of phosphorus to zinc, copper and arsenic that you've used in this case? 04:04PM
MR. GARREN: Object to form.
A I'm not aware of any studies that have looked at this. I would still amend that answer to say that any geochemist looking at this circumstance would have selected exactly these same constituents 04:04PM
and would have selected exactly the same methodology as I have applied, unless they were doing a multi-variance statistical study.
Q You're just not aware of anyone, other than yourself, who has done it with respect to poultry 04:04PM
litter; is that right?
A That's correct.
Q Do phosphorus and copper move through the soil in the same way?
A No. They'll move a little differently. 04:05PM

676c5b0b-4391-4682-9dda-575b4bc95703

Copper in general is a little more soluble than zinc, and so what you would tend to see along transport pathways, is that the aqueous-related phases would become somewhat more enriched in copper; whereas, the solid associated phases would 04:05PM
become somewhat more enriched in zinc. So you would see a fairly consistent shift. Say if I had solids that had moved a long way, those solids would be somewhat copper depleted compared to poultry waste with respect to copper. 04:05PM

Q I'm sorry.

A Go ahead.

Q Are the octanol water partition coefficients the same for phosphorus and copper?

A The octanol water partition coefficients would 04:05PM
be pretty much meaningless for phosphorus and copper.

Q Why?

A Because they're not organic constituents. To the extent they might form organic complexes, 04:06PM
octanol water partitioning might have some relevance, but in general has none whatsoever.

Q Do phosphorus and arsenic move through the soil in the same way?

A Well, in solution or as particles through 04:06PM

676c5b0b-4391-4682-9dda-575b4bc95703

cracks, if you want to get at that level of analysis, yeah.

Q Are their solubilities the same?

A No. I said that earlier, that copper compounds will tend to be somewhat more soluble, and as you would move away from a source, solids derived from that source would become somewhat depleted in copper. 04:06PM

Q Do phosphorus and arsenic have different soil absorption characteristics? 04:06PM

A They should because they have somewhat differing chemistries. Zinc has chemistry that's somewhat similar to calcium because of its atomic radius. Copper is a somewhat smaller atom.

Q Do phosphorus and arsenic have a different soil absorption characteristics? 04:06PM

A Phosphorus and arsenic are pretty similar in their chemical behavior. The difference here is going to be that there is an overwhelming amount of phosphorus in the system and as such, it's going -- as you start stacking up lots and lots of phosphates into the system, it will pretty much swamp the ability of the soil to take up arsenic. There's just too much phosphorus, so that the arsenic would tend, would tend over time -- as you titrated the 04:07PM 04:07PM

676c5b0b-4391-4682-9dda-575b4bc95703

soil with a high phosphorus solid, the soil over time will tend to desorb arsenic. So the answer to your question is they're somewhat similar chemically but there's just so much phosphorus in this system, that it's going to be interfering with arsenic 04:07PM interacting. Generally things you are talking about, those kinds of behaviors make more sense to discuss when you are dealing with low concentrations of materials where there's a lot of solid phase, absorptive phase compared to the solid phase that's 04:08PM doing the absorbing. Once you start putting a tremendous amount of solid into the system, you can really radically change what is going on. A good example of that, a good analogy, would be looking at injecting very salty water into a sandstone, which 04:08PM happens sometimes in the oil field. On those material, a thing radium, radium is strongly absorbed to solids, basically immobile, but when I put so much sodium into that system, it begins competing with radium for absorption sites. If you 04:08PM desorb all the radium, and if you look right around the halo of a salt contamination in a sandy aquifer, what you'll see is the halo is quite radioactive with radium being moved out of that sane. So the same thing would be happening here. Stuff in a lot 04:08PM

676c5b0b-4391-4682-9dda-575b4bc95703

of phosphorus, I'll start preferentially moving some arsenic off that system. That's kind of a long and wordy answer.

Q That's another way of saying the soil absorption characteristics for phosphorus and arsenic in this particular environmental system are different? 04:09PM

A No. What it's saying is the chemical behavior of these materials will vary as a function of how much material you stick on. Ultimately what you stick on immediately comes off. There will be no further absorptive characteristics. So the soil absorption character -- or the soil absorption capacity, as that becomes approached, there's no more soil absorption going on at all. 04:09PM

Q So the movement of arsenic, say, for example, in runoff off of a particular field may vary depending upon the phosphorus concentration of that field?

A Well, in runoff there will be a couple of constituents coming off the field. There will be a constituent that's sort of -- and it will also depend upon when waste was applied. If waste was applied relatively recently, in the last few weeks, for example, some of the material coming off is 04:09PM 04:10PM

676c5b0b-4391-4682-9dda-575b4bc95703

simply going to be the waste that was applied. The material is fairly low density because it has a lot of cellulosics in it. The material floats and it will be coming off just like bulk poultry waste. Other material, which will be somewhat less in 04:10PM
amount, will be soil particles that will have imbibed some phosphorus and arsenic and copper and zinc. Those will be moving off as erosion that's fairly low in most pastures if they're not overgrazed and, lastly, there will be -- and those 04:10PM
will be particulates, and lastly, there will be materials that are present in solution coming off, and that whole gimish comes off the field at one time.

MR. ELROD: How do you spell that word? 04:10PM

A That's a technical term. That's a -- I think that's a slang term for a rough mixture.

Q You still didn't spell it. How do you spell it?

A G-I-M-I-S-H in my dictionary. 04:11PM

Q Are the solubilities of phosphorus and zinc the same?

A Well, the solubilities of all of these materials are going to be somewhat different, but we're not just looking at the movement of materials 04:11PM

676c5b0b-4391-4682-9dda-575b4bc95703

purely in solution as they come off the field.
They're also coming off as particles.
Q Are the soil absorption characteristics of phosphorus and zinc the same?
A As I said before, the soil absorption 04:11PM
characteristics of these materials vary.
Q Are the water partition coefficients for phosphorus and zinc the same?
A Well, the water partition coefficients assume
that you sort of know the controlling solid phase, 04:11PM
but they would be -- they would probably be different.
Q How does your ratio analysis account for all of these different behaviors in terms of the
individual chemicals that you use, phosphorus, 04:12PM
arsenic, zinc and copper, in your analysis?
A Well, the way that you take a look at that is to see if those ratios are close. You're not trying to match 1.32. You're trying to match numbers
around one if you are looking at zinc to copper 04:12PM
ratio. If it's poultry waste in which you have roughly a one-to-one mass ratio of zinc to copper, then the solid phase that's close to the source should also have about a 1.1 or one-to-one ratio.
As you move away from that, you may be able to 04:12PM

676c5b0b-4391-4682-9dda-575b4bc95703

track -- you need more than one sample. You may be able to track a reaction or a reaction transport trend, in which you see the projection of the end member into the data array of material from that particular environmental compartment and that its 04:13PM behavior is consistent, which you know about the solubilities, for example, of zinc versus copper.

Q How close do the ratios or, let's say, for example, phosphorus to copper have to be in stream sediments compared to poultry litter for you to 04:13PM consider it to be a poultry impacted sample?

A I don't think it's interpreted in that way in terms of exactly what the ratios are. I'd have to look at the graph.

Q I'm trying to ask a more general question, but 04:13PM if you need to look at a graph, that's fine, but I guess my question is, you've told me you wouldn't expect the ratios throughout the environmental media to be identical?

A Correct. 04:13PM

Q Correct? So I want to know how far away from identical do they have to be before you are willing to offer an opinion that it is not poultry waste that is the source of the contamination in a particular sample? 04:14PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Okay. Well, I'm not offering an opinion that poultry waste is or is not the source of contamination in a particular sample.
Q Oh, you're not?
A I have never offered that opinion. 04:14PM
Q Maybe I misunderstood. I thought your Opinions 21 through 28 were that the samples that you're discussing are -- reflect contamination from poultry waste. Is that not your opinion?
A That's correct, they do, but we're looking -- 04:14PM this is a population, not at individual samples.
Q So you can't tell me with respect to any individual sample, based on your ratio analysis, if that sample and the concentrations of phosphorus, arsenic, zinc and copper in that sample is the 04:14PM product of contamination of poultry waste?
A Well, I didn't say that either. I said we're looking at a population. Perhaps we should look at a population.
Q Sure. Which one? 04:14PM
A Look at Figure 24, which is what you were talking about, stream sediments. Stream sediments are showing behavior of materials.
Let's go through the issues here. There are two end members. Let's look at the zinc to 04:15PM

676c5b0b-4391-4682-9dda-575b4bc95703

phosphorus plot. We'll look at all these plots on Figure 24 in sequence. We'll look at the arsenic plot last. It's kind of an interesting circumstance.

We're looking at residual solids, that is, the 04:15PM
sediments that are present in streams. So these are solids that have interacted with a lot of fluid. There are also solids that have some organic load in them, and there's some chemistry going on within
that organic load. So if I look at the first graph, 04:15PM
the black dots or the black squares are the array of poultry waste. The green triangles are control soil. The theory here being, of course, that soils become stream sediments because they are eroded and
end up in streams, and there's a line that connects 04:16PM
those. This is a mixing line that I calculate between the centroid of the green dots and the centroid of the black squares. That's a mixing line. And if I look at the red bubbles, which are
the stream sediment samples, what I note there is 04:16PM
that some fall under the mixing line and some are above it. That is, they have more zinc than you would anticipate immediately from dealing with poultry waste. Remember, we're looking at here,
you're dealing with solids that are residual and 04:16PM

676c5b0b-4391-4682-9dda-575b4bc95703

interacted with a lot of water.

Secondly, I also note that they increase in zinc concentration with phosphorus concentration. If I look at copper, we see an anticipated -- solids that have interacted with a lot of water. So here 04:16PM if I look at the mixing line, I have things that fall along that line and I have a number that fall below it. Ones that are falling below that line are somewhat depleted in copper. So that's explicable in the terms of solids that have interacted with a 04:17PM lot of water. We're still seeing the residual signal of the increase of zinc and copper as a function of total phosphorus, but we're also seeing the removal of copper by solubilization, and that's -- that really is expressed in the zinc-copper 04:17PM plots. So you take a look at those that says we have mixing curve here and these are enriched in zinc, so that there are some that are quite enriched in zinc. The points that are shooting out to the right that have fairly high copper levels may or may 04:17PM not have anything at all to do with poultry waste. That may be some other source.

Q Which ones?

A These ones that are shooting out to the right of the line here because they're veering in a manner 04:17PM

that is not anticipated. They're basically enriched in copper with respect to zinc. So in my analysis, these might be suspect to have been -- I didn't identify where they are or where they are from, but those would be those samples. 04:18PM

Q Can you go to the actual exhibit to your deposition, Deposition Exhibit 1, and circle the suspect samples?

A The ones that may be suspect? Surely. In this figure, these samples are probably the suspect 04:18PM ones. I might include that one.

Q For the Record, you've circled looks like four?

A Five points.

Q Five stream sediment samples that are below 04:18PM the mixing line?

A They're below the mixing line, which means they're substantially enriched in copper, which is not the anticipated direction of where these things should move. We shouldn't be concentrating copper 04:18PM in these things. We should be stripping copper from the system because its compounds are more soluble.

Q What's your basis for the statement that you would anticipate that behavior with respect to copper? 04:19PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Well, because copper compounds are more readily solubilized. So if I've taken solids and interacted them with a substantial amount of water, I would have stripped some copper out of that system. So what I'm saying is that the stream 04:19PM
sediments largely behave like you think they might behave, but there are some that seem to be misbehaving and that would make them suspect. They may have nothing to do at all with poultry waste, and I think you see that same group of samples in 04:19PM
each of these plots, zinc-phosphorus, copper-phosphorus and zinc-copper, and they're these ones that are kind of oddly behaving.

Q Let's back up for a moment. The mixing line that appears in each of the cross plots on Figure 24 04:19PM
that is drawn between control soil and poultry waste --

A Yes.

Q -- what does that line tell us?

A That line just tells us that if I had 04:20PM
completely conservative mixing, so I'd take sodium chlorite, which we aren't -- and look at chlorite, which is not going to be interacting in any substantial way, and I just made a series of dilutions of that, that that's what the composition 04:20PM

would look like if it were conservative mixing.
That's a conservative mixing line. We know that
can't be happening here, largely can't be happening
or at least there would be other mechanisms in play
because we do -- for example, as you pointed out, 04:20PM
there's somewhat differing chemical behavior. So
what you look for is do we have some explicable data
array that's extending itself from what we know to
be uncontaminated materials, what we know to be or
believe to be the contaminant, and then when we see 04:20PM
deviations from that behavior, does the chemistry of
those materials explain those deviations or not. So
in the case where we have what would appear to be
enrichment in copper, it's not explained by the
known chemistry of copper. 04:21PM
Q So why didn't you circle all of the red dots
on the bottom side of the mixing line and total
copper versus total zinc, they're all behaving in an
unexpected manner; correct?
A Well, the ones up here are particularly 04:21PM
enriched in copper.
Q What is your cutoff for particularly enriched
versus just a little bit enriched?
A Well, particularly enriched is they have a
larger separation form the line. They form a 04:21PM

676c5b0b-4391-4682-9dda-575b4bc95703

coherent mass, coherent grouping of points that are clearly separate from this cluster of points over here. They're different.

Q So, Dr. Fisher, how far off the mixing lines do the stream sediment samples have to be before you 04:21PM are willing to acknowledge that there's something occurring with those samples other than poultry waste contamination?

A I don't think that there's a specific criterion for that. Remember, this is a logarithmic 04:22PM plot as well. So when things are displaced out in this direction --

Q Uh-huh.

A -- they are way -- if you see a big white space, they are way odd. 04:22PM

Q Why did you plot them logarithmically?

A Because we're dealing with a distribution of concentrations that vary over a very wide range. In fact, for example, the phosphorus varies over something like four is the magnitude. 04:22PM

Q Plotting these, this data and these ratios, logarithmically serves to mute the differences in the data; correct?

A No. It serves to allow you to examine trends in the data that would otherwise simply be to 04:22PM

676c5b0b-4391-4682-9dda-575b4bc95703

compromise dots.
Q So you still haven't answered my basic question, Dr. Fisher, which is how far off the line does it have to be before you will acknowledge that it is a stream sediment that is affected by 04:23PM
something other than poultry waste?
MR. GARREN: Object to form.
A I don't have a specific criterion, aside from judgment as a geochemist and looking at this. You could, for example, say this point here in which - 04:23PM
which doesn't by the size of its dot intersect the line, you could take that one away, too, if you wanted or not, okay, but you're looking at the behavior of the population. Okay? This is not a -- what is it not? It's not something that looks at 04:23PM
specific numeric criteria.
Q So this is your own subject opinion as to how far off the line it needs to be before it is contaminated by poultry waste as opposed to some other source? 04:23PM
MR. GARREN: Object to form.
A I'm not saying that any individual point. I make no statement here in this report as to whether or not specific samples represent contamination by poultry waste. We're looking at population 04:24PM

676c5b0b-4391-4682-9dda-575b4bc95703

behavior. The populations are behaving at least with respect to phosphorus, zinc and copper in stream sediments as if we're looking at a mixture between a clean material or material that's unimpacted and the end member, which we know to be poultry waste. 04:24PM

Q Let's go about it this way: Dr. Fisher, can you identify for me on Figure 24 any stream sample that you have plotted here that you are willing to opine is to the best of your scientific judgment impacted or contaminated by poultry waste? 04:24PM

A Again, I've not made that determination with respect to individual samples. I'm looking at the behavior of the population, and so I'm unprepared to give you any opinion concerning any specific sample other than to say that those samples that are displaying strong enrichments in copper, which I circled on this diagram, are behaving oddly and might be suspect. 04:24PM

Q Dr. Fisher, I assume the answer would be the same if I asked you to identify from any of your other figures specific lake sediment samples or soil samples that you believe are contaminated by poultry waste? 04:25PM

MR. GARREN: Object to form. 04:25PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q You'd be unable to do that?
MR. GARREN: Object to form.
A We'd have to go through those particular things. I think that that might be generally true.
Q Let's don't leave Figure 24 yet. I thought I could cover a bunch of ground with one question and it didn't work out. Dr. Fisher, why are other sources not taken into account in the analysis that you show in Figure 24, for example, the contribution of wastewater treatment plants as affecting the chemistry that is shown in stream sediments in Figure 24? 04:25PM 04:26PM
A Okay. When we were able to fully discuss Opinion 18 to make that determination, we could do that, but where you would find the zinc, the point that might represent that would clearly not be related to this trend. 04:26PM
Q What do you mean where I would find the point that is related to that?
A Well, we could cross plot -- we could put on there the wastewater treatment plant data. We could put on there cattle data, but those points are not going to be points that can explain that particular mixing line. 04:26PM
Q And you say that because you're familiar with 04:26PM

676c5b0b-4391-4682-9dda-575b4bc95703

the concentrations reflected in those samples and you believe in comparison to the data shown in Figure 24, they would be separated?

A Yes.

Q Okay. Are you referring to concentrations in wastewater treatment plant expressed in -- I'm sorry, expressed as a concentration in liquid as opposed to solid? 04:26PM

A Okay. That would be an issue here because we could not -- you could not cross plot wastewater effluent on here. You would have to look solely at the mass ratio or the mole ratio, if you wanted to, between zinc and copper, for example. 04:27PM

Q But you could convert, based on the total suspended solids data associated with the wastewater treatment samples, those samples to a comparable dataset in terms of the concentration of zinc, arsenic, phosphorus and copper on solids; correct? 04:27PM

A If you had a separate analysis of those solids, I think that would be correct. We have a -- my recollection is there's a bulk sample that's looked at here. So you'd look at -- you are looking at everything that's present in the wastewater treatment plant effluent. 04:27PM

Q So you don't think you could compare the 04:28PM

676c5b0b-4391-4682-9dda-575b4bc95703

wastewater treatment plant data to determine the influence, if any, on stream sediment samples?

MR. GARREN: Object to form.

A Okay. Well, you compare it in terms of what you can mix to alter the stream sediment samples, 04:28PM and the mixture would require something that was pretty much fantastically enriched in phosphorus.

Q Why didn't you put the cattle waste samples on here and show an analysis of how the stream sediments behave or could be explained by cattle 04:28PM waste?

A Be the same. It's superfluous.

Q It's what?

A It's superfluous. There's no need to because their ratios are different. 04:28PM

Q You didn't even plot them because you believe the ratios are different?

A That's correct. I can't mix it in because I simply can't get the levels that I need to make -- well, you can't get the levels you need to generate 04:29PM this array, the data array of stream sediment data.

Q Let's go back to where it was when we got off. Back to Opinion 21 on Page 50, towards the middle of that paragraph that begins with Opinion 21, you state that if sufficient rainfall occurs in a short 04:29PM

676c5b0b-4391-4682-9dda-575b4bc95703

enough period of time, runoff is produced. Do you see that?
A That's correct.
Q How much rainfall and over what period of time is required to produce runoff? 04:30PM
A Okay. Typically about two inches of rainfall in about half a day or something like that. That's better answered by Dr. Engel, but it's about two inches of rainfall here in a 24-hour period produces significant runoff. 04:30PM
Q And what's your basis for that?
A Recollection of conversations I have had with others, including Dan Storm I believe and Bernie Engel.
Q Did you review any literature? 04:30PM
A I probably have. I just don't recall it.
Q Let's go to Opinion 22. You say soils to which poultry waste has been applied within the Illinois River watershed are contaminated by poultry waste constituents. Do you see that? 04:31PM
A Yes.
Q Dr. Fisher, are all the soils in the watershed contaminated with poultry waste constituents?
A No.
Q How many fields do you have data on that show 04:31PM

676c5b0b-4391-4682-9dda-575b4bc95703

contamination from poultry litter?

MR. GARREN: Object to form.

A I don't know how many fields. We've collected them here from 73 locations, and there may be multiple locations per field. 04:31PM

Q And is it your opinion, sir, that all 73 of the locations that you've collected data on are contaminated by poultry waste?

A I really don't offer an opinion about any specific location. 04:32PM

Q So you can't point the court to any particular field where poultry waste has been applied that you would say is contaminated?

A Well, no, that's not true. I would say if the amount of phosphorus that's present in the soil, the Mehlich III phosphorus, exceeds the agronomic rate, which sort of depends on what you want to call it, whether it's 65 pounds per acre or 100 pounds per acre or 125 pounds per acre, if it exceeds that amount, it's contaminated with phosphorus, and if it's receiving that phosphorus from poultry waste, then it's contaminated by poultry waste constituents. 04:32PM

Q So you define contamination as anything in excess of the agronomic rate? 04:32PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Yes, for phosphorus.
Q Would you apply that same definition for contamination with respect to zinc, copper and arsenic?
A I think that would be an opinion for Gordon Johnson, but I wouldn't disagree with that. If there's more than you need, then it's contamination with that material. 04:33PM
Q So if you have a field in the Illinois River watershed that's received poultry litter but its soil test is 64 STP, is that contaminated with phosphorus? 04:33PM
A Not yet, not according to my definition. The next shovelful, however, should throw it over the edge. 04:33PM
Q So have you sought to identify which of these 73 locations are above the agronomic rate and, therefore, in your opinion contaminated by poultry waste?
MR. GARREN: Object to the form. 04:33PM
A No, that wasn't the point of this analysis. The point of this analysis was to show that the zinc, copper, arsenic and phosphorus concentrations, especially the zinc and copper and the phosphorus concentrations that one found in soils were 04:34PM

676c5b0b-4391-4682-9dda-575b4bc95703

consistent with mixing cleaner materials with poultry waste.

Q That's what you were trying to convey in Opinion 22?

A Yeah. 04:34PM

Q Okay. The reason I got hung up is in the lead-in sentence you say that soils to which poultry waste has been applied are contaminated. Do you see that?

A I would agree with that, that's correct. 04:34PM

Q Which soils?

A Well, I'm not identifying individual soils. I'm saying that as a population, it's consistent with contamination by poultry waste. I could review that data with respect to the criteria that we've 04:34PM just discussed and give you that example, but I was not looking at Mehlich III phosphorus when I did this work, total phosphorus.

Q As we sit here today, Dr. Fisher, you cannot identify a single field that meets your criteria for 04:34PM contamination with phosphorus from poultry waste; correct?

MR. GARREN: Object to the form.

A I'm not sure that that's an accurate characterization. As I sit here, I can't say if I 04:35PM

676c5b0b-4391-4682-9dda-575b4bc95703

go to this particular location, it's contaminated, but I do know from looking at this data that with very little effort, I could identify a whole series of fields that are contaminated.

Q Why didn't you do that? 04:35PM

A Because that wasn't really of great interest to me. What is of interest to me is the behavior of the population of soils with respect to their receipt of poultry waste and how the chemistry of those soils vary. 04:35PM

Q So, Dr. Fisher --

A I'm sorry.

Q Go ahead.

A And is the chemistry of the soils consistent with taking up copper, phosphorus, zinc, arsenic from poultry waste. 04:35PM

Q Dr. Fisher, as a scientist working on this case, you were not interested in identifying the specific fields that were contaminated with phosphorus from poultry waste? 04:35PM

MR. GARREN: Object as to form.

A That wasn't really my charge. My charge was to look at the population behavior of these soils and examine whether or not the chemistry of those soils is consistent with the imbibing or taking up 04:35PM

constituents from the poultry waste. The contamination -- if they're taking up constituents from poultry waste, then they ultimately will become contaminated. That keeps going on.

Q You refer in Opinion No. 22 in this discussion to Figure 16 and we talked about it a moment ago, but let's go back to it. 04:36PM

A Okay.

Q Do you see the R squared values at the top of Figure 16? 04:36PM

A Yes.

Q What do those tell us?

A Well, what they really tell you is how tight the ellipse is around the data. If you were -- can I draw on something? 04:36PM

Q Sure, as long as you'll draw on something that will be an exhibit. You can draw on Figure 16 to your expert report.

A Okay. The R squared value is sometimes called a correlation coefficient, but what it actually is is if you have an array of data, whether it's -- you are kind of looking -- you are really looking at two measures like this. Is it a tight spread or is it a big ball? You know, how close is it to a circle, how close it is to a really tight ellipse from a 04:36PM 04:37PM

676c5b0b-4391-4682-9dda-575b4bc95703

circle?
Q Is it fair to say, and this is my
understanding, and it could be completely wrong, and
feel free to tell me if it is, that the R squared
value, as a general matter, tells you the strength 04:37PM
of the relationship between two variables, for
example, in this case phosphorus and zinc?
A Well, in this case what we're looking at is
the relationship between phosphorus and zinc,
phosphorus and copper, phosphorus and arsenic. That 04:37PM
is kind of generally true. When you say in looking
at the strength of the relationship, one thing to
note here is that these are samples from small
depths which may have somewhat differing behavior.
So it's not a regression by level or it's not a 04:38PM
correlation by level, but it generally tells you the
strength of the relationship.
Q And as a general matter, the higher the R
squared number, the stronger the relationship
between those two variables; do you agree with that? 04:38PM
A That is correct in terms of calculating an R
squared. There are other ways of looking at whether
or not something goes up versus -- even in the case
of arsenic here, which has a very low R squared of
.1236, if you took a look at this with a 04:38PM

676c5b0b-4391-4682-9dda-575b4bc95703

non-parametric statistic and you were saying when I go up -- when phosphorus goes up, does -- arsenic goes up, it would say yes, and that would be true.

Q What is your threshold for statistical significance on an R squared value? 04:38PM

A Okay. There's no -- there are some methodologies that look at statistical significance of R squared. That's typically not a really good thing to do because the values of R squared will tend to change or that the values change with the 04:39PM number of samples you have. The more samples you have, the better the R squared, even though the relationship is terrible. So these are saying that there's pretty -- if you look at the trendology of the data here, these are pretty strong 04:39PM relationships. It says phosphorus goes up, copper goes up; phosphorus goes up, zinc goes up; phosphorus goes up, arsenic kind of goes up. That's what that graph is showing you. If you are looking for a statistical test with respect to the 04:39PM significance of those, none were performed.

Q Dr. Fisher, why did you feel it necessary to put the R squared values on Figure 16?

A R squared was immediately thrown there by the software that computed it, and I didn't see any 04:39PM

676c5b0b-4391-4682-9dda-575b4bc95703

reason to edit them. They give a computationally derived value that is of some use in interpreting the data. It's not the sole way to interpret it.

Q Dr. Fisher, is there a statistically significant relationship between total phosphorus 04:40PM and total arsenic amongst the datasets shown in Figure 16?

A I think non-parametrically there would be. Parametrically, probably not.

Q What do you mean, parametrically, 04:40PM non-parametrically?

A Well, parametrics you use the actual numbers.

Q I like actual numbers.

A Well, they're always looking at data. If I looked at the relationship of phosphorus to arsenic, 04:40PM I'm looking at a range here of around 300 to something like 3,000 milligrams per kilogram arsenic -- I mean copper or phosphorus rather. Boy, I confused that Record. Let's back up.

We're looking at a range here for phosphorus 04:40PM in the bulk of the data somewhere between 2 and 300 parts per million total phosphorus and around 2 or 3,000 parts per million phosphorus. Simultaneously we're looking at a range for arsenic that's just hovering slightly above 1 milligram per kilogram up 04:41PM

676c5b0b-4391-4682-9dda-575b4bc95703

to about a factor of 8 milligrams per kilogram. So this is not a strong parametric relationship. If, however, you took a look at this in terms of when phosphorus goes up, does arsenic go up? The answer is pretty much, yeah, it does, but it's not 04:41PM something that in a parametric sense you would get a statistically significant relationship from.

Q What about total copper to total phosphorus? In a parametric sense, is there a statistically significant relationship between total copper and 04:41PM total phosphorus in the dataset plotted on Figure 16?

A If I tested whether or not the slope of the line was statistically different from zero, and I did not do that test, but if I did perform that 04:41PM test, it would be significantly different from zero. So it says that, yeah, they have a significant relationship. That would be my opinion based on looking at thousands of graphs in my life, that would give you a good relationship or parametrically 04:42PM arsenic would give you a pretty crummy one parametrically.

Q Is it statistically significant with respect to total copper and total phosphorus or just significant? 04:42PM

676c5b0b-4391-4682-9dda-575b4bc95703

A It would be statistically significant. It would say that the slope -- the test there is -- two tests. When you're looking at a regression line -- when I did the regression line through this, I'm looking to see this slope. Take a look -- if I take 04:42PM a look of the mean of X and the mean of Y, the line always passes through that. If I look at the confidence, say, a 95 confidence about this, it's going to be something like that. It's most constrained at the mean and least constrained as I 04:43PM go to data extremes. So what I'm interested in knowing is, is this different from zero; is this a positive slope, some sort of positive relationship, and if I just take a look at this data array, that's different from zero. I didn't perform a statistical 04:43PM test, but if I did, it would be significantly different from zero.

Q Why didn't you perform a statistical test?

A There wasn't any need to perform a statistical test. I can tell you right from that data array 04:43PM that it's different from zero.

Q Let's look at Figure 17. You also refer to Figure 17 in your Opinion 22 regarding soils and poultry litter. And you say that Figure 17 shows that the excess concentrations of phosphorus, zinc, 04:43PM

676c5b0b-4391-4682-9dda-575b4bc95703

copper and arsenic found in the zero to two-inch soil samples are from land applied poultry waste. Explain to me how Figure 17 tells us that.

A Okay. It's because, once again, if this is poultry waste, these black -- pair array of black 04:44PM points and the zero to two-inch samples, the surface samples which would be an R, those samples having the highest phosphorus levels, poultry waste applied on top, that I could explain these data or appear to be something very similar to a conservative mixing 04:44PM trend. That is, I can mix in this -- the poultry waste in any one of these components. If I look at the phosphorus, copper, for example, I mix the poultry waste into the soil and I generate an array of points that fall along the anticipated mixing 04:44PM line, I mean, some may not show contamination, maybe, maybe not, but they fall along an anticipated mixing line, and the same is true of zinc and copper. Same is true, these points fall on this line. If they did not do that -- these were 04:45PM compositionally not influenced by this. You would -- they wouldn't be near that line at all. They would be somewhere else.

Q How is the contemplated mixing line determined for purposes of Figure 17? 04:45PM

676c5b0b-4391-4682-9dda-575b4bc95703

A For purposes of Figure 17, okay, that particular -- okay.
Q Is it statistically determined?
A Oh, okay. Yeah, this might make sense. This is the regression line through these points here, 04:45PM
and it's where it projects outward there. I'm sorry. Okay. Take this --
Q Let me stop you there. Figure 17 does not contain a mixing line, does it?
A Figure 17 does not contain a mixing line 04:45PM
because there's no end member shown on that particular graph.
Q Right. The line on Figure 17 is a regression line; correct?
A That's correct. It's a regression line 04:46PM
through the soils data points, the soils data points, and you take a look at where that regression line predicts an end member would be here, and basically hits the poultry litter. So this array
projects into the poultry litter data field. 04:46PM
Q Doesn't hit all the litter samples, does it?
A Doesn't have to.
Q Why not?
A Just has to come close.
Q How close? 04:46PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Passed through some of the points. Passes through the meat of that data.
Q Got to pass through most of the points?
A No. It needs to pass through the meat of the data. So if you take a look at how this is set up, 04:46PM
see, if that's that data field, it needs to pass through that. If it passed over here someplace, no, or here someplace, no, but it doesn't. It passes right up and is consistent with mixing poultry waste with things that have the composition of the soils. 04:46PM
Q What about the total copper and total phosphorus, the poultry litter black square that's off to the right-hand bottom?
A It's an anomaly. The bulk of it, it passes through. 04:47PM
Q So that particular sample, what can you tell us about its relationship to soils?
A Well, it doesn't appear to be related to those specific set of soils.
Q Okay. What about with respect to the -- well, 04:47PM
back up. Are there any others that are not related to the soils as near as you can tell from looking at Figure 17?
A These all look pretty good. With respect to phosphorus and zinc, this looks pretty -- well, hang 04:47PM

676c5b0b-4391-4682-9dda-575b4bc95703

on. I'm starting in the upper left-hand figure.
These all look pretty good.
Q Hang on. Let me stop you there. There are
some that are off the line, Dr. Fisher.
A Doesn't -- that's not really of any import. 04:47PM
They're close to the line.
Q Well, how close are they?
A They're visually close to the line. This is a
reasonable array.
Q Who defines reasonable? 04:48PM
A I do.
Q Okay, and you define that statistically?
A I define it on my years of experience as a
geochemist working with mixing problems.
Q You have years of experience in looking at the 04:48PM
relationship between poultry waste and soils?
A It doesn't matter whether it's poultry waste,
a piece of granite, a piece of basalt, stuff coming
out of a chemical plant. The chemical behavior with
respect to mixing and reaction are considered and 04:48PM
examined on a plot of this nature. That is how it
is done.
Q If another geochemist looked at the same set
of data and concluded that some of the samples that
you think are close enough to the line are not close 04:48PM

676c5b0b-4391-4682-9dda-575b4bc95703

enough, you would just disagree with that person?
A Absolutely.
Q And what would be your basis for challenging that opinion?
MR. GARREN: Object to form. 04:48PM
A It would be -- a basis for challenging the opinion is I'd ask him for what his basis was. I mean, these -- this is a standard methodology for interpreting mixing between components. I think that you might differ in including some points in 04:49PM mixing, but with respect to whether or not this data array is related to that data array, there is absolutely no question.
Q Dr. Fisher, with respect to the bottom left-hand plot -- 04:49PM
MR. GARREN: Can we go back and just have him identify the data array that he was pointing to that isn't otherwise identified in the Record?
MR. GEORGE: I think he circled.
Q Have you not, Dr. Fisher? 04:49PM
A I have circled it on that plot for zinc, and the same would be true of this plot for copper. And then I think Mr. George is directing me towards the arsenic.
Q Yeah, but I think we need to change the tape 04:49PM

676c5b0b-4391-4682-9dda-575b4bc95703

first.

VIDEOGRAPHER: We are now off the Record. The time is now 4:50 p.m.

(Following a short recess at 4:49 p.m., proceedings continued on the Record at 5:01 p.m.) 05:00PM

VIDEOGRAPHER: We are now on the Record. The time is 5:01 p.m.

Q Dr. Fisher, could you turn in your report to Opinion 24 beginning on Page 52. Your Opinion 24 is that groundwater within the Illinois River watershed 05:01PM is contaminated by poultry waste. Do you see that?

A Yes.

Q Dr. Fisher, can you identify for me any specific location within the Illinois River watershed where you have determined the groundwater 05:01PM is contaminated by poultry waste?

MR. GARREN: Object as to form.

A Before I answer this, let me tell you this. I'm really starting to get flag here. I'm getting kind of tired. So I'll do my best to assist you 05:01PM with this.

Q I suspect we're both getting equally tired. For the Record, Dr. Fisher, you've consulted what figure?

A I'm consulting Figure 22. There are two 05:02PM

676c5b0b-4391-4682-9dda-575b4bc95703

figures that relate to this. One is Figure 21 and the other is Figure 22. Figure 21 is entitled Groundwater Collection Locations Within the Illinois River Watershed, showing type of groundwater collection. So type of groundwater collection being 05:02PM spring samples, groundwater samples and geoprobe samples. It just identifies the locations of those, and Figure 22 is entitled Relationship Between the Concentrations of Dissolved Phosphorus, Dissolved Copper, Dissolved Zinc and Dissolved Arsenic Found 05:02PM in Groundwater Samples and Dissolved Phosphorus, Dissolved Copper, Dissolved Zinc and Dissolved Arsenic Found in Edge of Field Runoff Samples, and the edge of field samples are identified in red and the groundwater samples are identified in blue on 05:03PM these graphs, various kinds of blue points.

Now, you asked a question and said could I point at a specific location and identify groundwater contamination.

Q Contaminated by poultry waste. 05:03PM

A Poultry waste. What the short answer to that question is, that wasn't what I was doing or attempting to do with this. Rather it was to show that the materials in the edge of field samples, which would be the material that would be first 05:03PM

676c5b0b-4391-4682-9dda-575b4bc95703

mobilized by waters coming off of fields, infiltrating or running off, that those samples identified and form a data array that, in fact, seamlessly blends with the groundwater array. So what that says is those samples in the groundwater, 05:04PM
a groundwater, which are sitting here in this probably midrange of copper and zinc, are likely contaminated. So the groundwater and the edge of field samples meld together, and so the material from edge of field or from this runoff or 05:04PM
infiltrating stuff is consistent with the concentration arrays that we see in groundwater. So I can't point to a specific site and say, yeah, that one is contaminated. I haven't done that. I can do it. I have not done it. 05:04PM
Q If I asked you to circle the sampling locations that you believe based on your analysis of edge of field samples and ratios of phosphorus, zinc arsenic and copper, you are contaminated with poultry waste, you could not do that today? 05:04PM
A Not on a map, no.
Q What about on these charts; could you do that on Figure 22?
A I might be able to do it on the charts. I think I'd prefer to -- if I was doing a sample by 05:04PM

676c5b0b-4391-4682-9dda-575b4bc95703

sample, it would be a different type of analysis.
Q Different than what you've completed to date?
A That's correct.
Q So you have not come to your opinions in this
case prepared to offer that sample location by 05:05PM
sample location opinion as to contamination by
poultry waste; correct?
A That's correct.
Q Okay. Your Opinion 24 regarding groundwater
contamination is based upon your review of the data 05:05PM
shown in Figure 22; is that right?
A That's correct.
Q Okay. Did you use all of the groundwater and
edge of field samples in Figure 22?
A I believe I did, yeah. 05:05PM
Q Did you use all the spring samples and
geoprobe samples?
A I believe I did, yes.
Q What are the orange squares on Figure 22?
A The orange squares are the edge of field 05:05PM
samples or maybe midfield samples where there are
cattle present.
Q Has litter been applied to those locations?
A Ostensibly, no. I mean, they're represented
to me as having not been applied. 05:06PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q I wish you used a color other than orange. I have a hard time picking out the squares.
A I'm so sorry.
Q Could you, Dr. Fisher, circle on your report the cattle edge of field samples on each of the four plots? 05:06PM
A Let's do that on each of the four cross plots. I'm looking at the cross plots here. The zinc-copper one is a little tough because they're right in the middle here someplace. It's -- 05:07PM
MR. GARREN: Will the enlargement help?
A Oh, boy. They're varied. I can show you the general region.
MR. GARREN: Robert, we're looking at an enlargement of -- 05:07PM
A We're looking at the enlargement on the computer.
Q If it's underneath the dot and you can point me to the general vicinity, that's okay.
A It will be in there somewhere. 05:08PM
Q Okay.
A So with respect to --
Q Just for the Record, Dr. Fisher, you've drawn red circles as near as you can identify them around where the edge of field samples fall in Figure 22? 05:08PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Correct. On the arsenic, dissolved phosphorus plot, it's very obvious. On the dissolved zinc and dissolved phosphorus plot, it's obvious. On the dissolved copper, dissolved phosphorus plot, it's less obvious. There's one here. They may actually 05:08PM
-- just one overlies the other, and in here I know they appear because they're in the dataset but they're in there somewhere, and that's where they are going to appear.

Q Thank you. Dr. Fisher, do you agree with me 05:08PM that the ratios of phosphorus to arsenic, zinc, copper in edge of field cattle samples all fall within the range of ratios for those same constituents in edge of field samples where poultry litter was applied? All the circles seems to be in 05:09PM the cloud of --

A Some do. Here, again, what is happening here is we're moving. We have this, which has a very high level of phosphorus.

MR. ELROD: You're going to have to -- 05:09PM

Q I'm sorry. What is this?

A Let's start with this. If you look at the groundwater samples, we have some groundwater samples that are clearly sitting out at very high level of phosphorus, one in particular there, and 05:09PM

there are --

MR. ELROD: You are going to have to point -- you're going to have to describe on the Record which of the four boxes you're looking at.

A You're right. 05:09PM

Q Top left-hand corner.

A I'm looking at the dissolved phosphorus, dissolved zinc plot. In this case we have a groundwater sample, which I've also circled in red, a blue triangle, which is a spring sample. 05:10PM

Q Let me stop you. I think you are answering a different question.

A Okay. Sorry.

Q Let's try it again. If you are trying to answer my question, I apologize for interrupting you 05:10PM but, Dr. Fisher, do you agree with me that the ratios of phosphorus to arsenic, zinc and copper in the edge of field cattle samples that you've circled here --

A Oh. 05:10PM

Q -- are within the range of ratios that you see for those same constituents in the other edge of field samples that you believe are related to poultry litter, not groundwater or springs, but other edge of field samples? 05:10PM

676c5b0b-4391-4682-9dda-575b4bc95703

A No.
Q Explain that to me.
A They're in the array of some of the edge of field samples, but there are clearly edge of field samples which have much higher arsenic and 05:10PM
phosphorus values and a different ratio. You actually -- if you look at the arsenic-phosphorus plot, which might be a good example, there are two populations. There's a population that falls along that, a population that falls along this. There are 05:11PM
two lines that I've drawn on the graph. One population maintains very low arsenic concentrations even though phosphorus may increase the higher levels. The other circumstance is that as phosphorus is increasing beyond about five 05:11PM
milligrams per litter, it's the edge of field samples, the arsenic values go up really quickly.
Q Okay. Dr. Fisher, when I look at this chart, I see the cattle edge of field samples that you circle are surrounded by poultry litter edge of 05:11PM
field samples; correct?
A Well, they're surrounded by other edge of field samples, some of which may have had poultry litter applied.
Q So as a general matter, doesn't this tell me 05:11PM

676c5b0b-4391-4682-9dda-575b4bc95703

that edge of field samples from cattle fields resemble, in terms of their ratio of arsenic to phosphorus, edge of field samples from poultry litter fields?

A Only from some fields. They're similar to 05:12PM
some fields.

Q Similar to some fields. What about with respect to dissolved phosphorus and dissolved zinc; it appears that the cattle edge of field samples are completely within the array of data for poultry 05:12PM
litter edge of field samples; do you agree?

A Okay. In this data array there -- say that again.

MR. GEORGE: Can you read it back?

(Whereupon, the court reporter read 05:12PM
back the previous question.)

A The pattern on this graph is similar to the pattern for dissolved arsenic. There appear to be two populations. So population that in -- almost independent, has a lot of variability, almost 05:13PM
independent. Dissolved phosphorus concentration has a relatively consistent level of dissolved zinc for the edge of field samples and then a population where zinc levels rise pretty precipitously, and I've drawn those lines on this graph as well with 05:13PM

676c5b0b-4391-4682-9dda-575b4bc95703

increasing phosphorus concentrations, and the break point appears to be around one part per million phosphorus.

Q You do agree with me, do you not, Dr. Fisher, that the cattle edge of field samples are 05:13PM chemically, in terms of the ratio between dissolved phosphorus and dissolved zinc, similar to some of the poultry litter edge of field samples?

A They're similar to some of the edge of field samples which we believe may have contained poultry 05:13PM litter, but these are also -- they're consistent with the ones that have the lower phosphorus concentrations.

Q How can you differentiate cattle -- I'm sorry. Strike that. How can you exclude cattle and runoff 05:13PM from cattle fields that have not received poultry litter as the source of contamination for groundwater based upon the similarities that you see in Figure 22 between those two datasets?

A Okay. In this instance, groundwater that 05:14PM would contain high levels, particularly high levels of copper or high levels of zinc, to the extent it would contain, the zinc is pretty low, but high levels of copper are going to be associated with poultry litter because the same trend seems to 05:14PM

676c5b0b-4391-4682-9dda-575b4bc95703

appear in all of these. There is something that has a lot of variability at low levels of phosphate and a more structured dataset at high levels of phosphate.

Q There are R squared values reported for Figure 22 in each of the cross plots; do you see that? 05:14PM

A Yes.

Q Okay, and let's look, for example, at dissolved copper to dissolved phosphorus. What did you report as the R squared value? 05:15PM

A Dissolved copper to dissolved phosphorus, and that's the edge of field sample, regression is .96 roughly.

Q Now, if you look at the actual scatter of the, as we discussed earlier, from edge of field sample, you would agree with me there's a good bit of scatter association with the edge of field samples that are plotted; right? 05:15PM

MR. GARREN: Object to the form.

A Right. Sorry. It appears to be scattered but it's -- what you're looking at here, the R squared is a parametric statistic. R squared is going to be very high because this -- these data here, the data, the higher numbers are phosphorus and copper, are going to dominate its computation. The reason you 05:15PM

676c5b0b-4391-4682-9dda-575b4bc95703

see what appears to be scatter is you are looking at a log-log plot. So here you are looking at the -- remember the business about the R squared? R squared you can interpret on a Cartesian space pretty easily, but here we are looking at really 05:16PM
pretty small deviations, I mean, small -- numbers that are very small, here numbers that are relatively much larger, so this is sometimes called press, that it's going to dominant the computation of the R squared. It's going to make it appear that 05:16PM
it's a very high number.

Q A single data point can do that?

A Well, this group of data points will do that.

Q Okay. Do you seriously believe --

MR. ELROD: You're going to have to say 05:16PM
what this is. I mean, the Record is not going to show what you're talking about.

Q Which series of data points you are referring to, Dr. Fisher?

A I'm referring to the data points at higher 05:16PM
phosphorus, dissolved phosphorus levels.

Q In the top right-hand chart on Figure 22?

A That's correct.

Q Do you believe those R squared values reflected on that particular cross plot are 05:16PM

676c5b0b-4391-4682-9dda-575b4bc95703

accurate?
A I believe that they reflect the computation made by the computer, and I think that's probably accurate.
Q You don't seriously believe from what you see there, that the statistical significance of the relationship is .96, do you? 05:17PM
A Well, that doesn't speak to statistical significance. It's simply the computed R squared value, which we discussed earlier. If this were placed on a linear plot, it would look quite different from this. This enhances the scatter at these lower numbers and expands the skill. This would all appear -- on these graphs, these numbers that are, say, less than one would all appear pretty much as one large dot. 05:17PM
Q Let's go to Page 52, under Opinion 25, which relates to stream sediments. On the third line from the bottom on Page 52 you say, total zinc in stream sediments is somewhat enriched compared to poultry waste. Do you see that? 05:18PM
A I do.
Q What do you mean by that?
A Okay. This was -- we discussed this earlier today in terms of transport and reaction, and in 05:18PM

676c5b0b-4391-4682-9dda-575b4bc95703

this case we're looking at mixing lines. If I have conservative mixing between something with a composition of the control soils and poultry waste, the bulk of the zinc points plot on an array certainly that's pointed towards poultry waste, but 05:18PM it sits above the conservative mixing line, and that says it's somewhat enriched in zinc.

Q And you're referring as an example in Figure 24 to the top left-hand cross plot for total zinc versus total phosphorus? 05:19PM

A I am.

Q Okay. On the next page, on Page 53 of your report, you say that total copper is somewhat depleted compared to poultry waste?

A That's correct. 05:19PM

Q What do you mean by that?

A Okay. In that case, if I take a look at what I compute as a mixing line between control soils and poultry waste on the plot of total copper versus total phosphorus, there is a linear array or an 05:19PM array of points on this plot that project towards poultry waste but fall largely below the mixing line. So that says there's less copper than you'd anticipate from purely conservative mixing between control soils and poultry waste. 05:19PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Okay. A little further on Page 53 you say, total arsenic is substantially enriched compared to poultry waste?

A Right. This is the -- this is something that we discussed earlier. Here if you take a look at 05:19PM the poultry waste materials, there seem to be two populations within the poultry waste that was collected by CDM. One population, relatively low arsenic, that is, say, less than 10 milligrams per litter -- milligrams per kilogram rather and another 05:20PM population that's higher than 10 milligrams per kilogram. Two different populations, low versus high.

Okay. So if you are taking a look at mixing, you really -- you can't generate any of these points 05:20PM over here with points that are less than 10 milligrams per litter because they exceed -- I mean, 10 milligrams per kilogram, excuse me, because they in fact exceed 10 milligrams per kilogram. You can only generate them from this through conservatively 05:20PM mixing.

Q And, Dr. Fisher, you've circled two groups on the bottom left-hand cross plot on Figure 24, one that is below the mixing line and the other that is at the end of the mixing line; is that correct? 05:21PM

676c5b0b-4391-4682-9dda-575b4bc95703

A That's correct. I may have included a point that we should leave out of that circle, the one directly on the mixing line, but the thing that is remarkable about this is that the arsenic levels in the stream sediments are quite high. Some of them 05:21PM are unlikely to be the result of poultry waste. Those would be these that I'm circling up near the top that are in the same data range of arsenic as poultry waste.

Q You've circled a group of about five or six 05:21PM samples --

A That's correct.

Q -- above the cloud of red dots? Can you write not poultry waste above that so we'll know what you're talking about. 05:21PM

A Well, let's write suspect samples. Suspect samples, samples here. Simply they just have a tremendous amount of arsenic in them and they have another source. The other -- there is an alternative explanation. 05:22PM

Q Let's hear it.

A Arsenic is a material that could indeed become concentrated in sediments because of its chemical interaction with organic materials. So that's possibly being captured in stream sediments. 05:22PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Dr. Fisher, based upon the statements that we read from Page 52 and 53 of your report, is it fair to say that for stream sediments, the relationship of phosphorus concentration to zinc, copper and arsenic concentration do not match those of poultry 05:22PM litter?

MR. GARREN: Object to form.

A I'm sorry. What they don't do is they don't match perfect conservative mixing. With respect to copper and zinc, the following observations can be 05:22PM made: One, that as phosphorus increases, in both instances copper and zinc both increase; that when I look at the population of points, the data array of the population of stream sediment points, it's pointing in the right direction towards poultry 05:23PM waste. The deviation from conservative mixing with respect to zinc being somewhat enriched and copper being somewhat depleted are completely consistent with the known chemical behaviors of copper and zinc. If that were reversed, if zinc were depleted 05:23PM and copper were enriched, it clearly would be something very different than poultry waste from a source far away or far away being in a field being transported to a stream. These stream sediments are residual solids that have interacted with a lot of 05:23PM

676c5b0b-4391-4682-9dda-575b4bc95703

fluid, which you would anticipate finding chemically is materials that are soluble having been leached or removed from those particular sediments.

Q Given that the concentrations in stream sediments for those four constituents don't match 05:24PM those same concentrations in poultry litter, how do you draw the conclusion that stream sediments in the watershed are contaminated by poultry waste?

MR. GARREN: Object to form.

A We draw the conclusion just as I have 05:24PM described moments ago, that is, that in poultry waste we observe that as phosphorus increases, both copper and zinc increase. We also observe that the general slope of the data array for the stream sediment points projects toward the poultry waste 05:24PM and that the deviations from ideal or mixing are in the direction that one would anticipate for solids that have undergone a substantial interaction with fluids.

So the gross chemistry and behavior of the 05:24PM chemistry in between zinc, phosphorus and copper is what one would anticipate having taken place if I'm mixing poultry waste with -- we call them geologic solids or soils and then eroding them and transporting them into streams. So it's completely 05:25PM

676c5b0b-4391-4682-9dda-575b4bc95703

consistent with that model.
Q So, Dr. Fisher, if I understand very basically the -- your opinion as to the explanation for why these ratios don't match exactly is that the differences are explained by chemical processes that 05:25PM occur in transport; is that fair?
A That's fair.
Q Okay. What have you done to test that theory that the differences that you see in the data are the product of physical processes that occur in 05:25PM transport in the Illinois River watershed?
A Okay. The differences in the data, that's based on knowledge of chemical behavior of copper and zinc. There's no specific test that's been applied, but I should amend this answer. If you are 05:26PM trying to look at what's going on with cattle waste, cattle waste just doesn't have much copper in it, and so if I have copper values that are sitting down here around one milligram per kilogram, they couldn't possibly be contributing any of this copper 05:26PM that we're seeing here.
Q Hang on. You've interjected cattle waste. Cattle waste is not even on Figure 24, is it?
A You're right, it's not on Figure 24.
Q Okay. My question was what have you done to 05:26PM

676c5b0b-4391-4682-9dda-575b4bc95703

test your theory that the differences in concentration that you see plotted in Figure 24 between stream sediments and poultry litter is the product of physical processes that occur in transport? 05:26PM

MR. GARREN: Object to form.

Q Have you done anything to test that theory?

MR. GARREN: Same objection.

A Sure. I've looked at the data and determined that copper seems to be stripped from -- it's 05:26PM complete -- the behavior of the solids in this system, completely consistent with what you'd anticipate. There is no specific test. You could put -- I suppose one could make a test, but there's no real reason to do this since we understand the 05:27PM behavior of copper and zinc in aqueous systems.

Q Your interpretation of these charts and the physical processes that explain the differences is simply the product of your understanding of chemical processes; is that fair? 05:27PM

A That's correct, as would be the description of that by any geochemist.

Q Let's go to Opinion 28.

MR. ELROD: What number?

MR. GEORGE: 28. 05:27PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Opinion 28, you're discussing concentrations of these -- of phosphorus in particular in Lake Tenkiller sediments; correct?
A Yes.
Q Have you compared the ratios of concentrations of phosphorus to arsenic, zinc and copper in lake sediments to poultry litter as you did with stream sediments? 05:28PM
A No.
Q Why not? 05:28PM
A The concentrations of these materials -- I can but I haven't. Concentration of these were fairly low compared to -- you're going to be in the lower range of the stream sediments here with respect to phosphorus, for example. That could be done, and maybe I did do it. 05:29PM
Q Well, maybe you misunderstood my question. With respect to stream sediments, you provided, as is shown in Figure 24, a comparison of the concentration, not just of total phosphorus to poultry litter, but total copper, total zinc and total arsenic; correct? 05:29PM
A That's correct.
Q Okay. With respect to the Lake Tenkiller sediments, why, Dr. Fisher, have you not provided a 05:29PM

676c5b0b-4391-4682-9dda-575b4bc95703

comparison of the sediment concentrations of copper, zinc and arsenic to poultry litter?

A Honestly, Mr. George, I thought I had.

Q Do you believe you have done that work?

A Boy, howdy. Yeah, I believe I've done that 05:30PM work. I don't know how it would have ever been omitted from this but maybe it was.

Q You'll agree with me that what we see in the discussion under Opinion 28, as well as Figures 26 and 27 that are referred to, focuses only on 05:30PM phosphorus; right?

A It focuses largely on that, yeah.

Q Does it focus at all on zinc, copper and arsenic?

A No. Well, it's really focused on the temporal 05:30PM behavior of phosphorus in the lake. It also shows the temporal behavior of zinc, arsenic and copper.

Q But it doesn't compare the concentrations of zinc, copper and arsenic in lake sediments to the concentrations of those same constituents in poultry 05:31PM waste, does it?

A Not specifically. That could be done, though.

Q Okay. If we do that analysis, Dr. Fisher, and the ratio of zinc, copper and arsenic in Lake Tenkiller sediments is substantially different from 05:31PM

676c5b0b-4391-4682-9dda-575b4bc95703

the ratios of those same constituents in poultry waste, wouldn't that prove that these sediments are being substantially impacted by something other than poultry waste?

A No, not necessarily, and the reason is we're now looking at the very end of the system where one would anticipate a fairly extreme depletion of copper, and so I'm not sure that what you would be seeing would be additional processing similar to what you'd see with the stream sediments is what I anticipate seeing. The significant thing in looking at Figure 29 -- and there should be -- is that as phosphorus goes up, the other materials also increase in concentration, but you would see -- you would see the result of additional fluid processing of these solids. 05:31PM 05:32PM 05:32PM

Q On Figure 29 you compare concentrations of phosphorus, arsenic, copper and zinc in lake sediments to something that you refer to as control soils; is that right? 05:32PM

A Correct.

Q Okay. What do you think that shows us?

A Well, it's showing that the basal sediments, the sediments -- the oldest sediments in the lake, if you project all the chemical trends back in time, 05:32PM

are tending towards lower concentrations and at least for sediment phosphorus and sediment copper and possibly sediment arsenic and zinc as well are tending towards what we call the control soil range, at least with respect to that particular dataset. 05:33PM

Q Why do you have a different date for the control soil for copper -- I'm sorry, control soil for copper than you do for zinc, phosphorus or arsenic?

A Well, I, in effect, don't actually have a 05:33PM date. There's no date significance. That's a present day sample for the control soils, and so it's shown there as a range. It's just moved to get it out of the way of that point that sits to its left. 05:33PM

Q Where did you get this control soil sample?

A The control soil samples are from CDM data.

Q Well, I mean, where was it collected from?

A They were collected from areas that had not been agriculturally modified within the watershed, 05:34PM and they're identified within Roger Olsen's report.

Q You don't have a trend analysis for control soils over time that you have for sediment samples; correct?

A Well, no, because there are no samples of 05:34PM

676c5b0b-4391-4682-9dda-575b4bc95703

so-called control soils over time aside from looking at the lowest concentrations of materials in soils submitted for analysis to agricultural laboratories. One could do that, but that would be a little thin on control. 05:34PM

Q Let me make sure I understand what this control soil sampling is. It's actually somebody at CDM scooping up some dirt in the watershed; is that right?

A Well, that's a little less dignified than what 05:34PM happened, but these are from CDM identifying areas that were not modified by agricultural activity and collecting soil from them.

Q How do the particle sizes of sediments or soils affect the concentration of constituents such 05:35PM as phosphorus, arsenic, zinc and copper?

A Well, the finer grain materials in the lake sediments will tend to enhance the concentrations at least of some metals and possibly of phosphorus. The soils themselves, these soils are going to be 05:35PM fairly fine-grained materials that are actually analyzed because the rocks and stones are taken out.

Q Well, they're not as fine grained as sediments at the bottom of Lake Tenkiller, are they?

A No, but they do seem to represent -- they do 05:35PM

676c5b0b-4391-4682-9dda-575b4bc95703

seem to be aware of the sediments at the bottom of Lake Tenkiller are trending and they would be the materials from which the stuff in Lake Tenkiller is derived since those soils, when they're eroded, along with whatever particular constituents of 05:36PM
poultry waste and maybe the odd cow pie, also end up as sediments in Lake Tenkiller.

Q Is it an odd occurrence to encounter a cow pie in the Illinois River watershed?

A I've never encountered one in the water. I'll 05:36PM
put it that way. That was kind of a flip comment, but the constituents that are put on the land end up in the drainage, end up in Lake Tenkiller.

Q As a general matter with respect to particle size, would you agree with me the smaller the 05:36PM
particle, that generally the higher the concentration of a particular metal or phosphorus you would expect to find, less surface area; isn't that the concept?

A Well, no. It's actually -- in part has to do 05:36PM
with the specific chemistry of that material and to some extent to post depositional change, but in general, finer materials are going to contain somewhat higher levels of metals than coarser materials. 05:37PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Did you compare particle sizes in the control soil samples to particle sizes in the lake sediments?
A I did not.
Q Okay. In light of that, Dr. Fisher, how do you control for the possibility that the differences in particle size between control soil samples and lake sediment samples are what explain the differences in concentration between those two media? 05:37PM
A I would simply say that the basal sediments appear to be trending towards the control soil concentration.
Q I don't know what that means.
A Well, the earliest sediments are low in concentration. The later sediments are high in concentration. There doesn't appear to be any particle size change between the youngest and the oldest materials, and so that's control of particle size because there's no variation there, and the soils seem to be in the right concentration range of the basal part, the oldest materials. So the data array of the sediments in time say that the earliest sediments look like these control soils. 05:37PM
Q Is it reasonable in light of differences in 05:38PM

676c5b0b-4391-4682-9dda-575b4bc95703

particle size to compare your control soil samples to, say, the sediment samples laid down in 2005?
A I'd say that if I would review the control soil data, that might well be true. I've not looked at the particle size issue because I didn't believe 05:38PM
that at the time this data was so consistent with the temporal trend in the chemistry of the lake sediments, that it would have in all likelihood been reflective of the uncontaminated material entering the lake. 05:38PM
Q Dr. Fisher, you haven't attempted to control for particle size in this analysis, have you?
A No.
Q Okay. On Page 58 of your report about halfway into the paragraph you state, this pattern of 05:39PM
temporal concentration increase for total phosphorus, total copper, total zinc and total arsenic as observed in the Tenkiller sediments is consistent with the chemistry of poultry feeds and poultry wastes? 05:39PM
A Yes.
Q Can you explain to me what you mean by the word consistent?
A It says as total phosphorus increases in this lake, the concentrations certainly of copper and 05:39PM

676c5b0b-4391-4682-9dda-575b4bc95703

zinc show a consistent increase. Phosphorus
increases over time. Copper and arsenic also
increase over time. When you cross plot -- it's not
displayed, but if you cross plot the sediment
phosphorus against zinc or sediment copper or 05:39PM
sediment arsenic, you find consistent relationship
that shows as phosphorus goes up, they go up. So
all these constituents increase over time and
they're all linked to the total phosphorus
concentration. 05:40PM
Q Dr. Fisher --
A I'm sorry. And poultry feeds we know contain
elevated amounts of copper, zinc and arsenic, and
poultry waste contain elevated amounts of copper,
zinc and arsenic. 05:40PM
Q What do you mean by your statement that this
trend of increasing copper, arsenic, zinc and
phosphorus is consistent with the chemistry of
poultry feeds and poultry waste?
A With respect to poultry wastes, as phosphorus 05:40PM
-- high phosphorus indicates higher copper and zinc
and arsenic. With respect to poultry feeds, we know
that phosphorus is added to these feeds. They're
very high in phosphorus. Copper and zinc compounds
are added to these feeds, and to many of the feeds, 05:40PM

676c5b0b-4391-4682-9dda-575b4bc95703

arsenical compounds have been added, so that an increasing trend in phosphorus associated by simultaneous increases in copper and zinc and arsenic are indicative of a poultry signature.

Q Where's the statistical analysis to validate that statement, Dr. Fisher? 05:41PM

MR. GARREN: Object to form.

A What statistical analysis are you referring to?

Q Did you perform any statistical analysis to validate that statement? 05:41PM

A I performed cross plots of these variables to look at their internal relationships.

Q Well, but your statement assumes that poultry litter is the source of sediment copper, sediment arsenic, sediment zinc and sediment phosphorus; correct? 05:41PM

A No. My study concludes that it is the source of the materials because there are no other sources rich enough in phosphorus to possibly be the source of that material. 05:41PM

Q The wastewater treatment plants are not rich enough in phosphorus to be the source of phosphorus found in the sediment samples on Lake Tenkiller; is that your opinion? 05:42PM

676c5b0b-4391-4682-9dda-575b4bc95703

A They are not rich enough in phosphorus to be that source and they don't contain the same sorts of levels of copper and zinc.

Q Does your -- I'm sorry. Go ahead.

A Go ahead. 05:42PM

Q Does your analysis assume that there must be one and only one increasing source in the basin to account for increases in sediment concentration of these four constituents?

A No, no. This analysis looks at -- considers 05:42PM the mass balance of phosphorus within the basin. It considers the composition of poultry waste and it considers the composition of poultry feed. It also considers the history of the growth of the poultry industry within the Illinois River watershed. What 05:42PM emerges from that consideration is a self-consistent picture in which the concentration of phosphorus within Lake Tenkiller's sediments increases over time. Simultaneously, there are increases in arsenic, copper and zinc. That's consistent with 05:43PM what we know about the composition of poultry waste and poultry feed. We also know that edge of field samples -- we see a chain of events from soils to edge of field samples to stream sediments, on into lake sediments, in which we have the same consistent 05:43PM

676c5b0b-4391-4682-9dda-575b4bc95703

showing of increases in copper, zinc and arsenic with increasing phosphorus and deviations with respect to stream sediments, at least, from ideal mixing are explicable in terms of chemical removal of copper. 05:43PM

Lastly, when one takes a look at the chain -- other potential sources here, whether they be humans, whether they be cattle, other animals, other kinds of livestock or they be poultry, and you look at the shape, the general trend and form of the 05:44PM increase in phosphorus in the lake cores material as a function of time, it is more closely modeled by the change in broiler population or poultry population than by any other potential source.

Q Your last statement, Dr. Fisher, was referring 05:44PM to the analysis that you put forward in the last figure to your expert report; is that correct?

A Figure 33, yes.

Q Figure 33, okay. Would you agree that cattle waste and effluent from wastewater treatment plants 05:44PM contain zinc, phosphorus, copper and arsenic?

A Yes.

Q Okay. Do you agree the population of people and cattle have increased over the last three decades in the watershed? 05:44PM

A Yes.
Q In the next sentence on Page 58 you say, this association of chemicals shows the influence of poultry waste on Lake Tenkiller sediments from land disposed poultry waste and is consistent with the 05:45PM
conceptual fate and transport model of poultry waste?
A I see that.
Q Can you describe for me in more detail your conceptual fate and transport model for poultry 05:45PM
waste?
A Sure. It's pretty straightforward. The poultry waste being disposed on fields is removed from fields both in solution and its particulates and its material that's interactive with soil 05:45PM
through runoff and leaching. That material enters surface water and groundwater and ultimately ends up in streams within the Illinois River watershed. The sediments that are present within those streams reflect this input of material that's high in 05:45PM
phosphorus and shows also high levels of -- concomitant levels of copper and zinc and frequently of arsenic, and that material ends up in Lake Tenkiller. The materials in Lake Tenkiller that appear to be poultry waste based upon their high 05:46PM

676c5b0b-4391-4682-9dda-575b4bc95703

phosphorus levels, their high copper and zinc levels and their elevated arsenic levels, those materials increase over time sedimentation within the lake, and that change, their relative change, especially in phosphorus, which is the largest signal signature 05:46PM
-- phosphorus is mainly particle associated. That is consistent with the observed growth trend of poultry within the watershed, much more consistent with that than anything else or any sum of any other animal constituent in the watershed. 05:46PM
Q Dr. Fisher, what analysis did you perform to exclude the influence of other watershed inputs as explaining the chemistry in Lake Tenkiller sediments?
A Okay. The chemical mass balance is the single 05:47PM
one that shows that poultry is the largest.
Q I'm asking what you did.
A Well, I examined all the data that was relevant to this or I believed relevant to this that was developed by myself and other workers here and 05:47PM
combined those into a model to explain the chemical data that I observed in sediment cores.
Q And what specific part of that analysis relates to an exclusion or your attempt to exclude the influence of, let's say, wastewater treatment 05:47PM

676c5b0b-4391-4682-9dda-575b4bc95703

plants as explained in the chemistry and sediments at the bottom of Lake Tenkiller?

A Okay. Well, I've never said that wastewater treatment plants don't make some contribution.

Q How much do they make? 05:47PM

A They make a contribution that would be in some way proportional to their contribution to the phosphorus mass balance. I've forgotten that number, but it's pretty small.

Q You haven't quantified it? 05:48PM

A Pardon?

Q You haven't quantified it?

A I've not personally quantified it, but it certainly is present in Meagan Smith's report, which is in Bernie Engel's report. 05:48PM

Q On Page 58, the two sentences that we've been discussing, Dr. Fisher, are you saying that the levels and ratios of these four constituents that you see in Lake Tenkiller sediments could never be generated unless you have poultry waste land applied in the watershed? 05:48PM

MR. GARREN: Object to form.

A I think you're talking -- you made a compound question. You talk about levels and ratios?

Q Sure. 05:48PM

676c5b0b-4391-4682-9dda-575b4bc95703

A I would say that the only reasonable explanation of the phosphorus, zinc, copper and arsenic levels that are present in Lake Tenkiller sediments, the best explanation is that they arise as the poultry industry within the Illinois River 05:49PM watershed grows and disposes of increasing amounts of waste within the watershed over time.

Q If I went to another watershed and gathered lake sediment samples and that watershed did not include poultry, is it your opinion that you would 05:49PM not expect me to find the same concentration of phosphorus, arsenic, zinc and copper?

MR. GARREN: Object to form.

A I don't think I said that. You might. It would depend upon the geology of that watershed. It 05:49PM would depend upon what chemical inputs went into that lake. It would depend on a lot of things. If there weren't any poultry in the watershed, it would have nothing to do with poultry.

Q But if I went to a watershed that didn't have 05:49PM poultry and I found the exact same trend or ratio of those four constituents in lake sediments, wouldn't that call into question your theory?

MR. GARREN: Object to form.

A No. 05:50PM

676c5b0b-4391-4682-9dda-575b4bc95703

Q Why not?
A Well, because the functional form of the increase in phosphorus especially but the lockstep variation of all of these materials, I don't think -- put it this way: I don't think you'll find 05:50PM
a watershed in which that's true, in which if you didn't have poultry inputs, you would find the same pattern of phosphorus, and you would not find the same pattern of relationship between phosphorus and the other constituents we've been discussing. 05:50PM
Q Dr. Fisher, in light of that, did you examine any sediment samples collected from Lake Stockton or Broken Bow where you did some sampling in this case?
A I was never concerned with those lakes.
Q You never did any sampling on those lakes? 05:50PM
A I never did any sampling on those lakes.
Q Are you aware those lakes were sampled by the expert team assembled by Motley Rice in this case?
A Yes.
Q Okay, and do you know whether sediment samples 05:51PM
were collected from those two supposed controlled watersheds?
A I don't recall. I don't know. Put it this way.
Q You didn't ask for any sediment samples to be 05:51PM

676c5b0b-4391-4682-9dda-575b4bc95703

collected?
A No.
Q So we don't have available to us, do we, an example of what a sediment core analysis would look like in a watershed that's not impacted by poultry? 05:51PM
MR. GARREN: Object to form.
A There's certainly no sediment core analysis from a watershed like that, and I would have to look, by the way, Mr. George, at the specifics of those sampling to see if it even would have been 05:51PM possible to obtain a core from those.
Q Well, how could it not be possible?
A Well, it could not be -- it might not be possible if there was insufficient history or insufficient sediment present or if the sediment was 05:51PM particularly mixed and could not be dated. I mean, there are a number of reasons why you couldn't do that work.
Q Do you have any reason to think that's the case in Broken Bow or Lake Stockton? 05:52PM
A I've not reviewed the information. Broken Bow does get poultry inputs.
Q It does?
A Yeah.
Q Substantial poultry inputs? 05:52PM

A Mainly from the Arkansas side of the -- gosh, I can't think of the name of the river offhand but, yes, it gets some poultry inputs. Substantial, I haven't made a judgment as to whether it's substantial. 05:52PM

Q Based on your review of the information, you would expect the water in Broken Bow to be impacted by chicken waste to some impact?

A It might show some impact.

Q You jogged a thought. Let me jump forward a little bit. Let me hand you what we'll mark as Exhibit 15 to your deposition, which, Dr. Fisher, is a map of the Broken Bow watershed which I obtained from your considered materials. Do you recognize that map? 05:52PM 05:53PM

A I do.

Q And did you assemble that or prepare it or someone working under your direction assemble or prepare it?

A May have. I mean, it's an ARKEY map. We could have prepared that or it could have been prepared by CDM. It looks more like something prepared -- that may have been prepared in our shop by one of my employees. 05:53PM

Q What does Exhibit 15 show us? 05:53PM

676c5b0b-4391-4682-9dda-575b4bc95703

A Exhibit 15 shows Broken Bow Lake and the watershed of the Mountain Fork River, and it shows the very rough locations of chicken houses that were interpreted from some air photo data.

Q Okay. The red Xs that appear throughout the Broken Bow watershed are the location of poultry houses? 05:54PM

A Yes.

Q Okay, and who actually identified those poultry houses? 05:54PM

A I don't remember. That was almost certainly done in our shop. It could have been Mr. Hight or it could have been Melissa Barton who worked for me.

Q In the top right-hand corner of Exhibit 15 it says poultry house count, 292. Do you see that? 05:54PM

A Correct.

Q Do you interpret that as a representation that within this watershed someone on the State's expert team had identified 292 poultry houses?

A Yes. 05:54PM

Q Some of those poultry houses appear to be located in close proximity to the river or stream; correct?

A In the Arkansas portion, yes, they are.

Q Even in the Oklahoma portion, right, you see 05:54PM

676c5b0b-4391-4682-9dda-575b4bc95703

some that are right along the stream?
A There are a couple of locales, yes.
Q Okay. What was the purpose, if you know, of creating Exhibit 15?
A I think we were simply asked to review, as I'm recalling, review the circumstances where poultry houses might exist within the watershed of the Mountain Fork River. 05:55PM
Q In light of the number of poultry houses present in the Broken Bow watershed, Dr. Fisher, do you believe that this is a watershed that fairly represents water quality in the absence of poultry? 05:55PM
MR. GARREN: Object to form.
A I think it may adequately represent water quality with not so many poultry -- not so much poultry. It's clearly not in the absence of poultry because there are poultry present. 05:55PM
Q Have you evaluated poultry house density in this watershed?
A I have not. 05:55PM
Q There are plenty of watersheds that don't have any poultry in the United States; correct?
MR. GARREN: Object to form.
Q That's an easy question.
A Well, there certainly are, but they aren't in 05:56PM

676c5b0b-4391-4682-9dda-575b4bc95703

this region.
Q None -- what do you mean by this region?
A Well, this region being within the general climatic -- in fact, this is in geologic circumstances that we're looking at within the 05:56PM
Illinois River watershed. So this is not an Ozark lake either. This is a folded Appalachian-type lake.
Q Right. Lake Stockton is an example of a watershed that has very little poultry in it; 05:56PM
correct?
MR. GARREN: Object to form.
A I don't recall. There is poultry in Lake Stockton watershed I'm pretty sure.
Q You think there is? 05:56PM
A I think there is, but I can't recall.
Q Have you mapped it or seen a map of it?
A I think -- my recollection, Mr. George, is -- I don't think it was ever mapped. I think what was done there was looked at the Agricultural Census 05:56PM
data. There may be some. There's some poultry. Basically I'm tired and I don't remember. So -- before I really corrupt the Record, let's stop.
Q Hang on. We've got five minutes. Let's quit at the end of the tape. This next subject is real 05:57PM

676c5b0b-4391-4682-9dda-575b4bc95703

easy for you. Exhibit 16, which I'll hand you, is a series of documents obtained from your considered materials that reflect I believe the results or work product of some sediment core analysis that you have been performing in Spavinaw Lake; is that right? 05:57PM

A This was work done by Bethrika Morundinati.

Q It's not work you completed?

A She's my graduate student.

Q Okay. You haven't been involved in this project? 05:57PM

A I've been involved in the project, but she was the one who did the work.

Q When was this work done?

A This work would have been done I believe in '04 or '05. I could check notes, but I think she 05:57PM was doing that work early on.

Q Why were you analyzing sediments in Lake Spavinaw?

A The work that was being done in Lake Spavinaw here and I think in Lake Eucha as well, she was 05:58PM trying to finish her masters degree, and this was a project that she was interested in pursuing. We had the instrumentation to pursue dating of these sediments.

Q Okay. Is that work at all related to or being 05:58PM

676c5b0b-4391-4682-9dda-575b4bc95703

used in any ongoing matters related to the City of Tulsa lawsuit?

A No, sir.

MR. GEORGE: Let's break for the day.

VIDEOGRAPHER: We're now off the Record. 05:58PM

The time is 5:58 p.m.

(Whereupon, the deposition was recessed at 5:58 p.m.)

676c5b0b-4391-4682-9dda-575b4bc95703

SIGNATURE PAGE

I, Berton Fisher, PhD, do hereby certify that the foregoing deposition was presented to me by Lisa A. Steinmeyer as a true and correct transcript of the proceedings in the above styled and numbered cause, and I now sign the same as true and correct.

WITNESS my hand this _____ day of _____, 2008.

_____

BERTON FISHER, PhD

SUBSCRIBED AND SWORN TO before me this _____ day of _____, 2008.

_____

Notary Public

My Commission Expires:

_____

676c5b0b-4391-4682-9dda-575b4bc95703

C E R T I F I C A T E

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

I, Lisa A. Steinmeyer, Certified Shorthand Reporter within and for Tulsa County, State of Oklahoma, do hereby certify that the above named witness was by me first duly sworn to testify the truth, the whole truth and nothing but the truth in the case aforesaid, and that I reported in stenograph his deposition; that my stenograph notes were thereafter transcribed and reduced to typewritten form under my supervision, as the same appears herein.

I further certify that the foregoing 325 pages contain a full, true and correct transcript of the deposition taken at such time and place.

I further certify that I am not attorney for or relative to either of said parties, or otherwise interested in the event of said action.

WITNESS MY HAND AND SEAL this 12th day of September, 2008.

_____

LISA A. STEINMEYER, CRR
CSR No. 386

676c5b0b-4391-4682-9dda-575b4bc95703

1 CORRECTIONS TO THE DEPOSITION OF
BERTON FISHER, PhD
2 Volume I
3 PAGE AND LINE NUMBER CORRECTION
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

676c5b0b-4391-4682-9dda-575b4bc95703

IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA,	)
Plaintiff,	)
vs.	)4:05-CV-00329-TCK-SAJ
TYSON FOODS, INC., et al,	)
Defendants.	)

- -

VOLUME II OF THE VIDEOTAPED DEPOSITION OF BERTON FISHER, PhD, produced as a witness on behalf of the Defendants in the above styled and numbered cause, taken on the 4th day of September, 2008, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

A P P E A R A N C E S

FOR THE PLAINTIFFS: Mr. Richard Garren
Attorney at Law
502 West 6th Street
Tulsa, OK 74119

FOR TYSON FOODS: Mr. Robert George
Attorney at Law
2210 West Oaklawn Drive
Springdale, AR 72762

FOR CARGILL: Ms. Theresa Hill
Attorney at Law
100 West 5th Street
Suite 400
Tulsa, OK 74103

FOR SIMMONS FOODS: Mr. John Elrod
Attorney at Law
211 East Dickson Street
Fayetteville, AR 72701

FOR PETERSON FARMS: Mr. Scott McDaniel
Attorney at Law
320 South Boston
Suite 700
Tulsa, OK 74103

FOR GEORGE'S: Mr. Woodson Bassett
Attorney at Law
221 North College
Fayetteville, AR 72701

FOR CAL-MAINE: Mr. Robert Sanders
Attorney at Law
2000 AmSouth Plaza
P. O. Box 23059
Jackson, MS 39225
(Via phone)

c2f2b933-291b-460c-9c73-0f3e968532c2

-and-
Mr. Robert Redemann
Attorney at Law
1437 South Boulder
Tulsa, OK 74119
(Via phone)

FOR WILLOW BROOK: Ms. Jennifer Griffin
Attorney at Law
314 East High Street
Jefferson City, MO 65109
(Via phone)

c2f2b933-291b-460c-9c73-0f3e968532c2

1 I N D E X

2

3 W I T N E S S P A G E

4 BERTON FISHER, PhD

5 Cont. Direct Examination by Mr. George 332

Direct Examination by Mr. McDaniel 423

6 Direct Examination by Mr. Elrod 606

Direct Examination by Ms. Hill 624

7 Cross Examination by Mr. Garren 637

Redirect Examination by Mr. McDaniel 638

8

9 Signature Page 640

Reporter's Certificate 641

10

11

12

13

14

15 08:45AM

16

17

18

19

20

21

22

23

24

25

c2f2b933-291b-460c-9c73-0f3e968532c2

(Whereupon, the deposition began at 9:00 a.m.)

VIDEOGRAPHER: We are now on the Record for Volume II of the deposition of Berton Fisher. Today is September 4th, 2008. The time is 9:00 a.m. 09:00AM

Would counsel please identify themselves for the Record.

MR. GARREN: Richard Garren for the State of Oklahoma.

MR. GEORGE: Robert George for the Tyson 09:00AM defendants.

MR. McDANIEL: Scott McDaniel for Peterson Farms, Inc.

MR. ELROD: John Elrod for Simmons.

MR. BASSETT: Woody Bassett for the 09:00AM George's defendants.

MS. HILL: Theresa Hill for the Cargill entities.

VIDEOGRAPHER: Thank you.

BERTON FISHER, PhD,

having first been duly sworn to testify the truth, the whole truth and nothing but the truth, testified as follows:

CONTINUED DIRECT EXAMINATION

BY MR. GEORGE: 09:00AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Mr. George, before you begin today, yesterday near the end of the day, you asked me some questions and I gave you a really bad answer because I was quite tired, and you've read my report and I wrote it, but you asked me whether or not I did the same 09:00AM sort of analysis with the sediments from the lake as I did with stream sediments and, in fact, I have, and let me show you where that graph is.

Q Okay.

A There are two graphs that pertain to that. 09:01AM One graph, which is Figure 31 in the report, is the relationship between concentrations of total phosphorus, total copper, total zinc and total arsenic found in sediments collected in Lake Tenkiller sediment cores. This graph shows the 09:01AM internal correlations among those materials, and then Figure 32, which is entitled a relationship between the concentrations of total phosphorus, total copper, total zinc and total arsenic found in the sediments collected in Lake Tenkiller sediment 09:01AM cores on contaminated soils and poultry waste shows the relationship of poultry waste composition to that of controlled soils to those of the lake sediments. So I wanted to amend that answer, that that type of analysis had been done. 09:02AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Thank you, Dr. Fisher. Could you turn to Figure 8 of your report, please.
A And one other thing I need to add to. Yesterday you asked me whether or not I knew if Tyson used antibiotic materials or antibiotics in 09:02AM
their feed formula, and I said at the time that I'd have to review that. So last night I did. I took a look at that, and in the time period 2005-2006 I found in among Tyson feed formulas that Tyson used an antibiotic called Sacox Biocox, which is a 09:02AM
salinomycin or anticoccidial agent, and in addition to that anticoccoidal agent, a material called bacitracin was also present in feeds in that general period and that contains materials that are used, too, in humans as well as in poultry. In fact, 09:02AM
that's a material that's contained in Neosporin. So the answer I believe to my opinion is, Tyson does use antibiotics.
Q Dr. Fisher, could you refer me to the source materials for those observations? 09:03AM
A I can get you the Bates number.
Q If you could do that perhaps on a break?
A Sure.
Q Or even after the deposition, I would appreciate that. 09:03AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Sure.
Q Dr. Fisher, the materials that you reviewed with respect to antibiotics and Tyson Foods, do you recall whether they were prescription records or feed records? 09:03AM
A They're feed records.
Q Based on your review of those records, Dr. Fisher, were those particular ingredients that you've just described on the Record included consistently in the feed formulas of Tyson Foods or 09:03AM was it a specific instance?
A Okay. These are some specific instances. There may have been some of more consistency but they were present in feeds formulated by Tyson.
Q How often? 09:03AM
A Pardon? I didn't make a count.
Q Okay. So all you can testify to today is that you've seen them present in at least one?
A Well, two different formulas.
Q Two different formulas, okay. Thank you. Can 09:04AM you turn to Figure 8 of your report, please?
A Surely. Yes.
Q And on Figure 8 you have plotted relationships in concentration between total arsenic, total zinc, total copper and total phosphorus in poultry waste, 09:04AM

c2f2b933-291b-460c-9c73-0f3e968532c2

cattle waste and wastewater treatment plant effluent; is that correct?

A That's correct.

Q Okay. Would you agree with me, sir, that the plots in Figure 8 give the reader the impression 09:04AM that wastewater effluent contains much lower concentrations of those four chemicals than either cattle or poultry waste?

A It's not the impression. It's the fact that they do. These are total concentrations of these 09:04AM materials present in whole unfiltered effluent and they're reported here in parts per million or milligrams per kilogram, so they would be reported for the same way for fluid and a density of about one. 09:05AM

Q Is it true, Dr. Fisher, that for poultry waste and cattle waste, the units of parts per million are milligrams of chemical per kilogram of waste for purposes of Figure 8?

A That's true. 09:05AM

Q Okay. Is it true that with respect to the concentrations you plotted for the wastewater treatment plant effluent, which is a liquid, that the units of measure are milligrams of chemical per liter of effluent? 09:05AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A In this case, that's not true because a liter of fluid of fresh water per liter weighs a kilogram, and as a consequence, milligram per liter is a part per million by weight.

Q Well, but you do -- you don't dispute the 09:05AM
fact, do you, that the units that are plotted for the wastewater treatment plant on Figure No. 8 are milligrams per liter?

MR. GARREN: Object to form.

A Well, milligrams per liter and parts per 09:06AM
million at the concentrations of materials in effluent from a wastewater treatment plant are the same unit. They're parts per million.

Q I understand your attempt to describe them as
the same. 09:06AM

A Well, they are the same. I'm sorry.

Q Dr. Fisher, can you answer my question?

A I answered your question.

Q Let's try it again.

A Okay. Let's try it again. 09:06AM

Q I don't believe you have. Are the units of measure that you have plotted for the wastewater treatment plant samples in Figure No. 8 expressed as milligrams of chemical per liter?

MR. GARREN: Object to form. 09:06AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Milligrams per liter and milligrams per kilogram of total material are the same unit. It's parts per million by mass because the density of fresh water is one kilogram per liter.

Q So are you agreeing with me that the units of measure are milligrams of chemical per liter? 09:06AM

MR. GARREN: Object to form.

A I'm telling you that there's no difference in fresh water between a milligram per liter and a milligram per kilogram of total solution. 09:07AM

Q All I want to know is the unit, not whether you think there's a difference. What's the unit for the wastewater treatment plant?

MR. GARREN: Object to form.

A I don't know what to tell you, Mr. George. 09:07AM The milligrams per liter -- a liter weighs a kilogram. So a milligram per liter and a milligram per kilogram are the same unit for fresh water.

Q Which one did you use?

A There's no difference. 09:07AM

Q Do you know which one you used?

A It doesn't make any difference which one was used. They would give you the same result.

Q Do you know which one was used?

MR. GARREN: Objection, asked and answered, 09:07AM

c2f2b933-291b-460c-9c73-0f3e968532c2

argumentative.

MR. GEORGE: No. He hasn't answered the question.

MR. GARREN: He hasn't answered what you want to hear. 09:07AM

MR. GEORGE: No. He hasn't told me what unit he's used, Mr. Garren.

A I've used parts per million.

Q You did not use milligrams per liter?

A I used parts per million. Parts per million 09:07AM and milligrams per liter are the same unit at these concentrations.

Q Let's go to Page 60 of your report, Dr. Fisher. On Page 60 towards the bottom in the bottom paragraph you reference as shown in Figure 31. Do 09:08AM you see that statement?

A Yes.

Q And the following sentence, I guess it's two sentences later, says that Figure 31 shows an increasing trend in phosphorus in conjunction with 09:08AM increasing copper, zinc and arsenic and that that is consistent with these materials having the same concentrated source, i.e. poultry waste; do you see that?

A Yes, I do. 09:09AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Can you explain your reasoning behind that statement?
A Yes. The reasoning behind that statement is embedded partially in Figure 8 and partially in Figure 32 and within the argument that's made 09:09AM
concerning lake -- I mean stream sediments otherwise.
Q Which argument are you referring to?
A Well, the argument is that we're taking a look at materials that are being chemically processed. 09:09AM
If you look at Figure 8 --
Q Is that an argument or is that a theory?
A Well, I guess maybe it's no post. It's a discussion of the facts as I see them.
Q Okay. You didn't mean to say that you were 09:09AM
making an argument in this case, did you?
A Well, I think that's a legal term.
MR. GARREN: Objection.
A In science an argument would be a discussion.
Q Okay. What are you turning to? 09:09AM
A Figure 8.
Q Figure 8 or --
A Figure 8 first.
Q Okay.
A In Figure 8 you take a look at the 09:10AM

c2f2b933-291b-460c-9c73-0f3e968532c2

compositional variation among -- between poultry waste, cattle waste and wastewater treatment plant effluent. They compositionally were distinct. They plot in different areas here, and if you try to project the line forward, they do not intersect. 09:10AM
That line does not intersect. They're compositionally distinct. That's point one.

Point two is if I look at Figure 30 -- let's look at Figure 31, which sets this forth, that total phosphorus appears to be the driver behind all of 09:10AM
the concentrations of all the other components. So as total phosphorus increases, total zinc increases, total copper increases, and total arsenic increases. As you recall, cattle waste did not contain arsenic. Wastewater treatment waste does, and we find a 09:11AM
strong relationship between zinc and copper, strongly correlated. If I look at Figure 32, Figure 32 really looks like a subset of the stream sediment data and, in fact, it is. These are the lake sediments. Figure 32 shows cross plots of 09:11AM
phosphorus with zinc, arsenic and copper, as well as a cross plot of zinc and copper, and on the diagrams are shown poultry waste in black squares, control soils in green diamonds, and the lake sediments in red dots, and these are consistent with what you 09:12AM

c2f2b933-291b-460c-9c73-0f3e968532c2

would anticipate in moving material high in phosphorus into this system -- high in phosphorus, high in copper, high in zinc and with some arsenic into these stream sediments and transporting them into the lake, in that zinc is somewhat enriched and 09:12AM copper is somewhat depleted. So that's consistent.

The last piece of that discussion has to do with Figure 33 that we discussed yesterday. If we take a look at the driving force, wastewater treatment plants are driven by human populations. 09:12AM Other nutrient inputs that are significant here would be animal manures, and that's based on the mass balance. Animal manures are significant inputs of waste. Humans are somewhat significant inputs of waste, and we believe poultry are significant inputs 09:13AM of waste.

The last piece of evidence is what does the functional form of the change in phosphorus as a function of time in lake sediments look like? Does it mimic human population increase; does it mimic 09:13AM cattle increase; does it mimic poultry increase; does it mimic some summation of these, and what we can see in this diagram is that the plot of total poultry over time fits the general functional form of the change in phosphorus over time in the lake 09:13AM

c2f2b933-291b-460c-9c73-0f3e968532c2

cores. So there are multiple lines of evidence pointing to poultry waste. Chemically it looks like poultry waste that has been processed by a lot of fluid, one. Number two, poultry are the largest source of phosphorus in the basin, and I think, in 09:14AM
fact, Poultry Partners at one time said they were only 73 percent of the phosphorus. I think they pretty much agree with our mass balance.

Q Poultry Partners?

A Poultry Partners said that. 09:14AM

Q In what publication did they say that?

A I'm sure you can get that. That's one of their little newsletters.

Q Well, you just cited it. I assume you know where it is. 09:14AM

A I would. I do know where it is. I can find it.

Q Is it part of your considered materials?

A It should be in my considered materials.

Q And it's a newsletter? 09:14AM

A It was a newsletter of some type issued by Poultry Partners. They at least seem to agree with it. I don't say they're scientific experts but they agree with us.

Q Well, you just relied on them. Surely you 09:14AM

c2f2b933-291b-460c-9c73-0f3e968532c2

wouldn't rely on something --
A I did not rely on them.
Q Oh, you didn't rely on them?
A But what I'm telling you about is that they
state the same thing. That was not the basis for 09:14AM
this mass balance. There's a mass balance that's
presented that says poultry is the largest piece.
The data for phosphorus in lake cores shows that
there's a functional relationship between -- there's
a good relationship between the change in poultry 09:15AM
over time and phosphorus in the lake cores. So I
don't think there's any question that poultry are
the source of phosphorus in those lake sediments.
Q Are you done?
A Yes. 09:15AM
Q Okay. Dr. Fisher, do you believe you answered
my question with respect to Figure 31?
A I do.
Q Okay. Perhaps my question was ill posed
because I didn't hear the answer that I was trying 09:15AM
to obtain in that question. With respect to Figure
31, which is what --
MR. GARREN: Object to form with regard to
the non-question.
Q -- with what you are discussing on 60, you 09:15AM

c2f2b933-291b-460c-9c73-0f3e968532c2

refer to Figure 31; correct?
A Yes.
Q Okay, and you see in the sentence immediately after the sentence where you cite Figure 31, you say total phosphorus increases in Tenkiller sediments, 09:16AM
total copper, total zinc and total arsenic also increase, and then you say, this is consistent with the materials having the same concentrated source, poultry waste; do you see that?
A Yes. 09:16AM
Q How does Figure 31 demonstrate to us that poultry waste is the explanation for the increasing trend in phosphorus, copper, zinc and arsenic in Lake Tenkiller sediments?
MR. GARREN: Object to form. 09:16AM
A Okay. As I answered at length earlier, in itself it does not. It demonstrates that they are related. There are other supporting figures that look at this information from other angles that reach that conclusion. 09:16AM
Q All right. Let's stay on Figure 31. You'll agree with me that all Figure 1 shows is as phosphorus increases, so do zinc, copper and arsenic in Lake Tenkiller sediments?
A I agree it shows that they increase with 09:17AM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus.
Q Are you saying, sir, that this trend of increasing phosphorus, arsenic, copper and zinc in Lake Tenkiller sediments could only have come from poultry waste? 09:17AM
A I'm saying that considering the information we have that poultry waste is the driver for phosphorus in these lake sediments.
Q Are you -- is it your opinion, sir, to a reasonable degree of scientific certainty that the 09:17AM only plausible explanation for an increasing trend over time in Lake Tenkiller sediments of phosphorus, arsenic, copper and zinc concentration is poultry waste?
MR. GARREN: Object to form. 09:17AM
Q Is that your opinion?
A My opinion is that it is driven primarily by poultry waste. That's the clear source of most of the phosphorus that's present.
Q And most of the arsenic and zinc and copper as 09:18AM well?
A Yes.
Q Okay, and when you say primarily, how much of the trend is explained by poultry waste versus the amount of the trend that is explained by other 09:18AM

c2f2b933-291b-460c-9c73-0f3e968532c2

sources?

MR. GARREN: Object to form.

Q Can you quantify it?

A I've not quantified that, but it could be quantified. 09:18AM

Q You agree with me, do you not, that phosphorus, zinc, copper and arsenic are all found in cattle waste, wastewater treatment plant discharges and soils that are eroding in the basin?

A No. 09:18AM

Q You do not?

A No.

Q Okay. Which one of those sources does not contain both phosphorus, zinc, copper and arsenic?

A Cattle waste. 09:18AM

Q Cattle waste has no what?

A Arsenic.

Q Has zero arsenic?

A From the analyses that were considered here, no arsenic was found, was analytically determined to be present. 09:18AM

Q Did they test for arsenic?

A Yes.

Q And is it your belief, Dr. Fisher, that if you did a representative study of cattle waste, you'd 09:18AM

c2f2b933-291b-460c-9c73-0f3e968532c2

find absolutely no arsenic?
A I don't know. I've not done that study.
Q Okay. All right. Well, let's -- entertain
with me for a moment the proposition that there's
some arsenic in cattle waste. I know you may 09:19AM
disagree with that, but if indeed that is the case,
would you agree that if those sources, cattle waste,
wastewater treatment plant discharges and erosion,
become larger contributors in the basin over time,
wouldn't that possibly explain increasing 09:19AM
concentrations in sediments of phosphorus, zinc,
copper and arsenic?
MR. GARREN: Object to form.
A Okay. You're going to have to ask that
question again. 09:19AM
Q Okay. Let's assume for a moment that there
are at least three other sources in the basin that
have concentrations of arsenic, copper, zinc and
phosphorus in their waste streams, okay, and those
three are wastewater treatment plant discharges, 09:19AM
eroding soils and cattle waste. Do you understand
the premise of my question?
A I understand the premise of your question.
Q Okay. So if that is indeed the case, if those
three sources increase over time, would that not 09:20AM

c2f2b933-291b-460c-9c73-0f3e968532c2

possibly explain what you see in the Lake Tenkiller sediments of an increasing trend in concentration in those sediments of copper, arsenic, phosphorus and zinc?

MR. GARREN: Object to form. 09:20AM

A No, and here's the reason: If I consider soil erosion, the primary source of phosphorus in soils is from the deposition or disposal of poultry waste so eroding soil --

Q Let me stop you there. Give me your basis for 09:20AM that statement.

MR. GARREN: Object. Let him answer. You asked the question, Robert. Now, let him answer it.

Q Go ahead, Dr. Fisher.

A Oh. 09:20AM

Q We'll make a note of the things I want to ask you.

A Okay. Based upon looking at the soil data, we have the dominant source of phosphorus coming into the basin is poultry waste in our mass balance. 09:20AM Those materials are disposed by soil application. When they're applied to soil, the concentrations in soil increase. That's indisputable. So when you erode soils and enhance erosion of soils, you're moving phosphorus. If you have enhanced levels of 09:21AM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus in those soils, those enhanced levels more likely than not, much more likely than not are derived from poultry waste, one.

Number two, with respect to cattle, the only phosphorus we're really interested in here would be 09:21AM extrinsic sources of phosphorus, phosphorus not originally present within the drainage basin. Certainly if cattle ate grass and defecated, whatever nutrients they released from that grass, they're simply recycling material in the basin. 09:21AM However, the grass is grown on fields to which poultry waste has been applied. Cattle eat that material, defecate. Some of that material that's defecated is swept into streams and on into the lake. Well, phosphorus coming from that is largely 09:21AM from poultry waste itself.

The last source, wastewater treatment plants, have a large human component, but in this basin, as I'm recalling the mass balance study, there are in some instances, and I can't remember which instances 09:22AM right as we sit here, but there are industrial discharges from poultry operations or poultry processing operations that enter those treatment plants, and so part of their phosphorus is from poultry, too. So to say that these sources are 09:22AM

c2f2b933-291b-460c-9c73-0f3e968532c2

independent of poultry operations within this basin is, well, simply kind of confusing the issue because they aren't.

Q Are you through?

A Well, for the moment. 09:22AM

Q Okay. Dr. Fisher, if I heard you correctly, the argument you're making is that not that cattle waste and erosion and wastewater treatment plants might explain the chemistry you see in the sediments but rather you think poultry is responsible for 09:23AM those particular sources as well; is that right?

A No. There are really two arguments. I made one of them -- or two discussions. I made one. One is that poultry is the biggest input of phosphorus into the basin, and it goes everywhere, Mr. George, 09:23AM everywhere, into the wastewater treatment plants, into the cows and into their feces, into the soils. The soils erode and end up in the streams. That's number one.

Number two, the -- looking at the materials in 09:23AM wastewater treatment plant effluent and in cattle waste, from my interpretation of this, you cannot make the compositions in those lake sediments that you find simply by taking those sources and mixing them with controlled soils or mixing them with 09:23AM

c2f2b933-291b-460c-9c73-0f3e968532c2

uncontaminated soils in the basin. So not only are poultry the biggest source but even if they weren't, you can't make it up, what's in the sediments, from other sources. So erosion may be a significant source, but erosion is related strongly to poultry. 09:24AM
I don't know how significant it is. It doesn't appear to be unusually significant driving throughout the basin. I'm now stopped at that next long answer.
Q All right. Let me follow up on some of that. 09:24AM
You mentioned what I interpreted as a mixing analysis, that you have analyzed the other sources, wastewater treatment plant, cattle, and erosion, and have determined that you cannot chemically create the concentrations you see in the sediments from 09:24AM
those sources; did I understand that correctly; have you done that analysis?
A Not from erosion per se. Erosion is going to look just like poultry waste.
Q Well, is that analysis that you are referring 09:25AM
to in terms of trying to reverse engineer the sediments and trace it back to wastewater treatment plants and cattle, is that in your report?
MR. GARREN: Object to form.
A Yes. 09:25AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Show me where that is because I may have overlooked it.
A That's Figure 8. That's Figure 8 and that's Opinion 18.
Q Dr. Fisher, where does Figure 8 provide me with the comparison of wastewater treatment plants and cattle to Lake Tenkiller sediments? 09:25AM
A Well, you don't need to do it here. You do it in two places. Here --
Q Hang on. First of all, will you agree with me that Figure 8 does not provide a comparison of Lake Tenkiller sediments with wastewater treatment plant effluent and cattle? 09:25AM
MR. GARREN: Object to form.
A Yes. I agree with you that Lake Tenkiller sediment compositions are not on this graph. 09:26AM
Q Thank you.
A Now, when you look at this set of graphs, though, what you'll note is that the poultry waste, the black squares, are in the uppermost right-hand corner, and if you look -- let's just look, for example, at zinc and copper. Zinc and copper -- zinc, copper plot shows that wastewater treatment plant wastes are way low. It says that cattle wastes are way high. If I tried to project trends 09:26AM 09:26AM

c2f2b933-291b-460c-9c73-0f3e968532c2

from those towards the concentrations that are in poultry waste, they don't intersect poultry waste. So you can eliminate those as a potential source. If they were sitting on a mixing line, it would be a different story. 09:26AM

Q Okay. Dr. Fisher, before we leave Figure 8, you'll agree with me that all Figure 8 tells us at best is that in your opinion there are differences in the chemical composition of cattle waste, poultry waste and wastewater treatment plant effluent in 09:27AM terms of the ratios of zinc, copper and arsenic to phosphorus?

MR. GARREN: Object to form.

Q That's what Figure 8 tells us; right?

MR. GARREN: Object to form. 09:27AM

A That is --

Q It doesn't tell us anything about stream sediment?

A Aside from that at best, that's what Figure 8 tells us, and if you then move to Figure 32 and 09:27AM recalling the discussion from yesterday of stream sediments, Lake Tenkiller sediments are a subset of stream sediments, and what we find here is that with respect to zinc, poultry waste -- there's a mixing line projected between poultry waste and controlled 09:27AM

c2f2b933-291b-460c-9c73-0f3e968532c2

soils in Figure 32. The Lake Tenkiller sediment data, the red cloud, sits slightly above that line, which is consistent with what we saw in stream sediments. So it's not surprising that stream sediment-type materials are moving into Tenkiller. 09:28AM
It's also not surprising they're slightly enhanced in zinc, but they're enhanced in zinc in the direction of this. Remember, cattle waste sits down here and the wastewater treatment plant material would sit down here in terms of its composition. 09:28AM
You can't make those compositions from those materials.
Q Hang on, Dr. Fisher, because you've pointed to Figure 32 and you've made a reference to wastewater treatment plant effluent and cattle. Do you agree 09:28AM
with me, Figure 32 does not portray cattle influences or wastewater treatment plant effluent, does it?
MR. GARREN: Object to form.
Q Is that on Figure 32? 09:28AM
A They're shown in Figure 8, which is on the same scale as Figure 32.
Q Let's go back to your question and some of the follow-ups I have on some of your statements.
MR. GARREN: Are you not going to let him 09:29AM

c2f2b933-291b-460c-9c73-0f3e968532c2

finish the question that you interrupted?

MR. GEORGE: I think he's told me -- he showed me the two figures that he's relying upon.

Q Have you shown me the two that you're relying on? 09:29AM

A That wasn't the question I was answering.

Q Go on, Dr. Fisher.

A If I look at copper and phosphorus and I project poultry waste, you mix poultry waste with uncontaminated soils, find that the copper sits 09:29AM slightly below that line, that's consistent with water processing of those materials, just like with stream sediments, and you can't make those compositions from cattle waste or wastewater treatment plant waste either. So we can leave it go 09:29AM with those two graphs, but the point is, that there is a clear relationship between poultry waste and Lake Tenkiller sediments in that poultry waste is mixed -- has been mixed with uncontaminated soils. That material has been eroded into the streams, 09:30AM passed into the streams. It's been processed by fluids and it's been deposited into Lake Tenkiller. Now I'm done.

Q You're done?

A For the moment. 09:30AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q In one of your earlier speeches, Dr. Fisher, you made the comment that the concentrations of phosphorus, arsenic, zinc and copper found in eroding soils comes primarily from poultry litter; do you recall saying that? 09:30AM

MR. GARREN: Object to form.

A I do.

Q Okay, and have you undertaken any scientific analysis to support that statement?

A Our scientific analysis has been the analysis 09:30AM of soils in areas receiving poultry waste, that demonstrate that areas receiving poultry waste contain high levels of total phosphorus. The other analysis is that those same similar high levels of total phosphorus are present in stream sediments and 09:31AM have the appropriate or the anticipated type of ratio between zinc, copper and phosphorus, and if you look in Lake Tenkiller sediments, the Tenkiller sediments appear to be a chemical subset or a compositional subset of the stream sediments. So in 09:31AM that sense, that analysis has been done.

Q Dr. Fisher, are the only soils that erode in the basin those that have received poultry litter?

A No.

Q You'll agree with me, in fact, will you not, 09:31AM

that pastures fertilized with poultry litter that grow vegetation are less likely to erode than pastures that are not fertilized with poultry litter?

A No. 09:31AM

Q Okay. What about stream banks; is there substantial erosion in the Illinois River watershed and deposition of solid materials from stream bank erosion?

A There is stream bank erosion. 09:31AM

Q Okay, and what analysis have you undertaken, Dr. Fisher, to determine that the soils eroding in stream banks in the Illinois River watershed have received poultry litter?

A If the soils were of a -- I've done no 09:32AM analysis. Here's the analysis. The analysis is, if the soils were of original compositions, control type soils that looked like the original flood plain type sediments that we find in the base of the Lake Tenkiller control soils, it would have no impact on 09:32AM changing phosphorus levels in Tenkiller sediments. So have I made measurements of eroding bank soils, I have not, but if the bank soils contain phosphorus, it's from being put there more likely than not, much more likely than not from poultry waste. If they 09:32AM

c2f2b933-291b-460c-9c73-0f3e968532c2

don't and that ends up being eroded on into the streams in Tenkiller, if they don't contain phosphorus, it would have no impact on -- they don't contain high levels of phosphorus, it's not going to alter the natural state of Tenkiller sediments. 09:32AM

Q Can you point me, Dr. Fisher, to the survey of eroding stream banks that you've completed to determine that any stream bank that's eroding in this basin has been influenced by poultry litter?

A No. 09:33AM

MR. GARREN: Object to form.

Q You've done no survey, have you?

A No.

MR. GARREN: Object to form.

Q You've not sampled, nor has anyone on the team 09:33AM of experts obtained by Motley Rice, a single instance of eroding stream bank, have you?

A I don't know if that's true or not.

Q Are you aware of a single stream bank sample taken for purposes of evaluating erosion in this 09:33AM case?

A As I sit here today, I'm neither aware nor unaware. I don't know.

Q Okay. One of the other statements you made in your remarks earlier is that cattle simply recycle 09:33AM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus from poultry litter application. Do you recall saying that?

A That's correct.

Q Okay. What survey have you done to substantiate that statement? 09:33AM

MR. GARREN: Object to form.

A Okay. I'm relying on two things. Number one, I'm relying on Slaton and others, 2004 paper, which was a work done at the University of Arkansas that makes exactly that statement and, number two, from 09:34AM my experience in the watershed, I don't see a lot of supplemental feeding activities taking place for cattle. You don't see big feeding troughs sitting around for them. So if Slaton doesn't -- Slaton, who is clearly an expert in this matter, along with 09:34AM Tommy Daniels and others who are co-authors of that paper, don't believe that cattle are receiving significant amounts of supplemental feed and the mass balance that Meagan Smith completes doesn't believe they're receiving supplemental feed, and 09:34AM what I see doesn't suggest they're receiving supplemental feed, I'm pretty sure they aren't receiving supplemental feed.

Q All that tells you is they eat grass; right?

A That's correct. 09:34AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay. Can you raise a cow in the Illinois River watershed without poultry litter?
A Yeah.
Q Have you evaluated the extent to which cattle are grazed in the Illinois River watershed on pastures that haven't received poultry litter? 09:34AM
A Here's what -- well, here's what I've established. Based upon the Agricultural Census records, in about the mid 1970s the inventory of cattle within the Illinois River watershed roughly doubles, and at that time, from that time forward doesn't change very much, and that's kind of coincident with some changes in the amount of poultry that's present. So what that tells me is that the environment was taken to carrying capacity sometime in the mid 1970s for cattle. 09:35AM 09:35AM
MR. McDANIEL: I need the answer to that question.
MR. GEORGE: Yeah, let's try it again. Can you read back the question, please? 09:35AM
(Whereupon, the court reporter read back the previous question.)
A There's been no such study made by me.
Q So you're just assuming that all cattle in the watershed are raised on pastures that receive 09:36AM

c2f2b933-291b-460c-9c73-0f3e968532c2

poultry litter and that's your basis for your attempt to ascribe poultry litter with responsibility for any phosphorus that's deposited by cattle?

MR. GARREN: Object to form. 09:36AM

Q Is that right?

A No, no. The logic is kind of inescapable here, Mr. George. If cattle are raised on pasture that's been fertilized with poultry litter, then phosphorus they're ingesting from grass contains 09:36AM some fraction, possibly a substantial fraction, of phosphorus in poultry litter, and then they defecate and that material goes into the stream. Well, some of that phosphorus is from poultry litter. If they're raised on pasture to which no poultry litter 09:36AM has been applied, then phosphorus they're imbibing either is from a natural source or it's been added by the addition of chemical phosphorus fertilizers, and so they're not putting poultry litter phosphorus into the stream. The use of chemical phosphorus 09:36AM fertilizers is something I think around 7 percent of the total phosphorus load into the basin. So it's a small number.

Q You're relying on logic?

A I think logic is a pretty good thing to rely 09:37AM

c2f2b933-291b-460c-9c73-0f3e968532c2

on.
Q Are you a philosopher or a scientist, Dr. Fisher?
MR. GARREN: Object to form.
A Scientists rely on logic. 09:37AM
Q Show me the scientific basis and analysis for your opinion regarding cattle being nothing more than a recycler of nutrients from phosphorus?
MR. GARREN: Object to form.
A I have provided -- that scientific basis is 09:37AM provided within that logic. The scientific basis is provided by an authoritative source that's been prepared outside of this litigation, in fact, by scientists at the University of Arkansas. The scientific basis is in the mass balance from -- that 09:37AM Meagan Smith produced.
Q Can we go to Figure 33, please. Who prepared Figure 33, Dr. Fisher?
A I did.
Q Have you reviewed the report of Meagan Smith? 09:38AM
A I have.
Q Did you see a similar chart in Meagan Smith's report?
A I used the numbers from Meagan Smith's report.
Q Which -- I didn't mean to talk over you. 09:38AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I'm sorry.
Q Which numbers did you use from her report?
A I used her numbers for animal units. I think, in fact, there's a citation that -- I'll have to find it here but they're from Meagan Smith's 09:38AM numbers.
Q So with respect to Figure 33, the sediment phosphorus and animal populations in the Illinois River watershed, that's the title of the chart we're looking at? 09:38AM
A That's correct.
Q The lines that are intended to reflect the population of poultry, swine, cattle and humans are information that you derived from Meagan Smith; is that right? 09:39AM
A That's correct.
Q Okay. You superimposed over that the plotting of the sediment core concentrations for phosphorus over time?
A That's correct. 09:39AM
Q Okay. I'm having a little difficulty understanding the actual numbers on the chart. I'm hoping you can help me. What is the poultry population in the most recent time period reflected, which I think is about maybe 2002 -- 09:39AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Well --
Q -- in Figure 33?
A -- part of your understanding may be enhanced by noting that to rescale these so these would come -- the graphs for all of the animals would come 09:39AM
up off the axis, the X axis, for beef cattle and dairy cattle, humans and swine, and get them into the same unit scale and multiply the animal unit numbers times two one-thousandths. You could multiply it by one one-thousandth and it would be a 09:40AM
better number. So it's this number divided by a thousand in this case or this number divided by 2,000 is the animal unit numbers. Those are the animal unit numbers that are used. It's simply a rescaling. It's a limitation in this software in 09:40AM
which I could not put two graphs with independent scales on the same plot.
Q I'm not good with fractions. I'll confess to that, nor exponents. So you are going to have to help me through this. What is the actual number in 09:40AM
terms of head, if you will, for poultry in 2002 as shown on Figure 33?
A These are in animal units. They're not in head.
Q What's the number of animal units then? 09:40AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A It's a little over 800,000.
Q I'm sorry. Did you answer and --
A I'm sorry. Yeah. I think it's like 800,000. I'd have to look at Smith's numbers to -- but they're her numbers. 09:41AM
Q And you got that from -- it looks like it's about 1,700?
A Well, I think it's 850,000 is in her numbers, and it's going to be at 1,700 there because it's multiplied times two and divided by a thousand. It 09:41AM just rescales that.
MR. ELROD: I'm unable to see what both of you are looking at and, I mean, I can see that, but, you know, he's pointing to stuff on your chart, and I absolutely do not understand what you're talking 09:41AM about.
Q Let's keep going, and hopefully we'll add some clarity. Dr. Fisher, the number you've just given me of about 850,000 would represent the topmost point on the red dotted line that goes to the far 09:42AM right-hand corner of Figure 33, is that right, right here?
A Yes.
Q Okay. So when you do the conversion based on 1,700 times two divided by a hundred; is that what 09:42AM

c2f2b933-291b-460c-9c73-0f3e968532c2

you said?
A No, no, no. It's 850,000 times 2 divided by a thousand.
Q Okay.
A So that turns into 1,700. 09:42AM
Q So, Dr. Fisher, the genesis of this point on Figure 33 for the 2002 poultry population is 850 animal units as a starting point; correct? I'm sorry, 850,000 animal units as a starting point?
A Yes. 09:42AM
Q Times two divided by a thousand?
A That's correct.
Q And that gets you about 1,700 which is where this last point is plotted?
A That's correct. 09:42AM
Q Okay. What is an animal unit? 850,000 animal units for poultry, what does that mean in terms of the number of poultry?
A I'd have to look at the poultry. It's in terms of half tons, basically a thousand pounds of 09:43AM animal.
Q So one animal unit equals a thousand pounds of animal?
A I think that's correct. I'm not really an expert in that area. I used Meagan Smith's numbers. 09:43AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q For purposes of the weight of animals, do you know what weight Meagan Smith assigned to a bird in the Illinois River watershed?
A No, I don't know at the moment.
Q Well, wouldn't that be important? 09:43AM
MR. GARREN: Object to form.
A You'd have to ask Meagan Smith.
Q I mean, if she assumed all broilers throughout the entirety of their life were five and a half pounds in size, that would skew the numbers, would it not? 09:44AM
MR. GARREN: Object to form.
A You'd have to ask Meagan Smith. I relied upon the animal unit graph that she had or chart that she had. 09:44AM
Q All right. What about for beef cattle; can you tell me what is shown on Figure 33 as to the population or the number of animal units for beef cattle in 2002?
A Again, they're Meagan Smith's numbers, and I can tell you what the graph reads within my ability to read this graph. 09:44AM
Q And please do, but while you're looking, Dr. Fisher, do you have any doubt in Meagan Smith's numbers? 09:44AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Pardon?
Q Do you have doubt or reservation of her numbers?
A I'm just -- I used her numbers.
Q Did you conduct any evaluation of those 09:44AM
numbers to see if they were properly determined and representative of actual populations in the watershed?
MR. GARREN: Object to form.
A Didn't do any independent investigation of 09:44AM
that.
Q Okay. I'm sorry. You were going to tell me what the number is for beef cattle.
A Well, it's low. I can't read it off that
graph. 09:45AM
Q It looks like -- you tell me if I'm wrong, but it's close to 200 animal units or at least 200 as shown on --
A Yeah, 200 units, yeah, 200 of those.
Q So it would be 200 -- 09:45AM
A It would be divided by two.
Q Times what?
A Times a thousand.
Q Ten times a thousand would be 10,000; is that
right? 09:45AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I think we would be better off with Miss Smith's table or chart than do it from the graph.
Q Well, it's in your chart and I'm trying to figure out how to interpret it to be honest with you and, I mean, Meagan Smith will be asked about this 09:45AM
but certainly you understand the animal units that you used as part of your analysis, do you not?
A Yes.
Q Okay. So tell me, for beef cattle what is shown for the 2002 population in terms of animal 09:45AM
units?
A A hundred thousand I think. Isn't that right?
Q Okay. A hundred thousand?
A Well, you're confusing me now. This is terrible. I'm sorry I confused you and now you are 09:46AM
confusing me. It's not a hundred thousand. It's around a hundred thousand.
Q Okay, and are we using the same animal unit in terms of one animal unit equals a thousand pounds of animal for cattle that we're using for poultry for 09:47AM
purposes of Figure 33?
A That's my understanding from Miss Smith's table.
Q Do you know?
A Do I know? That's my understanding, so I 09:47AM

c2f2b933-291b-460c-9c73-0f3e968532c2

would -- I don't know what the difference is between understand and know.

Q Well, have you asked Meagan Smith whether the animal units in terms of how many pounds of animals it takes to equal one animal unit are the same for poultry for her analysis as they are for other species? 09:47AM

MR. GARREN: Object to the form.

A I've not asked her that. It's my understanding that they are. 09:47AM

Q Okay. Can you tell me what the 2002 number of animal units for purposes of Figure 33 are for -- let's go with humans. Let me back up. Do you have a 2002 number for humans?

A No, no, because the census is different. It's going to be a 2000 number for units. 09:48AM

Q What's the number of animal units for humans in the watershed in 2000 according to Figure 33?

A Well, reading it off Figure 33 is going to be fairly inaccurate, but it's going to be somewhere around 30,000 maybe. 09:48AM

Q Do you know what average weight of humans Meagan Smith used for purposes of determining how many humans it takes to equal a thousand pounds of animals? 09:48AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A No. I'm sure it's the same. We have gotten fatter over time.

MR. ELROD: Speak for yourself.

Q Let me -- do you have the underlying data for this chart or did you just take the chart and 09:49AM superimpose your sediments?

A I have the underlying data.

Q Okay. I looked for it in your considered materials and perhaps I just couldn't identify it. Do you believe you produced it? 09:49AM

A Yeah. It would be -- I cited it as in the Bernie Engel's report I think in text and the -- and that's Meagan Smith's addendum to Engel's report.

Q Let me hand you what we'll mark as Exhibit 17 to your deposition, which did come from your 09:49AM considered materials and appears to be a spreadsheet showing --

MR. GARREN: Excuse me, Counsel. Is there no Bates number on this because --

MR. GEORGE: I printed it out 09:50AM electronically.

MR. GARREN: It was electronic?

MR. GEORGE: It's an electronic file, so --

MR. GARREN: Do you know what file it was?

MR. GEORGE: I don't know. 09:50AM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: You can print that with the file names on these.

MR. GEORGE: You probably could.

MR. GARREN: All right.

MR. GEORGE: I don't know that I can. 09:50AM

Q Do you recognize Exhibit 17, Dr. Fisher?

A Yeah. These are numbers derived from -- looks like USDA census data. I'm not sure that this is Meagan Smith's stuff. This is some draft materials that have -- these are numbers of animals with 09:50AM inventory and sales data for various animals, and it appears to be stuff that's allocated or tend to be allocated within the Illinois River watershed. I can't tell just from this spreadsheet, but these are numbers of animals. 09:50AM

Q And the original source of the populations or inventory and sales you believe is USDA?

A Yeah. That would be from -- just the dates that are given there, those are census dates.

Q And is it your understanding that's the same 09:51AM source of information that Meagan Smith used for purposes of putting together her animal unit calculations of beef cattle, dairy cattle, swine and poultry?

A For over time I think that is, yes. 09:51AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay, and the time period here seems to coincide largely with the time period of Figure 33, correct, 1954 to 2002?
A That's correct.
Q Okay. What is the difference in the data that is shown on Exhibit No. 17 for cattle inventory and cattle sales? 09:51AM
MR. GARREN: Object to form.
A What do you mean; what's the difference between inventory and sales? 09:51AM
Q For purposes of this data, what does that mean; what does inventory mean and what does sales mean?
A Okay. Inventory means the creatures that were present at the time of the census as I understand it, and sales means creatures that were there during that year but have been sold. 09:51AM
Q What about broiler inventory and broiler sales?
A Broiler inventory and broiler sales would be the same circumstance, that is, the number in inventory would be those number of broilers on hand at the time the census was conducted, and sales would be those birds that have been sold off the farm. 09:52AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And you can see in each year the sales for broilers in the watershed tends to be considerably higher than the inventory; do you see that?
A Yes.
Q Okay, and why is that? 09:52AM
A Well, for the same reason we talked earlier, is that these creatures have a fairly short life on the farm. That individual chicken today is somewhere on the order of 42 days as a broiler before it moves off the farm. 09:52AM
Q So in terms of representing the average number of birds that are -- I'm sorry, the average number of animals that are in existence in the watershed at a given moment, as between sales and inventory, which would be more representative? 09:53AM
MR. GARREN: Object to form.
A With respect to how many are present at any given moment, certainly sales is more representative -- I'm sorry. For cattle it's going to be different. The inventory is going to be more 09:53AM representative, but I'm not sure where you are heading with this, but go ahead.
Q Well, answer my question first.
A I thought I did. Okay. Well, your question was which number would be more representative for 09:53AM

c2f2b933-291b-460c-9c73-0f3e968532c2

the numbers present at any given time.
Q Right.
A Inventory.
Q Okay, and that would be true both with respect
to cattle and broilers; correct? 09:53AM
A Yes.
Q Okay, and just to give a little illustration
here, in 2002 in Exhibit No. 7 --
MR. GARREN: 17?
Q I'm sorry, Exhibit 17, the broiler sales 09:53AM
reported for the watershed are 109 million; do you
see that?
A Yes, I do.
Q Now, you acknowledge, do you not, sir, that at
no given moment in time in 2002 would you actually 09:54AM
find 109 million birds present in the watershed in
terms of poultry?
A That's correct.
Q All right. Now, when you look at the cattle
data in terms of inventory shown in Exhibit No. 17, 09:54AM
which is derived from USDA statistics, have the
number of cattle present in the watershed increased
each year or increased since 1954?
A They've increased since '54. It's the pattern
that we discussed earlier, that is, it roughly 09:54AM

c2f2b933-291b-460c-9c73-0f3e968532c2

doubles in the mid '70s and stays relatively constant thereafter.

Q With respect to the cattle inventory and cattle sales, do you know which one Meagan Smith used in compiling her animal units shown in Figure 33? 09:54AM

A My recollection, and this is my recollection, is the relevant year would be both because you need to consider the total amount of waste, animal units produced, which would be those animals that are 09:55AM living on site, inventory over some period of time, plus those sold off site. Both of those categories have produced waste and the same would be true for the broilers. In fact, just how that system works, if you're running a series of flocks through a 09:55AM broiler house, the waste from those broilers is deposited in the cellulosic material on the floor but it's not cleaned out -- cleaned out on an annual basis as the integrators seem to prefer, and then it's deposited on the field. So if you are looking 09:55AM at the reflection of what has happened in a year, you have to look at the waste deposited during the entire year, which would be for broilers more represented by sales because all those birds would have contributed waste. The broiler inventory is 09:56AM

c2f2b933-291b-460c-9c73-0f3e968532c2

going to be -- the inventory itself is present for a relatively short period of time but you would consider that as well for the short period of time.

With respect to cattle, the cattle inventory is going to be present for a substantial period of 09:56AM time, and those that have been sold were there for some period of time and they're gone. So you need to integrate the whole piece because if you are looking at that graph --

Q Figure 33? 09:56AM

A Figure 33, that's a lake that's receiving waste. It's intrinsically integrating what is happening within the watershed. It's summing up the totality of all inputs of material.

Q So you believe Meagan Smith should have used 09:56AM both the cattle inventory and cattle sales and broiler inventory and broiler sales in compiling the animal units shown in Figure 33?

A Well, my recollection from the Meagan Smith report, and I can refresh my recollection on that, 09:56AM that she appropriately proportioned the animal units present based upon how long those creatures were present, and I've forgotten all the details, but if we look, we'd have to consider both of those things.

Q Do you know, Dr. Fisher, whether she used both 09:57AM

c2f2b933-291b-460c-9c73-0f3e968532c2

the inventory numbers and the sales numbers?
A I would just say at this point because I don't remember specifically, I was satisfied with her approach at the time, what was discussed.
Q But do you know whether she used both? 09:57AM
A I'm pretty sure she did.
Q You think she did?
A Yeah.
Q Okay. Turn to the third page of Exhibit 17. There's some new categories here, farm acres and 09:57AM
woodland acres; do you see those two columns?
A Yes, sir.
Q And those are acreages reported to USDA in terms of the land use in the watershed; is that right? 09:57AM
A These are not. The fact that there is a fraction on there, I don't -- this being disembodied from the original spreadsheet that I prepared, the fraction -- the fractional acres on there, Mr. George, suggests to me that these are apportioned in 09:58AM
some way, and I don't know how they were apportioned without reviewing the spreadsheet because they don't report fractional acreages.
Q But is the underlying data in terms of the farm acres, regardless of how you allocated it to 09:58AM

c2f2b933-291b-460c-9c73-0f3e968532c2

the watershed, is the USDA the source of that data?
A Yes.
Q Okay, and the same would be true with respect to woodland acres?
A Correct. It would be what they categorized as 09:58AM
woodland acres, pasture acres, crop acres and farm acres.
Q And what you are telling me is that someone, yourself or someone else, allocated the overall
acreage reported for these counties by USDA within 09:58AM
and within the watershed; is that right?
A Right, and this looks like something I did and because of what is reported here, I think this was some early piece apportioning it on the basis of
total area of county within and without. 09:59AM
Q Okay, and would woodland be forest areas; is that --
A Well, woodland is wooded areas.
Q Okay.
A Whether you want to consider it forest or not, 09:59AM
I don't know.
Q Do you agree, Dr. Fisher, that the data shown in Exhibit 17 from USDA shows that there's actually been a reduction in the number of farm acres in the
Illinois River watershed from 1954 to 2002? 09:59AM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A I would agree with that, that there's an overall reduction in farm acres.
Q Would you also agree that the USDA data shown in Exhibit 17 shows there's been deforestation, a 09:59AM
reduction in the woodland acres in the watershed from 1954 to 2002?
MR. GARREN: Objection to form.
A It shows the diminution in woodland acres. I'm not sure it can be interpreted fully as 09:59AM
deforestation because these are acres that are reported to be associated with farms, and as a consequence, the number of farm acres dropped. The number of woodland acres dropped as well. There's a problem with this data because if you sum up all the 10:00AM
farm acres, you don't come up with all the acres that are present in the county obviously. So these are -- seem to be derived from the farm acre numbers.
Q You don't dispute the fact, though, just from 10:00AM
your own personal observation and investigation that there's been substantial deforestation in the watershed, do you?
MR. GARREN: Object to form.
A I've not made an assessment as to the amount 10:00AM

c2f2b933-291b-460c-9c73-0f3e968532c2

of deforestation. I would say that I have observed forests being cleared and converted into pastures.

Q What about into residential communities?

MR. GARREN: Object to form.

A Sorry. Along the extreme northeastern edge 10:00AM
and along the primary transportation, northwest transportation corridor in the north, which is US 412, there has been conversion of acreage into residential.

MR. GEORGE: Let's change tape. 10:01AM

VIDEOGRAPHER: We are now off the Record. The time is 10:01 a.m.

(Following a short recess at 10:01 a.m., proceedings continued on the Record at 10:10 a.m.) 10:10AM

VIDEOGRAPHER: We are back on the Record. The time is 10:11 a.m.

A Before we continue, I need to modify an answer I made earlier, a statement I made earlier concerning poultry -- I think I ascribed a 73 10:11AM
percent phosphorus number to Poultry Partners. It was actually from the Poultry Federation in a letter to the Tulsa World was the source of that.

Q And, Dr. Fisher, that was a letter related to the Illinois River watershed? 10:11AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I've forgotten the details. I think it's an exhibit somewhere in this case, though.
Q Well, that's a pretty important detail, isn't it, whether that's even the right watershed?
A I think it is the Illinois River watershed. 10:11AM
Q Okay. Just wondering why the -- never mind. Let's go to Exhibit 18, which I'll put in front of you, Dr. Fisher, which is a document that I've obtained from your production of considered materials in this case. That appears to be a graph 10:11AM showing population in the IRW by decade, 1970, '80, '90 and 2000. Do you recognize this document?
A I don't specifically recall this document, but this looks reasonable, and this looks like, you know, it's some census data from some source. I'd 10:12AM have to go look at the original spreadsheet and figure out what, you know, vintage it was and so on, but this would be representative of human population in the watershed.
Q Okay. That was my question, Dr. Fisher. This 10:12AM is an attempt -- whether it's the final attempt or an earlier attempt, I don't guess we know -- to track the growth in human population in the watershed by decade; is that fair?
A Yes, that's correct. 10:12AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And is there an upward trend?
A There is.
Q Okay. Each decade the population of the watershed was greater than the last; is that right?
A That's correct. 10:12AM
Q Dr. Fisher, when I look at the bar chart on Exhibit 18 and I hold it up next to your Figure 33, the trend looks a lot like the sediment cores, doesn't it?
MR. GARREN: Object to form. 10:13AM
A There's a -- I'd have to -- I've already looked at that trend, that the trend, as you can see on that graph, is right along the baseline with respect to the amount of phosphorus that's going to be coming in because phosphorus from animal 10:13AM excretion roughly scales with animal unit.
Q But, Dr. Fisher, the reason that the human trend is along the bottom as opposed to in the cloud of sediments is a function of the scaling of that for animal units; correct? 10:13AM
A Well, it's a function of the fact that the animal units for poultry are so much larger.
Q Well, no. The animal units are the same; right?
A An animal unit -- there are so many more 10:13AM

c2f2b933-291b-460c-9c73-0f3e968532c2

animal units of poultry than there are animal units of people.

Q What would happen to the lines if we use the different conversion factor that you've used to scale your Figure 33? 10:14AM

A Their slope would remain the same and would offset them from the X axis.

Q But I could find a conversion factor to replace this times two times ten to the minus three that would put the human trend going right through 10:14AM the sediment cloud, couldn't I?

A Well, you could put a trend that way, but on that graph, the slope wouldn't change and it would still roughly look like a straight line. It's not going to mimic the sediment change in phosphorus. 10:14AM

Q You don't think I could find a conversion factor that would put the human line on the same trajectory that you currently show as the poultry line?

MR. GARREN: Object to form. 10:14AM

A If you moved that curve up into the data array of phosphorus from lake sediments, the broiler curve would be coming out of the roof of this building.

Q It would just move up on the chart; right?

A It would move out of this building if you 10:15AM

c2f2b933-291b-460c-9c73-0f3e968532c2

moved that up there. It would be extremely high.
Q Dr. Fisher, if I make my chart bigger, I could show both the human population trend and the total poultry population trend; correct?
MR. GARREN: Object to form. 10:15AM
A You could show all the trends and you could make all of them separate more from the axis. You can put them anywhere on the graph you want, but it won't change the slope of those lines. It will simply change the offset. 10:15AM
Q Dr. Fisher, in your opinion is it scientifically significant in terms of causation and source that the poultry red line on Figure 33 intersects with the plotted sediment concentrations?
A Well, that's just for illustrative purposes. 10:15AM
What is significant is that the relative proportionate change is similar between poultry and phosphorus in lake cores from the earliest time to the most recent.
Q What's that relative -- 10:16AM
A And it is dissimilar. I would have to look at the graph again.
Q Go back to Figure 33. You have plotted concentrations of phosphorus in four different sediment cores on Figure 33; correct? 10:16AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A That's correct.
Q Is there a reason you didn't differentiate them by different colors as you have done in some previous exhibits?
A I just didn't. You could do that, but it doesn't really matter. 10:16AM
Q Do you agree that each of the four sediment cores that are plotted on Figure 33 were taken from different parts of the lake?
A Yes. 10:16AM
Q And do different parts of the lake behave differently in terms of hydrodynamics and the settling of particles?
A Yes.
Q Okay. Given that, Dr. Fisher, would you expect that these cores would have different particle sizes and types based upon the deposition characteristics in the area of the lake where they were collected? 10:16AM
A Okay. In the lake, in looking at those sediments, they do not have substantially different particle size. These are all silt clay materials. I've looked at that. 10:17AM
Q Have you evaluated the particle size and compared lake sediment core 1, 2, 3 and 4 in terms 10:17AM

c2f2b933-291b-460c-9c73-0f3e968532c2

of particle size?
A Okay. That data is available. I've compared them in particle size by visual and tactile observation. From years of experience, these are fine-grained silt clay materials. There's not going 10:17AM
to be any difference with respect to -- substantially with respect to grain size between -- what you do find, as you move up the lake, there's more -- a greater degree of sediment dilution.
Q Dr. Fisher, did I hear you correctly, it's 10:17AM
your opinion and judgment that there's no meaningful difference in the particle size from lake sediment core sample 1, 2, 3 and 4?
MR. GARREN: Object to form.
A I think that would be my opinion as I sit here 10:18AM
without going back to look at the information from what I know.
Q But there is actual data on that; correct?
A There is some data on that, yes.
Q Okay. If a scientist wanted to compare that 10:18AM
data and show or contrast the particle size, it's available; right?
A I believe it is.
Q Let's go back to Figure 29 of your report for a moment. Figure 29 has the same phosphorus data 10:18AM

c2f2b933-291b-460c-9c73-0f3e968532c2

for the sediment core samples plotted as we have been discussing in Figure 33; is that right?

A Yes.

Q In particular, the upper left-hand chart on Figure 29 is the same phosphorus data; is that right? 10:18AM

A Yes.

Q Here you've actually differentiated between the cores and their phosphorus concentration by different colors and symbols; is that right? 10:19AM

A I have.

Q Okay. Let's start with lake sediment sample location 1. What is it represented by on this chart?

A It's represented by the black diamonds on that chart. 10:19AM

Q Okay, and can you describe the trend that you see, particularly post 1985, in lake sediment sample 01?

A Well, in that particular instance there's -- the immediate and localized trend is slightly downward from a high in about '85. 10:19AM

Q And do I interpret the chart correctly to show that there is subsequently an increase, that it goes back up after, say, 1995? 10:19AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes.
Q So there's a little more of an upward trend beyond 1985 for lake sediment sample location 1?
MR. GARREN: Object to form.
A Yeah. I'm not sure I want to interpret things 10:20AM
that are happening over that short of time interval as your really trendology, as you are taking two centimeter sections and you are looking at a few years of material in each section, but in the data
array itself, there is a local high in about 1985, 10:20AM
and then there's -- then there's a somewhat lower value and what might be an upward tick, but overall what you see is an upward movement of phosphorus over time. I think that there may be details that
are recording some differences in deposition, but 10:20AM
overall it's an upward trend.
Q Describe for me the trend or pattern in the phosphorus concentrations in lake sediment sample 02 with particular emphasis on post 1985.
A Lake sediment sample 02 post 1985 shows a 10:21AM
decrease from 1985 forward. Again, within the context of the total data array, it's an upward trend since 1960.
Q But from 1985 until 2005 you actually see a
decreasing trend in phosphorus concentrations at 10:21AM

c2f2b933-291b-460c-9c73-0f3e968532c2

lake sediment sampling location 2; do you agree?
A You see a decrease. I'm not sure it's a trend.
Q Why is it not a trend?
A Because it's only defined by a couple of samples. 10:21AM
Q Well, how many data points do you have after 1985?
A Oh, I'm sorry. In that case, you might consider that to be a bit of a trend. 10:21AM
Q Okay, and you don't see that trend with respect to lake sediment sample 01; correct?
A You do not.
Q Okay. What about lake sediment sample location 03; do you see a downward trend post 1985 at that location for phosphorus concentration? 10:21AM
A It might be downward. I mean, certainly the data shows some downward dispersion.
Q And is the same true in terms of the downward trend in phosphorus concentrations at lake sediment sampling location 04? 10:22AM
MR. GARREN: Object to form.
A Lake sediment sampling location 04 has very low value near the surface. That may be an artifact of sampling. Again, the overall trend, if you fit a 10:22AM

c2f2b933-291b-460c-9c73-0f3e968532c2

line to this, it's increasing over time.
Q How do you account for the differences in trends at those four locations in terms of phosphorus concentration from 1985 until the present? 10:22AM
MR. GARREN: Object to form.
A In part there could be some sampling variation. There could be some real trends. There could be changes in deposition. It's phenomenology. We certainly see that there are lower values and 10:23AM higher values. Again, overall, the overall trend in that data is upward from the beginning of the time period, the period of record in lake sed 1 up to the present day. We have some low values but overall it's an upward trend. 10:23AM
Q But it's not an upward trend after 1985?
MR. GARREN: Object to the form.
A I won't agree with that, that it's not an upward trend after 1985. If you look at this overall, it's an upward trend. For example, if I 10:23AM remove three data points there from looks like '85 and the two beyond that, that's clearly an upward trend in the data as a whole for lake sed 1.
Q Well, you're not basing your analysis on one lake sediment sampling location, are you? 10:23AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A No, I'm not. I'm basing it on all four, and I'm basing it on the fact that when I consider all four samples and I look at the overall trend of phosphorus in those sediments, it overall trends upward from the beginning of the period of record to the present. 10:24AM

Q Dr. Fisher, if poultry litter is the primary cause of phosphorus concentrations in the Lake Tenkiller sediments, and poultry production in the watershed has increased since 1985, how can you explain a reducing trend in phosphorus concentrations at lake sediment locations 2, 3 and 4 after 1985? 10:24AM

MR. GARREN: Object to form.

A Well, more happens than just poultry with respect to sediment concentrations. For example, if you have periods of drought, there's less input. If there are periods of rainfall and extreme erosion, then there will be sediment dilution, that is, dilution with some materials that are less contaminated with phosphorus. So there can be a lot of reasons, and then there can be depositional changes within the lake itself. So there are a lot of reasons why you can have scatter in lake sediments. The significant thing in interpreting 10:24AM 10:25AM 10:25AM

c2f2b933-291b-460c-9c73-0f3e968532c2

this data is the overall picture that's drawn by this, not by individual small changes and small time periods.

Q Dr. Fisher, how did you try to control for those other factors, drought conditions, interactions between water and sediments in the comparison that you provided in Figure 33 where you pointed the finger at poultry? 10:25AM

MR. GARREN: Object to form.

A They aren't controlled for in the sense of did I account for each and every one of those, no. Those are things that do occur and can account for variability. 10:25AM

Q But you didn't attempt to account for it in your analysis; is that fair? 10:25AM

MR. GARREN: Object to form.

A I didn't look at that in my analysis.

Q Okay. Go to Page 57 of your report. On Page 57 -- let me find my quote I was going to ask you about. Okay. At the bottom of the first paragraph you say, concordant ages cannot be obtained for lead-210 and cesium-137 methods. What do you mean by that? 10:26AM

A Well, what I'm saying is that as explained earlier, that cesium-137 is a pulsed input to 10:27AM

c2f2b933-291b-460c-9c73-0f3e968532c2

systems dominantly from atmospheric testing in the 1960s. So that provided you have a long enough record, what you could obtain from a cesium-137 record would be its first appearance in a sediment core, which is about 1953. You would get its 10:27AM
maximum in about 1962, and when atmospheric testing of nuclear weapons was banned, the inventory of cesium in the atmosphere was rained out and entered sedimentary systems, and it leaves behind a peak.

So you have first appearance of cesium. You 10:27AM
have the peak, which is generally considered to be in '62 in terms of atmospheric deposition, and then you have the present day sediment surface, which is indisputable today, unless it's been eroded, in which case it might be yesterday. 10:28AM

Now, the input of cesium is a pulsed input. Cesium interacts with materials that are present within a watershed. That would be biological materials taken up into trees and grass. For example, one of the issues in nuclear accidents, 10:28AM
from the Chernobyl accident was that Finnish forests became contaminated with cesium-137, and deer who ate bark became radioactive. So there's interaction between cesium and a lot of biological components.

The net effect of that is that the cesium will 10:28AM

c2f2b933-291b-460c-9c73-0f3e968532c2

be retarded in its input into the watershed; it's held up in the watershed, and then it's released. So it has two effects. One is a broadening of the peak and, number two, it will be a delay of the peak. So the peak itself of cesium input to a lake, 10:29AM
for example, because of interactions within a watershed is going to be after 1962 at some point.

In contrast to that, lead-210 is produced from uranium 238 series decay. Lead-210 is the long-lived daughter of the decay chain that begins 10:29AM
with radium-226, which then decays to radon-222, which then decays to bismuth-214 and lead-214 and decaying to lead-210. The decay chain is such that when radium decays, it releases radon, a gas. That gas escapes or some fraction of the gas escapes to 10:29AM
the atmosphere from soils and rocks. That material in the atmosphere then undergoes radioactive decay through lead-214 and bismuth-214 on to lead-210.

I'll go slower. The lead-210 rains out onto the surface of the watershed or the surface of the 10:30AM
ground and then is swept into the lake and becomes incorporated into the lake sediments, just as other lake sediments do. The difference is that that's a steady state input, that is to say that uranium-238, which is decaying to radium-226 on to radon-222 and 10:30AM

c2f2b933-291b-460c-9c73-0f3e968532c2

so on, is happening all the time, and it's also because the progenitor of this, the uranium-238 and its nearer daughter radium-226, have very long half lives, that lead-210 is basically in secular equilibrium, that is, there's always a fairly 10:30AM constant supply of that material. It's always falling in the watershed, always coming in. So independent of any interactions that lead-210 may have with soils, sediments, biota, the lead-210 input is coming in all the time. 10:31AM

So with respect to cesium, the peak is retarded in time and broadened from when it's deposited on the watershed, and so it should appear in lakes and will appear at later times than it actually with the maximum from the atmosphere, 10:31AM whereas, lead-210 is also -- is not dependent upon a specific event. It's dependent -- it's dating methods are dependent upon a chain of events from the activity in the surface sediments to that at depth in sediments, and as a consequence, the 10:31AM lead-210 dates are going to provide a better dating scheme than a cesium-137 dating scheme.

One of the reasons that folks have liked cesium-137 to date things in the past is that previously it was a lot easier to do that work 10:32AM

c2f2b933-291b-460c-9c73-0f3e968532c2

because it was done by gamma spectroscopy, which involved simple counting methodologies, as opposed to lead-210 work, which early on required a fairly laborious chemical extraction from sediments followed by Alpha con, which was very difficult. 10:32AM

Presently lead-210 work is done with high purity uranium detectors with low energy windows, and so the level of doing that work is similar to the level of effort of doing cesium work. That was more than you had asked for. 10:32AM

Q Dr. Fisher, how would the dates or the ages of the sediment cores change if you dated them using the cesium-137 method?

A They get younger.

Q So -- 10:33AM

A They would be inappropriately young.

Q So looking at Figure 29, how would this plot and its appearance change if you dated the sediment cores using cesium-137; generally what would the difference be? 10:33AM

A It would shift to the right. You'll start squishing stuff together and shifting it to the right.

Q Wouldn't it actually shift to the left?

A Oh, I'm sorry. You're right. It's going to 10:33AM

c2f2b933-291b-460c-9c73-0f3e968532c2

have -- it's going to appear higher in the core, so it will shift left.

Q So with respect to the sediment phosphorus chart at the top, in essence if we dated it using cesium-137, we could just pull the sediment cores to 10:33AM the left and down; correct?

A I'm going to have to think about this just for a second. These really simple things can be really hard. No. To the left is older. So if I dated it with cesium -- let's say there's a five-year 10:34AM separation. If I dated it with cesium on -- the lead-210, I get an age of 1985. If I dated it with cesium, I get an age of 1990. So it would shift right.

Q You think the cesium dating method would 10:34AM actually make the sediments younger, not older?

A Well, if you look at what I was talking about, it's going to shift them in that direction because the peak --

Q If you're going to write on something, write 10:34AM on your report, I'm sorry, just so that we'll have a record of your drawing, not that I care about my report.

A Okay.

Q Go to Figure 29 in Exhibit 1 and if you need 10:34AM

c2f2b933-291b-460c-9c73-0f3e968532c2

to mark on something, feel free to.
A I need to think with a pencil. Okay. True age being lead-210 age, I'm going to say it's 1960 or 1970. That's a lead-210 age. If I have my cesium age, it's going to be shifted up in the 10:35AM
sediments. That says that 1970 roughly where that sits -- oh, I'm sorry. We will shift it left. It's going to make it look older. I think better with a pencil. It will make it look older.
Q Okay. So in terms of appearance, if you use 10:35AM
the other method, cesium-137 to date this, you would pull the dates of each of these dots back and down to the left; is that right?
A I'll pull them down in some way, yes.
Q Okay. Which would have the dots not so 10:36AM
crunched together at the right-hand side of the chart; it would stretch them out; is that right?
A I'm not sure it would stretch them out. It might. I'd have to look at that because you have to worry about compaction in that as well, but it would 10:36AM
basically shift it to the left.
Q Dr. Fisher, let me hand you what we'll mark as Exhibit 19, which is a document I printed out from your electronic files in this case, and actually for some reason it printed with a Bates number. It must 10:36AM

c2f2b933-291b-460c-9c73-0f3e968532c2

have been a PDF image, but for context I'll tell you the file name, I actually wrote it down on this one, was playing card. What is Exhibit No. 19?

A I think this is something that Randy Miller asked Mr. Hight to put together. I remember there was discussion of some kind of card. 10:36AM

Q What's the purpose of having a playing card that says Poultry Waste Disposal, Oklahoma Water Pollution?

A You'd have to ask Mr. Miller. 10:37AM

Q Okay. Did -- was it your understanding these were going to be passed out?

A I don't know what they were going to do. I know he asked Larry to do some work, and he did it, and I don't think anything ever came of it. 10:37AM

Q Just like the playing cards that the U.S. military passed out with pictures of terrorists on it; is that the same concept here?

MR. GARREN: Object to form.

A I don't know. You'd have to ask Mr. Miller what his concept was. 10:37AM

MR. ELROD: You're not objecting to form. You're objecting to substance.

MR. GARREN: Terrorist chickens.

Q Dr. Fisher, do you know what this means, stop 10:37AM

c2f2b933-291b-460c-9c73-0f3e968532c2

it, fix it, pay for it in Exhibit 19?
A You'd have to ask Mr. Miller.
Q Why would you have a copy of this in your files?
A Because when my files were produced, 10:37AM
everything that was on the hard drive in that directory was produced.
Q Dr. Fisher, do you have any idea why Mr. Miller would have an environment consultant, such as Larry Hight, putting together a piece such as 10:38AM
Exhibit 19?
MR. GARREN: Object to form.
A Well, Larry is the graphics guy.
Q Is there any scientific analysis required of Exhibit 19? 10:38AM
A No.
Q Just a propaganda piece?
MR. GARREN: Object to form.
A I don't know what it is. It's a piece that shows a bunch of photographs and text. 10:38AM
Q If I needed to understand how this was put together and what the instructions were, I'd need to talk Mr. Hight?
A Yes.
Q Dr. Fisher, at the beginning of the day today, 10:38AM

c2f2b933-291b-460c-9c73-0f3e968532c2

you handed or your counsel handed us some revised pages to your expert report, particularly Pages 39, 40, and 41, and on one of those pages there is a revised Table 12; is that correct?

A That's correct. 10:39AM

Q And I'll put in front of you what I've marked as Exhibit 20, which I believe is a copy of what Mr. Garren provided us. Did you prepare Exhibit 20 last night?

A Yes. 10:39AM

Q Now, let me back up for a moment. The opinion that is at issue is Opinion 18. That's where the changes occurred; is that correct?

A That's correct.

Q In your original report, Opinion 18 was 10:40AM supported by some computations that you or somebody working for you prepared in terms of ratios of zinc, copper, phosphorus and arsenic in poultry litter, cattle waste and wastewater treatment plant effluent; correct? 10:40AM

A That's correct.

Q And those computations are included throughout Pages 39 and 40 and also the underlying data appears in Table 12; correct?

A That's correct. 10:40AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And your opinion, based upon your review back in May of 2005 of that data and those computations, was that the chemical composition of poultry waste is distinctly different from the chemical composition of cattle waste and wastewater treatment 10:40AM plant effluent; correct?

A That's correct.

Q Do you hold that same opinion today?

A I do.

Q And you hold that opinion despite the fact 10:41AM that all of the ratios and computations and, in fact, Table 12 that you were relying upon are considerably different now that you've corrected an error as to what they were in May of 2008; is that correct? 10:41AM

MR. GARREN: Object to form.

A Well, that's partially correct. Although I've corrected an error and adjusted those ratios, the underlying data with respect to Figure 8, which was supposed to be the original data represented in that 10:41AM table, and for reasons known only to God was not. Figure 8 was really the basis of that original interpretation. The exposition of the ratios were something to exposit the ratios. They've changed, but it does not change the opinion because it has 10:41AM

c2f2b933-291b-460c-9c73-0f3e968532c2

not changed, so that these things are all the same.
Q So the data and math has changed but the opinion that rested upon the data and math has not changed; is that right?
A That's correct. Numbers changed around a little bit but they're still different. 10:42AM
Q You consider these to be small changes in the numbers?
A No. I consider them to be large changes in the number. 10:42AM
Q Despite large changes in the number, it doesn't affect your opinion; is that right?
A No.
Q Okay. Is your opinion really based on the numbers? 10:42AM
A Yes. My opinion is partially based on numbers and based on this graph which is correct.
Q Well, in May of 2008 when you issued your first report, were your opinions based on the numbers? 10:42AM
A The opinions were based on the graphs and the numbers.
Q Okay. Well, when you are describing the basis for your opinion on Pages 39 and 40, you're talking about numbers, aren't you? 10:42AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Right, and I'm talking about numbers today, and although the numbers have changed, they haven't changed to alter that opinion, and the graph has not changed.

Q Can you identify for me the changes that were 10:42AM made?

A Well, there are several. I pretty much would change all of the -- I can identify -- how long do you want to take to identify them? All day? I mean, pretty much all the numbers that relate zinc, 10:43AM copper and arsenic to phosphorus have changed, but the numbers relating copper and zinc have not changed and so --

Q Let's --

A Go ahead. 10:43AM

Q I'm sorry. You go ahead.

A There was an underlying, obvious underlying error in the number that was supposed to be associated with phosphorus.

Q Okay. Well, explain to me the error and how 10:43AM you corrected it, and then I want to talk about some of the changes.

A Well, the error had to do with a copy of information from one source into another source, and then ended up making a bogus computation, which had 10:43AM

c2f2b933-291b-460c-9c73-0f3e968532c2

to have involved the phosphorus number. I couldn't reconstruct the errors with specificity, but it would mean that the phosphorus number was very, very small. There are some other issues with respect to terminology that I used within the report so that I had written one thing and then put down a ratio for the reciprocal of that ratio. So it's now been fixed so that that's not true. 10:44AM

Q So, Dr. Fisher, do I understand correctly that your computations were performed in a spreadsheet; is that right? 10:44AM

A Yes.

Q Okay, and so the first time around in May of 2008 there was an error made in how you copied some numbers to a spreadsheet; is that right? 10:44AM

A Yes.

Q Okay. You've now identified the errors in that spreadsheet and have corrected them; is that right?

A Well, I went back to the original data source, the database, reacquired that information, pulled that back out of the data source, compared the original information to the data that sits behind these graphs and ascertained that in fact the graph data and the original data were the same. Then I 10:44AM

c2f2b933-291b-460c-9c73-0f3e968532c2

took the data that clearly corresponded to these graphs and redid the ratio computations.

Q Where are the work papers that underlie the comparison that you made and the new computations?

A It was done electronically. They're kind of fungible. 10:45AM

Q Well, but you created a spreadsheet; right?

A Yeah.

Q And it exists somewhere on your computer?

A Yes. 10:45AM

Q And that spreadsheet is the basis for the new numbers we see in Exhibit 20; correct?

A Yes.

Q Where is that spreadsheet; did you bring it with you today? 10:45AM

A I did not.

Q Why not?

A It's on my home computer.

MR. GEORGE: Rick, I want to ask for the production of the spreadsheet that forms the new basis for his new computations in Exhibit No. 20. 10:45AM

Q Where is the old spreadsheet that was in error?

A I don't know. A lot of those things are not maintained. You know, you would use them -- use 10:46AM

c2f2b933-291b-460c-9c73-0f3e968532c2

them to generate a series of numbers, use them to generate a graph or use them to generate a table, and then they are disposed of or written over as you might work with them a different way. If it still exists, it would be in my produced documents. The 10:46AM
original data, however, does exist and it's clearly identified in -- Footnote 102 identifies the sample IDs in the CDM database from which these computations were made. So those are still the same data, still the same sample identified. 10:46AM
Q But I can't see your computations in the lab sheets that are shown in Footnote 102, can I?
A No, but you can get the original data and the computation can be recreated. I can provide you with the spreadsheet that I used to construct this. 10:46AM
MR. GEORGE: Rick, I want a copy of the original spreadsheet that supported the previous calculations and a copy of the new spreadsheet that has now been corrected, so --
Q Help me understand a little better, Dr. 10:47AM
Fisher, the error that was made. You said it was a copying error. What was copied and how was it copied incorrectly; did it relate to -- well, that's more than one question there. Go ahead.
A Well, I mean, as best as I can reconstruct 10:47AM

c2f2b933-291b-460c-9c73-0f3e968532c2

this in looking at the original piece in the original work, the phosphorus number or a formula related to phosphorus was improperly copied because the shift that occurs was a rather large shifts -- was rather large shifts in the zinc-phosphorus and 10:47AM copper-phosphorus ratio in Table 12. Again, it has no impact on Figure 8. Figure 8 is correct. The ratios change in Table 12. It's unfortunate that I somehow succeeded in missing that.

Q As a general matter, on what order of 10:48AM magnitude did they change from your original report to Exhibit 20?

A Well, by a lot. Factors of -- I haven't looked at that factor, but it's factors of thousands. 10:48AM

Q So your numbers today in terms of ratios are a factor of thousands different than they were in May of 2008 but your opinion hasn't changed; is that right?

A No, because it hasn't changed a lot of the 10:48AM relative differences among these things.

Q All right. So what was the formula that you were using, and you said it related to phosphorus; is that right?

A Correct. 10:48AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q What was the formula that you were using before that you've now changed?
A Well, I haven't changed any formula. The formula that I used -- as far as I know, I haven't changed any formula. The formula I used before 10:48AM would simply be the -- oh, for God's sake.
MR. ELROD: That's me.
A No. That was me.
MR. ELROD: I was calling you.
A You were? Okay. Let me -- I thought this was 10:49AM turned off. I so apologize.
Q That's okay.
A You asked the question, what was the formula.
Q Before and what is it now?
A The formula was very simple. Total zinc 10:49AM divided by total phosphorus. It's always been the same.
Q Sounds like hard things screw up.
A Well, and that's what is so amazing about it. So what went over there was clearly the wrong 10:49AM phosphorus number.
Q All right. So the formula hasn't changed. It's just that you used the wrong phosphorus number in the first report compared to what you are using now? 10:49AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Evidently, yes.
Q Okay. Well, how did that mistake happen?
A Don't know.
Q Is there more than one phosphorus number
reported in the lab sheets? 10:50AM
A Well, no. I mean, I could have retrieved
an -- may have done an improper retrieval, that is,
pulled down a variable that I didn't mean to pull
down mistakenly. The way that's done is you
identify the variable name. If I identified the 10:50AM
parameter name -- if I identified the parameter name
incorrectly, I might have pulled down something
other than phosphorus, and because it's kind of a
complex thing to do, I screwed up. That's all I can
tell you. 10:50AM
Q So it's possible, just by way of illustration,
that the first time around due to a technological
error, you performed your computations not based on
phosphorus data but aluminum data or whatever it
was? 10:50AM
MR. GARREN: Object to the form.
Q The wrong parameter; is that right?
A It was either the wrong parameter or it was
something related to phosphorus that was -- you
know, it was a phosphorus -- there was numerous 10:51AM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus measurements were made, and it could have
been the improper measurement of phosphorus. I
didn't worry about reconstructing exactly that.
What I worried about doing is being sure I had total
phosphorus, total zinc, total copper, total arsenic. 10:51AM
Q So back in May of 2008, even though you
weren't using the phosphorus data, you were able to
arrive at a conclusion that in terms of phosphorus,
cattle waste, poultry litter and wastewater
treatment plant effluent looked different? 10:51AM
MR. GARREN: Object to form.
A Yes, I could because I reviewed Figure 8.
Q Any other errors that you noted with respect
to your computations or the data that you were using
to support Opinion No. 18? 10:51AM
A Not that I've noted at this time. No, I don't
think there are, Mr. George.
Q Dr. Fisher, are you comfortable with Exhibit
20 and the opinions and computations expressed in it
as being accurate and complete? 10:51AM
A In the revised one?
Q Yes, sir.
A Yes, I am.
Q Okay. All right. Let's look at some of the
changes just by way of example. Go to Page 39, and 10:52AM

c2f2b933-291b-460c-9c73-0f3e968532c2

I'll just for the Record state I have not had a chance to read all the way through this, and I certainly reserve the right, if necessary, to come back and ask Dr. Fisher questions about it later but I want to cover the things that I've noted. 10:52AM

MR. GARREN: Our preference is that you take your time during lunch and do what you need to do and ask the questions today.

MR. GEORGE: Well, I'm not going to be rushed into pulling together questions on a new 10:52AM opinion based on new computations over the lunch hour but --

MR. GARREN: And I would object to your characterizations.

MR. GEORGE: Never mind. 10:52AM

Q Under Paragraph 18, Dr. Fisher, you see the sentence that begins with further cattle waste?

A Yes.

Q Okay. If you go down to the second part of that sentence, you are making the observation now in 10:53AM Exhibit 20 that the ratio of total zinc to total copper in cattle waste is larger than the ratio of those same two constituents in poultry waste?

A That's correct.

Q Now, what did you say about those ratios in 10:53AM

c2f2b933-291b-460c-9c73-0f3e968532c2

your original report?
A That was reversed, and that was part of the original computation when I was doing this way early on, was sort of a reciprocal computation.
Q So in May of 2008 you believed that the ratio 10:53AM
of zinc to copper to cattle waste was smaller than poultry waste; correct?
A No, I don't say I believed it. I wrote that. I really wasn't looking so much at those numbers. I
was looking at this graph, so I can -- I did the 10:53AM
interpretation largely based on Figure 8. This material is supplementary to Figure 8 and expresses ratios between those materials.
Q So, Dr. Fisher, you didn't really believe what
you wrote in your first report; is that what you're 10:54AM
telling me?
MR. GARREN: Object to form.
A That's not what I'm saying.
Q Okay. In your first report you wrote that the
total zinc to total copper ratio in cattle waste was 10:54AM
smaller than poultry waste; right?
A Right.
Q Today you've offered the statement in your Exhibit 20 that the total zinc to total copper ratio
in cattle waste is larger than poultry waste; 10:54AM

c2f2b933-291b-460c-9c73-0f3e968532c2

correct?
A That's correct.
Q Okay. Despite that change, it's completely inverted; your opinion hasn't changed; is that right? 10:54AM
A That's correct.
Q Now, did you add something new on Page 39 towards the bottom?
A May have added some explanatory materials. Let's see. 10:54AM
Q With respect to the very last sentence of the last full paragraph, you've, I think, added a statement that copper in wastewater treatment plant effluent is enriched in zinc and arsenic with respect to total P? 10:55AM
A That's correct.
Q That's a new opinion?
A Well, that is reflective of the actual data as opposed to what I thought it was at one time.
Q Why is that important; is it important? 10:55AM
A Well, it's important because there is still -- it's still different from poultry waste.
Q So wastewater treatment plant effluent has more zinc than phosphorus and more arsenic than phosphorus; is that what I understand? 10:55AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Well, no, it has not more zinc than phosphorus and more arsenic than phosphorus, but the ratio of total zinc to total phosphorus and total arsenic to total phosphorus are enriched with respect to poultry waste. Poultry waste is copper rich. 10:55AM
Wastewater treatment plant material is zinc rich.
Q And arsenic rich?
A And, remarkably, arsenic rich.
Q And I think you told me yesterday that you didn't believe wastewater treatment plant had much 10:56AM
arsenic in it; is that right?
A Well, it still doesn't. I mean, in terms of the absolute amount of arsenic, it's very small.
Q It has more arsenic per phosphorus than poultry litter; correct? 10:56AM
A Right, and could contain poultry processing waste.
Q Do you believe that to be the explanation?
A It's possible.
Q Well, have you done any investigation of that? 10:56AM
A I have not personally.
Q Well, has anyone done that investigation?
A I believe Meagan Smith has done that investigation.
Q Let's go to Page 40. The second paragraph, 10:56AM

c2f2b933-291b-460c-9c73-0f3e968532c2

last sentence, in May of 2008 you said that with respect to phosphorus, copper is approximately 6.6 times more abundant in poultry waste than in cattle waste; do you see that? I'm sorry. Actually in May of 2008 you said, on Page 40, that with respect to phosphorus, copper is approximately 115 times more abundant in poultry waste than in cattle waste? 10:57AM

A Right, and that was in error.

Q Okay. Today in Exhibit No. 20, you say that with respect to phosphorus, copper is approximately 6.6 times more abundant in poultry waste than in cattle waste; correct? 10:57AM

A That's correct.

Q That's a significant change, isn't it?

A Well, it's a significant change, but what is really important here is it's still greater. 10:57AM

Q Despite the fact that your computations have changed by several order of magnitude with respect to this statement, your opinion is still the same?

A The graph has not changed and my opinion remains the same. 10:57AM

Q Okay. You weren't relying upon these calculations that you wrote back in May of 2008 in your expert report?

A Well, these simply seem to be supplementary. 10:58AM

c2f2b933-291b-460c-9c73-0f3e968532c2

They agreed with the graphs or I thought they agreed with the graphs at the time.

Q Well, they don't agree with what you said in May of 2008, do they?

A Well, they don't; they don't. 10:58AM

Q Let's keep going in the same sentence towards the end. In May of 2008 you said -- see if I can put this together -- with respect to phosphorus, copper is 151,000 times more abundant in poultry waste than wastewater treatment plant effluent. 10:58AM

That's what you said in May of 2008; right?

A That's correct.

Q Okay. Today after you corrected your error, you say with respect to phosphorus, copper is only 2.8 times more abundant in poultry waste than in 10:58AM wastewater treatment plant effluent; correct?

A That's correct, and what's significant is that it's still greater.

Q It's 2.8 times greater compared to what you thought in May of 2008, being 151,000 times greater; 10:59AM correct?

A Well, yeah. I mean, I don't know if I -- this number is wrong.

Q Yeah, and despite that order of magnitude of change in your computations, your opinion is still 10:59AM

c2f2b933-291b-460c-9c73-0f3e968532c2

the same?
A It does because it doesn't change the graphical data. That was still correct.
Q All right. Let's go to the next paragraph. You're talking about the ratio of arsenic to 10:59AM
phosphorus now, and in May of 2008 you wrote with respect to phosphorus, arsenic is approximately 13,400 times more abundant in wastewater treatment plant effluent than in poultry waste; correct?
A And we're talking about May 2008? 10:59AM
Q Yes, sir.
A And you're talking about the final sentence in the third paragraph?
Q Yes, sir.
A Correct. 10:59AM
Q All right. So in May of 2008 you thought phosphorus -- that arsenic was 13,400 times more abundant in wastewater treatment plant effluent than in poultry waste; right?
A I inappropriately calculated that. 11:00AM
Q But those were the numbers you were working off of in May of 2008; correct?
A I was working off Figure 8.
Q Well, I don't see a cite to Figure 8 in this paragraph either in your original expert report or 11:00AM

c2f2b933-291b-460c-9c73-0f3e968532c2

in this one, do you?
A No, I do not.
Q Okay. Now, today in September of 2008, in
Exhibit No. 20 you've come to the conclusion that
with respect to phosphorus, arsenic is approximately 11:00AM
4.9 times more abundant in wastewater treatment
plant effluent than poultry waste; correct?
A I think -- wait a minute. Yeah, but that's
not on this page. There is a reference to Figure 8
on Page 39. 11:00AM
Q Did I ask about Page 39?
A No, you didn't ask about Page 39 but I thought
I needed to give you a more complete answer.
Q You thought that after your counsel pointed it
out to you; is that right? 11:01AM
A Yeah, that's right.
Q Okay, all right, but you recall the question
before Mr. Garren pointed something out to you?
A No.
Q Okay. 11:01AM
MR. GEORGE: Can you read it back?
(Whereupon, the court reporter read
back the previous question at Page 420, Lines 3-7.)
A Well, that's not correct because it's 4.9
times more abundant. 11:01AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay. What did I say?
A Four, or at least the question, when read back was four.
Q I apologize. That's okay. With that amendment, you agree? 11:01AM
A Yes.
Q These ratios, zinc to copper to phosphorus to arsenic, in cattle waste, wastewater treatment plants and poultry litter really aren't important to your opinions, are they? 11:02AM
MR. GARREN: Object to form.
A No, that's not true at all. The most significant differences, the ones that are really -- were the same in May of 2008 as they are today were the ratios of zinc and copper. 11:02AM
Q So zinc and copper is the important one today; is that right?
MR. GARREN: Object to form.
A Well, they're all important to my opinion, Mr. George, and they were reviewed in those -- that data 11:02AM is displayed and reviewed in Figure 8, which is referenced on Page 39, which comprises part of Opinion No. 18. The data is important. I exposited those ratios, which were incorrectly calculated with respect to phosphorus. They were not incorrectly 11:02AM

c2f2b933-291b-460c-9c73-0f3e968532c2

calculated with respect to zinc and copper. So I think it mischaracterizes to say they aren't important. They are important to me, and they were important enough to me to become concerned when I was reviewing this and saw that there was a 11:03AM difference between the graphs and these numbers.

Q Dr. Fisher, is there any manner in which we could change these ratios that would change your opinion?

A Yes. 11:03AM

Q Tell me what that would be.

A Well, to make them coalesce so that the compositional -- the composition of each of these materials were the same, then there would be no way to differentiate among them. 11:03AM

Q They have to be exactly the same before you lose the ability to differentiate?

A They would have to be darned close.

Q How close?

A I don't know. We'd have to see what the 11:03AM actual date said.

Q Well, that's pretty important to know. There has to be a threshold. How close?

MR. GARREN: Object to form.

A You would have to make -- I can't make that 11:03AM

c2f2b933-291b-460c-9c73-0f3e968532c2

assessment as I sit here today.

MR. GEORGE: I'll pass the witness.

MR. McDANIEL: Let's go ahead and change tapes.

VIDEOGRAPHER: Wee are now off the Record. 11:04AM
The time is 11:03.

(Following a short recess at 11:03 a.m., proceedings continued on the Record at 11:11 a.m.)

VIDEOGRAPHER: We are back on the Record. 11:11AM
The time is 11:11 a.m.

DIRECT EXAMINATION

BY MR. McDANIEL:

Q For the purposes of Record, I'm Scott McDaniel and I represent Peterson Farms. Dr. Fisher, would 11:11AM you identify for me every occasion where you have worked with Mr. David Page, lawyer, on prior occasions?

A Sure. Let's see if I can recollect those. I've worked with Mr. Page at Gardere & Wynne and the 11:11AM primary cases I recollect working on with him was a Calcasieu Estuary.

Q I realize now that my question has taken you into an area I don't care about, so I don't want to waste time. I really don't care about when you were 11:12AM

c2f2b933-291b-460c-9c73-0f3e968532c2

employed about Gardere & Wynne. Let me rephrase the question and narrow it. Since the time you left Gardere & Wynne, please explain to me all the matters or occasions upon which you have worked with Mr. David Page. 11:12AM

A Sure. Since leaving Gardere & Wynne, I worked with Mr. Page on this matter. I've also worked with Mr. Page on -- in terms of extensive matters on a matter involving a permit application by Umetco Minerals for an NPD, a discharge permit, which it's 11:12AM an administrative matter in Arkansas. I think that's now concluded. I refer to it as the Billy Wilson case, but it's called something else, and I can't remember what it is.

I've provided some minor consultations to Mr. 11:13AM Page in a matter involving Tulsa Rig Iron, and I've done some consultation with Mr. Page probably no more than four or five days in total with respect to a matter involving a steel plant in Georgetown, South Carolina and a matter involving a paper mill 11:13AM in Dierks, Arkansas, and I think at present I have some additional prospective -- not prospective. It's prework, prebusiness work on another matter involving Umetco and Stratco, which are vanadium processor in a former vanadium mine in Arkansas. 11:14AM

c2f2b933-291b-460c-9c73-0f3e968532c2

That's what I recall post Gardere & Wynne.
Q Okay. If I was keeping good notes and if I count this case, I counted five other occasions or projects that you've worked with Mr. Page on since you became a private consultant? 11:14AM
A Yeah, only one of which has any significance. The others would be -- maybe in total the other four matters might involve ten days worth of my time.
Q Okay. Does that cover all the occasions which you have worked with Mr. Page? 11:14AM
A To my recollection, yes.
Q Okay. Now, Mr. Randy Miller, the same question. Since the time you left Gardere & Wynne, tell me every matter in which you've worked with Mr. Miller. 11:15AM
A Okay. With Mr. Miller, I've worked on this matter, and then I really haven't worked in the sense of doing work for any sort of compensation for him otherwise. I assisted him simply by going to a public meeting with respect to the Coffeyville 11:15AM refinery spill, flood and spill, and nothing has ever come of that.
Q Okay. That's it?
A That's it.
Q When -- how did you become involved in this 11:15AM

c2f2b933-291b-460c-9c73-0f3e968532c2

matter?
A Mr. Page asked me if I could assist him in preparing some materials to present to the Attorney General's Office concerning poultry matters.
Q Was that before the time the Attorney General hired outside counsel to prosecute this case? 11:15AM
A Yes.
Q Okay. So you were working under the direction of and being paid by Mr. Page to do that work?
A I was not. 11:16AM
Q Who was paying you?
A I was done without pay.
Q Explain that to me. Why would you work for Mr. Page on this matter without being paid?
A Why did I work without being paid? Well, in many matters in a developmental sense, if you are looking at the possibility of a matter, that would be done pro bono. I mean, I would do it without pay. That's pretty typical with consulting. 11:16AM
Q That's typical with you? 11:16AM
A Well, it's typical with many consulting companies. Certainly with my experience at Exponent that was true. It depends on the degree of consultation, and it depends on the nature and potential scope of the matter. 11:17AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q How much time did you put in assisting Mr. Page in preparing these materials? Let me strike that question and back up and make sure I understand. The materials that you were assisting Mr. Page in preparing, who were they intended -- who 11:17AM was the intended audience for those materials?

A The intended audience, as I understood it, was the Attorney General's office.

Q Okay. Tell me what you -- what work you did and what work product came from that work. 11:17AM

A My recollection that -- and this is awhile back -- is there's a PowerPoint presentation, which I have actually given publicly, and it should have been in my produced materials, maybe not, but it was material that just talked about the poultry industry 11:17AM generally and then talked about how chickens were raised, how waste was disposed, how the industry has changed over time, you know, preliminarily. That's what I'm recollecting.

Q As part of this pro bono work, did you look at 11:18AM any information specific to the Illinois River watershed, any specific factual information?

A Well, I looked at the Agricultural Census data. I looked at various reports. I think the one I recall was Dan Storm's report concerning -- or 11:18AM

c2f2b933-291b-460c-9c73-0f3e968532c2

David Gate actually, his thesis regarding the Illinois River watershed, as I'm recollecting that. Looked at some material pertaining to Lake Tenkiller. Not a whole lot of effort went into the presentation in terms of in detailed workup. I 11:19AM
think we looked at the existing aerial photography that was available on the Internet.

Q How about any environmental analytical data of any type?

A Oh, yeah. That's been produced in this case. 11:19AM
Is that true?

Q Just to make sure we're agreed on the context, this is what you looked at during this period you were assisting -- when you were assisting Mr. Page in preparing a presentation for the Attorney 11:19AM
General. That's the context of the question.

A Okay. You know, I just don't get the timing straight on this because things kind of muddle up from 2004, but in the summer of 2004, and it may or may not -- it was after at least one presentation to 11:20AM
the Attorney General's office, we collected some sediment samples, we being myself and Mr. Hight, and I believe Mr. Page was accompanying us that day. We collected some sediment samples in Lake Tenkiller for a very preliminary analysis. 11:20AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And I've seen some documents about that --
A Yeah.
Q -- trip, and that was in the summer of 2004?
A Yeah. I believe it was in July or August of
2004. It was awful hot. That's what I remember 11:20AM
about it.
Q Now, what was the purpose for collecting those
samples?
A The purpose was to make a very, very
preliminary because those were grab samples. 11:20AM
There's no historic context to them. Just look at
preliminarily what sorts of levels of materials that
are potentially -- were potentially associated with
poultry waste might be present in Lake Tenkiller.
Q How many different locations were sampled? 11:21AM
A Gosh, Mr. McDaniel, I don't recall. There
were several locations sampled but I don't recall
the exact number.
Q Was there laboratory analysis performed on
these samples? 11:21AM
A Yes.
Q And is that information from those 2004 core
samples, is that part of the -- does it form any
part of the basis for your opinions in this case?
A No. 11:21AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Why not?
A Well, that material was done in a survey mode. It had no historical context. It suggested that there might be poultry litter contaminants present in the sediments. I didn't feel it was conclusive, 11:21AM
and it was suggestive but not conclusive. It was a limited sampling. It didn't involve a core. These were grab samples. They were done with a ponar grab sampler, not with a coring tube. So they would be very preliminary survey-type materials, not things 11:22AM
that you would use to form a final opinion.
Q Was the reason for gathering this information, was it to assist in the development of strategies for prosecuting this case?
MR. GARREN: Object to form. 11:22AM
A I don't believe so. I mean, I'm actually a little unclear as to what strategies might be, but it was used to make a preliminary assessment of levels of contaminants in Lake Tenkiller. That was my understanding. 11:22AM
Q At the time you went on this sampling trip, were you being compensated for that work?
A No.
Q Okay, and this summer 2004 was also before the time that the Attorney General's office entered a 11:22AM

c2f2b933-291b-460c-9c73-0f3e968532c2

contract with outside counsel in this case?
A Yes.
Q All right. Any other -- did you make any other trips, field trips or surveys or sampling efforts with Mr. Page or anyone else during this 11:23AM
preliminary workup stage?
A My recollection is no but they -- I think that there was -- I'm recalling the meeting with the Attorney General's office at the time involved myself, Mr. Page, Mr. Miller, Randy Miller, and at 11:23AM
the time Getner Drummond. I think Mr. Page was at the Drummond Law Firm at that time, and then the work, the field work or the minor amount of field work that was done, that was pretty much it. I didn't travel anywhere, other than Oklahoma City, on 11:24AM
this matter.
Q If I -- if I understand what I've read correctly, I gather that when the Attorney General or his office made the decision to consider hiring outside counsel, they put out a request for 11:24AM
proposal; is that your understanding as well?
A I imagine so. I've never seen it.
Q Was it your understanding when you were working with -- were Mr. Page, Mr. Miller and Mr. Drummond working together in this effort to make a 11:24AM

c2f2b933-291b-460c-9c73-0f3e968532c2

presentation to the Attorney General?
A That I don't know. I do know that they showed up and talked to the Attorney General. I was there to show some slides.
Q Okay. Well, the purpose of the presentation 11:24AM
you made was in the hopes that Mr. Page would secure the contract as counsel, outside counsel in this case; right?
MR. GARREN: Object to form.
A Well, I don't know what -- my intent was to 11:25AM
assist David Page.
Q In accomplishing what?
A Well, I mean, potentially in securing a contract, but David asked me to help him, and I
helped him. 11:25AM
Q So who was present at this meeting?
A Okay. My recollection of those present at the meeting were Mr. Drummond, Mr. Miller, Mr. Page, myself, Kelly Burch and one other person from the
Attorney General's office, a man who I do not 11:25AM
recall. It was not Drew Edmondson.
Q Have you ever -- prior to the time that the contract was entered between the law firms of Motley Rice, Riggs Abney, et al, and Miller Keffer Firm,
prior to that time, did you -- is this the only 11:26AM

c2f2b933-291b-460c-9c73-0f3e968532c2

presentation, meeting or meeting in Oklahoma City that you participated in?

A It's the only one I recall, and I'm pretty sure that's the only one.

Q All right. What additional work did you do in this workup period besides what we've discussed, the Tenkiller sediment sampling and pulling some information together to help prepare a PowerPoint; anything else you did during that period? 11:26AM

A In a preparatory sense? 11:26AM

Q Uh-huh.

A I had some preliminary phone conversations with Roger Olsen. The purpose of that was, you know, assessing and looking at some of the Tenkiller data, sediment data and what it might mean. 11:26AM

Q And why did you call Dr. Olsen?

A Mr. Page suggested that Mr. Olsen might be someone to consult with.

Q Prior to that suggestion from Mr. Page, did you have any sort of a relationship or familiarity at all with Dr. Olsen? 11:27AM

A No.

Q Now, obviously at some point the firm of Camp, Dresser & McKee was retained and engaged to perform work in this case. How did that come about, if you 11:27AM

c2f2b933-291b-460c-9c73-0f3e968532c2

know?
A I don't know. I mean, I know that Mr. Olsen
-- Dr. Olsen and Dr. French ultimately became
involved in the case. I've had conversations. It's
awhile back. I've had more than one conversation 11:27AM
with Roger Olsen over time. They were I suspect --
I don't know. It would be speculation as to how
they became involved.
Q Would it be fair to say or draw the conclusion
from what you've said that you were the first expert 11:28AM
on board in this case?
A I don't know what on board means.
MR. GARREN: Object to form.
Q Well, you were engaged and involved in this
matter -- you were the first? 11:28AM
A In terms of formal engagement --
Q I'm not speaking formally.
A Oh. In forming -- that I became involved in
looking at this issue?
Q Yes, first expert involved in this case with 11:28AM
these outside counsel.
MR. GARREN: Object as to form.
A I don't know if I'm -- go ahead. I'm doing
that again. I am so sorry.
Q I don't care if you speak over Mr. Garren. 11:28AM

c2f2b933-291b-460c-9c73-0f3e968532c2

That's Lisa's problem.
A I know you don't.
Q I want to make sure you and I -- we don't speak over each other.
A I don't know if I was the first. I was early. 11:28AM
Q All right. Tell me what role you played in helping to identify other potential experts to serve or to work with outside -- the Attorney General's outside counsel in this case.
A My role in that matter was to offer up names 11:29AM of individuals who worked in the City of Tulsa case and to, in some instances, you know, be the person who might make a call to someone who's suggested working as an expert.
Q Did you do any of the screening of the 11:29AM potential expert candidates?
MR. GARREN: Object to form.
A I don't think I ever participated in screening. I don't know what you would mean by screening. 11:29AM
Q Well, did you go out and try to identify people that had expertise that may be applicable and look at their qualifications and work history and -- did you play any role in the vetting process?
A I think I was asked on some occasions for 11:30AM

c2f2b933-291b-460c-9c73-0f3e968532c2

folks to say, gee, do you think this guy knows what he's doing, but that's about it.

Q Why were you the person asked to make some of the initial inquiries to potential experts?

MR. GARREN: Object to form. 11:30AM

A I don't know why I was asked.

Q Okay. Under whose direction were you working at that time?

A Mr. Page would have asked me to do that.

Q It's -- Mr. Page through the course of this 11:30AM lawsuit, has he been your primary directing attorney?

MR. GARREN: Object to form.

A Mr. Page has done most of the work, much of the work with the experts, so in that sense, yes, 11:30AM but I've had quite a bit of interaction with others, Mr. Bullock and Mr. Garren, for example.

Q Okay. I understand the interaction, but I'm more interested in who is giving -- who was giving directions to you as to what work to perform? 11:31AM

A You mean authorizing work to be performed?

Q Sure.

A Mr. Page and Mr. Bullock would have been the author -- the people to say do this work.

Q All right. Mr. Miller is no longer involved 11:31AM

c2f2b933-291b-460c-9c73-0f3e968532c2

in this; is that true?
A As far as I know, that's correct.
Q And why is that?
A I don't know.
Q Well, what have you heard? 11:31AM
A I've heard that there was a clash of personalities.
Q Well, explain that.
A Well, that's what I know. Some dustup between Mr. Miller and the Attorney General's office. Other 11:31AM than that, I have no specific knowledge. I wasn't there, didn't participate in it. It's hearsay.
Q Now, you and Mr. Miller have been friends for many years; correct?
A We have been, yes. 11:32AM
Q All right, and you didn't speak to him at all about his disengagement from this matter?
A I've avoided that subject with him and, frankly, Mr. McDaniel, Mr. Miller has been -- is kind of ill. So his behavior has become a little 11:32AM erratic.
Q Okay. Tell me about his illness.
A He's had further issues with his arteriosclerosis, and then he was -- in my opinion, and I'm not a medical doctor, but he was fairly 11:32AM

c2f2b933-291b-460c-9c73-0f3e968532c2

seriously injured in a motor scooter accident. He was thrown over a car and landed on his head basically.

Q All right. In your non-medical opinion, there's been some cognitive effect that Mr. Miller has suffered? 11:32AM

A The observations that I made of Mr. Miller as a friend and someone I'm very fond of was that after those incidents or in the course of time, his behavior became a little erratic. 11:33AM

Q Okay. Now, since you left the employment with Gardere & Wynne, you have served as a private consultant within two firms, Exponent, which is a national scale company, and then more recently Lithochimeia, which is your own company; correct? 11:33AM

A That's correct.

Q During this period post Gardere & Wynne, what percentage of your work is associated with legal matters? They don't have to be in litigation but they're in legal matters. 11:33AM

A Well, setting aside the University of Tulsa employment, virtually all, probably 95 percent.

Q Okay. You made some comments yesterday explaining your expertise, and I gather from what you've said that you have been engaged in one 11:34AM

c2f2b933-291b-460c-9c73-0f3e968532c2

capacity or another working against the poultry industry for eleven years; is that what you said?

A Well, not working against the poultry industry. In 1997 I was asked by Patsy Bragg, a partner at Gardere & Wynne, who at the time was a 11:34AM member of the Tulsa Metropolitan Utilities Authority, and I've forgotten her exact position. I think at one time she may have been chair of their technical committee, but she asked me to assist her in understanding some technical data pertaining to 11:34AM water chemistry issues within the Eucha-Spavinaw watershed, about half of Tulsa's water supply. So I did assist her with that at Gardere & Wynne, and that at the time was a fairly collaborative effort with members of the poultry -- I remember attending 11:35AM meetings with TMUA, with representatives of the poultry industry there, and the fellow I remember most was Claud Rutherford, who I think was from Peterson, nice guy.

MR. ELROD: Simmons. 11:35AM

A Simmons. I'm sorry. He is a nice guy. But, no. You want me to finish the answer?

Q Go ahead.

A Following leaving Gardere & Wynne and going to work with Exponent, I worked on one poultry-related 11:35AM

c2f2b933-291b-460c-9c73-0f3e968532c2

matter Mr. Elrod is quite familiar with, which was an effort to vet or to examine the reports from the City of Tulsa and all the data pertaining to limnology of the Eucha-Spavinaw system in which Robert Wetzel, who has now passed on, but Dr. Wetzel 11:36AM was retained to review that information, and I assisted him because I had all the reports and so on with me, but that was sort of a third-party data review.

It wasn't until I was retained by the City of 11:36AM Tulsa and TMUA after the settlement of the original Eucha-Spavinaw matter, I believe that was in 2000 -- I can't remember when the evidentiary hearing was with respect to the phosphorus index. Was that '02 or '03? Well, anyway, I was retained then to assist 11:36AM them with that effort. So it's really been more like five years in terms of being -- working for attorneys on what you might call the other side of the poultry industry.

Q Well, now, Miss Patsy Bragg, she got Gardere & 11:37AM Wynne involved because the City of Tulsa had issues with the poultry industry operation in the Eucha-Spavinaw watershed; that's true; right?

MR. GARREN: Object to form.

A Well, she had issues with respect to 11:37AM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus in the Eucha-Spavinaw watershed, which we believed and I still believe is due to poultry operations, but that work, the work that I did there was not adverse to poultry.

Q But you and your team, you spent a lot of time and effort collecting data and mapping poultry farms and that sort of thing in the Eucha-Spavinaw watershed; right? 11:37AM

MR. GARREN: Object to the form.

A Yes. 11:37AM

Q And you even consulted with some State of Oklahoma personnel who were writing technical reports on the Eucha-Spavinaw watershed?

A That's correct.

Q All right. Change of subjects. You're not an agronomist; correct? 11:38AM

A I'm a geologist and a geochemist.

Q Okay. Well, I need you to answer my questions directly. Are you an agronomist?

A I'm not an agronomist. 11:38AM

Q Thank you, but I want to ask you some questions and see if there are some basic principles we can agree on that may be outside your field of expertise, and you can tell me if they are. Within the context of the Illinois River watershed, if I 11:38AM

c2f2b933-291b-460c-9c73-0f3e968532c2

use the word forage, do you understand that word, or tell me what your meaning of the forward forage is within the context of the Illinois River watershed.

A Plants grown to feed animals.

Q Okay, and in the Illinois River watershed, is 11:39AM that primarily Bermuda grass and fescue grass?

A I think that's accurate. I think Arkansas has more mixed grasses than Oklahoma, but you characterized that reasonably accurately.

Q Okay. If I call it grass, is that acceptable, 11:39AM that broad term?

A That's a good technical term, yes, sir.

Q Okay. Now, you agree that grass needs phosphorus to grow?

A Yes. 11:39AM

Q All right. So the plant itself, grass, will draw phosphorus from the soil if it's available?

A That's correct.

Q And its tendency is to draw as much as it needs if it is available; correct? 11:39AM

A Well, I think that there are some complications there but, in general, yeah.

Q All right. Is the phosphorus that is in the biomass or in grass, is that a pollutant, as you use that term in your expert opinions? 11:40AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A To the extent that a plant has not under -- done super abundant uptake because there's a tremendous amount available, I mean, it's just what you would expect in any normal grass growing on any normal soil, yeah, but I've not made a study of 11:40AM phosphorus levels in grass.

Q All right. You said yeah, as in yeah, it's a pollutant?

A I said yes, as in the phosphorus in grass, it is a pollutant. 11:40AM

Q Within the way you've used that term in the opinions you've expressed in your report?

A That's an interesting question. If -- if present in concentrations normally present in grass, it would probably not be a pollutant. 11:41AM

Q All right, and there are some places in your report where you use the word contaminant. Are pollutant and contaminant synonymous the way you've used them in your report?

A I believe they are. 11:41AM

Q Okay, and we're going to come back to this in a minute, but yesterday you told Mr. George -- he asked you what was a -- what was the level that defined contamination of soil with phosphorus, and you said, well, I've got to convey that in terms of 11:41AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Mehlich III phosphorus or as we commonly refer to it in this case, as soil test phosphorus or STP, and you said anything above the agronomic rate you would call polluted. Am I quoting you or is that your testimony? 11:42AM

MR. GARREN: Object to form.

A Yeah, I think that's a fair characterization of the testimony.

Q Okay. What I take from that is that you would agree that the normal uptake of phosphorus by 11:42AM grasses, that that's the good phosphorus; it's the necessary phosphorus in your view?

A If it's normal uptake by grass for the normal growth of grass, it's fine.

Q All right. Now, your comment that you or your 11:42AM opinion that you've expressed several times yesterday and several times today that are -- that cattle are recyclers of phosphorus, that's your opinion; correct?

A Yes, and the opinion of others. 11:42AM

Q All right. Well, I'm only asking about yours. If I want to know about somebody else's, I'll ask. That is from a mass balance perspective; true?

A That's correct.

Q What you're saying then for laypeople who may 11:43AM

listen to your testimony and not have your expertise is you're saying cattle neither import or export phosphorus from this watershed, and when I say cattle, grazing cattle. Is that what you mean when you say they're mass balance recyclers? 11:43AM

A That's correct.

Q All right. Well, we all agree that when cattle are harvested, they are killed and processed for meat, there will be phosphorus in the body, in the bodies of the cattle that are removed from the 11:43AM watershed; right?

A That's correct.

Q Okay. So they're not truly neutral on a mass balance. They do take -- they use phosphorus to grow in their flesh, and then when they leave the 11:43AM watershed, they take that phosphorus with them; true?

A That's correct, a minor amount.

Q All right. So when you say they're recyclers, I think I understand your opinion, but you do agree 11:44AM with me that cattle are an important part of the phosphorus transport pathway in this watershed?

MR. GARREN: Object to form.

A I would agree with Dr. Engel's opinion as to the extent of their import, but they definitely are 11:44AM

c2f2b933-291b-460c-9c73-0f3e968532c2

part of the transport pathway.
Q All right. From mass balance -- isn't the key in this case not what phosphorus may be entering the watershed but what phosphorus enters the water?
A Yes. 11:44AM
Q Okay. So do you agree with me then grazing cattle eat grass; they consume, take into their bodies the phosphorus that's in the mass of the grass; do you agree with me so far?
A Yes. 11:45AM
Q And I think we agreed that's not necessarily a pollutant?
A Not necessarily. The one thought I had on that, as I'm sitting here, is that with respect to increased fertility, and you do see this in poultry 11:45AM litter applied fields, especially those that are hayed, the biomass of grass that is grown, the productivity of grass goes up, which is the reason more cattle can be supported. In that sense, additional phosphorus is available for ingestion by 11:45AM cattle.
Q All right. Well, I don't want to get distracted. Are you making some policy statement that improving stocking rates on pastures is a bad thing? 11:45AM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A Okay. No, that's not what I'm saying. What I'm saying is you asked about the effect, and it's just to say that putting more phosphorus in to the extent it increases productivity, more phosphorus 11:46AM
in, most phosphorus out.
Q Do you associate -- let me put this differently. You've blamed a lot of things on the poultry industry. Do you blame the poultry industry for increased cattle stocking rates in the Illinois 11:46AM
River watershed?
MR. GARREN: Object to the statement. Ask it be stricken.
MR. McDANIEL: It was a question.
MR. GARREN: Object to the form, too. 11:46AM
A I'm thinking the term blame is kind of loaded. Poultry industry's presence in the watershed by virtue of providing materials that can increase the productivity of fields to which they are applied has permitted cattle stocking rates to increase, and 11:46AM
that's clear in the data from about the mid '70s, but it has not changed the cattle stocking rates substantially since then. They've about doubled that.
Q The poultry industry isn't raising cattle in 11:47AM

c2f2b933-291b-460c-9c73-0f3e968532c2

the watershed; do you agree?
MR. GARREN: Object to form.
A Okay. Well, I don't know. I think I saw a Tyson beef sign the other day, but I'm not sure. I don't think they are. 11:47AM
Q Okay. All right. Let's get back to the point. Cattle consume grass that contains phosphorus taken up in the growth of the grass; they take that into their bodies; they digest it and then they excrete waste like all warm blooded animals do; 11:47AM right?
A Correct.
Q All right. Tell me what happens to the phosphorus that was in the plant fibers that goes in through the mouth of the cow or steer; how does it 11:47AM change in form when it is discharged in cattle manure?
MR. GARREN: Object to the form.
A Some is not changed in form. Some is liberated and is easier to transport. 11:48AM
Q Okay. So the phosphorus that is in cow manure, deposited on the surface of a pasture is easier to move in the environment than the phosphorus was when it was in a blade of grass; do you agree? 11:48AM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object.
A In the living blade of grass, yes.
MR. GARREN: Object to form.
Q All right, and so cattle will convert good phosphorus into phosphorus that can become a 11:48AM
pollutant by virtue of being washed off or off the field?
A If you are saying can -- the processing of grass by cattle has the potential to accelerate, somewhat accelerate phosphorus transport from 11:48AM
systems or at least from grass out of systems, out of fields; is that your question?
Q Yeah. Answer that question.
A Yes.
Q Okay. Now, it's not just a potential. It 11:49AM
actually occurs. You spent a lot of time in the watershed. You claim to know what is going on. It's occurring?
MR. GARREN: Object.
A Sorry. You say cattle are eating grass. 11:49AM
Cattle are defecating. It rains and things on fields run off.
Q Yes.
A Yes.
Q Okay, and I don't think there's any 11:49AM

c2f2b933-291b-460c-9c73-0f3e968532c2

disagreement that if cattle have access to water, they will spend as much time as possible in water; do you agree with that?

MR. GARREN: Object to form.

A I think it depends on the circumstances of weather, but they will go to it. If they can get to water, they'll go to water. 11:49AM

Q All right. So cattle can also be a transport mechanism for taking phosphorus that was in a living blade of grass and actually putting it in a more soluble form directly into water? 11:49AM

A They can assist that process.

Q And that is occurring in the watershed as well?

A The question is, the degree to which it occurs, and I think Dr. Engels (sic) looked at that. 11:50AM

Q Well, if you can avoid qualifying your answer, is it occurring in the watershed?

A Well, I need to give you a complete answer. I would believe that it is occurring in the watershed. 11:50AM

Q All right, but you have not undertaken to evaluate the extent to which this transport mechanism, which is the normal life activity of grazing cattle, is influencing water quality by virtue of the fact that cattle take good phosphorus 11:50AM

c2f2b933-291b-460c-9c73-0f3e968532c2

in the plant matter and actually transport it and deposit it as more soluble phosphorus in manure in or near water courses?

MR. GARREN: Object to form.

Q That's not part of your evaluation? 11:50AM

A It is not.

Q Let's see. Your report, Page 4, you covered this with Mr. George yesterday. You said the only contaminants of concern in the Illinois River watershed are phosphorus and bacteria; correct? 11:51AM

A That's what I said, yes.

Q All right. What is the form of phosphorus that is the contaminant of concern?

A All forms of phosphorus are going to be the contaminant of concern because phosphorus undergoes 11:51AM numerous reactions with environmental media. So adding phosphorus in one form today, it can turn into a form that's taken up by algae tomorrow in a stream.

Q With the bulk of the water quality data, is 11:51AM this most oftenly expressed as total P?

A That's correct.

Q Okay. So when -- there have been a lot of discussion in the last two days about phosphorus, phosphorus, phosphorus. What typically you and 11:51AM

c2f2b933-291b-460c-9c73-0f3e968532c2

others in this case are doing is you are looking at the total phosphorus?
A That's correct.
Q What is the specific bacteria that is the contaminant of concern? 11:52AM
A Well, that was really going to be something that would be in the opinions of Mr. Teaf or Dr. Teaf and Dr. Harwood. As I understand their opinions --
Q Just a second. I do not want to hear their 11:52AM opinions. I only want to hear yours, the ones you intend to express at trial based upon your own expertise and work.
A Well, they would be pathogenic enteric bacteria indicated by the presence of indicator 11:52AM bacteria in the environment.
Q Okay. Name them.
A Name what?
Q The bacteria at issue here that are the contaminants of concern. 11:52AM
A The contaminants of concern are going to be indicated by fecal coliforms.
Q Okay. So the contaminant of concern is fecal coliform or fecal coliform indicates some other contaminant of concern? I'm trying to understand. 11:53AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Some fecal coliforms may be a contaminant of concerns in that fecal coliforms also indicate things that are contaminants of concern.

Q All right. What are those -- specifically tell me what are the bacteria that you are saying 11:53AM are a concern in the Illinois River watershed that are indicated by fecal coliforms.

A Enteric pathogenic bacteria as a class, and I'm not an expert in this area.

Q Can you name any of those bacteria? 11:53AM

A No.

Q Can you identify which, if any, of those bacteria have been identified as being commonly found in poultry manure?

A Well, the indicator species are found commonly 11:53AM in poultry manure.

Q That wasn't my question. The indicators themselves are not necessarily human pathogenic bacteria. Do you agree?

A Not necessarily, that's correct. 11:53AM

Q Okay. If I understand what you're saying, it's that they may indicate the presence of bacteria that are in fact human pathogenic; is that right?

MR. GARREN: Object to form.

A That's correct. 11:54AM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All right. Which of those bacteria that are in fact human pathogenic, which of them are on the list of what you call bacteria of concern in this case because those bacteria are commonly found in poultry litter; do you know? 11:54AM

A That would be a question to ask either Dr. Teaf or Dr. Harwood.

Q Okay. By that answer, are you saying that you don't know?

A I don't have a specific list of names. 11:54AM

Q Okay. You're not a microbiologist?

A That's correct.

Q You're not a toxicologist?

A That's correct.

Q You're not an epidemiologist? 11:54AM

A That's correct.

Q You're not a medical doctor?

A That's correct.

Q So you're not qualified to offer opinions as to which bacteria are human pathogens? 11:54AM

A No.

Q But isn't it true that you're the one that said bacteria is a contaminant of concern in your opinion; isn't it true that the only bacteria that are a true concern would be those capable of causing 11:55AM

c2f2b933-291b-460c-9c73-0f3e968532c2

infectious human disease?

MR. GARREN: Object to form.

A Okay. I would -- I mean, I have to answer that question by saying a qualified yes. Yes, but typically in monitoring water quality, no effort is 11:55AM made to specifically identify pathogenic bacteria; that to manage systems to health purposes, indicator bacteria are measured.

Q Isn't it true, though, Dr. Fisher, that the mere presence of indicator bacteria does not 11:55AM establish as a matter of scientific fact that human pathogenic bacteria are present at the same time and same place?

A It may not. I don't know for sure. The presumption, though, by public health officials is 11:56AM that it does since things like beaches are closed and swimming is shut down when indicator bacteria are found at higher levels.

Q As a management policy?

A That's correct. 11:56AM

Q But I'm asking you about scientific fact, not policy.

A That's a question that you would need to ask Dr. Harwood and/or Dr. Teaf.

Q Are you not qualified to answer that question? 11:56AM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I don't believe that I'm qualified to answer that question.

Q Now, you state in several places, but specifically I was looking at Page 7 of your report, where you say that the defendants' actions have 11:56AM polluted, and then you give a list of things that you say the defendants have polluted, and you covered this partially with Mr. George and, that is, what is your definition of pollution or contamination, and I want to focus on your two 11:56AM contaminants of concern, phosphorus and bacteria. Define what pollution means when you are speaking of phosphorus in the Illinois River watershed.

A Pollution means the presence of phosphorus within the watershed, say, within soils that's in 11:57AM excess of agronomic limits, economic need, anything beyond that in any consequence that flows from that would be pollution.

Q What do you mean by consequence that flows from that? 11:57AM

A Well, by driving up the soil concentration of phosphorus, the flux of phosphorus from pastures will increase necessarily. As soil concentration of phosphorus increases, soil solution concentration of phosphorus increases in particles that are 11:57AM

c2f2b933-291b-460c-9c73-0f3e968532c2

translocated from those fields in the surface soils and pieces of poultry waste that are enriched in phosphorus, the phosphorus flux will increase. So once we take it beyond or once a field is driven beyond agronomic levels of phosphorus, that field is 11:58AM polluted and all the phosphorus that flows from that is pollution.

Q The -- your criteria that soils in excess of the agronomic need is pollution, where do you draw that criteria from? 11:58AM

A These are materials that aside from -- I'll develop the criteria for you. There's no published criteria of that nature. The soil test phosphorus is known to be related to the flux or -- the flux of phosphorus. So you are -- really run sort of a 11:58AM balancing act here. When you look at putting fertilizer on a field, the purpose of doing that is to increase agronomic yield.

Q Okay. That is just not my question at all.

A Not your question. 11:59AM

Q I didn't ask you to explain the theory behind it. I asked you, are you relying on a regulatory guideline, something from the federal government, something from the state government; what are you looking to that says anything above agronomic rate 11:59AM

c2f2b933-291b-460c-9c73-0f3e968532c2

is pollution?
A It's simply the principle, and the principle is that if more material is placed into a field than would be needed to grow grass, it is waste, and that's pollution. 11:59AM
Q Okay. You've defined that as the limit for pollution. You can't look to any authoritative source or any regulatory guidance that says 65 soil test phosphorus or 100 S -- 100 soil test phosphorus defines the line between pollution and not 12:00PM pollution?
MR. GARREN: Object to form.
A We can look to authoritative documents that say you don't need any more phosphorus.
Q The State of Oklahoma, in its capacity to 12:00PM regulate practices in environmental matters within the state, has not declared that phosphorus in soil in excess of the agronomic rate is pollution. Do you agree?
MR. GARREN: Object to form. May call for 12:00PM a legal conclusion also.
A I can simply agree that agronomic rates are lower than what appear to be, from a plain reading, allowed amounts in soils.
Q Okay. Are regulatory water quality standards 12:00PM

c2f2b933-291b-460c-9c73-0f3e968532c2

relevant to your analysis in this case?
A You'll have to explain that question.
Q Are the limits for certain constituents in
certain waters set forth by the State of Oklahoma or
the U.S. Environmental Protection Agency, are they 12:01PM
relevant to your opinions in this case?
A I don't think so.
Q All right, and in an edge of field sample,
what level of phosphorus in an edge of field sample
would designate it as polluted or contaminated with 12:01PM
phosphorus?
A Edge of field sample -- I mean, level with
respect to --
Q If I take an individual edge of field sample,
analyze it and I look at the lab reports, what 12:01PM
criteria would I look at when looking at the
phosphorus data to tell me whether that sample is
polluted with phosphorus?
A I don't offer any opinions saying that the
edge of field material is polluted per se. This is 12:01PM
a pathway analysis looking from the fields to the
edge of field and on into streams. I don't believe
I said that it was polluted. I mean, it's
containing materials that are being translocated
from fields. To the extent phosphorus, for example, 12:02PM

c2f2b933-291b-460c-9c73-0f3e968532c2

in that edge of field sample is present at levels in excess of those that would be present at agronomic levels of phosphorus in the field, then that would be pollution. I don't know what that level is on there. 12:02PM

Q Okay. So to be clear, you do not have a specific phosphorus level in edge of field runoff samples that is used by you as a pollution criteria?

MR. GARREN: Object to form.

A Pollution criteria, meaning in your mind? 12:02PM

Q Well, the difference between saying it's polluted or not polluted with phosphorus, you don't have a number you can tell me?

MR. GARREN: Object to form.

A I've never developed such a number, and 12:03PM there's -- it's not part of my opinion as to whether or not there's a number of that nature.

Q Okay. Now, in the case of, again, soils, what is the level of indicator bacteria that indicates that soils are polluted with indicator bacteria or 12:03PM they're not polluted with indicator bacteria?

MR. GARREN: Object to form.

A I don't believe I have an opinion as to that.

Q Do you have an opinion about the level of indicator bacteria in edge of field runoff that 12:03PM

defines whether it is polluted or not polluted?
A I'd apply public health criteria.
Q And what is that?
A I don't have a specific number in mind at this
time, but there are published criteria. 12:03PM
Q And that public health criteria, which public
health criteria? There's criteria for primary body
contact recreation; there's criteria for drinking
water. What are you talking about?
A Well, I don't know what I'd apply. Probably 12:04PM
primary contact recreation for that.
Q Now, why would you apply primary body contact
recreation from water running off an agricultural
field?
A Because people could walk in it. That would 12:04PM
be the most reasonable reason to apply that.
Q All right.
A It could be people could be exposed to that.
Q Can you identify any circumstance that you're
aware of in your work experience where primary body 12:04PM
contact recreation criteria for fecal indicator
bacteria has been applied to runoff?
MR. GARREN: Object to form.
A No.
Q Okay. Where does the State of Oklahoma apply 12:04PM

c2f2b933-291b-460c-9c73-0f3e968532c2

its primary body contact recreation criteria; what types of body waters?

A In streams for people that have primary contact.

Q Okay, and people don't have primary water body contact in bar ditches? 12:04PM

MR. GARREN: Object to form.

A I think that that might be a little overbroad. I've had personal body contact in a bar ditch.

Q Primary -- I'm not saying that you might incidentally get wet, Dr. Fisher. Okay? It's not -- this is a recreational standard. Have you ever recreated in the water in a bar ditch? 12:05PM

A No.

Q Thank you. Is it true that runoff water from an agricultural field that's never received poultry litter will contain phosphorus and bacteria? 12:05PM

A It may contain bacteria. It's very likely to contain phosphorus. It's almost certain to contain some kind of bacteria. If you mean by enteric bacteria, it might not. 12:05PM

Q The -- now, in the case of geoprobe samples -- take just a minute for the benefit of the jury and explain what a geoprobe sample is.

A Geoprobe sample is so-called direct push 12:05PM

c2f2b933-291b-460c-9c73-0f3e968532c2

technology. In collecting those, a rod is forced downward through unconsolidated material. Once it has encountered free phase water, for example, if you are chasing water samples with it, then it is actuated from the surface such that it opens and 12:06PM allows the admission of that free phase water and that can be collected.

Q And the depth limitation for geoprobe samples would be a limitation of the equipment and how far it can push into the soil? 12:06PM

A Right.

Q The geoprobe samples taken in this case, what was the range of depths at which the water was taken?

A I don't recall the specific depth, but they 12:06PM were pretty shallow.

Q Help me. Give me some flavor. What does pretty shallow mean?

A Pretty shallow is certainly less than 50 feet I think. They're pretty shallow. 12:07PM

Q Okay. Now, in the case of geoprobe water samples, do you have a numerical criteria you can give me for defining what is or is not contaminated with phosphorus in a geoprobe sample?

A No. 12:07PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q How about for indicator bacteria?
A With respect to human exposure to indicator bacteria, no, not offhand. You would treat it as groundwater I think. It's presumptively water that could be part of the shallow groundwater system. So 12:07PM
it would be a health criteria.
Q All right. Phosphorus in a stream in the Illinois River watershed, what is your criteria for what is contaminated and what is not contaminated?
A I do not have the criteria. I believe that 12:08PM
would be the opinions of Jan Stevenson with respect to adverse biological consequences of various phosphorus levels.
Q Well, when you made the statement in your report that the poultry industry polluted streams, 12:08PM
what was the numerical criteria that applied to the streams you were referring to?
MR. GARREN: Object to form.
A What I'm talking about here is that the high levels of phosphorus in fields within the Illinois 12:08PM
River watershed that are in excess of agronomic rates, excessive need, means that waste is entering streams and that waste contains phosphorus, and to the extent that the phosphorus is entering those streams in excess of the amount that would be coming 12:08PM

c2f2b933-291b-460c-9c73-0f3e968532c2

to them, if the fields were at agronomic levels, that's pollution.

Q All right. So it doesn't matter if -- assuming your statement is true, that fields with phosphorus levels in excess of agronomic rates, if 12:09PM phosphorus comes off those fields and make it to a stream, from what you've just said, that is pollution by your definition whether or not that field has actually affected the phosphorus concentration in the stream? 12:09PM

MR. GARREN: Object to form.

A I'm not sure I follow your question.

Q Okay. If you don't have a phosphorus criteria for streams that defines pollution, how then can you conclude that phosphorus leaving an agricultural 12:09PM field results in pollution?

MR. GARREN: Object to form.

A The phosphorus that leaves the field -- that is leaving the field in excess of what would leave the field if it were present in the field agronomic 12:10PM levels is waste and waste is pollution.

Q All right. Regardless of whether it creates a problem in the stream or not?

MR. GARREN: Object to form.

A That would be a separate issue, and that would 12:10PM

c2f2b933-291b-460c-9c73-0f3e968532c2

be the degree of injury that might have related to that pollution.

Q All right. What is the criteria -- what is the phosphorus level in an edge of field sample that is the criteria for acceptable phosphorus loss from 12:10PM a field that is maintained at agronomic soil phosphorus levels?

MR. GARREN: Object to form.

A I don't have a specific number that I can give you at this time. 12:10PM

Q Tell me how any agricultural operator in this watershed is supposed to know whether he or she is polluting based upon your criteria if you can't state any criteria?

MR. GARREN: Object to form. 12:11PM

A If their field was at an agronomic level of phosphorus, they could definitionally not be polluting.

Q We'll have to change tapes and might as well take our lunch break. 12:11PM

VIDEOGRAPHER: We're now off the Record. The time is now 12:11 p.m.

(Following a lunch recess at 12:11 p.m., proceedings continued on the Record at 1:18 p.m.) 01:18PM

c2f2b933-291b-460c-9c73-0f3e968532c2

VIDEOGRAPHER: We are back on the Record. The time is 1:18 p.m.

Q Dr. Fisher, in your report on Page 8 you make the statement that essentially nearly all the poultry litter is land applied near where it's generated. That's one of your opinions, general opinions? 01:18PM

A Yes, that's correct.

Q All right. Why is that; why is that the case?

A As I understand -- 01:18PM

MR. GARREN: Object to form.

A Okay. As I understand the circumstances and from reading depositions of some haulers, which I've referenced in my report, the reason that it's disposed near to where it is generated has to do with hauling costs. 01:19PM

Q I'm sorry, did you finish?

A Yes, I did.

Q Okay. Doesn't your answer assume that the desire of the person where the litter is generated wants to get rid of it as in get it away and that's as far as it can go away is hauling costs? 01:19PM

MR. GARREN: Object to form.

A No, it doesn't. It doesn't assume that at all. It simply records the observations and the 01:19PM

c2f2b933-291b-460c-9c73-0f3e968532c2

data, and from reading the deposition testimony of Lance Bart Snyder in particular, Mr. Snyder says it costs too much to carry it very far. So it will be disposed near to where it's generated.

Q You agree that poultry litter is good at growing grass? 01:20PM

A I agree that poultry litter can grow grass.

Q Okay, and the people -- there are people in the Illinois River watershed who desire to utilize poultry litter in order to grow grass; that's why they use it? 01:20PM

A Certainly grows grass and certainly individuals permitted to be -- put on their land to grow grass.

Q Are you aware of anyone or any circumstance that you're aware of in the Illinois River watershed where a person has land applied poultry litter for the sole reason of getting rid of it? 01:20PM

A I think there are two reasons to apply. One is to grow grass and the other is to get rid of it. 01:20PM

Q Well, okay. Can you answer the question I asked?

A Have I asked anyone to just put it there to get rid of it, no.

Q Are you aware that there is a -- are you aware 01:21PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that there is a general practice in the Illinois River watershed of land applying litter for the sole reason of getting rid of it?

MR. GARREN: Object to form.

A No, but the effect is to get rid of it. 01:21PM

Q Isn't it another reason that litter is applied in the Illinois River watershed is that the State of Oklahoma and the State of Arkansas and the USDA Natural Resources Conservation Service have issued nutrient management plans that authorize the litter 01:21PM to be land applied in the Illinois River watershed?

MR. GARREN: Object to form.

A Well, nutrient management plans don't necessarily allow it to be disposed. I mean, nutrient management plans simply specify the 01:21PM conditions of disposal.

Q You agree that there are nutrient management plans or they be called an animal waste management plan as a label that have been issued by the State of Oklahoma that authorizes the land application of 01:22PM poultry litter in the Illinois River watershed?

MR. GARREN: Object to form.

A Okay. I'm not sure that they're issued by the State of Oklahoma as a state entity. They're generally -- it's my understanding and experience 01:22PM

that these are written by Soil Conservation Service employees. Now, if there are state employees -- that's a conclusion of law as to what I think, whether it's a state sponsored plan or not, but it's -- the animal waste management plans tend to be 01:22PM written by extension people.

Q All right. I won't debate with you who writes them. Are you aware of the fact that there are animal waste management plans that have been written for landowners in the Illinois River watershed in 01:22PM Oklahoma that authorize the land application of poultry litter?

MR. GARREN: Object to form.

A Okay. I'll recognize -- with respect to your question, I would agree that there are nutrient 01:23PM management plans or animal waste management plans that have been written that pertain to lands within the Illinois River watershed that specify the circumstances of disposal of litter on people's lands. 01:23PM

Q Okay, and those plans would dictate the allowable rate at which poultry litter can be land applied --

MR. GARREN: Object to form.

Q -- on specific fields? 01:23PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes.
Q And previously my question was sort of framed within the context of the state of Oklahoma, but those plans, nutrient management plans, are -- have also been written and issued to landowners on the 01:23PM
Arkansas side of the basin?
A I have seen nutrient management plans on the Arkansas side of the basin. It's my understanding that for -- until very recently they were not required. 01:24PM
Q By whom?
A Pardon?
Q Weren't required by --
A Weren't required by the State of Arkansas.
Q Do you know the extent to which the poultry 01:24PM
companies or any poultry company has required its contract growers to pursue and obtain a nutrient management plan notwithstanding state requirements?
A I know that there are some instances in which contract growers have had that requirement. 01:24PM
Q Is that the extent of your knowledge, what you just stated?
A The extent of my knowledge as I sit here today. I've read a ton of records. I think there are requirements by some contract growers that -- 01:24PM

c2f2b933-291b-460c-9c73-0f3e968532c2

for nutrient management plans for the growers.
Q Okay.
A I don't recall when that was first implemented.
Q All right. The -- now, back to where I 01:25PM
started a few moments ago, would you agree that one reason poultry litter is land applied near where it's generated in the Illinois River watershed is because there are landowners that have animal waste
management plans that allow poultry litter to be 01:25PM
land applied in those areas?
A Well, I'm not sure that it requires an animal waste management plan, but there are individuals who would desire to have it applied.
Q All right. Let me -- then tell me, do you 01:25PM
know whether all land application of poultry litter in the Illinois River watershed today requires the applicator to be licensed?
MR. GARREN: Object to form.
A Okay. I think we need to break that down into 01:25PM
by state.
Q If you want to answer by state, that's fine.
A With respect to Oklahoma, commercial applicators need to be licensed is my understanding,
and if you are applying it to your own land, you 01:26PM

c2f2b933-291b-460c-9c73-0f3e968532c2

have to make an application report. I'm not sure of the licensure requirements if you are applying waste to your own land.

Q Okay.

A In Arkansas, I am not familiar enough with that state's regulatory structure to have an opinion, but it's possible. 01:26PM

Q Is all the poultry litter that is applied in this day and time in the Illinois River watershed subject to rules or regulations in either Oklahoma or Arkansas depending on where the land is? 01:26PM

MR. GARREN: Object to form.

A I believe that at the present time that is true.

Q All right. Are you aware of any circumstance, Dr. Fisher, where poultry litter has been land applied in the Illinois River watershed in violations of the provisions of that landowner's nutrient management plan or animal waste management plan? 01:27PM 01:27PM

MR. GARREN: Object to form.

A I know of none, but there's also no way of truly checking that.

Q Now, in your report at Page 13 where you go into your history discussion of the defendants, you 01:27PM

c2f2b933-291b-460c-9c73-0f3e968532c2

offer a brief discussion about my client, Peterson Farms, Inc.; right?
A That's correct.
Q All right. Now, what qualifies you to render an opinion about the history of operations of 01:27PM
Peterson Farms, Inc.?
A I have read the history of Peterson Farms' operations.
Q Well, I can read them, too. Would I be as equally qualified an expert as you? 01:28PM
A I don't know.
Q Well, the only thing that qualifies you is that you read it; is that what you're telling me?
A I've read it, and I have familiarity with the poultry industry. 01:28PM
Q All right, and what you reviewed was a biography of Mr. Peterson?
A That's correct.
Q And you read what you could find on the company's website? 01:28PM
A That's correct.
Q Now, I fail to understand the relevance of this discussion of Peterson Farms to any of your opinions in the case. Can you tell me how this relates to the opinions that you've expressed? 01:28PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to the form.
A Well, that Peterson Industries was engaged in the poultry business in the 1950s, as early and before.
Q Do you agree with me that this paragraph about Peterson Farms, you make absolutely no statement and offer no opinions with regard to Peterson Farms' contacts or relationship or involvement in the Illinois River watershed whatsoever? 01:28PM
A There's no geographic specificity to that. 01:29PM
Q All right, and you would agree with me that Peterson Farms has never owned or managed a poultry farm in the Illinois River watershed?
A I don't know that to be true.
Q Do you know that -- do you have specific evidence that Peterson Farms has owned or operated a poultry farm in the Illinois River watershed? 01:29PM
A I do not.
Q Did you read the depositions taken of the Peterson Farms' representatives? 01:29PM
A I have.
Q You just don't specifically recall the discussion on that point?
A No.
Q Have you identified any location where 01:30PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Peterson Farms, Inc., the corporation, has land applied poultry litter in the Illinois River watershed?

A I've only identified some locations where material from Peterson's contract growers has been applied within the Illinois River watershed. 01:30PM

Q Have you identified any location where Peterson Farms, Inc., the corporation, has stored or stockpiled poultry litter in the Illinois River watershed? 01:30PM

A I have not.

Q The photograph that you produced, and it was discussed briefly yesterday. I might be able to point it to you. I think it's Figure 3.

A I think that's right. Yes, it is. 01:30PM

Q All right. You said disposal of poultry waste from Peterson Circle Farms. What is Peterson Circle Farms, sir?

A Peterson Circle Farms to my knowledge is a contract grower for Petersons. 01:31PM

Q Okay. So the name of the facility is not Peterson Circle Farms?

A Well, that's what the name says on the sign, Peterson Circle Farms.

Q Okay. You understand that throughout poultry 01:31PM

c2f2b933-291b-460c-9c73-0f3e968532c2

company, the contract growers have a sign indicating the integrator they happen to contract with that may say Tyson or Simmons or George's or Petersons; right?

MR. GARREN: Object to form. 01:31PM

Q Then they have the farm name on it?

MR. GARREN: Same objection.

A I'm just reporting what's on the sign.

Q All right. Well, let's be clear. Are you representing in your report or do you intend to 01:31PM represent that this farm is owned or managed by Peterson Farms, Inc.?

A No.

Q Is it your intention to represent or suggest to the jury that what is depicted in this photograph 01:31PM is a land application being conducted by Peterson Farms, Inc.?

A No.

Q Okay, and I think this photograph came up yesterday when you were talking to Mr. George about 01:32PM whether any specific land application had been directly linked to any particular location where water pollution had been identified. This land application that's depicted in Figure 3 of your report, were there edge of field samples taken from 01:32PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that field?
A I can't recall as we sit here at this moment.
Q All right. Can you tell me whether you or anyone else on the plaintiff's expert team to your knowledge has drawn a direct correlation between 01:32PM
this land application depicted in Figure 3 and any specific water contamination in the Illinois River watershed?
MR. GARREN: Object as to form.
A I don't know at this time. 01:32PM
Q Is there anything -- strike that. Okay. Sir, would you turn to Page 46 of your report, please. The top of the page, do you see the sentence that begins as shown in Figure 14?
A Yes. 01:33PM
Q All right. Just so we're clear, this is part of your statement of your Opinion No. 19, and you say, as shown in Figure 14, soils more susceptible to runoff dominate in the eastern and western portions of the Illinois River watershed, while 01:33PM
soils that are more susceptible to infiltration dominate in the central portion of the Illinois River watershed; correct?
A That's correct.
Q All right. Let's look at Figure 14. All 01:34PM

c2f2b933-291b-460c-9c73-0f3e968532c2

right. Explain this figure, please.
A This figure, which is entitled Figure 14, Hydraulic Properties of Soils Within the Illinois River Watershed, is a map of the soil hydrologic classes, and it looks at the ratio. What we are 01:34PM
depicting here is the ratio of infiltration to runoff. Those in Hydrologic Group B or B, the red soils there, are more susceptible to infiltration. Those that are classed in blue or in green are more susceptible to runoff, that is, they infiltrate less 01:34PM
rapidly.
Q Okay. So I would read the key, as the top of the key being red is the most susceptible to what, sir?
A It's infiltration. 01:35PM
Q Infiltration, which is water going down through the soil versus running off?
A That's correct.
Q As I move down towards D --
A Yes. 01:35PM
Q -- it is less likely to infiltrate, more likely to run off; is that fair?
A That's correct.
Q All right. I'm intrigued by this exhibit for a number of reasons. Do you see the 01:35PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Arkansas-Oklahoma State line there?
A Yeah. We refer to those as state line faults.
Q Okay. A fault in the display, not in the soils?
A No, no. This is from the interpretation as 01:35PM
applied by the state soil conservation folks in Arkansas versus the state conservation folks in Oklahoma as to the nature of the soils. So this is based upon their interpretation of the physical behavior of these materials. 01:35PM
Q Okay. Because clearly the surface of the earth geologically does not recognize the state line?
A Not to my knowledge.
Q So how does an expert, such as yourself, 01:36PM
interpret a figure that displays the information with such a contrast on each side of the state line?
A Well, you interpret it within the context of -- you rely upon the folks who did the mapping and what they believe to be correct. 01:36PM
Q If you look at the Oklahoma side of the state line, it appears that interpretation would say the majority of those soils -- just looking at the amount of red, the majority of those soils would be dominated by the red Class B, which is most 01:36PM

c2f2b933-291b-460c-9c73-0f3e968532c2

susceptible to infiltration, yet when you hit the state line, the color changes all the way down to C, which would be considerably less subject to infiltration; is that correct?

A Yes. The upland soils -- the way it's mapped in Arkansas, the upland soils are mapped as being more runoff prone and those within the alluvial valley fills, we see the traces of the streams there, I believe were mapped as more susceptible to infiltration. 01:37PM

Q All right. If I go to the point that's on the state line, any one of these points where just directly on the state line I can see where the soil color appears to change from red to blue based upon the two state's interpretation? 01:37PM

A Uh-huh.

Q Which is correct for that soil at that location?

A Well, you'd ask me to reinterpret their work. If you looked at this geologically, I suspect that there's an arcuit form that basically corresponds to what I've termed the Westville Plateau. This highland that extends out to here is going to have somewhat similar soils. So this blue stuff is going to come over this way and arc back around, but that 01:37PM 01:38PM

c2f2b933-291b-460c-9c73-0f3e968532c2

would require -- to draw that in detail would
require remapping and renaming, trying to find the
equivalence of soil units between Arkansas and
Oklahoma. Nobody has done that. It's important --
it's not particularly important if you went there -- 01:38PM
what they're saying is that in their opinion this is
more susceptible to infiltration than runoff in
Oklahoma. In Arkansas they think it's a little more
susceptible to runoff. The truth of the matter is
this will be somewhat degradational because the 01:38PM
geology changes just about here because of the
Westville highlands.
Q When you say just about here, be descriptive.
A I'm sorry. That's not very helpful to Mr.
Elrod. 01:38PM
Q Well, pointing to me isn't either. Say it;
put it in words for the Record.
A Okay. For the Record, as we come across from
Arkansas into Oklahoma, we reach -- there's a
highland that sort of stretches around this edge 01:39PM
here. I'll try to draw this on the map.
Q On your version?
A I'm sorry, on the exhibit version.
Q I don't think that's --
A I know that's not the piece, but it will be 01:39PM

c2f2b933-291b-460c-9c73-0f3e968532c2

somewhat helpful. 14. Okay. If you're reinterpreting this just grossly on geological features, the C group of soils from Arkansas would extend into Oklahoma in this arcuit form roughly between the Barren Fork and the Illinois River about 01:40PM
to, oh, this point as I'm illustrating on the map with this drawing, and here in the north, they're probably going to honor the alluvial fills. So it's going to look something like that, but that's a reinterpretation of the underlying soils data that 01:41PM
are presented by both state soil surveys, and if you're using this, for example, in phosphorus index models and you're worried about infiltration and runoff, this is how those hydrographic curves would be assigned are based upon those state soil surveys. 01:41PM
Q Now, why -- if you are in a phosphorus index, why do you care what the soil type is?
A Well, you care about the soil type with respect to infiltration versus runoff.
Q So if the question here is the fate of surface 01:41PM
applied materials, i.e., poultry litter, whether the soil is prone to infiltration or runoff is an important consideration; agree?
A It's certainly a consideration. Just bear in mind that this is susceptible to the two. Given 01:42PM

sufficient rain, everything runs off. Given a little bit of rain, all soil infiltrate; all soils will experience runoff.

Q When I use the term soil type, and that may be an imprecise term, what would that mean to you? 01:42PM

A Well, soil type is kind of a complicated term because it can be as multidimensional. It considers composition. It considers the parent material. It considers slope. It considers thickness and other considerations I can't think of right offhand. 01:42PM

Q How many different soil types are there present in the Illinois River watershed?

A There are a bunch. I can't think -- I can't give you a specific number as I sit here today, but it's, you know, north of 50 I think. 01:42PM

Q And give me an idea of what differences in properties may be exhibited by these soil types.

A Well, difference in properties would depend on what property you're interested in. If you're interested in infiltration versus runoff, that's 01:43PM largely going to be a function of how close bedrock is to the surface, how much clay content is present in the soil, those sort of things, and if you're looking at infiltration, it's going to be partially -- grain size dependence is going to have an awful 01:43PM

c2f2b933-291b-460c-9c73-0f3e968532c2

lot to do with that but slope is going to be important, too. A highly infiltrative soil on a steep -- that would be infiltrated upon a level surface could experience severe runoff on an inclined surface. 01:43PM

Q The -- can the chemical makeup of the soil vary among these 50 or so types you described in the watershed?

A Yes.

Q Can these different soils types have different 01:43PM effects on constituents that may pass through the soil; in other words, they may tend to bind some chemicals more than others, allow some things to pass, tend to hold on to others?

MR. GARREN: Object to form. 01:44PM

A To some degree, yes. It depends on what -- the specifics of what you are describing.

Q Okay. One point I want to make sure I understand from yesterday's testimony, is it your opinion, Dr. Fisher, that every act of spreading 01:44PM poultry litter in the Illinois River watershed is a pollution-causing act?

A Every act of spreading poultry litter or disposing of poultry litter in the Illinois River watershed, if the soil is above agronomic need, is 01:45PM

waste disposal, and it's going to be an act that results in pollution.

Q Okay. Rather than you stating the question you want to answer, I need you to answer the question I asked. The question I asked, is it your opinion that every act of spreading poultry litter in the Illinois River watershed is a pollution-causing act; can you answer that question? 01:45PM

MR. GARREN: Object to form.

A I'd have to know the circumstances of the individual spreading. 01:45PM

Q The question was, is every act of spreading litter a pollution-causing act?

A Since I haven't studied the specifics of every act, I can't answer that question. 01:45PM

Q Do you categorically believe that the use of poultry litter in the Illinois River watershed under all circumstances is creating pollution?

A Not necessarily.

Q Figure 6, if we could look at that briefly in your report, that's the one that has the sections of land that you have colored coded, cross hatched. If you could -- if you have documentation of the poultry litter application, if I understand that. 01:45PM

A That's correct. 01:46PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All right. On this, have you mapped -- let me phrase this differently. Do you know how many acres of open land in the Illinois River watershed have not received poultry litter?

A No. 01:46PM

Q All right. Do you agree if one is analyzing a particular pasture or field and is seeking to determine the potential that surface applied fertilizers, like poultry litter, on that field could affect groundwater or surface water, the type 01:47PM of soil in the field and the properties of that soil are factors you would consider?

MR. GARREN: Object to form.

A To some extent, yes.

Q Now, are you aware that the State of Oklahoma 01:47PM employs soil scientists who write animal waste management plans for people who want to utilize poultry litter in the Illinois River watershed?

A I don't know if the State employs them. I know there are individuals who will write nutrient 01:47PM waste or animal waste management plans.

Q Have you personally consulted with any of these nutrient plan writers to ask them what criteria they use for deciding where litter can be applied and where it cannot? 01:47PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I've read literature concerning that, but I have not consulted specifically with anyone I can identify as a plan writer.

Q Okay, and would that answer also be applicable to persons who write plans in the state of Arkansas? 01:48PM

A That's correct. I would have consulted with John Everett, who was in charge of people who wrote plans in Eucha-Spavinaw but not in the Illinois River watershed.

Q But John not a plan writer? 01:48PM

A He is not. He's a manager of plan writers.

Q In your report you discuss the Karst features in the Illinois River watershed, including faults, fractures, sink holes, and generally you state that these features influence the ability of materials 01:48PM placed on the surface of the ground to reach groundwater; right?

A They can, yes.

Q And on Page 49 of your report you state that -- all right. Actually it's the third little 01:49PM paragraph. It's just one sentence. Page 49, you state that the highest areas of aquifer vulnerability are within fractures, stream courses and on slopes; correct?

A That's correct. 01:49PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay. Just for the benefit of laypeople, can you give me a brief definition of what an aquifer is so when we use that term we both know we're talking about the same thing?

A Well, an aquifer has various definitions. An aquifer in a geologic sense is any water-bearing geologic material at saturation. 01:49PM

Q Let me just -- I want to know what the term means within the context of your report, if that's a different answer. 01:49PM

A That's really not a different answer.

Q Okay. So it's a subsurface zone that bears groundwater?

A That's correct.

Q Okay. All right. So you say the highest areas of aquifer vulnerability are within fractures, stream courses and on slopes. Now, how familiar with you with the Code 590 that's been written or issued by the United States Department of Agriculture, Natural Resources Conservation Service? 01:50PM 01:50PM

A I have some familiarity with it.

Q Are you familiar with the fact that there is a Code 590 that is applicable to Arkansas and one that's applicable to the state of Oklahoma?

MR. GARREN: Object to form. 01:50PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes.
Q Would you agree that the Code 590 governs the land application of organic fertilizer, such as poultry litter?
MR. GARREN: Object to form. 01:50PM
A I'm not sure I could agree it governs, but it certainly discusses and describes circumstances for its application.
Q Okay. If instead I use the word govern, if I use it's applicable to the land application of 01:51PM organic fertilizer such as poultry litter?
A Yes.
Q Does the Code 590 provide -- or excuse me. What does the Code 590 provide as the minimum distance poultry litter applications must be set 01:51PM back from stream courses?
A Okay. This is a recollection. My recollection is 50 feet.
Q What does the Code 590 provide as a minimum distance poultry litter applications must be set 01:51PM back from fractures, sink holes or rock outcrops?
A I don't recall the specific distance but there is a setback requirement. It may also be 50 feet.
Q What does the Code 590 provide as far as the maximum slope of land that can receive poultry 01:51PM

c2f2b933-291b-460c-9c73-0f3e968532c2

litter?
A You know, I know there is a maximum slope. I can't recall what it is.
Q In creating your maps, did you create a map of all the areas in the Illinois River watershed that 01:52PM
cannot receive poultry litter because of these restrictions in the Code 590?
A I did not.
Q So tell me how the Code 590 and the laws of Oklahoma and Arkansas that apply to litter use in 01:52PM
the Illinois River watershed factored in to the opinions you've developed.
A Well, I mean, Code 590 can apply only to -- for example, let's start with alluvial sediments or alluvial things along stream courses. Having a 01:52PM
50-foot setback from a stream course itself is not necessarily protective of a stream, in that the stream valleys are alluvial fills. They tend to be fairly easy to infiltrate with fluids, and so not applying waste immediately next to the stream course 01:53PM
simply means you don't throw it into the creek. It certainly can be dissolved in land surface and infiltrate downward into shallow groundwater and exit into a stream or into somebody's water well that might have an alluvial well. That's one 01:53PM

c2f2b933-291b-460c-9c73-0f3e968532c2

circumstance.

With respect to slopes, slopes are a whole other issue, and to some extent it may be somewhat self-limiting because my recollection of the slope, the maximum slope to which -- on which poultry waste 01:53PM can be disposed is fairly steep, and that's just my recollection.

With respect to faults, fractures, bedrock, you can only plan with what you see at the surface. So if -- and this is frequently the case. Faults 01:53PM and fractures are filled with regolith or their mantled -- this is a mantled Karst system. The Karst features may not at all be readily apparent at the surface.

Q All right. My question that preceded the 01:54PM statement you just made is, how did the Code 590 and the state's laws on litter application factor into the forming of your opinions? Based upon what I've heard, it sounds like they are not relevant to your opinions? 01:54PM

MR. GARREN: Object to form.

A Well, I think that's accurate. They are not relevant.

Q Okay. That was the question I was getting at.

A Okay. I'm sorry. 01:54PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Well, I note in your report that you discuss all the types of areas in the Illinois River watershed where poultry litter has the potential to cause impacts to groundwater, but because the 590 and the state laws are not relevant to your 01:54PM opinions, you did not mention that the law already has prohibitions in place for litter applications in those areas; true?

A No, that's not completely true. There are prohibitions under certain circumstances. If a 01:55PM stream course -- you have a setback requirement of 50 feet, that doesn't mean that you don't make an application within an alluvial fill. There are plenty of alluvial fills in the Illinois River watershed that are much wider than that and would 01:55PM permit, under 590, waste application to take place.

Q So define what a stream course means then.

A A stream course would mean in my mind -- as I interpret this, a stream course is the stream valley and its alluvial fill. 01:55PM

Q So you're saying it could be a mile wide each side of the center line of the stream?

A Well, if you are somewhere like the Mississippi, that could be true.

Q Okay. Well, I want to talk about the 01:55PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Illinois.
A The alluvial fills in the Illinois tend to be somewhat more narrow than that, but these are the flat bottom lands, and so those are areas where shallow groundwater is vulnerable to infiltrating contaminants. 01:56PM
Q All right. Page 47 of your report, second paragraph you say the vulnerability of the Boone aquifer within the area of the Illinois River watershed to pollution from surface applied contaminants has been addressed in both Oklahoma and Arkansas; correct? 01:56PM
A That's correct.
Q And your citation are to maps that have been prepared for both Oklahoma and Arkansas that identify areas of vulnerable groundwater? 01:56PM
A That's correct.
Q So the information you set out in your report about the Karst geology and the locations of vulnerable groundwater, that's not new; you're not the first person to comment on that? 01:56PM
A No.
Q And that same information is well known to the regulatory authorities in both Oklahoma and Arkansas as well; right? 01:57PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A I don't know if it's well known to them or not, but it's certainly been published by the Oklahoma Water Resources Board, and in Arkansas I think the publishing entity here is The Nature Conservancy. It's not an official state entity as far as I know. 01:57PM
Q Do you have any question in your mind, Dr. Fisher, that the environmental regulatory authorities in Oklahoma and Arkansas are familiar with the geology of the Illinois River watershed? 01:57PM
A I believe that scientists working in Oklahoma and Arkansas are very familiar with the vulnerable Karst geology.
Q Okay, and you agree that both states have passed laws that allow for the land application of poultry litter even today provided the person applying the litter follows certain restrictions? 01:57PM
A I agree, but that doesn't mean that they actually considered the vulnerability of the geology. 01:58PM
Q So you don't agree with the statements that the restrictions written into the laws of the two states take into consideration everything you've said about the soils and geology of the Illinois 01:58PM

c2f2b933-291b-460c-9c73-0f3e968532c2

River watershed?
A No. I'm not sure that they fully incorporate the issues related to Karst.
Q All right. So today, according to your client, State of Oklahoma, it's okay to use poultry 01:58PM
litter in the Oklahoma portion of the Illinois River watershed; agree?
MR. GARREN: Object to form.
A There's no complete prohibition on disposal.
Q All right. Is your client wrong for allowing 01:58PM
poultry litter to be land applied in the Illinois River watershed?
MR. GARREN: Object to form.
A In some circumstances it may be unwise.
Q Is the United States Department of Agriculture 01:59PM
Natural Resource Conservation Service wrong in the way it drafted the Code 590 for Arkansas and Oklahoma?
MR. GARREN: Object to form.
A The Code 590 was largely drafted with concern 01:59PM
for surface runoff.
Q Is it wrong, Dr. Fisher?
MR. GARREN: Object to form.
A Aspects of it may be inappropriate.
Q Are the scientists and technicians who prepare 01:59PM

c2f2b933-291b-460c-9c73-0f3e968532c2

animal waste management plans and nutrient management plans that tell farmers where, when and how much poultry litter they can land apply in the Illinois River watershed, are they wrong?

MR. GARREN: Object to form. 01:59PM

A Are they wrong? Well, they are preparing plans in compliance with rules. That's what they're doing.

Q Do you think it is wrong for them to write plans that allow for the land application of poultry litter? 02:00PM

A In some instances the land application of poultry litter is wrong.

Q All right. So they write a plan that says litter can be applied in some locations, you do not agree that it should in some of those same locations; is that -- 02:00PM

A I may not.

Q Have you gone through the nutrient management plans that have been written in the Illinois River watershed to identify specific nutrient management plans that you disagree with? 02:00PM

A I have not.

Q Has anyone else on the plaintiff's expert team done that to your knowledge? 02:00PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Not to my knowledge.
Q All right. Page 45 of your report, about the third line you say -- let's see. Which opinion is this just for the Record. It's part of Opinion 19 I believe. Does that sound right, sir? The text on 02:01PM
Page 45 is part of your Opinion 19.
A I believe it is, but I'm going to verify that. Yes, it is.
Q Okay. Now, you state that bacteria can readily travel from the soil surface to surface 02:01PM
water and groundwater during rainfall events; is that right?
A That's correct.
Q All right. I want you to take a moment and explain to me what your expertise is in the 02:01PM
environmental fate and transport of bacteria.
A Well, bacteria behave largely like particles.
Q I didn't -- I asked you for your experience.
A I have no experience with bacteria.
Q All right. Would that also mean that you 02:01PM
don't have any expertise in the fate and transport of bacteria in porous media like soil?
A Have I made studies of that? I mean, I'm trying to understand your question.
Q What is your expertise in the fate and 02:02PM

transport of bacteria in porous media like soil?
A I know that particles can move through holes. I know that bacteria are about the size of clay particles, and I know clay particles can infiltrate through soils. 02:02PM
Q But you have not -- you are not trained in the fate of bacteria in the environment; true?
A That's correct.
Q And you have not conducted research on that subject? 02:02PM
A You mean specific research outside the context of this case?
Q Yeah, yeah.
A No.
Q Can you tell me the differences between the 02:02PM
environmental fate of E. coli, Enterococci, Salmonella, Campylobacter; can you distinguish between how those different bacteria move in the environment?
A The specific creatures? 02:03PM
Q Yes.
A They move like sticky particles.
Q I want to know, can you tell me the differences between the different types of bacteria, how they move? 02:03PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A No.
Q Can you tell me between those specific bacteria, what creates -- are there differences in what stresses those individual bacteria; can you describe the differences? 02:03PM
A I'm not a microbiologist.
Q So can you tell me what's the fate of bacteria in poultry litter once it's spread on a field, and what I mean is, what does exposure to sunlight do to the bacteria? 02:03PM
A If it's exposed to bacteria, it's my understanding that it's killed.
Q You said exposed to bacteria. Did you misspeak?
A Pardon? 02:03PM
Q You said if it's exposed to bacteria. Did you mean sunlight?
A If bacteria are exposed to enough sunlight, they're killed, can be.
Q All right. Do you know what is enough? 02:04PM
A I do not.
Q Let's look at Page 15 in your report. It's part of your Opinion 3. You state that the streams in the Illinois River watershed show high levels of fecal bacteria contamination during periods of high 02:04PM

c2f2b933-291b-460c-9c73-0f3e968532c2

flow.
A That's correct.
Q And you're relying on the expert reports of Drs. Teaf, Harwood and Olsen for that statement; correct? 02:04PM
A That's correct.
Q This is not independent work you have done on your own?
MR. McDANIEL: Rick, that's suggestive, pointing out -- 02:04PM
MR. GARREN: Yes, it is suggestive because this is one of the erratas we need to inform you of you with regard to his preparation.
MR. McDANIEL: Well, that's still inappropriate for you to interfere with the 02:05PM examination. You are welcome to ask him questions after we're done if you want to straighten something up.
Q Do you recall the question?
A Not specifically. 02:05PM
Q All right. Your comment about the fecal bacteria contamination during periods of high flow in the streams in the Illinois River watershed, you're restating conclusions reached by Drs. Teaf, Harwood and Olsen? 02:05PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes. I've looked at the data as well but, yeah, I'm restating their conclusion.
Q But you're not a microbiologist and that is not your expertise of field; correct?
A I'm not a microbiologist. 02:05PM
Q It's not your field of expertise, is it?
A I said I was not a microbiologist.
Q Studying bacterial impacts of waters is not your field of expertise, is it?
A I can read data like anyone else. 02:06PM
Q Sir, do you claim to be an expert in that?
A In what?
Q What about that question was unclear?
A Well, since we've been fencing it, I suppose it's all unclear. 02:06PM
Q I'm not fencing. I'm trying to ask a straight question. Is this your area of expertise or not? It's not a trick question.
A Well, it is when you said is this. What is this my area of expertise? 02:06PM
Q And I told you, the study of bacterial contamination of waters. Is that your area of expertise or not?
A I've worked on it. I wouldn't claim I have extreme expertise. We have better experts. 02:06PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay, and telling me it's not extreme expertise is not particularly helpful. Is it an area of expertise; will you present yourself to the court in this matter as an expert in this field because if so, I need to know how you are going to qualify yourself to do so. 02:06PM

A Well, I'm not an expert in microbial contamination -- well, I'm not an expert in bacteriology, and I'm not an expert in -- what am I not an expert in? I certainly would intend to testify if asked concerning numbers of bacteria in environmental samples. 02:07PM

Q Well, that's not an expert opinion. That's reading a lab sheet; correct?

A That's reading a lab sheet. 02:07PM

Q All right. You are not going to be the person who will offer testimony that there is fecal contamination of any waters in the Illinois River watershed that derives from poultry litter?

A That's correct. 02:07PM

Q And that's because you've not conducted your own analysis to prove that bacteria from poultry litter has reached surface or groundwater in the Illinois River watershed?

A I've not done that work. 02:08PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All right. Page 49, your discussion -- let's pick up with which opinion this is. This is part of Opinion 20. Page 49, you're discussing that there are 300 -- excuse me, 3,563 wells in the Illinois River watershed. 1,717 of them are in Oklahoma; 02:08PM
correct?
A That's correct.
Q All right. What's the basis for those numbers?
A Okay. The basis for those numbers with 02:08PM
respect to Oklahoma are based upon the Oklahoma Water Resources Board database of known groundwater wells. There in fact may be more because there are older wells that aren't recorded. With respect to Arkansas, the basis are from reports on water well 02:09PM
construction, which the Bates number range of those are given, and those are documents that came from the -- well, there are Arkansas reports on water well construction, which is AWC 0001 to 3852.
Q And tell me what are those records, those 02:09PM
Bates number AWC. Roughly looks like 3,852 pieces of paper. What are -- tell me what those records are.
A Those records record the locations of wells that were drilled and completed in Arkansas within 02:09PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the Illinois River watershed.
Q Now, what did you actually have in your hands for Oklahoma? You said a database. What is that?
A Yeah. It's a database obtainable from the Oklahoma Waters Resources Board website. It's 02:10PM
updated on an ongoing basis. You can download the locations of groundwater wells by county within Oklahoma, and then you can map those groundwater wells as their locations are given in that database
and determine how many are contained within the 02:10PM
watershed boundaries of the Illinois River watershed.
Q Now, the only thing you can conclude from these two datasets is that a water well was placed
at that location at some point in time; true? 02:10PM
A Within -- yeah, you can tell that it was placed and reported to the State.
Q Right. If it wasn't reported, it wouldn't be there?
A That's correct. 02:10PM
Q Do the records for all these wells tell you the completion depth of the well?
A Many do.
Q When you say many, give me --
A I don't have a number. I can just -- 02:11PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q More than half of them had depths or --
A I don't recall. It's not an insignificant number to give you a total depth.
Q All right, but is it true to say the depth was not consistently reported for the wells in these datasets? 02:11PM
A I'd say that it's a reasonable thing to state, but it would probably need to be quantified if you're asking that specific question.
Q In the case of any well where the depth was not included in the record or data that you have, did you or anyone on your behalf undertake to determine what the well depth was? 02:11PM
A No.
Q All right. Now, you make -- you do make a statement in that paragraph. You say for drinking in other house -- excuse me. And about 50 percent of the wells in Oklahoma are shallow, less than 200 feet total depth. So tell me, what was the basis for that statement? 02:11PM 02:12PM
A For those wells which had total depths, and that was not an insignificant number, and I think it's far, far more than half, but I can't give you an exact number. Those wells had TDS or total depths of less than 200 feet. 02:12PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All of them?
A No.
Q 50 percent of the ones that had numbers --
A Yes.
Q -- were less than 50 percent? 02:12PM
A That's correct -- no, no, no, no. I'm sorry. Let's back up and let me answer the question clearly because I think we talked over each other. Of the wells for which -- the vast majority of the wells in the Oklahoma portion of the Illinois River 02:12PM watershed, 1,679, okay, or 1,717 are 98 percent registered domestic. Now, I can't tell you exactly how many had depths, but it's -- I'm pretty sure it's most of them, and half of those were shallow.
Q Okay. That's what I want to be clear. When 02:12PM you say 50 percent of the wells in Oklahoma are shallow, that means 50 percent of the ones for which you had information about the depth?
A Right, and I can establish that.
Q Okay. I just want to be clear that 50 percent 02:13PM doesn't apply to the entire 1,717 wells in the Illinois River watershed or Oklahoma portion because you don't have the data for that?
A Actually we're looking at 1,679 that are registered as domestic and, of those, whatever were 02:13PM

c2f2b933-291b-460c-9c73-0f3e968532c2

reported, have reported total depths, 50 percent were shallow.

Q Okay. You can't tell me what percentage of the 1,679 are shallow?

A Not as I sit here, but it's substantial. 02:13PM

Q Now, of all these water wells that you discuss on Page 49, how many of these wells are still functional today?

A I don't know.

Q How many of these wells are still being used for human consumption? 02:14PM

A I don't know.

Q Was there any effort made to identify and map the wells that are still being used for human consumption? 02:14PM

A No.

Q All right.

A That's not completely true. In attempting to sample water wells, we establish the locations of wells that were still in use but it's not -- didn't try to census them with respect to how many were now abandoned or no longer used. 02:14PM

Q The -- in this same paragraph you make the statement that based on your experience and observations, these domestic wells do not typically 02:14PM

c2f2b933-291b-460c-9c73-0f3e968532c2

employ treatment systems that would eliminate any bacterial hazard. Explain the basis for that statement.

A The basis for that statement is in -- when our folks would sample these wells, to my knowledge 02:15PM there weren't any that I recall that had any treatment systems for chlorination or for disinfection on the well. The well pumped to some sort of reservoir and then that reservoir led to a house. 02:15PM

Q All right. So how many wells did you specifically review or consider -- let me state that better. How many wells did you evaluate to determine whether or not they had any system in place for treating bacteria in water in the Illinois 02:15PM River watershed?

A Be the wells that we sampled and that would be I think around maybe 30 some were considered.

Q Okay. So 30 out of 3,563, and that's the basis for your opinion? 02:16PM

A Well, 30 out of 1,679 because we only looked at the Oklahoma side.

Q Okay. Is this opinion limited to only the Oklahoma side?

A It would extend to the Arkansas side as well, 02:16PM

c2f2b933-291b-460c-9c73-0f3e968532c2

but it would be my opinion, based on working in this area for some time, that shallow domestic wells do not have disinfection systems on them as a matter of course.

Q All right. This is a good time to change the tape. 02:16PM

VIDEOGRAPHER: We are now off the Record. The time is 2:16 p.m.

(Following a short recess at 2:16 p.m., proceedings continued on the Record at 2:23 p.m.) 02:23PM

VIDEOGRAPHER: We are now on the Record. The time is 2:23 p.m.

Q Dr. Fisher, in the same paragraph on Page 49 about groundwater, you say that surface water contaminated with land applied poultry waste will 02:23PM readily travel to shallow and often deep groundwater aquifers; correct; that's your statement?

A I say that given the above analysis of the geology and terrain of the Illinois River watershed, surface water contaminated with land applied poultry 02:23PM waste will readily travel to shallow and often deep groundwater aquifers.

Q All right. What does a deep aquifer mean in the context of that statement?

A That would be that there's potential to 02:24PM

c2f2b933-291b-460c-9c73-0f3e968532c2

contaminate the Roubidoux aquifer.
Q What's the depth?
A Well, I don't have the specific depth because it's somewhat variable.
Q All right. Have you identified any location 02:24PM
in the Illinois River watershed where you have proven that contaminants that came from poultry litter have polluted any deep aquifer?
MR. GARREN: Object to form.
A No. 02:24PM
Q So in this paragraph, if I understand your statement, you state that it can happen but you have not specifically proven that it has in fact happened?
MR. GARREN: Object to form. 02:24PM
Q Is that a correct characterization?
A That's correct.
Q Now, through your own work and analysis, can you identify any specific groundwater well that has been contaminated with bacteria that came from 02:24PM
poultry litter?
A I think that that -- in terms of making that assessment, that would need to be an opinion offered by Drs. Harwood or Teaf or possibly Dr. Olsen.
Q Okay. So the question was whether through 02:25PM

c2f2b933-291b-460c-9c73-0f3e968532c2

your own work have you identified any groundwater well that has been contaminated with bacteria from poultry litter. Is the answer no?

A No. My work has been focused on looking at the potential for bacterial hazard and evaluating a bit of the data concerning evidence that may suggest that it is. 02:25PM

Q Okay, but you can't point to any well and say there's bacteria there and I can show you it came from poultry litter? 02:25PM

A I might be able to tell you -- point to a well and tell you there's bacteria there, and I could probably point to well and tell you it's probably from poultry litter, but I can't do it right now.

Q Okay, and that isn't -- those aren't opinions you've developed as of today? 02:26PM

A Well, it's not an opinion that's expressed in here as to a specific well.

Q Okay. Did you conduct any analysis to determine the potential impacts on groundwater from septic systems in the Illinois River watershed? 02:26PM

MR. GARREN: Object to form.

A No.

Q Do you know how many active septic systems there are in the watershed? 02:26PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I think there may be some information in reports other than mine, but I've not developed that information. I do not know.

Q Do you know what percentage of those systems are failing? 02:26PM

A I do not.

Q Have you reviewed any studies or reports that discussed the significant number of failing septic systems in the Illinois River watershed?

A I have seen reports that indicated there were 02:26PM a number of failing septic systems in the Tonitown (sic) area -- Tontitown area.

Q Okay. You're referring to the engineering reports -- I think we may have gone through them in the preliminary injunction hearing -- about the 02:27PM Tonti -- excuse me, Tontitown and Highfill surveys; is that what you are referring to?

A Yes.

Q All right. Anything else you've looked at that discussed failing septic systems in the 02:27PM watershed?

A I think there's some state surveys or state reports from the State of Oklahoma that indicate there's some failing septic tanks.

Q Can you identify what documents you are 02:27PM

c2f2b933-291b-460c-9c73-0f3e968532c2

referring to?
A Not as we sit here today.
Q And that wasn't part of your analysis in this case?
A It was not. 02:27PM
Q Now, how many water wells were sampled as part of the plaintiff's sampling program here?
A Gosh. I would have to look to see. It's somewhere between 20 and 30 I believe.
Q How were the wells chosen? 02:27PM
A The well -- pardon?
Q Excuse me. Let me make a clearer question. How were the wells chosen for sampling?
A The well were targeted for well depths, as I recall, 150 feet or less was the protocol. I'm 02:27PM having to recall this. They were shallow groundwater wells. They were -- the attempt was made to array them spatially within the watershed, so that they weren't all concentrated in one area, and then the other portion of selection was whether 02:28PM or not individuals would permit you to sample those wells. So that was the selection criteria. The idea was shallow groundwater sampled and producing water wells over a reasonable geographic area.
Q Were you looking for water wells that were in 02:28PM

c2f2b933-291b-460c-9c73-0f3e968532c2

areas of high poultry production?
A Oh, yeah. That was the other -- thank you for reminding me. We also tried to array the wells over a gradient of poultry production intensity.
Q Based upon prior depositions, it appears, and 02:28PM
you can correct me, it appears that there was not a field investigation performed at each water well site to look for potential sources of contamination?
A Surface sources, I don't recall any of that
data. 02:29PM
Q The field sampling teams did not specifically look for and inspect the septic systems at each of the residences where a water well is sampled; correct?
A I think that's on the Record from previously. 02:29PM
Q Is my statement correct, Dr. Fisher, to your knowledge?
A To my knowledge, I'm not sure.
Q How many of these water wells were tested more
than once? 02:29PM
A I don't believe that any were.
Q Opinion 21 on Page 50 you state that the constituents in poultry litter can move through the soil to pollute the groundwater. I just want to be
clear about what constituents we're talking about. 02:30PM

c2f2b933-291b-460c-9c73-0f3e968532c2

When you and I started talking earlier, I thought the Record was pretty clear that the constituents of concern are phosphorus and bacteria. When you say constituents in the context of your statement on Page 50, are you referring to anything else other than phosphorus and bacteria? 02:30PM

A These would be the entirety of the suite of chemicals pretty much from poultry litter.

Q Are you claiming that there is water in the Illinois River watershed that is polluted by any constituent other than phosphorus and bacteria? 02:30PM

MR. GARREN: Object to the form.

A Okay. Am I claiming that there are any constituents of concern other than phosphorus and bacteria? 02:30PM

Q Yeah.

A No.

Q All right. Opinion 21, you refer to -- or I'm going to modify the word, attenuation. What is attenuation or attenuated mean? 02:31PM

A To attenuate is to diminish. The peculiar aspect of Karst terrain, which is what this speaks to, is that materials in Karst, there are very -- there can be very large fractures at depth. Those fractures permit a flow of water much as through a 02:31PM

c2f2b933-291b-460c-9c73-0f3e968532c2

pipe as opposed to through a sponge, which is a more normal means of -- if you think about soils, more like a sponge. So if there are fractures present in the rock, then constituents, including particles, can migrate very quickly and without being taken up 02:31PM
or held up on surfaces.
Q But soil can attenuate or lessen the concentrations of chemicals or contaminants; true?
A It can if the material is moving through the soil and the soil is like a sponge, the soils would 02:32PM
have modest, if any, impact, with runoff, prompt runoff from application.
Q When we're talking about attenuation in the soil, is that a product of chemical reactions or a physical filtering effect on these chemicals from 02:32PM
the surface?
A Both of those.
Q And those factors that affect attenuation or affect the transportation of that substance from the surface through the soil, does it vary with the 02:32PM
substance at issue?
A It can vary with the substance at issue if you are actually traveling through a medium that is interacting with the substances contained in the waste. 02:33PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Okay. I'm speaking of soil at this point. I understand your position about cracks, fissures, fractures. I'm talking about soil right now. So there are some chemical compounds or bacteria that may move quickly through the soil and some may move very slowly. It just -- it can vary from substance to substance; do you agree? 02:33PM

A Yes, I do.

Q And even with the same substance, it can vary from soil type to soil type? 02:33PM

A Within reason, yes.

Q And the extent to which you will see attenuation or this lessening of this contamination as you move through the soil, it would also vary with soil depth; agree? 02:33PM

A Soil medium would be a thick filter as opposed to a thin filter.

Q Everything else being the same, the depth of the soil.

A We have to describe what soil depth actually means. 02:34PM

Q Well, you describe it, and if I like it, we'll move forward on that basis.

A Okay. If I were looking at soil and considering thickness of soil, I would consider the 02:34PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A horizon, that is the organic-rich horizon as being the active zone for attenuation by mainly chemical means. Deeper horizons may be less so.

Q All right. Back to my question, though. The extent to which contamination on the surface will be 02:34PM attenuated or lessened as it moves through the soil will vary -- in the specific location it will vary with the soil depth; it's a factor?

A I'm having a hard time answering that question not because it's a hard question but because there's 02:35PM other things to consider. I mean, typically if you think about chemical or physical filtration, much of that takes place very shallow in the soil column and thick filters give you a greater capacity. They may not give you greater attenuation, but they give you 02:35PM a greater time over which the soils would attenuate contaminates.

Q All things being equal, greater soil depth is more protective of groundwater than shallower soil depth, everything else being the same? 02:35PM

A Thick soils are generally viewed as depending on their nature. If they don't fracture, dry and crack badly, then they would be more protective.

Q All right. The -- now, phosphorus -- let me strike that. I think you probably covered that with 02:36PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Mr. George. Now, what does the Code 590 provide as the minimum soil depth that must be present in order for poultry litter to be land applied?

A Boy, howdy. I may need -- I need to refer to a reference. I'm thinking it's something like ten 02:36PM inches.

Q Okay, but you -- okay. You don't recall the number specifically but you recall that there is such a criteria in the Code 590, minimum soil depth?

A That's correct. 02:36PM

Q Now, the constituents that are part of your analysis, the phosphorus, copper, zinc and arsenic, what I gathered from listening to your testimony yesterday and today, you agree that not all of those components, assuming they're in litter together, not 02:37PM all those components move through the subsurface and stay together; they're not conservative?

A I think my testimony yesterday says that they are not conservative. They have differing interactions with environmental media. 02:37PM

Q Now, given your discussion or given your testimony a little while ago about the fact that portions of the watershed tend to run off rather than infiltrate and that the ability for materials on the surface to penetrate to groundwater varies 02:37PM

c2f2b933-291b-460c-9c73-0f3e968532c2

from place to place in the Illinois River watershed, then the extent to which these different constituents, these four or five constituents in poultry litter, to the extent they can move to water is going to be different throughout the watershed; 02:37PM it's going to vary?

MR. GARREN: Object to form.

A It can vary from place to place, yes.

Q In Paragraph or Opinion 22 you are referring -- excuse me. Your analysis depicted in 02:38PM Figure 16 and 17 are the basis for your opinions in Paragraph 22 of your report; is that right?

A I believe that would be at least partially right and it's probably totally right, yeah.

Q Okay, all right. Thanks. All right. Figure 02:39PM 16, I think you've explained to Mr. George what this is. Based upon the plots, the regression lines that you've drawn for zinc, copper and arsenic as compared to phosphorus for these litter applied soil locations, isn't it true that there is no 02:39PM established relationship between phosphorus and these other chemicals, arsenic, copper and zinc, other than the simple fact that when phosphorus goes higher, the other chemicals go higher?

MR. GARREN: Object to the form. 02:40PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Okay. Well, the graph shows that as phosphorus increases on these litter applied locations, that the concen -- that the phos -- well, the concentration of zinc, copper and arsenic increase, tend to increase. 02:40PM

Q And that's all you can conclude from Figure 16; correct?

A Well, since the only significant substantial source of phosphorus to these fields to my knowledge is poultry waste, then these materials are derived 02:40PM from poultry waste because it has substantial levels of phosphorus.

Q Well, all right. The statement you just made is based upon factual information outside of the graph itself, but when you look at the slopes of the 02:41PM lines or you look at these regression lines, they don't establish a strong relationship between phosphorus and -- phosphorus concentrations and any one of these specific other chemicals; right?

A They establish extremely strong relationships 02:41PM between phosphorus concentration, copper and zinc. Look at the data array.

Q Okay. So an R-squared of .62 and .60 is very significant in your analysis?

A Well, I'm -- if I look at this data array, 02:41PM

c2f2b933-291b-460c-9c73-0f3e968532c2

this -- I'm not -- first of all, these are not linear plots because this is on log-log plot circumstance. These are linear regressions, so the regression -- the correlation coefficient may not be completely representative of how strong that 02:41PM relationship is, but these data arrays for zinc and copper are extremely strong.

Q Now, Figure 16 is the soil from litter application areas?

A Yes, from all soil depths sampled. 02:42PM

Q All right. Would you at least agree when it comes to these constituents of phosphorus, zinc, copper and arsenic, there is not a signature so to speak for litter applied soils in the Illinois River watershed? 02:42PM

MR. GARREN: Object to form.

A I don't know that you can say that just by looking at this graph. I mean, the homogeneity of the zinc versus phosphorus and that of copper versus phosphorus are extremely strong, and I would opine 02:42PM there is clearly a relationship between litter and these materials.

Q Okay. That wasn't my question. If we assume that litter went on each one of these fields that was sampled, if we assume that -- you assumed that; 02:43PM

c2f2b933-291b-460c-9c73-0f3e968532c2

you called them litter applied.
A Well, I mean, these fields were sampled because to my knowledge they had been litter applied and there was evidence to that fact.
Q My question is not whether there's some relationship. My question is whether the combination of these four elements portrays a signature or fingerprint for litter applied soils in the Illinois River watershed. 02:43PM
MR. GARREN: Object to form. 02:43PM
Q There's not a single chemical profile for phosphorus, zinc, copper and arsenic that you can say is the chemical fingerprint for litter applied soils in the Illinois River watershed?
MR. GARREN: Same objection. 02:44PM
A I'm not sure that that's true at all. These have consistent -- these would have a consistent ratio relationship between phosphorus, zinc, copper and a reasonably consistent one with arsenic, so these -- you wouldn't have these firm arrays of data if there was not a signature. I can't agree with you. It's there. 02:44PM
Q All right. What did you do to determine what the background levels were of these constituents at the fields, the litter applied fields that were 02:44PM

c2f2b933-291b-460c-9c73-0f3e968532c2

sampled?

A Well, since they're litter applied fields, you really couldn't make a determination of what the background was specifically there. What you would do and the reason all the depths are plotted has to 02:45PM do with this issue of takeup or uptake in soils. The further down in the soil column one goes, the lower the phosphorus concentration, and the reason, of course, it's being partially taken up in the soil above it, and so you are looking at an array of 02:45PM interactions between the constituents of poultry waste and these soils, and that permits you to draw graphs of this nature because you have varying degrees of interaction from a lot of interaction to lesser degrees of interaction, not for these 02:45PM particular soils but for the control soils, which are forested soils.

Remember, if you are looking at an agricultural soil that's present as a pasture, you really can't think of it as a control at all. It's 02:45PM been modified by agricultural activity. So if you look for control stuff, that would have to be in the materials that have not been modified by agriculture.

Q Did you make any assumptions about what were 02:46PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the background levels of these four constituents in your analysis of the litter applied lands?

A What were the back -- made assumptions about them?

Q Yeah. 02:46PM

A There's no assumption needed for this.

Q Okay. It wasn't part of the analysis for these deals?

A You don't need to make that assumption. You could take a look at -- if you wish, you could take 02:46PM a look at the control soils on that, but those are not agricultural soils either. So they've been in a forest regime. You can't directly correlate those to a pasture necessarily.

Q Which of these litter applied fields also 02:46PM receive commercial fertilizer?

A Okay. I'd have to review the records to see if we know that.

Q Okay. In fact, these fields were not screened to ensure that none of them had received commercial 02:46PM fertilizer, were they?

A To my knowledge, none of them had received commercial fertilizer.

Q All right. How many of these fields that were sampled that are depicted on Figure 16 had cattle 02:47PM

c2f2b933-291b-460c-9c73-0f3e968532c2

grazing on them any time within the prior year?
A A number of them had.
Q And how did you control for that?
A Didn't have to.
Q Now, what are the typical mineral supplements 02:47PM
that are fed to grazing cattle?
MR. GARREN: Object to form.
Q In the Illinois River watershed?
MR. GARREN: Same objection.
A I have never analyzed the mineral supplements 02:47PM
that are fed to grazing cattle, but based upon
looking at the analysis of waste, they are zinc
enhanced. They have X added zinc to them compared
to what is present in poultry waste.
Q Okay, but you don't have any information about 02:47PM
mineral supplement usage in the Illinois River
watershed?
A No.
Q Now, Figure 17, the regression lines that show
in the four plots, is that for the -- is that for 02:48PM
the soil sample or is it for the litter sample or is
it for both?
A The regression line is for the soil samples.
Q Now, why didn't you show the R-squared for
each one of these plots for the soil samples? 02:48PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I just didn't.
Q Why not?
A Because it's not significant here. What's significant here is that the regression line -- you have a coherent data array, and the regression line 02:48PM
projects into the field of composition of poultry litter.
Q In preparing your plots of which there are many in your report, did you not employ a standard reporting methodology such as I will show the 02:48PM
R-squared for every one of these plots?
MR. GARREN: Object to form.
A I can't recall that I did, no.
Q Isn't that an industry standard to develop a standard reporting protocol? 02:49PM
A Not necessarily.
MR. GARREN: Object to form.
Q Well, it's not for you?
A But this would be a perfectly reasonable plot, and the R-squared could be very readily calculated. 02:49PM
Q All right. Well, I don't think I heard an answer why you did not report the R-squared for these four plots.
MR. GARREN: Object to form.
A I don't know why I didn't report it. It just 02:49PM

c2f2b933-291b-460c-9c73-0f3e968532c2

isn't reported.
Q If you were going to look at the arsenic versus phosphorus plot, bottom left-hand corner --
A Yes.
Q -- if you were to put a regression line 02:49PM
through the poultry litter data, what would it look like?
A Well, it would be inappropriate to put a regression line through all the poultry data because
there are two regimes of arsenic concentration in 02:50PM
the poultry litter.
Q Why is it appropriate to put a line through all the soils data but not all the litter data?
A Because for the soils data, there's no prior
knowledge of any differences among those soils other 02:50PM
than they receive poultry litter. So you are going to take a look at the notion that these represent some mixture between an end member that has not received poultry litter or something that's less
contaminated with poultry litter being deeper soils 02:50PM
and poultry litter. That's a perfectly reasonable approach. If you have a prior knowledge that there is a difference between regimes of the data, then you would not do it that way.
Q So there's not an arsenic signature for 02:50PM

c2f2b933-291b-460c-9c73-0f3e968532c2

poultry litter in the Illinois River watershed?
MR. GARREN: Object to form.
A I'm not concluding that at all.
Q I note that on this Figure 17 you show this regression equation, and on Figure 16 you show the 02:51PM
regression equation plus the R-squared?
A Yes.
Q Is reporting the regression equation, is that a normal format for reporting these plots?
MR. GARREN: Object to form. 02:51PM
A It's normal reporting form that I just calculated.
Q Did you make any effort to compare the litter samples from a particular farm with the soil samples taken where that particular specific litter had been 02:52PM
land applied?
A No.
Q Why not?
A Because I'm looking at this as a population, not by specifics. 02:52PM
Q This Figure 17 I think is where you testified that because this regression line in the soils data touches the litter data, that you draw some conclusion that they are related?
A Well, it doesn't necessarily have to do with 02:52PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the regression line. If you took the line off of there completely, what you would note is that there is an ability to simply project a trend between the litter data, some of the higher pieces of the litter data, and the soils data, so that it forms a 02:53PM
continuum. It appears to be something that is the result of mixing between two components.
Q But part of this visualization you're discussing is that when I look at this trend line on the soils data, lo and behold, it hits the litter 02:53PM
data and you found that to be significant in forming your opinions, right or wrong?
A I don't think that's significant in forming my opinions. I would have formed the same opinion without the regression line. 02:53PM
Q Well, you testified yesterday that because the orange line hits the black boxes, that tells you that they are related or one stems from the other. Are you taking that testimony back?
A No, I'm not taking that back. I'm saying you 02:53PM
could do it with or without the regression lines because as I'm looking at these, these are different regression lines.
Q So what was the point of putting the regression line on these plots and extending it past 02:54PM

the part of the plot where the poultry litter data is?
A It's a mechanism to assist interpretation.
Q Okay, and your last statement in Opinion 22 where you're discussing Figure 17, you say in each 02:54PM
of the cross blocks --
A Oh, I see, that's right.
Q -- projection of the regression line calculated from the zero to two-inch soil samples intersects the poultry waste data. This shows that 02:54PM
the excess concentrations of P, zinc, copper and arsenic found in the zero to two-inch samples are from land disposed poultry waste; right?
A Right.
Q So that is the methodology; you projected that 02:54PM
line, it touched the poultry litter data, you reached a conclusion?
A That's what I wrote. You could reach it without the line.
Q Okay. Let's look at Figure 8. Figure 8 you 02:55PM
discuss with Mr. George this relationship between total phosphorus, copper, zinc, et cetera, poultry waste, cattle waste and unfiltered wastewater treatment plant effluent; correct?
A That's correct. 02:55PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All right. I can use this methodology and I can draw a regression line through the wastewater treatment plant effluent, and it looks to me like if I'm looking at total phosphorus versus total zinc, it looks to me, lo and behold, that line is going to 02:55PM hit cattle and it's going to hit poultry litter. So, therefore, with your methodology, I can conclude that cattle waste comes from sewage treatment plant waste?

MR. GARREN: Object to form. 02:55PM

A No, because it doesn't depend solely upon a single chemical relationship. It depends upon a consideration of the relationship of zinc to phosphorus, copper to phosphorus, and arsenic to phosphorus to the extent that you can look at that, 02:56PM and copper to zinc, of course.

Q But I can use that line and I can draw a line and see what it hits, and I can draw a conclusion that, A, it was caused by B because this dataset is projected into the other dataset? 02:56PM

MR. GARREN: Object to form.

A That's not what I said. You would need to consider each of the constituents and find a consistent pattern of matching and if you examine Figure 8, you will note that copper does not match. 02:56PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Page 51 of your report, your Opinion 23, you state that runoff and edge of field samples is contaminated with poultry waste; right?
A Yes.
Q In the context of this sampling program, 02:56PM describe for me briefly what qualifies as an edge of field sample.
A Qualifies as an edge of field sample are materials -- well, they're fluids that have accrued near the edge of a field and have flowed from that 02:57PM or areas nearby.
Q Okay. So would samples taken in ditches beside fields qualify?
A They absolutely would.
Q Ponding areas on or next to fields? 02:57PM
A Absolutely would.
Q Are you saying absolutely will?
A Would, yes.
Q Absolutely would, okay. How about channels that run through fields? 02:57PM
A Conceivably it could, yes.
Q How about roadside ditches?
A Roadside ditches could, yes.
Q All right. How many samples were taken where the runoff was moving across the land in a sheet at 02:57PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the point it was sampled?
A Not too many, two or three, and in the protocol for collecting the samples, the sample could be collected if the flow could be determined by one of two methods. Either by directly observing 02:58PM
flow or by noting the local slope and topography and determining that flow could have come from the field at issue.
Q All right. At the time the water is sampled, it did not actually have to be flowing if someone 02:58PM
deduced that it had flowed?
A That's correct.
Q Okay. So you can say these thing really simply if you try.
A Well, if you continue assisting me, I 02:58PM
appreciate it.
Q All right. I'm handing you what I've marked as Exhibit 21 to your deposition. Identify that document for the Record, please.
A Okay. This is standard operating procedure, 02:58PM
edge of field sampling.
Q Standard operating procedure 10-1; correct?
A Yes.
Q All right. Now, within the context of this sampling program, were the standard operating 02:59PM

c2f2b933-291b-460c-9c73-0f3e968532c2

procedures, of which this is one, is this the methods that were designed for collecting and handling field samples?

A You mean for collecting these edge of field samples and returning them to the laboratory, yes. 02:59PM

This was supposed to have happened.

Q Okay, but my question was a little broader. Within the context of the field investigation that was done by the plaintiff in this case, the standard operating procedures were the written rules by which 02:59PM

-- or I don't want to say rules. Written guidelines by which the field personnel were to collect and handle samples; right?

A Yes.

Q All right. This one written specifically for 02:59PM

edge of field sampling; right?

A That's correct.

Q And is it states that you're one of the authors?

A It is. 03:00PM

Q Correct?

A That's correct.

Q All right. The first version of this it says was written February 3rd, 2007; right?

A That's correct. 03:00PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q This particular version, which is Revision 1, was dated two days later; right?
A Correct, as approved that it is later.
Q Okay, and actually date approved is three days later by the written date? 03:00PM
A Understood, yes.
Q Okay. Now, how many edge of field samples were collected before this standard operating procedure was finalized in February of 2007?
A I can't tell you as we sit here today. There was some. 03:00PM
Q There was quite a few, weren't there?
A Yeah, there were.
Q Prior to your involvement in this litigation, I want you to tell me every time that you have drafted a standard operating procedure for collecting edge of field samples from an agricultural field other than the one we're looking at. 03:00PM
A Never. 03:01PM
Q Now, in Section 2.0, the first page, it says sample locations will be selected from public right-of-way locations adjacent to contract growers' farms or company-owned facilities where aqueous runoff from the facilities is occurring during or 03:01PM

c2f2b933-291b-460c-9c73-0f3e968532c2

immediately after precipitation events; correct?
A That's correct.
Q By and large these public -- excuse me. These edge of field samples had to be collected from public right-of-way locations because you could not 03:01PM
get access on to the private property?
A That's correct.
Q Now, this refers to aqueous runoff. That sounds like a term you would use instead of water; right; is that your term? 03:02PM
A I appreciate your comment. Yes, water.
Q Okay. So as long as it's water, it doesn't matter if that water is an ephemeral stream running through a field?
A If it's material that's run off the field and 03:02PM
into that particular stream and coming off the field, that would be fine.
Q Paragraph or Section 4.3, there's reference here to two sampling methods, a passive runoff collector and a dip sampler? 03:02PM
A Yes.
Q All right. Give me a brief description of what a passive runoff collector is.
A Passive runoff collectors are PVC pipes with a grating on the top to screen out large materials 03:02PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that were excavated and placed within whole and public right-of-way area, in a ditch, for example, coming off a field to capture runoff from the field.

Q My understanding from Darren Brown's deposition is only Lithochimeia, your firm, 03:03PM collected samples using passive collectors; is that true?

A That's correct. I think that's largely correct if it's not completely correct.

Q At some point in this process the decision was 03:03PM made to stop using passive collectors?

A Yes.

Q Why?

A The passive collectors were inadequate at capturing runoff. They would have problems with 03:03PM floating away, had problems with collecting adequate volume in many instances, even though there was substantial rainfall events. They basically didn't work reliably in terms of capturing samples, and so the decision was made to instead of doing that, to 03:04PM collect from the ponded water itself or moving water itself.

Q There was no way to prevent cross contamination or tampering of a passive collector?

A Well, they were hard to detect, so if you 03:04PM

c2f2b933-291b-460c-9c73-0f3e968532c2

didn't know they were there, they wouldn't get tampered with.

Q If somebody saw you putting it there, they certainly could, like a farmer?

A Well, I think they could have removed it, but I don't think there was any instance of problems with that. 03:04PM

Q I don't see anything in this standard operating procedure that dictated what the maximum time water could sit in one of these passive collectors before it had to be collected and sent to the lab. 03:04PM

A There is -- let me see. Well, you're right, Mr. McDaniel. However, the practice was --

Q I didn't ask what the practice was. I simply asked was it in the document. 03:05PM

A It's not in the document.

Q All right. There's also no specifications in this document for how one manufactures or installs a passive runoff collector; right? 03:05PM

A That's correct.

Q Now, for every field where an edge of field sample was collected, was there a complete investigation performed to determine what had been applied to the field? 03:06PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A What do you mean by complete?
Q With a high degree of confidence that you knew everything that had been applied to the surface of that field.
MR. GARREN: Object to form. 03:06PM
A The information that was available -- I'm still misunderstanding. Did you go out and fully document everything that was applied to the field, no. That information isn't really available.
Q Okay. So with regard to the edge of field 03:06PM sample locations, you do not, as a fact, know whether chemical fertilizers were used on those fields?
A No.
Q You do not know if any of these fields 03:06PM received liquid dairy or swine waste?
A Highly unlikely.
Q You know that stuff is generated and land applied in the Illinois River watershed, don't you?
A Yeah, I do. 03:07PM
Q Have you documented the locations where swine waste and liquid dairy waste is land applied in that watershed?
A We documented where liquid waste has been applied. 03:07PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All of them or just --
A Some.
Q Opportunistically you've seen a few?
A Opportunistically we've seen a few, and we do have records of least sites of application and I 03:07PM
believe sites with company application.
Q What did you do to verify what, if any, herbicides had been used on pastures?
A Herbicides would be of no moment to this investigation. 03:07PM
Q Is that right? So the answer to the question is no?
A No.
Q Do any other agricultural chemicals used in the Illinois River watershed contain phosphorus or 03:07PM
copper or arsenic or zinc other than poultry litter?
MR. GARREN: Object to the form.
A Well, the content, certainly just about any sort of commercial material, given the strict sense of that question, would contain all of these 03:08PM
ingredients.
Q And I would appreciate it if you would stick to the strict sense of the question.
A Dog food would contain that.
Q Okay. You don't know which of those fields 03:08PM

c2f2b933-291b-460c-9c73-0f3e968532c2

had been grazed at any time in the prior year?
A Not necessarily.
Q All right. This edge of field work you did over Labor Day, what was communicated to you that prompted you to undertake this work? 03:08PM
A It was communicated to me that there had been questions with Mr. Brown concerning the edge of field and that in fact to my knowledge Darren had never participated actively in that pursuit and that I wanted to be familiar with all the sampled sites. 03:08PM
Q You are aware, aren't you, Dr. Fisher, that Mr. Brown offered an expert opinion in this case that the edge of field sampling program was proper and properly executed?
A I don't know exactly what he had to offer an as opinion. 03:09PM
Q Okay, but if he did, you're telling me he didn't know enough about the edge of field sampling to offer such an opinion; right?
A Well, he hadn't been to all the sites and, in fact, neither had I. So I went out and visited each one of the sites for which a sample was collected and analyzed. 03:09PM
Q Why; why did you need to do that?
A I felt it was Labor Day weekend and it was a 03:09PM

c2f2b933-291b-460c-9c73-0f3e968532c2

good time to do that.
Q Oh, come on. You felt like you didn't have anything better to do Labor Day so you ran around to 60 or 70 spots in the watershed?
A Well, that's a bit flippant. In fact, I 03:09PM
didn't have anything better to do Labor Day.
Q All right. Dr. Fisher, you had a communication with someone that resulted in you making this trip over Labor Day to the watershed.
Who did you communicate with and what was 03:09PM
communicated?
A Well, I mean, I talked with Louis Bullock. He indicated that Darren's deposition had included a fairly extensive review of edge of field work, and I
suggested that it might be useful if I was to visit 03:10PM
all those since these would come up in my deposition.
Q Did he suggest to you that Mr. Brown's examination did not go well for Mr. Brown on the
subject of edge of field sampling? 03:10PM
MR. GARREN: Object to the form.
A He didn't really characterize Mr. Brown's deposition with respect to edge of field other than there had been a significant number of questions
asked of him. 03:10PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Did he tell you that he was concerned about what he saw with regard to the edge of field sampling program?
A I don't know what Mr. Brown said.
Q No. I'm telling you, did Mr. Bullock share 03:10PM
with you any concerns about what he saw or learned in that deposition about the edge of field sampling?
A He did not.
Q Now, what was the criteria for these sketches
that -- and I'm looking at what was marked as 03:11PM
Exhibit 10 to your deposition. This is a copy of the field book; correct?
A That's correct.
Q What was your objective when you went to each
of these locations? 03:11PM
A I wanted to validate that the protocols with respect to water flow from the field, the field nearest by field, was in fact followed, that there weren't any circumstances where it was unobvious
that flow could have come from the field to the 03:11PM
point of collection.
Q Is that another way of saying you wanted to verify these were all good sampling sites?
A I wanted to double check that, yeah.
Q On each sketches, you did in fact mark the 03:11PM

c2f2b933-291b-460c-9c73-0f3e968532c2

specific point where the sample was collected?
A Well, to the extent that you can mark it, I indicated there's flow towards the sampling point. In those little sketches there's generally a dot that shows the direction of flow from the adjoining 03:12PM field or fields and it shows the -- typically the direction of flow in the ditch if there was a direction of flow.
Q What's the dot supposed to represent?
A The sampling location. 03:12PM
Q And how do you know that's the sampling location?
A Because the GPS coordinate was recorded at that dot.
Q And a GPS coordinate with the device used by 03:12PM these sampling teams, what was the plus or minus error in the location?
A That will vary, but it's between, say, 30 and 16 feet radius.
Q Okay. So these dots are not nearly as precise 03:12PM as they would suggest on the sketch because it could be anywhere from up to 16 feet from where the GPS recorded that location; right?
MR. GARREN: Object to the form.
A Well, that's true, except it's really obvious 03:12PM

c2f2b933-291b-460c-9c73-0f3e968532c2

where a sample would have had to have been taken.
Q Based upon your observations two years later?
A Yes, and based upon the fact that I participated in some of the sampling, so, sure.
Q All right, and you went and looked at every single edge of field sample location for which data has been reported in this matter? 03:13PM
A That's correct.
Q And having reviewed each of these locations, is it your opinion that each one of those sample locations was appropriate and in keeping with the protocols established for this field investigation? 03:13PM
A It is.
Q And based upon going and looking at every one of these samples, have you made the decision that any of the data from any of these edge of field samples should be disregarded or not used in any way? 03:13PM
A No.
Q Any other conclusions you reached as part of this Labor Day effort other than what we've talked about? 03:13PM
A No.
Q Let's look at Figure 19. What is this?
A Figure 19 is a plot of zinc, copper and 03:14PM

c2f2b933-291b-460c-9c73-0f3e968532c2

arsenic plotted against total phosphorus, both in milligrams per liter or parts per million, for each of field runoff samples against phosphorus concentration.

Q As it relates to these substances identified on Exhibit 9, what percentage of each of these substances is likely background? 03:14PM

A Well, you have an array of things that are quite high with respect to zinc, copper and arsenic. They're looking at things that contain particles as well as these are whole samples, particles and things in solution, and it's mixing it with something that's fairly low, although the total phosphorus levels, even at the lowest level here, tenth of a part per million, which is quite high. 03:14PM 03:15PM So there's probably none of this that's background. The background here would be, oh, something like that 10 parts per billion phosphorus.

Q Is your answer the same for zinc, copper and arsenic? 03:15PM

A Yeah. There's no representation of background on here because there's no way within this watershed because of the pervasive nature of the disposal of poultry litter to necessarily find a place that is background. 03:15PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q All right. How many edge of field samples were collected from fields you actually had sampled the soil in the pasture?

A Very few. I can't give an accurate number on that. 03:15PM

Q All right. So when you overlay litter samples with soil samples with edge of field samples, the fact of the matter is you don't have any of those samples at the same place where you tracked the litter to the soil to the edge of field and then 03:16PM you're looking at the plots of that; you haven't done that, have you?

MR. GARREN: Object to form.

A No, and you wouldn't need to in looking at this as a population. 03:16PM

Q Because on a field-by-field basis, that's not relevant to your evaluation?

MR. GARREN: Object to form.

A It is not.

Q When you look at Figure 19, you'd agree that 03:16PM as it relates to phosphorus, zinc, copper and arsenic, that there's no fingerprint involving those constituents that would characterize edge of field runoff in the Illinois River watershed; correct?

MR. GARREN: Object to form. 03:17PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I wouldn't agree to that at all. It says that as phosphorus goes up, all those constituents go up and the rate at which -- the slope of this increase is fairly constrained. So I wouldn't agree that there's no fingerprinting in that at all. 03:17PM

Q What does constrained mean?

A Well, it's not a complete hash of points across all of this, this plot where it's just a ball of data. It is a coordinated assemblage of information. It has -- called the good aspect 03:17PM ratio. It has an ellipse on this plot.

Q Why didn't you plot the regression lines for the three different chemicals, arsenic, copper and zinc, on Figure 19 so we could see how the relative slopes compare? 03:17PM

A Well, you could do that but there are regression lines plotted on Figure 20 that relate just to poultry litter.

Q All right. So Figure 20 is -- does depict the regression lines for each of those datasets for edge 03:18PM of field?

A It projects it for zinc and phosphorus, for copper and phosphorus, for arsenic and phosphorus and for zinc versus copper.

Q All right. This is the same thing. You 03:18PM

c2f2b933-291b-460c-9c73-0f3e968532c2

projected this regression line and because it hits the litter data, you conclude one derives from the other?

A I think that's a pretty good methodology.

Q All right. This regression line for the phosphorus versus zinc, copper and arsenic, this outlier that is in the right, is that included in the calculation of the regression line? 03:18PM

A Yes.

Q Now, when I look on this copper -- excuse me. The phosphorus versus zinc plot, this outlier has a phosphorus level of over a thousand PPM; right? 03:18PM

A That's correct.

Q All right. When I look at the -- excuse me. Okay. Now, you didn't report an R-squared? 03:19PM

A No.

Q For -- why not?

A Same reason before, just didn't. It could easily be computed by your experts or I could compute it myself. 03:20PM

Q And it's not important to your analysis?

A Not significant to my analysis, but the data array itself projects into the field of the poultry.

Q And tell me why didn't you plot the regression lines for the litter samples on these same diagrams. 03:20PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Can you for the Record describe what diagram you are referring to?

MR. McDANIEL: I'm talking about Figure 20.

Q You plotted regression lines for the edge of field samples but you didn't show us the regression lines for the litter samples on the same drawing. Why not? 03:20PM

A Well, there's no real reason to do that. I mean, in the case of --

Q The slopes would be dramatically different, wouldn't they? 03:20PM

A Not necessarily.

Q Let's go ahead and change tapes because I'm going to change topics.

VIDEOGRAPHER: We are now off the Record. The time is 3:21 p.m. 03:21PM

(Following a short recess at 3:21 p.m., proceedings continued on the Record at 3:28 p.m.)

VIDEOGRAPHER: We are now on the Record. The time is 3:28 p.m. 03:28PM

Q All right. Dr. Fisher, Page 52 of your report, Opinion 24 you said groundwater has been contaminated by poultry litter. Now, this paragraph, this Opinion 24, this is your opinion and proof that the land application of poultry litter 03:28PM

c2f2b933-291b-460c-9c73-0f3e968532c2

has in fact polluted groundwater in the Illinois River watershed; right?

A Yes, and my interpretation of comparison of groundwater samples with edge of field samples.

Q All right. The reason for my question is, 03:29PM

your opinions are rather compartmentalized in your report. This Paragraph 24, this is your groundwater contamination opinion?

MR. GARREN: Object to form.

A Yes. 03:29PM

MR. McDANIEL: I'm sorry. What was wrong with the form of that?

MR. GARREN: I don't have to tell you right now. I'm just telling you I object to form.

MR. McDANIEL: I thought the idea was to 03:29PM

let me know. You can tell me whenever you think of it.

MR. GARREN: I think it assumes a lot of things.

MR. McDANIEL: Well, Dr. Fisher I guess 03:29PM

understood. He answered.

Q Now, this opinion is based on the chemical cross plots that you prepared in Figure 22; right?

A That's correct.

Q Now, for the purposes of this analysis on 03:29PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Figure 22 in your discussion and Opinion 24, you are considering these geoprobe samples to be groundwater; right?

A They are groundwater.

Q Now, but you're not claiming that geoprobe samples represent the quality of the water in aquifers people are consuming in the Illinois River watershed? 03:30PM

A Geoprobe samples represent the quality of shallow groundwater that could impact those aquifers. 03:30PM

Q But the geoprobe samples do not represent the aquifers that are supplying the drinking water in the Illinois River watershed?

A But they're not drinking water wells and they're not from a bedrock aquifer. 03:30PM

Q Now, how would high levels of suspended solids affect the chemical analysis of the groundwater geoprobe and edge of field samples?

A Well, high levels of suspended solids will tend to increase the apparent concentrations if the sample is not filtered. 03:30PM

Q Did you encounter any samples with high total suspended solids?

A Yeah. Many of the geoprobe samples have high 03:30PM

c2f2b933-291b-460c-9c73-0f3e968532c2

levels of suspended solids.
Q Now, how did you address this in your analysis?
A They're filtered.
Q All right. Did you conduct an analysis of the 03:31PM
data to determine whether it was evident that any filters had failed?
A No.
Q Now, on these four plots on Figure 22, this
dotted orange regression line, is that for just the 03:31PM
edge of field samples or is it for the entire cluster of data depicted on that plot?
A It's for the entire suite of data.
Q All right. So that dotted line is -- I guess
your computer program takes all those points, 03:31PM
whether edge of field, edge of field cattle, springs, wells and geoprobes and creates this line on here?
A That's correct.
Q All right, and calculated the R-squared for 03:32PM
the zinc versus phosphorus, copper versus phosphorus, and copper versus zinc; right?
A That's correct.
Q Now, why is there no regression line or
R-squared calculated for the arsenic versus 03:32PM

c2f2b933-291b-460c-9c73-0f3e968532c2

phosphorus?
A In that instance, I think it -- well, it would have generated something fairly meaningless. There are two regimes to arsenic. There's one sample that's -- has quite a bit of arsenic in it. That 03:32PM
was the geoprobe, and one edge of field sample with quite a bit of arsenic. Those are probably outliers. So putting a regression line through that is probably not particularly meaningful.
Q So the plot of arsenic versus phosphorus is 03:32PM
not particularly helpful in the analysis?
A It's not, that's correct.
Q Now, through the other three plots, it appears to me that the regression line does go through this outlier edge of field sample in the upper right 03:33PM
portion of the graph; right?
A Yes. I mean, no data was eliminated.
Q Now, why did you plot the data from all the types of samples together than showing them to us by sample type? 03:33PM
A Well, they are shown by sample type and they're also plotted together. I used different symbols to plot them. The reason is that we're dealing with a continuum. The edge of field samples show clearly variable degrees of contamination from 03:33PM

c2f2b933-291b-460c-9c73-0f3e968532c2

a lot to a little and possibly not much at all. So the notion here was to make some analysis that would relate the concentrations of materials observed in the edge of field samples and see if there was some sort of continuum between them and shallow 03:34PM
groundwater and what that looked like.

Q All right. You make the statement that the concentration relationships found for the edge of field samples blend seamlessly with those found in the groundwater samples, and you're grouping 03:34PM
together springs, wells and geoprobes as groundwater samples; right?

A That's correct.

Q All right. So you're saying the edge of field blends seamlessly with that. If it blends -- if 03:34PM
it's true that the edge of field concentrations blends seamlessly with all of these groundwater samples, I should be able to plot each of these sample types and I would be able to see the similarity between them; agree? 03:34PM

A Well, you'd be able to see some similarity between them, that's true. If you look at these, you'll note that the water wells tend to have absolutely the lowest concentrations of phosphorus as you imagine they would. The geoprobe samples 03:35PM

c2f2b933-291b-460c-9c73-0f3e968532c2

seemed to be arrayed somewhere in the middle, and the edge of field samples have the highest concentration of phosphorus, within the data array, not showing that every sample is higher than all the others. 03:35PM

Q If -- I need you to explain what the term blend seamlessly means in the context of Opinion 24.

A If you --

MR. GARREN: Object to form.

A This does not appear to be two different 03:35PM compositional datasets. If, for example, the groundwater had no relationship at all to edge of field samples, I would not anticipate that the edge of field samples would blend into that, that they would go somewhere else. It says these are pretty 03:36PM clean, these are pretty dirty. Dirty goes into clean, and there are some materials that are -- seem to be present in this intermediate range. So these indicate some contamination of groundwater. That's what I'm talking about by blend seamlessly. We 03:36PM don't have distributions, and it's especially clear with the zinc, the copper plot.

Q Now, you've not connected any location you contend is polluted by poultry litter back to the operations or actions of any specific Peterson Farms 03:36PM

c2f2b933-291b-460c-9c73-0f3e968532c2

contract grower, have you?
A I have not.
Q And as it relates to all the other defendants in this case, you've not connected any location you contend is polluted by poultry litter back to the 03:37PM
operations of any of their contract growers?
A Okay. I can relate some edge of field samples to some contract growers for everyone. I may have misanswered your first question, but is that --
Q Any location that you contend is polluted by 03:37PM
poultry litter, I want to know if you have related any of those locations, if you connected them back to the operations of any specific contract grower.
A With respect to the litter application locations, yes, since the source of the poultry 03:37PM
litter there is known. With respect to some of the edge of field samples, the answer would be yes, although I've not presented that information in this report, but it's certainly present in my considered materials, since in some instances the origin of the 03:38PM
poultry waste that was disposed in the field from which the edge of field sample was collected is no.
Q Have you connected the pollution of any waters of the state of Oklahoma back to the actions of any contract grower for any defendant in this case? 03:38PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A I think that calls for a legal conclusion because I'm not sure what -- and I'm also not sure what the term waters of the state of Oklahoma mean.
Q All right. For the purposes of this question, 03:38PM
assume for me, and I'm not saying this is the waters of the state of Oklahoma, but for purposes of this question because it's disputed, for purposes of this question so you can provide a factual answer, if --
assume for me the waters of the state of Oklahoma 03:38PM
include groundwater and any waters flowing in a definable stream in the state of Oklahoma. If that is the state, the waters of the state of Oklahoma, can you connect the pollution, any pollution in any
of those waters to the operations of any contract 03:39PM
poultry grower?
MR. GARREN: Object to the form.
A Okay. With respect to flowing streams, would you include ephemeral streams?
Q No. 03:39PM
A No.
Q Figure 22 still, phosphorus versus zinc plot, this data point that's at the upper right, do you know which edge of field sample that is?
A Not as we sit here today. I've considered 03:39PM

c2f2b933-291b-460c-9c73-0f3e968532c2

these as a population, not as individuals but --
Q I'm handing you what I've marked as Exhibit 22, some documents produced by the State of Oklahoma here. Tell me if you -- you may not recognize these specific sheets, but do you recognize that the last 03:40PM
sheet is a chain of custody and the first two sheets are laboratory analytical sheets?
A I do.
Q I want you to look -- take a moment -- first, do you agree with me that the analytical sheets are 03:40PM
for edge of field sample 73B as in boy?
A Yes.
Q All right. Now I want you to take a moment and look at the analytical data and tell me if you agree that this outlier point or this point on the 03:40PM
upper right portion of the three plots is indeed the sample from location 73B.
A Well, there's -- this is the only one it could be.
Q Okay. I assume 73B was one of the locations 03:41PM
you looked at last weekend?
A Yes.
Q Now, the values for the levels of phosphorus in the samples in this case were measured to a variety of analytical methods; true? 03:41PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes.
Q And can you identify them by name or number?
A Yeah. This is 60-20 dissolved phosphorus, is the 145 figure that is shown.
Q What are the other methods that were used to obtain phosphorus results? 03:42PM
A Oh, gosh, there are a stack of them. I would need to review that and report back to you.
Q Was there -- all I can ask you is what you know today, but was there an agreement reached by the plaintiff's expert team that one method for phosphorus analysis was preferred over another method? 03:42PM
A My recollection of that is yes.
Q And what was the preferred method? 03:42PM
A It was 60-20.
Q And why was it preferred?
A I think it gave the most consistent results, but that's a question really for Dr. Olsen.
Q All right. How did the consistency of the 60-20 method compare to the consistency of the 4500-P F method? 03:42PM
A I can't tell you as we sit here today.
Q Was there a conclusion reached among the environmental experts, for the State's environmental 03:43PM

c2f2b933-291b-460c-9c73-0f3e968532c2

experts in this case, that it is not desirable to use data generated from the 60-10 method?

A I don't really recall, Mr. McDaniel. I know we had discussion of that and that 60-20 was a method, my recollection, that was going to be the one that would be looked at. 03:43PM

Q All right, and in the work -- in the work you've performed and the opinions that you've offered in this case based upon phosphorus data, was it relevant to you which method was used to generate the phosphorus results? 03:43PM

A To the extent that I could use a single method for my analysis, yes.

Q Explain. Then what did you do?

A I used 60-20. 03:44PM

Q All right. Does that mean you excluded data from other methods?

A I did not consider that data for those other phosphorus methods.

Q Okay. I think I understood you, but let me make sure. In your analysis expressed in your report, you only considered phosphorus data generated through the 60-20 method; is that what you just told me? 03:44PM

A That's my recollection that that's what I 03:44PM

c2f2b933-291b-460c-9c73-0f3e968532c2

wanted to use.
Q Okay. Now, is it your opinion that the Illinois River watershed is underlain by carbonate aquifers?
A There are some carbonate aquifers that are Karsted, yes. 03:44PM
Q All right. What is the expected range of phosphorus concentrations in this type of geologic setting?
A I think they are probably expressed in the surface waters in unimpacted Ozark streams looking at somewhere less than 20 and probably around 10 parts per billion. 03:44PM
Q How about groundwater in those aquifers?
A Groundwater in the Ozark aquifers to the extent it's related to carbonates is going to be similar to surface, although may be slightly enhanced. 03:45PM
Q Okay. So I can get a clear Record, in this geologic setting in the Illinois -- that is present in the Illinois River watershed, what is the expected phosphorus concentration in groundwater? 03:45PM
A Low, and I'm not sure I have a number, but it's going to be low, maybe 10 parts per billion.
Q Parts per billion? 03:45PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yeah, .01 milligrams per liter or so.
Q All right. What's the Chattanooga shale?
A Chattanooga shale is Devonian shale. It's a black shale that separates the Boone from the Roubidoux. 03:46PM
Q In the Illinois River watershed?
A That's my recollection. I'd have to look at the stratigraphic column, but yes.
Q All right. Do streams flow from the Chattanooga shale in the Illinois River watershed? 03:46PM
A Some may flow typically or could flow from contacts between carbonate units in the Chattanooga shale.
Q Are drinking water wells completed in the Chattanooga shale in the Illinois River watershed? 03:46PM
A That I don't know. They may be.
Q Would you agree that pyrite is a major constituent of the Chattanooga shale?
A I would say it's a constituent. I've not looked at the geochemistry of the shale with respect to its pyritic content, but it's a black shale that's going to have pyrite in it.
Q Are you familiar with a publication called the Bulletin of the Geological Society of America? I've marked it as Exhibit 24. 03:47PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Exhibit 23.
Q Sorry. Are you familiar with that publication?
A I think it's probably in my considered materials. I don't know how familiar I am with it. 03:47PM
MR. McDANIEL: Sorry, Rick. I thought I highlighted on one of them.
Q Look at Page 1307. First off, the title is Mineralogy, et cetera, et cetera, of the Chattanooga Shale. Everybody that sees it knows why I've said 03:47PM et cetera. It's a discussion of the composition of the Chattanooga shale; would you agree, Dr. Fisher?
A Yeah, published in 1957.
Q All right. Look at Page 1307.
A Well, I'm trying to determine where this study 03:48PM was made.
Q Under pyrite, it says pyrite is a major constituent of the Chattanooga shale.
A That's what it says.
Q If you turn to Page 1312, it reports pyrite 03:48PM concentration and marcasite as high as 11 percent; correct?
A Yes, it does.
Q All right. What is pyrite?
A Pyrite is iron sulfide, stoichiometric iron 03:48PM

c2f2b933-291b-460c-9c73-0f3e968532c2

sulfide. I'm sorry. It's FeS2, non-stoichiometric iron sulfide.

Q Do you agree that common impurities -- you agree that common impurities in pyrite include arsenic, copper and zinc? 03:49PM

A Yes. They could be present as impurities in pyrite.

Q All right. Have you observed outcrops of the Chattanooga shale in the Illinois River watershed?

A I have. 03:49PM

Q Have you seen the Chattanooga shale exposed in road cuts and other excavations?

A I've seen some exposures of it, yes.

Q Now, what happens to the Chattanooga shale when it's exposed to the air? 03:49PM

A It oxidizes and weathers.

Q And it breaks down very easily, doesn't it?

A Shouldn't say it breaks down very easily, but it does break down.

Q Well, it erodes easily, doesn't it? 03:49PM

A It's a fissile shale. It breaks easily and then it weathers.

Q Okay. Exhibit --

A Before we continue, I need to determine where this study of the Chattanooga shale was made if I 03:50PM

c2f2b933-291b-460c-9c73-0f3e968532c2

can make that determination here. Okay. This is a study --

Q Dr. Fisher, I haven't asked you a question.

MR. GARREN: If you are going to ask him a question about these documents, then do the extraction that you've done and not allow him to read the document, I'm objecting to it. 03:50PM

MR. McDANIEL: I have no problem with him reading the document.

MR. GARREN: He's just trying to put it in place. 03:50PM

MR. McDANIEL: That's fine, and he can read it and you can direct. He's not allowed to just decide he wants to pipe up about what he likes in the document. I'm not playing hide the ball. I'm just not going to sit here and have him consume my time with what he wants to tell us about the document. 03:50PM

Q All right. Exhibit 24 is three photos, I'll represent to you, taken in the Illinois River watershed. You may even recognize one or more of the locations there. In the photos do you -- in any of the photos do you see what appears to be the Chattanooga shale? 03:50PM

A It appears what appears to be a black shale, 03:51PM

c2f2b933-291b-460c-9c73-0f3e968532c2

and I'll accept that it's the Chattanooga from the stratigraphic position on the Boone.

Q All right. From the first photo, what -- explain what appears to you to be the Chattanooga shale on that photo. 03:51PM

A It's the basal dark unit that sits underneath what appears to be a -- if this is the Boone, which is probably it, Boone, St. Joe, then this is the Chattanooga shale, the black unit here.

Q Okay. What is the light colored layer? Can you put an X an the Boone so it will show up? 03:51PM

A Well, what appears to be a carbonate unit, given this is from the Tahlequah junction -- I know where this is; this is Route 62 and Route 10 -- is going to be up here. 03:51PM

Q Okay. Can you make it a little more conspicuous? I'm not sure that will show up with photocopying it.

A I need a better pen.

Q Make a dot, a bigger X, anything you want to do. 03:52PM

A (Witness complied).

Q Okay. Now, with that as a point of reference, what is the Chattanooga shale?

A Sits beneath it. 03:52PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q The gray?
A Yeah, the gray. I'll make a circle with an X in it.
Q Okay, good. Now, let's go to the second picture and let me ask you, do you see what appears to be the Chattanooga shale? 03:52PM
A Yes.
Q All right. Is the light colored zone -- would that be the Boone?
A Well, it's identified here as the St. Joe formation, and then there's a parting break. It's a limestone unit that sits above or a limestone dolomitic unit that sits above the Chattanooga. 03:52PM
Q All right. Is there a way for you to mark the Chattanooga shale on the second picture? 03:52PM
A Yes. I'll mark it in the same way, circle it with an X.
Q Okay. Now, let's go to the third picture and ask you to do the same exercise. Could you see it on the third picture? 03:53PM
A Probably. It's a little hard. This is a little covered, but my suspicion is that from looking at the photograph, it's in this lower stratigraphic position.
Q All right. The physical conditions that are 03:53PM

c2f2b933-291b-460c-9c73-0f3e968532c2

depicted in the photographs of Exhibit 24, these are fairly common -- it's a fairly common sight to see these types of outcrops and cuts exposing the Chattanooga shale in the Illinois River watershed; would you agree? 03:53PM

A Well, in the western portion of the watershed, yes.

Q All right. Western being the more Oklahoma part of the watershed?

A Yeah. 03:53PM

Q Now, what causes the rust color on those exposed faces on the Chattanooga shale?

A The weather of iron-bearing minerals. Probably specifically in this case the oxidation of pyrites. 03:54PM

Q All right. Now, when pyrite is exposed to water and air, the components of the pyrite are released into the water; agree?

A That's correct.

Q So any spring in contact with the shale can expect to show the effects of pyrite, which could include arsenic, copper and zinc? 03:54PM

A It might.

Q Seeps in springs and runoff from these exposed areas will carry arsenic, copper and zinc and other 03:54PM

c2f2b933-291b-460c-9c73-0f3e968532c2

impurities to the streams and sediments; do you agree?

A They could. It would be background.

Q Robert van Waasbergen has been mentioned many times in the course of these depositions. Who is the person who directed Mr. van Waasbergen's work? 03:55PM

A Robert van Waasbergen -- that's kind of a complex question. I'm sorry.

Q That's all right.

A Robert van Waasbergen's role was to reposit data so that individuals who needed specific kinds of information could make a request from him and that information would then be transmitted to them because he would -- could be more responsive. 03:55PM

Q There was a point in time when you were actually his supervisor; right? 03:55PM

A I was his supervisor at Gardere & Wynne; right.

Q All right. Handing you what I've marked as Exhibit 25, let me ask you if you recognize this document. It actually is a printout from a spreadsheet. 03:56PM

A Yeah.

Q With the file name as identified on the top of the page. 03:56PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Okay. Mr. McDaniel, you mean -- this is from Gordon Johnson's documents it looks like.
Q No. Well, that actually is the name of the spreadsheet file.
A Oh, okay, okay. Yeah, I recognize this. I can tell you what it is, and I'm not -- you know, it's sort of necessarily out of context, but it reports land use and land cover types acreage by county, both for the entire counties of Adair, Benton, Cherokee, Sequoyah and Washington Counties, Benton and Washington being in Arkansas, and then those portions that are in the Illinois River watershed. 03:56PM 03:57PM
Q All right. The way I read this is there were actually two methods employed, and that's why there's two tables, two methods or different datasets to evaluate the different land uses and the allocation of inside and outside the watershed. Am I on track? 03:57PM
A There are two different datasets. One is 2001 national land use and cover data and overlays, LULC 2001, and then the other is the -- an earlier version, 1992, of National Land Cover Data set. 03:57PM
Q When I look -- there's considerable differences between those datasets, aren't there? 03:57PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes, there are.
Q All right, and you and other experts in this case employed an allocation method of inside the watershed versus outside the watershed in more than one context. Is one of these datasets, one of these 03:58PM
tables represent the numbers that were actually used in that process?
A I don't know because that was -- the discussion was to do it based on land use and land cover, but after that determination was made, I had 03:58PM
no further hand in that. So however the calculation was made is something I'm unfamiliar with, but decisions were made by possibly Dr. Engel and Dr. Johnson, Gordon Johnson, to select one of these over the other. These things are gathered using 03:58PM
differing methodologies. Some of those are satellite-derived materials and they're computed using different algorithms. So I don't know which one was used for this.
Q Dr. Johnson couldn't answer the question. So 03:59PM
based on what you told me, the only other person you suggest we talk to is Dr. Engel; is that true?
MR. GARREN: Object to form.
A Dr. Engel might be the person to ask, yes.
Q Lithochimeia actually participated in some of 03:59PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the sampling or sample collection; correct?
A Yes.
Q You personally took some samples?
A Yes.
Q Were there other people that you paid that 03:59PM
took samples?
A Yes.
Q And who were they?
A They were individuals -- you want their names?
Q Well -- 03:59PM
A I can't think of all the names.
Q Let me get more to the point because we're
short on time. There were a number of college
students deployed to the field to work on sample
teams hired by you? 04:00PM
A That's correct.
Q All right. How many?
A I think all totaled over the course of the
project because not everybody worked all the time,
maybe a dozen. 04:00PM
Q And were these people undergraduate students
or graduate students?
A Some were graduate students and some were
undergraduates.
Q Now, why were these -- were they treated as 04:00PM

c2f2b933-291b-460c-9c73-0f3e968532c2

temporary personnel?
A Yes.
Q All right. Now, why were temporary personnel hired through Lithochimeia rather than Camp, Dresser & McKee? 04:00PM
A I could bring more people to the field more quickly and with more flexibility.
Q Because of your contacts with the university?
A Yes.
Q What were you paying these people for their work, hourly rate? 04:00PM
A Gosh. I think they were paid $18 an hour.
Q And what did you charge for their work?
A I think I charged $35 an hour.
Q Not a bad profit center, was it? 04:01PM
A Well, according to Exponent, it was a pretty lousy profit center, but it was a profit center.
Q Exhibit 26, Dr. Fisher, is an E-mail chain. Do you recognize this?
A Yes. Well, let me go to the beginning of the chain here. E-mail from Ron French to me and to Roger Olsen, the original one, and then to Conrad Kleinholz, and subject was an Illinois River watershed recon with Dr. Kleinholz. 04:01PM
Q Okay. This -- you recognize this as being an 04:02PM

c2f2b933-291b-460c-9c73-0f3e968532c2

E-mail communication that was in your materials produced to us?
A Yes.
Q All right. You see Mr. David Page's message dated March 15th, 2005 that's at the bottom of the first page? 04:02PM
A Yes.
Q He says -- and it's to you. He says, please consider duplicating some of the Jimmy Pig data so that a comparison could be made. What is the Jimmy Pig data? 04:03PM
A Okay. As I understand it Jimmy Pig was an individual who was employed by the State of Oklahoma for many years in the past, and he visited various riverine sites and collected information pertaining to those, I think photographs and some anecdotal observations concerning fish and so on. 04:03PM
Q Did Mr. Pig collect data in the Illinois River watershed?
A I believe he did. 04:03PM
Q And --
A To my knowledge -- I'm sorry.
Q Did he collect it within the scope of his employment as an employee of the State of Oklahoma, if you know? 04:03PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A That I don't know.
Q Now, what does Mr. Page mean when he says consider duplicating some of the Jimmy Pig data?
A Well, it was awhile back, but Jimmy Pig, he was -- I think what Mr. Page was thinking about was 04:04PM
that Jimmy Pig had been to -- had some specific sites which had repeated visits, and I think the notion was, although this wasn't directly within my area, notion was to revisit some of those same sites if at all possible. 04:04PM
Q All right. The message at the top of the first page from Conrad Kleinholz, who is he?
A Conrad Kleinholz is a fisheries biologist. He at one time was the aqua culture extension agent for the State of Oklahoma. He was a professor at 04:04PM
Langston University.
Q Where is he today?
A Well, I think he's retired today and he's working in the coy farming business.
Q Where? 04:04PM
A Here in Oklahoma.
Q Do you know where in Oklahoma?
A Somewhere in the Okmulgee area. I don't know where he lives specifically. He used to live in Stillwater. 04:05PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Had he ever been retained as an expert or consultant for the plaintiffs in this case?
A I think he did some consulting work in this case.
Q Now, in his message he says that he thinks it will take years of sampling to manage the inherent variability in river systems; correct? 04:05PM
A That's what he says, yeah.
Q All right. Is that the reason he was not used as a testifying expert in this case? 04:05PM
A No.
MR. GARREN: Object to form.
A I don't know why he wasn't used as a testifying expert in this case.
Q Who is Shanon Phillips? Do you need to see this to answer? 04:05PM
A I recognize the name kind of. Shanon Phillips is an employee of the State of Oklahoma with the Conservation Commission.
Q All right. I've handed you Exhibit 27, which is an E-mail chain that includes you that was in your produced materials. Do you recognize this? 04:06PM
A Yeah, I recognize it as being from that.
Q All right. What was the general point of this communication? 04:06PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Well, the general point of this communication is attempting to find streams that are probably not impacted by poultry waste within the Illinois River watershed.

Q All right. There was some discussion about 04:06PM whether the Cedar Hollow subbasin could be used as a subbasin that had not received any impact from poultry litter; right?

A I believe that's true.

Q All right. Would you read aloud Miss 04:07PM Phillips' message in its entirety on March 31st, 2005?

A Sure. Begins, Cedar Hollow empties into the Illinois River southwest of 31, 18 north, 23 east, just north of Sparrow Hawk Mountain. We have water 04:07PM quality data and I believe some biological data on this stream that we have most likely included in the data we've already sent you. However, I will ask our data manager to pull the data out separately and resend it. Cedar Hollow was a stream we began 04:07PM sampling in the early 1980s as a very high quality stream with very low levels of nutrients or other apparent impacts. Unfortunately I believe in either the late '80s, early '90s, the landowner leased it out to someone who was running cattle in the 04:07PM

watershed and we began to see elevated nutrient concentrations and dramatic increases in periphyton growth. Unfortunately, I'm not sure whether we have this data or whether Bob Lynch from OU Health Sciences is the only one who has it. Fortunately, 04:08PM
this only lasted for a few years, and by the late '90s water quality seemed much improved. Now the Nature Conservancy owns almost all of the watershed. I believe it is near pristine.

Q Thank you. Now, was Cedar Hollow subbasin 04:08PM
used as a control location for analytical purposes in this case?

A Well, I don't know what Cedar Hollow was used for. This was a biological station. I'm not sure if it was used as a control station. 04:08PM

Q All right. Isn't it reasonable to conclude from Miss Phillips' message or one could reasonably conclude that cattle grazing in the Illinois River watershed contributes to increased nutrients in the water and increased periphyton growth? 04:09PM

MR. GARREN: Object to form.

A That's her conclusion.

Q It is a reasonable conclusion, isn't it?

A Well, I don't know whether it's reasonable or not because that's what she says, and I don't have 04:09PM

c2f2b933-291b-460c-9c73-0f3e968532c2

any of the underlying information to look at.
Q You don't question her conclusion, do you?
A I don't question that she sent this E-mail.
Q You don't have a basis for questioning her
conclusion about the results or the causes of 04:09PM
degraded water quality in Cedar Hollow?
MR. GARREN: Object to form.
A Nor a basis for denying it.
Q What was the firm Global Remote Sensing, LLC?
A Global Remote Sensing -- can I see the 04:09PM
document?
Q Sure.
A It would be helpful.
Q Just take one.
A I just get one? Oh, yeah, Global Remote 04:10PM
Sensing, LLC. Global Remote Sensing is the
contractor who I hired to perform the subbottom
acoustic survey in Lake Tenkiller.
Q Okay. Is that the only role they performed in
this case? 04:10PM
A It is.
Q All right. Have you produced the work product
generated by Global Remote Sensing, LLC?
A I have.
Q Exhibit 28, I believe, is an E-mail with an 04:10PM

c2f2b933-291b-460c-9c73-0f3e968532c2

attached retention agreement from Liza Ward at Motley Rice Law Firm. Tell me if you agree.
A Yes.
Q All right. Did you execute this agreement in the form that is attached to Exhibit 28? 04:11PM
A I can't tell you. I'd have to look at anything we might have in our contract files, but likely so, yes.
Q Did you negotiate any changes to the professional services retainer agreement with Motley Rice? 04:11PM
A I don't recall.
Q Is it reasonable for me to assume that the one that you executed, since I haven't seen a signed copy, is it reasonable to assume that the one you executed is substantially the same as the one that is -- 04:11PM
MR. GARREN: Object to form.
Q -- Exhibit 28?
A I think it would be substantially the same, yes. 04:11PM
Q Now, this E-mail is dated April 5th, 2006. Did you have a contract with anyone for your services prior to April 5th, 2006?
A Only verbally. 04:12PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And who were you submitting your bills to?
A To Motley Rice.
Q Was your verbal agreement consistent with this written agreement?
A Well, it was a lot looser than the written 04:12PM
agreement. I mean, the verbal agreement just said you work and we'll send you checks for your bills if they're reasonable.
Q Did they ever conclude that any of your bills
were not reasonable? 04:12PM
A No.
Q Please identify Exhibit 29.
A Document produced by CDM called Standard Operating Procedure, Springwater Sampling, Illinois
River Watershed. 04:13PM
Q All right. This is a standard operating procedure that was used for the spring sampling in this field investigation in this case?
A Yes.
Q Who wrote it? 04:13PM
A I'm looking to see who wrote this. I'm one of the contacts. I may have had some hand in writing this but, frankly, I don't know who wrote it.
Q Can you state the qualifications of the author
of this document? 04:13PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A If I recollect, this would have been -- Darren Brown was the person who wrote most of these, but I don't know who wrote this. The person that wrote this would certainly be qualified to write it. 04:14PM
Q Is that an expert opinion?
A Well, I mean, we would certainly hope so. I mean, CDM had this put together.
Q I agree we would hope so, but you do not know who wrote it? 04:14PM
A You can ask Roger Olsen who wrote it.
Q I will. If we can move on --
A Yeah, we can move on.
Q -- in Section 1.0, it mentions -- it says, in the Illinois River watershed over 50 springs or 04:14PM seeps have been identified. Were there any seeps sampled?
A I don't believe so.
Q Section 2.0, it says in order to collect a representative springwater sample, the sample 04:15PM location must be within 200 feet of the spring head, location where the water table outcrops; correct?
A That's what it says.
Q So one could collect a sample 200 feet away from the point at which water emerges from the 04:15PM

c2f2b933-291b-460c-9c73-0f3e968532c2

ground and according to this SOP, it would be deemed to be representative?

A That's correct.

Q Now, this procedure was actually loosened in later versions of this SOP, and instead of being 04:15PM required to be within 200 feet, the requirement was changed to be requested or recommended to be within 200 feet; right?

A Well, I don't know. I haven't seen that document recently, so I'd have to review it to 04:15PM confirm that.

Q Were you involved in any discussions about loosening the requirement in the SOP to eliminate the absolute requirement that spring samples had to be taken within 200 feet of the spring head? 04:15PM

A I don't recall any such discussion but I may have been. There have been a lot of discussions.

Q Isn't it true that you must sample the water at the point it emerges from the ground in order for a spring sample to truly be groundwater? 04:16PM

A I wouldn't agree with that.

Q In the distance of 200 feet from the point where water emerges from the ground at a potential sample location, what can influence the quality of the water? 04:16PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Well, surface contamination, biological activity, two things that I can think of.
Q How many of the spring samples can you affirmatively establish were collected at the point where the water emerges from the ground? 04:16PM
A I've not made that review of that information.
Q Many of the springs in the watershed are used for watering holes for livestock and wildlife; true?
A Some are.
Q Have you observed springs pools in locations 04:16PM that are actually receiving runoff from the surrounding topography?
A I've not personally observed them.
Q You haven't seen that?
A No. 04:17PM
Q Were any spring samples excluded from consideration in this case because they may have been affected locally by animals or runoff directly into the spring locations?
A Well, I didn't personally exclude any spring 04:17PM data from consideration.
Q All right. Are you aware of anyone else doing so?
A I am not.
Q What I'm handing you marked as Exhibit 30, Dr. 04:17PM

Fisher, is a compilation of documents I pulled together. They weren't -- I'm not representing they were produced in this order or as a group. They are E-mails transmission -- transmittals with copies of what appear to be landowner access agreement forms. 04:18PM
Do you agree?
A Yes.
Q All right, and there are several communications in 2006 involving Mr. Brown, Mr. Page, Mr. Olsten -- Mr. Olsen and you. Question 04:18PM
number is, will -- does Exhibit 30 contain the access agreement that was actually used in the field investigation?
A Okay. I've forgotten. It may well but it would be substantially similar to this. 04:18PM
Q To which one?
A Well, to the most recent version. I didn't maintain it. This was of not a whole lot of interest to me.
Q Why not? 04:19PM
A Well, this was basically an agreement with the landowner to obtain water from something on their land, groundwater well. It provided we had the ability to get onto the property and have them agree to that in a friendly way. That was what I was 04:19PM

c2f2b933-291b-460c-9c73-0f3e968532c2

hopeful for.

Q All right. You can't tell me if any of these was the actual form used?

A No, I cannot as we sit here today.

Q Was there anybody in the sampling -- was there anybody in this field investigation whose job it was to track that landowners had granted permission for entry before entry was attempted? 04:19PM

MR. GARREN: Object to form.

A My recollection was that Darren Brown had that -- some of that responsibility, if not exclusively that responsibility, but I don't recall specifically. 04:19PM

Q None of these drafts of this access agreement tell the landowner that the people coming on their property are seeking data to be used in this lawsuit; do you agree? 04:20PM

A Well, they were -- I haven't read all these agreements.

Q Does it say anywhere on here that this relates to a lawsuit in federal court in Tulsa, Oklahoma, does it? 04:20PM

A If the landowner had any questions concerning that, they were directed to contact David Page and given his phone number. 04:20PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Dr. Fisher, none of these forms say anything about this lawsuit, do they?
A No.
Q Were these landowners not entitled to know that you were coming on their property to collect samples for potential use in a federal lawsuit? 04:21PM
MR. GARREN: Object to form.
Q In your opinion.
A In my opinion, they were entitled to know whatever they asked and that was not concealed from them. 04:21PM
Q It wasn't -- weren't they entitled to be told up front what the point of this access to their property was in your opinion?
MR. GARREN: Object to form. 04:21PM
A I think everybody asked what that was all about and they were told. It's not on the form.
Q To your knowledge did any sample team ever enter private property to take samples before this form was adopted? 04:21PM
MR. GARREN: Object to form.
Q Or any form was adopted?
MR. GARREN: Same objection.
A I can't recall. I don't believe so. It may have occurred. 04:22PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Did the sampling teams obtain signed access agreements every time before they entered private property?

A I believe they did. I have no specific knowledge of that. 04:22PM

Q Was there a written policy or procedure requiring the sample teams to have the agreements signed before they entered private property?

MR. GARREN: Object to form.

A They were verbally told that they would have to have that agreement. 04:22PM

Q All right. There was nothing in the procedures manual -- well, there wasn't a procedures manual for this investigation, was there?

A For what investigation? 04:22PM

Q This collection of data for this lawsuit.

A Well, there are a series of standard operating procedures that were written for a specific phases and aspects of it.

Q And ensuring authorization to enter property was not a specific standard operating procedure? 04:22PM

A It was a standard operating procedure. It was verbally transmitted to the sampling teams that they needed to have that permission.

Q Was there any log kept of the access 04:22PM

c2f2b933-291b-460c-9c73-0f3e968532c2

agreements that had been executed?
A Access agreements were retained.
Q Did you receive copies of them?
A I was not the repository of that. That was
the CDM responsibility to reposit them. 04:23PM
Q I asked you if you saw copies of them.
A I've seen copies of them.
Q And you didn't retain any in your files?
A No, not that I recall.
Q Did any of the field investigation teams at 04:23PM
any time enter private property without first
obtaining permission from the owner?
MR. GARREN: Objection.
A I don't know.
Q Are you aware of any time during this sampling 04:23PM
program that someone complained that the sampling
team was on private property without permission?
MR. GARREN: Objection to form.
A I can't specifically recall. I think there
was one instance in which a landowner called to 04:23PM
complain.
Q You don't recall being written up in the
newspaper for having samplers on Washington County,
Arkansas land?
A Well, I wasn't personally written up in the 04:24PM

c2f2b933-291b-460c-9c73-0f3e968532c2

newspaper.
Q There was a discussion about these yellow barrels with the name Lithochimeia on them.
A Oh, if you are referring to that, the -- those were placed within stream segments and within the 04:24PM
wetted portion or what would be the wetted portion of streams, which was considered to be public land. That was the opinion that was provided to me.
Q Well, Washington County, Arkansas disagreed with that analysis, didn't they? 04:24PM
A Well, Judge Hunton seemed to disagree with that but he also didn't remove the barrels after we discussed that.
Q There was a commitment made that all data that were collected from the barrels would be shared with 04:24PM
Judge Hunton?
A I believe there was.
Q Did you provide him any of that data?
A That data would have been provided through counsel. 04:25PM
Q What counsel?
A Well, I didn't make a personal commitment to give him that information to my recollection.
Q Do you think any of the lawyers here represent Judge Hunton? 04:25PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A No, I don't think any of you represent Judge Hunton, but the legal team would have made that transmission to him.
Q Oh, you mean the State's counsel? 04:25PM
A The State's counsel.
Q All right. My mistake.
A I'm sorry.
Q I misinterpreted.
A And I misspoke. 04:25PM
Q Do you know if in fact the State's counsel sent this data promised to Judge Hunton?
A I don't know.
Q Were you ever asked by the State's counsel to pull together information about trespassing during 04:25PM the field investigation in order to answer discovery submitted by any defendant in this case?
A Boy, I don't recall doing that.
Q I asked you, do you recall being asked?
A I don't recall being asked or doing it. 04:26PM
Q Let's change the tape.
VIDEOGRAPHER: We are now off the Record. The time is 4:26 p.m.
(Following a short recess at 4:26 p.m., proceedings continued on the Record at 4:29 p.m.) 04:29PM

c2f2b933-291b-460c-9c73-0f3e968532c2

VIDEOGRAPHER: We are now on the Record.
The time is 4:29 p.m.
Q Dr. Fisher, why are you no longer employed by
the University of Tulsa?
A I'm no longer employed by the University of 04:29PM
Tulsa for a number of reasons. Primarily because in
working as a consultant and working as a university
professor were sort of incompatible pursuits, and
despite the fact that it was worth a substantial
amount of money to me for free tuition for my 04:30PM
daughter and daughters now, I was forced to leave
because I simply couldn't serve two masters.
Q When you say forced, were you asked to leave
or asked to choose?
A No, no. I chose. 04:30PM
Q And when did you leave University of Tulsa?
A I departed the University of Tulsa in the
spring of 2007.
Q All right. You, sir, are not an expert in
animal husbandry? 04:30PM
A You mean in terms of caring for animals?
Q Right.
A I'm not an animal husbander, no.
Q You've never been qualified in any court as an
expert in poultry husbandry? 04:31PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A In terms of the actual operation of poultry facilities?
Q Yeah.
A No.
Q I think we've already established you're not an agronomist. You have no expertise in the biological processes of poultry or livestock? 04:31PM
MR. GARREN: Object to form.
A I'm not a domestic animal biologist and I'm not a veterinarian. 04:31PM
Q All right. You don't have any expertise in veterinary science?
A Yeah, I said that, correct.
Q Well, I said it a different way. Do you agree with my statement? 04:32PM
A I'm not sure what veterinary science is necessarily. I'm not a veterinarian.
Q Then you can't be an expert if you don't know what it is.
A Touche. 04:32PM
Q You're not an expert -- excuse me. You are not a nutritionist, an animal nutritionist?
A No.
Q You have no expertise in evaluating feed formulas for animals? 04:32PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A Yeah, I can look at them from a chemical perspective.
Q You can read a formula and understand what the chemicals say? 04:32PM
A And I could compute, for example, the copper concentration in a formula based on the amount of copper sulfate that was added.
Q Now, this -- in this case you have data from one feed sample; correct? 04:32PM
A We have data from one feed sample, that's correct.
Q All right, and this was collected from Mr. Barney Barnes?
A That's correct. 04:33PM
Q Now, to your knowledge, sir, who owns the poultry feed on Mr. Barney Barnes' farm?
A I don't know.
Q Was that not relevant to you?
A Mr. Barnes was willing to give us a sample, 04:33PM and it seemed reasonable to me. It was his farm.
Q Okay. So it didn't matter to you if he didn't own the feed?
MR. GARREN: Object to form.
A Well, I -- it seemed reasonable to believe 04:33PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that he did.
Q Seemed reasonable to believe that he did.
What led you to believe that he did?
A It was his farm.
Q Okay. Now, you understand that poultry 04:33PM
companies change their feed formulas?
A Yes. Having reviewed many hundreds of those
records, they do change them from time to time.
Q And it can be changed on fairly short order,
meaning -- let me rephrase it -- frequently change 04:34PM
their feed formulas?
A They're changed. I don't know how frequent
they're changed. Some formulations seem to have
some longevity; some don't.
Q And you know there are different feeds for 04:34PM
different types of birds?
A Correct.
Q There are different feeds for different life
stages of birds?
A That's correct. 04:34PM
Q All right. This one feed that you've got a
physical sample of, what kind of bird was it and
what stage feed was it?
A They were for broilers, and I'm not sure of
the stage, but I'm sure I could reconstruct that. 04:34PM

c2f2b933-291b-460c-9c73-0f3e968532c2

It's probably midlife, like in the midst of this, the growing phase, not the initial start-up feed or continuing.

Q All right. How many different types of feed are typically fed to broilers in the course of their 04:34PM life span?

A Well, at least three. It would appear that there's a starter feed. There's something that's about -- maybe four. It depends on the company, too. There's sort of an early grow-out feed, a 04:35PM later grow-out feed and then a withdrawal feed in which some of the medications and stuff may be removed.

Q Isn't it relevant to know which of those you analyzed? 04:35PM

A Partially, yeah. It would be nice to know, but since it's a broiler feed, it's what you have. You're dealing with a population of materials. When you look at the feed formula, you have one sample of feed is what you have. 04:35PM

Q The companies that have utilized 3-Nitro or FDA approved feed additive 3-Nitro that contains organic arsenic, the companies that have used that, do you know -- do you have an opinion, sir, as to whether that feed additive is used 100 percent of 04:36PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the time, 20 percent of the time; do you have any opinion at all, the degree to which that feed additive is utilized?

A I do not. I simply knows that it shows up in poultry waste and that it's a material compounded in numerous poultry feeds. 04:36PM

Q Let's look at your Exhibit 20, which is your amendment for Opinion 18, okay, and I'm looking at your Footnote 102. How many cattle manure samples are you working from in the development of your Opinion 18? 04:37PM

A Eleven.

Q All right. If I understand how to read these sample identifiers, these samples -- well, let me put it this way: How many different fields were sampled? 04:37PM

A I'd have to make a review of that information. It's certainly more than one. It's several, and these are compositive samples.

Q So they went out to a field and collected cow manure from multiple spots in the field and then combined it into one sample for the field? 04:38PM

A Yes.

Q All right. It's more than one but less than ten; you would agree? 04:38PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Possibly more than one and could be as many as ten. I'd have to review the information.
Q All right. It's no more than the number of samples there are; that's for sure?
A That's correct. 04:38PM
Q All right. So it's a maximum of ten or eleven. Now, you cannot state, sir, based upon these samples, when you don't know where they're taken or how many fields, that these samples of cattle manure can be considered truly representative 04:38PM of the collective chemistry of grazing cattle manure in the Illinois River watershed?
A Well, I can't say they aren't either. I would believe that, based upon the fact these were composited across several fields, that they are 04:39PM somewhat representative, if not completely so.
Q But you have no basis in fact for that conclusion; you don't even know how many fields have been sampled?
A Not as we sit here today. 04:39PM
Q You don't know if these came from different herds of cattle?
A Well, they came from different fields. They likely came from different herds if they're from different landowners, for example. 04:39PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q But you don't know?
A I don't know. That's correct.
Q All right. Let's get back to the primary question. You do not have a well-founded scientific basis for offering the opinion that these manure 04:39PM
samples represent the entirety of cattle manure that is being deposited on the ground in the Illinois River watershed?
MR. GARREN: Object to form.
A I would offer the opinion that since they're 04:39PM
composited samples from multiple locations, they are a representative sample.
Q From those locations?
A Yes.
Q But you can't state they're representative of 04:40PM
other locations?
A Well, they're representative of those locations. To be representative of all locations, one would have to sample every location. This is a sampling. It's like any other sample. 04:40PM
Q Dr. Fisher, are your standards so low that you'll say that these eleven samples are representative of the entire watershed when you don't even know where they were collected from?
MR. GARREN: Objection to form. 04:40PM

A I could review where they were collected from.
Q Have you?
A I did review it at one time. I think they are representatives of cattle manure within the watershed. 04:40PM
Q Based upon what?
A Based upon the fact they're composited samples from multiple locations.
Q A composite sample from ten or less locations, that's all you need to know? 04:40PM
MR. GARREN: Objection to form.
A Well, also they seem to be -- if they're from multiple locations, they have a relatively limited compositional span.
Q That could also be caused by the fact that they were collected from fields very close, similar herds; it could be because they weren't representative? 04:40PM
MR. GARREN: Objection to form.
A That would be speculation, and I would simply review the distribution of these in space to make a better determination of that. 04:41PM
Q Is it proper methodology for you to look at the results of the analysis to conclude that the samples were representative of an entire population? 04:41PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A Well, if these are the samples that you have, it's the representative nature -- it's as representative as it gets.
Q All right. It doesn't cause you any concern whatsoever to base your opinions on this limited number of manure samples? 04:41PM
A No.
Q When you don't even know how many fields are sampled, you're good to go? 04:41PM
A I think we're in reasonable condition.
Q All right. Let's talk about the wastewater treatment plants. How many wastewater treatment plant samples are you basing your opinion on?
A Four. 04:41PM
Q And those samples were taken one time at four locations?
A There are two from Lincoln wastewater treatment plant, one from Rogers, Siloam Springs and Springdale. 04:42PM
Q All right. Why weren't there samples collected from every publicly owned treatment work in the watershed?
A Well, these were the largest contributors.
Q Yeah. That's it; that's the basis? 04:42PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A From a mass balance sense, that's the basis and --
Q Why not sample the ones that are the closest to Lake Tenkiller?
A Because they would have less total mass 04:42PM
contribution to the system because they're smaller.
Q But they're closer; is that not relevant to you?
A It's not particularly relevant. You could get
one from Tahlequah, for example. 04:42PM
Q Each one of these wastewater treatment plants discharges into a different stream, doesn't it?
A That's true.
Q Is that relevant to the analysis?
A Potentially so, but they have a fairly limited 04:42PM
compositional range.
Q Is it your position that the wastewater treatment samples, these four samples, are representative of all the wastewater treatment plant
effluent in the Illinois River watershed? 04:43PM
MR. GARREN: Object to form.
A I would say that they're representative samples of wastewater treatment plant effluent in the Illinois River watershed.
Q Can you state with any degree of certainty 04:43PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that these four samples represent wastewater treatment effluent chemistry in 1980?

A No.

Q How about in 1995?

A Probably not. Similar but probably not. 04:43PM

MR. McDANIEL: I'll pass the witness.

DIRECT EXAMINATION

BY MR. ELROD:

Q Dr. Fisher, for the Record my name is John Elrod and we've met before today; is that correct? 04:44PM

A That is correct.

Q Dr. Fisher, because I'm going third, my query will lack structure. You understand that?

A Well, it will have the structure you've given it. 04:44PM

Q Okay. Let's talk about Barney Barnes for a second. Did lawyers for the State of Oklahoma know that I or members of your team were going to interview Barney Barnes before it was done?

MR. GARREN: Object to form. 04:44PM

A I believe so.

Q Okay. Do you understand, sir, that interviewing Barney Barnes would have been ethically incompatible with Barney Barnes being an employee of Peterson Farms; is that true? 04:45PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A I thought he was a contract grower for Peterson Farms.
Q Yes, sir.
A Does that make him an employee? 04:45PM
Q Well, that's my question to you. You understand it would have been ethically incompatible for him to be interviewed by you at the behest of the State's lawyers if he were an employee of Peterson Farms during litigation? 04:45PM
MR. GARREN: Object to form.
A I wouldn't know that.
Q And do you know that it would have been ethically incompatible for you to have interviewed Barney Barnes if he were an agent of Peterson Farms? 04:45PM
MR. GARREN: Object to form.
A I wouldn't know that.
Q In any event, it's your testimony that the lawyers knew that you were going to interview Barney Barnes before he was interviewed? 04:45PM
A Yes.
Q All right.
A And we were accompanied, as I recall, during that interview by Mr. Barnes' counsel, Charles Shipley. 04:45PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Now, I want to ask you some questions regarding the reports of -- your report, the reports of Dr. Wells, Dr. Cooke and Welch, Dr. Engel, Dr. Stevenson and Dr. Olsen. You're aware that all of you, those names mentioned, were under court order 04:46PM to submit completed expert reports on May 15 of 2008; is that correct, sir?

A I was directed to submit that report on that date.

Q And you know that the others were also? 04:46PM

A Yes.

Q And you know that this May 15th, 2008 date came after some court-permitted delays and previous scheduling orders; is that true?

A Well, I don't recall all that. 04:46PM

Q All right. Now, you're also aware that Dr. Wells, Drs. Cooke and Welch, Dr. Engel, Dr. Stevenson and Dr. Olsen have submitted what they call errata sheets subsequent to the May 15th deadline; is that true? 04:47PM

A I don't know what's been submitted, but I think there have been erratas. I've heard about errata sheets being submitted.

Q All right. Now, would you tell the ladies and gentlemen of this jury why this jury should have any 04:47PM

c2f2b933-291b-460c-9c73-0f3e968532c2

confidence in the testimony of Drs. Wells, Cooke, Welch, Engel, Stevenson and Olsen given the fact that they made substantial errors and mistakes in the initial reports that they offered in this case?

MR. GARREN: Objection to form. 04:47PM

A Because they corrected them.

Q How is this jury to know that the corrections that they made are now in fact accurate?

A They can make that judgment based upon listening to the experts' testimony. 04:47PM

Q Is Dr. Wells incompetent in your opinion?

A I've never met Dr. Wells, but I believe him to be competent.

Q He did make mistakes in the report that he initially issued in this case, did he not? 04:47PM

MR. GARREN: Object to form.

A I've not reviewed his report and I'm unaware of mistakes that he may have made.

Q What about Drs. Cooke and Welch; are you aware of the mistake they made in the report that they 04:48PM issued?

A I'm aware that there was an errata sheet generated for their report. I'm unaware of the nature, scope or magnitude of their errors.

Q Are you aware that Dr. Engel made mistakes in 04:48PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the report that he issued?
A I am somewhat aware that there seemed to be errors in that report. I don't know the nature, scope or extent of those errors.
Q Are you aware that Dr. Stevenson made mistakes in the report that he issued? 04:48PM
A I am unfamiliar with Dr. Stevenson's -- any mistakes he made in his report.
Q Are you aware Dr. Olsen made mistakes in the report that he issued? 04:48PM
A I am somewhat aware that there are errata being submitted for Dr. Olsen's report.
Q And you have admitted today that you made mistakes in the report you issued; is that true, sir? 04:49PM
A That's correct.
Q Why should the jury -- tell the jury why it should now have any confidence in the final report that you have issued and that we've lawyered about over the last two days, given the fact that you had to give substantial revision to your Opinion No. 18? 04:49PM
MR. GARREN: Objection to form.
A Because corrections and revisions were made and the original data was consulted to correct shortcomings in that original report. 04:49PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q I'd like to expand a little bit on this notion that you were asked about, I think by Mr. McDaniel, this notion that cattle are simply recyclers of waste imported by the poultry industry. Is that the notion? 04:49PM

A Well, that seems to be the notion, yes, sir.

Q All right. You'll agree with me that cattle are foragers; correct?

A They eat grass, yes, sir.

Q And that they do eat grass; correct? 04:50PM

A That's correct.

Q They do not eat dirt?

A Well, I think cows may eat a little dirt from time to time.

Q All right. Because they might pull up the 04:50PM roots of the grass blade while they're eating the grass and foraging; is that true?

A That's correct.

Q Now, you'll agree with me that the blade of grass that contains phosphorus would not know the 04:50PM source of the phosphorus that is in that blade of grass; correct?

MR. GARREN: Object to form.

Q Whether it comes from natural soil conditions, from chicken litter or from commercial fertilizer; 04:50PM

c2f2b933-291b-460c-9c73-0f3e968532c2

correct?
A That's correct.
Q All right. Will you agree with me that if there was no chicken production at all in the Illinois River watershed or in the nearby area but 04:50PM
that the cattle that are there were there for purpose of this question, that the cattle would still be foraging on grass; correct?
MR. GARREN: Object to form.
A Yes. 04:51PM
Q And they would be foraging on grass that contained phosphorus in the blades of the grass; correct?
A That's correct.
Q And that we can assume from a standpoint of 04:51PM
reasonable logic, could we not, that the owners of the cattle would fertilize their pastures in order to achieve maximum production?
MR. GARREN: Object to form.
A They would have fertilized their pastures 04:51PM
largely with nitrogen-based fertilizers and not paid for phosphorus in excess of agronomic need.
Q If the phosphorus -- if the grass needed phosphorus, they would logically provide phosphorus to the grass; correct? 04:51PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A I think they would logically provide phosphorus up to agronomic need; otherwise, they would be wasting their money.
Q And the -- I think we've already established that the only, the only phosphorus that is contained in the blade of grass that the cattle are foraging on would be at the agronomic uptake rate of that particular plant? 04:51PM
A Well, setting aside any sort of super abundant uptake, yes. 04:52PM
Q Now, can we also -- I think your testimony was that you observed cattle over the weekend in 7 of the 64 fields that you reviewed?
A I think that's correct. It's like 12 percent of the fields. I think that was the number I remember computing, which is about 7, and there were horses in one of the fields, three horses. 04:52PM
Q Can we not assume, though, sir, that at some point in the last year all 64 of those fields would have contained cattle? 04:52PM
MR. GARREN: Object to form.
A I think -- I wouldn't know. I don't think that's necessarily true.
Q Well, is it not true that given the nature of 04:53PM

c2f2b933-291b-460c-9c73-0f3e968532c2

the agricultural industry in the Illinois River basin, the whole point of utilizing chicken litter as a fertilizer is to grow forage for cattle; correct?

A Well, the reason to put that down seems to be to enhance forage growth. 04:53PM

Q For cattle?

A For cattle, correct.

Q So we can assume that if chicken litter was put down on a particular field, that cattle had been on that field, can we not? 04:53PM

MR. GARREN: Object to form.

A Not necessarily. It could have been used to grow hay.

Q Just hay? 04:53PM

A I've seen that.

Q And you'll also see that after hay is harvested, cattle will come in on a field right behind the hay harvest?

A That can happen. 04:53PM

Q So can we not assume then, sir, that in fact substantially more than 7 out of the 64 fields that you observed over the weekend would have had cattle on them in the last -- within the last year?

MR. GARREN: Objection. 04:54PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I don't know what -- I'm sorry. I don't know what to assume, Mr. Elrod. I just can report what I saw in those fields.

Q Now, you testified twice in the last two days that the contaminants of concern in this case are phosphorus and bacteria; correct? 04:54PM

A That's correct.

Q Now, I have to prepare a defense for my client at the trial of this case. You understand that?

A Yes, I do. 04:54PM

Q Does that mean that I don't have to be concerned about preparing a defense for metals?

MR. GARREN: Object to form.

A You mean metals as pollutants?

Q Yes, sir. 04:54PM

A That's correct.

Q And does that assume that I do not have to prepare a defense for my client regarding hormones?

MR. GARREN: Object to the form.

A Well, I've never offered any opinion on hormones, nor do I know of any experts who have. 04:54PM

Q Does that assume then -- can I assume then I do not have to prepare a defense for my client regarding hormones?

MR. GARREN: Object to form. 04:55PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A I don't believe you do.
Q And then does that also assume that I do not have to prepare a defense for my client regarding nitrogen?
MR. GARREN: Object to form. 04:55PM
Q Especially nitrogen impact on groundwater?
MR. GARREN: Same objection.
A I don't know. I don't believe so.
Q And does that also -- can I also assume that I do not have to prepare a defense for my client on 04:55PM the issue of antimicrobial effects?
MR. GARREN: Object to form.
A Could you define antimicrobial effects?
Q I can't any better than I just said it.
A Okay. If you are talking about a defense of 04:55PM your client with respect to the presence of antibiotic materials in litter --
Q Yes, sir.
A -- I don't believe so.
Q All right. If you'd look at your report on 04:55PM Table 1, I didn't note the page.
A Table 1?
Q Yes, sir. It should be the growth in chicken production in the Illinois River watershed.
A I have that, yes, sir. 04:56PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q What page is it on?
A It's on Page 19.
Q All right. According to this, is it true then that between 2000, there were 117 million birds that came through the watershed; is that true? 04:56PM
A In 2000 that is the estimate produced. These are documents produced by the defendants.
Q Okay.
A It is lacking -- it's a partial year for George's and Peterson in 2000. So it would be more 04:57PM than 117 million birds, given that they had a partial there.
Q That's not really the one I wanted to ask questions about. I have in my notes there was a Figure 29. That's what I want to ask you about. I 04:57PM want to ask you about the upper left-hand graph, which is sediment phosphorus between 1960 and 2005.
A Yes.
Q Are you with me?
A I'm on Figure 29. 04:58PM
Q And the upper left-hand corner graph is the one I want to ask you questions about.
A Yes.
Q Now, one of the exhibits we looked at showed a growth between '85 and 2005 of birds in the 04:58PM

c2f2b933-291b-460c-9c73-0f3e968532c2

watershed from 72 million birds to 109 million birds. Okay?
A Yes.
Q 72 million to 109 million, that increase. Now, I'd like first to get rather as definite as we 04:58PM
can about the phosphorus numbers between 1985 and -- I mean between -- yeah, 1985 and 2005.
MR. GARREN: Is your question going to include your reference to the poultry population and if so, can he -- 04:59PM
MR. ELROD: Yeah. Let me have my stack of documents.
MR. GARREN: What number are you looking at, John?
MR. ELROD: Looking at Fisher 17. 04:59PM
Q The number I focused on, Fisher 17, on the front page for broilers sales, 72 million for 1982 and 109 million for 2002. Are you with me?
A Broiler sales, yes.
Q Yeah. Do you believe those numbers to be 05:00PM
reasonably accurate, and I'm interested in the growth more than anything else.
A Yes.
Q All right. So that 20-year period the broiler numbers in the watershed increased from 05:00PM

c2f2b933-291b-460c-9c73-0f3e968532c2

approximately 72 million to approximately 109 million; is that fair according to your testimony?

A That's correct.

Q Now, let's try to track that same time frame as close as we can on Figure 29, and that is about 1982 to 2002. So let's go to 1980 on this graph and let's go to 2000. Is that a fair comparison with very little overlap? 05:00PM

A From 1982?

Q Yeah. On the graph let's go from 1980 to 2000. 05:01PM

A That's reasonable.

Q Okay. Now, let's take Lake No. 1. Now, Lake No. 1 is on the upper end of the lake just down the lake from the Highway 82 bridge; correct? 05:01PM

A No. Lake No. 1 is just up from the dam. It's at the lowest end of the lake.

Q All right. So 1 to 4, we were working up the lake from dam to -- where's 4, Horseshoe Bend?

A 4 is -- we have to look at the graph of where it is, but it's the most riverine sample. 05:02PM

Q All right. Now, show me the total phosphorus count of the sediments in 1980 for No. 4, the riverine section; what is that number?

A Wait a second. We started out with Lake Sed 05:02PM

c2f2b933-291b-460c-9c73-0f3e968532c2

1. You want to do the most riverine section?
Q Yeah, I want to start at the top of the lake and go down. Is it not true to the cores at the top of the lake would logically capture the most phosphorus coming down the river? 05:02PM
A No.
Q Why is that not true?
A Well, the phosphorus will be carried on through biological processes and they're going to end up with the best signature, best signal will be 05:02PM down by the dam with respect to timing.
Q Okay. We're going to get to No. 1, but let's start at the upper end of the lake. What is the total phosphorus count in 1980?
A In 1980? 05:03PM
Q Yes, sir.
A Estimate would be about 800.
Q All right. Then in 1985 what is it; is that the next number? I can't read those numbers. Are these five-year segments? 05:03PM
A 1980, 1985.
Q Okay. What's 1985?
A Lake Sed 4 is not going to show much change in 1985.
Q Okay. What about 1990? 05:03PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A 1990, the number there is about a thousand.
Q And then 1995 what is it?
A In 1995 it's about 1,200.
Q And then in 2000 what is it?
A 2005, the actual value is about 1,200. It's 05:03PM
just under 1,200.
Q Okay. So it's dropped?
A Well, by a little. I don't think it's going
to be different from the value in 1990. It's
dropped a little. 05:03PM
Q But chickens have increased?
A Right. That's not inconsistent with the
entire data trend, though.
Q Well, let's go to the next lake position. No.
2 -- I mean, No. 3 would be the next one downstream? 05:04PM
A That's correct.
Q What's the 1980 number for it?
A About 900.
Q And what's the '85 number for it?
A Just under a thousand, a little bit bigger. 05:04PM
Q And what's the 1990 number for it? I just
asked you that, didn't I?
A No.
Q Okay. What is 1990?
A 1990 is about 1,100. 05:04PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And what's 1995?
A 1995 is about -- looks like just under 1,300.
Q And 2000 is what?
A In 2000?
Q Yes, sir. 05:04PM
A 2000 is about the same.
Q All right, but chickens have increased during that period of time; correct?
A That's true.
Q No. 2, what is it in 1980? 05:04PM
A 1980, for No. 2 we're going to be making an estimate. It's going to be around 800.
Q And for 1985 what is it?
A '85, it's going to be around a thousand.
Q And 1990 what is it? 05:05PM
A 1990 values are around 1,300.
Q 1995, what is it?
A 1995, values are around a little over 1,200.
Q And 2000, what is it?
A In 2000 values are just under 1,400. 05:05PM
Q Now, let's go to Lake No. 1, which I believe your testimony was would be the -- what was your testimony?
A Well, Lake Sed 1 has the best record. It shows the least sediment dilution and it has the 05:05PM

c2f2b933-291b-460c-9c73-0f3e968532c2

nicest looking chronology.
Q All right. Let's go to -- and how close to the dam is that?
A We can take a look on the map.
Q Don't do that. It's all right. 05:05PM
A It's upstream from the dam.
Q All right. No. 1 then, what is it in 1980?
A 1980, it's, say, around a thousand, a little over.
Q Where do you see that? Lake No. 1 -- oh, I'm 05:06PM
sorry. Yeah, that's the diamond, right?
A Yeah.
Q Okay, and in 1985 what is it?
A In 1985, I want to look at that. It's just under 1,200. 05:06PM
Q '86, what is it -- I mean, '90, what is it?
A 1990, it's just under 1,200.
Q 1995, what is it?
A 1995, it's just under 1,300.
Q And 2000, what is it? 05:06PM
A 2000, it's around 1,400.
Q And chickens have increased by a substantially greater percentage in the watershed during that period of time than the percentage increase in phosphorus at Lake 1; is that right? 05:06PM

c2f2b933-291b-460c-9c73-0f3e968532c2

MR. GARREN: Object to form.
A No. At Lake 1 the increase in phosphorus is from about a thousand. If you want to read the individual points, they're around 1,400, an increase of about 40 percent, and the poultry, if you look at 05:07PM
just broilers sales, that change is from 72 million to 109 million, a change of 37 or, you know, just over 50 percent. So they're comparable changes.
Q If our experts testify in this case that the lake has improved in water quality from 1985 to the 05:07PM
present time, would they just flat be wrong?
A Well, I don't know if they would be wrong or not. I'm not making testimony on water quality in the lake. I'm talking about the temporal signature in the sediments. 05:07PM
MR. ELROD: That's all. Thank you.

DIRECT EXAMINATION

BY MS. HILL:
Q Dr. Fisher, my name is Theresa Hill, I represent Cargill, Inc., and Cargill Turkey 05:08PM
Production, LLC. Going forth today, I'll probably jump around even a little bit more than the prior questioners, so please bear with me. Let's turn to Page 11 of your report. This is where you are talking about the Cargill history. 05:09PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Yes.
Q You mentioned that there was a barn built in 1960 and still being used. What's the significance of a 1960s barn still being used?
A Simply that at that particular operation or 05:09PM
that particular location, there was a barn used for turkey production since 1960. I mean, it's kind of in and of itself a statement, that Cargill was using an older barn, so it may have had history dating back that far. 05:09PM
Q Even though you recognize Cargill -- you say later Cargill entered business in 1967, you're not saying here that Cargill was using this barn in the '60s?
A No. I don't know if Cargill was using that 05:10PM
barn or not in the '60s. That was just part of the evidence showing that Cargill had operations in the watershed in the '60s --
Q So are you making any point --
A -- or operations in the '60s. 05:10PM
Q We'll try not to step on each other.
A We will.
Q It's been a long day, two days. Are you making any point that there's some significance to a barn built in the '60s being used today; is there 05:10PM

c2f2b933-291b-460c-9c73-0f3e968532c2

any point being made there?
A No.
Q Okay. So just the '60 date is all that you're pointing out here?
A That's correct. 05:10PM
Q Let's turn over to Page 15 and Opinion 4, and we've talked about before how you cite Engel's work, as well as Smith's work, for support in Opinion No. 4, and looking back at the mass balance report, are lake sediments listed as one of the sinks of 05:11PM phosphorus in the mass balance report?
A I'm not sure that they're listed that way directly, but very little of the material exits the watershed. I think it's like 1 percent per year is exiting the watershed via the discharge from 05:11PM Tenkiller. I think I recall that correctly, and so they would be a sink but they're an implied sink.
Q So you do consider the sediment in Tenkiller a sink for phosphorus?
A Well, it can be both a sink and a source. 05:11PM That is, phosphorus can enter those sediments and it can also exit the sediment and enter the water column. So you can't -- a true sink is something that's sort of a roach motel. Phosphorus walks in but it can't walk out. In the lake sediments, 05:12PM

c2f2b933-291b-460c-9c73-0f3e968532c2

that's not necessarily true.
Q Do you know how that was taken into consideration in the mass balance report if it was at all?
A Well, the mass balance report did not -- 05:12PM
that's going to be phosphorus that you can't account for with respect to known losses. So you would take a look at all the inputs of phosphorus in mass balance. So you would look at fertilizers, for example. You would look at poultry feed, which we 05:12PM
know is largely imported material or is imported material. Look at all those inputs, and then you look at the outputs you could measure, and the outputs you can measure would be the number of animals harvested and taken out of the watershed, 05:12PM
for example, the amount of forage or hay taken out of the watershed, the amount of phosphorus present in water discharging from the watershed and which it can't account for gets stuck. So it's either going to be in soils or in sediments in the watershed or 05:13PM
in the standing crop and biota.
Q All right. Let's move on. Page 20, this is your Opinion No. 7.
A Uh-huh.
Q And talking about the increase in the growth 05:13PM

c2f2b933-291b-460c-9c73-0f3e968532c2

of the poultry industry, and you also make mention that there's an increase in the weight of birds over time that you correlate to the increase in litter production in reference to Engel. Have you looked at whether this increase in the weight of birds is 05:13PM true for turkeys?

A I've not looked specifically at turkeys. I know that it's true for broilers.

Q So you don't know whether the weight of turkeys has changed over time? 05:13PM

A I don't recall at this time. I think I may have looked at that data at one time, but it's not significant for this opinion.

Q The weight of -- the increase in the weight of the birds is not significant to this opinion? 05:14PM

MR. GARREN: Object to form.

A I guess with respect to a gross mass balance on the birds, turkeys are large birds, and they produce a substantial amount of waste, but in terms of the gross input of waste into here, the lion's 05:14PM share is from broilers. I mean, all the birds contribute. Broilers are the biggest piece.

Q Okay. So if you had any data on the weight of turkeys and whether that changed over time, would that be in your considered materials? 05:14PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Well, it would be considered with respect to animal units, issues that Meagan Smith would have considered and I would have incorporated.
Q So, no, I would not find that in your considered materials? 05:14PM
A You may. There's a lot of stuff in my considered material.
Q That's true.
A I didn't look at specifically changes in the weight of turkeys over time, mainly because turkeys, 05:14PM though important, are not the driver of poultry waste in this watershed.
Q And are you telling me that perhaps Meagan Smith may have looked at that?
A Yes. 05:15PM
Q Page 23, the way I understand Table 5 here is that it's based on data from Eucha-Spavinaw nutrient management plans that you looked at; right?
A Is there a question?
Q Is that correct? 05:15PM
A Yes.
Q Okay. Just to review where we've been for the last two days. Have you considered whether the clean-out practices in Eucha-Spavinaw and Illinois River are similar? 05:15PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Given -- they are believed to be similar since they are similar operations in contiguous watersheds with the same, pretty much the same group of integrators.

Q Have you looked at the typical clean-out practices in turkey houses? 05:16PM

A Yeah. Turkey houses don't clean out as frequently as other houses do.

Q How about the typical clean-out practices of preproduction houses for turkey growers, brooder houses? 05:16PM

A Haven't looked at that. This is based on their nutrient management plans. Nutrient management plan, we have a limited set for turkeys, that's true, and based upon the production of waste that was claimed and what would need to be disposed there, these are the numbers. I think they are actually probably low. 05:16PM

Q Okay. So this analysis of Eucha-Spavinaw watershed data, you don't take it a step farther to look at it, any clean-out practices from one watershed to another? 05:16PM

A No.

Q Okay. Did you do any comparison of those Eucha-Spavinaw nutrient management plans with 05:17PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Illinois River watershed nutrient management plans
or animal waste management plans?
A Yes, and the consideration is the
Eucha-Spavinaw watershed nutrient management plans
are far more detailed as far as their descriptions 05:17PM
of the growing facilities and they're much more
consistent.
Q Did you line any of those up for turkey
production?
A Pardon? 05:17PM
Q Did you line up an Illinois River watershed
nutrient management plan for a turkey grower with
one from the Eucha-Spavinaw watershed?
A No.
Q Let's jump over to Page 31 and here we're 05:17PM
looking at Opinion 12. I told you I would jump a
little.
A Okay.
Q Opinion No. 12 speaks to the timing of land
application. What determines when an individual 05:18PM
grower may spread litter?
MR. GARREN: Object to form.
A The question is what drives an individual
grower to spread litter?
Q When does -- when? The issue is when. 05:18PM

c2f2b933-291b-460c-9c73-0f3e968532c2

A Oh, when. Well, when they clean out the house, which is typically based upon looking at the ODAFF records. We're looking at this as a population of everybody who is regulated as a poultry grower and everybody who is spreading for a 05:18PM limited time period from the late 1990s forward, they're spreading -- beginning to spread this material from the data dominantly February, March, April, May, June, with the major portion of it taking place in March and April. 05:18PM

Q Okay. I think you started to answer my question when you said relatively close to when they clean out, an individual grower may land apply. Did you do any analysis about when they would actually spread their litter, what factors determined litter 05:19PM application, when?

MR. GARREN: Object to form.

A Okay. This material is typically put out during the period where nitrogen that's present in it will do the most good in terms of germinating 05:19PM forage. They might be hampered in spreading this material during wet conditions because you can't get trucks out into the field. There would be an issue with respect to the availability of clean-out contractors. I mean, those are all kind of factors. 05:19PM

c2f2b933-291b-460c-9c73-0f3e968532c2

I haven't really worried about that because the data tells us when they do clean out or when waste is deposited in fields.

Q The ODAFF records specifically tell you when land application took place; correct? 05:19PM

A Yes.

Q Okay. From those specific dates, did you determine any dates of significant rainfall after any litter application dates you found in those ODAFF records? 05:20PM

A I didn't make that determination. This is a population study looking at the timing of distribution, the distribution in time of this material. That sort of analysis could be done but that's at a level of detail that's beyond this, the 05:20PM scope of this report. They're put down -- these materials are put down during the period of the year when this is the time where there's the most runoff events.

Q And I think you testified earlier, if you get 05:20PM a lot of rainfall, you'll get runoff. What is a lot of rainfall?

A More than two inches in 24 hours. I think that's kind of a rule of thumb around here.

Q I'm hoping you can help me with your Table 10 05:20PM

c2f2b933-291b-460c-9c73-0f3e968532c2

on Page 37.
A Okay.
Q I'm looking at Table 10 and you have 25 observations in Footnote 96. I'm going to hand you Table No. 1, which is Appendix B to Dr. Olsen's 05:21PM
report, and there I see 16 poultry waste samples. Do you know what accounts for the difference in the number of observations between your report and Dr. Olsen's?
A I do not. These are collected from these -- 05:21PM
these observations, which are identified here are from the same database.
Q I'm having a hard time determining what Litter 3, Litter 4, Litter 2 and Litter 5 are on your Footnote 96. 05:21PM
A Okay. Those are sample IDs that are present within the CDM database, and they would individually identify specific litter samples.
Q Okay, and you don't know which 16 out of these 25 Dr. Olsen used? 05:22PM
A Well, no, because these are both combinations of information. I can't recall. There may be some reason that he edited the information. I'm not sure, but I've used the materials from the CDM database. 05:22PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q Well, I'll have to ask Dr. Olsen about that one then. All right. Page 54.
A Okay.
Q Starting here the discussion addresses really the amounts of sediments in the lake, and Page 54 05:23PM
and the following pages, is there a calculation of the mass of sediments that has accumulated in the lakes?
A No, there's not. That could be accomplished from this data, but it was -- I did not conduct that 05:23PM
computation.
Q You mentioned Dr. Olsen. Is he working on a supplementary errata?
A I don't know what Dr. Olsen is doing at this time. 05:23PM
Q Are you aware of any supplemental work he's doing on his report?
A I'm unaware of any supplemental work he's doing at this time.
Q Can you tell me how many other CERCLA NRD 05:23PM
cases have you worked on before, and you can give me a ballpark?
A I believe two significant ones. It would be the Calcasieu Estuary. I can spell it for.
C-A-L-C-A-I-S-E-A-U (sic), if I spelled it 05:24PM

c2f2b933-291b-460c-9c73-0f3e968532c2

correctly, and then on the -- oh, I mean, CERCLA cases with NRD, Calcasieu, and I believe I -- it was an NRD action associated with it, the Chazay (phonetic) Superfund site.

Q Are you familiar then with the concept of baseline? 05:24PM

A I am.

Q Can you tell me what that means to you?

A Baseline to me means that condition of the environment prior to impact or in the absence of impact, absence of injury. 05:24PM

Q Impact or injury, is that one and the same?

A Well, I should probably use the terminology. It would be in the absence of injury.

MS. HILL: Those are all my questions. Thank you very much, Dr. Fisher. 05:25PM

THE WITNESS: Thank you.

MR. GARREN: Let's take a quick break and let me talk to my client, witness.

MR. McDANIEL: Your client? 05:25PM

MR. GARREN: My client witness.

MR. McDANIEL: Is it your client witness?

MR. GARREN: I guess so.

VIDEOGRAPHER: We are now off the Record. The time is 5:25 p.m. 05:25PM

c2f2b933-291b-460c-9c73-0f3e968532c2

(Following a short recess at 5:25 p.m., proceedings continued on the Record at 5:28 p.m.)

VIDEOGRAPHER: We are back on the Record. The time is 5:28 p.m.

CROSS EXAMINATION

BY MR. GARREN:

Q Dr. Fisher, do you have Exhibit 23 there in front of you?

A Yes.

Q Have you seen this particular article before today when it was handed to you at this testimony? 05:28PM

A Yes.

Q You've seen it before today?

A I think I've looked at this before.

Q Okay. Does this particular study show any samplings taken in Oklahoma? 05:28PM

A It does not.

Q Does it reference any samples taken in Arkansas?

A It does not. 05:28PM

Q And of the sampling that was conducted in this particular study, would those samples vary in their composition makeup than that which is found in Arkansas and Oklahoma?

A They certainly could, and I would add that 05:29PM

c2f2b933-291b-460c-9c73-0f3e968532c2

some of the samples collected here, as mentioned on Page 1306, were actually from France and Sweden.

Q And you believe there may be some distinctions in the composition makeup taken there as opposed to the Illinois River watershed? 05:29PM

MR. McDANIEL: Object to the form, leading.

Q Do you have any opinion, sir, whether or not there could be differences in the samples in Sweden than that found in Arkansas or Oklahoma IRW?

A Yes. 05:29PM

Q And what would that opinion be?

A The opinion would be that it is highly likely that samples from half a world away are pretty different from samples taken here.

MR. GARREN: No other questions. We'll read and sign. 05:29PM

MR. McDANIEL: One follow-up, but go ahead.

MR. GARREN: I was going to say we'll read and sign.

REDIRECT EXAMINATION

BY MR. McDANIEL:

Q Dr. Fisher, the issue with Exhibit 23 was the extent to which pyrite is a component of the Chattanooga shale; correct; that was our discussion?

A That's correct. 05:30PM

c2f2b933-291b-460c-9c73-0f3e968532c2

Q And you agreed that pyrite is a component in the Chattanooga shale?
A That's correct.
Q Have you conducted any analysis to draw conclusions about the relative percentage of pyrite 05:30PM
that can be found in the Chattanooga shale formations in the Illinois River watershed?
A No.
MR. McDANIEL: Thank you.
MR. GARREN: We'll read and sign. 05:30PM
VIDEOGRAPHER: This concludes the deposition of Berton Fisher. The time is now 5:30 p.m.
(Whereupon, the deposition was concluded at 5:30 p.m.) 05:30PM

c2f2b933-291b-460c-9c73-0f3e968532c2

SIGNATURE PAGE

I, Berton Fisher, PhD, do hereby certify that the foregoing deposition was presented to me by Lisa A. Steinmeyer as a true and correct transcript of the proceedings in the above styled and numbered cause, and I now sign the same as true and correct.

WITNESS my hand this _____ day of _____, 2008.

_____

BERTON FISHER, PhD

SUBSCRIBED AND SWORN TO before me this _____ day of _____, 2008.

_____

Notary Public

My Commission Expires:

_____

c2f2b933-291b-460c-9c73-0f3e968532c2

C E R T I F I C A T E

STATE OF OKLAHOMA)
) ss.
COUNTY OF TULSA)

I, Lisa A. Steinmeyer, Certified Shorthand Reporter within and for Tulsa County, State of Oklahoma, do hereby certify that the above named witness was by me first duly sworn to testify the truth, the whole truth and nothing but the truth in the case aforesaid, and that I reported in stenograph his deposition; that my stenograph notes were thereafter transcribed and reduced to typewritten form under my supervision, as the same appears herein.

I further certify that the foregoing 314 pages contain a full, true and correct transcript of the deposition taken at such time and place.

I further certify that I am not attorney for or relative to either of said parties, or otherwise interested in the event of said action.

WITNESS MY HAND AND SEAL this 17th day of September, 2008.

_____

LISA A. STEINMEYER, CRR
CSR No. 386

c2f2b933-291b-460c-9c73-0f3e968532c2

1 CORRECTIONS TO THE DEPOSITION OF
BERTON FISHER, PhD
2 Volume II
3 PAGE AND LINE NUMBER CORRECTION
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

c2f2b933-291b-460c-9c73-0f3e968532c2