IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex rel, W.A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA, et al.	)	
Plaintiffs,	)	
V.	)	No. 05-CV-329-GKF-SAJ
TYSON FOODS, INC., et al.,	)	
Defendants.	)	

REPORTER'S TRANSCRIPT OF PROCEEDINGS

FEBRUARY 22, 2008

PRELIMINARY INJUNCTION HEARING

VOLUME IV

BEFORE THE HONORABLE GREGORY K. FRIZZELL, Judge

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Exhibit 4

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PROCEEDINGS

February 22, 2008

THE COURT: Dr. Olsen, if you will retake the stand. Mr. George, you may resume.

MR. GEORGE: Thank you, Your Honor.

ROGER LEE OLSEN

Called as a witness on behalf of the plaintiffs, having been previously sworn, testified as follows:

FURTHER CROSS-EXAMINATION

BY MR. GEORGE:

Q. Good morning, Dr. Olsen.

A. Good morning.

Q. Sir, when we last left, we were talking about your principal component analysis. Do you recall that?

A. Yes, sir.

Q. Sir, if I understand correctly, the principal component analysis is performed through some statistical software; is that right?

A. Yes, sir.

Q. What is the name of that software?

A. We used a combination of Excel and Sysstat.

Q. And at a basic level, that's about the level at which I understand, so you can straighten me out if I'm wrong, sir, the principal component software takes the data that you decide to give it; correct?

A. Yes.

Q. Okay. And it looks for relationships within that data between the list of parameters or constituents that you select; correct?

A. And all the samples, yes.

Q. What you get out of the software on the principal component analysis is a bunch of statistics; is that right?
A. It's a printout with coefficient factors. I guess you could call those all statistics.
Q. Let's look at one of those printouts. Let me hand you, Dr. Olsen, my copy, what I've marked as Demonstrative Exhibit 35. Dr. Olsen, I printed out this spreadsheet from the materials that you produced in this case. Do you recognize it?
A. I do not. Let me see. I think this was one of the runs that we performed. I'd have to look for sure, but it looks familiar.
Q. Dr. Olsen, is this the format in which you receive output from the PCA software?
A. This is just one of the outputs. And this was for a smaller set of contaminants than we ended up with the final analysis.
Q. This is some of the data or statistics that you would be looking at in trying to make a determination as to the presence or absence of a signature; correct?
A. Yes.
Q. If you look on the first page, let's talk through this a little bit, the one that is on the screen. It doesn't have a page number, does it? Do you see, sir, the list of the variables on the left-hand side?
A. Yes, sir.

Q. What are those variables?
A. Those are the contaminants that were analyzed for.
Q. And across the top there is a listing of factors. Do you see that?
A. Yes.
Q. And it appears to me it goes factor 1 through factor 5; is that right?
A. Yes.
Q. What are those factors?
A. Those are the principal components that we've been talking about, principal component 1 and principal component 2 that would correspond to factor 1 and factor 2 in this run.
Q. Okay. Now, beneath each factor is a long number that begins with a decimal; correct?
A. That's correct.
Q. And those numbers are loading values; is that correct?
A. These particular ones here are correlation coefficients. If you -- under the no rotation, they're actually directly proportional to the coefficients or the loadings that we actually use. So it's a number similar to this and the order would be the same but these aren't the numbers that are actually used in the final analysis of the component score.
Q. Now, Dr. Olsen, with respect to the factors, factor 1 through 5, the computer does not identify those as poultry; correct?

A. No, that's right.
Q. This is not a situation where you feed a bunch of chemical data into a computer and it prints out the word poultry as a source; correct?
A. That's correct.
Q. Now, let's go back a little further in the documents to the percent variance page. Can you find, Dr. Olsen, in the materials I've handed you, the page that shows the percent variance? You're familiar with that term?
A. Yes.
Q. And we'll pull it up on the screen so that Your Honor can see it. Sir, now, the computer generates a value for each factor amongst this data that was analyzed in terms of percent variance explained; correct?
A. Yes.
Q. I think you told me in your deposition that this is what you look at in making a determination about chemical signature; correct?
A. I said that was one of the factors. You remember I said the overriding factors was to try to keep as many as parameters possible and still explain a maximum percent of the variance.
Q. Right, but percent variance, the higher the percentage, the more comfortable you are with the idea that the factor described explains something in the data; correct?
A. As long as you have enough parameters in there. So

there's those two things you have to weigh back and forth.
Q. Sir, how many parameters were on this run of your PCA analysis?
A. Nineteen.
Q. And again, sir, on this page of the output, the computer doesn't identify factor 1 as poultry and factor 2 as point sources. Those are your determinations; correct?
A. That's right.
Q. You, Roger Olsen, look at these statistics and you decided to call principal component 1 the poultry signature; correct?
A. No, as I explained yesterday, I did several things. I ordered the factor scores so it isn't these statistics I looked at. And I also compared the signature or all these variables to known waste compositions.
Q. But those are your determinations, not the software's determination; correct?
A. Yes, and that's exactly what I tried to say yesterday.
Q. And your determination as to whether factor 1 is a poultry signature or something else is one that you make using your own judgment; correct?
A. That's correct.
Q. You decided, did you not, sir, that principal component number 1 in your PCA runs represents a source of contamination as opposed to just normal variation in the data; correct?
A. That's correct.

Q. You decided that principal component 1 represents a single non-point source of contamination from poultry litter rather than a combination of different sources; correct?

A. That's correct.

Q. Sir, have you subjected those conclusions regarding your interpretation of these results as indicating a poultry signature to the formal peer review process to allow scientists other than those retained by the Motley Rice Law Firm who are experienced in interpreting PCA results to evaluate the soundness of your methods and conclusions?

A. You mean like to a journal or something like that?

Q. Yes, sir.

A. No, we haven't at this time. We plan to do that.

Q. Dr. Olsen, out of all the scientists in the world who have studied water quality in areas where poultry production occurs, you're the only one, aren't you, sir, who holds the opinion that the list of parameters that we saw in your direct examination constitute a poultry signature?

A. Well, that poultry signature is specific to this basin and I'm the only one besides other scientists in our company and one outside reviewer that's looked at this. So no other people outside the group or our scientific reviewer has seen this, so no one else has made that conclusion.

Q. You recall being asked these same questions in your deposition, sir?

A. Yes.
Q. Okay. Let's look at what you said in your deposition.
Cassie, I want to play two clips back to back, if I can, sorry. Page 120, lines 13 through 18 and page 121, lines 3 through 122, line 2?
(An excerpt of the videotaped deposition of Roger Olsen was played.)
Q. "Are you aware of a single other scientist in the world who claims to have identified this list of 25 constituents and the coefficients that you've developed and called that a signature for chicken litter influencing water?
A. "I'm not aware of any, no."
MR. GEORGE: Play the next one too, please.
(An excerpt of the videotaped deposition of Roger Olsen was played.)
Q. "Dr. Olsen, how long have scientists and governmental bodies been studying the potential impact of poultry litter on water quality in the United States?
"MR. PAGE: Object to the form.
A. "I don't know the exact data. I'd have to go back and look at some of the literature sources.
Q. "Do You agree that work as been ongoing for at least decades?
"MR. PAGE: Object to the form.
A. "I think it just most recently -- I don't know if it's

been going on for decades. I can't determine that. It's certainly gotten much more scrutiny in the last few years.

Q. "And during all the length of that study by scientists from other firms and government regulators, no one other than yourself has identified this 25 list of parameters in certain concentrations as a chemical signature for poultry litter; is that true?

"MR. PAGE: Object to the form.

A. "That's my unique work to develop that signature. It's just like no one has ever developed a qPCR for chicken litter. We did it and we did get a signature too."

Q. (By Mr. George) Dr. Olsen you were here during the examination of Secretary of the Environment Tolbert?

A. No, I was not.

Q. You were not here for that, okay. Were you here for opening statements?

A. No.

Q. You are aware, are you not, sir, that the Illinois River Watershed and in particular water quality in the Illinois River Watershed has been the subject of numerous reports from universities and government agencies for at least the last 20 years?

A. Yes, I'm aware of some of those studies.

Q. Sir, and have you seen in any of those studies a suggestion by any of the authors that they believe that the

list of components on Plaintiffs' Demonstrative 455 which you have described as your poultry signature for chemical -- I'm sorry, your chemical signature for poultry is a reliable way of identifying poultry litter applications as the source of contamination?

A. No, no one has ever looked at such an extensive list before.

Q. Well, have any of the authors in the studies that you've seen suggested that a combination of zinc or potassium or total dissolved solids, total organic carbon, aluminum, sulfate, alkalinity, that those things are indicative of contamination from poultry waste?

A. Certainly there's been many suggestions that many of those parameters related to poultry waste --

Q. Sir, my --

A. -- but no one has ever identified that unique combination of 25 that I did.

Q. Let's talk about the unique combination of 25, sir. Do you see on the screen the list of principal components?

A. Yes, I do.

Q. And the one on the left-hand side, principal component 1, is the list of parameters that you believe in various concentrations are a chemical signature for poultry litter; correct?

A. That's correct.

Q. Sir, is total organic carbon unique to poultry litter?
A. No, it isn't.
Q. You find total organic carbon everywhere in the environment, correct?
A. In varying concentrations you find it, from very small to very large --
Q. Would you find --
A. It happens in chicken waste it's a huge amount.
Q. Sorry, didn't mean to cut you off. Do you find total organic carbon in soils?
A. Yes, you do.
Q. Copper, you find copper in soils; correct?
A. Yes, you do but it's, again, the amount. We find so much more of it in the wastes than we do the soils.
Q. Sir, with respect to this list that is in front of you, are any of the 25 components that you used in your analysis unique to poultry litter?
A. No.
Q. Sir, are every one of these components found in other sources that are known to exist in the basin in varying concentrations?
A. Most of those would be -- well, again, you have to determine detection limits. Like for cow, essentially there's -- or a wastewater treatment plant, there's essentially no arsenic and no copper. So there's some there, but you just

can't detect it. And then compared to, of course, poultry waste, those are very, very large numbers. So when you say if it's present or not, you really have to talk about an analytical detection limit. So some of these would not be present in other wastes.

Q. Which ones would you not find in another waste in this watershed?

A. Well, there's always some, but many of the analyses I've seen from wastewater treatment plants for like arsenic are below detection limit. Same for either zinc or copper.

Q. Let me stop you because I think maybe you are answering a different question. Are there any of these that you would not find detectable in at least one source other than poultry litter that's present in this watershed?

A. Well, by source you're meaning everything?

Q. Everything.

A. I'd have to review but, again, some of the trace metals, you would find those in soils, of course, but particular waste, you may not find some of these trace metals. I'd have to review all those other sources which I haven't reviewed all those other sources. I've reviewed wastewater treatment and cattle.

Q. Dr. Olsen, soils are a source of contaminants in the water in the Illinois River Watershed; correct?

A. They run off with it, with the -- when you have runoff,

the soils are incorporated. But it turns out that those trace elements that are in the soils are not soluble, whereas in poultry waste they're very soluble and that's why we find them.

Q. Dr. Olsen, one of your parameters that you have identified as part of your unique signature for poultry is calcium; correct?

A. Yes.

Q. Sir, were you here when Dr. Fisher testified?

A. For part of that.

Q. Did you hear Dr. Fisher describing the limestone that underlies much of the Illinois River Watershed?

A. Yes.

Q. And what is limestone composed of, sir?

A. Calcium carbonate.

Q. If you look at your list of components, there are three different types of phosphorus, are there not, in your signature?

A. One point on the calcium, it's negatively related to the signature.

Q. Sir, if you could stay with my questions, your counsel will follow up with you. And I've only got limited time, so I don't mean to be rude at all but I do want to get through what I can. With respect to phosphorus, Dr. Olsen, there are three different types of phosphorus in your signature; correct?

A. That's correct.

Q. One of them, total phosphorus, is a combination of two of the others; correct?
A. Not a direct combination of the others.
Q. Well, phosphorus SRP and dissolved phosphorus would be two of the things that go together to comprise total phosphorus; correct?
A. What was that again, SRP is soluble reactive.
Q. Dissolved phosphorus.
A. Those two don't add up to give you total there. They're different.
Q. Are they included in total phosphorus?
A. The total up here, they're included in that, yes, sir, but they're different.
Q. You included nitrogen in your chemical signature for poultry. Nitrogen is found naturally in the soils; correct?
A. There's several forms of nitrogen I've included. And it depends on what form you are talking about, but it's found in soils.
Q. I'm talking about the form in your signature.
A. Well, the one that's found in the signature that's most prevalent is total Kjeldahl nitrogen, that's both organic nitrogen plus ammonia. That's a specific type of nitrogen. And again, that relates to the signature of what type of nitrogen you find in the various components.
Q. That type of nitrogen is found naturally in the soils,

correct?
A. In some soils, yes.
Q. In the soils in the Illinois River Watershed, you know that to be true, don't you?
A. There is some organic nitrogen in some soils.
Q. Sir, potassium is found naturally in the soils in the Illinois River Watershed; correct?
A. That's correct.
Q. Now, sir, you collected litter samples and you had them analyzed for a lot of things beyond the 25 that are on your list; correct?
A. That's correct.
Q. You know, do you not, sir, that nickel is found in poultry litter?
A. There's some concentrations of nickel in poultry litter. I'd have to look up those exact --
Q. Isn't it, in fact, true, Dr. Olsen, that you detected nickel more commonly in the environment than you did many of the things you've included in your signature?
A. I don't think that's true. I'd have to go back and look at the data.
Q. If nickel is in poultry litter, why is it not in your poultry litter signature?
A. Again, this is -- this signature is based on actually what leaches from the field and what gets into the environment. If

it didn't show up in the actual water samples, it wouldn't be part of the poultry signature.

Q. So what happens to the nickel?

A. It doesn't leach into the water.

Q. Nickel doesn't move from a field that's received poultry litter, but you believe the aluminum does?

A. In some cases, yes. It depends on what is tied up. But the nickel is a very, very small concentration, if I remember correctly, and it isn't a parameter that would be a significant contributor to the signature. We're looking at significant contributors here.

Q. Dr. Olsen, poultry litter also contains chromium, lead and molybdenum. Too many consonants in it.

A. Yeah, and we looked specifically at those. And even though they contain it, they contain it at very small quantities in cases that are not much different from natural soils, sometimes littler than natural soils. So it wouldn't contribute to a signature at all and that's why they aren't in here.

Q. Your chemical signature for poultry litter includes some things that aren't even chemicals; right?

A. There's some bacteria in there.

Q. Even beyond bacteria, there are just some physical properties in your list; is that correct?

A. I don't see any. Maybe you can point one out to me.

Q. Let's try alkalinity. What is alkalinity, Dr. Olsen?
A. It's a measure of specific chemicals.
Q. Isn't alkalinity the capacity of water to neutralize acid?
A. Well, no, that's one definition. Here the alkalinity is defined as how much carbonate and bicarbonate you have in the system which are chemicals. But you're right, it's a titration, but it's a titration of chemicals usually defined as how much carbonate and bicarbonate you have. So it's a chemical signature.
Q. You consider alkalinity to be a chemical property as opposed to a physical property?
A. Certainly. It's a titration. As you said, That's a chemical property.
Q. Dr. Olsen, you testified earlier -- we're going to pull up State's Demonstrative Exhibit 467, Dr. Olsen. You testified from this on direct examination. We'll put it on the screen and then and I'll ask you a question about it.
MR. PAGE: Your Honor.
THE COURT: Yes, sir.
MR. PAGE: Just for the record and anticipating on the issue of the supplemental data. We prepared for the defendants both groups depending on how the Court would rule, so there's an A group and a B group on these exhibits. And Dr. Olsen actually testified yesterday to 466 which doesn't have the supplemental data.

MR. GEORGE: Let's go to 466.

THE COURT: Thank you.

MR. GEORGE: Thank you, Mr. Page.

Q. (By Mr. George) Do you recognize State's Demonstrative Exhibit 466, Dr. Olsen?

A. Yes, I do.

Q. If I understand your testimony on direct examination, these are the percentages in the samples that you used in the principal component analysis where you believe you have detected the chemical signature for poultry; is that correct?

A. One clarification on this. This is by location, not by samples.

Q. Okay. So Dr. Olsen, with respect to the edge of field samples 100 percent, and the groundwater samples 60 percent, those percentages do not include the 2,000 samples that were excluded from your principal component analysis; is that right?

A. They only include the samples that have enough parameters to do the principal component analysis.

Q. I believe you testified yesterday that was about 620; correct?

A. 621, yes, for this set.

Q. So the remaining samples, approximately 2,000, you could not find enough of the parameters on your list in those samples to make them useful in the PCA analysis; is that correct?

A. Well, most of those samples, a lot of those samples are

not water samples. So the poultry waste, the soils, the sediment you have to take out right away. And the others were designed for a less set of parameters. We did not analyze all those samples for the extended list of parameters. So there's a reduced list here that we can use and that number is approximately 621.

Q. Dr. Olsen, if we factored back in the 2,000 samples where you didn't even have enough of your parameters to run the PCA, what would your percentages on this chart look like?

A. You couldn't do the analysis, sir. You have to -- the PCA blows up or doesn't work when you have holes in it. That's why we have to select the list that we do and make some rules.

Q. Well, sir, if a given sample does not even have enough of the parameters to allow the PCA to analyze it, isn't that an indication that the chemical signature that you believe you've identified from poultry is not in that sample?

A. No, that's not correct at all. You misunderstand what we are doing here.

Q. You think that on the samples where you don't even have, for example, phosphorus and aluminum detected, that even though those are components of your signature, that the chemical signature still might be present in those samples?

A. Yes, if we had analyzed the complete suite of parameters, we would have had much -- a lot of those -- about the same percentages, I would say, of all those samples would have had

the chemical signature. It's just that some of those samples were not analyzed for the complete list.

Q. Why not?

A. Well, one of the reasons is that we were trying to -- remember yesterday I described setting up stratified sampling designs. And one of the things I talked about was collecting over 200 samples just for indicator parameters like phosphorus and nitrogen. And from that set, then we did a stratified design and picked a subset of samples where we could do all the analysis. So the analysis that we did for the complete analysis were set up on a -- surface water were set up on the stratified random designs that I collected yesterday. It's just impossible cost-wise to actually analyze for that many parameters and that many samples. So we created a scheme where we had a representative set where we analyzed for all the parameters.

Q. Dr. Olsen, let me refer you to State's Demonstrative Exhibit 459 which is a chart that you prepared. You'll recognize it when it comes on the screen, I suspect. Do you recognize that chart, sir?

A. Yes, I do.

Q. You prepared that; correct?

A. Yes, I did.

Q. And if I understand it, the point of this chart is you're comparing concentrations in poultry litter of various

constituents with literature values for cattle; correct?
A. Well, there's a couple of things. First of all, I just compared the actual waste analysis with the signature, poultry waste analysis from the basin, so that's the first column. And I actually compared those numbers to literature poultry waste. And the last column that you are referring to is comparison to literature values for cattle waste if I could find values.
Q. Let's talk about the first piece of that. You said you are comparing the poultry litter samples with the principal component coefficients on the left-hand side; is that right?
A. That's correct.
Q. Sir, the two things you are comparing are not the same, are they? The thing on the left-hand side, principal component 1, is a coefficient; correct?
A. Yes, I'm comparing the relative concentration and the size of the bars to make sure that that pattern and the most important bars are consistently -- those parameters are consistently found in the poultry waste. I'm not comparing coefficients to actual concentrations.
Q. Sir, the bars on the left-hand side are not concentrations, are they?
A. That's right.
Q. Okay. So the longer the bar, for example, for copper, does not mean that in order to be a match with your signature, you have to have a greater concentration of copper than you do,

say, barium. That's not the way this chart works, is it?
A. Well, somewhat. No, it doesn't work that way at all. But the longer the bar, the more important that parameter is. So we need to make sure that all those are present in poultry waste.
Q. But, Dr. Olsen, the way the software works, even a constituent with a small concentration could be very important to the signature; correct?
A. That's typically not the case because all those relationships -- and some of them are relatively small to others because you're right, they are all related, but they all should be present in poultry waste.
Q. They should all be present. Is that all it takes to qualify?
A. No.
Q. Dr. Olsen, let's take an example here. Organic matter in poultry litter, you've listed it at 730,000 milligrams per kilogram; correct?
A. That's correct.
Q. Now, copper which is next, the second most important one on your list is not the second highest concentration, is it?
A. No.
Q. It's 420 milligrams per kilogram?
A. Yes, yes.
Q. Correct. Now, let's move over to the literature for

cattle waste. Why were you relying upon the literature as opposed to actual samples?

A. We didn't collect any actual samples and analyze them.

Q. Well, you collected cattle manure samples, didn't you?

A. Just for PCR.

Q. Well, but you had cattle manure in your possession. You could have sent it to a lab and had it analyzed for all of the things that you believe are indicative of your signature for poultry litter, couldn't you?

A. That's correct.

Q. You chose not to do that?

A. No. At that time, those samples weren't big enough to analyze for all these parameters and they were specifically collected for PCR.

Q. Now, Dr. Olsen, there are several rows in the column for your literature cattle waste that have a line in them. What does that mean?

A. And they're white. That means I couldn't find a literature value for that particular parameter.

Q. Did you search hard for literature values?

A. I did not do an exhaustive search. I was just trying to do a comparative analysis to see if there was a difference.

Q. Why wouldn't you do an exhaustive search?

A. Well, the fact is, sir, that if the PCA identifies a different signature and we know from this it's different enough

that it will give a different signature, we would see it in the basin. So the real proof of identifying sources is what signatures you see in the actual samples from the basin.

Q. Dr. Olsen, when you say we see in the basin, you mean you, I see in the basin; correct?

A. Yes, with input from the other experts, yes.

Q. Dr. Olsen, you know, do you not, that cattle manure contains E. coli, Enterococcus and total coliforms?

A. Yes, I'm aware of that and I haven't made any statement that it didn't.

Q. And after $6 million worth of work in this case, you couldn't find a single piece of literature that reported the concentrations of E. coli, Enterococcus and total coliforms in cattle manure?

A. Again, I didn't do an extensive list. I'd be glad to get any literature and add that to this list, if we can.

Q. Well, did you consult with Dr. Teaf to see if he had any literature on the presence of bacteria in cattle?

A. No, I didn't.

Q. Were you aware that Dr. Teaf had performed computations as to the number of fecal coliform bacteria in cattle?

A. I was aware that he was doing some computations on that.

Q. Let's go down to phosphorus, soluble reactive phosphorus and soluble phosphorus. You know, do you not, sir, that cattle manure contains soluble phosphorus?

A. Yes, it does, but I couldn't find a value for that in the literature.
Q. After all the money that you've been paid and all the time that you've spent on this case, you couldn't find literature that would report a value for soluble phosphorus for cattle manure?
A. Yes, I didn't do an extensive list or an exhaustive list of trying to find all these parameters.
Q. Dr. Olsen, who did your search for you?
A. I had our librarian do the search for waste, cattle waste analysis and she did a computer search for that.
Q. Did you explain to that librarian that you were going to present this information to a federal court and that you needed it to be as complete as possible?
A. She did -- I told her what to search for and she searched all the journal articles available and all the databases she could find to do this.
Q. Dr. Olsen, you also collected samples of human waste from septic tanks as part of your work in this case; correct?
A. I did not collect those. Those were collected for the PCR analysis.
Q. Did somebody working with your company, Camp Dresser & McKee, collect samples of human waste from septic tanks?
A. Actually those were collected by staff from Lithochimeia.
Q. But you're the technical director, you knew that work was

ongoing; correct?
A. Yes, sir.
Q. Did you take those samples and have those samples analyzed to determine the presence, absence and concentration of the 25 parameters that you are using in your chemical signature for poultry?
A. No, we did not.
Q. Why not?
A. At the time, that was -- the program was designed specifically for qPCR.
Q. Dr. Olsen, who actually set up your computer program and all of the statistical language and macros that's involved with that to run the PCA analysis?
A. Dr. Rick Chappell.
Q. Dr. Rick Chappell is no longer with your firm, is he?
A. No, he is not.
Q. Sir, let me hand you what we've marked as Demonstrative Exhibit 34 which is, sir, a treatise entitled Introduction to Environmental Forensics. And I'll ask you to take a moment and look through that. The listed author is Brian Murphy and Robert Morrison. Sir, have you ever had occasion to consult this particular treatise?
A. No, I have not.
Q. I'm going to read some statements out of it and just ask -- that discussed PCA and some of its limitations and ask

whether you agree with them. Let's start, if we can, on page 5 -- it's listed 510, the summary section.

MR. GEORGE: And by the way, for the record, Your Honor, what I put in front of the witness and I provided a copy, of course, to counsel for plaintiffs, is the cover page, the copyright page, and then this is actually a multi-chapter treatise. I've included the chapter on principal component analysis which is Chapter 12.

THE COURT: Yes, sir.

Q. (By Mr. George) Do you see at the bottom of page 510 in the summary section on principal component analysis, sir, the very last paragraph. There should be some highlighted language in your copy, is there?

A. There's two highlights, which are you referring to?

Q. Let's talk about the last one first. Let me read it and I want to ask you if you agree with this. "PCA, the earliest of the procedures discussed in this chapter, works best in simple cases where there are few sources contributing to the system and there's limited mixing between sources. If an initial PCA indicates the presence of mixtures, it is usually best to move to a data analysis method capable of resolving the nature of that mixture." Do you see that?

A. No, I don't see where you are reading at all, sir.

Q. Sorry, it's on the screen, it be highlighted. Let me look at your copy to make sure you have one that's highlighted.

Yours is not highlighted for some reason.
A. I didn't follow you at all there.
Q. Let me do it again, I want you to follow me. I want to read it and it should be on your screen highlighted, Dr. Olsen. It might be easier to look at your screen. "PCA, the earliest of the procedures discussed, works best in simple cases where there are few sources contributing to the system and there is limited mixing between sources. If an initial PCA indicates the presence of mixtures, it is usually best to move to a data analysis method capable of resolving the nature of that mixture." Do you see that?
A. Yes, I do.
Q. Do you agree with that statement?
A. Let me read that again. Let's see. Works best for simple cases where there are few sources contributing to the system. Again, we only have a few sources here contributing to the system. I wouldn't say it's a simple case. I think PCA works for these very complex cases. And there is limited mixing between the sources. Actually, we didn't find a lot of mixing between the sources. It was very clear when we had mixing and when we didn't and we could identify that mixing. And overall, there was limited mixing of the sources in our analysis and that's very clear when we did the PCA scores on everything and compared scores 1 and 2.
Q. Dr. Olsen, so if I understand what you've just said, you

believe that the Illinois River Watershed is a system which only receives input of the things on your list of parameters from a few sources, two?

A. No, there's three major sources out there and we were able to identify two. And we were able to identify when those two sources mixed together and we see that out there frequently. There is a third source, cattle source. We were able to identify specific samples of where that was and those few specific samples were mixed with the other samples. So I would say there was limited mixing overall and we could identify where that was.

Q. Dr. Olsen, if you could turn back a few pages to page 464 in this treatise. There should be a highlighted paragraph which I'm going -- we can read it all, but I'm interested in some particular things. You'll see it on your screen, Dr. Olsen, but I'll certainly give you time to find it in your paper, too. Do you have page 464 in front of you?

A. Yes, I do.

Q. Do you see the first paragraph?

A. Yes.

Q. I'm going to read some portions of that paragraph and then ask you whether you agree, sir.

"Regardless of the data analysis strategy chosen, another important consideration is the presence of bad or questionable data. Common problems with environmental chemical

data include the following: Chemical analysis performed by different laboratories or by different methods which may introduce a systemic bias, the presence of data at concentrations at or below method detection limits, the presence of coelution, the ever-present problem of error in data entry, data transcription or peak integration."

And Then dropping down, sir, to the first two sentences of the second paragraph. "Unfortunately such errors rarely manifest themselves as random noise. More often, they contribute strong systemic variability. If unrecognized, the result may be a derivation of 'fingerprints,' which have little to do with true sources."

Do you see that language, sir?

A. Yes, I do.

Q. Do you agree with that as a description of the problems associated with bad or highly variable data used in a PCA analysis?

A. With bad data, not with -- with bad data, not with high variability data. I mean, you're looking for data that has a lot of variability.

Q. Poor term on my part. What about biased data?

A. Yes, and all these four things that are listed here, we checked very carefully in our analysis when we did them.

Q. Dr. Olsen, there were multiple laboratories who ran analysis that the results of which were used in your PCA;

correct?
A. Yes, but those laboratories were always doing the same set of analysis, sir. So there wasn't like a variety of labs doing the same analysis. So the same lab did all the different analysis so it's --
Q. Sir, your counsel will give you a chance to elaborate. Please answer my question so my time is not all consumed. Dr. Olsen, how many laboratories were involved in the results that you used in your PCA analysis?
A. Three.
Q. Okay. Just three?
A. Yes, one for the bacteria, one for the phosphorus and one for all the other parameters, that's just three.
Q. Can you list those three labs for us?
A. Yes, Environmental Microbiological Laboratories did the bacterial analysis, Aquatic Research did the phosphorus analysis, and A & L did the rest of the analysis, all the metals and the general water quality parameters.
Q. Sir, you left out FoodProtech, did you not?
A. Yes, I left out -- they did some analysis up front, but because they had bad data, we dropped them very quickly.
Q. How quickly did you drop the FoodProtech data?
A. Oh, that was within probably a half a year after we started, five or six months. So there is some FoodProtech data left in our analysis and I forgot to mention that, I'm sorry,

but it's a very small amount.
Q. Even after the problem with FoodProtech was identified and their bacteria data was rejected by Dr. Harwood, you continued to use the results of samples run by FoodProtech in your PCA analysis; correct?
A. No, that's not correct. She did not reject all the data. In fact, at her suggestion they actually changed one of their procedures. So after that time, there was some good data and there was only two or three of the actual analyses out of the seven they were performing that she actually rejected.
Q. You're continuing to use FoodProtech data in your PCA analysis?
A. Just the valid data is all that we're using, sir.
Q. When did Dr. Olsen determine that the bacteria data produced by FoodProtech was invalid?
A. I did not determine that.
Q. I'm sorry, when did Dr. Harwood determine that?
A. I can't remember. We got her involved early, but I think it's consistent with what I said. It was still the first year that we were sampling. And I'd actually started to use EML so we had some comparison. So it was probably in late 2005, sometime in that time frame, mid 2000 -- to autumn 2005.
Q. Sir, you said you testified that you dropped the FoodProtech data from the PCA analysis that had been rejected by Dr. Harwood; correct?

A. Yes, I did for the most recent runs.
Q. Sir, how many PCA runs in support of your chemical signature analysis did you perform with the rejected FoodProtech data still in there?
A. There were a substantial number until I discovered that some of that rejected data was still there.
Q. Let's quantify. You're up to PCA run 9 today; correct?
A. I don't have any recollection what you mean by PCA run 9. There's been lots of runs and we didn't number them like that.
Q. Do you quarrel with the notion that you've run your PCA at least nine times?
A. We've run it -- no, we've run it hundreds of times, sir.
Q. So you ran your PCA database analysis hundreds of times?
A. Yes.
Q. With the FoodProtech rejected data?
A. No, I didn't say that. I said overall we've run it that many times.
Q. Well, sir, you just pulled out the FoodProtech data about two weeks ago; correct?
A. Yes, and we've done substantial runs since that time to verify that everything was still valid.
Q. Have you run it hundreds of times since then?
A. No, I didn't testify to that, sir.
Q. And every time that you ran that PCA analysis with the rejected FoodProtech data in it, you saw the chemical signature

for poultry, didn't you?
A. Yes, I did.
Q. Sir, one of the other factors listed as problematic by the authors of this treatise is the presence of data at concentrations at or below method detection limits. Do you see that?
A. Yes, sir.
Q. You had difficulty in this case, did you not, sir, with samples that reported consistently some of the constituents used in your PCA analysis at or below the detection limits?
A. I don't know what you mean by the word difficulty. I mean, that's an expected result. There were results with --
Q. A lot of the data that you were working with in your analysis included samples that had reported values below the detection limits for the things included in your poultry signature; correct?
A. No, we eliminated most of those parameters that had mostly non-detects. So you can't run a PCA if you have all non-detects. The program won't run at all because there isn't any variance in the data, so we had to eliminate all those.
Q. You eliminated them from what you ran through the PCA but they're still present in your environmental sampling data; correct?
A. Yes.
Q. And, sir, doesn't the presence of all of those samples

with values below the detection limit or unquantifiable for the things listed in your poultry signature cause you some concern about suggesting that that is a poultry signature?

A. Sir, I don't think you quite understood because your question contradicts itself. Those things aren't in the poultry signature that had all non-detects or a large percentage of non-detects.

Q. Let's go to page 510. Do you see the other highlighted paragraph on the screen, it's actually two sentences. Second paragraph under the summary 12.4?

A. Yes, sir.

Q. I'm going to read it and then ask you if you agree. "All of the methods discussed," which include, of course, the PCA, "can produce spurious results when faced with bad data. A single highly aberrant measurement can significantly disrupt the variant structure of the data." Do you see that?

A. Yes, sir.

Q. Do you agree with that statement?

A. "All methods discussed can produce spurious results when faced with bad data." That's right and we eliminated the bad data. "A single highly aberrant measurement can significantly disrupt the variant structure of the data." That would not be the case in our data structure to have a singly high value because we have over 620 values. So one single value would not disrupt the variant structure of the data in our case. If you

had a smaller data sample, it may.
Q. Sir, you had some aberrantly high measurements for bacteria, did you not, in the data that you ran through the PCA?
A. I wouldn't call them aberrantly high. They were high values, but they were measured values.
Q. Let's approach it this way. Many of the values that were included in your PCA analysis for, for example, total coliforms were above the reportable quantity from the lab; correct?
A. Did you use the word many?
Q. Many.
A. No, not many.
Q. Several?
A. Some, yes.
Q. You don't believe those high values that the lab cannot even quantify for naturally occurring total coliform would be disruptive to the PCA analysis?
A. No, not at all.
Q. Sir, we went through the exhibit earlier that shows the statistical output. Users of PCA analysis often prepare charts that allow them to better understand and interpret the statistical data. Do you agree with that?
A. Yes, sir.
Q. You're familiar with some of those charts?
A. Yes, sir.

Q. I believe you testified in your deposition that you really didn't look at charts, that you looked at the raw data; correct?

A. No, that's not correct. We were talking about some specific outputs. And I said for those specific outputs, that I had not looked at the charts for those specific outputs.

Q. Let's get Demonstrative Exhibit 33 on the screen, please. Dr. Olsen, you identified some materials on PCA analysis in your production in this case. And you'll note at the bottom of this exhibit I've referenced where I pulled this chart from, which is an article that you produced. It's got your Bates number on it by someone whose name I can't pronounce, I'm quite sure. Dr. Olsen, what is this?

A. This is a plot of PC 1 versus PC 2, principal component 1 versus principal component 2.

Q. It's a factor score plot?

A. I can't tell whether this is a factor score or a coefficient plot, but it would tell the same type of information.

Q. Sir, did you plot your factor scores and compare PC 1 to PC 2?

A. Yes, I did.

Q. You did it like this?

A. Yes, sir.

Q. Did you produce those, sir?

A. Those were -- could have been produced from the data that I gave you, if you wanted to.

Q. Did you produce the charts?

A. No, I did not produce those. I produced the raw data that gives you these exact values that could have been plotted.

Q. Sir, are the distribution of your factor scores on the charts that you created and looked at but didn't produce, are they important to your determination of whether a poultry signature exists?

A. I looked at the raw scores, and I also looked at the plots of where they did similar plots to these.

Q. What should this chart look like if there's a strong signature in the data?

A. You have distinct groups of samples and that's exactly what the results did when I looked at them from this particular --

Q. You believe, Dr. Olsen, if I understand your testimony, that if I take your factor scores and I plot them in this format, I'm going to find distinct groups?

A. Yes, definitely.

Q. Okay. Sir, you may or may not have seen it but there have been some slides presented in this case discussing the diseases of Campylobacteriosis and Salmonellosis. Are you familiar with those diseases generally?

A. Just generally.

Q. You understand that's one of the health risks that the State is claiming may be present from water that receives influence from poultry litter?
A. I do not know that for sure.
Q. Sir, does your poultry signature include Campylobacter?
A. No, it does not.
Q. Does your poultry signature include Salmonella?
A. No, it does not.
Q. So under the analysis that you've done, sir, your signature for water supposedly contaminated by poultry litter would not include either of those two elements?
A. That's correct.
Q. So under your signature, finding Campylobacter or Salmonella in the waters of the Illinois River Watershed is not suggestive of contamination of poultry litter, is it?
A. I don't think that you could make that conclusion.
Q. It's not in your signature; correct?
A. It's not in the signature.
Q. Your signature is supposed to tell us what water contaminated by poultry litter would look like; correct?
A. Well, what we would want to do is compare our poultry signature to where those Salmonella were found and see if the poultry signature was in that sample, like we did with the exceedances of bacteria.
Q. Let's go back to Demonstrative Exhibit 455, State's

demonstrative exhibit. It shows your list of parameters?
A. Yes.
Q. Sir, the only bacteria in your signature for poultry litter is E. coli, fecal coliforms, Enterococcus and total coliforms; correct?
A. That's correct.
Q. You know, do you not, sir, that all four types of those bacteria are found in cattle manure?
A. I don't know that for sure but I suppose they are, yes.
Q. You know, do you not, sir, that all four of those types of bacteria are found in human waste deposited in septic tanks?
A. Probably so.
Q. You know, do you not, sir, that all four of those bacteria are included in the feces of wildlife that live in the Illinois River Watershed?
A. I do not know that for sure.
Q. You don't know that?
A. No. I'm not a bacteria expert.
Q. All right. Dr. Olsen, does your signature allow you to identify -- strike that. Let me approach it this way. Dr. Olsen, your signature does not allow you to identify any farm contracting with Tyson Foods, George's or any other defendant represented in this courtroom as a source of any area of water contamination in the Illinois River, does it?
A. You mean does it allow me to identify a specific farm?

Q. A specific farm under contract with one of the defendants.
A. No, I've not been asked to do that.
Q. Does it allow you to identify a specific defendant?
A. No, I've not been asked to do that.
Q. Going to Demonstrative Exhibit 461, State's Demonstrative Exhibit 461. Dr. Olsen, you prepared this map; correct?
A. That's correct.
Q. And I didn't quite follow this, so I want to discuss it with you. In your direct examination, there was some attention drawn to the green dots outside of the Illinois River Watershed.
A. Yes, sir.
Q. Do you recall that?
A. Yes, sir.
Q. And I think you described those as control areas; is that right?
A. There's three green dots. There's one right above the basin, that's Spring Creek. And there's two below the basin, far below the basin, not that far, kind of on the county line there that are Little Lee Creek. And there's a green dot that can't be shown here because it's Dry Creek, it's in the Buffalo Creek area. Those are the reference areas for surface waters. Those other three happen to be springs that were collected. I didn't really associate those were reference areas. Again, they were just trying to collect all the springs. So those are

the kind of three little dots there too. So there's those primary unimpacted areas is the right word for those, unimpacted with poultry waste.

Q. Okay. And Dr. Olsen, what was the purpose of collecting samples there and applying your chemical signature analysis to them?

A. Well, we always need a comparison. So we have to do some complete analysis on unimpacted areas too, so we know what unimpacted areas look like too. So we selected these three areas outside the basin. We also tried to find areas within the basin and found at least two that were minimally impacted and I used those as references too within the basin.

Q. Let's go to your affidavit. Pull up his affidavit.

MR. GEORGE: Your Honor, may I approach the witness?

THE COURT: Yes, sir.

Q. (By Mr. George) Dr. Olsen, I'm going to come stand by you for just a moment. Do you recognize this affidavit which was attached as Exhibit 15 to the State's preliminary injunction motion?

A. Yes.

Q. And if we can turn to paragraph, I think it's 9 in your affidavit, can you read the very last sentence, please?

A. "This signature is not present in samples collected from streams and rivers in an area where -- with no poultry waste disposal."

Q. I'm told if I don't give it back, I'll be in trouble. Can I have that back? Dr. Olsen, is that statement supported by this work that you did outside of the watershed, are those two things connected?

A. Yes.

Q. So when you were saying in your affidavit that you can't find the signature in places where poultry is absent, you were referring to these reference areas; is that right?

A. Yes, both within and without, within the basin and outside the basin.

Q. Now, which watershed is this one down in the bottom, did you say that's Lee Creek watershed?

A. That's the name of the stream, Little Lee Creek.

Q. Okay. And sir, if I understand, you selected the Lee Creek watershed as a control watershed because you believe it had no poultry in it?

A. None or very little that would have a significant impact, that's correct.

Q. How many would be significant?

A. I don't know. We, again, tried to do the same thing within the basin. We tried to get a minimal amount of chicken houses in those particular basins.

Q. Let's talk about the Lee Creek Watershed. Is it smaller or larger than the Illinois River Watershed?

A. It's smaller.

Q. Okay. It's one of the smaller --
A. Yes.
Q. -- smaller watersheds. And you say that you collected samples from the Lee Creek Watershed and you can't see the poultry signature there; correct?
A. Yes.
Q. Okay. You believe that validates your analysis because if there's not poultry there, you wouldn't expect to see a poultry signature; correct?
A. Well, there was three reference areas and then another two within the basin. So there's five different areas I looked at all together.
Q. Dr. Olsen, I'm going to hand you what's been previously marked and admitted subject to the stipulation as Defendants' PI Exhibit 188. I'll give you a moment to look at that document which for the record is a report issued by Mr. Tolbert's office entitled The Coordinated Watershed Restoration and Protection Strategy For Oklahoma's Impaired Scenic Rivers. It's the 2007 update. Sir, can you turn to page 2 of that document? Actually, I'm sorry, it's not page 2, it's page 8.
A. Yes, sir.
Q. And you see the paragraph that's got the bullet points at the very bottom that says, "Based on inspection and oversight by ODAFF". Do you see that?

A. Yes. Yes, I do.
Q. It talks about poultry farms. Do you see that?
A. Yes.
Q. And if you go down to the middle of the first bullet point, it is talking about the Lee Creek, Little Lee Creek Watershed and it identifies two poultry operations. Do you see that?
A. Yes, I do.
Q. Sir, were you aware there were -- those two poultry operations were present in Oklahoma in that part of the watershed?
A. I do not know for sure how many there were. I know that we did aerial inspection and tried to pick our locations based on aerial inspections of where the houses were at locations that wouldn't be impacted in the Little Lee Creek. So I would have to determine exactly where these two operations were compared to where we sampled --
Q. You --
A. -- and that's why we did it by aerial analysis.
Q. I'm sorry, I didn't mean to interrupt you. Dr. Olsen, you do understand that a watershed collects, during rain events, the things that run off the surface of all of the land in that watershed; correct?
A. Yes.
Q. It all makes its way to the stream and in this case Little

Lee Creek; correct?
A. Yes, but we don't know where these two operations were. That's not very many and it could have been below where we sampled Little Lee Creek.
Q. And you sampled in Oklahoma; correct?
A. Yes.
Q. And Little Lee Creek, if I understand, runs from -- like all the rivers in this part of the state, from east in Arkansas across the border into Oklahoma; correct?
A. I don't know that for sure with Little Lee Creek.
Q. You don't know which direction Little Lee Creek flows?
A. Well, it flows that general direction. I don't know whether it flows clear across the border exactly like you said.
Q. You didn't bother to investigate whether or not Little Lee Creek receives water from Arkansas?
A. No, we were just interested in whether -- how many poultry houses and where they were located versus our samples.
Q. Well, could poultry houses in Arkansas affect water quality in Oklahoma?
A. Yes, they do, uh-huh.
Q. Let's go to the next page, page 9. This is Table 1. And above it, it's giving an estimate of the amount of litter generated in the watersheds in Oklahoma. And you'll see a reference, the third row down, to LLC which is Little Lee Creek. How many tons does ODAFF report of litter are generated

in Oklahoma in the Little Lee Creek Watershed?
A. 1,008 tons.
Q. Do you know where that poultry litter went?
A. No, in fact, I don't even know if we're talking about the same Little Lee Creek. I just know what we did for an aerial inspection to pick these locations.
Q. You're not sure if this report that relates to the scenic rivers of the State of Oklahoma issued by Miles Tolbert is discussing Little Lee Creek where you pulled your samples?
A. I'm not for sure. Again, I --
Q. Okay. I'll represent to you it does and I'm not asking you to accept that.
A. Okay, that's fine. There's a map back here I can probably check.
Q. Sir, let's go to page 11 in the report. Actually I think we were just at it. Do you see Table 3 on page 11?
A. Yes, sir.
Q. You'll see at the top of that that this is information provided by the Arkansas Natural Resources Commission for Arkansas poultry operations within scenic river watersheds. Do you see that?
A. Yes, sir.
Q. And you see Lee Creek referenced down there?
A. Yes, sir.
Q. In Arkansas, in the Arkansas side of the basin, how many

poultry houses are in Lee Creek Watershed?
A. What was your question again? Sorry, I was looking at the data.
Q. I'm sorry. From looking at that chart, can you tell how many poultry houses the Arkansas Natural Resource Commission reports for the Arkansas side of the basin for Lee Creek?
A. Is this just reporting the Arkansas side, I didn't see that?
Q. It is.
A. Well, if that's true, then it says 69.
Q. So two poultry houses reported in Oklahoma in the Lee Creek Watershed and 69 in Arkansas for a total of 71. How did you miss 71 poultry houses in your control area, Dr. Olsen?
A. Again, those may be branches to Little Lee Creek, I'd have to look back. I just remember from the aerial inspection there was not that many poultry houses or any at all in the area that we sampled.
Q. So, Dr. Olsen, poultry houses, we've heard some testimony from other witnesses in this case, are pretty easy to spot from aerial photographs. Do you agree with that?
A. That's correct, yeah.
Q. And I'm assuming you've spent some time looking at aerial photographs regarding northeast Oklahoma and northwest Arkansas as part of your work in this case?
A. Some.

Q. And somehow or another, sir, in that review and in selecting a control watershed for your PCA and sampling analysis, you missed 71 poultry houses in the control watershed that you were using; correct?

A. Well, I didn't miss those. I had someone else do that analysis for me and that was represented to me that the areas that we sampled were not -- have that much impact by poultry houses or waste.

Q. Dr. Olsen, the poultry litter generated from those 71 houses you couldn't detect in your chemical signature analysis, could you?

A. Those samples were very clean, that's right.

Q. So -- did that poultry litter just evaporate into thin air?

A. Well, if it is actually there, it definitely didn't get into our control samples because it's not there. I mean, those waters don't have all the chemicals that would be associated with the poultry litter. So if all those poultry houses are there, it didn't get into the water sample that I sampled.

Q. So if I understand your testimony from your PCA analysis, when it rains in the Illinois River Watershed, poultry litter and the constituents associated with your signature, find their way to the rivers and streams, but when it rains in the Lee Creek Watershed, that doesn't happen?

A. I didn't say that at all, sir.

Q. Isn't that exactly what your PCA analysis proves if, indeed, it is valid?
A. No, that isn't what it shows at all, sir.
Q. All right. Let's switch gears a bit. We've heard testimony in this case about edge of field samples and some high bacteria levels that were found in edge of field samples. Your firm was responsible for selecting those locations and retrieving the samples and having them analyzed; correct?
A. As I talked about yesterday, those fields were actually identified by the inspectors. And then the team that was out there, including CDM people and Lithochemia people inspected the fields and selected the locations that would represent where runoff would come from those fields.
Q. Let's go to State's Demonstrative Exhibit 42. It's coming up on the screen, Dr. Olsen. I'll hand you a copy, if you'd like. I think Your Honor already has one. I'll provide another, if you'd like. You recognize this as a map of the recreation area along the Illinois River Watershed?
A. Yes.
Q. Were any of the edge of field samples that have been discussed as having these high levels of bacteria collected in the stretch of the Illinois River Watershed that is shown on State's Demonstrative Exhibit 42?
A. Well, none of the edge of fields were collected in the Illinois River. Those are edge of field runoff samples, they

aren't in rivers, sir.
Q. Well, were those edge of field samples collected in any way close in proximity to this portion of the Illinois River?
A. I'd have to look for sure to see that.
Q. Let's go to Defendants' Demonstrative Exhibit 92. Dr. Olsen, I'll represent to you that -- well, let me approach it this way. You recall that in discovery in this case you were required to provide GPS coordinates for the sampling locations?
A. Yes.
Q. And I'll represent to you that I've taken those coordinates for your edge of field samples and I've plotted them on a map that is put in front of you as Defendants' Demonstrative Exhibit 19.
A. Okay.
Q. And, sir, do you see any edge of field samples collected in close proximity to the orange part of the Illinois River, which is the part that is the recreational area?
A. No, there's none that are close to the orange part.
Q. All right. When you look at this map, sir -- strike that. Let's go to Defendants' Exhibit 177. Do you recognize Defendants' Exhibit 177? You don't have a copy, so you probably can't recognize it, sir.
A. Thank you.
Q. You're welcome. What is that document?

A. This is a -- looks like a status report from Darren Brown, Ron French and Roger Olsen to David Page.
Q. And the date of that status report is what?
A. That date is wrong. It's for the week ending 4/1/06.
Q. So April of 2006 would be the time frame; is that fair?
A. That's correct, yes.
Q. Turn to the second page, sir. You see a photo on the second page?
A. Yes, sir.
Q. This is a representation of the type of edge of field sampling conducted by the State in this case; correct?
A. That's correct.
Q. This shows someone down at either the opening of a culvert or at least the roadside collecting water from an area that looks like it has pooled and collected some water. Do you agree?
A. Yes, sir. It's actually running off there. You can see that it has a pool. You can see on the left that it's dry. And after the rain, it ran into this gully and it's actually running off the field through that little slot there and that's where he's collecting the sample as it runs off the field.
Q. Sir, as we sit here today, do you know if they found high levels of bacteria in that particular location?
A. I'd have to check for sure.
Q. Dr. Olsen, does this appear to you to be a water body that

is used for recreation?
A. No, it is not.
Q. You don't see anybody canoeing or swimming in that puddle, do you?
A. No.
Q. Sir, from looking at this photograph, do you have any thoughts as to the possible source of any bacteria that may have been found in the sample collected from that location?
A. Well, these -- all these fields were documented as having been spread recently with chicken -- with, excuse me, poultry waste, so there's certainly poultry waste on this field. It looks like there's also some cows there that you've identified.
Q. Let's pull them up and we're going to magnify the image some.
THE COURT: I can see it.
MR. GEORGE: You can see it, okay.
Q. (By Mr. George) Would the cattle have contributed to any bacteria that was found in the sample, Dr. Olsen?
A. Well, that's the interesting part that my analysis has shown. That it turns out that it looks like that cow manure just isn't leaching and creating its own distinct runoff and signature or we would have seen it. I can't say for sure that that cow didn't contribute. But from what we've seen, the cow manure just doesn't leach and contribute as much to the waters of the Illinois as the poultry waste. And there's certainly

physical reasons for that, but I can't make a categorical statement that there isn't some bacteria from those cattle in the sample we collected.

Q. Let's switch gears a bit. As part of the sampling program conducted by the State, you and others working for the State set up high flow sampling barrels; is that right?

A. Well --

Q. Give them the right term, give them the right name. I'm sure that's not right.

A. I'll give you some leeway there, sir.

Q. What would you call it?

A. Well, they were automatic high flow ISCO samplers, that's the manufacturer name. And they were just put inside barrels. They're a sophisticated piece of equipment that turns on at a particular height and collects samples at regular intervals.

Q. To someone unsophisticated like me, if I were to come across one of these samples, it would be a yellow barrel with a tube sticking out of it?

A. That's correct, sir.

THE COURT: Mr. George, I'm afraid we're going to need to wrap it up, sir.

MR. GEORGE: Okay. I'm almost through, Your Honor.

Q. (By Mr. George) Let's pull up Defendants' Exhibit 176. And do you see one of those automated samplers in the photograph, sir?

A. Yes. I can't identify which one that is by the -- from this picture, but that looks like that would be one of them, yes, sir.

Q. Do you see the legend at the bottom that says HFS 20. Does that help you identify it?

A. Okay. That's 20, okay.

Q. So this would be high flow station 20, correct?

A. That's correct, sir.

Q. And, Dr. Olsen, if I understand the testimony thus far, there were some high values of bacteria reported in the high flow samples collected from some of these automated samplers; correct?

A. Well, we also collected base flow and there were high numbers in both the base flow and high flow. So there's -- amazingly there wasn't a lot of difference between high flow and base flow in a lot of these places.

Q. Sir, how many of these high flow sampling stations were put in places where substantial water recreation activity occur?

A. These all were in smaller basins. They weren't in recreational areas.

Q. Does the area in Defendants' Exhibit 176 appear to you to be the type of water body that would be used for recreation?

A. No.

Q. Okay. Sir, do you have any thoughts as to the source of

any bacteria that may be found in the samples collected from high flow station 20, given the photograph?

A. It collected all the runoff from all the fields around it.

Q. Do you see behind the sampler upgradient, the grazing cattle?

A. Yes, I do. I don't know whether that's upgradient or downgradient.

MR. GEORGE: I'll pass the witness, Your Honor.

THE COURT: Redirect.

MR. PAGE: Yes, Your Honor. Thank you.

REDIRECT EXAMINATION

BY MR. PAGE:

Q. Good morning, Dr. Olsen. Would you pull out that watershed study that was Defendants' 188 that talked about both Lee Creek Watershed and Little Lee Creek Watersheds?

A. Certainly.

Q. Would you please turn to page 15 of that document and tell the Court whether or not that page shows a map of where Little Lee Creek Watershed and the creek that you sampled originates?

A. Oh, that's a completely different creek than we sampled.

Q. So the Little Lee Creek that defense counsel was examining you concerning is not the same Little Lee Creek that you used as a reference?

A. That looks right. I'd have to inspect that more but that's what I was interested in determining.

Q. Well, let me ask you another question. When he was asking you all these questions about the number of poultry houses in Arkansas, even for this Little Lee Creek, does this Little Lee Creek on page 15 originate in Arkansas?

A. No, it doesn't look like it.

Q. So if there was some poultry houses under the Lee Creek Watershed that was on page 11 in Arkansas, would they influence the Little Lee Creek on page 15?

A. No.

Q. Dr. Olsen, if -- Dr. Olsen?

A. Yes, sir.

Q. Do you have anything more you want to comment on that map?

A. Yeah, our samples weren't there.

Q. If cattle were a significant contributor of contamination to the waters of the IRW, would that have affected your PCA results?

A. Yes.

Q. How so?

A. If it was a significant contributor, we would have found a significant basin-wide signature that would have showed up as a distinct principal component in our analysis.

Q. Would there have been another PC 3 that would have resulted from your analysis?

A. Yes.

Q. Now, Mr. George spent quite a bit of time asking you

whether or not a constituent, a particular contaminant was also present in other sources in your PC analysis. Do you recall that examination?

A. Yes.

Q. Is the fact of presence the only factor or the only issue in developing a signature for poultry or any other kind of waste?

A. No, it's the presence and the concentrations.

Q. So would you explain that a little bit to the Court how just presence isn't the only important factor that identifies a principal component?

A. That's what principal component analysis does. It looks at the concentrations and compares those all to each other, so -- and then it looks for differences in those concentrations and it looks for similarities in those concentrations. That's why I was trying to point out in the tables that there's a large difference in concentrations between knowing waste compositions.

Q. And it's their relative correlations is also a factor; correct?

A. That's correct.

Q. Why did you include three different types of phosphorus in your analysis?

A. We originally had seven different types. We ran analysis with and without those and dropped those that we thought were

redundant. Those three various forms are important to identify potentially different sources.

Q. Okay. Dr. Olsen, do you have an explanation for the Court as to why, when the rejected FoodProtech data was taken out of the analysis, it did not substantially affect your opinion as to the poultry signature that you found in this case?

A. That's because the signature in the analysis is so robust that dropping that percent of data did not change the signature or the conclusions at all. In fact, you could probably drop more data and that signature would still be there.

Q. Now, finally, Doctor, is your opinion concerning the pervasiveness of poultry waste in the PCA signature throughout the basin supported by any other lines of evidence in addition to the PCA?

A. Yes, as I testified, I didn't just look at PCA, I look at a weight of evidence approach.

Q. Those factors are what in this instance?

A. Well, for instance, on this site we did the pathway analysis type. We found poultry waste in all the components from the very source to the very end where it ends up in Lake Tenkiller and everywhere between in a uniform gradation that we'd expect. As Dr. Fisher testified about his core samples, that's supportive evidence that I considered. Dr. Engel talked about the mass of poultry waste, that's supporting evidence. Dr. Harwood talked about qPCR, that's supporting information.

We did other spatial analysis, upgradient and downgradient of fields where rain was occurring on them and in rivers and found differences in concentration. So there was a whole body of information that went into forming my opinion and that was all consistent with my PCA analysis.

MR. PAGE: Thank you, Your Honor, I pass the witness.

THE COURT: Mr. George.

RECROSS-EXAMINATION

BY MR. GEORGE:

Q. Dr. Olsen -- can we pull up, first of all, Plaintiffs' Demonstrative 461? I want to close the loop on this Lee Creek discussion. You see the green dots, the two done, one on both sides of the Sequoyah County line?

A. Yes, sir.

Q. That's what we've been discussing as the Lee Creek area in which you sampled; correct?

A. Yes, sir.

Q. Let's put on the screen -- Dr. Olsen, can you hear me from back here?

A. Yes, I can.

Q. You can see there, there is one line around this area that describes one watershed; correct?

A. That's correct.

Q. And that watershed includes both the Little Lee Creek and the Lee Creek; correct?

A. Yes.
Q. And this is in the same area in which those samples were collected. Do you see it straddles the Sequoyah County line?
A. Yes, but they're over there in an area that doesn't have any chicken houses in it.
Q. Well, Dr. Olsen, what direction does the Lee Creek flow? Does it flow from Arkansas?
A. It looks like it flows from north to south there.
Q. And does it -- do you think it begins at the state line or begins in the State of Arkansas?
THE COURT: All right. This is relatively simple, folks. Little Lee Creek appears to start in Oklahoma. Lee Creek comes from east to west and joins together with Little Lee Creek; right? Can we all agree to that?
MR. GEORGE: I think we all agree, Your Honor.
MR. PAGE: We'll stipulate, Your Honor.
THE COURT: Where was the testing, where was the testing here on the upper end of Little Lee Creek?
MR. GEORGE: It's not clear to me, Your Honor.
THE WITNESS: It looks like it was on a tributary to Little Lee Creek --
THE COURT: Do we know where the poultry houses are in this watershed?
THE WITNESS: There's no poultry houses in that area that we sampled.

THE COURT: Well, of course, this is a map of oil and gas wells. It's not a map of --

MR. GEORGE: Correct, Your Honor, it was just pointed to the witness.

THE WITNESS: Okay.

THE COURT: I'm just wondering if we could figure this out. Okay. I don't think we need to spend any more time.

MR. GEORGE: That's fine, Your Honor. Thank you.

THE COURT: All right. You may step down. Let's take a five to ten minute recess to allow our daily copy to be made. We'll be right back.

(Recess.)

THE COURT: Who is the next witness?

MR. GEORGE: Just a couple housekeeping matters before.

THE COURT: Yes, sir.

MR. GEORGE: First of all, with regard to exhibits, there were several referenced that were subject to the stipulation and I just want to note those on the record, Your Honor.

THE COURT: Yes, sir.

MR. GEORGE: They are Defendants' Exhibit 177, 176, 188, 275 and 273.

Then lastly, Your Honor, I appreciate the Court's comments yesterday in regard to Mr. Jorgensen's motion seeking

the exclusion as unreliable the testimony of Dr. Harwood. And I believe the testimony that was just heard from the State's witness, Roger Olsen, meets the same criteria. It's a novel approach, not peer reviewed. No other scientist in the world has ever come to this conclusion regarding this chemical signature. And, Your Honor, I believe that it would not satisfy the reliability standards under Daubert. I do appreciate that in this setting the Court, although it has to be cognizant of the instructions of the Supreme Court regarding relying upon evidence that doesn't meet those requirements, it has more leeway in terms of accepting that testimony into the record. But I want to go ahead and procedurally make the motion to exclude as unreliable the testimony of Dr. Olsen.

The last point I would add, Your Honor, is it came out in testimony today for the first time that the witness did not produce what he said was critical to his analysis which was some factor score plots that he relies upon in seeing this poultry signature. And, Your Honor, those documents would have been subject to the Court's order. They've not been provided to the defendants and that would be additional basis to exclude the testimony.

THE COURT: Well, that really goes beyond my knowledge with respect to what's -- I take it it's been ordered. There's been no motion to compel; correct? And I take it, did you just now learn of that? I imagine you suspected it; correct?

MR. GEORGE: Your Honor, in fact, at the deposition I asked Dr. Olsen, and I can find the excerpts if I need to, if he relied upon charts and graphs to display the data and he told me he did not. And so I was surprised to learn today in cross-examination that, in fact, he did. In fact, when I requested that -- because I knew the charts and graphs couldn't be created from the PCA analysis, I requested the production of those. I was told by Dr. Olsen and by counsel that he did not consider those. And if I wanted to create them myself using a PCA software and database, that I could do so, but it was not part of his analysis.

THE COURT: As I mentioned yesterday, I'll await argument at the end with regard to the weight that I ought to give these two experts and whether or not under Daubert analysis -- which I really don't think is any different from the time-honored analysis with respect to experts. It's just the Supreme Court's clarification of how to do it. We'll make the decision at that time. Anything else?

MR. GEORGE: No, Your Honor. Thank you.

THE COURT: The plaintiff may call its next witness.

MR. BULLOCK: Judge, the next matter is we would like to publish on the record Plaintiffs' Exhibit 7 which is the Poultry Water Quality Handbook by Peterson and signed by their president. This is the second edition of this. It is undated, but it's some time after 1994 as reflected in the -- on it's

Pigeon 0614 which is also page 5 where it says the first edition was 1994, so the date was always uncertain. Of particular attention, what I call the Court's attention to is it's Pigeon 0630. And let me give the Court a copy of this.

THE COURT: Thank you.

MR. BULLOCK: I've already given it to the defendants.

THE COURT: There is no objection to its admission?

MS. LONGWELL: No, Your Honor. I need to confer with my co-counsel about whether there's an objection to its admission. I do not have a copy.

MR. BULLOCK: I sat one over on your table.

MS. LONGWELL: I apologize, thank you. But I would like to be able to inform the Court after lunch, if you may, after I confer with Mr. McDaniel.

THE COURT: Well, we're on it right now, Counsel, and we really need to make a decision. Was this not in the exhibits of the plaintiff?

MR. BULLOCK: Yes, yes.

THE COURT: Well, then it's subject to the stipulation that Mr. George made yesterday, so it's admitted. Plaintiffs' Exhibit No. 7 is admitted. Go ahead.

MR. BULLOCK: And --

(A discussion was had off the record.)

THE COURT: Apparently we've got another 7. So then that raises the question as to whether or not it really was on

the Plaintiffs' exhibit list.

MR. BULLOCK: It is, Your Honor. What I looked at was the deposition exhibit number, now that I look more closely --

THE COURT: 364?

MR. BULLOCK: Correct.

THE COURT: Let's just allow Ms. Longwell to satisfy herself that 364 is one of the exhibits on the Plaintiffs' list.

MS. LONGWELL: It is, Your Honor.

THE COURT: Very well, State's Exhibit 364 is admitted.

MR. BULLOCK: And I would call, for purpose of the record, the Court's attention to what is Pigeon 0630, and I would just read that into the record. It's just a couple of paragraphs, Judge.

THE COURT: Very well.

MR. BULLOCK: "Desirable and undesirable microorganisms live in our environment. Animal waste is a potential source of some 150 disease-causing organisms or pathogens. These organisms include bacteria, viruses, fungus, protozoa and parasites. Examples of undesirable microorganisms include Salmonella, Cryptosporidium, Giardia, Listeria, coliform, Newcastle, parens virus, ringworm, coccidiosis and ascaris. When found in water or waste, these pathogens pose significant threats to humans and other animals. They can

infect humans and animals through drinking water, contact with the skin or consumption of fish or other aquatic animals. Most pathogens die relatively quickly, however under the right conditions, they may live long enough to cause problems. They may persist longer in groundwater than in surface water."

MR. MCDANIEL: Your Honor, can I make a record with regard to that entry?

THE COURT: Yes.

MR. MCDANIEL: I just want to point out for the Court there is no more rank hearsay than what the Court just heard. This is --

THE COURT: So just back up here. So the stipulation earlier was not made on behalf of Peterson Farms then? So this is not or should not be admitted under that stipulation?

MR. MCDANIEL: No, Your Honor, it is admitted. I'm trying to make a point as to the weight the Court should give it.

THE COURT: All right.

MR. MCDANIEL: Your Honor, this document, there has been no evidence in the record about the authorship, qualifications of the authors or the basis for this study, and that's all.

THE COURT: The authors were good enough for Peterson.

MR. MCDANIEL: Well, your Honor, if you want to get into that, Peterson handed this out to a grower. It came out

of a grower's file, but there was also testimony that Peterson didn't endorse it. And it was just a resource for the growers, but Peterson isn't adopting this language as its own.

MR. BULLOCK: Judge, just very quickly, I call the Court's attention in that regard to the second page which is the letter from the president of Peterson Farms at that time.

THE COURT: I saw that.

MR. BULLOCK: And he writes that it is important to provide you with the most up to date information on water quality information which will serve as a tool in managing your poultry operations.

THE COURT: I saw that.

MR. BULLOCK: I will now call Dr. Robert Taylor.

CHARLES ROBERT TAYLOR

Called as a witness on behalf of the plaintiffs, being first duly sworn, testified as follows:

THE COURT: State your full name for the Court, please.

THE WITNESS: My full name is Charles Robert Taylor.

THE COURT: Thank you, sir. Mr. Bullock, you may inquire.

DIRECT EXAMINATION

BY MR. BULLOCK:

Q. Where do you live, Dr. Taylor?

A. I live in Opelika, Alabama.

Q. And what's your employment?
A. I'm employed by Auburn University.
Q. And what's your position there?
A. I have a position with an unusual title. The title is eminent scholar, it's an endowed chair.
THE COURT: That's a title all of us would like.
Q. (By Mr. Bullock) Where and when did you obtain your PhD?
A. I obtained my PhD in 1972 at the University of Missouri, Columbia campus.
Q. And in what subject was that?
A. Agricultural and resource economics.
Q. Have you had a tenured position in agricultural economics at any other universities?
A. Yes, I've been tenured at the University of Illinois, Texas A&M University, Montana State University and now at Auburn University.
Q. How long have you been at Auburn?
A. Almost 20 years.
Q. Have you authored any peer reviewed articles in your field?
A. Yes, I have.
Q. And could you give us some view as to the scope of those?
A. The scope, the early work dealt with fertilizer as an environmental quality factor, pesticide policy, farm programs and on and off bioenergy evaluations.

Q. And the later part of your work?
A. For the last 10 or 15 years, a significant part of it has dealt with the poultry industry.
Q. Have you served on the editorial board of any scholarly journals?
A. Yes, I have.
Q. And could you tell us of that experience?
A. I've been on the editorial board or editorial council of five journals, including the American Journal of Agricultural Economics.
Q. Now, what is the American Journal of Agricultural Economics?
A. It's the top journal in my field.
Q. Have you served in any elected leadership positions in the field of agricultural economics?
A. In 1998, I was elected to be on the executive board of our national ag-econ association which was a three-year term.
Q. You said earlier that your later work has been focused on the poultry industry. What's been the nature and extent of that study?
A. The nature and extent has just dealt with the economic structure of the industry.
Q. And have you ever done any work for the EPA?
A. I've done work on and off for EPA throughout most of my professional career. I had a grant in 1976 and '77 on economic

impacts of non-point source pollution control and then one after that on pesticide policies. And since then, they've come to me on and off and invited me -- asked me to do aggregate economic evaluations for them.

MR. BULLOCK: Your Honor, if I might approach the witness and go ahead and give him copies of exhibits?

THE COURT: You may, sir.

MR. BULLOCK: I've given these to the defendants already.

Q. (By Mr. Bullock) Would you look at Plaintiffs' Exhibit 30 which is on the top of that and tell me what it is?

A. It's my academic CV.

MR. BULLOCK: It's already been identified on the record, Judge.

THE COURT: Very well, State's Exhibit 30 is admitted.

Q. (By Mr. Bullock) Can you explain to us what vertically integrated means?

A. In general, vertical integration refers to an economic system going at the extreme from basic raw materials all the way up to a final consumer. It's where the whole production processing, marketing and sometimes distribution and even retailing is integrated and controlled from some point in that vertical structure. In agriculture, it's often simplified as a system of from farm to table.

MR. BULLOCK: Judge, just so that the Court

understands the context of Dr. Taylor's testimony, it goes to the arguments advanced from page 14 to 17 of the Plaintiffs' brief in support of the motion for preliminary injunction.

Q. (By Mr. Bullock) Within the poultry industry, what is the extent of vertical integration?

A. It's almost completely vertically integrated and has been for decades. USDA statistics show something like 95 percent of the poultry industry is vertically integrated. The remaining 5 percent is largely some organic operations, pastured poultry and natural poultry in some niche marketing.

Q. What do you mean by niche marketing?

A. Small special markets for a special commodity such as an organically-grown chicken or what they call pastured poultry.

Q. Would you look at 430 which is in front of you or -- I'm sorry, 443. What is that, Doctor?

A. It is a chart showing the vertical integration in the broiler industry.

Q. Okay. And if you need to, if it would help, I think the Court will allow you to step down, but if you could explain what that is suggesting.

THE COURT: You may step down, if you'd like, sir.

A. This shows the organization of the commercial poultry industry. We really start with a genotype in baby chicks and go through production and grow-out houses, largely so-called contract growers, some grow-out operations owned by the

integrators, then to processing where the chicken is processed. Some whole processed birds are sold, but then also some are cut up into pieces and sold different ways. Then a marketing division and then onto the final consumer. There's actually some other levels in between the market division and the final consumer that aren't shown, but it shows the vertical integration of production and processing.

Business office means the poultry company or the poultry integrator. They decide on the genotype of bird that will be grown, sometimes called breeds, sometimes called strain, provide baby chicks to the grow-out houses. They decide on the type of chick, the number of chicks, when the chicks are delivered. Over on the other side, it illustrates the feed mill. The integrator decides on the type of feed and when that will be delivered to the grow-out houses, when the feed ration will be changed and --

Q. (By Mr. Bullock) Now, just before you drop down, you also have, between the hatchery supply farm and the grow-out, flock service. What is that about?

A. These are representatives that work for the individual integrators. Generally they visit each house once a week and then report back to the integrator and make recommendations or mandates to the growers on what needs to be done for that flock.

Q. Okay. And from there it goes to the processing plant;

correct?
A. Correct.
Q. Now, who decides when those birds go to the processing plant?
A. The integrator.
Q. Okay. And within this scheme, who -- while the bird is at the grow-out, who owns the bird?
A. The integrator owns the bird. The integrator owns the feed.
Q. Okay. Are there other things that we ought to learn from that relative to the issue of the control over the operations of the grow-out farm?
A. Well, the integrator controls the chicks, when they are delivered, the type of feed. They control the number of chicks delivered to each house. They control when the birds are picked up for processing. They control when the next batch of chicks is delivered. And these are usually grown under contracts, so-called contracts.
Q. Okay. Now, what -- I think you can probably sit down again. Now, within -- when we're talking about the issue of the -- at the grow-out farm, what is the nature of the control over the person who is supervising or even owns that farm?
A. The integrator controls almost all aspects. They also control specification of the houses and the equipment in the houses. The grower must follow recommendations and sometimes

mandates made by the integrator and follow the flock servicemen. Generally the decision or the type of work that a grower has to do is to go to the house daily, make sure feed and water are being distributed properly, check for dead birds and things, and pick up dead birds.

Q. Do you know from your study whether the poultry industry in northwest Arkansas and northeast Oklahoma is vertically integrated?

A. Yes, it is.

Q. Now, this particular drawing came from Avian Advice; is that correct?

A. That is correct.

Q. That's the reason why the exhibit shows Avian Advice?

A. Yes.

Q. What is Avian Advice?

A. Avian Advice is what I would call an outreach publication by the college of agriculture. I think it's called division of agriculture in the poultry science department at the University of Arkansas. It's a periodical.

Q. Now, what role do the contracts play in terms of the control that you've described over the operations on the individual farms?

A. Well, economic payback period for a poultry house and equipment in the house is on the order of 20 to 30 years. Most of these contracts are very short term. The dominant contract

nationally is for a single flock of birds which will be in a house for 40 to 60 days. A few now go for longer terms, but the contract terms are dictated by the integrator.

Q. Okay. So under the contract, I take it that when we talk about who owns the birds, those types of things are provided under the contract?

A. Yes.

Q. Okay. What about feed?

A. Feed is also provided by the integrator.

Q. Okay. And is that generally specified in the contract?

A. Yes, and it's generally specified that the grower cannot get any other feed and give it to the birds.

THE COURT: So a new contract is executed dominantly each time a flew flock is delivered?

THE WITNESS: No. The contract is usually for a single flock, but the integrator keeps delivering new batches of chicks. And this can go on typically for three or four years. And then the integrator will come up with a new contract that's usually for one flock of birds and that will continue for a few years. So the contracts state one flock only, the first flock, but then the integrator and the grower keep operating under that.

THE COURT: Kind of a month-to-month contract kind of idea?

THE WITNESS: Two months to two months, yeah.

THE COURT: All right. Well, but typically they just keep operating under the contract. Now, are you saying that it's only good for that first flock or are there provisions that allow it to provide for subsequent flocks if no other contract comes in and supersedes?

THE WITNESS: The only -- I'm not an attorney, but my economic understanding is that the integrator is obligated to provide only that first flock, but then the integrator has the option of placing additional flocks.

THE COURT: Who typically finances the construction of these houses?

THE WITNESS: The houses and house equipment is typically financed by banks with government loan guarantees, typically for 90 percent of the value.

Q. (By Mr. Bullock) Okay. And -- but the grower actually signs that 90 percent guaranteed loan as a general matter; right?

A. I don't know about the details of who signs it. I think it protects the banker, I'm not sure it protects the grower. But again, I'm not an attorney.

Q. In these contracts you say that now that some of them are for longer term than the flock to flock that you talked about. Who controls when the next flock of birds will be provided?

A. The integrator exclusively.

Q. Okay. And how important is that, that is, the term

between when the next -- when they pick up the last flock and when they deliver the next flock, how important is that issue to the grower?

A. As I mentioned earlier, the economic payback period on a poultry house and equipment is on the order of 20 to 30 years. And they have to have chicks over that full period to make a decent return on labor management, capital risk, all that they bring to it. And it's very important that they quickly get new batches of chicks, within a couple of weeks, but the integrator can decide whether it's a few days or not at all.

Q. Dr. Taylor, before you gave your opinions in this case, did you review samples of contracts between the defendants and the growers in this watershed?

A. Yes, I did.

Q. Okay. And what was the nature of that review?

A. I quickly looked through those and the conclusion was they're similar to what I've seen in other areas of the United States.

Q. Doctor, I've put in front of you a pleading filed in this case. It's Docket Number 1535 that was filed by defendant Simmons. Do you see that?

A. Yes.

Q. Let's go back to the attachment which is the third page of that document.

A. Okay.

Q. Doctor, in your course of reviewing for this case, was this amongst the -- or something similar to this amongst the documents that you say that you scanned?

A. I went back and checked and I do not have the one with these same Bates number, but I have the same contract that must have been for a different grower.

Q. Okay. Now, in looking at this contract, what are the obligations of the grower?

A. This particular contract has growers' obligations as a separate category from the integrator Simmons' obligations. And to go down the list, 2A is to have a house prepared as prescribed by Simmons before chicks are delivered. And I won't read all of this. B, to furnish all labor, housing, water, litter, fuel, spraying, utilities and equipment as specified by Simmons.

Q. So as to that one, of course we're talking about Simmons here, the grower has to do those things at their expense; correct?

A. Correct.

Q. But Simmons gets to tell them the specifics of it?

A. That is my understanding.

Q. Okay. Go on.

A. C is to comply with the management instructions given by Simmons in service reports, memoranda, management tips and other communications as may be supplied from time to time.

Q. Okay. Now, going back to the chart of vertical integration, is this part of the flock service that you were pointing to there?

A. Generally that's the connection between -- the weekly connection between the grow-out houses or the flocks and the integrator.

Q. Okay. Let's skip down to J. You've said that the live birds or the birds belong to the company. What does this provide in terms of the dead birds?

A. It says the grower is obliged to dispose of dead birds by sanitary and legal means.

Q. Okay. K, what's the essence of K?

A. It means the grower cannot provide any feed or medication other than what the integrator provides and tells them to use.

Q. Okay. And what is the importance of the provision of M in this issue of the control of the grower?

A. Just means they can come in at any time to inspect the premises and all of the records the grower is required to maintain. So they have, in my understanding, 24-7 access to the grow-out houses and flocks.

Q. Okay. And the next is vaccinating the birds. Who decides that?

A. According to Simmons' instructions.

Q. Okay. Now, Simmons does provide for the disposal of litter; is that correct?

A. Simmons does not.
Q. What does the contract provide?
A. Item 20 says that the grower is obliged to dispose of litter in accordance with BMPs as detailed by the nutrient management plan for grower's farm, developed with appropriate governmental agencies and to follow all applicable regulations pertaining to litter disposal.
Q. In this contract, do you recall any provision relating to transferring the feces which come out of Simmons' birds to the grower?
A. This just says the grower must dispose of it.
Q. Okay. Now, in your study of this industry, and whether in this watershed or outside, are provisions providing for the transfer of the birds' feces to the ownership of the grower, is that generally provided?
A. To go back in time, a lot of the contracts I've seen from the '70's and '80's and even into the '90's did not mention the word litter. It's only recently that the litter provision has appeared in contracts.
Q. And to the extent that it's in there, is it similar to what we see here?
A. Yes.
Q. Okay. Now, how does this contract compare generally with the contracts that you've seen in this case?
A. It is similar. There's slight differences in wording from

contract to contract. This one has an attachment that shows calculation of pay. It's for what economists call a tournament that is used by broilers and turkeys. The other poultry operations have a somewhat different pay system, but most of them have some kind of incentive for the grower built in, performance incentive.

Q. Okay. Just so that the Court understands, I think you referred to that as a rodeo?

A. Tournament.

Q. Tournament. I don't know where I got that. What do you mean by a tournament?

A. Basically how it works is an integrator, integrator A takes all of the birds that are picked up for processing in a given week within a defined complex and the performance of each flock is calculated and then the flocks are ranked. And grower pay is based on performance of an individual grower's flock compared to a mean, median or average for all of the flocks settled in that particular week. And there's slight variations on that but that's the basic idea of a poultry pay tournament.

Q. Now, to what extent are the contracts which the various companies have, to what extent are those negotiable by a grower or growers collectively?

A. A grower does not have the option of -- generally does not have the option of negotiating contract terms. And as far as I know, there have been no group negotiations.

Q. Okay. Now, in your affidavit, you referred to contracts of adhesion. What do you understand contracts of adhesions to be?

A. That's a legal concept and not an economic phrase. And I always struggle to try to translate economic jargon into legal jargon. It's my understanding that a contract of adhesion occurs when there is a gross imbalance of power favoring one side. The extreme being one side has the option of taking the contract or leaving the contract and that's it.

Q. And how do these contract arrangements measure up against that standard?

A. Growers only have the option to take a contract or leave it. And when a new contract is offered, they still only have the option to take it or leave it. And therefore, by my definition, that's a contract of adhesion.

Q. Okay. And given the finance issues that you described earlier, does that help inform how that discussion goes?

A. I'm not sure I --

Q. Well, that was probably more complicated than it needed to be. You said earlier that the houses will be financed over a number of years. The options of the grower at the time of the contract renewal, are they affected by that?

A. Yes.

Q. How so?

A. When I refer to an economic payback period of 20 to 30

years, I'm using the economic concept of a reasonable or market return for all that a grower brings. Loans for new house construction range from seven to 15 years. And during that time, growers typically don't make much for their labor and so forth. They're paying off the loan. Quite often after 10 or 15 or 20 years, they have to make a major upgrade and quite often they have to get a loan on that. But loans are generally from 7 to 15 years on a house and 7 or 10 on new equipment depending on the extent of the upgrade.

Q. Within this market today, is there a place for a grower that decides that he's just going to take his houses and go out and raise birds on his own without association with an integrator?

A. Only the niche marketing possibilities I mentioned earlier. But in general, they can't take a commercial broiler out, raise it up to processing weight and haul it and sell it at a market.

Q. Is there an economic term for the type of situation that you've described here?

A. Yes.

Q. What is that?

A. Well, economists have their own jargon. Monopsony is the technical economic phrase that describes it. It's a mirror image of monopoly. Monopoly refers to seller's side power, monopsony refers to buyer's side power.

Q. Dr. Taylor, does your -- maybe we ought to unwind that a little. How does -- how does this apply in the poultry industry?

A. Well, technically speaking, sometimes economists are precise in terminology and use monopsony to refer to a situation where there is only one buyer. Other times they use it in a more generic sense to just mean the buyer has power over the seller. There's another big word, oligopsony for when you have a few. But basically the integrator has monopsony or oligopsony power over the growers.

Q. How so?

A. Well, it's evident from the fact that no terms are negotiated.

THE COURT: To the extent that occasionally growers will switch integrators, this would more accurately be an oligopsony; right?

THE WITNESS: Yes. To magnify on that, if I may, there are some areas in the United States where there's only a single integrator but this one has several, so oligopsony would be a better term to use.

Q. (By Mr. Bullock) Does your description apply to the operations of the poultry industry in the Illinois River Watershed?

A. Yes, it does.

Q. What about to the defendant poultry companies in this

case?
A. Yes.
Q. What about differences between turkeys and chickens?
A. Well, there's biological differences. The turkeys, their grow-out period is longer than for broilers. But for turkeys, the integrator still owns the birds and the feed and makes the decision about when poults will be placed. And they grow them up to a certain age. It may be in part of a house or a different house and then they're moved into a grow-out facility. So generally the same kind of business model.
Q. Doctor, let's change to another area and that is the issue of the decisions made by the companies. In terms of the location of the poultry houses in this watershed, what is the role of the integrator companies?
A. The integrator company decides on the location.
Q. How so?
A. Jargon in the industry, they have what they call complexes. And a single integrator often has multiple complexes. The complex is generally a fairly small geographic area around a feed mill and/or processing plant. It's usually the feed mill is the central part. And they only contract with growers within a certain range of the feed mill. And it varies somewhat, but 40 to 50 miles is generally as far out as an integrator will grow to for a grow-out house. And it's the integrator who decides where the complex will be and how large

it is.
Q. And so the companies, of course, decide where their complexes are; correct?
A. Correct.
Q. And that really drives the concentration of the industry?
A. Yes, it does.
Q. And then they determine how many houses to contract with in their region?
A. Correct. They determine who will be a grower, where in the region the houses will be located and the size of the complex.
Q. Okay. How does the northwest Arkansas and northeast Oklahoma poultry industry compare to those in other areas of the country?
A. It's highly concentrated. There are a few other areas where poultry is also highly concentrated.
Q. What would be other comparable areas?
A. One where they're highly concentrated is known as the Delmarva area that's in Delaware, Maryland and Virginia. The Sand Mountain area of north Alabama is highly concentrated. The far north part of Georgia has a concentrated area. And there's one in south central Mississippi that's concentrated and a few others.
Q. Now, let's go to the role which poultry waste or poultry litter -- once the house is cleaned, does that play any further

role in the production of the poultry?

A. No, it does not.

Q. And do you know what the most common manner of disposal of poultry waste is in this area?

A. Nationally and in the IRW, it's land application.

MR. BULLOCK: Okay. I have nothing further. I'll surrender the witness.

THE COURT: Mr. Elrod.

MR. EDMONDSON: Thank you, Your Honor.

CROSS-EXAMINATION

BY MR. ELROD:

Q. Dr. Taylor, we are meeting for the second time; is that correct, sir?

A. Correct.

MR. ELROD: Your Honor, I guess you had the impression that you yourself have an endowed chair and tenure.

THE COURT: No one has ever called me an eminent scholar, Mr. Elrod.

Q. (By Mr. Elrod) Dr. Taylor, this is not the first time that you have testified against poultry companies, including Tyson Foods; is that correct, sir?

A. Correct.

Q. And you'll agree with me that the last time you testified against Tyson Foods was in a case in Alabama in federal court; is that correct, sir?

A. That is a case that started out against Iowa Beef Packers. And Tyson acquired IBP along the way and then I did testify, yes.

Q. And that would have been -- your testimony in that case would have been last year; isn't that correct, sir?

A. That was '04.

Q. '04.

A. February of '04.

Q. The judge in that case was Judge Neil Stromm in Alabama; is that true, sir?

A. Judge Lyle Stromm from Nebraska, but it was tried in Montgomery, Alabama federal court.

Q. Yes, sir. And that case involved allegations that Tyson Foods was conducting a monopsony; correct?

A. That case involved allegations of the use of what's known as captive supplies of fed cattle to manipulate the market.

Q. And you provided testimony for the plaintiffs in that case; is that true, sir?

A. True.

Q. Judge Stromm looked at you during your testimony and said, "Dr. Taylor, you are nuts." Did he not?

A. He did not.

Q. What did he say to you?

A. He didn't say anything to me.

Q. When did he say you were nuts?

A. In heated arguments between the lawyers over draft jury instructions, at one point he blurted out, "I'd like to say, Dr. Taylor, you're nuts," but he didn't say it to me.

Q. I guess I was confused. And in regard to that particular case, you wrote an article in which you referred to wayward judges; true?

A. I have published an article on that and have another one coming out in the Antitrust Bulletin. I don't recall using the word wayward. I used it in a title of a talk and it had wayward with a question mark after it.

Q. And the article was criticizing Judge Stromm's decision in the Pickett against Tyson case. And the thesis of your article was that both Judge Stromm and the Eleventh Circuit Court of Appeals, quote, "got it wrong"; isn't that true?

A. There were two issues involved. They were one dealing with the antitrust rule of reason and one dealing with a meeting the competition defense.

Q. I'm correct, am I not, that the thesis of your article was that both Judge Stromm and the Eleventh Circuit got it wrong?

A. I'm saying that --

THE COURT: Different issue. You know, fortunately we have freedom of speech in the United States.

MR. ELROD: I understand, Your Honor. But I think I'm entitled to show the attitudes that this witness brings with him to the courtroom. That's all I'm trying to do, Judge.

I'll get to the substance in a second.

THE COURT: All right. It's your time.

MR. ELROD: Yes, sir.

Q. (By Mr. Elrod) And you've also written an article or you've made the statement that the American economic system is slithering towards fascism, haven't you, sir?

A. I wrote an article in a newsletter in which I stated that democracies are generally very fragile and unstable and it is difficult to maintain a balance between government and business. And in one instance, government can dominate business, and that's not good. And in the other case, business can start to dominant government, and that is equally bad. And I said we're slithering in one direction.

Q. Dr. Taylor, you've also referred to, in the past, growers as servants, have you not?

A. I have.

Q. And you've also in the past referred to chicken growers as bubbas, have you not?

A. I have not.

MR. ELROD: Would you pull up 14, please?

(An excerpt of the videotaped deposition of Robert Taylor was played)

Q. "...fleshed that out in that Establishing Fairness article. You said, quote, the lack of objective public information on grower pay and financial risk means that some

uninformed, gullible or overly optimistic individuals can be lured into becoming contract growers.

A. "Yes.

Q. "The term you used to describe these people is bubbas, isn't it?

A. "No, I didn't use that. Somebody else did.

Q. "You've adopted the term?

A. "I adopted that, yes.

Q. "I think that when you were talking about bubba, it's your Invisible Hand article, quote, Bubba only needs to look at income statistics for the upper five to ten percent compared to the lower 40 percent to see what is happening in America. The Powerful masquerading behind the invisible hand first picked bubba's pockets. Now, the hand has been clinched into a corporate fist and bubba's way of life is threatened whether he knows it or not. As I understand your theory here, agricultural companies abuse the free market to put bubba in jeopardy of bankruptcy?

A. "As I mentioned earlier, the phrase free market has many, many different meanings, and it can range from one extreme where there are absolutely no regulations at all, and when some people use free market, that's what they mean. Others, when they say free market, they mean a truly competitive market where there's a semblance of balance of power. So when you ask a question with the free market phrase, I don't know for sure

what you mean.

Q. "Well, I can ask it a different way. Is it your position that those bubba poultry farmers out there don't know what they're doing when they enter into contracts to be contract growers and somebody ought to stop them from doing it?

A. "I'm not saying they should be stopped from doing it. They should go in with their eyes open about the true economic return to contract poultry production and there's very little information on that."

MR. BULLOCK: Judge, this appears to be well beyond the appropriate use of a deposition in order to impeach. They asked him whether he used the term bubba. We covered that very early and now they just seem to be playing depositions because they like the deposition.

MR. ELROD: I'm through, Your Honor.

THE COURT: Frankly, there toward the tail end, frankly when your objection arose, I think it has to do with the subject that you raised. So overruled. Go ahead.

Q. (By Mr. Elrod) Now, let's get into the substance of your testimony, Dr. Taylor. You agree with me, that in all the travels that you have made and all the speeches that you've given and all of your knowledge of the poultry industry throughout the United States, you know of no one who treats litter as a hazardous substance?

MR. BULLOCK: Objection to the relevance. We have

claimed that it is a waste. We haven't said that it's a hazardous waste under the act, Judge.

MR. ELROD: Well, if that's the State's position, then I'll withdraw --

THE COURT: But is it an objection to the relevance or beyond the scope of direct?

MR. BULLOCK: It's also beyond the scope. I was getting it from two places here, and I apologize

THE COURT: Sustained.

MR. ELROD: Your Honor, I guess my point is that if that's the State's position, then we've disposed, perhaps, with a great deal of issues in this lawsuit. If their position is that litter is not a hazardous substance, then that's great.

THE COURT: Well, I think ordinarily it's just beyond the scope of the testimony of this witness, I believe.

MR. BAKER: Just to be clear, Your Honor, we have not said that poultry waste is not a hazardous substance. We're talking RCRA now, solid waste versus hazardous waste, very different concept.

THE COURT: You've educated me. I appreciate that. I still frankly need some education from both of you on that. It's an interesting legal issue. But in any event, Mr. Bullock's objection is sustained.

Q. (By Mr. Elrod) Dr. Taylor, in the conduct of your investigation of the poultry industry, have you become aware

that most of the contracts, if not all of the contracts offered by my client, Simmons Foods, are for at least seven years' duration?

A. That came up in the deposition that some had seven year contracts. I have not seen one of those. The longest term I have seen in the sample set of contracts I have is three years.

Q. Have you, in the course of conducting your investigation, have you looked at the length of the relationship that is typical between a grower family and Simmons Foods or any other integrator as a defendant in this case?

A. Nationally, it's generally long term.

Q. It is long term nationally, is it not, sir? The nature of the relationship between a typical grower and the company for whom that family grows is typically a long-term relationship, is it not?

A. It is typically. It has been historically.

Q. Yes, sir. And bankers finance the construction of poultry houses and attendant equipment based on the nature of the relationship between the grower and the integrator; isn't that true, sir?

A. That, plus the fact that 90 percent of their loan is guaranteed.

Q. And have you conducted an interview with any grower in the IRW in the formation of your opinions in this case?

A. I have not.

Q. Would you agree with me that the core of the relationship between the integrator and the grower is one of trust?
A. That is what is necessary to make this relationship work.
Q. Yes, sir. And you'll also agree with me that no one holds a gun to the head of anyone who chooses to become a poultry grower?
A. As far as I know, no one has held a gun to a potential grower's head.
Q. And if one chooses to become a contract grower with an integrator, then the contract that must be signed is the contract that is presented. That's your testimony; isn't that true, sir?
A. Yes.
Q. Will you agree with me that the Packers and Stockyards Act, an act of the federal government, requires that there be no unjust discrimination between growers of a particular integrator?
A. That is not the exact wording used in the Packers and Stockyard Act. And there is also an issue of when poultry was added to the Packers and Stockyard Act, Congress overlooked giving USDA authority to enforce the poultry part of Section 202 that has wording about unfair, deceptive, preferential or anticompetitive business practices.
Q. Yes, sir. That's true, sir. Now, have you formed an opinion or a view as to whether the Packers and Stockyards Act

would permit an integrator to offer different contracts to different growers who are similarly situated?

A. I have asked key people in USDA GIPSA, that's Grain Inspection Packers and Stockyard Agency, the poultry people charged with enforcing it, and they know -- have told me they know of no USDA requirement that all growers must have the same contract.

Q. So it's your view that the Packers and Stockyards Act, which does not permit discrimination between growers, would, in fact, permit growers to obtain different contracts from the same integrator. Is that your view?

A. I know of instances where executives with integrators have contracts that are different from their own growers in that complex.

Q. You -- who is that?

A. To start with, and these are in SEC public documents, Beau Pilgrim of Pilgrim's Pride.

Q. Your testimony is that Beau Pilgrim of Pilgrim's Pride offers different broiler contracts, for instance, to different broiler growers within the company?

THE COURT: No, he's saying that Pilgrim contracts with himself at a higher rate than he does with his other growers.

THE WITNESS: Yes.

Q. (By Mr. Elrod) Is that what you're saying?

A. Yes.
Q. Do you know whether any of these integrator defendants follow the same practice, assuming that practice is, in fact, true?
A. Not as a fact.
Q. Now, let's talk about some of the elements of what you call control, sir. In regard to the requirement of the companies that only their feed be put through their chickens, that makes sense to you, does it not?
A. Yes.
Q. You will agree with me that the chicken company graveyard is littered with companies that were inefficient in the past?
A. I do not know that as a fact.
Q. Will you agree with me that 60 to 70 percent of the cost of the raising of birds comes from feed?
A. The cost of raising a bird up to the point where it's ready for processing?
Q. Yes, sir.
A. That's reasonable.
Q. And will you agree with me that since ethanol production has become increased in the United States, that the price of corn has skyrocketed to $5?
A. It's getting up in that range.
Q. Will you also agree with me, sir, that the efficient raising of birds inures both to the benefit of the integrator

and to the grower?
A. Efficiency is a word that has many different economic meanings. I assume you're referring to feed efficiency. And feed efficiency is what the integrator is concerned with and that's not necessarily economic efficiency for a grower's operation or economic efficiency in the aggregate sense.
Q. Well, the tournament that you were talking about and the method of pay -- first of all, there is a base pay; correct?
A. There's base pay.
Q. And then on top of the base pay, the, quote, "tournament," end quote, determines how much a particular grower will receive in addition to base pay; isn't that true?
A. Depends on the tournament. Some have a base pay and then have a bonus going up above that. Some have a different base pay with deducts below and a bonus above.
Q. So the companies have different kinds of contracts?
A. Somewhat.
Q. And you'll agree with me that most of the amount of pay to a grower who settles a particular week against other growers is based on feed conversion efficiency?
A. Generally.
Q. Because after all, what we're actually doing is we're taking carbohydrates and converting those carbohydrates into protein?
A. Okay. I'm an economist.

Q. That's what happens, isn't it? That's what we're doing, isn't it? We're taking corn --
A. I'm here as an economist, not a biologist.
Q. We're taking corn and soy meal and putting it through a bird and turning it into protein for human consumption?
A. You're taking a soybean meal which is a vegetable protein and converting it into animal protein.
Q. The point is that the efficiency with which that is done inures to the benefit of the grower who is in charge of that flock of birds through the feed conversion bonus process?
A. Well, I wouldn't say that the grower is in charge of that because of the weekly visits, and sometimes more frequently, by the flock representatives. And again, feed efficiency does not translate into efficiency for a grower's economic situation.
Q. Well, he gets more money.
A. That's not necessarily efficiency.
Q. It's a good thing to get more money though, isn't it? Isn't that good?
A. This idea of make more money just doesn't have a concrete economic meaning.
Q. Well, if you're trying to pay the light bills and send Johnny to college, it has a meaning, does it not?
A. It does in that sense.
Q. Isn't that --
A. That's not the only economic aspect of profitability,

economic profitability for a grower. A grower faces different incentives.

Q. Well, paying the light bill and sending Johnny to college is a pretty strong incentive, is it not, sir?

A. Yes.

Q. Now, Doctor, would it surprise you to know that at any one time the company I represent, Simmons Foods, which is one of the smaller of these integrators in this case, will have $75 million at any one time in its assets in the form of birds out in the hands of third parties?

A. I wouldn't be surprised. I haven't seen Simmons' financial statements.

Q. The number of birds that any one of these companies has in the hands of third parties, i.e., growers, you'll agree with me is at any one point in time going to be a significant portion of their assets?

A. Yes.

Q. It's, therefore, not surprising, is it, sir, that the companies are careful about the protection of those assets?

A. Yes.

Q. I think you agreed with me in your deposition that there are 168 hours in a week?

A. Okay.

Q. And I think your testimony was that in any particular week, the field service tech will be at a grower's farm for

maybe one or two hours maximum?
A. That is the physical visit.
Q. Yes, sir. Do you know of any other physical relationship between the company and a particular grower other than the weekly visit of the field service tech typically?
A. I know with the higher tech houses there's constant monitoring of temperature and humidity and other factors and integrators can even get access to that over a modem. So they're not physically there, but they can be monitoring the house.
Q. We'll talk about that in just a second. But in terms of physical contact, one or two hours a week out of 168 hours in a week would be the typical, average week-by-week physical contact between the company and the grower; correct?
A. Well, it would depend on number of houses but that's --
Q. The other 166 or 167 hours of the week, it's the grower alone with his or her chickens?
A. Yes. Wait, not with his or her chickens, with the integrator's chickens.
Q. You're right. You'll agree with me that in terms of the notion of agency, that the --
MR. BULLOCK: Objection to the relevance of the issue of agency.
THE COURT: Overruled.
Q. (By Mr. Elrod) In terms of the notion of agency, that the

grower brings to the job and to the task the tools necessary to complete the task, i.e., the poultry houses, the equipment inside the poultry houses and the labor necessary to grow a flock of birds; isn't that true?

A. I don't know the legal meaning of the word agency. It has a meaning in economics but --

THE COURT: That's a very-fact specific matter. So go ahead. That's for me to decide. Go ahead, Mr. Elrod.

Q. (By Mr. Elrod) You'll agree with me that the grower brings to the task of raising a flock of birds the chicken houses, the equipment within the chicken houses and the labor necessary to do the job?

A. Yes. They still have to meet specifications of the integrator for the houses and equipment.

Q. Based on the contracts that you have reviewed -- you've looked at them back into the 1970's, as I understand it?

A. I've seen some in the late '70's, I think.

Q. And you have never seen a contract that says the integrator owns the litter; isn't that true?

A. That is true.

Q. All of the contracts you've seen say, if they say anything at all, that the grower owns the litter; isn't that true?

A. This may be legal semantics, but I have not seen any contracts that says the grower owns the litter. The contracts say the grower is responsible for getting rid of the litter and

waste.
Q. You'll agree with me that this lawsuit is about litter, it's not about growing birds; isn't that true?
A. It's about waste generation from growing birds.
Q. It's about litter; correct?
A. It's about litter and waste.
Q. Doctor, turning to this issue of control and agency, have you ever built a house?
A. Yes.
Q. Did you have a contractor?
A. My dad was a carpenter, so I've helped build houses growing up but, yes, I've had a contractor.
Q. All right, sir. And when that contractor built your house, if he left the job to go pick up a load of wood, bring it back, ran over a heart surgeon and killed him, you wouldn't expect to bear that liability yourself, would you, sir?
A. No.
MR. BULLOCK: Objection to the relevance of this, Judge.
THE COURT: Sustained.
Q. (By Mr. Elrod) Have you seen the affidavit of Gary Murphy that's been filed in this case, the CEO of Simmons Foods or president of poultry operations?
A. This one from February 13th?
Q. Yes, sir.

A. Yes.
Q. It was in your packet; right?
A. The one I have here.
Q. He discusses in that affidavit the notion of movement of growers between companies, does he not, sir?
A. Yes.
Q. And he states under oath that during last year, 160 houses have moved from Simmons Foods to at least one of its competitors, does he not, sir?
A. That's what it states.
Q. And does that surprise you?
A. The number surprises me. It's not unheard of for a grower to switch to another integrator. There's no public information on growers switching, but over a long time period and considering all, it's a very small percentage in my opinion.
Q. But it happens?
A. It happens.
Q. And you also see in his affidavit his statement that Simmons had no control over the ability of those growers to make that transition; isn't that true? Couldn't stop it?
A. Couldn't stop it, yes.
Q. Will you agree with me that the regulatory schemes in the State of Oklahoma and Arkansas regarding the disposition of chicken litter are directed at the growers, not at the integrators?

A. That is my understanding.
Q. Why do you believe that to be the case?
A. Just talk about land application and the best management practices and nutrient management plans.
Q. But those regulations are directed at the grower or applicators, not at the integrators; isn't that true?
A. I understand it's the applicator which can be a grower.
Q. Dr. Taylor, there is -- there are opinions in your affidavit that you've not discussed during your live testimony, isn't that true, having to do with the cost of transporting litter out of the watershed?
A. Yes.
MR. ELROD: Your Honor, I think it would be appropriate for me, since they're in his affidavit and part of the record in this case, to examine this witness about some of those matters. I would ask leave to do so.
THE COURT: That's fine, the problem is you've got about two minutes left.
MR. ELROD: All right. It's suggested by Mr. Ryan, I just move to strike that portion of his affidavit.
THE COURT: What portion are you referring to?
MR. ELROD: He provides affidavit information regarding the cost of transporting chicken litter outside of this watershed, Your Honor, at fairly great length. And we spent a lot of time on that issue in his deposition and it's

not been addressed in live testimony here today.

MR. BULLOCK: Judge, we didn't offer the affidavit into evidence. We don't have any problem with the Court striking that.

MR. ELROD: That's fine.

THE COURT: Very well. With no objection.

MR. BULLOCK: I mean, not striking the parts that are not referred to in the evidence.

THE COURT: Very well. Mr. Elrod.

MR. ELROD: Your Honor, Mr. Graves points out to me that there are also some parts of his affidavit that talk about nutrient movement and we move to strike those portions of that -- of his affidavit --

THE COURT: Specifically what portion, Mr. Graves?

MR. GRAVES: I don't have the affidavit in front of me right now.

MR. ELROD: James, you're under a lot of pressure, buddy. We'll just move to strike anything in his affidavit that wasn't covered by his live testimony, Your Honor. That would be the most efficient way to get at it.

MR. BULLOCK: Judge, I take it the affidavit, unless they are offered into evidence, that they're not evidence in the case. I don't want to establish a precedent by agreeing to this, that the affidavits of the defendants' experts are evidence in the case even if they're not addressed in the

course of testimony. I mean, that's my only concern with this discussion of striking things that haven't been offered.

MR. ELROD: Well, I guess this issue has not been discussed here.

THE COURT: It really hasn't because frankly I was a little bit surprised that Mr. Bullock was willing to strike aspects of the affidavit. I thought it all came in. I mean, if they're sworn statements before the Court, both for and against the imposition of the preliminary injunction, I don't know why they would need to be stricken merely because they've not been the subject of examination before the Court in this proceeding frankly.

MR. BULLOCK: Well, I'm perfectly agreeable to proceeding like that and agree to those portions being stricken at this time, just to keep everything moving.

MR. ELROD: Our view is that our affidavits are part of this case, Judge. That's our view.

THE COURT: All right.

MR. ELROD: In accordance with what you just said.

THE COURT: Well, all right. Then, Mr. Bullock, Mr. Elrod doesn't wish to strike his affidavits. And of course, we've got a number of defendants here. It seems to me that it all should just come in.

MR. BULLOCK: That's fine, Judge. I'm agreeable to that and we can proceed however the Court wishes to.

THE COURT: They're sworn statements, they're under the penalty of perjury.

MR. BULLOCK: In fact, they are listed on the exhibit list which the Court has already addressed issues with. I hadn't thought this one through.

THE COURT: That's fine, that's fine. Mr. Ryan.

MR. RYAN: Your Honor, the reason I made the suggestion to Mr. Elrod is just time saving. If they're not going to be relying on those portions of his affidavit that deal with economy, cost of transportation, that sort of thing, why waste Your Honor's time with it? That's all I'm asking.

THE COURT: As a practical matter, frankly to the extent it's not brought to me by you all, that's an indication that it's not terribly important. So, I mean, this frankly is the longest preliminary hearing I've ever conducted. I don't know how many of you have been involved in a preliminary hearing that lasted seven days. Well, of course, Mr. Jorgensen, but it's a rare occurrence. So, you know, if you think it's important, bring it to my attention. Redirect.

MR. ELROD: Thank you, Judge.

MR. RYAN: Your Honor, may I ask a couple of questions?

THE COURT: Yes, sir.

MR. RYAN: It will cover less than 90 seconds.

THE COURT: Yes, sir.

CROSS-EXAMINATION

BY MR. RYAN:

Q. Dr. Taylor, the grower decides when to apply poultry litter; correct?

A. When to apply it to the land?

Q. Yes.

A. Yes, but the grower doesn't always decide when the house is cleaned out.

Q. My question is, the grower decides when to apply poultry litter; correct?

A. Correct.

Q. The grower decides how poultry litter is applied; correct?

A. Correct.

Q. The grower decides whether to sell the litter or to apply it to land; correct?

A. Generally.

Q. And the grower decides whether to apply it within this watershed or outside this watershed; correct?

A. Correct.

MR. RYAN: That's all I have, Your Honor.

THE COURT: I have a quick question. You made reference to the decision of when to clean out a poultry house. Growing up, I don't know, we maybe had 30 chickens but nothing this big. Other than obviously it needs to be cleaned out between flocks, what other considerations are you aware of

relative to the decision of when to clean out a poultry house?

THE WITNESS: Generally it's in between flocks of birds that a clean-out occurs or a partial clean-out, decaking --

THE COURT: Do you have personal knowledge in this regard as to when these houses are cleaned out?

THE WITNESS: That depends on the type of bird and the integrator --

THE COURT: I mean, do you have knowledge of when these things are done typically?

THE WITNESS: As kind of a rough rule for a broiler house, it would be once a year, not every flock.

THE COURT: Okay. All right. Redirect.

REDIRECT EXAMINATION

BY MR. BULLOCK:

Q. Doctor, Mr. Elrod in his cross presented that Simmons has a seven year contract. Do you recall that?

A. Yes.

MR. BULLOCK: Let's go to the contract which they filed with this Court. And Judge, for purposes of the record, I'm going to offer this as Plaintiffs' Exhibit 469 which is the affidavit with the attachment.

THE COURT: Where is that?

MR. BULLOCK: The 469?

THE COURT: Yes, sir.

MR. BULLOCK: It's that affidavit of Gary Murphy with the attached contract.

THE COURT: All right, thank you. Any objection?

MR. ELROD: No objection, Your Honor.

MR. BULLOCK: And let's go to --

THE COURT: That will be Plaintiffs' 469, I'm sorry, Mr. Bullock. Plaintiffs' 469 is admitted, I'm sorry.

Q. (By Mr. Bullock) Okay. Let's go to Paragraph 10 of the contract. That would be on the third page of it.

A. Yes.

Q. What does Paragraph 10 tell you about the duration of this particular contract?

A. The first sentence says, "This agreement is a flock to flock agreement. Its duration is for one flock of birds."

Q. Okay. Are there instances where in this arrangement an integrator will require the clean-out of a house at a particular time? Do you know?

A. In almost all of the cases, if they think the health of a bird -- of a new bird is threatened or feed efficiency is threatened, then they will require a clean-out.

Q. Mr. Elrod stated that basically this is a process of -- and I'm probably being less than exact in this, but something to the effect that this is a process of converting carbohydrates into protein. Do you remember that line of questioning?

A. Yes.
Q. The other part of that process is the production of feces and urine; is that true?
A. That is true and it's also much more than just carbohydrates. There are many different feed ingredients.
Q. Okay. In terms of the transfer of growers from an integrator such as Simmons, do the integrators have any tools at their disposal to encourage such a mass exodus?
A. I'm not aware of any.
Q. Well, if the --
A. Oh --
Q. If the company wants people to move, they don't have any tools to get them to move?
A. If they simply don't deliver chicks, then they have no option but to try to find another integrator.
Q. Okay. And do you know whether companies actually own or operate farms themselves? You talked about Purdue, are there other instances of that?
A. Some do. Not all of them, but most of them have a few research houses, a few or many. Executives sometimes own houses, such as Beau Pilgrim. And sometimes they have houses that are just used for commercial production.
Q. Okay. But you haven't looked at that specific issue in this case, have you?
A. I have not.

MR. ELROD: I move to strike that testimony, Your Honor. Beau Pilgrim is not involved in this case at all.

THE COURT: Any response?

MR. BULLOCK: That's not true, Your Honor. In fact, Peterson -- the deposition testimony in this case is that they actually own one house and manage nine houses, so at least -- I mean, George's. I'm sorry, I misspoke. No wonder I got a what. George's actually owns one house and manages nine other or eight other houses.

MR. ELROD: Your Honor, I've got to object to counsel testifying --

THE COURT: We're spinning out a little bit here. The testimony regarding Beau Pilgrim came up in cross-examination in response to a question regarding discrimination in these grower contracts. I think it was a fair response. There was no objection at the time. The motion to strike is denied. Any recross?

MR. RYAN: Just one question.

THE COURT: Of really questionable relevance here. Go ahead.

RECROSS-EXAMINATION

BY MR. RYAN:

Q. Doctor, are you familiar with Tyson's contract in this watershed?

A. Yes, I haven't memorized them, but I've looked at them.

Q. Just simply want to -- do you know or can you argue with the notion that Tyson's contract with growers in this watershed vary between three and seven years?

A. I have not seen a contract for the last -- I mean, a new contract or fairly new contract that goes seven years. I recall seeing one that went three years.

MR. RYAN: Thank you.

MR. MCDANIEL: Your Honor, may I?

THE COURT: You certainly may. And I take it, while Mr. McDaniel is coming up, that would be an incentive to switch if somebody could provide a more long term contract, I take it?

THE WITNESS: Correct.

THE COURT: Mr. McDaniel.

CROSS-EXAMINATION

BY MR. MCDANIEL:

Q. Dr. Taylor, my name is Scott McDaniel. I represent Peterson Farms. In your testimony that you offered that there are no contracts in force in this watershed that state that the poultry grower owns the litter, did you review the contracts currently in force with Peterson Farms?

A. I have reviewed those, but not looking for that one word on whether it is "own" or "are responsible" for disposing of it.

Q. All right. Sir, is your testimony then that you can state with certainty that the contracts with all the growers and all

the integrators in this watershed currently in force, none of them provide that the litter is owned by the grower?

A. I cannot state that with certainty.

MR. MCDANIEL: Thank you.

MR. TUCKER: May it please the Court.

THE COURT: Yes, sir.

CROSS-EXAMINATION

BY MR. TUCKER:

Q. With regard to Cargill, sir, did you have an opportunity to look at the length of Cargill contracts?

A. Cargill turkey contracts are -- the ones I have seen are for four or five flocks or for eighteen months.

Q. And what year was that contract you looked at?

A. I don't recall.

Q. Was it a current contract?

A. I think it was fairly recent. I don't know that it's current. Probably not current, it only lasted for 18 months.

Q. The contract you testified about earlier was one that was dated 2004. Have you seen a contract for Cargill since 2004?

A. I do not recall seeing one that had longer than four or five flocks or 18 months.

Q. Sir, the question I asked you is have you seen a Cargill contract that was dated since 2004?

A. I do not recall the dates on all of them I've seen, so...

Q. Do you recall seeing one that was since 2004?

A. I do not.

MR. TUCKER: Thank you.

MR. BULLOCK: Judge.

THE COURT: Yes, sir.

MR. BULLOCK: I'm not sure they've produced such contracts. So I have no further questions.

THE COURT: You may step down, sir.

THE WITNESS: Thank you.

MR. GRAVES: Your Honor, I actually have two questions.

THE COURT: I'm sorry.

MR. GRAVES: It's just two quick questions.

CROSS-EXAMINATION

BY MR. GRAVES:

Q. Prior to Mr. Bullock telling you that George's owned a farm in the watershed and managed eight others, were you aware of that situation?

A. I knew that the integrators owned some and --

Q. I'm asking you specific as to George's, though. Were you aware before the attorney told you a few moments ago?

A. I don't recall George's specifically.

Q. I take it then that you don't know whether that contract or those contracts are any different than the contracts that any third-party growers might have with George's?

A. I have not seen, that I can recall, contracts for grow-out

operations owned by the integrator, George's or any of the others.

MR. GRAVES: Okay. Thanks.

THE COURT: Thank you. Mr. Jorgensen.

MR. BULLOCK: Judge.

THE COURT: Yes, sir.

MR. BULLOCK: If any of these companies want to publish their contracts on the record, we're certainly open to that.

THE COURT: Mr. Jorgensen.

MR. JORGENSEN: I'm sorry, Your Honor, we resolved it between ourselves.

THE COURT: All right. And Mr. Elrod.

MR. ELROD: I'm going to take him up on that offer, Your Honor. We'll provide a copy of our newest contracts.

MR. BULLOCK: I think Simmons did in February, I guess. If they -- if this isn't their contract, I wonder what --

THE COURT: This is the Simmons contract, right?

MR. ELROD: We've got newer contracts.

THE COURT: All right, thank you.

MR. BULLOCK: We didn't know of those, Judge.

THE COURT: Thank you. All right, you may step down. Do our reporters need to take a break to update daily copy? Let's do that. It was my intention to go until about 12:30.

So let's take a break to allow daily copy to be updated. We'll be back in five to ten minutes.

(Recess.)

THE COURT: The plaintiff may call its next witness.

MR. BULLOCK: Judge, our final -- we are prepared to rest with -- of course, we need to call back Dr. Lawrence and I wish to offer what is Exhibit 447 as a summary exhibit, Judge. We found that there was one error in it where we had owned and it should have been manages for George's nine farms. The nature of this exhibit is that each of these statements were derived from the transcript designated in the exhibit.

THE COURT: So this is an attempted summary for the Court?

MR. BULLOCK: Right.

THE COURT: And you say in George's case it should be manages rather than owns?

MR. BULLOCK: Correct.

THE COURT: In terms of the statement owns and supplies the birds?

MR. BULLOCK: No, that they -- in fact, you probably have the corrected. As you see up here where we have the tape on, do you see?

THE COURT: Oh, I see. I do have a corrected. It says manages nine farms.

MR. BULLOCK: All right. The original blow-up showed

owned. This is being offered, Your Honor, in support of proof of contributor liability. We have had some questions concerning agency and I would call the Court's attention to both the statute and to our brief --

THE COURT: Contributor is the term; correct?

MR. BULLOCK: It is the term.

THE COURT: So just to clarify here then, you are really not even attempting for the purposes of this preliminary injunction to prove agency?

MR. BULLOCK: That's correct.

THE COURT: You're trying to fall under the terms of the statute with respect to contributor?

MR. BULLOCK: Correct.

THE COURT: All right. Any objection to State's 447?

MR. GEORGE: Yes, Your Honor. I believe that it's being offered, if I understand it, as a summary pursuant to 1006 which I don't believe is a rule that allows for lawyers to summarize deposition transcripts and offer those. It's a rule that relates to data and records as best I can recall. And Your Honor, I would point out that the exhibit that is offered does not have a single direct quotation. So I haven't gone and page and line reviewed every one of these but the underlying deposition testimonies to me would seem to be a more reliable source of information.

THE COURT: I think that's right. I mean, to the

extent that it may help direct the Court, I may use it to look to see if the page and line that Mr. Bullock suggests is supportive of the position. But I do think we're probably, despite the stipulations, we've gone far beyond that which -- to the point where the Tenth Circuit believed one ought to go even under the relaxed evidentiary standards.

MR. BULLOCK: I appreciate the Court's comment. Let me, first of all, in terms of reading the depositions -- and we're certainly happy to read these -- the nature of the counter designations on these is very lengthy. And it appears to me that we might attach these pieces of the record which are brief. And I understand the Court's reluctance to read depositions but these are very limited. And --

THE COURT: The problem just really, frankly, is one of time. I've got, as you may be aware, I've got a deadline within which motions are supposed to be decided and I've got a whole lot of motions that I've got to read.

MR. BULLOCK: Judge, we're really trying to accommodate the Court and understand that and want to move this ahead. We will proceed however the Court wishes, but I will tell you that with the counter designations, this brief information, I think, is well in excess of an hour and will be quite lengthy in terms because of the counter designations, but we're certainly prepared to proceed like that.

THE COURT: So the reading of the designations and

counter designations you think will be an hour?

MR. BULLOCK: Yes, sir.

THE COURT: That's fine. That's probably more efficient to do it that way, frankly.

MR. MCDANIEL: Judge, I do have a comment about the exhibit.

THE COURT: Go ahead.

MR. MCDANIEL: Thank you. Your Honor, Mr. George made the, I think, the key evidentiary point. There's no foundation for this under Rule 1006. And as was just made apparent by your conversation with Mr. Bullock, these contain only their designations. There are statements on there that are argumentative. For Peterson Farms they cite to a Simmons' Foods website. Your Honor, this document is nothing but trouble and I would prefer the Court not even have it in its possession. If the Court is going to make a decision, that it would do so based upon the record.

THE COURT: Well, it sounds to me like the record is going to be presented to me in terms of the designations and counter designations. So the objection of Mr. George and Mr. McDaniel is sustained. The Court will decline to admit the proposed exhibit, Plaintiffs' 447. The plaintiff may call its next witness, whoever is going to, I think, read the deposition; is that correct?

MR. BULLOCK: Yes.

THE COURT: You may proceed.

MR. LENNINGTON: Deposition of Leasea Butler.

Q. "State your name, please.

A. "Leasea Dawn Butler.

Q. "Ms. Butler, how are you currently employed?

A. "I work for Cobb-Vantress.

Q. "You understand that here today you're speaking on behalf of the company Cobb-Vantress. Do you understand that?

A. "Yes.

Q. "In terms of the contract, is it true that Cobb does not negotiate with any of the individual terms of its contract with the growers?

A. "I feel that we do give them the option to negotiate terms. I mean they can sign the contract or not.

Q. "So basically it's a take it or leave it proposition; is that correct?

"MR. GEORGE: Object to the form. Answer if you can.

A. "We have had instances in other complexes where a grower did not want to be on that particular contract. So we have negotiated certain things.

Q. "What type of terms has Cobb changed?

A. "On that one, it went from a one-year contract to a five-year contract. And then our pay schedule has changed between the ones that he -- he was wanting to stay on the one-year contract from '06 versus the five-year contract of

'07.

Q. "Now Cobb also provides all of the feed; is that correct?

A. "Yes.

Q. "Cobb also owns the chickens or the birds the entire time or through the process?

A. "Yes.

Q. "The producer never owns them?

A. "No.

Q. "Okay. Your birds eat the food that you provide?

A. "Yes.

Q. "And then through natural processes, that food becomes feces and urine that goes onto the bedding?

A. "Yes.

Q. "And that bedding is purchased by you?

A. "Yes.

Q. "In your contract, am I correct that there's no provision in it that passes title of the bedding to the producer?

A. "The verbiage is not in the contract, no.

Q. "The producer, though, is required as part of his tasks to remove the waste at the end of the growing cycle; correct?

A. "Correct.

Q. "Do any of your birds or any of the barns collect liquid waste rather than dry waste?

"MR. GEORGE: Hang on, in the IRW?

"MR. BULLOCK: In the IRW.

A. "No just dry.
Q. "And whenever Cobb started here in the IRW, since then its birds have been producing feces and urine, haven't they?
A. "Yes.
Q. "Does Cobb now own any grow-out facilities, I mean actually own any production facilities in the IRW?
A. "No.
Q. "Could you tell me approximately -- I have your report, will give me an exact number, but can you tell me approximately how many houses you have currently under contract?
"MR. GEORGE: In the IRW?
"MR. BULLOCK: In the IRW.
A. "Approximately 130.
Q. "Does the poultry litter have any value to the company once it has been used?"
MR. LENNINGTON: Page 65.
A. "To the company, no.
Q. "It's a by-product of the production process? If you understand the term by-product.
A. "I understand it.
Q. "I'm sorry.
A. "No, that's okay. I believe so. Yes, I believe so, I mean, yes."
MR. LENNINGTON: Page 105.
Q. "Okay. Is there any difference in the method, manner,

direction or management of your poultry-growing operations in Oklahoma vs. Arkansas?

A. "No, they have the same contracts so --

Q. "And are managed under the same program?

A. "Managed under the same complex, yes."

MR. LENNINGTON: Deposition of Kirk Houtchens.

Q. "Would you state your full name or for the record, please.

A. "Casey Kirk Houtchens.

Q. "Mr. Houtchens, for whom are you employed?

A. "Peterson Farms.

Q. "What is your job for Peterson Farms?

A. "I am the live production manager."

MR. LENNINGTON: Page 27.

Q. "Of what significance is it to Peterson Farms that the Illinois River has been designated by law a scenic river in Oklahoma?

A. "I believe we -- we recognize that it's been designated a scenic river.

Q. "Has that fact made any difference to your company in the way it operates?

A. "No, sir.

Q. "Can you list for me any ways in which your company's operations are different in the Illinois River Watershed from other places it operates because the Illinois River was designated as a scenic river?

A. "No, sir."

MR. LENNINGTON: Page 44.

Q. "Okay. What do most of the growers with Peterson contracts do with the poultry excrement and bedding material removed from the houses?

"MR. MCDANIEL: I object to the form.

A. "Well, when you say most, I'll just assume you mean what is the larger percentage or --

Q. "Yeah.

A. " -- the majority?

Q. "Right.

A. "The majority of our independent growers -- well, that is hard to answer. Our growers have to follow their state recommended nutrient management plans. So depending on what that is, whether they can land apply or they have it removed or sell it to be taken to another area, another watershed where it can be land applied."

MR. LENNINGTON: Page 64.

Q. "Do you know if the company is aware that bacteria are contained in poultry manure?

A. "I assume we do, yes."

MR. LENNINGTON: Page 76.

Q. "In your experience, would you agree that farmers are encouraged to apply poultry waste to pasturelands for its nitrogen, even though those soils would have no need for more

phosphorus?"

"MR. MCDANIEL: Object to the form.

A. "No, we don't. Our -- our growers are using their nutrient management plans and those are written based on phosphorus index -- indexes."

MR. LENNINGTON: Page 84.

Q. "Okay. So how would that help the scenic river watershed if less poultry litter were applied in it?

"MR. MCDANIEL: Object to the form.

A. "Personally I don't think it will help. It would if litter is being applied by our contract growers and by what the state law allows, whether it's Oklahoma or Arkansas, there shouldn't be any pollution."

MR. LENNINGTON: Page 164.

Q. "There was a quote I read earlier to you from the Water Quality Handbook which you provided all of your growers back in the 1990's. The quote was that there are -- I'm sorry, that animal waste is a potential source of some 150 disease causing organisms and pathogens. What has Peterson done since first being put on notice of that to deal with that issue?

"MR. MCDANIEL: Object to the form.

A. "I think -- and I'm not looking at that. It just said that most of them don't last very long though, if I remember right what I saw. And that's pretty much what I know too is most -- most bacterias and viruses cannot live very long

outside a body so...

Q. "Has the -- was that it? Did you have anything else?

A. "No, I don't think I answered your question yet but...

Q. "Okay. Well, let's move on.

A. "But I'm just saying that what has Peterson's done? You know, you don't go -- you don't go out and you don't want your kids to go out and handle things that don't need to be handled. I mean, there's no secret. Feces, whether it's human or animal, you don't handle the stuff. But doesn't mean it's bad, you just have to use common sense.

Q. "Has the company taken any steps to protect people against these pathogens which are found in the waste produced by their chickens which is spread throughout the Illinois River Watershed?

A. "No, we have not.

Q. "Has the company done any sampling or testing to find out if the bacteria or any kind of pathogens are, in fact, present in poultry waste from these chickens?

A. "No, we have not.

Q. "Has the company done anything to find out if the pathogens in chicken waste are getting into the Illinois River or its tributaries?

A. "No, we have not."

MR. LENNINGTON: Deposition of Read Hudson.

Q. "Would you please state your name for the Court and for

1 the record.
2 A. "Read Hudson.
3 Q. "Mr. Hudson, are you currently employed?
4 A. "Yes.
5 Q. "And for whom are you employed?
6 A. "Tyson Foods.
7 Q. "All right. And you understand you're here today as a
8 company designee to speak for the company on certain subjects,
9 to provide complete knowledgeable and binding answers on behalf
10 of the company regarding those subjects which you have been
11 identified in an exhibit to 30(b)(6) notice?
12 A. "Yes.
13 Q. "Based on the corporate structure, so that the record is
14 clear, the Tyson Foods, Inc., owns a hundred percent of Tyson
15 Chicken; correct?
16 A. "Correct.
17 Q. "Tyson Poultry, Inc.; correct?
18 A. "Yes.
19 Q. "Cobb-Vantress, Inc.; correct?
20 A. "Yes."
21 MR. LENNINGTON: Page 49.
22 Q. "For purposes of control in the Tyson entities, does
23 Cobb-Vantress take direction, if you will, from Tyson Foods?
24 A. "Yes.
25 Q. "And the other entities, Tyson Chicken, does it likewise

take direction from Tyson Food, Inc.?
A. "Yes.
Q. "And Tyson Poultry, Inc., does it take direction from Tyson Food, Inc.?
A. Yes."
MR. LENNINGTON: Deposition of Benny McClure. Page 7.
Q. "Mr. McClure, please state your full name for the record.
A. "Benny Lloyd McClure.
Q. "Are you currently employed?
A. "Yes.
Q. "And for whom are you employed?
A. "George's.
Q. "You understand you are here today to speak as a company designee and that company would be George's, Inc. Do you understand -- let me clarify this. Does George's, Inc. own, wholly own the George's Farm, Inc., company?
A. "Yes.
Q. "To try to make this simple today, what I'm going to suggest is that when we refer to George's, we'll refer to George's, Inc., the parent company. If there is some particular answer that you believe is better corresponded from that entity, George's Farms, will you let me know that?
A. "Yes.
Q. "Okay. So you're here today to speak on behalf of both entities. Do you understand that that's your role today?

A. "Yes.
Q. "And you're not speaking personally for yourself but that of the knowledge of the company or the companies. Is that your understanding?
A. "Yes, it is."
MR. LENNINGTON: Page 32.
Q. "Does George's, Inc., or its subsidiaries have growing, like poultry barns, in the IRW today?
A. "Yes.
Q. "Maybe I can ask it to you this way. Does George's, Inc., have its own company owned or managed poultry barns in the State of Arkansas?
A. "Yes.
Q. "State of Oklahoma?
A. "No.
Q. "The IRW -- the poultry barns located in the IRW, does George's, Inc. own those facilities?
"MR. GRAVES: Object to the form.
A. "George's, Inc. owns one farm in the Illinois River Watershed.
Q. "Okay. And is it a broiler farm?
A. "Yes.
Q. "Do you know the name of that farm?
A. "Morrison Farm.
Q. "Has it owned more than one farm in the past within the

IRW?

"MR. GRAVES: Object to the form.

A. "That is the only farm that George's, Incorporated, has owned in the watershed that I'm aware of.

Q. "Okay. Has George's or any subsidiaries of George's owned any other farms in the IRW now or in the past?

A. "I'm not trying to dodge your question. I'm trying to think of -- there are, there are other farms that are managed by George's, Inc., that are not owned by George's, Inc.

Q. "Can you give me an example of the names of -- do you know how many there are, managed farms?

A. "I could count them in my head, but I believe there are nine.

Q. "And those are all in the IRW?

A. "That are in the IRW."

MR. LENNINGTON: Page 61.

Q. "My question to you, sir, is what did George's do to substantiate or to provide the basis for factually its opinion that you just gave on behalf of George's --

"MR. GRAVES: Object to the form.

Q. "-- that you can nearly eliminate pollution from animal waste being applied?

A. "I got that, but I'm not sure how I misstated -- you said I misstated number 39. How did I misstate?

Q. "Well, you added the term eliminated and it doesn't say

that. It says to reduce. And we got off talking elimination and you have said that nearly eliminated. And I'm asking what George's did to determine it's nearly eliminated if you follow these waste utilization guidelines. What did they study, what did they research, what did they do to determine the truth of that statement?

"MR. GRAVES: Object to the form.

"MR. HIXON: Object to the form. Assumes facts not in evidence.

A. "George's has worked with the NRCS, who are the soil scientists, if you will, the people that are on the ground writing plans, monitoring those plans, evaluating those plans, updating those plans as necessary. George's has worked with those folks. And it is through our work with those people that are qualified to make those judgments that we have developed that opinion.

Q. "When you say George's has worked with them, what has George's done?

A. "George's has worked with them in -- as they come out and they soil test our fields and they put the maps together and we give them the information that they need to prepare our plans.

Q. "Is it that all George's has done in order to substantiate its opinion that nearly eliminates the potential for pollution from animal waste being spread on the land?

"MR. GRAVES: Object to the form.

A. "When you're working with and cooperating with the people that are trained to do that, the people that are the soil scientists, the people that our government, in fact, puts out in the field to be the experts, that is enough to develop the opinion that I just expressed to you.

Q. "Okay. Let me ask it to you this way. Has George's done anything independent of that to determine the truth of the statement you've made for George's?

"MR. GRAVES: Object to form.

A. "It is not our opinion that we have to go out and verify what the government and the state and the soil scientists are telling us.

Q. "Okay. Your answer is you've not done that then; is that correct?

"MR. GRAVES: Object to the form.

Q. "You've not done anything independent to determine whether or not that statement is correct?

"MR. GRAVES: Object to the form.

A. "George's has not felt the need to do its own research or commission any studies when there are people in the field that are trained scientists that are trained to prepare these plans that are funded by the government that are the experts in that arena. George's has not felt the need to go beyond that."

MR. LENNINGTON: Page 79.

Q. "Do you know whether or not George's has made any attempt

to undertake a study or research whether or not poultry waste, poultry manure runs off land from which it's been applied?

A. "George's has not independently commissioned any studies to make that determination.

Q. "Do you know whether or not George's has made any independent research into whether or not poultry manure, when it's spread on the land, can run off?"

"MR. GRAVES: Object to the form.

A. "George's has not."

MR. LENNINGTON: Page 132.

Q. "What I'm going to do now is I'm going to go down a list of items that I believe are uniform in respect to all of these contracts and I'm going to ask you whether or not these are -- if my understanding is correct about the various aspects of these contracts. So if there is a particular contract that you know of that doesn't fit into the category that I'm describing, please let me know. First off, with regard to these contracts, George's does not negotiate the terms of these contracts with its growers, does it?"

"MR. GRAVES: Object to the form of the question.

A. "From the standpoint of the grower gets to make the decision as to whether or not he wants to enter into that contract with George's.

Q. "That's the grower's choice, whether they even want to enter the contract; correct?

A. "That's correct.
Q. "But the actual terms of that contract, the conditions under which they will perform, the grower does not negotiate those terms with George's; is that correct?
"MR. GRAVES: Object to form.
A. "That is correct.
Q. "Is it correct then that George's supplies and delivers the birds to its growers at no cost?
A. "That is correct.
Q. "And George's owns the birds or retains title to the birds throughout their life?
A. "That is correct."
MR. LENNINGTON: Page 135.
Q. "Does George's supply and deliver all the feed to each of its grow-out farms?
A. "Yes, it does.
Q. "Does it supply all the medications required for the birds at the grow-out farms?
A. "If any is required, we would supply it.
Q. "Does George's supply all the vaccinations that are required for the birds at the grow-out farm?
A. "Yes, we do.
Q. "And does George's supply all the veterinary services for its birds?
A. "Yes.

Q. "George's, in fact -- it also supplies what I refer to as a service tech or a field representative, field man? What term do you use at George's?

A. "Serviceman is fine.

Q. "Serviceman. And does George's supply a serviceman for use -- let me back up. First off, the serviceman is an employee of George's; correct?

A. "Yes.

Q. "His duties or tasks are generally to go in and out and check on the various grow-out farms on a fairly regular basis?

"MR. GRAVES: Object to the form.

A. "Generally, yes."

MR. LENNINGTON: Page 146.

Q. "Okay. Does George's have a minimum defined specifications for the houses' growers are to used?

"MR. GRAVES: Object to the form.

A. "We do not have minimum housing specs that existing growers have to meet. If a grower has a contract with George's, as long as he is competitive and productive under that contract, we don't require that he upgrade or update his equipment as we go along.

Q. "George's has what is referred to as an intensified management program; is that correct?

A. "That is correct.

Q. "When did that go into place?

A. "That went into place about 7 years ago.
Q. "If a grower is in that program and doesn't seem to succeed, is that an example where maybe an upgrade of the housing specifications is requested?
A. "The upgrade may be recommended to the grower, but it's always the grower's option as to whether or not he wants to make that upgrade."
MR. LENNINGTON: Deposition of Gary Murphy. Page 7.
Q. "Mr. Murphy, give us your full name, please, for the Court.
A. "Gary Jack Murphy.
Q. "And you are currently employed; is that correct?
A. "That's correct.
Q. "For whom?
A. "Simmons Foods.
Q. "How long have you been so employed?
A. "Sixteen years.
Q. "And what position or capacity do you hold at this time?
A. "President of poultry operations.
Q. "Do you understand that you're here today as a company designee to speak for the company on certain subjects and to provide a complete, knowledgeable and binding answer on behalf of the company regarding the subjects that are identified in the Rule 30(b)(6) notice?
A. "Yes, sir."

MR. LENNINGTON: Page 20.

Q. "Does Simmons Food, Inc., have any ownership interest in any investor farms or partnerships?

A. "Simmons Food does not, no, sir."

MR. LENNINGTON: Page 39.

Q. "Isn't it a fact that farmers who contract with Simmons apply poultry litter to their own land as fertilizer?

A. "In cases where they have land that is suited for application of litter, yes, sir.

Q. "And if they don't, they typically sell it, don't they?

A. "That's one of the options that they have, yes, sir.

Q. "Or they can give it away; correct?

A. "That's true.

Q. "And generally when they do, they give it to somebody who then spreads it on their land. Is that a fair statement?

A. "Litter would be applied somewhere, yes, sir.

Q. "It's not taken to a landfill, is it?

A. "No, sir."

MR. LENNINGTON: 53.

Q. "Prior to the inception of any regulation with regard to the application or land spreading of poultry waste, Simmons required soil testing to be done by its contract growers?

A. "We started urging all of our growers to adhere to best management practices.

Q. "When?

A. "Early '90s.
Q. "And what was the reason that you started in the early '90s urging them to follow best management practices?
A. "More of a general philosophy and concern that Simmons has in regard to protection of the environment."
MR. LENNINGTON: Page 114.
Q. "Does Simmons admit or deny pathogens are contained in poultry waste?
A. "I think that there are certain pathogens in there, yes, sir. But I would also like to say that I'm certainly not a scientist. As far as any bacteria or pathogens that would be in there that I would have to -- based on the number of years I've been in the business, I have never seen anything come forward from any agencies to say that there is anything hazardous to human health in it.
Q. "So it's your belief that the pathogens in poultry waste does not create a threat to human or animal health?
"MR. MCDANIEL: I object to the form.
A. "I have never seen anything documented that said anyone has gotten sick based off pathogens found in poultry litter.
Q. "And when you say that, you're speaking for Simmons; is that correct?
A. "That's correct."
MR. LENNINGTON: Page 118.
Q. "Would Simmons utilize the same broiler agreement for all

broiler growers?

A. "Yes.

Q. "And that contract would be used regardless of the state in which the growers are located, it would be the same form?

A. "That's correct."

MR. LENNINGTON: Page 126.

Q. "And generally it's true, is it not, that Simmons doesn't negotiate the terms of its contracts with its contract growers?

A. "That's true."

MR. LENNINGTON: Page 130.

Q. "So you believe that the form that I would be looking for if I wanted to find a litter disposal record that's required for a grower to be maintained, it would be a questionnaire that you were referring to?

A. "We require them to have adequate nutrient management plans. In those plans, they are required by the State to maintain those records.

Q. "Is that the same in Arkansas and Oklahoma?

A. "Yes, sir.

Q. "And in the GAP program, does he receive more attention from the service tech and/or others in management with regard to his growing?

A. "We would offer that, yes, sir.

Q. "You would offer it. Do most growers need and require it?

A. "That doesn't necessarily mean they will accept it but

yes."

MR. LENNINGTON: Page 139.

Q. "Does Simmons own the birds at all times?

A. "Yes, sir.

Q. "Simmons supplies all the feed to the farm for the growers?

A. "Yes, sir.

Q. "And do they, in fact, deliver it to the growers at no cost?

A. "Yes, sir.

Q. "Does Simmons supply all the medication used for the birds?

A. "Yes, sir.

Q. "Does Simmons supply the vaccinations used for the birds?

A. "Yes, sir.

Q. "Does Simmons supply all the veterinary services provided for the benefit of the birds?

A. "Yes, sir.

Q. "Does Simmons supply then a service tech, as we talked about before, who makes these weekly or more often visits?

A. "Yes, sir.

Q. "There's no charge for that from the grower's standpoint, is there?

A. "That's correct.

Q. "And talking about the service techs, is it correct that

they supervise and advise for the care and feeding and management of the flock?

A. "They look in on the birds and give advice to the grower.

Q. "Do they inspect, when they look in on the birds, temperature controls and/or the temperature in the barn?

A. "On all of our houses today, it's all computerized and all of that information is available through printouts either with the grower -- primarily with the grower."

MR. LENNINGTON: Was there a designation on 146 to 149? Is the next designation 154?

MS. GENTRY: Yes, 154.

Q. "This may be a good time to look at this document. Your counsel handed us before the deposition today a document named SIM AG 32198. That's the only copy I have. But tell the Court what this document is and what it represents.

A. "This is the number of houses primarily of each broiler type, breeder type and pullet type. In the bold or in the typed print is from 2003 until current, 2007. There's penciled in figures on the top of the page that go from 2000 to 2002. It gives the number of houses, again both active and inactive, the number of head for those given years and that number of head is for broilers. Our data system didn't allow us to pick up breeder or pullets.

Q. "Say that again.

A. "For instance, say 2004 where we have --

Q. "Yes, sir.
A. " -- 25.4, those are the -- that's millions of head and that would have been settled in the Illinois River Watershed.
Q. "And it's broilers only?
A. "Broilers only.
Q. "What -- so that I'm clear, this entire set of facts deals only with the Illinois River Watershed; correct?
A. "Yes, sir."
MR. LENNINGTON: Page 170 -- no, page 169.
Q. "I guess my question was do you know whether or not Simmons owns land where it would have deposited or spread poultry waste from any of its barns or grower -- contract grower barns?
A. "No, sir."
"MR. ELROD: Question was do you know and your answer was no?
"MR. GARREN: Right.
Q. "And that's what you -- you're saying you don't know. It's not that you don't have, it's just that you don't know?
A. "I don't know of any, no, sir.
Q. "Is there any limit by which one of those facilities is central to determining how far a grower can be and Simmons would contract with them?
A. "The Fairland Feed Mill.
Q. "How far then would Simmons go to contract with somebody

that is supplied from that mill?

A. "Nothing outside of a hundred miles.

Q. "So anything under a hundred miles would be considered as a potential grower site?

A. "Would be a potential, yes sir."

MR. LENNINGTON: 193.

Q. "Is that the way you read this?

A. "That's the way I'm interpreting it, yes, sir.

Q. "And 47 tons in Elk River and 61 tons in Honey Creek, and those are the respective percentages. Going back to others, you said that could be a mushroom company?

A. "Could be. Could be.

Q. "I know there is a mushroom company. What is the name of that company?

A. "I don't recall. It's located just outside of Miami, Oklahoma, though.

Q. "What is that, J&M?

A. "Yeah, it is J&M.

"MR. ELROD: J&M at the bottom of this.

"MR. GARREN: J&M, you cheated and went to the bottom.

Q. "Okay. So then how does the waste generated we see there that goes to J&M, how does it get there?

A. "The litter is sold to a contract hauler and the contract hauler in turn delivers it."

MR. LENNINGTON: Page 261. "Mr. Elrod."

Q. "You were asked about -- these were my words: Good deeds regarding environmental issues and about Simmons' dedication to the environment?

A. "Yes, sir.

Q. "In order that we may, we will not be arguably prohibited from talking about these things at trial. I want to ask you some questions about a few of these that would fit in this category. Has Simmons Foods encouraged the use of BMPs by its independent contract growers since at least the early 1990s?

"MR. GARREN: Leading and suggestive. Object to the form.

A. "Yes, sir.

Q. "Has Simmons contractually required that its independent contractor growers have nutrient management plans since at least, I think, late 1990s, maybe early 2000s?

"MR. GARREN: Object to the form, leading.

A. "Yes, sir.

Q. "And does Simmons Foods, in fact, now monitor whether or not its growers have nutrient management plans --

A. "Yes, sir.

Q. "And has Simmons Foods assured itself that all of its growers do, in fact, either have nutrient management plans in place or under application at the present time?

A. "Yes, sir.

Q. "Has Simmons Foods since at least the late '90s, maybe

early 2000s required contractually its independent contract growers comply with all laws of the State of Oklahoma and Arkansas?

A. "Yes, sir.

Q. "Do those include environmental laws?

"MR. GARREN: Object to the form.

A. "Yes, sir.

Q. "And do we know whether Claude Rutherford as a W-2 employee of Simmons was dedicated by the company to being utilized by the Arkansas governor's animal waste task force in the 1990s?

A. "He was.

Q. "And the company paid his salary while he was dedicated to that job; is that true?

A. "That's true.

Q. "Do you know whether Claude was also active in the Oklahoma Governor's Animal Waste Task Force?

A. "It's my understanding that he was, yes.

Q. "Referring to the Southwest City facility, has Simmons Foods recently won a national award for its contributions to water quality?

"MR. GARREN: Object to the form of the question.

A. "Yes, sir.

"MR. GARREN: Leading and suggestive.

Q. "And have you also installed, at substantial cost to the

company, sophisticated air emissions controls at the Southwest City facility?

"MR. GARREN: Same objection as to the form.

A. "Yes, sir, we have.

Q. "And has the company also made a substantial gift to the Oklahoma Scenic Rivers Commission?

A. "Yes, it has.

Q. "And does it have ongoing responsibilities towards making gifts to the Oklahoma Scenic Rivers Commission?

A. "Yes, it does.

Q. "Has Simmons Foods supported the relatively new Arkansas law and the upcoming regulations regarding the land application of chicken litter on the Arkansas side of the state line?

"MR. GARREN: Object as to form. Leading.

A. "Yes.

Q. "And has Simmons Foods invested substantial money, along with Tyson Foods, in an attempt to develop, I think you referred to it as composting but I'm referring to it as pelletizing, a pelletizing program for utilization of chicken litter?

"MR. GARREN: Object to the form, leading.

A. "Yes, sir.

Q. "And has Simmons Foods sponsored at its physical headquarters in Siloam Springs what I call a come-one-come-all conference to determine alternative uses for chicken litter?

A. "Yes.
Q. "And has Simmons Foods provided some financial support for BMPs, Incorporated?
A. "Yes, they have.
Q. "And is the job of BMPs, Incorporated, among other things, to put together a hopefully sustainable transportation program to move litter out of the Illinois River Watershed?
"MR. GARREN: Object to the Form.
A. "Yes, sir.
Q. "And has the company, for a number of years -- I think it was one of the exhibits -- in fact, moved litter from the Grand Lake/Eucha-Spavinaw Watersheds from company-managed farms outside of those watersheds?
"MR. GARREN: Object to the form and relevance with regard to this lawsuit.
A. "Yes, they have.
Q. "And the company operates a wastewater treatment facility at its Southwest City facility; isn't that true?
A. "That's correct.
Q. "And has it enacted a stringent phosphorus controls on that wastewater facility?
"MR. GARREN: Object again as to form, leading.
A. "Yes, sir.
Q. "And is it, in fact, discharging substantially less than .5 parts per million phosphorus out of that facility?

A. "That's correct.

"MR. GARREN: Object to the form, leading.

Q. "Are there other things we might think of later, given enough time?"

A. "Possibly."

MR. LENNINGTON: Deposition of Steven Patrick.

THE COURT: This would be an appropriate time to break. Let's go to lunch. We'll be back here at 1:00 o'clock.

(Recess.)

THE COURT: You may resume.

MR. LENNINGTON: Deposition of Steven Patrick.

Q. "State your name, please.

A. "Steven Wayne Patrick.

Q. "By whom are you employed, Mr. Patrick?

A. "Tyson Foods.

Q. "What is your job title?

A. "I am the director of EHS Services.

Q. "What does EHS mean?

A. "Environmental, Health and Safety."

MR. LENNINGTON: Page 12.

Q. "Today you have been designated as the person to testify on behalf of some Tyson companies. Do you understand which Tyson companies you're speaking on behalf of today?

A. "Yes.

Q. "What are those?

A. "Those would be Tyson Foods Incorporated, Tyson Chicken, Cobb-Vantress and --

Q. "Tyson Poultry?

A. "Tyson Poultry. I wanted to make sure I didn't skip any.

Q. "So there are four, those four?

A. "There are four."

MR. LENNINGTON: Page 19.

Q. "So are you telling me today that the Tyson entities don't have any information about the constituents of poultry waste found or sampled from the floors of grow houses in the Illinois River Watershed where their chickens are raised?

A. "I am saying that I am not aware of any specific information on a house in the Illinois River Watershed that would have come to Tyson Foods.

Q. "Well, you're speaking on behalf of all four entities?

A. "Yes."

MR. LENNINGTON: Page 40.

Q. "As far as you know, Tyson has no records regarding the amount of poultry waste that is generated over a certain period of time in one of its own houses?

A. "That is correct."

MR. LENNINGTON: Page 42.

Q. "What about within the entire watershed, the Illinois River Watershed currently since Tyson doesn't own any houses that it operates where its birds are fed in the watershed. So

my question would be just to those contract growers' houses in the Illinois River Watershed. In the entire watershed, does Tyson have any statistical information about the amount of waste?

A. "No.

Q. "None?

A. "Are you saying quantify all the waste? We do not have any document that summarizes how much poultry litter is in the entire watershed.

Q. "Tyson contract grower houses?

A. "Yeah. Well, they're --

Q. "I was talking just about the Tyson companies, not other poultry companies operating in the watershed?

A. "We do not have information on the total -- from the contract growers, we do not have information on all the poultry litter in the Illinois River Watershed."

MR. LENNINGTON: Page 80.

Q. "So the fact that the river has been designated as a scenic river hasn't caused any differences in the way Tyson conducts its businesses there?

A. "For the businesses that we own, no.

Q. "No, you do business with growers in the Illinois River Watershed, don't you?

A. "Yes, yes.

Q. "Has the fact that it has been designated a scenic river

entitled to protection, special protection, in fact, change or had any bearing upon the way Tyson does business in that watershed?

"MR. GEORGE: Object to form. Answer if you can.

A. "I don't think it would have made any change. We would want them to make sure that they followed the regulations in that area. If the regulation is designated to a certain standard and -- they have to comply with the law. So we would still make them follow the law, ask them to follow the law."

MR. LENNINGTON: Page 126.

Q. "I believe we learned yesterday that in its contractual relations with its growers and producers, Tyson is not allowed to have different requirements or simply doesn't have, that all of its contracts are essentially the same with respect to growers similarly situated?

A. "That's my understanding."

MR. LENNINGTON: Deposition of Patrick Pilkington. Page 6.

Q. "Please state your full name for the Court.

A. "I'm Patrick Martin Pilkington.

Q. "And are you currently employed, Mr. Pilkington?

A. "Yes, I am.

Q. "And for whom are you employed?

A. "With Tyson Foods.

Q. "Today I will be using certain terms and I want to talk

about the definition of those terms so you and I understand each other when I do ask those questions. When I refer to Tyson or Tyson Foods, I mean Tyson Foods and all of its entities that it owns, such as Tyson Poultry, Tyson Chicken, Tyson Farms, Cobb-Vantress. If your answer needs to be particular to any one of those separate entities, please tell me that that's what you're doing, if you would please. Otherwise, I'll just understand that we're talking generally about Tyson Foods and its entities. Is that a fair understanding then?

A. "Well, I understand, except that I can't speak for Cobb.

Q. "Okay. Other than Cobb then. So you understand that you're here today to speak on behalf of Tyson as a designee knowledgeable on certain issues and areas of inquiry. Do you understand that?

A. "Yes."

MR. LENNINGTON: Page 20.

Q. "Is it true that the contracts that Tyson uses are not negotiated in the terms with the grower?

A. "Well, when we offer a contract, they certainly have the ability to either accept the terms or not.

Q. "And with regard --

"MR. GEORGE: Let him finish his answer.

Q. "I'm sorry.

A. "Excuse me. When we offer a contract, they have the

ability to accept the terms or not. They have the ability to review that contract over a period of -- a reasonable period of time, consult with counsel, consult with accountants or so forth and then decide for themselves whether they want to enter into that contract.

"MR. GARREN: Okay. For the record, I'd move to strike his answer as not responsive.

"MR. GEORGE: Hang on. Let me state for the record -- you made a statement. I'm going to make one too, okay. I want to say his answer was directly responsive. I think the confusion stems from what you define as negotiation versus the witness.

Q. "With regard to the actual terms of the contract, are any of these negotiated separately with the growers individually?

A. "We do not. We don't negotiate, to use your term, individual parts of contracts. In fact, it's my understanding that we have an obligation through Packers and Stockyards' regulations to treat similarly situated growers similarly. And in fact, I believe that would prohibit what I think it is you are asking."

MR. LENNINGTON: Page 48.

Q. "Let's talk just generally about contracts. I want to go through a list of items and ask you whether or not these provisions are generally what you see in contracts with the Tyson growers. Tyson, does it supply and deliver the birds to

the grower at no cost?
A. "Yes, we bring the birds to their farm.
Q. "And does Tyson always own of the birds it delivers?
A. "It retains ownership, yes.
Q. "Okay. Does Tyson generally set the schedule for placement of the birds with the grower?
A. "Yes.
Q. "Does Tyson generally set the schedule for pickup of the birds from the grower?
A. "Yes.
Q. "Does Tyson supply and deliver all the feed to each farm?
A. "Yes."
MR. LENNINGTON: Page 67.
Q. "If certain house conditions at the grower facility don't meet Tyson's specifications, will it withhold birds?
A. "If the conditions are such that we feel they would inhibit the welfare of the bird, sir.
Q. "Does the Tyson entities require houses to be cleaned out periodically?
A. "We don't set the clean-out schedule for our facilities, no.
Q. "Does Tyson require houses to be cleaned out periodically?
A. "There are cases when we have had houses cleaned out, yes.
Q. "Does it have a provision in its contract or its grower manuals with regard to the periods in which houses should be

cleaned out?

A. "No.

Q. "Does Tyson require a decaking to occur after a flock has been in a house?

A. "No. We will require -- or excuse me. We will have a producer decake a house when the conditions are such that they're going to hinder the birds' welfare or performance on the next flock. But as a general rule, we don't just require that for every flock every time."

MR. LENNINGTON: 147.

Q. "What is the furthest distance from a mill Tyson will contract with a contract grower?

A. "We don't have a set policy for distance that growers have to be within, but going on to say what may be the furthest one today, I know of contract situations that may be as great 70 miles. I don't know if that's the longest one out there though.

Q. "Is that distance more the exception?

A. "That would be more of the exception, yes.

Q. "Is there a distance with those feed mills in the IRW -- let's back up and just ask you this. What feed mills service the IRW?

A. "Westville, Johnson Road and that's it. That, again, exclusive of Cobb.

Q. "Is there a general distance from Westville, Johnson Road

that Tyson prefers to have the growers located?
A. "Again, we didn't -- we don't have a policy around that. The closer, the better but -- so I can't even say that there's -- I can't even make a generalization there other than to just look at the growers and figure out how far they are."
MR. LENNINGTON: Deposition of Ray Wear.
Q. "Would you state your name for the record, please, sir.
A. "Ray Wear.
Q. "Mr. Wear, we've just met. I'm David Riggs. I'm an attorney for the State of Oklahoma in this litigation that the State has filed against your company, Peterson, and other defendants regarding alleged pollution of the Illinois River Watershed. Do you understand why we're here today?
A. "Yes, sir.
Q. "What is your understanding of that?
A. "That I'm supposed to talk about contracts in the corporate structure.
Q. "Okay. So you were designated as a spokesperson for the company, Peterson Farms, Inc., in those areas you just mentioned?
A. "Yes, sir."
MR. LENNINGTON: Page 18.
Q. "Okay. So Peterson Farms in its broiler operation has always contracted with other persons to grow its broilers? Either would sell them to them and buy them back or actually

contract with the growers, independent growers, to take care of their chicken until they are ready for processing?

A. "Yes."

MR. LENNINGTON: Page 30.

Q. "So back when Peterson contracted with persons to raise these broilers, Peterson maintained ownership of the birds the entire period of time; correct?

A. "That's correct."

MR. LENNINGTON: Page 39.

Q. "Were any terms under any contracts Peterson ever had with any of its growers negotiated with the individual grower?

A. "Not to my knowledge.

Q. "All of the growers who are under contract to Peterson Farms or Evans & Evans who raise broilers raise them under the same contract terms?

A. "Yes."

MR. LENNINGTON: Page 55.

Q. "Who owns the poultry waste which accumulates in the contract grower's grow house?

"MR. MCDANIEL: Object to the form.

A. "Talking about poultry litter?

Q. "Well, we'll talk on that later but I'll let you use your term for now, poultry litter?

A. "The grower owns it.

Q. "From the time Peterson started using contract growers to

produce its chickens, has the grower always owned the litter produced in the growing of the chickens?

A. "As far as I know, yes.

Q. "Has Peterson ever imposed any restrictions on its contracts regarding how poultry litter is to be managed and disposed of, other than that we've just talked about?

A. "It's required a litter management plan for several years."

MR. LENNINGTON: That's it, Your Honor, for our designations.

THE COURT: Defendants.

MR. BULLOCK: Judge, we do not have as of yet a 30(b)(6) from Cargill Turkey -- or Cargill, Inc., or Cargill Turkey. So it is important that I call the Court's attention to page 23 of the joint response of the defendants filed in this matter. It is document No. 1531 where the defendants write, "Under these contracts, defendants provide poultry to contract growers --"

THE COURT: Hold on just one second.

MR. BULLOCK: I'm sorry, sir.

THE COURT: I'm trying to get where you are. You say document what, Exhibit 23?

MR. BULLOCK: Document 1531. No, it's Document 1531 in the Court's file.

THE COURT: Got it.

MR. BULLOCK: And page 23 on that.

THE COURT: All right. Where are you, sir?

MR. BULLOCK: I'm at the top paragraph on that page where it says, "Under these contracts, defendants provide poultry to contract growers and pay them a fee for their services. The contract growers raise the poultry in their own houses on their own land. While defendants retain ownership of the chicks and provide feed, medicines and technical support, the contract growers provide and control everything else in this process."

MR. TUCKER: Excuse me. Is that defendant or defendants?

MR. BULLOCK: It says defendants. And at this time, Judge, we conclude the presentation of the case with the right to reopen to call Dr. Lawrence.

THE COURT: Mr. Jorgensen?

MR. JORGENSEN: May it please the Court.

THE COURT: Yes, sir.

MR. JORGENSEN: Can I briefly ask Mr. Bullock's indulgence to clarify what type of testimony he expects from Mr. Lawrence. I think I know, but it would probably be good to have it on the record.

MR. BULLOCK: Dr. Lawrence?

MR. JORGENSEN: Yes.

MR. BULLOCK: As described in his affidavit and in

his -- of course, in his testimony given at deposition.

MR. JORGENSEN: With that, Your Honor, we as the defendants have been very grateful for your time and attention in this case. We'd like to start out our case at the close of the Plaintiffs' case, recognizing that they are still going to call Dr. Lawrence. And Dr. Lawrence is going to offer his opinion as to imminent and substantial endangerment.

THE COURT: Remind me, is this being done because of his schedule?

MR. JORGENSEN: I believe that's right. The defendants accommodated that because I believe he had a family vacation or something of the sort.

MR. BULLOCK: Right, his family had bought cruise tickets for him months ago and there was no way to reschedule.

MR. JORGENSEN: I totally understand that, so he will come later. But with that, with exception, Plaintiffs' case is closed. And we have enjoyed your time and attention. We've enjoyed being here with you, but I think we might be able to save everyone a lot of time, the Court, the parties and everyone by asking you if you are not prepared under the elements that were put up by the plaintiffs at the first of the case to enter your judgment. Plaintiffs' case is in on all of the issues except imminent and substantial endangerment. If I can just briefly begin our case by saying what have you heard that says -- if I can bring up one of the slides that the

General used. This is State's Exhibit 465. The definition of solid waste under RCRA --

THE COURT: I just wonder, given the stipulation or agreement rather to allow Mr. Lawrence to be brought in out of time whether we're spending our time properly here with regard to essentially a demurrer.

MR. JORGENSEN: And it is essentially that, that is where I'm going.

THE COURT: Given that you've all agreed that Lawrence is yet to come in, I really think we ought to wait until Lawrence's testimony before you make that argument.

MR. JORGENSEN: I understand, Your Honor. Our thought was that since he is addressing only imminent and substantial endangerment and not solid waste, he's a medical doctor, as I understand it, we can talk about every point except for imminent and substantial endangerment because if it's not a solid waste, it doesn't matter if there's imminent and substantial endangerment, as you understand. But if you would prefer that we wait, we'll wait.

THE COURT: I really would. You all need to bring me more up to speed on the solid waste issue. I'm a lot farther than I was at the beginning of this process, but I need to be more educated before I make that decision.

MR. JORGENSEN: All right. We'll look forward to that. Thank you, Your Honor.

THE COURT: So defendants may can call their first witness.

MR. MCDANIEL: Your Honor, the defendants call Jay Churchill.

JAY ANDREW CHURCHILL

Called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

THE COURT: State your full name for the record, please.

THE WITNESS: Jay Andrew Churchill.

THE COURT: Thank you. Mr. McDaniel, you may inquire.

MR. MCDANIEL: Thank you, Your Honor. Just to start off, I will utilize three exhibits during the examination that I believe are subject to the stipulation. We've handed up a copy for Your Honor. That is the Defendants' Exhibit PI 50 and 289 and then also Defendants' Demonstrative No. 36.

THE COURT: Agreed that those are subject to the stipulation?

MR. BULLOCK: Yes, Your Honor.

THE COURT: Very well. Defendants' PI 289 and Defendants' 36 and Defendants' PI 50 are admitted.

MR. MCDANIEL: Thank you.

DIRECT EXAMINATION

BY MR. MCDANIEL:

Q. All right, sir. Would you tell us what your profession

is, Mr. Churchill?
A. I'm a professional engineer in the Province of Ontario.
Q. Who do you work for?
A. I work for Conestoga-Rovers & Associates.
Q. And what type of company is Conestoga-Rovers & Associates?
A. We're an environmental engineering firm, multidisciplinary firm with a focus on environmental work.
Q. Mr. Churchill, what has been admitted as Defendants' Exhibit 289, I've placed before you. Is that a true and accurate copy of your expert report that was attached as Exhibit 44 to the joint response of the defendants?
A. Yes, sir.
Q. Would you describe briefly for the Court, Mr. Churchill, your work history and qualifications that relate to the opinions expressed in your report?
A. I have a bachelor of science degree in engineering. I'm a professional engineer in Ontario. I've over 20 years experience in the environmental field. Part of that experience includes the collection of many, many environmental samples, including soil, groundwater, surface water, sludge, wipe samples, air samples.
Q. Have you had experience, sir, in developing field sampling programs?
A. Yes, sir. I've followed agency approved work plans which contain a sampling analysis plan. I've prepared sampling

analysis plans myself, educated personnel that work with me and for me on execution of those plans.

Q. All right. Attached to Defendants' Exhibit 289 is Appendix A. Is this a correct and up-to-date version of your curriculum vitae?

A. Yes, sir.

Q. All right. Now, part of the services you render or Conestoga-Rovers renders to clients is environmental field sampling?

A. Correct.

Q. And does Conestoga-Rovers provide these services on an international basis?

A. Yes, sir.

Q. Are you familiar with sampling standards and industry practices within the United States?

A. Yes, the primary location of my work is in the United States.

Q. Are you familiar with working under protocols established by the United States Environmental Protection Agency?

A. Yes, sir, absolutely. Most of our work plans that prepare are prepared to follow U.S. EPA and industry standards.

Q. And you were hired to work for the defendants in this case; is that right?

A. Correct.

Q. And what were -- what were you hired to do?

A. We were hired to review a work plan and standard operating procedures prepared by CDM and then to conduct field oversight of CDM's sampling activities.

Q. Now, as far as the oversight, I note your report is entitled Report of Sampling Oversight Operations, Illinois River Watershed, Oklahoma and Arkansas; is that right?

A. Yes, sir.

Q. Now, the field sampling that Conestoga-Rovers observed or monitored, was that the sampling that was done pursuant to the subpoenas issued from this Court, if you know?

A. Yes, it's my understanding that it was at least a portion of the sampling done pursuant to the subpoena.

Q. Do you understand that Camp Dresser McKee did other sampling for which Conestoga-Rovers did not receive notice nor did it monitor the work?

A. That's my understanding, yes.

Q. Can you tell the Court how you went about performing your task of monitoring or observing CDM's sampling?

A. Sure. Typically we set up one or two teams of personnel. Those teams might consist of three or four individuals, one person taking field notes, another person taking a video log, a third person recording still photographs and another person collecting, recording the geospatial information on GPS. Sometimes there might be a little bit of overlap between those personnel.

Q. What were the media or substances that were sampled at the time your teams were making observations?
A. Soil, spring water, groundwater and poultry litter.
Q. All right. What you refer to groundwater, were those samples taken from groundwater wells?
A. Yes, sir.
Q. The reason I ask is there's been evidence in this case that there has been some groundwater sampling by geoprobe. You didn't observe geoprobe sampling, did you?
A. No, sir.
Q. Now, when you were actually on site with the CDM sampling team, explain what your team did as far as making its observations.
A. We watched CDM's field activities very, very closely. And having reviewed the standard operating procedures, we kept a close eye to see if and how they were following their standard operating procedures and other common industry accepted procedures.
Q. You, sir, were personally present for some of this sampling?
A. Yes, sir, I was personally present on eight farms.
Q. Did you review documentation from the other Conestoga-Rovers teams that were present during sampling when you were not?
A. Yes, sir.

Q. What kind of documentation was that?
A. Video footage, photographs and portions of field logbooks.
Q. All right. I have placed before you what has been admitted as Defendants' Exhibit PI 50. Would you please tell the Court what Exhibit 50 is?
A. This is a photograph that was collected by -- taken by Conestoga-Rovers.
Q. Would you open the packet of materials that I gave you or unclip them for your use?
MR. MCDANIEL: May I approach the witness, Your Honor?
THE COURT: You may, sir.
Q. (By Mr. McDaniel) Go ahead and unclip them. Mr. Churchill, Exhibit 50 is the entire group of photographs that were taken. Would you tell the Court where those photographs came from?
A. This photograph was taken by Conestoga-Rovers & Associates. What we were trying to show in this particular one was --
Q. Well, just a moment. I'm just asking you is this a group of photos that you collected. I don't really want to talk about the specifics of that photo.
A. Yes, sir.
Q. Okay. In total, about how many photographs did Conestoga-Rovers take during this monitoring program?
A. It was in the order of 1,800.

Q. So this grouping in Exhibit 50, is this just a subset you selected for purposes of your report in this hearing?
A. Yes, sir.
Q. Now, were you asked as part of your task to determine whether the plaintiffs' field sampling was done in conformance with the Plaintiffs' own standard operating procedures and industry standards?
A. Yes, sir.
Q. Did you review Camp Dresser & McKee's standard operating procedures?
A. Yes, sir.
Q. Can you tell the Court briefly and generally what are standard operating procedures?
A. Standard operating procedures are a set of procedures that are established to, one, allow you consistent methods of collecting samples, regardless of the type of media, whether it be soil, water, surface water, et cetera, that will lead to ultimately to good sample integrity and then finally reliable sample results.
Q. Now, if standard operating procedures are not adhered to, what are the potential results?
A. Unreliable data ultimately.
Q. Did you find that Plaintiffs' sampling team failed to adhere to standard operating procedures or industry practice?
A. Yes, sir, very frequently.

Q. Now, how did you document that in your report?
A. We prepared a summary table in Table 1.
Q. All right. Is this Exhibit 289, your report, Table 1, is that what you are referring to, Mr. Churchill?
A. Yes, sir.
Q. Will you explain briefly to the Court what Table 9 is?
A. Table 9?
Q. Excuse me, Table 1. Thank you.
A. Table 1. Table 1, across the top we presented a listing of various the field issues that we identified during our oversight of CDM's field activities. That's going across the top from left to the right. Down the column to the left we have identified the various locations of the farms where these issues were identified and completed. Within the table itself are the number of instances where such field observations occurred.
Q. All right. And is Table 1 broken up by the different media that you previously identified?
A. Yes, sir.
Q. And does Table 1 identify sampling from two different groupings of samples conducted by CDM for which you had the opportunity to make observations? What I mean was -- let me rephrase. I can tell by the look on your face that was a bad question. Did you observe sampling by CDM under subpoena in 2006 and then a separate sampling exercise in 2007?

A. Correct. In 2006, we observed the collection of samples of soil, spring water, groundwater and poultry litter. In 2007, it was just soil samples.

Q. Were there some poultry houses sampled in 2007, Mr. Churchill?

A. Yes. I believe there were, yes.

Q. Now, in addition to Table 1 -- or excuse me -- on Table 1 across the top, these are the specific areas of concern that were identified?

A. Yes, sir.

Q. Now, did you do anything else in order to document or to expand upon those particular issues of concern?

A. Yes, also in the report, as well as preparing this listing in Table 1, identified more in a narrative context list of issues associated with each of the soils, spring water, groundwater, and poultry litter sample collection.

Q. Did you endeavor in your report for these different categories of issues to identify the particular standard operating procedure that may have been applicable?

A. Yes, sir, we did. We referenced in the report under each section where a certain part of the CDM SOP or work plan was violated.

MR. MCDANIEL: All right. If you'll bring up Defendants' Demonstrative D36. Your Honor, for your benefit, it's on the board. But I think if your eyes are like mine,

it's a good thing I gave you an eight and a half by eleven because I can barely read it from here.

THE COURT: Yes, sir.

Q. (By Mr. McDaniel) Tell us, Mr. Churchill, what is Defendants' Demonstrative 36.

A. This is a table that's -- this table is a summary table of the key issues which were identified in Table 1, presented in a slightly different format. We've identified as broken up in the left column from top to bottom based on the soil samples, spring water samples, groundwater samples and the litter samples collected. Across the top from left to right we've identified, based on the numbers from Table 1, the number of fields that we believe the data is compromised in and then broken up further to the number of farms on a percentage basis.

Q. All right. You're organize -- you organized the document a little differently for the water and litter samples. Can you explain that, please?

A. Right. The soil samples -- it's broken out like that for the soil samples because of compositing, et cetera, between the various fields and farms. For the water samples, the spring water, groundwater and the litter samples, those were collected at individual locations.

Q. All right. Working through these summary observations, can you describe generally for the Court, Mr. Churchill, what Conestoga-Rovers' observations were with regard to the soil

sampling conducted by Camp Dresser & McKee?

A. Sure. The soil sampling was quite different from what we're normally used to doing ourselves and what we're used to observing in the industry. It was quite remarkable some of the differences that we have observed as compared to commonly accepted protocols and CDM's own work plans. Some of the key things that we observed were -- one of the first things that we observed that was that there was cow manure present in a significant number of the fields. It's my understanding that the focus of this is poultry litter and not cow manure.

We saw sample probe, sampling equipment placed in sample bags. Failure to decontaminate sampling equipment between sample locations and fields and also farms. Failure to change sampling gloves, I mean, it's just -- it was extremely obvious.

THE COURT: What is the standard operating procedure and/or industry accepted practice with respect to soil samples obtained on the same field when those samples are mixed? Does one have to clean the probe between every sample if you're going to mix the substance that you receive on that particular field?

THE WITNESS: Absolutely. It was in the work plan, CDM's plan, in their work plan and their intent to collect discrete soil samples from each of three depth intervals. The first one being zero to two inch below grade, two inch to four

inch, and four inch to six inch. So in that context, when you're actually trying to collect, you know, discrete samples, it's absolutely important to decontaminate equipment.

THE COURT: But perhaps you didn't hear my question. When you are going to mix those soil samples, is it absolutely necessary to clean the probe?

THE WITNESS: Yes, it is.

THE COURT: The difficulty I'm having is whenever I do a soil test on my Bermuda lawn, they tell me to go down, what, an inch, gather a certain amount, go to another place in the lawn, go down an inch, gather it and then mix that up and they tell you how much they want. It doesn't strike me as a rational standard operating procedure if you are going to mix the soil, that you would have to clean the spoon that I use before I go to pick up the soil that I'm about to mix with that which I've already gotten. What sense does that make?

THE WITNESS: I'd like to give an example. If you were able to -- if you picked up something on the soil core probe, they advanced a steel probe at least six inches into the ground. If you are able to pick up something on the probe, be it cow manure or anything --

THE COURT: That's another issue, that's a separate issue from this. You're saying that because of the possibility that one can pick up something on the probe external to the soil that you're trying to retrieve at depth, that you have to

clean off the probe even if you're sampling from the same field and going to mix those soil samples?

THE WITNESS: Correct, because they've got samples from discrete intervals and they made no attempt to remove soil that was in contact with the inside of a probe. So what you're pulling from one location to the other ends up --

THE COURT: I see.

MR. MCDANIEL: Your Honor, I asked the technician to put up page number 4 from Exhibit 50, a photograph. Anyway, it's before you. I thought that might help Mr. Churchill be responsive to your questions.

THE COURT: Well, this became the subject matter of previous testimony. I don't know if you were here at the time, but that's why I asked.

Q. (By Mr. McDaniel) Mr. Churchill, the way the plaintiffs took these samples where they wanted to get a zero to two inch, two to four inch, and four to six inch sample, they were all taken from a single core; is that correct?

A. Yes, sir.

Q. How does that relate to the questions you were answering for His Honor regarding the need to decontaminate that probe?

A. Okay. Perhaps an explanation of how the samples were physically collected in the field might help here. What we have here is that CDM would advance a steel coring probe into the ground at least six inches and retrieve it from the ground.

What we're looking at here is they're showing how -- they're pulling the sample material from the probe into a sample bag. Typically what they did is they would take a sample knife and remove material from below a six inches layer, okay. Then they would take the same sample knife and use it to remove material from the four inch to six inch depth and drag that into the sample bag. That's what we're looking at here. A couple of other things I'd like to point out here in a minute, but I want to explain the sample collection procedure.

Then they would take the bag -- as they're pulling the material into the sample bag from the four inch to six inch layer, they wouldn't get all of the material. So you would have a reasonable amount of material left in the probe from that four inch to six inch depth. Then they would take a new sample bag, calling that representative of the two inch to four inch depth interval, take the same sample knife and start pulling that material from two inch to four inch and dragging that down. They would insert the end of the probe into the sample bag and start dragging that down into the bag. So by doing that, they would be picking up residual soil that was still remaining in the probe from the four inch to six inch layer and pulling that in as well, okay. They would call that their two inch to four inch sample layer.

From there, they would take a new plastic bag and then attempt to sample the zero to two inch sample material.

Meanwhile, there is still a residual material because they don't get it all out. There would be a residual material from the two inch to four inch layer still remaining in the probe. So then they go to sample the zero to two inch, take the knife, pull it down. As well as pulling material from the zero to two inch depth, it would also be pulling material from the -- sorry. As well as pulling material from the zero inch to the two inch depth, they would also be pulling material from the two inch to four inch depth interval as well into the bag, resulting in unrepresentative samples.

Q. At the end when those three, if you want to call them slices, are taken out of the device, then what did you typically observe about what was done with the sampling probe?

A. And in concluding this, they would lift the end of the probe and then empty all remaining soil that was remaining in the soil into the sample that was supposed to have been representative of the zero to two inch depth interval.

Q. Now, these three layers, two inch -- supposedly two inch layers in the sample, when CDM composited them for a field, did they take all of the zero to two inch samples, put them in a container, all the two to four inch samples and put them in a container and then the four and six and put them in a separate container?

A. We didn't observe the compositing, but that was my understanding that that's the way it was going to be taken out.

Q. Was that the SOP?
A. Yes.
Q. So the Court asked the question regarding how if he wants to take some fertility sampling for lawn or his land, how does this sampling differ from what would be agricultural fertility sampling when it comes to the question of decontamination of equipment?
A. Well, this sample they're trying to show -- it's my understanding that they're trying to show or get reliable data from three discrete depth zones and you don't get that from taking a -- from using a probe or other sampling equipment that was not cleaned between. There was no attempt made during this to remove the residual soil that was in contact with the probe. And normally in an environmental sampling investigation, for sure you would be doing that.
Q. The fact that one of the questions at issue is bacteria, to what extent does that relate to the need to decontaminate between sample locations?
A. If you picked up some bacteria at one sample -- sorry. If that probe was in contact with manure from one sample node and then transported to the next node at a certain depth interval, it would cross-contaminate that sample.
Q. So rather than just have one sample that may have been contaminated by manure --
A. Exactly, it could continue on to the next one and the next

one there after that and the following one as well.
Q. All right. Let's look at Exhibit 50, page 6. I want to talk about some of the other issues you mentioned in your discussion of soil. You made several comments about cattle and manure. What are we seeing in Exhibit 50, page 6?
A. This photograph was taken primarily to show the presence of, you know, not just one or two cattle in one of these sampling areas, but the whole herd.
Q. Was it -- were the bulk of fields where these soil samples taken, were they being grazed?
A. Yes, sir.
Q. Your field notes reflected that cow manure was observed in at least 64 percent of the fields and on 79 percent of the farms?
A. Correct.
Q. All right. Let's look back at Photograph 50, page 4, the one we were just looking at. Are there other issues that are identified in your Table 1 and on your demonstrative exhibit that are depicted in this photograph you can point out for the Court?
A. Yes, there are several here. We see visible soiled sampling gloves or nitrile gloves being used. Those gloves were not typically changed between individual sample nodes, nor were they changed between sample fields resulting in whatever is on the gloves could have ended up in the soil samples.

We've got other photographs where, I mean, gloves with -- soiled gloves were in contact with soil sample material. One of the SOPs indicated that all of the surficial organic material was supposed to be removed from the soil samples. We can see here some roots and things like that in the upper portion of the sample. We see the tip of the soil probe again in contact with the inside of the sample bag.

Q. What's the problem with the probe inside the bag?

A. Because whatever was on the sample probe on the outside is getting directly introduced into the sample material.

Q. Now, the question we spent a few moments on and that is the contamination of this sampling equipment, on what percentage of the fields and farms did you observe this failure to decontaminate the sample probe?

A. We reported that in about 84 percent of the farms.

Q. Is that when the CDM team went from one field to another; is that right?

A. Correct.

MR. PAGE: Objection, leading, Your Honor.

THE COURT: Sustained, rephrase.

MR. MCDANIEL: All right. Let me rephrase the question. I guess it was leading because of my voice inflection, right?

Q. (By Mr. McDaniel) Mr. Churchill, when the Camp Dresser & McKee sampling team went from one field to another field, did

you document the percentage of fields and farms where you observed they did not decontaminate the soil sample probe?

A. Yes, sir, 40 percent.

Q. All right. That was for fields?

A. Yes.

Q. What was the number for farms?

A. Eighty-four percent of the farms.

Q. Now, the procedure we talked about a few moments ago where you expressed to the Court the need to decontaminate between sample nodes?

A. Yes.

Q. What percentage of the time did you observe that they did not decontaminate between sample nodes?

A. A hundred percent of the time.

Q. All right. Exhibit 50, page 2, please. Would you tell the Court why you selected this photograph?

A. Yes, I mentioned earlier as well as failure to decontaminate sampling equipment between nodes and fields, they also did not change their gloves between sample locations, and this is just a very, very basic requirement of environmental sampling to always change your gloves between samples. I showed in the earlier photograph, you could see a significant amount of dirt on the sampling gloves. This one here we also see some dirt and soiling on the gloves and that we see the gloves, you know, immediately inside of the sample bag in

contact with the bag. We also see some organic material in the sample as well.

Q. What was the standard operating procedure for removing vegetative material before the soil probe was advanced?

A. The standing -- the SOP was to take a shovel and remove the vegetation from the ground surface prior to advancing the probe.

Q. Did you ever observe the CDM sampling team following that procedural step?

A. No, we never observed that.

Q. Now, you made an observation on the demonstrative or it's noted on the demonstrative about how and what percentage of the fields and farms it was observed that the sampling team actually touched the sample. What were those percentages?

A. Seventy percent of the occasions for the field which compromised 100 percent of the locations on the farms.

Q. All right. Let's go to Exhibit 50, page 7, please, and tell the Court what is visible in this photograph.

A. Well, if I can shed a little bit of light here. In order to establish the depth intervals to be sampled, CDM used a ruler to measure off between the zero to two inch and two to four inch and four inch to six inch. This photograph was taken to show where, in fact, the ruler that is being used to make the measurements and which at times was in contact with the soil and the probe was lying in cow manure.

Q. Let's look at Exhibit 50, page 15, please. Please tell the Court what is significant about this photograph.

A. There are a few things in the photograph here. It's not the industry standard, I've never seen it done to use cotton gloves in the collection of environmental soil samples. We've seen this on numerous occasions. Again, there was no decontamination of either the probe or the sample knife between individual sample nodes nor between fields. Here's an example of the type of soil that would be stuck to the sample knife. So while they were pulling material from a certain depth interval with this knife, once they collected that sample, the same knife with soil on it would be used to collect the upper sample. We also see the tip of the probe again inside the sample bag.

Q. If Conestoga-Rovers had been hired and the standard operating procedure called for a single core to be taken but then removing a zero to two, two to four and four to six samples, what type of device would you have used and how would you have used it?

A. We would have used a split spoon sampling device. A split spoon is similar to the probe in that it's manufactured steel, two and a half to three feet long. It's advanced. It's got coupling over the end. You drive the spoon into the ground, retrieve it, take off the caps and open it up fully. So you actually have a full kind of half circle of exposed sample

material to sample from. We would have used -- our split spoons would have been decontaminated between every sample. No sampling equipment, every single knife or spoon would have been cleaned between not only each node, but between each depth interval. We always remove the outer layer of soil which is in contact with the split spoon. CDM made no attempt of that at all. And we always wear nitrile gloves, interchangeable gloves and you're using many, many, many sampling gloves, changing them between every sample and every layer.

Q. All right. The sampling probe being placed in the sample bag, what percentage of fields and farms was that observed?

A. A hundred percent of the field and a hundred percent of the farms.

Q. All right. Mr. Churchill, please look at Exhibit 50, page 9. Tell the Court why you selected that photograph.

A. This photograph was selected to show where CDM had advanced the soil core probe through a cow pattie.

Q. What's the little orange flag?

A. The orange flags were used -- CRA would have put that flag in after the fact in order to locate that. So when we used a GPS to get the coordinates of that sample location, it was a marker for us.

Q. Page 10 of Exhibit 50, please tell the Court what we see here.

A. This is another example of where the soil core probe was

advanced through cow manure.

Q. All right. Page 14 of Exhibit 50, please. Tell the Court what we're seeing there, Mr. Churchill.

A. CDM used a triangle. It was typically a yard stick taped at each corner to mark out where their sample locations were going to be from what we see here. So that same triangle was moved from node to node, from field to field during the collection of the samples. What we see here is another location, still again, where the probe was advanced directly through cow manure for the sample collection. And we have the sampling equipment, the triangle, also in contact with manure.

Q. So the brown area near the tip of the triangle, is that cow manure in your opinion?

A. Yes, sir, sure.

Q. Any question in your mind, Mr. Churchill, that that's cow manure?

A. No question at all.

Q. All right. At what percentage of fields and farms did you observe where the CDM sampling team actually penetrated a cow pattie with their soil probe?

A. We observed that in 16 percent of the fields and 53 percent of the farms.

Q. All right. Now, you made another observation on your chart about where cow manure was observed in close proximity to the sampling points. What percentage of fields and farms were

compromised by the fact that cow manure was observed in close proximity to the sampling points?

A. We determined that 50 percent of the fields were compromised as a result of sampling in close proximity of the cow manure and 84 percent of the farms.

Q. All right. Let's look at Exhibit 50, page 19, please.

THE COURT: Just one second. With regard to the triangle, I'm not certain -- perhaps 14 shows contact of the triangle with the top of that cow pie. But in that the sample should be taken as you described, why is it important that the triangle not come in contact with or touch a cow pie? You're not sampling with the triangle.

THE WITNESS: Correct, but that triangle is getting transported, the same triangle without any decontamination or cleaning in between, and getting transported from sample node to sample node and then from field to field. So whatever is on the triangle could end up in your soil samples.

Q. (By Mr. McDaniel) Does the fact that the gloves were not being changed play any role in your opinion about the issue of failure to decontaminate the triangle?

A. Would you mind repeating the question?

Q. Sure. If a CDM employee picks up a contaminated piece of equipment like this triangle, what's the potential that that contamination could find its way into a soil sample other than your prior example?

A. Sure. CDM, during the sample collection, at times they would rotate. So one person at one time might actually physically be collecting the soil sample and then a certain period of time or a number of sample locations later, that person be using the driver which was a handheld device used to advance the probe. They might be doing that or one of the other or they could be holding the sample bag over the end of the probe. So, you know, whatever could have been on the sample triangle or on the outside of the probe or on the driver here --

THE COURT: I get it.

Q. (By Mr. McDaniel) All right. Let's look at page -- Exhibit 50, page 19. Is this a driver that you referred to?

A. Yes.

Q. What's the significance of this photograph?

A. The driver has been placed in cow manure.

Q. All right. What percentage of fields and farms did you observe this error?

A. Twelve percent of the fields which affects 42 percent of the farms.

Q. And I don't want to shortcut the explanation, but I gather the Court understood why you were pointing that out from the prior discussion. Does that relate to the ability to get on the hands and then transfer it?

A. Exactly.

Q. Now, let's move to the spring sampling, Mr. Churchill. Would you give the Court a brief summary of the observations Conestoga-Rovers made with regard to Camp Dresser & McKee's taking of samples at springs?

A. Sure. We observed the collection of four spring water samples. I personally observed one of the most, I'll say glaring examples of inability or unwillingness to follow an SOP. It's referred to here on the CDM stepping in a spring prior to sampling it. The result of that -- I remember it actually very, very clearly. We had all walked down, both the CDM crew and CRA personnel walked down to locate what CDM believed was a spring. Walking down to that area, it was obviously an area where cattle had been present. There were cow patties on the path. I actually saw a footprint in one of the cow patties.

Shortly after that, CDM went to go sampling in one of these springs and one of the sampling personnel kind of slipped and stepped into the spring stirring up sediment. There was also a cow pattie about 18 inches, two feet from the actual spring, where they were sampling. The person retreated from that area, then walked around and then intentionally stepped in a spring prior to sampling, then inserted the sampler intake tube into the spring. The result of that is collecting sediments which have been likely degraded by cow manure in the sample. That was just one of the ones, it was a fairly glaring

example that I had personally observed. The other springs, there was evidence of cattle at least in and around the spring.

Q. Did you observe -- this pumping device that was used to obtain the samples, does it have a discharge point?

A. Yes.

Q. Did you make any observations with regard to how that was deployed?

A. Yes, effectively they used a peristaltic pump which has an intake tube which was inserted into the spring. Then that tube goes through the pump to a discharge tube. And prior to collecting the sample, they were running spring water that was being extracted from the spring through the discharge tube, and it was discharging, you know, down the bank and back into the spring where they were sampling. And that was coming right down again through an area that we observed cow patties present on.

Q. Did you observe springs where the area that was sampled was some type of surface pool?

A. Yes.

Q. Did you observe surface pools that were sampled that had evidence of access or accessibility to livestock or wildlife?

A. Yes, absolutely for sure.

Q. Would you explain briefly your observations with regard to the groundwater well sampling monitored by Conestoga-Rovers?

A. Yes, we observed the collection of six groundwater

samples. Again, this was pretty significant variations or departures from standard operating procedures here. Normally when you go to collect a sample from this, you would allow the well to be purged for a certain period of time. The CDM work plan states that they're going to purge these for 15 minutes prior to sample collection. On one occasion we saw them go to -- it was at a dairy farm and there was a hose next to the barn and immediately grabbed that hose, had a spray nozzle on the end and immediately start collecting the sample directly from the nozzle, directly from the hose without any purging.

Q. Any other observations you want to share with the Court about the groundwater sampling that you observed?

A. Well, yes, sir. I mean, just along that same line at that same location, you would never collect a groundwater sample from a hose. You're introducing the possibility of contaminant from whatever was going to actually be -- whatever might be present in the hose or on the nozzle. I'd also just like to explain the reason why you purge a well before sampling is because you want to collect a sample that's representative of the groundwater in the formation, not what's sitting in the well and that could have been sitting there for some period of time. Okay.

Q. Did you observe any issues with regard to sterilizing the sampling point for a water well?

MR. PAGE: Objection, leading.

THE COURT: Overruled.

A. I was going to get to that here. On the -- on one occasion, again, we saw them sampling from a spigot, sampling a well directly from the spigot. Normally you would take some kind of precaution to make sure that the spigot itself wasn't contributing to any, you know, contamination or bacteria in your samples. And you might do that by flaming the spigot or at least, you know, taking a bleach solution and making some effort to clean it.

Q. (By Mr. McDaniel) Were all the spigots that were sampled, were they outside as compared to an inside faucet?

A. Yes, they were outside.

Q. Let's move on to the last issue and that was the poultry litter sampling. Was all the sampling that you observed, was it actually conducted in poultry houses?

A. Yes, sir.

Q. Explain your observations with regard to that.

A. Okay. One of the first observations we made was that, you know, in keeping with good standards, you're supposed to be using clean sampling equipment. One of the first observations that we made was a fairly large manufacturer's label present on the spade that was used to collect the sample. No attempt was even -- let alone to clean the spade, no attempt was even made to remove the label. The spade was a tapered spade. So the top was square and as it came down towards the bottom, it

tapered in. So using that type of a sampling device inherently resulted in collecting litter that was more representative of the upper portion of the pack because as they retrieved it, because of the taper on the spade, material from the lower portion would just fall off into the floor of the barn.

Q. All right, I'm trying to draw -- if this is a cross section and this is litter and this is the soil below.

A. Right.

Q. You're talking -- are you referring to taking a sample like that, sir, or --

A. Yes, sir. Actually, yes.

Q. Explain what, in your opinion, is the problem with that method.

A. Well, the idea of collecting the litter sample, they're supposed to get a sample that was representative of the entire column of litter. In fact, what we're seeing was mainly because of the taper of the spade as they pulled it up, a lot of material from the lower portion of the pack would fall off. The other thing that I should mention that actually shows up very well on that sketch, Mr. McDaniel, was at times they actually collected the soil included in the sample of the litter of soil that was remaining below the litter pack.

Q. Mr. Churchill, the Court heard testimony yesterday from Dr. Harwood that the uppermost layer of litter will have the highest concentration of viable bacteria. Does that illustrate

the problem you just described with the sampling of the litter?
A. I think it's an important point, sure.
Q. Now, the sampling of poultry litter, was it also to be composited from the house?
A. Yes.
Q. Briefly, what does that mean?
A. CDM typically collected, you know, individual aliquots. They walked through the poultry barns kind of in a zigzag pattern, typically collecting approximately 18 different aliquots that would be added to a bucket. Inside the bucket, there was a plastic bag. So they would add that to the bag and then the idea was to homogenize it, provide a split sample to CRA and then take their own samples from that. And what we witnessed was just a very, very poor job of homogenizing the sample partly just because of the, you know, the shape of the bucket. The bucket that might have been twelve to fourteen inches deep, you know, using a spade or a trowel to homogenize that material, they might have only mixed up the upper, you know, I would say not more than 50 percent of that material. And then providing, you know, a sample to CRA or a split sample to CRA, that's what we got. We wouldn't have gotten any of the material that was, you know, perhaps in the lower portion of the bucket and it probably would have been collected from the, you know, earlier sample aliquots. It was just a poor job of mixing.

Q. What percentage of the poultry litter samples did you determine were compromised as a function of an improperly mixed composite?

A. Sixty-five percent.

Q. Did you ever observe, Mr. Churchill, where they took the sample of litter with a brand new shovel that still had the self-adhesive manufacturer's label on the surface of the shovel?

A. Yes, sir.

Q. How many times did you see that?

A. I can't give you the exact number offhand.

Q. Was it frequently?

A. I'll say it was periodically.

Q. So even the label on the face of the shovel had not been removed prior to sampling?

A. Yes.

Q. Now, your findings with regard to the high percentage of samples that were compromised overall, Mr. Churchill, is this normal for sampling of this kind?

A. Absolutely not.

Q. Now, the Plaintiffs' field team from CDM, do you believe they were aware of your presence and knew that you were documenting every move they made?

A. Well, they had to have been aware of our presence. We had three or four people standing in close proximity to their

activities. There was no doubt they were aware of our presence.

Q. Based upon what you observed about how the plaintiffs' sampling was conducted while Conestoga-Rovers was watching, can you draw any reasonable conclusions about how these samplers performed when no one was watching?

A. Well, I can't speculate exactly what they did when we weren't there to observe but based on --

THE COURT: Okay. Well, we don't allow speculation. Go ahead.

A. I have no reason to believe it was any better when we weren't there.

Q. (By Mr. McDaniel) Based upon the observations made by the Conestoga-Rovers field team and your analysis, what conclusions did you reach with regard to the field sampling program undertaken on behalf of the plaintiffs?

A. Well, I felt there was a significant disregard to following standard operating procedures, either in CDM's work plan or other industry standards. During the collection of soil samples, as a result of failure -- primarily as a result of failure to decontaminate equipment and sampling gloves, you know, I believe that soil sample integrity was compromised. With respect to the water samples, for lots of reasons, sediment being included in the samples, other bacteria and things that might have been present in groundwater samples, I

1 believe the samples are not representative of groundwater in
2 the formation. With respect to the litter samples, I believe
3 that the samples themselves do not have integrity and that as a
4 result, the data would be considered unreliable.
5 Q. Did you draw any conclusions, Mr. Churchill, with regard
6 to the level of training the CDM field personnel had received?
7 A. Quite frankly, they appeared to be rookies.
8 Q. Did you draw any opinions with regard to the level of care
9 exhibited by the CDM sampling team?
10 A. Yes, it was clear to us that a very low level of care was
11 taken.
12 Q. Did you develop any opinions about the CDM field team's
13 level of regard for ensuring that samples taken were
14 representative?
15 A. Yes, we did. I believe that most of the samples were
16 compromised in some fashion and not representative of what was
17 there.
18 MR. MCDANIEL: I will pass the witness, Your Honor.
19 THE COURT: How much time did we use there, Mr.
20 Overton?
21 THE CLERK: 1:20 to 2:00. It looks like 40 minutes.
22 THE COURT: Forty. Mr. Page, cross-examination.
23 MR. PAGE: Thank you, Your Honor. David Page for the
24 State of Oklahoma.
25 THE CLERK: Fifty. I misspoke.

THE COURT: I'm sorry, 50.

MR. PAGE: Fifty minutes?

THE COURT: Yes, sir.

CROSS-EXAMINATION

BY MR. PAGE:

Q. Mr. Churchill, have you ever published any environmental paper in a peer reviewed journal?

A. No.

Q. Have you written any protocols other than for your private clients for any agency on how to do environmental sampling?

A. No.

Q. So you've never done that for a governmental agency?

A. I've prepared work plans that have been approved by government agencies.

Q. Have you ever worked for a governmental agency and prepared a work plan?

A. Yes.

Q. You have working for -- actually been employed by the governmental agency?

A. No.

Q. Now, you mentioned that there was some industry standards violated. Did you cite any industry standards that were violated in your declaration for this Court?

A. We didn't cite them. We primarily cited the CDM's SOPs that were to be followed during the work.

Q. So there's no industry standard that you claim were violated put forth in your declaration?
A. There were industry standards that were violated, yes.
Q. But they're not set forth in your declaration?
A. Well, we refer to in this declaration EPA standards, yes.
Q. Which one?
A. They're not laid out individually.
Q. No, they're not, are they, sir? Don't you think that would be important for the Court to be able to evaluate your claims of violations of standards to cite those for the Court in your declaration?
A. I believe commenting on CDM's SOPs is sufficient.
Q. Now, you've testified through a lot of observations. How many of these observations that are on this board up here, Defendants' 36, did you actually see?
A. A high percentage of them.
Q. Well, a high percentage, ten percent, 15 percent, 80 percent, how many?
A. Probably 75 percent.
Q. How many of these pictures did you take that you showed the Court?
A. That I actually took myself?
Q. Yes.
A. I was present during the collection of many of the pictures. As far as me actually snapping the pictures, it

would be a small number.
Q. Well, the pictures that you presented to the Court in Exhibit 50, how many of them did you actually see the same thing that's being shown here to the Court?
A. Probably four or five.
Q. Four or five. I notice there were no spring sampling pictures in this group?
A. I believe there is, yes.
Q. There is. Which one? Maybe it's page 11. Is that a spring sampling picture?
A. Yes, sir.
Q. What does that depict?
A. Pardon me?
Q. What problem does that depict?
A. This was the spring where I observed CDM stepping into the spring prior to sampling.
Q. Where is the footprint?
A. Up at the kind of the top left corner, you can see the cow pattie on it on the bank there.
Q. Where's the footprint from the CDM person stepping in the spring?
A. This picture looks like it was taken immediately prior to sample collection.
Q. So this picture on page 11 doesn't indicate any of the violations you claim to have observed?

A. Well, I think it does. It shows the presence of cow manure in close proximity to the spring.
Q. What about the CDM people stepping in the spring. Does it show anything in that regard?
A. Not in that regard.
Q. We'll get to the cow manure in a minute. Now, I suppose you took your own samples out there so you could demonstrate all your observations for us here today?
A. We received split samples of the samples collected by CDM.
Q. No, that wasn't my question, sir. I suppose to support your violation claims, you took samples in the same area the way they should have been taken so you can demonstrate for us all here today that the samples were really -- the problems that you mentioned here really do make a difference in sample collections and the results?
A. No, we did not collect those samples.
Q. You were given the opportunity to, were you not?
A. I'm not aware of whether we were or not.
Q. Lawyers didn't tell you that you could take samples while you were out there?
A. I'm not aware of that.
Q. So your job was just to be out there to take pictures on a gotcha kind of basis; is that correct?
A. Our job was to observe and monitor and follow the sampling conducted by CDM and to monitor when they're violating their

SOPs.
Q. So just to be clear for the Court, with regard to soil samples, you did not do your own demonstration of sampling to show that any of these concerns that you raised for soil sampling would have any material difference in the results; is that correct?
A. We were not tasked to do that.
Q. You did not do that?
A. Correct.
Q. Now, same question with regard to spring water. Is it your testimony, sir, that you collected no spring samples in order to demonstrate that the issues that you've raised, the claims you've made actually would make a material difference in the results of the spring sampling?
A. We received split samples.
Q. Did you do any sampling to show that the different sampling methods would make any difference?
A. No.
Q. In fact, a split sample wouldn't give you any indication of a sampling problem. It would just determine whether or not the analytical lab was correctly analyzing the sample; is that correct?
A. That's correct.
Q. Thank you, sir. Now, with regard to groundwater, did you take any samples of groundwater at the locations you complained

or you allege there's problems with to demonstrate that there was any material difference that would have occurred if groundwater samples had been taken differently?

A. We did not collect groundwater samples ourselves.

Q. And the same question for litter samples. Did you collect any litter samples whatsoever?

A. No.

Q. Now, is it your claim here today, sir, that if a sample is to be composited, you have to clean the sampling equipment between the subsamples that are going to be composited?

A. Repeat the question.

Q. Well, if you are going to mix up some samples, you're going to take multiple samples in a field and you're going to composite those multiple samples, is it your claim here today that you have to decontaminate the sampling tool in between each subsample being taken?

A. If you're sampling for discrete depth intervals, yes.

Q. What if you're not?

A. If you are going to -- if you are going to collect one sample, one depth interval, no.

Q. Now, when you are concerned about using split spoon sampling as opposed to push core, is that typically for an industrial protocol versus an agricultural sampling protocol?

A. Typically, yes.

Q. Thank you, sir. Now, wasn't one of your complaints that

there was vegetation left in the samples?
A. Yes.
Q. Okay. Did you know that the CDM protocols provided that when the samples were composited back at CDM, the vegetation and organic material was going to be removed?
A. We were reviewing the work activities conducted by CDM and making observations when they didn't follow and followed their SOPs. The SOP says that they're going to take a spade and remove the organic material from ground surface prior to advancing the probe, and we never saw that happen.
Q. And it said where possible. And then did you also read on with that same SOP that said that the vegetation would be removed through a sieve process at the CDM lab and any organic material or vegetation be removed prior to analysis?
A. I don't immediately recall that, no.
Q. You don't recall that? You have a lot of complaints about cow manure being in the field next to the sample; is that correct?
A. Correct.
Q. Can you show me in these CDM sampling plans, the SOP, the standard operating procedures, the scope of work where it says in the field samples, land applied field samples or the spring samples we're just trying to isolate poultry waste contamination?
A. I did not see that in the SOPs, no.

Q. It's not in there. So why are you complaining about manure being in the field?
A. It's my understanding that the focus of this investigation is focused on poultry litter and not on cow manure. And when we immediately see, you know, cow manure and cattle grazing in these fields, you know, it's pretty quick to come to mind.
Q. Where did you get that understanding?
A. That it was focused on -- repeat the question.
Q. Where did you get the understanding that the sampling in the fields was only to identify poultry litter contamination?
A. Well, it's just my understanding of the litigation involved that it's focused on poultry and not cow, cow manure.
Q. Okay. Well, if we're trying to determine sources of contamination in the environment, wouldn't you want to have samples that represent the environment and all sources of contamination that could have impacted?
A. I think that's getting beyond what we were tasked to be involved in.
Q. Okay. You've testified you've done a lot of sampling?
A. Yes, I have.
Q. Wouldn't you want to do that? Wouldn't you want to also get samples in fields where poultry litter is applied, if there's cattle in that field, also get samples where the cattle is also so that when people do analysis of various contamination, they could have a full spectrum of the sources?

A. That's outside the focus of what we were tasked to do and I don't feel obligated to form an opinion on that.

Q. So you probably shouldn't have mentioned cow at all, right?

A. No, I think I should have.

Q. Well, then what's your basis for focusing on cattle if you don't even understand the scope of the investigation or the objectives of the investigation for the sampling?

A. Again, it was just a very, very clear observation. We made a lot of observations in the field and it was just blatantly obvious that there was cattle and cattle manure in that area that was being sampled.

Q. That would, in your experience, be a representative sample for the types of contamination from those fields; correct?

A. Not if the focus of my investigation was on poultry.

Q. I have the same --

THE COURT: Let me just see. I think, Mr. McDaniel, there cannot be any true objection that the samples were taken in fields where cattle were present; correct?

MR. MCDANIEL: That's correct, Your Honor. That's not really the position.

THE COURT: Yeah. But now, that's different from driving a probe through a cow pie.

MR. MCDANIEL: Exactly.

THE COURT: So we don't have to -- the fact that it

was cow manure is observed in the field frankly, Mr. Page, your point is very well taken.

MR. PAGE: Your Honor, I would suggest the same point is even if you drove the sample through -- the probe through the --

THE COURT: Well, if you're trying to obtain representative samples at different depths, you know, just as you don't want to drive that probe through vegetative material, you don't want to drive that probe through a cow pie and contaminate your sample at depth. But your main point is well taken, the fact that they're criticizing the sampling because cow manure was observed in the field is just not -- it's not an apt criticism. Go ahead.

MR. PAGE: Thank you, Your Honor.

Q. (By Mr. Page) Also you observed some cattle near springs; correct?

A. Correct.

Q. And if we were trying to get a representative sample of the sources of contamination that could potentially affect that spring, wouldn't it be appropriate to have cattle if they were present in that area, observe and take samples from those springs?

THE COURT: That's exactly right. We can move on.

MR. PAGE: Thank you, Your Honor.

Q. (By Mr. Page) Now, with regard to groundwater being

collected, you mentioned that some of the well samples weren't properly purged before sampling?

A. Correct.

Q. And there is a protocol by CDM on that. Does the protocol also say that if allowed by the landowner, that is, you will purge the well provided the landowner allows you to do so?

A. Yes, it does say that.

Q. Isn't it true in those locations where it was not completely purged, the landowner objected to the purging process?

A. I don't know that.

Q. Now, with regard to the litter sampling observations, is one of your complaints that it wasn't properly composted in the field, that is --

A. Composted?

Q. That means mixed up, excuse me.

A. Yes.

Q. Did you know that the litter samples were thoroughly mixed at the CDM lab?

A. I believe that's their SOP that they were going to do next.

Q. And you were invited to observe those processes at the CDM lab, were you not?

A. Not that I'm aware of. But their composite samples could not have been representative if they gave CRA a portion of the

upper material of the sample as a whole.
Q. Yes, but CRA was also -- did not your lawyers tell you that CRA was allowed to go to the labs and collect samples?
A. I'm not aware of that.
Q. Do you have any pictures of this shovel that was a problem with the sample collection?
A. I don't have them with me.
Q. Can you describe -- have you ever seen a shovel that can cut a hole in anything in a V shape like that? I mean, Mr. McDaniel drew on the board a sample collection in the litter that you said was representative of the type of hole. What kind of a shovel cuts a hole like that?
A. A spade.
Q. A spade, it cuts a hole so it comes in like small at the bottom and --
A. It would be a shovel with a tapered end.
Q. Okay. Well, what kind of shovel was this? How much was the taper from the top to the bottom?
A. Well, it might have been -- the top of the spade might have been about this wide and it came down perhaps four or five inches and tapered to a point.
Q. Have you ever heard of a shovel called a sharp shooter?
A. I've seen it referenced.
Q. Were those used out on the site?
A. Not that I'm aware of.

Q. Okay. So this was a regular typical spade with a somewhat rounded edge, but it comes pretty straight down the side?
A. I wouldn't call it a rounded edge. It more kind of came into a triangle.
Q. A point?
A. A point.
Q. And so was most of the length of the spade equal distant in width?
A. No, I wouldn't say that.
Q. Well, what was the difference between the top of the shovel blade and the lower part before it started moving into the point?
A. I'm going to estimate that the top maybe half of the shovel was rectangular before it started to taper.
Q. It was rectangular?
A. Yes.
Q. So pretty equal distant all the way before it started to taper?
A. I going to say that the top, perhaps the uppermost half of the shovel itself was rectangular before it started to taper.
Q. Did you bring any pictures of the shovel?
A. I don't have them with me here, no.
Q. Now, one of your complaints was that one of the samples was dropped on the floor?
A. Yes.

Q. Was it dropped in the same material that was being collected?
A. Yes, but it was -- yes, it was being dropped on the same material that was being collected.
Q. So it was picked up and put in the composite bag to be mixed up, correct, or a bucket to be mixed up?
A. Repeat that.
Q. So that sample, the one of 18 that was dropped on the floor, that was picked up and put into the bucket?
A. Correct.
Q. But it was dropped on the same material that was being sampled?
A. Right.
Q. You found that to be a problem with the sampling technique?
A. Well, they wouldn't necessarily be able to pick up all the material that they dropped.
Q. Might have left a little litter on the floor of the litter?
A. Yes, sir.
Q. Now, did you -- you also had a concern about the dirt in the samples?
A. Correct.
Q. Do you know whether or not that data was not used in the evaluation for litter?

A. I haven't seen the analytical data.
Q. So you don't know whether or not those samples were not used for representations of litter?
A. Well, because of that shovel full of material, the soil on the end of it was added to the sample bucket. It must have been -- reasonably it must have been included in the material being analyzed.
Q. And I notice -- so you are just assuming that that sample was used for litter evaluation?
A. Well, the sample was soil from the bottom, it would have been added to the sample bucket. As we discussed earlier, the material in the sample bucket was at least mixed a little bit and that soil would have been mixed in with litter as well.
Q. Was that particular sample in the field book? Did you know that the CDM people actually noted that that sample had some soils mixed with it?
A. I've not reviewed the CDM field book.
Q. So you don't know whether that particular sample that was collected, that instance that had soil in it, was actually relied upon by any of the experts or not, do you?
A. Are you telling me that that sample was not analyzed, the full composite sample from the bucket?
Q. You know what, I get to ask the questions and you get to answer them.
A. Fair enough.

Q. You get to answer my question.
A. Repeat the question, please.
Q. Thank you, sir. Are you telling me today that that particular sample that had the soil in it was actually relied upon by the experts to evaluate the litter composition in this case?
A. I have no reason to believe that that sample was not included.
Q. You don't know that, do you, sir?
A. I don't know.
Q. You reviewed the scope of work in this case by CDM?
A. Yes.
Q. Did you find that it complied generally with EPA guidelines for similar scopes of work?
A. It was similar.
Q. What about the standard operating procedures? Did you also find that it was met satisfactorily within industry standards and EPA guidelines?
A. Portions of them, yes.
Q. Which portions did not?
A. There was little about -- you know, in the example of collecting the residential -- the sample of the groundwater from the spigot, there was little, if anything, in there about sterilization of like the spigot or there wasn't anything there about saying don't collect it from the hose. There was nothing

in there about sampling as close as you could to where the water was coming from. There was nothing in the SOPs about sampling prior to any water treatment features.

Q. Anything else?

A. Not that immediately come to mind.

MR. PAGE: Thank you, Your Honor. I'll pass the witness.

THE COURT: I had to smile because I'm very familiar with the type of spade that the witness was talking about, having spent many hours in a horse stall shoveling. Mr. McDaniel.

MR. MCDANIEL: Thank you, Your Honor.

REDIRECT EXAMINATION

BY MR. MCDANIEL:

Q. Mr. Churchill, are your criticisms identified in your report and that we've discussed, are they focused on the way the SOPs were drafted or on the way the team in the field adhered to the SOPs?

A. They're focused on the way the team failed to adhere to the SOPs.

Q. When you were asked by Mr. Page whether the split spoon methodology you believe was correct would apply to an industrial versus an agricultural setting, in an agricultural setting, is the sampling generally for fertility purposes as compared to for environmental contaminants?

A. Yes, that's the case generally, for fertility.
Q. If you are sampling for environmental contaminants in this case, would this case qualify as an industrial matter?
A. Yes, sir.
MR. MCDANIEL: Let me ask one question about the litter mixing. And if I can approach the demonstrative, I'm actually having a little fun here.
THE COURT: You may, sir.
Q. (By Mr. McDaniel) Again, the side of a bucket. So the individual -- you called them aliquots?
A. Yes.
Q. Were taken from the house. How were they composited?
A. CDM would walk through the poultry house in kind of a zigzag pattern and advance the shovel into the litter and then take at approximately 18 locations, sometimes it was 16, probably on several occasions it might have been 21, but close to the 18 that they identified in the SOP and take that material and put it into the bucket. So the first sample aliquot that you collected would have ended up in the bottom of a bucket. There was a plastic bag, a liner used in the bucket.
Q. My crude drawing, if that is all 18 or 20 of the individual samples placed in the bucket, is my drawing adequate for purposes of our discussion?
A. Actually the bucket would be basically full.
Q. All right. Is your criticism related to the mixing of

this material right there at the poultry house?
A. Yes, but -- yes, but the bucket was full. And you know, because it was full and the size of the spade and things used to conduct the mixing itself, you know, they just weren't able or were unwilling to get down to the full base of the bucket.
Q. All right. At some point was there a part of this material taken out and actually used for the sample that went to the lab?
A. I don't know that.
Q. Did you see them actually pull the sample out of the bucket and give part of it to your people and then they took their own sample?
A. Yes, they did. And on at least one occasion, they actually collected their own sample in a plastic bag. And they wrapped up, sealed the rest of the larger bag and took that offsite for their analysis.
Q. All right. So you have part of it that goes to a lab. What happens to all the rest of that litter, what is done with it?
A. Well, I believe --
MR. PAGE: Your Honor, I think that's speculation. It calls for the witness to speculate --
MR. MCDANIEL: He can state whether he knows or not. I'm sorry, Your Honor.
THE COURT: Rephrase, please.

Q. (By Mr. McDaniel) Mr. Churchill, the balance of the litter in this bucket that is composited onsite?
A. Yes.
Q. Did you actually see what happened to the balance of this litter that did not go into the sampling bag?
A. They closed the bag, wrapped up the bag, spun it around and took it off site.
Q. All right. When Mr. Page was talking about the SOP for mixing of litter at some lab, was that referring to this subset, to your knowledge, when it got to the lab?
A. I don't -- do you mind repeating the question?
Q. The composite was prepared in order to then take a smaller volume of material to actually analyze?
MR. PAGE: Objection, leading, Your Honor.
THE COURT: I think we've already established that. Overruled, go ahead.
A. Correct.
Q. (By Mr. McDaniel) All right. Is this the material, this smaller subset, is that the material that would go to the laboratory?
A. They did collect at least one sample like that and also took the larger remaining portion with them.
Q. All right. Is the point of criticism you made with regard to the mixing of all of those 18 individual little aliquots while you were there at the poultry house?

A. Yes.

MR. MCDANIEL: That's all the questions I have, Your Honor. Thank you.

THE COURT: Mr. Page.

MR. PAGE: Nothing further, Your Honor.

THE COURT: You may be excused. This would be an appropriate time to take a short recess. Let's break for about 10 minutes.

(Recess.)

THE COURT: Mr. Elrod.

MR. ELROD: Your Honor, in line with your previous comment, it's my observation that shoveling crap makes you appreciate being a lawyer.

THE COURT: Absolutely. Good experience.

MR. ELROD: I am. We'd call Dr. Herman Gibb, Your Honor.

HERMAN JONES GIBB

Called as a witness on behalf of the defendants, being first duly sworn, testified as follows:

THE COURT: State your full name for the record, please.

THE WITNESS: Herman Jones Gibb.

MR. ELROD: Your Honor, with --

THE COURT: Mr. Elrod.

MR. ELROD: I'm sorry. Your Honor, with Dr. Gibb, we

will use Demonstrative 28 and its subparts and we'll introduce Dr. Gibb's CV which is Exhibit 306. His affidavit is Exhibit 231. We also intend to utilize on direct examination State's 407 and State's 77. And he's scheduled for one hour, but we hope to give some time back to the situation. We will introduce Dr. Gibb and as to what he did and what he's done, we will talk again about county rates in Oklahoma, and we will discuss the eight in a thousand issue. And I think that will pretty well cover his testimony.

THE COURT: Any objection to those particular exhibits?

MR. BULLOCK: No objection to any exhibits. My cross may go beyond the limited things they are talking of.

THE COURT: Very well. Mr. Elrod.

MR. ELROD: I've just been informed that the PowerPoint presentation has been changed to 307.

MR. BULLOCK: That's fine.

THE COURT: Thank you.

DIRECT EXAMINATION

BY MR. ELROD:

Q. Dr. Gibb, tell us where you live.

A. I live in Alexandria, Virginia.

Q. What do you do for a living, sir?

A. I'm the president of Sciences International which is a health risk assessment consulting company.

Q. Tell us your education, please.
A. I have a bachelor's degree in chemistry and biology from Pennsylvania State University, master's degree in public health and focus on environmental health from the University of Pittsburgh. And I have a PhD in epidemiology from Johns Hopkins University.
Q. When did you get your PhD?
A. 1989.
Q. For the record, we can see you, but for the record, what is your age?
A. My age is 59.
Q. Thank you, sir. Dr. Gibb, let's talk about your professional career for a few minutes. Are you involved with the World Health Organization in any manner at the present time?
A. Yes, I am.
Q. In what way are you involved with the World Health Organization?
A. I am a member of the foodborne epidemiology reference group. The foodborne epidemiology reference group is charged with developing the global burden of disease from foodborne illness. There are three task forces on it and enteric which includes bacteria and viruses, parasites and chemicals. I chair the chemical task force. I'm also a member of the source attribution task force of the -- of this reference group and

the source attribution task force is to determine how much disease comes from food and how much disease comes from water.

Q. All right, sir. Did you have a career at the EPA before your present job?

A. Yes, I did.

Q. When did you start at the Environmental Protection Agency?

A. 1974.

Q. When did you conclude your career there?

A. 2004.

Q. It was a 29-year career at EPA?

A. Yes, it was.

Q. And would you tell the Judge some of the jobs that you had while you were at the EPA that bear on your qualifications to testify in this matter.

A. Yes, I was at the National Center for Environmental Assessment. The National Center for Environmental Assessment is part of the office of research and development. The charge to the national center is to develop the health risk assessment methodology for the agency and to do the high profile risk assessments. I was the -- I started as a staff epidemiologist. I was a branch chief. I became the assistant center director of the national center. And then I was the associate director for health at the national center.

Q. At the end of your career there?

A. Pretty much at the end of the career, yes.

Q. Doctor, did you have any involvement in either establishing at the beginning or discussions later on within the EPA about the water quality standards that have been lawyered about in the last three days?

A. Are you referring to the recreational water standards?

Q. Yes, sir. I'm sorry, I wasn't specific.

A. Not so much with the recreational standard, no.

Q. What water quality standards have you been involved with in terms of discussion?

A. Was involved with the water quality standard for arsenic, was involved with some of the other metals for which maximum contaminant levels have been established for.

Q. Doctor, have you received any awards while you were at the EPA?

A. Yes. I received the gold medal for the risk assessment work that I did on arsenic. I received the scientific and technical achievement award for the epidemiology study I did of chromate production workers.

Q. Chromate?

A. Chromium -- chromate production workers. And that study became the basis of OSHA's permissible exposure limit for hexavalent chromium, of which I'm rather proud because OSHA doesn't set a lot of permissible exposure limits. I also was the -- I received an award for the work that I did with the World Trade Center.

Q. Tell His Honor what work you did in regard to the tragedy at the World Trade Center.

A. I -- following the collapse of the towers, we did -- I directed the assessment of the exposure that came from the towers. So there were monitors set up around ground zero and extending some blocks away from ground zero. We collected -- there were collected hundreds of thousands of data points which we analyzed for various substances.

Q. And that work is now complete by you, sir?

A. That work is complete, yes.

Q. Have you served on any White House interagency committees?

A. Yes, I served on the White House interagency committees for risk assessment for mercury in the Gulf of Mexico, a couple of White House committees actually for risk assessment.

Q. Are you the author of any publications?

A. Yes, a number of journal and book publications.

Q. Doctor, I'm sure the Judge knows, but for the record, tell us what epidemiology is.

A. Epidemiology, I think, briefly is sort of a study of disease and risk factors for disease.

Q. What is risk assessment?

A. Risk assessment is taking the information from epidemiology studies, toxicology studies and developing -- assessing the risk as it would apply to the population.

Q. And have you done that specific kind of work, risk

assessment, during your career within the EPA?
A. Yes.
Q. And could you give us some specific examples, please?
A. Well, I did, for example, the arsenic risk assessment. I've done assessments for nickel, for various chemicals. We worked on coke oven exposures, acrylonitrile, a number of different substances.
Q. Doctor, what have you been asked to do in this matter?
A. I was asked to evaluate the epidemiologic information that has been presented with regard to the Salmonellosis and Campylobacteriosis rates and to examine the risks for the -- the epidemiology studies on which the primary body contact recreation standard -- or water quality criteria are based.
Q. What we call the eight in a thousand or what I'm calling the eight in a thousand?
A. Yes.
Q. Before we get into those specific issues, would you tell the Court based on your knowledge and your education and the work that you have done, what the day in, day out, year in, year out source for Campylobacteriosis in the United States is as opposed to food and water?
A. The day in and day out. Well, most Campylobacteriosis comes from food.
Q. Most comes from food?
A. Well, that's how most of it is transmitted, yes.

Q. That's my question, it was very poorly put. Can you give -- is there a better percentage than most?

A. I don't know if I can give you a percentage, but I think -- I mean, if you consult the Centers for Disease Control or the World Health Organization, you'll find that most Campylobacteriosis is transmitted through food.

Q. Same question for Salmonellosis, is there a percentage that comes from food as opposed to water on a day in, day out, year in, year out basis?

A. I don't know that I can give you a percentage. I've heard 80 percent, but I don't know that I can substantiate that.

Q. Dr. DuPont will address that later in the case, sir. Let's move directly to your charts. Pull up, please, Ms. April, 3071. Doctor, do you need copies of these? I've got a packet here for you.

A. I think I do, yes. Yes, I do. Thank you.

MR. ELROD: Judge, do you have a package of this?

THE COURT: I don't believe so, sir.

Q. (By Mr. Elrod) All right. Now, Doctor, these bar graphs are a little small to be seen on the screen, so the Judge has one, you've got one, I've got one. Is this the Campylo rate for counties in Oklahoma in 2002?

A. Yes, it is.

Q. Are these taken directly from the Department of Health statistics of Oklahoma?

A. Yes, they are.
Q. And if I could lead just for a second, is it true, Doctor, that this -- these are bar graphs from all of the counties in Oklahoma for that year?
A. Yes, they are.
Q. And have you colored in yellow the four counties that are within the IRW in some form or fashion?
A. Yes, I have.
Q. So working from top to bottom yellow lines, Adair County is the first yellow line; is that true?
A. Yes.
Q. Cherokee would be the second yellow line; is that true?
A. Yes.
Q. Delaware County is the third yellow line?
A. Yes.
Q. And Sequoyah County is the fourth yellow line?
A. Yes.
Q. What's the red dotted line across from top to bottom?
A. That is the rate for all of Oklahoma.
Q. Now, what, if anything, is significant to your opinions in this case on this chart for Campylobacteriosis?
A. I think that what's important about this chart is that it presents that there's a lot of variation. There's a lot of -- I don't see anything sort of -- I mean, in earlier testimony we had seen Adair County presented against the State of Oklahoma.

But I think if you look at Adair County in comparison with other counties, you don't see a particular difference.

Q. For instance, how many total cases of Campy -- these are expressed in numbers per hundred thousand population; correct?

A. These are numbers for a hundred thousand. And in this particular case, there's only five cases on which the rate for Adair County is based. And if I might, the discussion earlier came up about how many -- these are small numbers, and the point here is that if you have -- let's say there were 500 cases as opposed to five cases. Then reducing that by a couple of cases doesn't change the rate a lot, but if you reduce five cases by two cases or three cases, you change the rate considerably.

Q. Yes, sir.

A. So the point is that if you look at all of these rates, some of them will be statistically significant, but overall most of these rates are going to be very statistically not different from that for the State of Oklahoma because of the small number that the rates are based on.

Q. Let's talk about the Delaware County for a second. Do you see Delaware County, the second or the third yellow line?

A. Yes.

Q. You've been in the courtroom, by the way, for the entire hearing up to this point in time, have you not?

A. Yes, I have.

Q. So you've heard all the testimony?
A. I took an afternoon off.
Q. Which witness was that? Delaware County is well below the average state line?
A. Yes, it is.
Q. And there's only a slice of Delaware County in the IRW?
A. Yes.
Q. But do you know whether or not Delaware County, Oklahoma is one of the largest chicken producing counties in the State of Oklahoma?
A. My understanding is that it is, yes.
Q. And then look at Ellis County, the largest by far.
A. Yes.
Q. Are there any chickens produced in Ellis County?
A. Not that I'm aware of.
Q. Look at the second one, Tillman County. To your knowledge, are there any chickens produced in Tillman County, Oklahoma?
A. No, it's down the Red River, I think.
Q. So let's go to number 2, the Campy rates by county in Oklahoma for 2003. And Adair County has grown now to three per thousand and is one of the largest in the State of Oklahoma for that year; is that true?
A. I'm sorry?
Q. Number 2.

A. Number 2 is -- I'm sorry, but what was the question?
Q. The second chart.
A. Yeah, I've got that but what was the question.
Q. Adair County for the year 2003 has grown?
A. Yes.
Q. But how many cases is that?
A. That's six cases.
Q. Six cases total?
A. Right.
Q. Does that have any statistical meaning in terms of trying to make a connection between the land application of chicken litter and the Campy rate?
A. No.
Q. Appendix 3, same exercise. Again, Kingfisher County is the highest for that year. Are there any chickens raised in Kingfisher County to your knowledge?
A. Not that I'm aware of, no.
Q. And Adair County, how many total cases in Adair County for that year would that be?
A. In 2004, there was eight.
Q. And again, in Delaware County, it's well below the line and there's a lot of chickens there; is that true?
A. Yes, something I want to point out is that we saw a graph from Dr. Teaf in which he compared the rates of Adair County to the State of Oklahoma. And for all the years that he showed,

you know, they were elevated above the rate, above Oklahoma. But you can do the same thing for Pontotoc County and you can do the same thing for Carter County.

Q. Are there chickens in Pontotoc or Carter County?

A. No, but Carter County -- the point is that Carter County and Pontotoc County both have rates elevated above the Oklahoma rate for all of these years studied here and they're not anywhere near the Illinois River Watershed. So sort of, I guess, to some extent if you only look at Adair County, you know, some of them looking under the street lamp and you're finding something. But if you step back and look at all the counties of Oklahoma, you see you can find those kinds of relationships for other counties as well. And for example, I can point out that Adair County was elevated above the Oklahoma rate, but I can also tell you that Tillman County was elevated above Adair County for four out of those five years. So I'm not sure what the message here is. Tillman isn't anywhere close to the Illinois River Watershed.

Q. All right, sir. Then look at Appendix 5. Anything meaningful or causal connectivity between chicken litter application and Campy rates in Oklahoma in Appendix 5?

A. No.

Q. Appendix 6, now we move into Salmonellosis; is that correct?

A. Right.

Q. And the first year is for 2002?
A. First year is 2002. And one thing I want to point out is that the rates below, you'll see the incidence rate below, is like 140 in this particular graph. That's where it will fit the rate. In some cases, it's not -- you know, the next -- like in Appendix 7, it's 90 is the rate, is the maximum rate.
Q. I did not understand what you just told us.
A. I'm sorry. At the bottom of the chart, you'll see the rate goes up to 140.
Q. I see, yes.
A. But at the next, in Appendix 7, it goes up to only 90. So there are -- just for the Court, I just want to make sure that --
Q. I understand. At any rate, for 2002 Adair County was slightly below the state average?
A. Adair County was below the state average for 2002.
Q. And Delaware County was about half the state average?
A. Yes.
Q. Sequoyah County was about a third of the state average?
A. Yes.
Q. Again, how many cases of Salmonellosis would there be in Adair County in 2002?
A. I believe it was three.
Q. By the way, these are what you call crude statistics?
A. These are what would we called crude rates. And the

reason they're called crude rates is because they're not age-adjusted rates.

Q. Did you say crude or true?

A. Crude, crude rates.

Q. C-R-U-D-E, right?

A. C-R-U-D-E.

Q. Yes, sir. What is the importance of age adjustment as from an epidemiological standpoint?

A. Well, whenever you are comparing groups, you want to make sure that if there's a difference in disease by age, you want to make sure that you're comparing apples and apples. So you would do what is called an age adjustment. And so these aren't age adjusted and, frankly, I wouldn't expect them to be because there are so few numbers. I mean, you can't age adjust with such small numbers. But if you are doing a true comparison of rates, you would be comparing age-adjusted rates. Of course, that can't be done and you can't fault -- I mean, I wouldn't be faulting the State for that because they're just too small numbers. But at any rate, that's the point is you don't compare crude rates.

Q. The fact that they are crude rates, does that take away from any utility they might have?

A. It would certainly take away from the utility of being able to compare these rates.

Q. Tell us why age adjustment is important from an epi

standpoint.
A. Well, if, for example, children are more susceptible and you have more -- if the age distribution in the population, you know, between counties, among counties is different then, you know, you would want to have age specific data and then come up with what's called an age-adjusted rate.
Q. Why are children more susceptible, Doctor?
A. Well, they may be more susceptible because they don't have the immune system, you know, for what they may eat and so forth.
Q. They also have a lot of hand-mouth activities going on?
A. And a lot of hand-mouth sort of thing, right. And also there may be -- you know, elderly could be affected, you know, that sort of thing.
Q. Children are in daycare centers sometimes?
A. If, for example, children at a daycare center were, you know, all fed, you know, bad chicken sandwiches or something.
Q. Look at Appendix 7, the Salmonellosis rate for Oklahoma 2003.
A. Yes.
Q. Are you there?
A. Yes.
Q. Adair County is again below the average?
A. Yes.
Q. As is Cherokee?

A. Yes.
Q. As is Delaware?
A. Yes.
Q. And as is Sequoyah?
A. Yes.
Q. Look at Appendix 8 for 2004. Adair County looks like it hit the state average right on?
A. Yes.
Q. How many cases was that?
A. I think that's three cases.
Q. All right. Cherokee County was slightly above?
A. Yes.
Q. Delaware County comes in below?
A. Yes.
Q. And Sequoyah County comes in below?
A. Yes.
Q. Look at Harmon County, that huge spike.
A. Yes.
Q. Is that in chicken country?
A. Not that I'm aware of.
Q. Even though that's the largest number for the year in Oklahoma, do you know how many cases that was?
A. For Harmon, I can't tell you what it was.
Q. Okay. Now, look at 2005 for Salmonellosis, Appendix 9, Adair County that particular year, as Dr. Teaf has been kind

enough to point out, was the highest county in the state; is that true?

A. Yes.

Q. How many total cases was that?

A. I believe it was nine cases.

Q. Nine?

A. I believe it was nine.

Q. And could all of those cases have come from one event?

A. They could have come from one event, yes.

Q. You were here when he talked about serology.

A. Yes.

Q. I think that's the right term.

A. Yes.

Q. They might not have come from one event?

A. They may not have come from one event. They could have come from two events.

Q. Cherokee County is below the average?

A. Yes.

Q. Delaware County is below?

A. Yes.

Q. And Sequoyah County is below?

A. Yes.

Q. 2006 for Salmonellosis?

A. Yes.

Q. Adair County has fallen back to just about the state

average; is that true?
A. Yes.
Q. Cherokee County, below?
A. Yes.
Q. Delaware County is almost right on the mark?
A. Yes.
Q. Sequoyah County is almost right on the mark?
A. Yes. Here's where this -- why I said below on the graph. It's like this, for Appendix 10, it's 120. So you can compare that to the previous graph for Adair, and Adair was about 40. So Roger-Mills County was almost three times -- in 2006, it was almost three times what Adair was in 2005. I mean, I wouldn't necessarily make anything of that but, I mean, it just shows you how much variability there is in these rates and how difficult it would be to compare them.
Q. Would it be intellectually honest for anyone to try to make a connection between the rates for any of these years for your Campy or Salmonella and the land application of chicken litter, sir?
A. No.
Q. Doctor, look at Appendix 11, please. Now, we're going to have to spend a second talking about this one. What is the vertical chart on the left?
A. On the left, we have the number of broiler chickens sold and that comes from the USDA statistics.

Q. So this would be a function of the number of chickens in any particular county in Oklahoma?

A. I'm sorry, chickens in a particular county. This is the number of broiler chickens sold in the counties of Oklahoma in 2002.

Q. And then the horizontal axis is what?

A. That's the Campylobacteriosis rate. And what I did was I wanted to look at was there a correlation between the number of chickens sold in a county and the Campylobacteriosis rate.

Q. And the IRW counties are in the green boxes?

A. Yes.

Q. I see three of them. Is there just three?

A. Well, no, the other one is sort of occluded on the line there.

Q. So of what significance is it that the line is almost exactly horizontal?

A. It means there's no correlation. I mean, if the R squared was one, you would have seen a line going from the lower left-hand corner to the upper right-hand corner, but there's no correlation at all. And it's not -- you see the R squared that says 2E to the minus 05, what that means is that it's .00002, in other words, it's two ten-thousandths -- excuse me, two one hundred-thousandths. Essentially there's no correlation. And the probability -- if it was statistically significant, the probability would have been less than .05, but you can see the

probability is .97.
Q. What does that mean, please?
A. It means that there's, essentially there's no -- the correlation is not statistically significant.
Q. And, Doctor, if there was a correlation, would the line that is horizontal be at a 45 degree angle?
A. Yeah, exactly.
Q. Right. Turn to Appendix 12, please. Is this the same sort of exercise for Campy rates for 2002?
A. Yes, but for Arkansas counties.
Q. All right. Why did you include Arkansas counties?
A. Well, because Arkansas is in the Illinois River Watershed so --
Q. Benton and Washington Counties?
A. Right. But the third one is --
Q. Excuse me, go ahead.
A. There are three counties in Arkansas in the Illinois River Watershed.
Q. Crawford barely?
A. Right. Okay. So one of those is Crawford.
Q. All right. Now, have you gone through the same exercise to determine if there was a correlation between chicken production and Campy rates on the Arkansas side of the line?
A. Yes.
Q. And is there?

A. No.
Q. And why is that? I don't mean why is that, but what does the chart show in terms of correlations?
A. The chart shows that there is no correlation. I mean, again, the R squared is .0042. The probability is .6094. Again, if the probability had been less than .05, it would have been statistically significant. There is no correlation.
Q. What is Appendix 13, Doctor?
A. That is Salmonellosis rate in broiler and other types of chickens sold in Oklahoma counties, 2002. The reason we used 2002 was because that was the year that USDA had data for those. That was the most recent year the USDA had data. So we used the 2002 rates compared to the 2002 USDA data.
Q. You didn't cherry pick years?
A. No.
Q. What is Appendix 13 then, that's for the Salmonella rate for Oklahoma counties for that year?
A. Yes, right.
Q. And again, would you explain whether there's any correlation from this chart?
A. No, I mean, it shows a negative correlation. I wouldn't put anything into that. It's not statistically significant but, again, there's no correlation.
Q. Finally, Appendix 14 is the Salmonella rate for Arkansas Counties, Benton, Washington and Crawford; is that true?

A. Yes, correct, Benton Washington and Crawford.
Q. And again, if there was a correlation, would the line be at a 45 degree angle, sir?
A. Yes.
Q. Is there a correlation between chicken production on the Arkansas side and Salmonellosis rates?
A. No.
Q. For 2002?
A. No.
Q. Thank you. Now, what is the -- if you would turn to the next document, please. You've got some cull outs. What is this document, sir?
A. This comes from the Oklahoma Department of Health. And it is a fact sheet on Campylobacter. And this actually kind of goes to the question that you asked me earlier about how Campylobacter is transmitted. And this is a statement by the Oklahoma Department of Health that says infection of Campylobacter mainly occurs by eating raw or undercooked chicken or pork or contaminated food or raw milk. And then later on it says most infections come from eating food contaminated with the bacteria.
Q. Do you agree with this -- what this statement is?
A. Yes, and you can find similar, actually, statements from the World Health Organization or Oklahoma Centers for Disease Control.

Q. Is this really an issue at all in the scientific community in terms of foodborne versus waterborne?
A. It is an issue because it's like we know most Campylobacter is transmitted through food.
Q. All right, sir. The next document is the same in regard to Salmonellosis; is that true?
A. That's correct. And again, I could have produced the same documents from World Health Organization, CDC, the Handbook For Communicable Diseases put out by the American Public Health Association.
Q. Doctor, what is the next document in your PowerPoint? Does that discuss sources and reservoirs for Campylobacteria?
A. Correct. And I know this has been brought up earlier in the proceedings, but this comes from the Control of Communicable Diseases Manual published by the American Public Health Association. And the point I'm making here is, is that the reservoir for Campylobacter are animals, most frequently poultry and cattle, but puppies, kittens, other pets, swine, sheep, rodents and birds may also be sources of human infection.
Q. Why are we focusing on, both the State and the defense, on the Salmonella bacteria and the Campylobacter bacteria?
A. Because poultry can be a reservoir for both Campylobacter and Salmonella, so that's a consideration.
Q. All right, sir. Now, what's the next document?

A. Next one is for Salmonellosis. And again, it's from the Control of Communicable Diseases Manual. And it says that the reservoir is domestic and wild animals including poultry, swine, cattle, rodents and pets such as iguanas, tortoises, misspelling, turtles, terrapins, chicks, dogs and cats, also humans, in other words, patients, convalescent carriers and especially mild and unrecognized cases.

Q. Doctor, would you tell us what the pie chart is that we're going to be looking at next and why you created it? Did you create it?

A. Yes. The pie chart was because I, you know, the question -- if the question is because we have impairments in the Illinois River Watershed, I just wanted to get an idea, are the impairments in the Illinois River Watershed, are they greater than the rest of Oklahoma. And this comes from actually the 2004 data because it was on the EPA website and EPA had their most recent year was 2004. But I think it was interesting that of the 532 impairments for bacteria in the State of Oklahoma, there are only 14 in the Illinois River Watershed. So it certainly doesn't appear from the State's data that the Illinois River Watershed -- and this has been shown in previous testimony, but it certainly didn't appear that we've got any more impairments in the Illinois River Watershed than the rest of the state.

Q. Were you sitting in the courtroom during Mr. Ryan's

opening statement and his examination of Secretary of the Environment Tolbert when he showed the bar graphs for the entire State of Oklahoma on the screen?

A. Yes.

Q. In terms of impairments and bacteria loadings?

A. Yes, yes.

Q. Is this consistent with what you saw in those presentations?

A. Yes.

Q. Doctor, if you would turn to the next one, please. Now, tell us what this is.

A. Well, if the contention is that poultry litter is contributing to impairments from bacteria, then I wanted to see what the State itself had to say about --

Q. The State of Oklahoma?

A. The State of Oklahoma, the State of Oklahoma Department of Environmental Quality.

Q. This is the same State of Oklahoma that's the plaintiff in this lawsuit?

A. Exactly.

Q. What does the same State of Oklahoma that has sued my client said regarding sources of bacteria in the IRW?

A. Well, this is something actually that's been presented before, but it's -- for most of the sources, it's unknown. They don't know what the source is. And the only place that --

you know, if you look down at, for example, Tyner Creek is the first water body where they state what the causes of the impairment are. None of those relate to poultry. Peacheater Creek, they list a number of causes. The only one that could be related to poultry is the runoff from confined animal feeding operations, but there they don't specify if it's poultry or if it's cattle or if it's swine. Flint Creek, source unknown. Sager Creek, source unknown and municipal point source discharges. So I guess my thought was that if the Oklahoma Department of Environmental Quality isn't sure what the source is, I guess I was questioning the allegation.

THE COURT: Mr. Elrod, are there any cattle CAFO's on Peacheater Creek?

MR. ELROD: I don't think there are, Judge. And I say that only because I happen to have a pretty good personal knowledge of the IRW.

THE COURT: Yes, sir. Okay.

MR. ELROD: I mean, I don't know what the proof would or would not show, but I expect suspect there's cattle.

Q. (By Mr. Elrod) We're going to get into the association, if any, between Enterococcus and human disease, but let's address that while we're looking at this chart. Is there a connection between Enterococcus and human disease, is it a pathogen?

A. Enterococcus is not a pathogen. It's an indicator

bacteria. And I guess I think what's -- Enterococcus was used as an indicator bacteria in the -- what formed the water quality criteria from the EPA. But I think there is certainly question of the use of the Enterococcus as an indicator. And I kind of note that in the testimony yesterday of Dr. Harwood and she mentioned the weight paper and she showed a graph on E. coli.

Q. Let's just move right on into that whole area.

A. Okay.

Q. Pull up the next chart before you do that and then we'll get into Wade 2003.

A. Okay.

Q. What does this tell us?

A. This is the recreational water -- this was from a workshop. And this workshop has been discussed before as a workshop that EPA convened of experts on recreational water. And I think it's important to note that the EPA and the group of experts developed the existing ambient water quality criteria for recreational waters were based on epidemiological studies that related concentrations of fecal indicator bacteria at recreational waters impacted primarily by point sources of human sewage. It's important to point out the aspect that the water quality criteria are based on studies, you know, where there was human sewage. And I think that has a lot of implication on trying to relate it to sources -- to other

sources of bacteria.

Q. All right. Let's talk about that for a second. We're going to move into Wade 2003 in just a second. The EPA's water body contact standards, that's what we're talking about; correct?

A. Correct.

Q. The testimony has been that they were developed in the 1980's; is that true?

A. The studies were -- the studies were actually done in 1979, 1980 and 1982.

Q. Did they take place at Keystone Lake just right out here, outside of Tulsa?

A. That's correct.

Q. And Lake Erie?

A. That's correct.

Q. And were those swimming beaches?

A. Yes, they were.

Q. To the extent there is a beach at Keystone. And was the water at those locations impacted by human fecal matter?

A. Yes, at Keystone Beach there were -- the study -- the first study was done in 1979, and there were 120,000 gallons of sewage, unchlorinated. It was treated but unchlorinated, released from a point source into Keystone Lake. Three miles away was a beach and another five miles away was another beach. The same protocol was used at Keystone Lake as was used at Lake

Erie. At Lake Erie, it was studied for 1979, 1980 and 1982. At Lake Erie, there was a beach three-quarters of a mile away from a sewage outfall which released 45 million gallons a day into the lake and it was treated sewage. And then there was another beach across the peninsula apparently from where the sewage outfall was. Bathers, swimmers, to be a swimmer, it was part of the study that you had to have had your head immersed. And then 8 to 10 days later, they called the people up and asked them about symptoms.

Q. Do you suspect that they forewarned them that they were swimming in human sewage?

A. I don't know that they forewarned them. I mean, you could say that the sewage was treated but, nevertheless, it was human sewage.

Q. And they had to be observed putting their heads under the water?

A. They had to be -- actually they were asked when they came out of the water that they wanted to make sure -- the people doing this study were told to observe them as to whether their heads were wet. But if they weren't wet, they asked them a question did you have your head immersed. They then, as I said, eight to ten days later, they called them up and asked them about symptoms. They didn't ask them about anything else. They didn't ask about was there any illness in the family, was there -- had they been drinking, had they eaten any bad food or

anything of that nature. They just asked them about the symptoms. Of course, these are self-reported, they're not medically confirmed.

Q. Right.

A. The symptoms were -- they had symptoms that they were highly credible gastrointestinal illness which consisted of either vomiting, diarrhea with fever or nausea with fever, then they called it highly credible gastrointestinal illness. There were more children in the swimmers than there were in the non-swimmers, almost twice as many children in the swimmers as there were in the non-swimmers, which presents somewhat of a bias because the children are believed to have taken in more water.

So there are several biases that came into the study. There's potential reporting bias. There's potential interviewer bias because we don't know that the interviewers didn't -- you know, were aware who they were interviewing. And there's potential bias because of the distribution of children in the swimmers. So there are a number of uncertainties in the study. And there were -- essentially there were two beaches at Lake Eerie that were studied for three years. There were a sum total of five -- essentially five smaller studies at Lake Erie and four studies at Keystone Lake, so a total of nine studies. Only two of them, and that was the Lake Erie, was there a significant difference between swimmers and non-swimmers and

that was the beach that was three-quarters of a mile from the sewage outfall in Lake Erie. The other ones, it was not statistically significant between swimmers and non-swimmers. So there is some uncertainty in the study certainly.

Q. Did the EPA base the eight in a thousand on what you just told us?

A. That's what the EPA based it -- essentially they plotted the data. They developed a regression through that data. And this is -- and from that, then they made an estimate of 8 per thousand and the 8 per thousand itself is arbitrary.

Q. Why?

A. Well, it's arbitrary because it goes actually back to, believe it or not, studies that were done in the late 1940's. In the 1940's along the Ohio River, they took total coliform and they related the total coliform to what they called significant illness. And that was about 23 to 2,400 total coliform. Then in 19 -- 15 years later they decided that total coliform is not a good indicator, but fecal coliform would be a good indicator, but they didn't know how much fecal coliform were in the studies in the late '40's. So 15 years after, they went to the Ohio River and they sampled for fecal and they said it's about 18 percent of the total, so we'll set the standard and that's about 400 fecal coliform. So we'll say we'll set the standard at 400, but we need some kind of safety, so we'll set it at 200. So 200 becomes the standard.

When they did the studies at Lake Erie and Keystone, then they related the Enterococci to the fecal coliform. Are you following this?

Q. I am.

A. To the fecal coliform and the E. coli to the fecal coliform and essentially this is where the eight in a thousand comes from. I mean, it's arbitrary based on 200 was, you know, what was done in 1968 by the Federal Water Pollution Control Admission which preceded EPA.

Q. I put up a chart which is actually a State of Oklahoma chart, a demonstrative. I don't know the number of it but it says Recreational Water Quality Standards and U.S. EPA for E. coli and the geomean is 126 and the max is 235?

A. Yes.

Q. Is that the eight in a thousand standard?

A. That's the eight in a thousand, yes.

Q. That we've been talking about?

A. Yes.

Q. And for Enterococci, it's 33 geomean and 61 max. Do you see that?

A. Yes.

MR. ELROD: It's number 433. Thank you.

THE COURT: This is already admitted I recall, correct? Thank you.

Q. (By Mr. Elrod) The eight in a thousand numbers are

associated -- are they associated with the geomean U.S. EPA numbers that we see on this chart; is that true?

A. Yes.

Q. And were the eight in a thousand numbers derived from the, quote, "study," end quote, that you just described to the Court where children were putting their heads into the water in human sewage?

A. Well, yes.

Q. I might have exaggerated a little bit. All right, sir, let's go to the next PowerPoint. And Doctor, Dr. DuPont will get into this issue later in our case, but do you know from having lived on the Earth and from having done what you've done in your lifetime, sir, that there is a -- is there a interspecies barrier, that's my word, in terms of the potential for contracting disease from bacteria?

A. Yes, I mean, there's a species barrier and it's like if I get sick, my dog doesn't get sick. My dog sets sick, I don't get sick. I mean, there is a difference and sometimes things will jump the species barrier. It has happened, but by and large, the diseases that animals have are not the diseases that humans have.

Q. And what is the next PowerPoint?

A. And the next one is --

Q. I think before we get into that, we need to actually pull Wade up. Can you do that without me giving a number?

Plaintiffs' 77 is Wade 2003. All right. Now, Doctor, during your -- during the 1990's when you were at the EPA, did the issue of these recreational water quality standards become a matter of discussion within the EPA?

A. Yes, they've been a matter of discussion for some time.

Q. In terms of their -- in terms of what?

A. Well, in terms of -- there's been some question, criticism of whether they truly predict human risk, whether, you know, whether the indicator mechanisms, they're a good predictor. And there's some question, I think, about, you know, being on one number and how that's some sort of a magic line.

Q. All right. Let's turn to -- were you involved in those discussions or did you overhear those discussions?

A. I was aware of the discussions, yes.

Q. And what did the EPA -- did they ask that a study be done by a man named Wade?

A. Actually what happened was that there's been a considerable amount of discussion about recreational water guidance. And the Environmental Protection Agency, as it often will do if they have a difficult problem, will go to the National Academy of Science and ask for some deliberation on the issue.

Q. The National Academy of Science sounds like something important. Would you tell us what it is?

A. Well, it's the -- the National Academy of Science is the

country's most esteemed scientists and they will form committees. And the National Research Council was asked to form a committee to address this issue. And so what they asked Wade to do was to look at the numbers of studies that have been done with Enterococci or looking at indicators. And so -- and this came up yesterday in the discussion. Wade did this meta-analysis. He looked at Enterococci and found absolutely no correlation with that and the relative risk.

Q. Ms. April, would you turn to page 1105 of this which is 2846 Harwood?

THE COURT: See if I understand this in terms of -- this comes out after the DuFore 1984 report?

THE WITNESS: DuFore, yeah, DuFore 1984, yes. This Wade --

THE COURT: All right. So how recently was Wade?

THE WITNESS: 2003.

THE COURT: All right. And he was contracted by whom, the National Academy?

THE WITNESS: Well, he was requested by the Academy, yes, to look at it and --

THE COURT: But as far as EPA is concerned, the DuFore report, the August '84 report is still their standard?

THE WITNESS: It is still the base of the standard, yes.

THE COURT: All right.

Q. (By Mr. Elrod) Now, we are looking at the same chart that Dr. Harwood addressed yesterday; is that true?
A. No, this is different. This is for the Enterococci -- this if for me, I'm sorry, it's the marine. This is the marine environment. But if you want to look at the -- I think the chart you want to look at is a couple of pages on. I think actually here you'll see in the table above it -- do you see the table above it?
Q. Yes.
A. Can you look at fresh water Enterococci?
Q. Let me get my brain around this. Why is the chart that's behind what she's pulled up right now not the same chart that Dr. Harwood was looking at yesterday?
A. Well, the chart that Dr. Harwood was looking at yesterday is a couple of pages on.
Q. All right. But the one that we're looking at right now, is that fresh water?
A. No, this is marine actually.
Q. All right. I was confused which is my normal state. If you'd pull that back up, please, April.
A. You go to --
Q. No, no, what you had. That one right there, yeah.
A. Yeah.
Q. Now, we're looking at Table 3 on page 1105; correct, sir?
A. Right. If you look under fresh water, you'll see

Enterococci. And if you look over to the far -- the R squared, there apparently is no correlation.

Q. All right. Now, it's got the number .016 is what we're looking at?

A. Right, essentially no correlation.

Q. Freshwater Enterococci?

A. Right. And the P value is the .97.

Q. All right. Now, you're going to have to talk to me like I'm a fourth grader.

A. Okay. The P value, if it was less than .05, it would be significant, but it's not anywhere close to significant.

Q. What does the R value mean -- what does R --

A. That was the correlation coefficient that we were talking about earlier.

Q. And it's .016, tell us what that means.

A. Well, if it was 1, it would be correlated.

Q. So what does .016 mean?

A. It means it's no correlation essentially.

Q. What does that mean in terms of what the Wade study found in terms of whether there was any correlation at all in a meaningful sense between the presence of Enterococci bacteria and human pathogens?

A. It doesn't correlate, I mean, it essentially doesn't correlate. And the Academy then said -- well, if you go actually -- I should let you ask the questions, I guess.

Q. No, you go ahead. You are doing better than I am.
A. Well, if you go on to the next -- the couple of pages onto the E. coli.
Q. All right, sir.
A. If the E. coli -- this is the graph, and it indicates there are three studies and two studies. I'm sorry, okay.
Q. Doctor --
A. Okay. Here they have done a correlation -- this is the E. coli and this is what Dr. Hargrove showed. There were three studies that went into this because if you go down through the studies, there are three studies that comprise this database, okay. It says in the document three and two, but actually it's really a total of three studies because two of them contribute two data points. And one of them is DuFore. So in other words, you're using the DuFore study to sort of prove, you know, the relationship that he had before. Another one is Lightfoot. Lightfoot was actually a PhD dissertation from the University of Toronto and she spent much of her dissertation addressing why these indicator bacteria did not reflect disease. She had done a study of, I think it was nine different beaches in Ontario. And then the other study was a study of, I think, triathletes.
So the National Academy of Science, their comment was there wasn't a best indicator. And they -- the academy said that the idea that -- of an indicator bacteria being correlated

with pathogens is flawed. I mean, because you have to have -- an indicator bacteria ideally would be a one-to-one relationship. You have an indicator bacteria, you have a pathogen and so when you demonstrate indicator bacteria, you have an increase in disease. And they said that's absolutely flawed because the bacteria in the gut are fairly constant, whereas the pathogens, you know, will vary considerably. And on top of that they said once they are released in the feces, the ability, because of sunlight, salinity, temperature and so forth, of them to survive is different. And they said that the -- there was -- these are the words of the Academy, these are not my words. They said that there was considerable uncertainty in taking indicator bacteria and applying that to where there was -- where there was non-point source pollution. In other words, the non-point source pollution will come generally from animals.

So the point here being that they said there was very poor correlation between viruses and non-point source pollution. There was a fairly good correlation between Enterococci and viruses when it was from septic tanks, from a point source. They even indicated that there are bacteria in the environment that didn't even come from the -- you know, it didn't even come from feces, so that even further complicates the picture. So the basic statement they were saying was indicator bacteria are a poor predictor of human disease.

Q. Let's move to this piece of paper right here.
A. This was the National Academy of Science report in 2004, I might add.
Q. All right. Now, we're looking at the Illinois River Watershed bacterial synopsis which is State's Exhibit No. 407.
A. Yes.
Q. And, Doctor, if I could draw your attention to -- this is the Illinois River Stream Reach Bacterial Exceedances, is that true, 2005, 2007? Are you looking at it?
A. Yes, it's from the State's --
Q. State's case?
A. State's case.
Q. From the State of Oklahoma, the plaintiff; correct?
A. Yes.
Q. Read the bacterial parameters in the first -- in the second column from the left going down, just read them all.
A. Enterococci, Enterococci, Enterococci, Enterococci, Enterococci, E. coli, Enterococci, Enterococci, Enterococci, Enterococci, fecal coliform, E. coli, Enterococci, Enterococci, Enterococci, Enterococci, Enterococci.
Q. Thank you, sir. Now, is that the same Enterococci that the National Academy of Science has said there is very poor correlation between its existence and pathogenic bacteria?
A. Yes.
Q. Doctor, therefore, does the eight in 1,000 number that the

State has been touting in this case mean that eight people will get sick from the State's evidence in the Illinois River basin?

A. The first question I would ask is, you know, we don't know where the Enterococci came from. And so if this is from non-human sources then, you know, I would question whether, you know, it has any -- has relevance.

Q. All right, sir. If it's from non-human sources, whether there's any relevance. And who asked the National Academy of Science to look at the correlation issue?

A. EPA was asked to address the issue of indicator.

Q. EPA asked the National Academy of Science?

A. EPA asked the National Academy of Science.

Q. And it's the EPA standard that we're talking about?

A. It's the EPA standard, right.

Q. Now, Doctor, if we could move to the next slide. We're almost at the end. What is this slide about, sir?

A. Well, this is my summary of what I concluded was that of Campylobacteriosis or Salmonellosis associated with waterborne, there is no evidence of Campylobacteriosis or Salmonellosis associated with waterborne transmission of bacteria in the IRW. And I base that on there's no evidence from the epidemiologic data. We don't see any differences in county rates. Even if there was a difference, of course you would have to ask the question was it foodborne, was it waterborne. And if it was, you know, if it was waterborne, then you have to ask the next

question is where could it have come from. Could it have come from cattle, could it have come from swine, could it have come from poultry.

So I might add that, you know, the Oklahoma Department of Health for each of these years, you know, where there was an outbreak, they did an investigation and none of them, you know, found a water source. So, you know, there's just no evidence that, you know, we have increased risk of Campylobacteriosis or Salmonellosis in the Illinois River Watershed.

Q. Dr. Gibb, what's the middle bullet point?

A. That poultry litter is -- there's no evidence that poultry litter is causing bacterial impairments of recreational water bodies in the IRW. I base that on if the Oklahoma Department of Environmental Quality isn't going to state -- won't state that this is coming from poultry, you know, I guess -- I guess I'm curious as to how the case is being brought.

Q. Your last bullet point is what, sir?

A. That there is no evidence of bacterial waterborne disease outbreaks in Oklahoma associated with recreational water. I base that on the Center for Disease Control reports. I'm sorry I forgot to mention that, but the center for Disease Control reports goes over waterborne, you know, recreational waterborne illnesses back through 1994 and I looked at all of the reports. There were no reports from Oklahoma, save one for a swimming pool and one from a -- it was an amoeba, but there was no

evidence that they were in the Illinois River Watershed, but they had nothing to do with recreational water. That was the point, I mean, river water.

Q. Dr. Gibb, have you spent your entire adult life attempting to protect the American public from potential health effects from environmental matters?

A. Yes, I have.

Q. Is that something you take very seriously?

A. Yes, I do.

MR. ELROD: Thank you, sir. I pass the witness.

THE COURT: Would this be an appropriate time to take a short break? Let's take a short recess.

(Recess.)

THE COURT: Mr. Bullock.

MR. BULLOCK: Okay.

CROSS-EXAMINATION

BY MR. BULLOCK:

Q. Dr. Gibb, listening to your account of your experience, it appeared that you've worked primarily in the area of risk assessment of chemical compounds?

A. Mostly chemical compounds, yes.

Q. Have you testified in court before as to bacteriological contamination?

A. Yes.

Q. Okay.

A. Actually, it was an international tribunal.
Q. Well, it was court or it was an international tribunal?
A. It was an international tribunal.
Q. Okay. Now, one of the things which you said that you had worked on most recently was the assessment of arsenic, the question of what the risk levels are with arsenic?
A. Yes.
Q. Were you one of the ones who advocated that arsenic levels be allowed to rise higher than what they are presently?
A. I'm a scientist so I wasn't trying to advocate but I --
Q. Is that where your science led you?
A. My science led me to lower levels.
Q. Your firm was discharged by the EPA last year; is that correct?
A. No, that's not correct.
Q. It is not true that Science International had a -- actually, I'm sorry, was it the National Institutes of Health that you were discharged from?
A. No, it was the National Institute of Environmental Health Sciences. And we had done a document and there were allegations made of conflict of interest. The contract was terminated. Subsequently, the NIHS did an investigation by an independent auditor, found that there was no evidence of any wrongdoing. Unfortunately, they did the audit after they terminated. And you know, the director at the time was under

accusation of personal conflict of interest and I think unfortunately we became part of the -- unfortunately, it was expedient to terminate us, so -- but I felt vindicated when they did the audit and found nothing had been done wrong.

Q. Doctor, I am curious as to the issue of risk and contamination from animal feces. This is the sample of the litter that the defendants were nice enough to make a demonstrative. If I put some of that in this gulp of water that I have left, there's not risk to my health or to yours should you drink it?

A. I think that you can never say there's not risk. I mean, there's risk for doing almost anything, but is the risk minimal or is the risk -- so I mean, there's always a question of risk. There's a question of being struck by lightning.

Q. So is what you're telling us is that the risk would be minimal from drinking water which is contaminated from the feces of poultry?

A. Let me put it this way. I would much rather consume water with the feces of poultry than water with the feces from a human.

Q. But, of course, that's not the question. The question here that you're asked to address is whether there is a risk to people swimming in water that is potentially polluted from the feces of poultry; right?

A. That's correct.

Q. Okay. So is it your testimony that there isn't any appreciable risk to swimming or taking a gulp of water which is contaminated from the feces of poultry?

A. I can't say that there is no risk, but I can't say that there is a risk either.

Q. Then you have -- if we went on this, State's 329, I believe. No, that's the case number. What was it? I had the number. 433. So if we had another one here, another column for -- with your name on it and for animal contamination, it would be no limit -- or for poultry contamination, it would be no limit, no matter how many E. coli we have from animal -- from poultry waste, you would say no limit?

A. No, I wouldn't say that.

Q. Okay. Then what is your -- what is the limit that you would recommend to this Court as being the limit where water would become unsafe for people for full body contact?

A. What I'm telling you is that you can't take these concentrations and apply them when it's a non-point source and expect that, you know, you're going to have human disease with a risk of eight in a thousand. Remember, there are uncertainties with the study that produced that. You are now taking that and applying it to non-point sources mostly coming from animals. The World Health Organization says we seriously can over estimate the risk by taking animal pollution and applying, you know, these kinds of criteria. The expert panel

from the environmental -- that the Environmental Protection Agency pulled together said the same thing. That's the point here is that we're taking these and now applying it to non-point sources and saying, oh, you know, we've got -- you have a risk, and that's -- you know, that's an inappropriate use of the information.

Q. Okay. Now, this debate as to whether or not to change the standards, I believe it was your testimony, has been going on for some time as whether to change the standards for full body contact, that that debate within the EPA has been going on --

A. The debate is -- yes.

Q. -- for sometime. And the EPA has reviewed that on several occasions; correct?

A. The EPA has reviewed it internally. There is a World Health Organization meeting in Annapolis where they developed the Annapolis protocol, there's been the World Health Organization --

Q. Doctor, I really -- and I'm going to let you give lots of speeches, but generally let's try to stick with the subject. Do you recall the EPA' May 2002 implementation guidance for ambient water quality criteria for bacteria?

A. Yes.

Q. Okay. Do you recall what the EPA's conclusion was in that study?

A. Conclusion, I'm not sure what you mean by conclusion.

Q. As to whether there was evidence to change these standards?

A. They didn't -- you know, they said we'll continue to use the same standard. I mean, they need to have something. You can't just say, you know, we're going to wait until we figure this all out, so you have to have a standard.

Q. Isn't it true that this -- and I'm reading from page 11 of the report and we've got a copy here if you want to look at it.

MR. ELROD: Would you mind giving me one, too?

MR. BULLOCK: Certainly, more than happy to. Okay. Let me go ahead and give you one, too. Judge, in fact I have this. These are the ones that I'm going to reference and the sub-copy.

THE COURT: Thank you, sir.

MR. BULLOCK: Here is a copy. Here is a more shortened version.

Q. (By Mr. Bullock) Let's go to the bottom of page 11 of that. Now, just to get the time frame right, this is after Wade and after years of discussion as to whether to change the numbers in terms of full body contact; correct?

A. Incorrect. It's before Wade, it's before the National Academy of Science.

Q. All right. At this time they say on page 11, "None of the epidemiological studies examined by EPA in its recent review presented compelling evidence that necessitate revising the

1986 water quality criteria for bacteria." Is that correct?
A. Is the statement that you just read correct?
Q. Well, was that the bottom line for the EPA?
A. That's what it says, yes.
Q. Well, now I don't -- it's not just whether the statement says that, Doctor. I want to know whether that's a fair representation of the holding of this agency.
A. I think -- I'll say that's correct, yes.
Q. Okay. Now, let's, you -- let me ask you this. You've come here as you say as a scientist, not as an advocate; correct?
A. That's correct.
Q. And in science, one of the fundamentals is that you've got to interpret the data as it is, not as you wish it to be?
A. Yes.
Q. Okay. And isn't it also in the search for truth in the scientific method that when we cite an article, such as I just used that EPA draft report, that we accurately characterize it?
A. I think you should accurately characterize information.
Q. You wouldn't want to mislead someone as to what the holding of a scientific report was, would you?
A. No.
Q. Well, let's go to -- I'm not quite sure what number this is of your slides, but if we could maybe perhaps put this up. This was the one right before your -- well, let me be sure I

1 got it in the right place. I think this was the one right
2 before your summary.
3 THE COURT: 23.
4 MR. BULLOCK: Yes, could we put 23 up?
5 Q. (By Mr. Bullock) All right. You have taken this report,
6 and this was the most recent of the reports from the
7 Environmental Protection -- no, that's 20 -- the one I'm
8 looking at is not that one. I think it must be the next one.
9 Yes, yes, that's it. Okay. It's 22. You highlighted it is
10 widely believed that human feces pose a larger health risk than
11 animal feces to swimmers; correct?
12 A. That's correct.
13 Q. But the report didn't end there, did it?
14 A. Well, it's the introduction, I don't think it did.
15 Q. Even that introduction didn't end there, did it? Why
16 don't you read the next paragraph, which begins with
17 counterbalancing?
18 A. "Counterbalancing the concept that animal feces may pose a
19 lower risk is recognition that animals do harbor many bacterial
20 and protozoan pathogens that pose a human health hazard and
21 that some of these pathogens, such as enterohemorrhagic
22 E. coli, can cause serious potentially life-threatening illness
23 in humans. In addition, animal feces are often directly
24 deposited in fresh water. It receives no treatment before
25 reaching bathing areas. The concentration of both feces and

pathogens may be sufficiently high at beach locations at various times to pose a significant health risk to swimmers."

Q. Okay. Now, why don't you go to what is the conclusion in that introduction, the bottom line, as it were. Read the next paragraph.

A. "The bottom line is that there are few data to demonstrate whether animal feces pose a lower, greater or equivalent health risk to bathers than human feces. If there is a difference, it would be helpful to know the magnitude of that difference in order for EPA to make appropriate public health recommendations. The only way to get a better sense of the health risk for swimmers posed by animal feces is to conduct targeted studies. Some types of studies, epidemiological and quantitative microbial risk assessment qMRA studies, would produce quantitative estimates of risks, while others, fate and transport, pathogen loads in water and so forth, would provide supporting information or stand-alone qualitative information about risk."

Q. And so actually the EPA in this report in 2007 actually stood neutral ultimately on the issue as to whether animal feces played or posed a lower, the same or a greater risk to humans than human feces; is not that correct?

A. No, I wouldn't say they stood neutral. I mean, also in here they discussed a study by Calderone which is in another part of the document. And Calderone looked at a swimming hole

where it was believed to be animal feces. There was no association with gastrointestinal risk. There was another more recent study and of course that wouldn't have been in this document, the more recent study.

Q. Right. We're just talking about your representation of this document.

A. Okay, that's fine.

MR. ELROD: Could he answer the question?

MR. BULLOCK: Certainly he can answer the question, but as to this document as to his representation.

THE WITNESS: That's fine.

THE COURT: Do you have anything more to say, Doctor?

THE WITNESS: No, I don't have anything more to say. That's fine.

THE COURT: Okay.

Q. (By Mr. Bullock) Well, and the Calderone study did not convince the EPA that animal feces played a lower -- was a lower risk, did it?

A. No, but the reason --

Q. Okay.

A. I think I should answer that though.

Q. All right, go ahead.

A. Because they mentioned that the study was smaller, they would like to see larger studies, but basically they said that there was no evidence from that particular study. You know, I

1 think that the strength of the evidence is what they said here
2 in the call out and that is echoed again in the World Health
3 Organization report. Most experts will recognize that there is
4 a difference between animal and human when it comes to
5 evaluating risks as measured by indicator bacteria.
6 Q. Well, and the EPA said that there might be a difference
7 and it may be less, it may be greater, they don't know; right?
8 A. The EPA is a public health agency. They do what they can
9 to protect the public health and they'll be conservative in
10 that regard.
11 Q. Okay. And is that not appropriate when we're dealing with
12 public health to be conservative about it?
13 A. Oh, you know, it is conservative. In fact, that is the
14 stated position of the Environmental Protection Agency. They
15 say their risk assessments are conservative. They say that
16 front and center. However, trying to take that and translate
17 that to actual evidence of human disease or to make estimates
18 of human disease, that's where the science doesn't support it.
19 Q. All right. But in terms of a protective standard for
20 human health, that's what we have here according to the EPA for
21 the Enterococci and the E. coli; correct?
22 A. These are the -- this is what the ambient water quality
23 criteria is, I agree with that. But whether you can say that
24 you can get -- you're going to get eight out of a thousand and
25 that can apply to any particular situation where you have

indicator bacteria, that's misleading.
Q. So your argument with what you've seen in this case is not that these levels are not appropriate protectors of human health, but only that you're not sure whether the eight in a thousand is an appropriate number of illnesses to expect?
A. No, that's wrong.
Q. Okay.
A. I'm not saying -- I don't even know if these -- you know, these are what has been developed. You know, if there was better information we could better indicate what pathogens were, then the agency would do it. And the agency is working on that, but this is what we have now.
Q. Okay. That's the best science has to offer for protecting human health?
A. I don't know that it's the best that science has to offer. I think the science is working on improving, but I think I gave you a flavor of some of the limitations of the studies that we had. And now, again applying this to studies where people had to have their head immersed and now trying to apply it to floating down a river and you don't know where the source of the pollution is, you know, and claiming there's disease from that, that's, I think, stretching the science beyond where it can go.
Q. Well, are you saying -- or let me ask you if you agree with this. Is that given poultry feces polluting the water and

causing exceedances of this number, that --

MR. ELROD: Your Honor, I was going to object to the predicate but I understand this is a bench trial and I won't do it.

Q. (By Mr. Bullock) Is it not true that exceedances of those numbers by poultry feces may result in eight in a thousand illnesses?

A. May? I mean may is a big word.

Q. May is a big word.

A. I would say based on the information that I know, no.

Q. Okay. And do you have a study to point to which says that it won't?

A. Well, I'll point to two studies. And they aren't exactly equivalent because they are, you know, not exactly -- they're not studies exactly of poultry but the Calderone study in which they found no evidence when there were animal feces and the study just published in 2007 in the Journal of Epidemiology by Colford, et al, in which they looked at Mission Bay, California and found no association between Enterococci and gastrointestinal illness. I mean none. And their conclusion was because it wasn't human. So my answer to that is, no, I don't think there's any evidence.

Q. That particular study, the one by Calderone, the Mission Bay exceedances actually were very small; is that not true?

A. I can't exactly tell you what the exceedances were. I

mean, exceedances, they weren't exceedances. They were measurements of Enterococci, no exceedances.

Q. Well, but actually they did look at how many of the samples or how many times the Enterococci exceeded the health protective standards; is that not true?

A. You know, I'm sorry, but I'd have to look at the study again.

Q. Okay. Maybe we'll get back to that. Let's talk about Dr. Wade's article, that Plaintiffs' Exhibit 77. It was actually a look-back study in terms of examining past studies; right?

A. Yes, it was.

Q. Okay. And we're reading more into it than it had if we say that on the -- that those past studies did not -- he became convinced that those studies that he looked at didn't show a correlation with Enterococci to say that there isn't a correlation with Enterococci; right. Enterococci, I hope I'm pronouncing it right, but I'm probably butchering it.

A. What is your question again?

Q. Well, just the limits of the Wade study is that what Wade found was that the past studies had not sufficiently shown a correlation with the Enterococci; right?

A. Yes.

Q. Okay. He didn't find that there wasn't some correlation there, did he? I mean, he didn't rule that out, did he?

A. Well, he certainly didn't find any evidence of it.
Q. Okay. Well, you mentioned the CDC. Doctor, do you recognize that?
A. Yes.
Q. And what is it?
A. It's the MMWR report, Center for Disease Control, Surveillance of Waterborne Diseases and Outbreaks Associated With Recreational Waters in the United States, 2003, 2004.
MR. BULLOCK: And I would move admission of Plaintiffs' Exhibit -- I don't have a number.
THE COURT: 473.
MR. BULLOCK: 473.
THE COURT: Any objection, Mr. Elrod?
MR. ELROD: Let me check, just a second. Was it premarked and on the list?
MR. BULLOCK: No, no, this is cross-examination.
MR. ELROD: So this is a brand new animal?
MR. BULLOCK: Yes.
THE COURT: So it's not subject to the stipulation? Mr. Elrod, you may want to take a look.
MR. ELROD: Are you representing to me that this is one of his considered materials?
MS. XIDIS: I believe it is. You can ask him.
THE COURT: Do you care to --
MR. ELROD: May I inquire?

THE COURT: Yes, you may.

MR. ELROD: Dr. Gibb, is this one of your considered materials in this case?

THE WITNESS: Yes. Yes, it was.

MR. ELROD: Okay. No objection.

MR. BULLOCK: All right.

THE COURT: Very well. State's Exhibit 473 is admitted.

Q. (By Mr. Bullock) Now, let's go to page 3 of 28 of this. Would you read -- or I will read it and tell me whether this is correct. This study is being conducted to test rapid new water quality methods that are able to produce results in two hours and to correlate these indicators with health effects amongst beachgoers. Do you remember that?

A. Which paragraph are you referring to?

Q. Well, I'm on page 3 right above methods.

A. Okay. So the EPA's action plan for beaches?

Q. Yeah.

A. Okay.

Q. Let me give just a little bit on this, Doctor. You have criticized the Enterococci in particular as an indicator, have you not?

A. What I've criticized is the studies that have been done to date and their ability to be predictive of disease, particularly when it's non-human waste.

Q. Okay. But in terms of the Enterococci itself, you believe that that is an appropriate indicator?
A. The Enterococci itself?
Q. Yes.
A. I think the Enterococci can be an appropriate indicator if associated directly with human pollution. If it's non -- and that is what the National Academy said. If it's non-point pollution, it's probably not a good indicator.
Q. Okay.
A. Non-point pollution would be -- you know, mean things like animals and poultry.
THE COURT: Like what, I'm sorry, and poultry?
THE WITNESS: Well, animals and whatever else may be putting Enterococci into the environment.
THE COURT: Let me ask because I don't know, is there an agreement as to whether or not septic tanks are point or non-point? Is there a definition there?
MR. BULLOCK: I believe that they would be a point -- they're a non-point? All right.
MR. ELROD: They're non-point.
MR. BULLOCK: The people that know this law tell me they're non-point.
THE COURT: All right. And with that clarification, if that's true, Doctor, then if septic tanks -- and I'll -- I believe it's established on this record that there are a number

of septic tanks in this watershed. Any modification of your statement there?

THE WITNESS: Well, I think the point is, in fact, what the Academy said was that there was -- they had found a correlation between viruses and Enterococci where septic tanks were present. So I think the point here though is really -- I think they're a good indicator -- or they could be an indicator if we know that there's human pollution. I've stressed point source but whenever they talk about non-point source, they're generally referring to the animals and whatever else might put it into the water.

THE COURT: Well, I want it to be precise because I didn't know whether your definition of non-point --

THE WITNESS: Okay. I probably should clarify that and I think it, you know, I think it's more -- the important aspect is whether it's human fecal waste or whether it's fecal waste from other sources. And in fact, in fact, earlier on the direct I indicated that there may be even Enterococci in the environment that don't even come from a gastrointestinal tract which further complicates the issue, you see.

THE COURT: Mr. Bullock.

MR. BULLOCK: Yes. Doctor -- let me have him identify this. Let me hand this to the witness.

THE COURT: Yes, sir.

Q. (By Mr. Bullock) Doctor, could you identify that?

A. Implementation guidance for ambient water quality criteria for bacteria.

Q. Okay. This is one of the documents that you relied upon in reaching your opinion here?

A. Actually I did not. I didn't use this one, I used the 2002.

Q. Okay. Did you consider this one?

A. No, I didn't.

Q. Okay. Why wouldn't you consider it, Doctor?

A. I could have considered it. I think the 2002 is very similar to the 2003, there's some slight differences.

Q. Well, I want to ask you whether this statement which appears on Roman Numeral 5 within the executive summary of this is correct?

MR. ELROD: Your Honor, if I could.

THE COURT: Yes, sir.

MR. ELROD: As I understand the state of this situation, Dr. Gibb has not considered this. It's, therefore, not in his considered materials and it's not on the State's exhibit list.

MS. XIDIS: It is. Actually, it's Exhibit 16 on the State's exhibit list.

THE COURT: Very well.

MR. BULLOCK: Okay.

THE COURT: Thank you, Mr. Elrod.

MR. BULLOCK: I am so lucky.

Q. (By Mr. Bullock) Okay. Let's go to Roman Numeral 5. You see the paragraph that begins, "In many circumstances --"

A. Yes.

Q. "-- water bodies are impacted by not only human sources of fecal contamination but also domesticated animals and wildlife; right?

A. Yes.

Q. And that's true, is it not?

A. Yes.

Q. And domesticated animals, would you understand that to include poultry?

A. Yes.

Q. Okay. And then it goes on to say, "In these situations, based on the ability of warm-blooded animals, especially those animals with -- which humans come into contact most frequently like livestock and domestic animals, to harbor and shed human pathogens, EPA feels it is inappropriate to conclude these sources present no risk to human health from waterborne pathogens." Right?

A. Yes.

Q. Is that contrary to the views that you express in this court?

A. No, I don't think it is contrary. And I'll tell you why it's not contrary. Because the EPA is a public health agency,

they have to be protective and this says no risk. As indicated before, it could present some risk, but the evidence is -- you know, there is strong evidence that human waste presents a much greater threat to humans than does waste from other -- from animals and domesticated animals and so forth.

Q. Now, going back to 473, do you remember on page --

A. I'm sorry, page --

Q. 473, which is that CDC study. I just wanted to be sure that we were on board. Well, I don't know whether we are, but we had at least discussed the issue of whether Enterococci is an appropriate measure to be used to measure -- to protect human health in water bodies.

A. I'm sorry, I'm confused. You mentioned a CDC study.

Q. Well, I'm getting to the CDC study.

A. Okay.

Q. But before I did, I wanted to see whether we were on the same page that Enterococci, that these levels set by the EPA are an appropriate measure to protect human health in fresh waters that may be contaminated by humans or animals?

A. I think -- and the question is?

Q. Is that true, do we agree on that point that this is at least appropriate to protect human health in water bodies where the source is unknown of the contamination?

A. I don't know that these are the best indicators of the potential for disease.

Q. Okay. But you don't have one to substitute, I mean, we've gone through that.
A. We don't have one to substitute, we don't have better data. But I think one thing you have to understand though is because these are levels, doesn't mean that you can now take Enterococci or E. coli from any source and now make an estimate of disease in a population. That's stretching the science.
Q. All right. But they are protective, at least, of human health?
A. I'm not going to say that they're protective. I don't know that they're protective. I mean, you know, there's evidence that, you know, these indicators may not be very -- don't correlate or can't be very predictive, I should say.
Q. Well, let's go ahead and put up the Plaintiffs' Exhibit 407 that you looked at with Mr. Elrod. Now, do you remember that chart?
A. Yes.
Q. Okay. And you read down the number of Enterococci exceedances which the plaintiffs found in their investigation; right?
A. Yes.
Q. Okay. And you read the ones for the geometric mean?
A. Yes.
Q. And just briefly, a geometric mean has to be five violations in a month, is that correct, or five measures in a

month, not violations?
A. Five measures in a month.
Q. And then the geometric mean is taken of those and those you measure according to the standards that we saw on the previous chart; right?
A. You mean you compare to?
Q. Yes.
A. Yes.
Q. Now, when you look here, for instance, if you go down to the Flint Creek portion of the watershed, do you know where that is?
A. I've seen it on a map. I couldn't go to the map and point it out right now.
Q. I thought you had studied the extent of the violations within the IRW, the impaired sections?
A. I did but if you asked me to put it on a map, I'm not sure -- I mean, Flint is up in the north, I believe --
Q. Okay.
A. -- near the Arkansas border but -- and Flint is right --
Q. Would you understand that to be Flint Creek?
A. That would be my understanding, yes.
Q. If I told you -- were you here for Miles Tolbert and Dr. Caneday who spoke of the recreational uses of Flint Creek?
A. Yes.
Q. Okay. Now, there we see for that portion of Flint Creek

which is highlighted in red there, that we had geometric means as high as six and 13 times of the EPA standard. Do you recall that?

A. You know, no, I can't say I actually recall that specifically.

Q. Well, in opining as to whether there was or is a substantial and imminent risk to human health, is that not important that you had exceedances of such magnitude on a heavily recreated part of this water body?

A. This is the geometric mean?

MR. ELROD: Your Honor, I object to the question and the reason I object to it is this. He is misstating the evidence. Flint Creek has not been testified to as being a heavily recreated part of the Illinois River. In fact, Flint Creek is a small tributary. The testimony from Caneday and from Tolbert was that from Flint Creek on down, there is some usage of the main stem of the Illinois River, but there's no testimony in this record that Flint Creek itself is heavily recreated or --

THE COURT: I believe there's testimony regarding the confluence on this record, correct, of Flint Creek and being a recreational site, is there is not? And frankly, sending my children to New Life Ranch every year, I can't get that out of my mind. It's on Flint Creek.

MR. ELROD: It's on Flint Creek.

Q. (By Mr. Bullock) So six to 13 times on that, if that body is -- folks swim and recreate in it, would that inform you anything as to whether there might be an imminent and substantial risk to human health?

A. First, I have to ask the question again, where did the pollution come from, where did the bacteria come from? Secondly, if you are going to take, you know, the standards that we're talking about, how would these standards -- let's say it's human pollution, let's say it's human fecal waste. Are we talking about people swimming in there, are we talking about people walking in to put their canoe in? Remember how the epidemiology studies were done that formed the basis of the ambient water quality criteria. How can you generalize that to this particular situation?

Q. Okay. So if this is poultry waste on that portion of the creek, then you -- it is your testimony here that geometric means of six to 13 times the standard is not of a concern to human health?

A. I didn't say that. I have to -- again, if this is all coming from septic systems, I mean, if the State wanted to do something about the health, they would be going after the 75 percent of septic systems that are -- that aren't functioning properly. That's where -- you know, if there's a health risk, that's what it is. So I have to ask is this coming from human waste, is it, you know, coming from some other waste, how is

the body being used, how are we taking the epidemiologic data and generalizing to this particular situation? I mean, you know, you can't take estimates of eight in a thousand and say, well, we just go up the line and say six to 13 times and say the risk is 13 times. That would be, you know, a misuse of the information.

Q. Doctor, I didn't posit that. My only question was whether if this is poultry which is causing this water body to be thirteen times the standard, is it your position that there is not any type of a substantial risk to human health?

A. I wouldn't say there is not, but I wouldn't say that there is.

Q. Okay. So you stand agnostic on the question of whether -- I learned that from Judge Holmes. But you do, you're not a believer either way as to the importance of that?

A. Listen, I'm a scientist, okay? I have to take the information that I have available and make sense of it and see how it applies in this particular situation. If you get driven by numbers, you know, and say well, this went over that number, that must mean we've got risk, then that's a misuse of the data. And you know, this would happen in the Environmental Protection Agency and we would develop numbers. We weren't sure how they would get used and they would get misused. And you know, it's a problem with this kind of thing.

One of the things that the 2007 group of experts that

EPA pulled together said, numbers like this take on a life of their own. They become some kind of magic number and we're taking ourselves away from how to really protect health.

THE COURT: Mr. Bullock, excuse me, but we're right at 5:00 o'clock. How much more time do you have on this witness because I'm sure Mr. Elrod would like to ask some questions.

MR. BULLOCK: I probably have -- actually I sort of got diverted. I don't know how much time I have left and so that probably is the determinant, Judge. I do not want to exceed my welcome.

THE COURT: How much time do we have left, Mr. Overton?

MR. OVERTON: We have 15 minutes left.

MR. ELROD: Your Honor, I sure would like for him to be able to go back home.

THE COURT: I agree.

MR. ELROD: Without having to come back.

THE COURT: I agree.

Q. (By Mr. Bullock) As to the whether or not poultry waste is a substantial contributor to the bacterial pollution of this water body, other than reviewing the Plaintiffs' expert materials, have you reviewed any other?

A. Have I reviewed any --

Q. Any other information as to the possible sources of the contamination of this watershed?

A. No. I mean, well, I reviewed like the Oklahoma Department of Environmental Quality's information and they said they didn't know what the -- in most cases they didn't know what the source was.

Q. You were here for Secretary Tolbert's testimony, weren't you?

A. Yes.

Q. And he went through how all of these bodies have talked about the problems of the intensive poultry operations in this watershed causing problems with the bacteria loads, didn't he?

A. I mean, I don't remember that he spoke to each one of them and described what kind of data they presented or, you know, what kind of evidence they had or how good that evidence was or anything to that nature.

Q. So in preparing to come into this court and give your opinion, other than looking at the 303(d) list as to sources unknown, did you search any further in order to determine what the possible sources of the contamination of this watershed are?

A. No, I didn't but it seems to me that the basis of the Plaintiffs' complaint was the exceedances of the 303(d). So that seemed to me to be the issue here, so that's what I focused on.

Q. Sitting in this courtroom, have you come to any different opinion?

MR. ELROD: Than what?

Q. (By Mr. Bullock) That the source of our complaint is not solely the 303(d) list?

A. No, I mean, I've got -- that seems to be the -- if it is the contention that there is a health risk here, you're using the 303(d) list as the basis for that. And you also have used some county rates as the basis. And when I look at that information, I'm sorry, but there's just no evidence of a health risk.

Q. I hope that I get to that. I've got one thing that I want to address with you before that counsel didn't raise with you. Now, in your opinion which was filed with this court, you left out this entire section of the river as being impaired for primary body contact, didn't you?

A. In what?

Q. The section which is most heavily floated? Do you remember --

A. Now, wait, in what record are you talking about?

Q. In your affidavit which you filed with this court, do you not recall giving testimony that the floaters who intensively use this river do so primarily on a section which is not impaired for primary body contact?

A. Would you show me that in my affidavit?

Q. Let me show you that in your exhibit. While we're pulling that up, do you recall discussing this chart?

A. Never.
Q. No? I could have sworn that you discussed that. Maybe I've read too many of them too fast. Let's go to the countywide data. Do you find it provocative at all that Adair County during the period of time that you looked at it was consistently above the levels of the state average for Campylobacter?
A. No.
Q. Okay. And the fact that Adair County sits downstream from the intensive poultry operations in Arkansas is of no importance to you when you go to causation?
A. No, because, you know, I've told you before, the rates for Adair County -- you know, you could go to Pontotoc County. That's not even -- they're elevated, you know, for all the years that I looked at above the Oklahoma rate, so is Carter County. Tillman County is, four out of five times, it's higher than Adair County. So the connection between chicken litter and Campylobacteriosis rates I think is --
Q. Doctor, let me go back to your summary here. I knew I wasn't that nuts. Read the next to the bottom --
A. Right.
Q. -- conclusion.
A. Right. This was not the conclusion -- this slide wasn't submitted to them.
Q. It was submitted to us.

MR. ELROD: No, it's not.

MR. BULLOCK: I didn't steal it.

MR. JORGENSEN: The thing he's referring to there is an exhibit we've not used.

MR. BULLOCK: I know you didn't use it.

MR. JORGENSEN: My point is when he says no --

THE COURT: I'm sorry, counsel, counsel. I need you to direct comments to the Court.

MR. JORGENSEN: I apologize, Your Honor.

THE COURT: Now, are we talking about the summary, No. 24, is that what we're talking about?

MR. ELROD: That is a summary that was not used in the evidence in this case, Your Honor.

MR. BULLOCK: Judge, that was given to me as what we admitted into evidence earlier.

THE COURT: It's fair game. It's fair game. You can ask questions about it. I am, however, looking at the affidavit to try to find where he said that no portion of the floated portion of the Illinois River is impaired and frankly I can't find that.

Q. (By Mr. Bullock) Okay. You're not going to tell us that people don't float on an impaired part of the river, do you?

A. Well, let me -- since you've raised the question, I'll speak to it.

Q. Okay.

A. If you go to the 2006, the data that was approved, okay, there wasn't any impairment on the Illinois River where the floating takes place. My understanding is -- and this, you know, is something that I learned later, was that the State then submitted data to the EPA but the data hadn't been approved by the EPA. So the EPA-approved data for the floater part of the Illinois River doesn't show any impairment where the floating takes place.

Q. Okay. That's the point. Now, you also, do you not -- you now know that that's not true; right?

A. No, again, we're dealing with data that has not been approved. So the data was subsequently given by Oklahoma to the Environmental Protection Agency, asked for approval, but it happened after the 2006 data had been approved. So there's no evidence of, you know, information that has been approved by the agency that shows impairments on the Illinois River is my understanding.

Q. How do you know that it has not been approved?

A. That's just been my understanding from what I've been told.

Q. And who told you that?

A. Well, I can tell you, it's not in the 2006 ODQ --

Q. No, no, no, I need to know who told you that.

A. I ask questions. It may have been one of the counsel, I don't recall.

Q. Let's just very briefly go over your -- the question of the impairments. There's one chart that I do -- that I am interested in in terms of the Campylobacter rates. Would you pull up your chart on Campylobacter and broilers sold in Oklahoma? All right. No, the broilers sold in Oklahoma.

THE COURT: Demonstrative 11?

MR. BULLOCK: It's number 11.

Q. (By Mr. Bullock) Do you have it there, Doctor, so that we can get this done? Now, tell me whether -- I'm sorry. Tell me whether it isn't generally a rule in terms of doing these, and I'm far from knowledgeable on statistician, but where you have a lack of data, that is a problem in trying to run a correlation; right?

A. When you have a lack of data?

Q. I mean if, for instance, no broilers are sold in the majority of counties, then correlating something with broilers sold, you're not going to get a fit, are you?

A. Well, there are 77 counties, I'm recall, in Oklahoma. We ran this on all the counties, however we took out those counties where there are three farms or less because we didn't know what the number of chickens were. So we took those out because I didn't think it would be intellectually honest to run it with those counties. So we only ran it with the counties that we have but we have a number of points there. And I think there's more than enough points to do a correlation.

Q. And where there might be other types of sources, this type of a correlation could miss it. For instance, if you have large pig CAFOs, they might sell a lot of pigs in the county, but it wouldn't correlate with chickens sold, would it?

A. No, it wouldn't. And you know, this is -- I mean, this is, in epidemiology, this would be called an ecologic correlation. You're taking, you know, a surrogate as a measure, that is the number of broiler chickens sold, and trying to correlate that with the Campylobacteriosis rates. You could do maybe a multivaried regression, but that's probably more -- you know, a little too complicated for the level of data that you've got. But I think, you know, it's -- I mean, we don't see any evidence at all of a correlation at all if we look at Oklahoma, if we look at Arkansas, for either Salmonellosis or Campylobacteriosis.

Q. Like I say, there could be some things going on in these other counties where you show, for instance, high numbers of Campylobacter or significant Campylobacter. There could be some other things going on in some of these other counties, couldn't there, that are scattered around this chart?

A. You know, this is not, you know, what I would -- you know, there are sort of different levels of epidemiologic evidence. If you did a case control study or a cohort study, those are more analytical. This type of study, it's a simple study to do. It's obviously expensive to do, but it gives you some idea

of whether you've got any kind of correlation going on. And so I'm not going to say this is the be-all and the end-all evaluation, but it certainly does give you some idea of whether there is any kind of relationship. And you know, as I've indicated, there is none.

Q. Now, as I recall your counsel saying is that in layman's terms, if we had a correlation, then we'd have something of a 45 degree angle there; right?

A. Right.

Q. Okay. Well, I look at the counties in the IRW, the three in green, and I see a line that sort of looks like the one that your counsel described; is that correct?

A. If you look -- well, actually you're looking at four of them.

Q. No, there's three --

A. There's four of them, one is occluded sort of by the other ones. So it goes more like this, but --

Q. In fact, I guess that's sort of a curve there going up?

A. But also, I mean, you have to look at the, you know, the -- like, for example, number of broiler chickens sold. You see up in the upper left-hand corner, you've got a huge number of chickens sold. But, you know, there's no -- you know, there's no relationship with the Campylobacteriosis rates. It's lower than this county way out here at the end that, you know, has a high Campylobacteriosis rate but they don't sell

any chickens so there's no chickens there.
Q. Well, that's right. They may sell hogs out there. You don't know what is going on out there?
A. They could, they could. And as I indicated, this is a --
Q. But at least within the IRW, three out of four of those, we get a pretty good line in terms of Campylobacter rates and broilers sold, don't we?
A. That may be, you know -- I think you're going to isolate on that, but then if you're going to look at the other graphs, you don't see that correlation and there's more chickens produced in Arkansas than there are in Oklahoma.
Q. Doctor, how much were you paid for this testimony?
MR. ELROD: I object to the question being formed that way.
Q. (By Mr. Bullock) I'm sorry, that was poorly formed, I apologize. Doctor, what's your rate of compensation in this matter?
A. It's 275 an hour for research and 413 for trial.
Q. Okay. And approximately how much has your firm billed for this?
A. How much have they billed? I don't know, I can't tell you.
Q. Can you give me an approximate?
A. You know, I've been working on this maybe five or six weeks but not, you know, 40 hours a week.

THE COURT: Mr. Elrod.

MR. ELROD: I just have one question.

REDIRECT EXAMINATION

BY MR. ELROD:

Q. Dr. Gibb, as far as Campylobacteriosis and Salmonellosis, is it healthier to live in Benton and Washington Counties, Arkansas than in the rest of the state?

A. I mean, according to this graph, according to the chart, there is. But you know, I'm not sure -- I think if I saw a striking correlation -- I mean, here there's a negative correlation. It's interesting, it's curious. From this, the take home message almost would be, yeah, you would want to live in Benton and Washington Counties if you want to avoid Salmonellosis but, you know, I wouldn't -- as a scientist, I'm not going to take that to the bank.

MR. ELROD: All right. Those are my questions. And, Your Honor, as a clean-up matter, I would move for the introduction of Defendants' Exhibit 306 which is Dr. Gibb's CV.

THE COURT: Any objection to the CV?

MR. BULLOCK: No, we're not going to object.

THE COURT: 306 is admitted. Any further questions?

MR. ELROD: We're through. Thank you, Dr. Gibb.

THE COURT: Very well. Have a safe trip back. And we are adjourned until Monday next.

MR. ELROD: Judge, could I just bring up one matter,

I'm sorry?

THE COURT: Yes, sir.

MR. ELROD: I just want to make sure we're on the same page and I think we are. But it is our understanding that we have an agreement with counsel that we have the ability, even though some of the witnesses are available and may even be in the courtroom, that we can present as we wish by deposition subject to their right to put a new witness on live for their cross-examination. I want to make sure we're all on the same page.

THE COURT: Read it in?

MR. ELROD: No, I'm talking about Dr. Crutcher and other witnesses that we have on down the road.

MR. JORGENSEN: By video, Your Honor.

MR. EDMONDSON: By video.

MR. JORGENSEN: To save time, we cut the video. So we can put Dr. Crutcher on in 19 minutes and save two hours.

THE COURT: Great. Any objection?

MR. ELROD: That is our agreement.

MR. EDMONDSON: We don't have an objection to that. We do not want to be limited to parts that they pick and choose.

MR. ELROD: No, no.

THE COURT: Yes, sir, certainly. We will be adjourned until a week from Monday at 9:00 a.m.

A TRUE AND CORRECT TRANSCRIPT.

CERTIFIED: s/ Glen R. Dorrough
Glen R. Dorrough
United States Court Reporter