IN THE UNITED STATES DISTRICT COURT FOR THE

NORTHERN DISTRICT OF OKLAHOMA

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

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DEPOSITION OF VICTOR BIERMAN, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 14th day of April, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

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1 the Justice Department and the U. S. Environmental
2 Protection Agency. I believe it was an EPA suit
3 joined by the Justice Department or vice versa.
4 The issue was that the Hammond sanitary
5 district plant was in violation of its permit and it 09:21AM
6 was discharging excessive amounts of various
7 pollutants from the wastewater treatment plant, as
8 well as I recall from combined sewer overflows, or
9 were they storm sewers, I can't remember, and these
10 discharges had negative impacts on the east and west 09:21AM
11 branch of the Calumet River.
12 Q And what opinions did you provide in that case
13 for the government?
14 A Well, I prepared a written expert report, and
15 my opinions pertained to the -- back up. Another 09:22AM
16 expert in the case conducted an investigation in the
17 watershed and provided me with the non-point source
18 loadings. Either he or still a third expert in the
19 case provided me with the wastewater treatment plant
20 loadings. My work on that case involved the 09:22AM
21 receiving water, the impact of those loadings on the
22 east and west branches of the Calumet River.
23 Q So you took the information from the expert
24 that provided the non-point source loading and
25 combined that with the expert information from 09:22AM

wastewater treatment plant loading and then from that information determined effects of those loadings on downstream locations; is that correct?

A Not the effects. It was transport and fate.

Q Okay. So you did kind of the in-stream analysis of those pollutants? 09:23AM

A I did the in-stream analysis of the pollutants, and I computed the impact of those pollutants on the exposure levels, concentration levels in the stream, and I believe I also computed the delivery, the mass delivery of those pollutants to -- out the system. I forget -- I forget what the eastern boundary of the system is and I forget right now what the western boundary of the system was, but we looked at the loadings of the constituents outside the boundaries. 09:23AM

Q What were the chemicals or pollutants of concern in that case?

A Solids was one of them.

Q Total organic carbon, or what do you mean by solids? 09:24AM

A Solids expressed as total suspended solids.

Q Total suspended solids?

A Yes.

Q Okay.

A Yes, I did.
Q Okay, and what topics did you provide expert testimony in court?
A The chemical company was discharging -- had violated its permit and had discharged 09:56AM
concentrations of phosphorus and some toxic chemicals that were in violation of the discharge permit as demonstrated by their own monitoring data. The State of Michigan was -- they were sued by two parties, the State of Michigan and a Michigan 09:56AM
environmental group for damages, injury, harm that these discharges caused to the Titabawassee River, which is the receiving water body, and ultimately to Saginaw Bay, which is down -- to which the Titabawassee River discharges through the Saginaw 09:57AM
River. I conducted assessments of the transport and fate for both toxic chemicals and phosphorus.
Q This was in-stream analysis?
A The metals were an in-stream analysis. The impact on Saginaw Bay -- let me back up. The issue 09:57AM
with the metals was their potential impact on the Titabawassee River. The issue with phosphorus was its ultimate impact on Saginaw Bay. The Saginaw Bay work involved use of a model that I had previously developed over some years. The Saginaw Bay model 09:58AM

1 involved a water quality model of the bay itself and
2 it involved a watershed assessment to develop the
3 loadings for the Saginaw Bay model. That work
4 involved a couple of watershed and receiving water
5 body models. 09:58AM
6 Q Okay, and so the metal was an in-stream model.
7 What in-stream model did you use in that case for
8 the metals?
9 A I used a steady state model that my company
10 developed, which is public domain. 09:58AM
11 Q Does it have a name?
12 A It has -- it is called SMPTOX. That would be
13 S-M as in Mary, P-T-O-X, one word all caps.
14 Q Okay, and for the bay, which included a
15 watershed assessment, what was done in that regard? 09:59AM
16 A We identified sources of flow and sources of
17 phosphorus loads from the watershed to Saginaw Bay
18 to drive the Saginaw Bay water quality model.
19 Q How did you identify sources?
20 A We identified point sources through the permit 09:59AM
21 records and we represented the watershed. We
22 represented different land uses, and we assigned
23 unit area loads to different land uses.
24 Q And then aggregated those units to determine
25 load for the non-point source load to the bay? 10:00AM

work backward in time.
Q Okay.
A The second project under selected experience --
Q Uh-huh. 10:50AM
A -- Review of Watershed and Water Quality Models For Nutrient TMDLs in the Caloosahatchee River estuary. TMDLs, of course, means total maximum daily loads. The --
Q Please go ahead. 10:50AM
A I conducted an independent scientific review of a coupled watershed receiving water model. The HSPF model, watershed model had been applied to the entire Caloosahatchee River watershed. I assessed the watershed model and the receiving water model. 10:50AM
The issue was nutrients and dissolved oxygen.
Q So the HSPF model was coupled with what other to evaluate the watershed in that case?
A The HSPF model was the watershed engine, loading engine so to speak. The outputs of the HSPF 10:51AM
model were used as inputs to the EFDC receiving water model in the estuary.
Q And what did you find in that evaluation?
A Well, I conducted a review of the work and I provided about seven or eight pages of comments. 10:51AM

This model was put forth by the Florida Department of Environmental Protection for use as the modeling platform to develop nutrient TMDLs for the Caloosahatchee River estuary.

Q Okay, and what was the runoff model that was used on that TMDL analysis? 10:51AM

A Well, HSPF was the -- HSPF is the watershed model, and that includes non-point source runoff.

Q And were you personally the one who evaluated the sufficiency of the HSPF runoff model in that case? 10:52AM

A I was personally involved as was a staff person.

Q Okay, and what evaluations did you perform on the HSPF model for that particular TMDL? 10:52AM

A We evaluated the input data, the site-specific application, the calibration results, comparisons of model output to data.

Q Anything else?

A It's the things that one would -- 10:53AM

Q Did you find that the HSPF model was sufficient to model the watershed loads for that river estuary?

A I need to draw a distinction between HSPF as a modeling tool, a modeling platform, and this 10:53AM

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1 site-specific -- this HSPF site-specific application
2 to the Caloosahatchee River. My task was to
3 evaluate the site-specific application, not to
4 evaluate the appropriateness of HSPF as a modeling
5 tool. 10:53AM
6 Q Did you find that it was an appropriate
7 application in this case?
8 A I would need to review the eight pages of my
9 comments before providing a definite answer to that.
10 The question is broad. Let's just put it this way: 10:54AM
11 I had comments, a number of comments on the results,
12 identified a number of items that needed some work,
13 needed some improvement, needed some revision. I
14 made those recommendations, but I don't recall that
15 I questioned the adequacy of the framework itself. 10:54AM
16 Q Can you identify other experience you have
17 with non-point source pollution, sir?
18 A Yes. Let's continue. Let me find the next
19 one. I've been involved with the Chesapeake Bay
20 program for over 20 years. The Chesapeake Bay 10:54AM
21 program involves a couple of watershed receiving
22 water modeling system that's been through several
23 different generations. It's probably the most
24 advanced, most sophisticated coupled watershed
25 receiving water modeling system in the world. For 10:55AM

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various clients I've sat at the Chesapeake Bay Modeling Subcommittee meetings for years, and I have participated in reviews of the watershed model and the receiving water model. I am -- within the past few years I have conducted -- I am conducting now 10:55AM and have conducted in the previous few years three different modeling projects involving the Potomac portion of the Chesapeake Bay water quality model, which is driven by the flows and the nutrient loadings or driven by results from the HSPF-based 10:56AM watershed model.

Q So in that case, the Chesapeake Bay study, they used the HSPF watershed runoff model, coupled that with an in-stream model; is that correct?

A That's correct. 10:56AM

Q Did you actually do the HSPF modeling work in that case?

A No, I didn't.

Q Who did the work in that case, that portion of the modeling work? 10:56AM

A That portion of the modeling work has been done by the EPA Chesapeake Bay program staff.

Q Okay. Were you personally involved with the in-stream portion of the modeling for Chesapeake Bay? 10:56AM

A All right. The next project is directly below. It's the third project from the top on Page A-7. It's entitled peer review -- I'm sorry. Strike that. Let's go to Item 4. Peer Review of a Linked HSPF-AQUATOX Modeling System. 11:02AM

Q Okay. Can you tell me about that project, please, sir?

A Yes. Excuse me. The US EPA contracted me to conduct an independent scientific peer review of this coupled watershed receiving water modeling 11:02AM system. It had been applied to several watersheds in the state of Minnesota, and EPA was proposing this modeling system as an alternate approach for development of numeric nutrient water quality criteria in support of their regulatory program. 11:03AM They recognized my expertise in watershed and receiving water quality modeling. I'm on their list of pre-approved reviewers. They gave me a contract to conduct this review, and I did so and produced a review report. 11:03AM

Q Was that a contract with you personally, sir, or your firm?

A Well, a contract with my firm. The point is that I was -- this was a contract project for pay. It was not a pro bono review, such as one might do 11:03AM

for peer reviewing a paper submitted to a journal.
Q I understand. What is the HSPF part of that work?
A The HSPF model in this case was applied to the test watersheds. There were two or three; I can't recall. 11:04AM
Q Was that the overland flow portion of the model?
A It includes overland flow but it also includes stream flow. HSPF is -- it's an integrated -- what I would call an integrated watershed model. It includes not only runoff from fields to edge of stream but it also explicitly includes a stream and river network for transport, fate and delivery. 11:04AM
Q And do you know where HSPF got its components for the overland flow portion of its model? 11:04AM
A I don't recall. I should say it's a model that's been around for many years. It's EPA supported, widely used, et cetera.
Q Did you do the review on the runoff portion of the analysis or did someone else perform that analysis? 11:04AM
A I performed the entire review of the runoff analysis and the receiving water analysis.
Q What were the issues in the peer review for 11:05AM

ecologist.
Q How about a geologist; would you characterize yourself as a geologist?
A I have a working knowledge of geology, but I would not label myself as a geologist. 11:24AM
Q A soil scientist, would you label yourself a soil scientist?
A I have knowledge of soil science, but I would not label myself a soil scientist.
Q Microbiologist, same question? 11:24AM
A Same answer.
Q Fisheries expert?
A Same answer. I know something about -- I have knowledge of fisheries, but I would not characterize myself as a fisheries expert. 11:24AM
Q How about a hydrologist?
A I know a lot about hydrology. I've had courses in hydrology. I would not characterize myself as a hydrologist. If I can offer a sidebar here, normally one would apply the phrase 11:25AM hydrologist to someone who is trained in hydrology, who practices in hydrology, and whose knowledge and practice are by and large limited to hydrology. That is not what I do. I develop and apply models, environmental models, mass balance process-based 11:25AM

models, and I've done this for many systems, land-based systems, aquatic, rivers, streams, estuaries and so on, and that requires me to have knowledge of many different areas of science and engineering. However, it doesn't require me to be a 11:26AM
hydrologist or a river ecologist or any one of these. I guess what I'm saying is my expertise is interdisciplinary and multidisciplinary. So none of the labels you've put forth so far I would use to apply to myself. 11:26AM

Q I understand, sir. What uplands watershed modeling have you personally performed, and I'm not talking about here reviewing someone else's model, but I'm talking about work you've personally done with regard to uplands watershed modeling. 11:26AM

A Please define uplands.

Q That would be runoff from fields or soils runoff as opposed to the in-stream or lake or bay model component.

A By personally performed, do you mean actually 11:27AM
running the model hands-on?

Q Yes, sir.

A Well, actually I have as much hands-on experience with Dr. Engel's GLEAMS model of the Illinois River watershed as he claimed to have had 11:27AM

1 during his deposition, that is, I've run it perhaps
2 half a dozen times.
3 Q The GLEAMS model?
4 A Yes, sir. As Dr. Engel stated in his
5 deposition, he's not the man at the switch running 11:28AM
6 the model every day.
7 I work in a similar mode. I have 35 years of
8 experience, and I work with highly trained, highly
9 qualified, highly motivated staff on this and many
10 of my other projects. In particular, I've worked 11:28AM
11 with four principal staff on this investigation.
12 Just the four principal staff I've worked with have
13 a combined total professional experience of 85
14 years. I have personally worked with these people
15 for 62 years. In addition, there have been three, 11:28AM
16 four, half a dozen other people involved from time
17 to time in this project. I don't work in a vacuum,
18 sir, and neither does Dr. Engel, neither does anyone
19 who has been at 35 years of professional experience
20 in my field. 11:29AM
21 Q Okay. Well, what I want to do, though, sir,
22 is I want you to tell me about your personal
23 experience throughout 35 years, not today maybe, but
24 throughout your 35 years of experience, how much
25 personally have you done on upland modeling? 11:29AM

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did -- I'm not sure if this qualifies but I want to disclose it so I'm giving you a complete answer. I did spend several days in the watershed, and it involved being on the water for several days, the Illinois River, but I did not take any samples. 11:35AM

Q Or perform any scientific analysis other than your visual observations?

MR. BOND: Object to form.

A Well, okay. Let's go back to square one. I have not -- neither myself nor my team has conducted 11:35AM any sampling in the Illinois River watershed. My personal experience -- my -- I did visit for several days and observe. We made observations at numerous points in the watershed and on the water itself. That was an observational trip only. 11:36AM

Q Okay. When you say -- let me back up here. How many days have you been in the IRW where you've actually done observation work?

A I guess it depends on how you count. I visited Fayetteville a number of times, but I was 11:36AM out in the -- this trip lasted -- it was about two years ago. I can't remember. I think it was three or four days.

Q I'm not talking about when you were visiting an office in Fayetteville. 11:36AM

A No, no. Out in the field -- we were out in the field for three or four days, myself and some of the other defendants' expert witnesses.

Q And that was two years ago?

A I think it was in summer of 2006 actually. 11:37AM

Q Any other field work you've done in the IRW?

A No.

Q What observations did you make when you were out in the field?

A Well, it's a broad question. I made many 11:37AM observations over four days and there were many pictures that we took.

Q Did you produce all your photographs?

A Yes.

Q So what did you do? I'm just trying to 11:37AM understand what you did for three or four days within the Illinois River watershed.

A Part of it involved driving to different sites. Well, back up. The question is broad. I'll try to be responsive, and if you want more detail, 11:38AM I'll need to refer to my photographs. I observed pastures. I observed poultry houses. I observed -- I think we observed at one point a wastewater treatment plant. We observed the large nursery on the shore of Lake Tenkiller. We observed eroded 11:38AM

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stream banks. I observed cattle in the riparian zone. I observed cattle in the stream. I observed cattle defecating in the stream, things of that nature.

Q Did you notice any filamentous green algae in the streams? 11:38AM

A I observed algae in the stream. I didn't know if they were filamentous green algae or not. One would need to have taken a sample and looked under a microscope to confirm the algal identification to give an exact answer to your question, and I did not do that. So I may have observed it in the sense that I may have seen it, but I didn't know necessarily if it was filamentous green algae. 11:39AM

Q Did you see any algae attached to rocks on the streambeds or the sides of the stream? 11:39AM

A Yes.

Q Did you observe any poultry waste land applied in the IRW when you were out there?

MR. BOND: Object to form. 11:40AM

A Did I observe the application process?

Q Yes, sir.

A I don't recall that I observed that. I could have, but I can't remember.

Q Do you know how poultry litter is applied in 11:40AM

the IRW?
A I've read about how it's applied, but I can't recall the details sitting here.
Q You didn't do any study of poultry litter application in the IRW, how it's applied, when it's applied? 11:40AM
A I did not conduct independent studies of those things.
Q You reviewed what Dr. Engel -- analysis, for example? 11:40AM
A Well, I read Dr. Engel's report. I also read reports by other of the plaintiff's experts, and I've read some of the reports of the defendants' experts, and I'm sure I've read descriptions of that operation, but I don't recall the details. 11:41AM
Q Are you offering any opinions concerning the methods of poultry litter application in the IRW?
A The methods?
Q Yeah.
A No, I'm not. 11:41AM
Q Or the timing?
A Only insofar to point out, as I did in my expert report, that Dr. Engel's model represents all the poultry litter as being applied once a year in a single heap. Whereas, data in another portion of 11:41AM

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rate changed, but my -- the -- my current hourly rate for the investigations that I conducted and for preparation of my expert report is $250. My hourly rate sitting here today for this deposition is $375.

Q What were the hourly rates for your four assistants? 01:39PM

A I can't recall them individually offhand, but they were lower than mine.

Q And do you know the total compensation to your company for work that's been performed in this case by your company for the defendants? 01:39PM

A Since January of 2006 the total compensation to my company has been approximately $900,000.

Q Were you first retained in 2006, January of 2006? 01:39PM

A The agreement was signed I believe in January of 2006.

Q And what work did you begin doing in January of 2006?

A We reviewed many reports, papers, data trying to familiarize ourselves with the watershed. We conducted some very limited analyses of some of the data but we didn't have -- we didn't have the plaintiff's expert reports, so we had nothing to review and react to, so virtually all of what we did 01:40PM

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pertained to just learning about the watershed and learning what data existed and reviewing reports.

Q Would you describe for me what you meant by the limited analysis of the data you performed?

A We were told that Lake Francis, which sits at the Arkansas-Oklahoma border, was a local issue of concern because the sediments had -- were high in phosphorus. A dam had broken, and there was the thought that perhaps -- perhaps the sediment phosphorus would constitute an internal source to the Illinois River, especially during periods of higher flow. So we conducted an analysis of phosphorus concentrations in the water upstream and downstream of Lake Francis for -- I can't remember the time periods, but that's an example of the analysis. 01:40PM 01:41PM 01:41PM

Q Okay, and what did your analysis determine?

A For the datasets that we used for the periods of record that they covered, and I can't remember exactly what they were, I recall that we did see a statistically significant increase in total phosphorus concentration downstream of the lake compared to upstream. 01:42PM

Q And did you include that analysis as part of your report? 01:42PM

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A No, I did not.
Q Why not?
A Because the -- I was asked to produce -- I was asked to review the body of work put forth by Dr. Engel and the body of work put forth by Dr. Wells 01:42PM
and to review their modeling results and to review the portions of other expert reports that may have relied upon those results. That became my assignment. So all the work, everything that appears in my expert report was consistent with that 01:42PM
assignment.
Q In your Lake Francis sediment analysis, did you determine the sources of phosphorus to those sediments?
A No. We just looked at the concentration data 01:42PM
upstream and downstream.
Q Did you make a determination as to whether the sediment phosphorus concentrations in Lake Francis was greater, equal or less than, for example, background concentration levels of soils in the IRW 01:43PM
for phosphorus?
MR. BOND: Object to form.
A I don't recall conducting that investigation.
Q Okay. Any other limited analysis other than this Lake Francis analysis? 01:43PM

A I recall that we used LOADEST, one of the methods in LOADEST to compute phosphorus load at a few different locations in the IRW. They were -- I would characterize that as just exploratory analyses. I should tell you that all of the files 01:43PM and all of the materials that were produced by myself and my staff were in my production.

Q So these LOADEST analyses, exploratory analyses were produced?

A Everything we did is there. Everything we 01:44PM did -- my produced considered materials include everything from January 2006 forward, even the things that are not in my exert report.

Q Any other limited analysis of data other than the two topics we've discussed? 01:44PM

A There may have been but I can't recall them sitting here.

Q Who told you that Lake Francis may be an issue of concern in the case?

A Oh, I think that was discussed -- we had 01:44PM several meetings among the lawyers and the experts, and that was one of the topics that was brought up. I can't remember specifically who did it. Excuse me. Could you repeat the question?

Q Yeah. I think my question was, who told you 01:45PM

that Lake Francis sediments may be an issue of concern in this case?

A Oh, may be. Yeah. I wasn't told it would be an issue in the case. I was just told that that is a -- it could be a potential issue of concern, but at that point since the plaintiffs hadn't produced any expert reports, we didn't know what body of work the plaintiffs would put forward to support the claims, so it was speculation on our part. 01:45PM

Q Where is Lake Francis located? 01:45PM

A My recollection is it's located on the Illinois River. It's at the state line, the Oklahoma-Arkansas state line. It sits at or near the state line near Route 59.

Q So based on your investigation, do you believe that the sediment -- phosphorus in sediments in Lake Francis would have been contributed by sources in Arkansas? 01:45PM

A Well, water flows from Arkansas to Oklahoma, and that's sitting right there on the border, and if it has phosphorus in the sediments, it most likely came from somewhere in Arkansas. 01:46PM

Q It's a common sense analysis?

A (Witness nods head up and down).

Q Did you review other expert opinions or 01:46PM

reports as part of the work you did in this case?
A For the plaintiffs or defendants?
Q Oh. Good question. For the defendants.
A Review is too strong a word. I read some of the expert reports. 01:46PM
Q Which ones do you recall?
A Portions of Clay because I used some of his work and I cited what portions I used, a portion of Jarman and again I cited that in one of my -- in my expert report. Of course, Engel, Wells, portions of 01:46PM Stevenson, portions of Cooke, portions of Welch -- oh, I'm sorry. I'm going through the plaintiffs.
Q Well, you can do them all. That's fine.
A Okay. So I think -- okay. So there's that. Getting back to defendants, I did read Dr. 01:47PM Sullivan's report and I read Dr. Connolly's report.
Q Did you -- I'm sorry.
A I did read other plaintiff's expert reports early on. They're enumerated in one or more of my declarations, and I forget sitting here right now 01:47PM which ones they were.
Q For the defendants' reports, Clay, Jarman, Sullivan and Connolly, did you make any comments on any of their reports?
A I didn't on Clay and Jarman because they had 01:47PM

1 additional information you're seeking.
2 Q What about the GLEAMS model is inappropriate
3 for predicting watershed scale non-point source
4 phosphorus?
5 A Well, it's inappropriate for the reasons that 02:35PM
6 I begin to state. Beginning with the second
7 paragraph on Page 4, Shoemaker, et al, 2005, state
8 the following limitations: Limited to an
9 agricultural field of very small size not suited for
10 bigger watersheds, not suited for urban land uses. 02:36PM
11 Q Okay. I believe you've testified, sir, that
12 this particular work in this case was your first
13 experience working with the GLEAMS model?
14 A That's correct.
15 Q And then I believe your testimony has been 02:36PM
16 that you personally have had limited experience with
17 upland water quality runoff models?
18 MR. BOND: Object to form.
19 A That's correct. Let me continue my answer,
20 sir. For 35 years I have developed, applied, used 02:36PM
21 and reviewed deterministic process-based mass
22 balance models. Those models have -- they balance
23 water; they balance mass. Those scientific
24 principles -- those identical scientific principles
25 embodied in field scale runoff models such as 02:37PM

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1 GLEAMS, watershed scale models such as HSPF and
2 SWAT, receiving water models such as CE-QUAL-W2,
3 CE-QUAL-ICM, WASP, BFDC and so on. Those are all
4 process-based finite volume mass balance models.
5 They balance mass; they balance water. I've spent 02:37PM
6 35 years at my career doing that. I know a mass
7 balance model when I see it.
8 Number two, this is an EPA agency report. I
9 have no reason to disbelieve any of the conditions
10 for applicability that I read in Shoemaker, et al, 02:37PM
11 2005, or any of the other references I've cited
12 therein in my report.
13 Q Sir, would you -- would you -- are you
14 suggesting that the data that you input in a runoff
15 model, field runoff model is similar to the data you 02:38PM
16 use in an in-stream model?
17 A No, that's not what I'm saying. I'm saying I
18 know what a mass balance model looks like when I see
19 it, and GLEAMS is a mass balance model, and every
20 model has a -- is specifically designed to operate 02:38PM
21 at certain spatial scales at certain time scales and
22 include certain physical chemical and biological
23 processes.
24 Q Okay. Are the coefficients that are employed
25 in the GLEAMS model similar to the CE-QUAL model 02:38PM

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1 Water Assessment Tool: Historical Development,
2 Applications and Future Research Directions, and
3 it's senior authored by P. C. Gassman,
4 G-A-S-S-M-A-N.
5 Q Is it your understanding that SWAT uses the 05:00PM
6 GLEAMS and CREAMS runoff components for its model?
7 A I'm sure some of the detailed components are
8 different, but as Dr. Engel stated in his
9 deposition, the science underlying SWAT is the same
10 as the science which underlies GLEAMS. 05:00PM
11 Q And do you know whether or not GLEAMS had any
12 special component for urban runoff -- excuse me, not
13 GLEAMS, but SWAT had any special component in
14 addition to what it obtained from CREAMS and GLEAMS
15 to model urban runoff? 05:01PM
16 A I don't know.
17 Q Is SWAT used for urban runoff?
18 A Dan Storm in his application of SWAT to the
19 Illinois River watershed included urban land use, so
20 I know he applied it to urban land use. 05:01PM
21 Q Do you know whether or not it is typically
22 applied to urban runoff, that is, SWAT?
23 A I don't know that for a fact.
24 Q Have you ever reviewed Exhibit No. 10?
25 A No, I have not. 05:01PM

in my opinion doesn't actually route anything, and he stated in his deposition that it merely is a time distributor for loads. So I think the routing model -- the term routing -- I know it has to be called something. It doesn't actually route anything. 05:06PM

Q But what I'd like you to do is answer my question.

A I'm sorry.

Q And that is, did you do anything to determine whether or not the model that Dr. Engel used, the 05:06PM routing model that he used --

A Yes.

Q -- in fact did not represent a valid representation other than what you did about Question 3A? 05:06PM

A Okay.

Q For example, did you use like CE-QUAL in-stream model to see if it produced different results?

A No. My contention here in statement 1C is 05:07PM that the routing model is not a representation of the real system of streams and rivers. I don't need to apply an alternate model to form that opinion.

Q Okay. What -- what in your opinion would be an appropriate model that would show a, quote, real 05:07PM

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IN THE UNITED STATES DISTRICT COURT FOR THE

NORTHERN DISTRICT OF OKLAHOMA

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

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VOLUME II OF THE VIDEOTAPED

DEPOSITION OF VICTOR BIERMAN, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 15th day of April, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

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through the images. It also depends on how you mean by misrepresent. I would say dozens, dozens, tens.

Q Do you have experience in interpreting aerial photo such as presented in the NLCD dataset?

A I personally do not. 10:20AM

Q I suppose since you didn't determine the total quantity of alleged misclassifications, you don't have an opinion on whether or not this issue that you've raised has an effect on Dr. Engel's results, do you? 10:21AM

MR. BOND: Object to the form.

A It has an effect on the results because if the -- if you don't get the land used correct, you can't get the loads correct because different land uses have different runoff characteristics, but I 10:21AM did not quantitate that difference, the discrepancy.

Q Well, if you -- if some forest was shown as pasture, was some pasture also shown as forest so they would even out?

A I don't recall that we saw pasture classified 10:21AM as forest.

Q Did you look at all of the land use or just some locations that you selected?

A We didn't look at all of them, but we certainly didn't select them. We were doing a 10:22AM

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consistency check between the NLCD primary data and Dr. Engel's files and we noticed discrepancies. So we investigated deeper and we noticed a large number of discrepancies, some of which I've reported out quantitatively in the middle paragraph of this page 10:22AM and others of which I simply showed illustrative examples in Figures 2 through 5.

Q Well, if you don't have experience in interpreting aerial photos for land cover data, how do you know that the classifications were incorrect? 10:22AM

A Because I have highly trained and competent GIS staff who have that experience in looking at NLCD images and making determinations about land use areas.

Q So you didn't do this analysis yourself? 10:22AM

A I had staff do the analysis, that's correct.

Q Can we look at Figure 3, sir?

A Yes.

Q Okay. Figure 3 is an example of your concerns about inconsistencies; is that correct? 10:23AM

A Yes.

Q Okay. Is NLCD data -- let me ask this question first: Is it remote sensing data?

A You mean satellite as opposed to airplane?

Q Yes. 10:24AM

Q And then there's a couple more figures on the same topic, I guess, on this page?
A Yes, there are.
Q Okay. Let's look at No. 1 on the top part of Figure 4. What is that purported to show? 10:27AM
A Well, again, we see -- the Illinois River watershed map in the upper right has three rectangles labeled 1, 2 and 3, and the panels in the upper left and on the bottom are blow-ups of those locations. This is an example of urban land use 10:27AM that was classified as pasture by Dr. Engel in his GLEAMS model.
Let's look at the rectangle in the upper left-hand corner. The rectangle encompasses land that Dr. Engel classified as pasture, but the legend 10:28AM and the callout indicates that there's residential urban land under development in that box, which is not pastureland.
Q Who made that interpretation that that was residential urban land under development that was 10:28AM classified as pasture?
A My GIS staff.
Q Do you know what factors they used to make that determination?
A It was explained to me at the time during 10:28AM

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preparation of this. I don't remember the details.
Q Let's turn to page -- Figure 5.
A Yes.
Q Another figure -- what is shown on No. 1, Box No. 1? 10:29AM
A Again, the rectangle, the blue rectangle inside Figure 1 represents an area that Dr. Engel classified as pasture, and roads are visible. Specifically Highway 59 is visible as running through the box and that was also captured in an 10:29AM area that was represented as pasture.
Q So that small road there was part of Dr. Engel's classification using NLCDS pastureland?
A I won't characterize -- well, it's a matter of opinion whether it's small. The point is that the 10:29AM road is not pasture.
Q What percentage of that square would be represented by the cover of a road?
A I don't know. I didn't quantitate it.
Q Small percentage; less than half? 10:30AM
A I don't want to speculate.
Q Let's -- Image No. 2, what's the issue with Image No. 2 on this page?
A It's the same issue. The land inside the box was represented as pasture. Highway 512 is 10:30AM