MR. RYAN: Yes, which the copy that the witness is now looking at on the LitePro is the one she marked up yesterday, and has been marked as Exhibit 43-A. It's identical to Figure 5.

THE ADMINISTRATIVE LAW JUDGE: Yes.

MR. McAFEE: May we go off the record?

THE ADMINISTRATIVE LAW JUDGE: Yes, we can go off the record.

(Discussion off the record.)

THE ADMINISTRATIVE LAW JUDGE: So, again, Mr. Ryan, this one was--what was the new number for this? I know it's the same exhibit with some annotations to it. What's the number of this one?

MR. RYAN: This one is 43-A, Complainant's 43-A, which for the record is the marked-up version of Figure 5 from Exhibit 43.

THE ADMINISTRATIVE LAW JUDGE: Yes. Thank you.

BY MR. RYAN:

Q. Now, Ms. Doty, looking at the--I believe your testimony yesterday was that the--what you have marked there in the upper right-hand corner, UNT, that blue line was the unnamed tributary, and following down the different stream segments, and then we get down to segment 5 and you were testifying

a moment ago what the meaning was for the graph segments you looked at in B-2 for segment 5. Could you explain that for us using this diagram, please?

A. Yes. Segment 5 is the small watershed area, and it represents the runoff that's coming from the--

Q. Ms. Doty, don't mark on it yet, please.

A. Sorry. It represents the runoff that's coming down off the subdrainage area into that segment. It doesn't represent the runoff--the actual flow that's already in the channel that's coming from 1 on down to the Elliot Creek.

Q. Just so we're clear, when we look at the graph in Appendix B-2 of stream segment 5, it's not predicting what's in the actual channel, it's predicting what's coming into the channel?

A. Yes, it is.

Q. Based on your assessment of the--and is the blue line passing through segment 5? You see up there, that would be the drainage 5, the red 5?

A. Yes, it is.

Q. The blue line, would that be the low point of the land?

A. Yes, it would.

Q. So would water drain down to it from the north and from the south?

A. Yes.

Q. So is that the smallest drainage area on this Figure 5, this Exhibit 43-A?

A. Yes, it is.

Q. And based on your professional experience, if we had base flow coming in from upstream, and your modelling showed base flow downstream, would you expect to see base flow in segment 5 in the unnamed tributary?

A. Yes, I would.

Q. Those are all the questions I have for that exhibit. Thank you.

MR. RYAN: May I, Your Honor?

THE ADMINISTRATIVE LAW JUDGE: Yes.

MR. RYAN: Your Honor, may we go off the record for just a moment?

THE ADMINISTRATIVE LAW JUDGE: Certainly.

(Discussion off the record.)

THE ADMINISTRATIVE LAW JUDGE: We'll pick up at ten of two. See you then.

(Recess at 12:50 p.m., until 1:50 p.m.)

AFTERNOON SESSION (1:55 p.m.)

THE ADMINISTRATIVE LAW JUDGE: So the first order of business is I'm going to return to Mr. Ryan the exhibits which he offered and marked for identification, but which were not admitted per my ruling. That is CX-51, CX-52. And then there was another group of papers. I'm not going to need to identify it because it wasn't brought up by Mr. Ryan. I'm handing back all of that stuff.

I assume, counsel, you received those three sets? Excuse me. Sorry. I shouldn't make you reach that far, Mr. Ryan.

Okay. With that, we're ready to go again.

SANDRA DOTY,

resumed her testimony as follows:

REDIRECT EXAMINATION (Resumed)

BY MR. RYAN:

Q. Okay, Ms. Doty, just before the lunch break we were--strike that.

During your cross-examination this morning--you might recall some discussion at various points in the cross-examination about the use of the--or the intent of the models, and whether they were intended to be used for the Clean Water Act--proving Clean Water Act violations. Do you recall that testimony?

A. Yes, I do.

Q. Now, is the purpose--let's break them up. To save time we'll talk about them together, but if you think we need to break them up, tell me and we'll do so.

Is the purpose of the APEX model and SWAT model to model runoff and things entrained in runoff?

A. Yes, it is.

Q. Okay. And is--were they developed with that purpose in mind?

A. Yes.

Q. And were they-- And that would include assessing the amount of pollutants that might come off of a site?

A. Yes.

Q. And can we rely on those models as a scientific--can we rely on the results of those models as being scientifically based?

A. Yes, we can.

Q. Now, you, as a hydrologist, and you've been working in this field for 26 years, have you--does it make any difference to you whether your modelling is being used in a court setting or in a non-court setting?

A. No, it doesn't.

Q. Do you consider--if you were applying these models in a non-court setting, would you use any more or less rigor than you used in this court setting?

A. No, I wouldn't.

Q. And I think you've testified before that you consider these results trustworthy?

A. Yes.

Q. Now, you recall your testimony regarding subarea J. This is referring you to page 9 of your report. Actually, Ms. Doty, please turn to page--to your report, Exhibit 43, to page--to the Figure 9. Do you have that in front of you, Figure 9 on page 25 of your expert report, which is Exhibit 43?

A. Yes, I do.

Q. Okay. And do you recall the testimony regarding the area--subarea J, as in jack, towards the top of the page?

A. Yes.

Q. And there was some testimony as to whether that was pasture or not. Do you recall that?

A. Yes.

Q. Now, tell us what difference it makes to have different types of cover? In other words, pasture versus some other kind of cover, what difference can that make?

A. Different types of cover can be more or less erosive based on how much cover is there and whether the land is disturbed or left to grow on its own.

Q. Okay. And you called that pasture; is that correct?

A. Yes.

Q. Okay. And is pasture--I think you also said summer meadow. Are those the same thing?

A. I was using them, in that context, being the same thing, native grasses growing in a field.

Q. Is that considered disturbed soil?

A. No.

Q. Is water more likely or less likely to run off of undisturbed soil such as a pasture?

A. Less likely.

Q. So if you called--say, for example, there were soybeans planted in area J. Is it more likely to have runoff, or less likely than pasture?

A. More likely to have runoff soybeans.

Q. How about corn?

A. Yes, more likely.

Q. For purposes of this line of questioning, if you're wrong, this isn't pasture, this is soybeans or corn, did you overestimate or underestimate how much runoff would come from subarea J?

A. By using a summer meadow I was using a very dense planting scenario, and it would be--it would have less runoff than if it had been a crop like corn or soybeans.

Q. So your modelling effort would have underestimated how much came off?

A. Yes, that's true.

Q. Now, based on your review of the weather data, I think you testified, maybe yesterday, regarding the seasonality of the rains in this part of the world. When is the heaviest part? When is the rain the hardest and the most?

A. Summer and sometimes fall.

Q. And of the 45 days of discharge that you identified of pollutants to the unnamed tributary, were they mostly in the summer, or were they mostly in the winter, or they kind of spread all over?

A. There were very few in the winter. I could go back and figure that out, if you'd like me to, but mostly they were summer, fall, some spring.

Q. When one would expect to see more rain?

A. Yes.

Q. And you also were asked about accounting for snow and snow melt. Do you recall that?

A. Yes.

Q. And the--and you were asked if it would change your opinion if the snow were being cleared off right after the snowstorms. Do you recall that testimony?

A. Yes.

Q. Now, is it, in your opinion, if someone were clearing snow from a pen, would the--would any manure that was on the ground before it snowed be entrained in that snow when it's pushed away, pushed aside?

A. Some, perhaps.

Q. Do you think it would be possible to plow snow without touching the manure underneath?

A. No, I don't think it would be.

Q. And do you think if--since we have no testimony regarding this yet, we're working on hypotheticals that were given to you, let's assume for sake of argument that he's not--that the owner--that Mr. Vos is not actually picking up the snow and hauling it away, he's just pushing it to the side. Where I come from, when we plow snow, we don't truck it away, we push it off to the side of the driveway.

Assume, for sake of argument, that he's plowing his pens, he's pushing it up to the side. Eventually would that snow melt?

A. Oh, definitely.

Q. And would any pollutants in it enter these subdrainages you looked at?

THE ADMINISTRATIVE LAW JUDGE: Subterraneous?

MR. RYAN: Subdrainages you looked at.

THE ADMINISTRATIVE LAW JUDGE: Subdrainages.

A. Yes, assuming it was still located within the watershed area I was modelling.

BY MR. RYAN:

Q. And if someone--if Mr. Vos-- Along similar lines, where you talk about scraping quite a bit, if you were to scrape the manure off his pens, and if he stockpiled it within the drainage area you looked at under APEX, would that ultimately end up with some pollutants in the creeks?

A. Yes.

Q. So if he removed it from, let's say, for example, subarea B on Figure 9 of your expert report, and he moved it off to, let's say, for example, the corner of subarea E, would that remove it from the system, or would it end up going downstream?

A. It would remain in the system flowing downstream if it was within the watershed boundaries.

Q. So only if he scraped, put it in a truck and trucked it away outside this watershed boundary would

it not be accounted for?

A. That's true.

Q. And I believe you said you assumed in your scraping function he, in fact, did that, he trucked it--removed it from the watershed?

A. I did assume that.

Q. If the testimony--well, if hypothetically he was not trucking it outside the watershed, would that result in an underestimate by you, or an overestimate by you of the amount of manure that would wash out?

A. An underestimate.

Q. Let's look at Exhibit 46. It's that big fat collection of rainfall data for LeMars.

MR. RYAN: Does Your Honor have that page handy, Exhibit 46, LeMars? Would you like me to come up and show you where it's at?

THE ADMINISTRATIVE LAW JUDGE: I will find it, thank you. I'm on 46 LeMars. You're going to direct me to a particular page, right?

BY MR. RYAN:

Q. We spent some time--you spent some time on cross-examination with Mr. McAfee this morning talking about the date of February, I believe it was, 18th, 2002; is that correct?

A. Yes, it is.

Q. Yeah, and--yeah, February 18th, 2002. And your testimony at the time was that the model did not account for, necessarily, the individual days of data from the weather service, but relied on the monthly means. Do you recall that testimony?

A. Yes, I do.

Q. So let's look at that monthly mean data for February of 2002. And I think you identified that in your cross-examination by actually reading all the numbers across that long line. As you see, is that--the monthly mean data, is that to the right of--the data in Exhibit 46 LeMars, is it to the right of the 2002, 02/28 data?

A. Yes, it is.

Q. Is it--now, in that right-hand side of the page, the first number is 26.1. Is that the mean temperature?

A. Yes, it is.

Q. Okay. And then max--the mean max temperature would be the 37.8; am I correct? Am I reading this correctly?

A. Yes, you are.

Q. Okay. Now, what would the high temperature for the month be?

A. The high temperature would be 61 degrees

Fahrenheit.

Q. What would the low temperature for the month be?

A. Minus 9 degrees Fahrenheit.

Q. So in the month of February 2002, the data is telling your model that we had very cold days and some pretty warm days; right?

A. Correct.

Q. Let's look far off to the right, the number 9. Do you see that on the far right-hand side of the monthly data for February?

A. Yes.

Q. What does that 9 stand for?

A. That says there was snowfall.

Q. Is it 9 inches of snowfall in February of 2002?

A. I don't see the units under the snowfall, but, yes, I assume it's inches of snowfall.

Q. So in the month of February we had 9 inches of snowfall and 61 degree temperatures. Would you expect to see melting under those environmental conditions?

A. Yes, I would.

Q. Now, you were asked a series of questions on cross-examination this morning regarding whether

additional sampling would help your modelling efforts; whether if someone grabbed a sample showing an existence of pollutants, such as manure, elevated nitrogen, whatever, if that would help you. And you were asked the converse question, whether a sample from the creek showing no pollution, would help you or assist you in any way. Do you remember that testimony?

A. Yes, I do.

Q. Now, if--let's discuss that for a minute. If you were to collect a sample when it were not raining, would you expect to see pollutants from Mr. Vos' feedlot in--let's say in the unnamed tributary? Would you expect to see manure flowing into the unnamed tributary on a day when it was not raining?

A. No, I wouldn't.

Q. Why not?

A. Because the source is the runoff, and there would be no runoff into the creek at that time.

Q. If you collected a sample on a dry day from the unnamed tributary, what would it typically tell you?

A. I assume that it would tell me that there was--there was not detected, there were not

pollutants in it.

Q. Is it the nature of streams to flow downstream?

A. Yes, it is.

Q. And is fresh water coming in from upstream of the pollutant source?

A. Yes.

Q. So if you measure just next to Mr. Vos' farm on a day when it was not raining, or not discharging, would you be measuring the water coming from off-site upstream?

A. Yes, I would.

MR. RYAN: May I have one minute, Your Honor?

THE ADMINISTRATIVE LAW JUDGE: Sure.

MR. RYAN: Those are all the questions I have, Your Honor. Thank you.

THE ADMINISTRATIVE LAW JUDGE: Okay. Recross?

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

MR. RYAN: Can we go off the record one minute?

THE ADMINISTRATIVE LAW JUDGE: Yes, we can go off the record.

(Discussion off the record.)

THE ADMINISTRATIVE LAW JUDGE: We're back on the record.

RECROSS-EXAMINATION

BY MR. McAFEE:

Q. Ms. Doty, I think what I'll do for my recross-examination here is maybe start at the back and move forward since this last exhibit--I don't know if you still have that open looking at the February 18th, 2002, weather data.

A. Yes.

Q. Do you still have that open?

A. Yes, I do.

Q. And just for the record, let me make sure I'm properly identifying it. It's Plaintiff's Exhibit 46 LeMars, and, again, it's the weather data. I think Mr. Ryan had you looking at the page with the February 18th, 2002, data on it; is that correct?

A. Yes.

Q. And you were testifying in response to some questions from Mr. Ryan about the--would you call it the summary data for the month of February?

A. Yes.

Q. And you testified as to what the numbers mean. And I guess what I want to make sure I

understand from this is the model--these are the only numbers, this information as to the mean high and the mean temperature--and what is the 9.0? Is that the total snowfall for the month?

A. Yes, it is.

Q. Okay. Is that the only information the model gets is that information, those figures that start with 26.1 on the left and 9.0 on the right?

A. I can't answer your question--is that the only information it gets? Well, that is the information that it uses when it's determining snow melt.

Q. And maybe I didn't ask it-- Is that the only information the model gets, weather information for the month of February, are those figures, from 26.1 on the left to 9.0 on the right, is that the extent of the information that the model uses for the weather information for the month of February?

A. No, it is not.

Q. What other information does it have?

A. It has the daily precipitation values that are a part of it, it has solar radiation, humidity. There's one or two more.

Q. Okay. So the model knows when that precipitation occurred? That 9.0 snowfall for

February, the model knows what days that occurred on?

A. Yes, that's correct.

Q. And does the model also know the temperature on the specific days for the month?

A. It's using the monthly data for the temperatures.

Q. Okay. So it doesn't get daily temperatures?

A. No. It uses a normal distribution around these means that we've been talking about.

Q. Okay. Is there a feature that allows the model to get the daily temperature information?

A. Yes, you can input it.

Q. But you did not?

A. I did not.

Q. Is there a reason why you did not?

A. I didn't input it because I didn't have it readily available at the time that I was starting the modelling, and so I didn't think it was a sensitive parameter, and I used the data that the database has.

Q. Wouldn't it be fairly important to have the daily temperatures available to the model so that the model knows what days the warm weather occurred in relation to when the snowfall occurred, so that the model could be--these are my words--more accurate on when runoff would occur?

A. It used the monthly data for temperatures, and it is representative of the conditions, and it would only be important in any way during winter months.

Q. Okay. What do you mean by--explain to me what you mean by only important during the winter months?

A. The runoff is going to be snow melt when it's above 32 degrees Fahrenheit, and it's only using it to determine if that has occurred.

Q. Okay. So during the warm weather months, again, the daily precipitation, which would be rain during anytime--during most of the times when the temperature is above 32 degrees it should be rain, absent those right around 32--and maybe I shouldn't testify to this. Rather than me saying it, but-- Let me say it this way: When the precipitation is rain, the model does know exactly what days the rain occurred on?

A. Yes, it does.

Q. So then the model can--it would not use, like--in the warm weather months, the model would not use a monthly total for rain?

A. No, sir.

Q. Okay. All right. That helps me understand

how the inputs to the model work.

During my direct examination--excuse me--my cross-examination this morning, I asked you about the subarea J and the pasture, and I believe Mr. Ryan talked to you briefly about what effect that would have. But I stated on the record I would confirm with you your report on March 25th, and I believe I should do that now just to clarify the record.

MR. McAFEE: May we go off the record?

THE ADMINISTRATIVE LAW JUDGE: Yes.

(Discussion off the record.)

THE ADMINISTRATIVE LAW JUDGE: We'll go back on the record.

BY MR. McAFEE:

Q. Would you please turn to Complainant's Exhibit No. 29.

MR. RYAN: What page number, please?

MR. McAFEE: I was just going to let her get to the exhibit.

BY MR. McAFEE:

Q. Page 8 of Exhibit 29. And in the second paragraph there on page 8 of Exhibit 29 would you take a look there at your reference to subarea J. It's about in the middle of that paragraph.

A. The northern pasture subarea was designated

subarea J.

Q. Okay. And then I just want to compare that to your final report, if you would do that with me, please. And that, of course, is Exhibit 43. And that would be page 9 of Exhibit 43.

A. Yes.

Q. And would you please look at that paragraph to see if that is the same sentence regarding subarea J.

A. I believe it is, yes.

Q. And so nothing has changed between the two reports?

A. No.

Q. And the Exhibit 29 was prepared prior to your visit to the site on July 1 of 2008; correct?

A. Yes.

Q. And I think this morning you were testifying as well as you could from memory that maybe that had changed after your site visit?

A. Yes. I honestly don't remember the exact wording in the March 25th report at this point, so I wasn't sure. Yes. Correct.

Q. Yes. But you're testifying now, after looking at the two, that your characterization of subarea J being a pasture subarea was originally made

in March when you prepared Exhibit 29, and did not change after your visit to the site on July 1st?

A. Correct.

Q. Okay. Thank you. Now I would like to go back to the--where I'm headed here is Appendix B-2 to Exhibit 43. Do you have that?

A. Yes, I do.

Q. Would you please turn to page 8. And I believe you testified in response to Mr. Ryan's questions about this that the lower graph, which represents the flow in channel segment 5 in the year 2002--and I believe your words were that this is not an anomaly; is that correct? Is that what you testified to?

A. I don't remember that phrase, but I might have.

Q. Well, the record will reflect what you said.

A. Yeah.

Q. Is it your testimony that this does not--like, channel segment 5 in this graph, that does not represent what's actually in the unnamed tributary, that's in the--that's what's in--maybe I should let you testify to this. I was looking for the word in my notes here. Did you use the term "sublateral flow"?

A. Yes, I did. Should I explain?

Q. Yes, please.

A. Within each subdrainage area you have runoff during a precipitation event. But also there can be a component of sublateral flow. And so I'm--and you get seepage from sublateral flow, and the model reporting in these figures is reporting that amount of runoff and potentially sublateral flow--there may or may not be that, you know, you have to look at the record--running into--channelized by the drainage at that point in time.

Q. So it's my understanding it's your testimony that what is shown here in the flow in channel segment 5 in this graph, or in any other graph in this Appendix B-2, does not show what's in the actual unnamed tributary main channel; am I understanding you correct?

A. Yes. It's the flow that ends up in that main channel from the lateral directions. It doesn't account for the cumulative effective flow that's coming in the same way up gradient.

Q. And so when we see in this graph, when we see those--what appear to be those zeros for the flow in the months of, it looks like, April and May, are you saying that appears to be correct to you?

A. Yes. Yes. I believe that is correct. It's a very small subwatershed area and there might have been a very small amount of runoff that occurred during that period of time.

Q. Okay. Then let me direct you to, it looks like, sometime in early to mid-May. There's a line on that graph that goes all the way up to--and I know you testified to this yesterday. It's over the line of ten. Would you tell me what that line represents on the graph? The highest line in that graph, how many gallons per day would that represent?

A. Yes. That's ten billion gallons per day.

Q. What's the next line? What's the next line up from that on the axis?

A. A hundred billion.

Q. So that point on that graph is between ten billion and a hundred billion. Could you estimate for me, based on that graph, what you think that number would represent?

A. A typographical error in the output file.

Q. Okay. But for purposes of the record, could you tell me what number, just looking at the graph, how many gallons per day that point on the graph would represent, to the best of your ability?

A. I don't have a calculator here, but if you

took the ten billion and divide it by approximately 648,000, you'd end up with gallons per day--I mean you'd end up with cfs.

Q. What I'm asking you, ma'am, is help me put a number on that point on the graph that is in between ten billion gallons per day and a hundred billion gallons per day. What's your testimony as to what that point on the graph represents based on the numbers on the graph?

A. Well, having reviewed the data last night, I understand that that is not--that's a mistake--

THE ADMINISTRATIVE LAW JUDGE: Yes, but his question is not that. His question is simply, as I understand what counsel is trying to ask you, not whether it's correct or not, but looking at that graph, if that spike line reached all the way up to the top, then that would be a hundred--what is it? A hundred--the top line is a hundred billion?

THE WITNESS: Yeah.

THE ADMINISTRATIVE LAW JUDGE: If it's slightly below, you could make an estimate what that is in the range of ten billion to a hundred billion. He's just asking you to give a visual estimate, as I understand your question, counsel, what that would be. We know that's not with precision, but you can

make an estimate. I could.

A. I would say it's 20 or 30 billion.

BY MR. McAFEE:

Q. That would be 20 or 30 billion gallons of flow in that channel segment. You testified you believe that is a typographical error?

A. Yes. Looking at the data last night, I do believe that.

Q. I guess where I'm confused, then, you just testified, as I understand it, where it shows zeros a few days before that, that you would expect to see that, based on this graph.

A. Yes. I believe that that small subwatershed area did have points where there was zero flow based on the data I reviewed last night, too.

Q. And I don't want to--well, I'll just ask the question.

In other words, if I'm understanding your testimony correctly, you believe what it says for when it shows zeros, but we can't believe what it says when it shows 20 to 30 billion gallons of flow rate, gallons per day?

A. That's correct. For that particular case I looked at the data and there was an error in that. When I looked at the data output and plotted it, that

spike was no longer there in the file that I was looking at. I believe that's an error. That's all I'm saying.

Q. Okay.

THE ADMINISTRATIVE LAW JUDGE: So would it be fair to state, Ms. Doty, that, really, looking at this bottom graph, that you really couldn't rely on the graph itself? What you had to do was to go back in the evening, last night, and crunch some other numbers, look up some other data, and from that you then concluded that part of the graph seems to be correct, and part of it seems to be incorrect?

So the graph itself, you couldn't rely upon looking at this graph for accuracy? You had to go back to this other data, which is not in the record, and from that you concluded the spike was wrong, the spike that you said was maybe 30 billion, right? But the zero, based on this other data, which is not part of the record, you determined was correct; fair enough?

THE WITNESS: Yes.

BY MR. McAFEE:

Q. I want to talk now just a minute about the SWAT model, and you testified that you did not rerun the SWAT model after discovering the errors in the

data in Appendix B; is that correct?

A. That's correct.

Q. Don't you believe it might have been advisable to rerun the SWAT model just to make sure there were no errors that affected your output?

A. This data--I'd say no. This data isn't the data that I used. The last run that I used, I went ahead and looked at that data. I have no reason to believe that that data isn't correct. It appears to be correct because it correlated well with the Sioux City precipitation events, and the tables that were associated with the output. So I believe it's correct.

Q. And, again, you saw no need to rerun the model?

A. No, I didn't.

MR. McAFEE: I have no further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Okay. Mr. Ryan?

FURTHER REDIRECT EXAMINATION

BY MR. RYAN:

Q. Just a couple, Ms. Doty. On these graphs we just discussed on this stream segment 5, looking at the bottom of page 8 of Exhibit--of Appendix B-2

to Exhibit 43, your expert report--we were just talking about that. Do you have that in front of you?

A. Yes, I do.

Q. I think you testified earlier that drainage area 5 was the smallest drainage area in the watershed you looked at?

A. Yes, it is.

Q. Would it make any sense to you, as a hydrologist, to see 20 to 30 billion gallons per day of runoff coming off that small watershed?

A. No, it wouldn't.

Q. At the same time would it make any sense to you, as a hydrologist, to see zero in some months?

A. Yes, it would.

Q. Now, in fact, do you have Complainant's Exhibit 52 in front of you?

MR. McAFEE: Excuse me, Your Honor--

MR. RYAN: This is one that was not admitted into evidence, but we were going to discuss further on redirect. It's directly relevant to your recross.

THE ADMINISTRATIVE LAW JUDGE: No. I sustained the objection to not allowing Exhibit 52.

MR. RYAN: I thought you said into evidence, Your Honor. I was going to ask her a question

regarding--we've already had extensive testimony that she reran the numbers last night, and I just wanted to verify--okay. Thank you, Your Honor.

BY MR. RYAN:

Q. Regarding the need to rerun the SWAT model, which was the last line of questioning you had on recross, the--tell us what the data we see in B-1 represents. Is that the data that went into making your run on the SWAT model, or is it what supposedly came out of the SWAT model?

A. It came out of the SWAT model but not directly.

Q. When you say "not directly," what do you mean?

A. What came out of the SWAT model was then put into an Excel spreadsheet and manipulated there to get it in the format that is appropriate for establishing flow rate versus the date for this graph.

Q. So what we see in Appendix B-1 to Exhibit 43, did you push a button on the SWAT model and say, "print this"?

A. No, I did not.

Q. Is there such a button or command you can give to the SWAT model to say "print all the data,

all the output data"?

A. Yes, there is.

Q. How big would that be if you gave it that command?

A. Tens of megabytes.

Q. Hundreds of pages? Tens of pages?

A. Oh, hundreds of pages.

Q. Would it show more than we see here on Appendix B-1?

A. Yes, it would.

Q. So if--what we're looking at on Appendix B-1, I think it's your testimony that this is--in Exhibit 43, this is not reflective of what the SWAT model--last run of the SWAT model you did; is that right?

A. That's correct.

Q. So asking you the question that counsel asked you a minute ago, given that this is output data, would it make any sense to rerun the SWAT model to reflect what the real output data should be?

A. No.

MR. RYAN: I have no further questions, Your Honor.

MR. McAFEE: I have no further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Okay. It's over, Ms. Doty. Thank you. You can head back to Colorado. Thank you for your testimony.

THE WITNESS: Thank you.

THE ADMINISTRATIVE LAW JUDGE: I take it that--she's going home, so is there any need to have her stay? I'm asking counsel for Respondent. No? You're shaking your head no?

MR. McAFEE: I'll be glad to answer on the record. No, there's no need. We've had plenty of opportunity to conduct our examination.

THE ADMINISTRATIVE LAW JUDGE: Okay.

MR. RYAN: Your Honor, we are reserving the right to call her as a rebuttal witness. They have a hydrologist who will be testifying.

THE ADMINISTRATIVE LAW JUDGE: So she's going to be having a tentative reservation to fly back here at a moment's notice?

MR. RYAN: Or she'll be staying.

THE ADMINISTRATIVE LAW JUDGE: I was under the impression--that's fine.

MR. RYAN: Your Honor, since she is not a fact witness, she's an expert witness, may she be allowed to sit and observe the proceedings, certainly observe the expert testimony of their expert?

THE ADMINISTRATIVE LAW JUDGE: Do you have a comment, Mr. McAfee?

MR. McAFEE: Your Honor, I object to that. I didn't bring our expert witness in to hear her testimony, and I would expect the same of her, not being present for our expert.

THE ADMINISTRATIVE LAW JUDGE: I agree. That's the way it's going to be, Mr. Ryan. I'm sorry. You'll be able to, in framing any questions, ask her to assume that thus and so is the situation and get her opinion. But I think it's unwise to have people listening to other people's testimony generally.

MR. RYAN: Your Honor, may we take a quick break here so I can make sure my next witness is available?

THE ADMINISTRATIVE LAW JUDGE: Absolutely.

MR. RYAN: He's been sitting around for quite some time.

THE ADMINISTRATIVE LAW JUDGE: So we'll go off the record.

MR. RYAN: May we have a five-minute break now?

THE ADMINISTRATIVE LAW JUDGE: Absolutely. Yes.

(Short recess.)

THE ADMINISTRATIVE LAW JUDGE: We'll go on the record.

MR. RYAN: I would like to call Jonathan Shefftz, please.

THE ADMINISTRATIVE LAW JUDGE: Good afternoon. Raise your right hand.

JONATHAN S. SHEFFTZ,

called as a witness by the Complainant, being first duly sworn by the Administrative Law Judge, was examined and testified as follows:

THE ADMINISTRATIVE LAW JUDGE: Have a seat, sir, and state your name and then spell it for us, please.

THE WITNESS: Jonathan S. Shefftz. The last name is spelled S-h-e-f-f-t-z.

DIRECT EXAMINATION

BY MR. RYAN:

Q. Mr. Shefftz, where are you presently employed?

A. I'm a self-employed independent consultant.

Q. And where were you previously employed?

A. Previously I was employed by Industrial Economics, Incorporated, from 1992 until spring of 2006.

Q. Can you tell me a little bit about Industrial Economics?

A. Industrial Economics, or IEc for short, is a consulting firm founded in 1981 with about 100 employees providing economic analysis and environmental analysis services to a mixture of public and private sector clients. I'm also working for EPA under a subcontract with IEc on this case.

Q. Is your current work as an independent consultant along the same lines as your work at Industrial Economics?

A. Yes. While at IEc I worked on, essentially, applied financial economic analysis in the context of litigation disputes, environmental enforcement, and public policy decisions. And since moving out of the Boston area and becoming an independent consultant, my work has remained pretty much the same.

Q. Can you briefly summarize your educational background for us.

A. I have an undergraduate degree in economics and political economy from Amherst College, and master's degree in public policy from Harvard University.

Q. Are you a member of any professional societies?

A. Yes; a member of the National Association for Forensic Economics, the Government Finance Officers Association, the Eastern Economics Association, and the Western Economics Association.

Q. Are there any other activities related to your consulting practice?

A. I've served as a manuscript referee for the *Journal of Forensic Economics*. I'm currently serving as a course liaison for the engineering economic decision-making course at the University of Massachusetts, Amherst, where my duties essentially comprise giving guest lectures and assisting in the students' long-term research projects. I'm also the vice-chair of the planning board in the town of Amherst where I reside.

Q. Have you been published before?

A. Yes. I've published three articles, one on EPA's economic benefit, practices, and policies; another on so-called wrongful profits in the context of economic benefits; and a third in a peer-reviewed journal on taxation considerations in commercial damages cases.

Q. You just mentioned economic benefit. What's the point of calculating an economic benefit?

A. Although I'm not a lawyer, my understanding

is that EPA penalty policies comprise two main components, the first being economic benefit under which a penalty should not be set; and the second being the gravity component which is added to the economic benefit component.

Q. Describe your experience for doing economic benefit calculations for us.

A. I've worked in this field since 1992. Most of my experience stems from performing calculations in settlement and for the U.S. EPA, Department of Justice, state environmental agencies, and attorneys general, not-for-profit litigators, and other private parties.

I've also worked on the EPA BEN computer model. I developed the current Windows version of the model in 1998. I've been involved in revisions to it since then. I've taught training courses on the model on many occasions, both state and federal staff, and I've also assisted in staffing and supervising and consulting to the help line that U.S. EPA maintains both for federal and state users of the model.

Q. Could you tell us approximately how many economic benefit calculations you've done in your career?

A. I can't give you a precise number, but I've been named as an expert in many dozens of cases, worked on many hundreds of cases, and as a result probably performed thousands of calculations by now.

Q. Have you testified as an expert before?

A. Yes. I've testified either in deposition or at hearing or trial I think about 26 times, or something like that.

Q. Would that include any EPA administrative actions, such as the one here?

A. That included five administrative hearings, one being *In the Matter of Ekco/Glaco*, one *In the Matter of Rising Sun*, and then three were variations on cases that involved Vico Construction.

MR. RYAN: Your Honor, I would move at this time to have Mr. Shefftz recognized as an expert witness in financial analysis and calculation of economic benefit.

MR. McAFEE: No objection.

THE ADMINISTRATIVE LAW JUDGE: Okay. And he is so designated.

BY MR. RYAN:

Q. Mr. Shefftz, are you familiar with the Vos case?

A. Yes, I am.

Q. And how so?

A. I was retained by EPA to provide an expert report on Respondent's economic benefit from the alleged pollution control noncompliance.

Q. And could you--there's a series of binders in front of you. Could you turn to Exhibit 47.

A. Yes.

Q. And do you recognize Exhibit 47?

A. Without inspecting every single word on every single page, it appears to be a copy of my expert report in this case, along with the attached CV.

Q. Did you, in analyzing the economic benefit in this case, did you reach a result?

A. Yes.

Q. What was it?

A. Yes, I did. Based on modelling the pollution control expenditures as being avoided entirely, the economic benefit is about 196,000. If the control measures are put in place by the end of this year, the economic benefit is about $65,000.

Q. Okay. Let's step back and talk about the economic benefit theory for a bit. How is a noncomplying company financially better off in economic benefit terms?

A. This can arise out of--three ways. One is that required expenditures are avoided entirely; one is that the--the second is that the savings arise by the expenditures merely being delayed rather than avoided; a third goes beyond the mere delay or avoidance costs. So, in other words, the economic benefit is based on analyzing what the company's profit would have been had it been in compliance, and then comparing that to what the profit actually was out of compliance.

When we looked just at delayed and/or avoided expenditures, we're taking a shortcut, analyzing only those expenditures and setting everything also about those two states of the world equal. So that third category is basically when that simplifying treatment doesn't apply.

Q. You mentioned just a moment ago "company." Would you analyze a facility, such as Mr. Vos' feedlot operation, any differently than you would a company?

A. Economic benefit, the analysis can vary by entity depending on certain things like tax rates. But, in general, economic benefit, regardless of whether it's a municipality, even a federal facility, a not-for-profit, or a very small feedlot like this,

which I understand is organized as a sole proprietorship--I haven't had confirmation of that--either way it's the same analysis, looking at the money that would have been made, or what the overall cost would have been for being in compliance versus the actual state of the world.

Q. Can you describe your theory of economic benefit in this case?

A. So here what I'm doing is the economic benefit represents the financial gains from not being in compliance. And the idea is that money that should have been spent on compliance was, instead, available for, perhaps, other profit-making ventures, it simply could have been returned to the owner, or financing costs to pay for the environmental structures were avoided.

And going along with that, it's very important to note the time value of money. And so money should have been spent at some point in the past. It has not been spent yet. Even if it is spent, there is a difference between money spent in the past, money spent today, and money spent in the future.

Q. So is it correct that the Respondent was able to keep ahold of the money he would have

otherwise spent on control equipment and use it over time?

A. Sure. That's one way of thinking of it. Money was available for purposes other than environmental controls.

Q. How did you calculate economic benefit here?

A. Here, like in all cases, I used standard financial analysis and cash flow and present value techniques. So all I'm doing is I'm applying the same techniques I would use in, say, a commercial damages analysis, or just when a company is making internal decisions, looking at different investment alternatives, or even the course I'm currently assisting with at the University of Massachusetts, looking at, for these students' research projects, some entity trying to make a decision, looking at different alternatives and seeing what the differences are between them.

So what I do is I compare complying in a timely and full manner versus what actually ensued. And then once I've laid out the costs and cash flows associated with those two different alternatives, I have to first adjust it for inflation, adjust it for taxation, and then adjust it for that time value of money I discussed before. Because if we take dollars

from different years and add them together, it's somewhat comparable to doing the same thing with currencies of different countries. Mathematically we could add together, say, U.S. dollars and euros, but it really wouldn't have any meaning.

So in order to compare these in a sensible way, what we need to do is adjust dollars from different years to present values as of some common date and then they can sensibly be compared to each other, so the total of the present value of the scenario with on-time full compliance can be compared to what actually ensued, and then the difference between them is equal to the economic benefit.

Q. Let's look at a real simple example here to kind of break this down. Let's assume that a noncomplying facility feedlot could have installed a piece of equipment for a dollar in 2000. How does that calculate? How does that benefit over time?

A. The first thing that has to be done, if we're just looking at a dollar that was avoided back in 2000, and here we are in 2008, is that dollar needs to be adjusted for its tax deductibility. So just like when you're trying to determine how much a mortgage is really going to cost you, and you can deduct the interest payments on your mortgage from

your taxable income, here, if, let's say, the marginal tax rate is 40 percent, that dollar becomes only 60 cents.

Next we need to bring that dollar forward to the present. So a pretty typical cost of capital, pretty close to what the generic value is in the BEN computer model, is about 9 percent these days. So that 60 cents in 2000 is compounded forward to 2008. It becomes about $1.20.

So essentially first that dollar became smaller because of the tax consequences, and then adjusting for the time value of money, it became bigger.

Q. You mentioned 9 percent is the typical cost of capital rate. What did you actually use in this case?

A. Here in this case I used the Ibbotson Associates Cost of Capital Yearbook to look up the value for the meat products in the industry codes. And over the period of noncompliance that worked out to an average of significantly lower, 7.7 percent.

Q. So going back to our hypothetical, the 60 cents, bringing it forward, if that were not a dollar, but, say, a hundred thousand dollars, how would that compute out?

A. Basically the same ratio would apply. So in the first example, a dollar became a dollar-twenty. If it was a hundred thousand dollars in the first place, then it would become about $120,000.

Q. So looking back to the year 2000 in this hypothetical, if a feedlot were looking at an expenditure of a hundred thousand dollars, is it worth more, then, down the road to have not spent it in 2000, or if they have to, say, ultimately spend it in 2008?

A. Right. So if you took that, say, hundred thousand dollars in 2000, it would be bigger in 2008 because of inflation, but it wouldn't be $120,000. It would be somewhere between 100,000 and 120,000, and also reduced for taxation. And so the economic benefit would be equal to the difference of those figures.

Q. Let's back off from our hypothetical and talk about this case specifically. What numbers did you look at in this case? Feel free to refer to your expert report if you feel it's necessary.

THE ADMINISTRATIVE LAW JUDGE: Keep your voice up.

MR. RYAN: I'm sorry, Your Honor.

A. If you want to follow along, in this case on

the bottom of page 5, I used the *Beef Feedlot Systems Manual* published by Iowa State University. And there I took the figures in Table 10 of the Appendix entitled "The Initial Investment for System 1, Earthen Lot with Windbreak." There were three components there for the initial capital investment.

Q. Can we stop for a minute, Mr. Shefftz? Did you say we're at the bottom of page 5 of your expert report?

A. Yes.

Q. Where it says "Cost Estimates"?

A. Yes.

Q. Okay. Thank you.

A. And so that was composed of $50,000 for engineering, 90,000 for construction, and $75,000 for irrigation. I also included 5 percent of that 75,000 irrigation figure, 3,750, for annual repairs. And then there was a replacement at the end--replacement cycle at the end of 25 years as specified by Table 15, which included the figures for the useful life of these structures.

Q. Let's go to that report. Could you please, in your notebook in front of you, turn to Exhibit 32?

A. Yes.

Q. And that should be the *Beef Feedlot Systems Manual* from Iowa State University. Do you see that?

A. Yes.

Q. Would you turn to page 19, please, the Appendix Table 10?

A. Yes.

Q. Is that the same Table 10 you're referencing on page 5 under "Cost Estimates" in your expert report?

A. Yes.

Q. Okay. Now, looking at--there's a whole series of rows and columns there. At the very bottom of the page 19 of Exhibit 32, the second to the bottom line says "Total," and it has a number of numbers, and one is $187,010. Is that for a lot that has 750 head?

A. That figure you're looking at, yes. Not the figure I used.

Q. And the next number over would be $547,910. Is that for the total cost for 1,500 head?

A. Right. That's the total cost for the initial investment. Once again, not the number I used.

Q. Which number did you use, then?

A. The number I used is the subtotal in the row one up from that, for the environmental structures.

So facilities and equipment, that did not enter into my calculations at all.

Q. So is the number you used $215,000?

A. Yes, just the $215,000 subtotal there for the environmental structures.

Q. Okay. So you used that number, and then what did you do with it?

A. So if you turn to the final page of my report--or the final numbered page of my report before the resume, on page 8 it has a rather dense table--and I apologize for the font. If I knew how it was going to be reproduced, I would have tried to make it a little more legible. But this shows the calculations, and what I did with that 215,000 figure--

Q. Is that in the upper left-hand corner of the chart on page 8 of your report?

A. Right. So the column that says "Original Cost Estimate," and the row that says "Initial Cost," you'll see the 215,000 figure.

Q. That's right out of Table 10 of Exhibit 32?

A. That's correct.

Q. Tell us how you got to your economic benefits results starting with this $215,000 initial cost.

A. The first thing I have to do is that's from a document that was produced in 2006. Now, noncompliance, I understand in this case, physically is alleged to date back to, if I recall correctly, 1991. But because of the statute of limitations, I conservatively took the economic benefit back to only August 2002, five years before the filing of the complaint, is my understanding.

Q. Can we stop there for just a minute?

A. Yes.

Q. you say you started the economic benefit numbers calculation, then, five years ago; is that correct?

A. That's right.

Q. Now, if hypothetically Mr. Vos was out of compliance with the Clean Water Act longer than that five years, would he actually have a greater economic benefit as a result?

A. Yes. The economic benefit would be much larger both because the--looking at the costs I have here both because the annual--annually recurring repair cost, the irrigation system would have been avoided over a much longer period of time, and having to--the present value of having to put in the environmental structures over a decade earlier would

have had a much higher value and, therefore, the economic benefit would be much higher.

Q. Going back to your analysis for the last five years only, what did you do next?

A. Okay. So I have these cost estimates from the manual, but that's as of 2006. Had compliance occurred in 2002, because of inflation, it would have cost less. So I have some calculations here. Instead of using the constant inflation rate over time, to be more precise I have monthly values from what's called the Construction Cost Index from the publication *Engineering News Record*. So just like you might hear about on the nightly news about how the Consumer Price Index has gone up so much over the past month, this is a more specialized index that more closely tracks costs for, like, the environmental structures in this case.

So after I performed the inflation adjustments to figure out what the out-of-pocket costs, so to speak, would have been back then, I take into account the tax consequences using, to be conservative, a very high tax rate, the highest possible marginal combined tax rate, U.S. and Iowa combined.

Q. Why is that conservative, using the highest

tax rate?

A. The higher the tax rate--the higher the tax rate, the lower the after-tax cost of compliance. All else being equal, the lower the cost of compliance, the lower the economic benefit. So even if Respondent was paying a marginal tax rate much lower than this, then, therefore, the actual after-tax cost would have been higher, and, therefore, the economic benefit figures would be much higher than in my report. But lacking any information on Respondent's detailed tax finances, I just conservatively used the highest tax rate possible.

Q. So by using the highest tax rate possible are you essentially giving the Respondent the benefit of the doubt?

A. Yes. It's biasing the economic benefit result downward.

Q. Okay.

A. In addition to the tax rate, I also chose the most rapid depreciation schedule possible. Even though these environmental structures have a useful life of 25 years, according to the Beef Manual, I used a relatively rapid depreciation schedule over a seven-year period just in case, for tax purposes,

they really might have been able to depreciate that quickly. Once again, that lowers the economic benefit.

And I also took account of the fact that the special depreciation schedules were available. As of 2002, congressional legislature encouraged investment then. Whether something like this really would have qualified, I don't know for sure, but to be conservative, I applied that faster schedule which also biases the economic benefit downward.

So then once I've finished with these inflation and taxation adjustments, then I have dollars as of these different years. As I said before, I have to adjust them for the time value of money. And so I use a present value factor that's based upon that annual 7.7 percent rate.

And then to figure out what the economic benefit is if all these costs are avoided--

Q. Where are we on this chart right now, page 8?

A. Sorry. We're now on the final column, and you see some of the headings above that say "Present Values using 7.7 percent, and at September 1st, 2008."

When I wrote this report in mid-August,

September 1st was the first day of the following month. Now we're in the middle of September. I also, once we get down to that section, I give figures on how this economic benefit can be brought forward from month to month recalculating, essentially, the definition of when the present is.

Q. So what's the significance of that September 1st, 2008, date?

A. It was simply roughly at the time of my report.

Q. Okay. Go ahead.

A. So focusing on that final column where I have the result in dollar terms--and, once again, I apologize for the poor print quality here--there's a line that says if all compliance costs are avoided, then total economic benefit is equal to about 196,000. So that's adding up the present values of putting in place the environmental structures in 2002, and then paying for the irrigation system repair costs over the intervening period, up until February 2007, when I understand the feedlot came into compliance by lowering its head count.

Q. So in simple terms, if Mr. Vos never constructs these controls, and he's found to be governed by the Clean Water Act, in other words he's

required to have these controls, then this would be his economic benefit?

A. Yes, if he never takes any other measures to come into compliance.

But then, alternatively, if these controls are to be put in place by about the end of this year, I calculated what the economic benefit would be for that.

So you can see I have the delayed costs down below. So that 215,000, now instead of getting smaller, it gets bigger because of the inflation adjustments since the manual from 2006--the costs are going to be higher at the end of 2008. So if you look at the fine print--once again I apologize for the poor legibility of this, but the 215,000 becomes about 235,000.

Q. Where is the 235,000?

A. If you look at the row that says "Delayed Costs," and then you follow it across, the 215,000, there are some--there's a monthly value for the Construction Cost Index, and then in the fourth column that has numbers in it, there's a 235,000.

Q. Would that be under the "Inflation Adjusted Cost"?

A. That's correct.

Q. Just so I understand, if he were to go out and build it today, based on these 2006 costs we find in the manual, Exhibit 32, it wouldn't be 215,000, it would be 235,000?

A. Roughly speaking. If those costs in the manual are reasonably indicative of the cost that would be incurred at this particular feedlot, and if inflation over this two-year period for structures like this has been pretty similar to the Construction Cost Index, then that's a good estimate of what it would cost now.

Q. Go ahead and proceed.

A. So then I go through the same calculations for the present value of that, and I subtract that from the previous figure for the economic benefit, and also add onto that a measure of the--what it would cost to replace this equipment earlier had it been installed at an earlier point in time.

Since even if this equipment is put in place--I'm sorry--these structures are put in place in 2008 as compared to 2002, they're still in better condition than they would have been in 2002. There's more of their useful life left. So with those adjustments, the final result is 65,000 as compared to $196,000.

Q. And that would be reflected in the final column in approximately the middle of that chart on page 8 of your expert report?

A. Yes.

Q. Is the actual number $64,965?

A. Yes, if we take it to the exact dollar.

And then earlier I said that this table also has calculations that show how these figures increase over time if the penalty is paid at some point in the future as opposed to right now, as of when these figures are calculated. And so for the avoided cost scenario with the economic benefit of about $196,000 increases at a rate of about $1,200 per month, and the $65,000 figure increases at a rate of about $400 per month.

Q. So in a general sense, economic benefit is looking at the money that the noncomplier has in his pocket, so to speak, from not building a piece of equipment, and what it's worth to him today. Is that correct, generally speaking?

A. Yeah, that's a quick summary.

Q. So the date he disgorges that money from his pocket would be the penalty payment date?

A. That's right.

Q. Until he disgorges that economic benefit for

noncompliance, the economic benefits continue to accrue in his favor?

A. That's right. I should note, as I said earlier, the compliance dates that I use in my calculations also play a big role. The irrigation system repair costs, those are cut off at February of 2007 when the facility did come into compliance. And the delayed costs of the $215,000 for the environmental structures, I modelled that as being projected to be completed at the end of this year.

So putting in those dates, as opposed to dates further in the future, has a big impact on stopping that economic benefit. But then once that economic benefit is calculated, it does continue to grow, depending on what our definition of the present is for the present value calculations.

MR. RYAN: I have no further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Okay. You need a minute, or are you ready to launch right into this?

MR. McAFEE: I think I'll go ahead and start.

THE ADMINISTRATIVE LAW JUDGE: Okay.

CROSS-EXAMINATION

BY MR. McAFEE:

Q. Good afternoon, Mr. Shefftz. Did I pronounce your name correctly?

A. Yes.

Q. All right. Thank you. I'm Eldon McAfee. I represent the Respondent, Lowell Vos, and I want to go through some of this with you to make sure we understand how this has been calculated. And some of my questions may be pretty basic, but, again, we need to get to the bottom of this to determine how you've calculated your economic benefit analysis here.

And I guess I'll start with some background on you. I won't get into your resume and qualifications other than to ask you have you ever conducted an economic benefit analysis on a feedlot before?

A. Yes.

Q. Okay. Could you tell me when and for what purpose or purposes?

A. There have been a lot.

Q. Okay.

A. I don't want to repeat my qualifications, but I have been doing these calculations since 1992.

Q. On feedlots?

A. Feedlots--you know, every now and then I get a case for a new industry that I've never worked on before, sometimes a product that I never even knew existed, but feedlots, for better or for worse, are something that we see quite a bit.

Q. When you say "we"-- Let me ask you, are those cases you've worked on, are those related to EPA actions?

A. EPA, Department of Justice, state EPAs, and state attorneys general, and not-for-profit litigators, yes.

Q. Again, regarding feedlots?

A. Yes, quite a few.

Q. Okay. You've not been to Lowell Vos' feedlot, I take it?

A. I have not.

Q. I take it it is not necessary for you to physically view a feedlot, or any other business, to conduct this analysis?

A. In this case I did not think that a site visit was necessary.

Q. Okay. I guess one of the things I want to understand is how the increased costs of the construction costs are figured into your analysis. I think it's a pretty basic assumption that you're

assuming Lowell should have built these facilities in--what date, again?

A. It's based on the statute of limitations cut-off, so it's August 2002.

Q. Okay. And, obviously, and I think you've testified to this, the cost of building those today, using the date of December 31 of 2008, as you have here, is higher; is that correct?

A. Yes, unless there's some highly unusual circumstance where somehow there's been some technological innovation, or perhaps the cost of specific material has gone down. Sometimes I see things like that in products or services that tend to follow, perhaps, local conditions, things like hazardous waste disposal that don't follow general inflationary trends. But something like this, it seems like the Construction Cost Index would be a reasonable fit.

Q. For someone like me, and others, we would say, well, the fact that he did not build, if he was required to build in August of 2002, and doesn't build until December 31 of 2008, that there may not be any economic benefit to waiting that long because the costs--the fuel costs, et cetera, going up as much as they have lately, that there may not be any

economic benefit. Is that all factored into your analysis here?

A. Yes. If you look at--again, I apologize for how this printed up as an exhibit, but my estimate for how much it would have cost in 2002 is $185,000. My estimate for how much it would have cost in 2008 is about $235,000. So that takes into account the inflationary increases over that period.

All else being equal, if inflation is higher, that reduces the economic benefit. If inflation is lower, that increases the economic benefit. So the key factor is that spread between inflation and the time value of money.

Q. Could you help me? I see the $235,856 figure. Is that the one you're saying is today's cost?

A. Yes, roughly speaking.

Q. Where is the 185?

A. The very first row going across.

Q. Okay. Very first row--I apologize.

A. Very first row, fourth column with numbers under the--the same column.

Q. I see it.

A. To give an example, once we had--when we were working on some cases that involved a more industrial process machinery, you know, pieces of

control equipment that had large components of steel in them, and there is a period in the U.S. economy when steel prices were just going up at an astoundingly high level, that would significantly reduce some economic benefit figures to almost nothing just because the cost of compliance out-of-pocket had gone up much faster than anything else in the economy. So it really would have paid to do it earlier to take advantage of it, and there's some elements of that here.

For example, the special tax break that I had mentioned with accelerated depreciation was available back in 2002 following the September 11th tragedy, but eventually that was phased out and it's no longer available now. So things like that do dampen the economic benefit, or partially offset it.

Q. So Mr. Vos' costs to build now, when it comes to December 31, 2008, if those were higher than $235,000, then his--your economic benefit analysis would not reflect that?

A. You also need to look at what the cost would have been in 2002. In other words, let's say both of those figures in reality would have been 10 percent higher than what I have here. So in that case that would--well, that would slightly--that would slightly

increase the economic benefit. If both those figures were five percent lower, it would slightly decrease the economic benefit. If it was a fixed amount, if each figure was $20,000 lower, that would change it. It all depends on the relationship between those two dates.

Q. Again, let's turn, then, to--what if Mr. Vos has already paid some of the costs of construction? You have engineering costs built into this, I assume, through the ISU *Beef Systems Manual*?

A. That's correct.

Q. I believe I saw a number on page 19 of the *Beef Systems Manual*--let me check that exhibit number.

MR. RYAN: 32.

MR. McAFEE: Thank you.

BY MR. McAFEE:

Q. Exhibit 32 on page 19 lists engineering costs of $50,000. Is your model assuming he has not paid those?

A. That's right.

Q. So if he has, in fact, paid engineering costs already, just hasn't constructed, that would affect your analysis?

A. That's correct.

Q. And how would that--you'd have to know that date as to when he paid it because that would, in effect, have stopped the benefit of not paying that cost; is that right?

A. Exactly.

Q. I now want to talk a little bit about the dates of noncompliance. You started the date of noncompliance, again, on the statute of limitation date, which is on page 5. You've listed August 14th, 2002. Is there a way--well, let me ask you first, if that date of noncompliance were several years later, let's say four years later, for instance--I'll just ask you this as a hypothetical--that would, obviously, change your calculations quite a bit; is that right?

A. Yes.

Q. All right. There will be some testimony in this case, which has not been entered of record yet, so we'll have to use it as a hypothetical, but a program where arguably--and I, on behalf of Mr. Vos, will be making this argument to the Court--that he was not out of compliance, if at all, of course, but not out of compliance until April 1 of 2006 when a program called the Iowa Plan ended.

So if that were the date, beginning of

noncompliance, April 1 of 2006, and then you have February 19, 2007, as the date when he reduced his head counts to come into compliance, that would be just short of a year of noncompliance, right, roughly?

A. Yeah. About ten months, yeah.

Q. Is there some way from your table, like these monthly increases, can those be used to do an analysis, or figure out what would your figure be for ten months of noncompliance?

A. It's something that, you know, doing some typing on my computer I could figure out very quickly, but by looking at this table and trying to do calculations in my head, not really, but it would be drastically reduced.

Q. Is there a way--I understand you're not at your computer.

A. I'm sorry. I misspoke. The delayed economic benefit would be drastically reduced. The avoided economic benefit would be significantly reduced, but it would still be substantial.

Q. Okay. Let's talk about the delayed cost. Turning to page 8 of your report, you have there a monthly increase--talking about delayed costs, again--of $404 per month; is that correct?

A. That's correct.

Q. What I'm trying to get at, just sitting on the stand as you are today without your computer in front of you, can we use that $404 a month to in any way determine what the economic benefit would be for ten months, not compliant from April 1 of '06 to--

A. Sorry. It's just a math thing. It just doesn't work that way. That figure is applying to $65,000 being brought forward from month to month.

Just to give you a flavor, if you want to know what this would entail, if you have this only about ten- month noncompliance period, basically these dates change. So if you're only interested in the delayed costs, the spread between the dates when the money should have been spent and when it was actually spent, it's less than a year, so the differential gets a lot smaller. And then, also, the avoided annual costs, you have only ten months of those instead of almost five years. So that was a fairly small cost to begin with.

Although it's a little bit speculative for me to say this, I'm pretty sure with only a ten-month noncompliance period, the delayed economic benefit would be quite small. The avoided economic benefit, though, would still be substantial.

Q. For the delayed--and I'm just asking for estimates from you, and I realize they're very rough. Can you give me a dollar estimate? You said quite small. I'm just looking for a ball park.

A. I wish I could. I love doing recalculations. Clients call me up on the phone all the time and ask me to recalculate things. I love doing that. I love numbers, what can I say?

All I can say is now it's 65,000, and although--unfortunately, these things don't work quite proportionally, but it's based upon a noncompliance period, you know, from August of 2002 to February of 2007, and then the delayed costs, you know, to December 2008, kind of averaging out the five or so years, you know. When you take five or six years and you cut it down to less than one year, you know, can you sort of say it's equal to one-fifth or one-sixth? Sort of. It gives you a very rough idea.

I will say, I'm pretty confident it would be less than half that figure there, and it might even be more like a quarter of it. It's getting really speculative. And although these things are not complicated to do with a spreadsheet, to try to do them in my head, I can't give you a more precise answer that than.

Q. I'm not trying to be unfair to you, I'm just looking for a ball park, and maybe I'm being unfair to ask for a ball park. You said maybe a fourth--I don't want to mischaracterize what you said.

A. Although some things surprise me sometimes when I run it through a spreadsheet and take into account all the taxation and inflation considerations, you know, looking at it here, I'm pretty confident it would be less than half of that $65,000, and I'm fairly confident, you know, somewhere--a quarter of that $65,000 figure is in the ball park, so to speak.

But, once again, it's something easy, relatively, to do in a spreadsheet, at least for me, at least, but hard for me sitting here on the stand in my head.

Q. I understand. I think you've done very well, I just wanted to get a ball park.

I do want to confirm one thing. Does your economic benefit analysis, it does take into account the lost income, the fact that--I need to clarify better. I mean for lost income, first of all, when Mr. Vos reduced to less than a thousand head, you stopped your delayed cost analysis at that point; right?

A. I stopped the irrigation costs that were being--the irrigation repair cost being incurred each year.

Q. Okay. All right. Let's take the scenario if Mr. Vos never builds, never constructs anything, and he would--to do that and not have the EPA on his door constantly, he would have to be at less than a thousand head to do that. Does your model take that into account, if he never constructs--and your number is much higher if he never constructs--he must stay under a thousand head to be in compliance, does your model take that into account?

A. I did not have sufficient information to do that. If the feedlot was to forever stay under a thousand, then I would need to have information on what level it was at before, and then detailed information on the incremental costs and incremental revenue, and, therefore, incremental profit associated with the additional head. And I know I just said "incremental" three times in a row, but it's an important distinction because the concern is not the overall profit level, but that profit associated just with those incrementals, those additional head of cattle.

So it requires a lot more information to do

that than what I have here. Not just a different type of information, but a lot more information because I need to know what costs are fixed costs; in other words, they don't vary depending on the number of head, and the same thing with revenues. Sometimes it's hard to split those things out.

So as an example, this type of analysis--recently I was looking at an asphalt plant, a lot different, I know, than raising cattle. But the issue there was the company had exceeded its permit limit and produced more than it should have. So I had very detailed information on each facility for each month's production, breaking out costs. So I was able to identify which costs were proportional to the level of production. I could scale those back accordingly, and then figure out what the revenue had been on a per time basis. That's an example of how that kind of calculation would work.

Q. I want to make sure I understand. Under your analysis, if he does not build--of course that's much higher, the economic benefit. And does that assume that he will return to production at over a thousand head, if he does not build?

A. It's not taking into account the distinction between that. I mentioned in the report on page--the

top of page 5 I have a reference to that. So--I mean, alternatively the economic benefit can be done by saying that back in 2002 the head count should have been reduced to that, and then information we need, not just current information, but going back in time as to how cost and revenues varied and were linked to the head count.

Q. I need one clarification here. Again, you've stopped some of your calculation, anyway, at February 19th, 2007, when he reduced to less than a thousand head; right?

A. That's correct.

Q. And what I'm not quite following, and you might have explained it, but you may have to lead me through it again, is why does the cost, if he never constructs, go up so much if that is the date he came into compliance, and if he stayed at that date? Are you telling me that's the information you don't have?

A. I'm sorry. I just wasn't quite following you. You might have said that fine.

Q. Probably the way I asked the question. In your analysis you've stopped--I'm using the term "stopped"--some of the economic benefit on February 19th of 2007, when he reduced to less than a thousand head, which brought him into compliance; right?

A. Right. Into legal compliance, right.

Q. You stopped some of your economic benefit--the economic benefit he received, that stopped as of that date, some of it; right?

A. Right. I'm stopping the avoided costs for the irrigation system repair rate.

Q. The other costs continued?

A. Right. The delayed cost is not modelled as being incurred until the end of this year.

Q. What I'm not--maybe you've answered it. I want you to help me confirm that. Maybe if--with that date in mind, and if he never constructs and stays below a thousand head, I'm having trouble understanding why the benefit is so high. Is that the information you don't have that you say you need?

A. Well, if you're saying that he's never going to instruct--construct, but is going to permanently stay below a thousand head, then that becomes the more accurate compliance scenario. And although this can be used as a proxy for it, I would want to know what the incremental profit was associated with those additional head of cattle that essentially should have been foregone over the entire noncompliance period, and that would probably be a better measure of the economic benefit.

Q. And so those numbers aren't here?

A. I lack--I love doing these calculations, but I don't know what the exact head count was over time. And although it's possible to look up average figures for profit per cattle, you know, something like that varies so much from feedlot to feedlot.

Q. I understand. Let's turn to the scenario if he does construct. He's at less than a thousand head right now, and your analysis here, does it assume that he stays at a thousand head until December 31, 2008, and then constructs?

A. Essentially, yes.

MR. McAFEE: Okay. I don't have any further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Thank you.

Mr. Ryan?

REDIRECT EXAMINATION

BY MR. RYAN:

Q. On that last theme of head count, I believe you testified that in order to do a proper analysis for staying in compliance by remaining forever under one thousand head, you'd have to look at the per head profit for the entire period of noncompliance. Is that what you stated?

A. The incremental--I know I keep using that

word, but it's very important. Not just taking the total profit for the feedlot and dividing by the number of head, but looking at the profit, the incremental profit that's gained from how many head put the feedlot over the thousand head limit.

Q. So, for example, if the lot had 2,000--to pick round numbers, the lot had 2,000 head over the last five years, and now has 1,000 head that reduced--so they're producing 1,000 head less. And let's assume for this hypothetical that the profit per head is $100, just to pick a round number. That will be $20,000--that would be reduced by 1,000 head times $100 per head, that would be $20,000 per year reduced profit. Is that a fair analysis--way to look at it?

A. I think you multiply a hundred dollars times--

Q. Two thousand--one thousand, excuse me. I'm a lawyer, I don't know math.

A. That's okay.

Q. $100 per head times 1,000 head would be a hundred thousand dollars.

A. Right. A hundred dollars per head times a thousand head, $100,000, depending upon--I don't exactly know what the production cycle, so to speak, is for rearing a calf and bringing it to slaughter, but that would need to be accounted for, too.

Q. So let's assume there is one production cycle per year. If there are two production cycle per year, it would be double that. So let's assume one each year. For the last five years the feedlot owner is producing 1,000 less head in order to stay under the limit. So that would be $100,000 a year for five years. So would that be $500,000 in profit that he made but he should not have made over the last five years?

A. Roughly speaking, $500,000 in profit, and then we have to go through that--basically that same exercise we went through earlier, with the one dollar in avoided costs, except here it's profit that has to be converted to after-tax basis and then brought forward at the same time value of money. So first it gets smaller, and then it gets bigger.

So in this--in the scenario you've described there, complying by permanently staying under that limit, is far more costly than implementing control--environmental control measures.

Q. And we would have to look at the profit that he did in fact gain over the last five years in looking forward to this noncompliant scenario of permanently staying under a thousand head; is that correct?

A. Going out into the future, that's not

something that was done improperly, so we're just looking at the noncompliance period.

Q. Right. Now, on cross you were asked about the 2006 costs that were in Exhibit 32, and that was the Iowa State beef cattle study that we talked about. You used the number 215,000, and you were asked if that number were bigger--let's assume for sake of argument that $215,000 underestimates how much Mr. Vos would have spent five years ago to come into compliance, or in 1991, for that matter. If you were asked if that number was bigger, what effect would that have on the overall economic benefit? Can you briefly summarize what would happen if that number grew?

Let's assume, for sake of argument, that Mr. Vos couldn't have done this for $215,000 in 2006 dollars. Let's assume it cost him $300,000. What effect would that have?

A. Basically it's proportional to the relationship between those two numbers. So, in other words, to keep it a little bit more simple, if that 215, if, say, that Iowa feedlot had been redrafted and focused--and the Iowa Manual had been redrafted to focus specifically on this feedlot and they decided it was $430,000, exactly twice as much, then

the economic benefit would be exactly twice as much.

Earlier I was asked to perform some numbers in my head, which is hard to do. But when we're just talking about all the compliance cost figures increasing by a certain percentage, the economic benefit increases by the same percentage.

Q. If this $215,000 is low by 30 percent, would the ultimate economic benefit be low by 30 percent, roughly speaking?

A. That's correct.

MR. RYAN: I have no further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Okay. Mr. McAfee, anything?

MR. McAFEE: I believe just one question.

RECROSS EXAMINATION

BY MR. McAFEE:

Q. Did I hear you correctly-- I believe you made the statement, in response to a question from Mr. Ryan about staying under a thousand head, something about it would be far more costly than building the structures. Did I hear that right, or did I misunderstand you?

A. That was under the scenario where the incremental profit per head is $100. And what I

meant by "costly" was foregone profit. So I'm kind of talking economic speech there. The concept of opportunity cost.

So if there's an action that a company has to take that even if it doesn't require writing a check to someone in the form of a cost, it reduces profit, then that's what I meant by more costly.

Q. Did I understand that correctly, staying under a thousand head would be far more costly to Mr. Vos than building the structures? Is that what you meant?

A. If it was $100 per head and you had one full cycle of cattle each year.

MR. McAFEE: I just wanted to make sure I understood. Thank you. I have no further questions.

MR. RYAN: I have one more question.

FURTHER REDIRECT EXAMINATION

BY MR. RYAN:

Q. If it were more costly, this hypothetical $500,000 to Mr. Vos, would that result in a larger economic benefit, or a smaller economic benefit?

A. That's what I meant by more costly. In terms of the economic benefit, the foregone profit would be much higher.

In other words, when I say there's an

economic benefit, X amount of dollars, even based upon avoided and delayed pollution control costs, that's essentially saying that's what the cost of compliance ultimately is by complying on time, it's that economic benefit.

So here, if reducing the head count would have entailed foregoing that much profit, it's more costly in that sense; and, therefore, what I mean by that is the economic benefit is, therefore, much higher.

MR. RYAN: I have no further questions, Your Honor.

MR. McAFEE: I have no further questions, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: Okay. Thank you for your testimony.

(Witness excused.)

THE ADMINISTRATIVE LAW JUDGE: We'll take a five-minute break. Then the next witness will be?

MR. BREEDLOVE: Bryan Hayes from the Iowa Department of Natural Resources will be our next witness.

THE ADMINISTRATIVE LAW JUDGE: Okay. See you back in five minutes.

(Short recess.)

THE ADMINISTRATIVE LAW JUDGE: We'll go back on the record.

Go ahead, Mr. Breedlove.

MR. BREEDLOVE: The Environmental Protection Agency calls Bryan Hayes with the Iowa Department of Natural Resources.

THE ADMINISTRATIVE LAW JUDGE: Okay. Hi, Mr. Hayes. Raise your right hand, please.

BRYAN THOMAS HAYES,

called as a witness by the Complainant, being first duly sworn by the Administrative Law Judge, was examined and testified as follows:

THE ADMINISTRATIVE LAW JUDGE: Okay. What we'd like you to do is state your name and spell it for the court reporter.

THE WITNESS: Bryan Thomas Hayes; B-r-y-a-n, T-h-o-m-a-s, H-a-y-e-s.

THE ADMINISTRATIVE LAW JUDGE: Okay, Mr. Breedlove.

MR. BREEDLOVE: Thank you, Your Honor.

DIRECT EXAMINATION

BY MR. BREEDLOVE:

Q. Mr. Hayes, can you please provide us with your educational background.

A. I graduated from Iowa State University in

the fall of 1985 with a bachelor of science degree in fish and wildlife biology.

Q. And who do you work for?

A. I work for the Iowa Department of Natural Resources.

Q. How long have you worked for IDNR?

A. For 21 years.

Q. What area of IDNR--within what area of IDNR do you work for?

A. I work for the fishery section.

Q. How long have you worked for the fishery section?

A. For 21 years.

Q. What is your current position?

A. I'm a fishery biologist.

Q. How long have you been in this position?

A. For nine years.

Q. Previous to your current position?

A. I was a natural resources technician for 12 years.

Q. And prior to that?

A. Prior to that I'd worked some seasonal positions while attending college.

Q. What are your duties in your current position?

A. I cover a ten-county area managing fish populations in the waters of the state.

Q. And what type of work did you do in your previous positions?

A. As a natural resources technician, also worked in--on managing fish populations, but maybe not necessarily in a leadership role. In the fishery section we tend to work in two-person teams, a biologist and a technician. So...

Q. In your current position, what are your typical duties? What do you do?

A. Manage fish populations in public waters. This involves lakes, streams, rivers. It involves a whole host of things. It can involve stocking fish, when needed. We do monitor some water quality, we work to improve water quality. We do a lot of public relations work, promoting fishing.

So it can involve a whole host of things. But what we're getting at is trying to provide the best fishery resources we can for the people in the State of Iowa.

Q. Your duties include assessing streams?

A. Yes, it does.

Q. What's involved in assessing a stream?

A. Well, we go out and sample streams. We've

been inventorying streams a number of years in Iowa trying to find out what's in them. A lot of these streams have not been inventoried for 25 years. And by an inventory, I mean we go out and look and see what kind of species are there and at what abundance.

We also do some physical habitat measurements just to provide some, you know, current data on what the habitat is like so if they repeat this in another 25 years, we can look and see what's changed.

Q. Have you ever performed any investigations following up on fish kills?

A. Yes, I have.

Q. What's--how many fish kills have you responded to?

A. Oh, probably 25, or so.

Q. Do you also perform routine investigations looking at diversity and populations of streams?

A. Yes, I have. In the 21 years I've probably done 200 of those.

Q. Have most of those stream assessments been on Iowa streams?

A. All of them have been.

Q. And, typically, what type of streams are you assessing? Large? Small? Please describe what you

typically work on.

A. We call them HUC 12 streams.

THE ADMINISTRATIVE LAW JUDGE: What are they called, sir?

THE WITNESS: HUC 12. That's hydrologic unit code, H-U-C.

THE ADMINISTRATIVE LAW JUDGE: Thank you.

A. The whole country's divided up into regions, and then subdivided again, and subdivided again. And eventually you get down to this hydrologic unit code. And a HUC 12 is a small enough stream that it's wadeable, is what we're looking at. We're looking for streams we can wade in, we don't need a boat, we don't need a barge. So HUC 12s are wadeable streams in Iowa--well, they're all across the state.

A HUC 12, there's an individual number associated with that watershed, so anybody in the country can see that code and determine which watershed you are in and whether it drained to the Missouri River or the Mississippi, and that kind of thing. So we sample small wadeable streams.

BY MR. BREEDLOVE:

Q. Of the 200, or so, stream assessments that you've performed, what percentage would you say are on small wadeable streams?

A. Probably about 80 percent of them, I would say. I have done, you know, survey work on larger rivers and nonwadeable streams.

Q. But the majority of your work is on small--

A. The majority of the stream work has been in wadeable streams, the smaller HUC 12 streams.

Q. Have you ever testified before?

A. No, I haven't.

Q. How's it going? Are you all right?

A. It's fine.

MR. BREEDLOVE: Your Honor, at this time I would like to move to qualify Mr. Hayes as an expert in stream assessments of aquatic life in Iowa streams.

MR. McAFEE: No objection, Your Honor.

THE ADMINISTRATIVE LAW JUDGE: He's designated. By the way, because I wasn't paying as close attention as I should have, you said "wadeable." They can wade in and not be above X number of feet? What's the definition of wadeable?

THE WITNESS: We put on chest waders, and we won't find water deeper than our chest waders. So...

THE ADMINISTRATIVE LAW JUDGE: Okay. Thanks.

MR. BREEDLOVE: Your Honor, can I get my

glass of water?

THE ADMINISTRATIVE LAW JUDGE: Sure.

BY MR. BREEDLOVE:

Q. MR. Hayes, are you familiar with Elliot Creek?

A. Yes, I am.

Q. Are you familiar with the unnamed tributary that feeds into Elliot Creek on Mr. Vos' feedlot?

A. Yes.

Q. How are you familiar with that stream?

A. I did some fishery survey work there this past August, August 5th, to be exact, 2008.

Q. So what sort of work did you do on that stream?

A. We went in there and sampled fish in three 500-foot segments of Elliot Creek, two of them in Elliot Creek, and one in the unnamed tributary.

MR. BREEDLOVE: Your Honor, I'd like to use the LitePro so we can go ahead and designate where he sampled.

THE ADMINISTRATIVE LAW JUDGE: Sure.

MR. BREEDLOVE: Mr. Pollard, can you turn that on for me?

Your Honor, I have Complainant's Exhibit 43-C--or 43-A. I'm just wondering where I should--

MR. RYAN: Put it up with the other exhibits.

BY MR. BREEDLOVE:

Q. Mr. Hayes, when this warms up, with the Judge's permission, we can mark it up.

THE ADMINISTRATIVE LAW JUDGE: When he tells you to go up there, he'll tell you to mark on it.

MR. BREEDLOVE: Your Honor, may he approach?

THE ADMINISTRATIVE LAW JUDGE: Yes. Absolutely.

Go ahead, Mr. Hayes.

BY MR. BREEDLOVE:

Q. So, Mr. Hayes, when did you perform this assessment?

A. August 5th, 2008.

Q. This was on Elliot Creek, and an unnamed tributary to Elliot Creek?

A. Yes.

Q. Was water present in Elliot Creek when you were there?

A. Yes, it was.

Q. Was it present in the unnamed tributary?

A. It was present and flowing.

Q. On the map you have in front of you, could you please designate the section of the stream that

you sampled on Elliot Creek?

A. We sampled a 500-foot segment in this region, and then--

Q. Yeah, if you could go ahead and mark right on there.

A. Sample one?

Q. Lower.

A. Lower Elliot.

THE ADMINISTRATIVE LAW JUDGE: While he's doing this, Mr. Breedlove, I know this is going to be a separate numbered exhibit, but I assume that this is also in the exhibit book. You want to give me a number?

MR. BREEDLOVE: Yes, Your Honor. I believe it's Complainant's Exhibit No. 6. We've used this document to mark up before, and if I recall, we're on Complainant's Exhibit 51 at this point--

MR. RYAN: 53. 51 and 52 were not admitted.

MR. BREEDLOVE: Complainant's Exhibit 53.

THE ADMINISTRATIVE LAW JUDGE: For now this would be 6?

MR. BREEDLOVE: That's correct, Your Honor. That would be not 6 Pollard, it would be the unmarked version.

THE ADMINISTRATIVE LAW JUDGE: Okay.

MR. BREEDLOVE: Let the record reflect Mr. Hayes has placed three designations on the map that will be Complainant's Exhibit 53, one mark locating the lower Elliot Creek portion that he sampled, another marking the upper Elliot Creek section that he sampled, and also a section for the unnamed tributary.

Can you see okay, Eldon?

MR. McAFEE: Yes.

BY MR. BREEDLOVE:

Q. Mr. Hayes, I'd like you to tell me a little bit about this sampling trip. What all is involved with your sampling? What is your protocol?

A. We have a standard sampling procedure that we follow. This was set up in 2005. It was based on some work that our Water Resources Section was doing, and in 2005 we standardized so everybody across the state was doing their stream samples the same.

So we followed our standard stream protocols. Those protocols call for doing a minimum 500 feet. If it's a bigger stream, you do 40 stream widths. You take a stream width, multiply it by 40, and then that determines your length of sample.

So basically if the stream is less than 12 feet wide, you're going to do the minimum 500 feet,

and that's what we did in this case.

Q. On all three sections?

A. On all three sections. The sampling gear we use is a backpack electrofishing unit. This is battery-powered, carried on your back. It's got a wand that acts as a cathode, and a tail that drags in the stream that acts as an anode.

THE ADMINISTRATIVE LAW JUDGE: You're not going to tell me what I think you're going to tell me. Are you telling me you kill the fish?

THE WITNESS: It shocks them. It stuns them and allows you to capture them. We're setting up an electrical field in the stream that stuns and captures fish, and they recover from it.

THE ADMINISTRATIVE LAW JUDGE: As far as you know?

THE WITNESS: Most recover from it.

THE ADMINISTRATIVE LAW JUDGE: And they're less depressed?

THE WITNESS: We don't know that.

A. Anyway, we electrofish to collect our samples. We've got dip nets, two people walking in the stream, one carrying a bucket, the other with the backpack, collecting fish and transporting them back to a bucket to hold them in.

BY MR. BREEDLOVE:

Q. Do you block the two ends so fish don't move in or out?

A. Yes, we do. We put in a block net at the lower end of the sample, a block net at the upper end, and then we set a tub up in the middle with aeration. There's an air stone in it so when we get to about 250 feet, we can empty our buckets, and then continue and finish with the 500-foot sample.

Q. Without harming the fish?

A. You can't hold them in a bucket forever. So we're sampling a 500-foot stretch, we're looking at the species present, the number of fish species present, and also the number--the abundance of each of those species.

Q. Did you do the same sampling--did you implement the same sampling protocol for each of the three sections?

A. Yes, I did.

Q. Let's dive right in. Let's talk about what you found on lower Elliot Creek.

A. On lower Elliot Creek in the 500-foot sample we captured 17 fish. 12 of them are fathead minnows, and the rest were creek chubs.

THE ADMINISTRATIVE LAW JUDGE: Creek what?

THE WITNESS: Creek chubs.

A. So we saw two species and 17 fish.

BY MR. BREEDLOVE:

Q. What were you expecting to find?

A. Well, typically we see upward around 200 fish in a 500-foot segment. In that Elliot Creek, that lower Elliot Creek, we got through the first 100 feet of it and hadn't picked up a fish yet. And so we started looking at our gear. Is our backpack shocker working? And there's meters on it that record volts and amps. If you're not picking any fish up--and typically you know right away your gear's working, you're collecting fish. But the gear was working properly, we were putting out the targeted volts and amps, we just weren't seeing very many fish.

Q. How did what you found in this stream compare to what you--compared to the 200 sampling events you've taken part in?

A. This stream was very low in diversity with only two species, and very low in abundance. We, as I said, we typically see around 200 fish in a 500-foot segment.

There was some sampling work done in the northwest part of the state on these HUC 12s that

represents 34 streams in northwest Iowa, and the range from those 34 streams, I think the low end was 166 fish in a 500-foot segment. On the upper end of one of those HUC 12 samples from northwest Iowa was well over 2,000.

Q. Now, the sampling that you're referencing of the northwest studies, is that the Northwest Fisheries--Stream Fishery Index, 2006 and 2007?

A. Yes.

Q. That's Complainant's Exhibits 44 and 45. Would you like to take a look at those?

A. Yes, that's what I was referring to was those assessments.

Q. So how many streams in those two exhibits, in the 2006 and 2007 fisheries inventory, how many streams did they survey?

A. These documents represent 34 streams in northwest Iowa. And as I said, there's a range of abundance from 160 fish up to 2,000. The number of species, the fewest species they found in one of these surveys was six, and the most was 21.

Q. And how many did you find in Elliot Creek?

A. Two.

Q. How many fish--what was on the low end of the fisheries index, the number of fish that had been

identified?

THE ADMINISTRATIVE LAW JUDGE: Species you mean? Six he said.

MR. BREEDLOVE: The population, the population found in the 2006-2007 inventories.

A. The low end was 166.

BY MR. BREEDLOVE:

Q. You found--

A. Two.

Q. --two species? How many number did you find?

A. Oh, excuse me. 17.

Q. Seventeen? Now, the streams that are investigated as a part of these inventories, are they comparable to Elliot Creek?

A. Yes, they are. They're HUC 12 streams.

Q. Okay. So they're wadeable, fishable?

A. They're wadeables.

Q. Excuse me. Wadeables.

Now let's move on to discuss the upper Elliot Creek survey you did. Now, what did you find there?

A. Upper Elliot Creek we found similar to lower Elliot Creek. We found two species and low numbers. I think we found, like, only seven fish up there.

But one thing we did find up in the upper Elliot Creek that we did not find in the lower section was the presence of crayfish, an invertebrate. And I routinely make notes on my data sheets of things like invertebrates, because like fish, they're also an indicator of what's going on in the environment, and they indicate quality or lack of quality.

Q. So how many crayfish did you find in upper Elliot Creek?

A. We found 20.

Q. How many did you find in lower Elliot Creek?

A. We didn't find any in lower Elliot Creek.

Q. What does that indicate regarding the water quality between the two sections?

A. It indicates a difference, a difference in the water quality in the upper Elliot Creek.

Q. Now, "difference," elaborate on difference. Is it better water quality if crayfish are present?

A. The presence of crayfish in that upper stretch indicates better water quality up there. The lack of crayfish in that lower is a reflection of poor water quality.

Q. Let me ask you this, then: If the water quality is better in upper Elliot Creek, why did you not find more fish there?

A. In these--there's migration of fish in and out of these tributary streams all the time. Some of the seasonal migration, where you've got fish moving up these tributary streams in the spring--the fish use these tributary streams as nursery areas. And so they'll move up these tributary streams when flows return in the spring. The reverse is true in the fall, when the fish will move down the tributary streams into bigger tributaries or rivers over winter.

At some point in Elliot Creek, the resident fish population has been wiped out. And with the--what appears to be going on is we no longer have resident fish. And there's some--excuse me--and there's some sort of barrier to fish movement because fish are not able to move back up in there. That barrier--there's no physical barrier, like a dam, but there can be a chemical barrier if you have a stream that has poor water quality.

If the stream is polluted, it will act as a chemical barrier. The species of fish we found in there, the creek chub, they're the most tolerant species we have. They're the most widely distributed and most tolerant.

Flathead minnows are used as bait fish

because they can live in a bait bucket, where a shiner and other fish like that will quickly die in a bait bucket. Fathead minnows are the toughest fish and we find them in a lot of different places. You'll find them in some of the worse water quality, where other fish can't live.

So we had two tolerant species in here, and those fish are barely hanging on, they're barely making it in there.

Q. Why do you feel they're barely hanging on?

A. We saw no evidence of any reproduction. The creek chubs were all the same size. There's no small creek chubs. The fathead minnows were all, basically, you know, adult fathead minnows.

So no evidence of reproduction, very low numbers, and that upper Elliot Creek, I think there's a barrier to fish movement, that the water--the fish are not able to move into there and repopulate Elliot Creek.

Q. So you've stated that there doesn't appear to be any sort of physical barrier. So is it your opinion there is some sort of chemical barrier preventing higher populations and higher diversity in upper Elliot Creek?

A. Yes.

Q. Is it possible that there is contamination coming from upper Elliot Creek that's causing this?

A. Well, the presence of crayfish in upper Elliot Creek is a good sign that it's not coming from up there.

Q. Let me ask you this-- Let's go ahead and move on and talk a little bit about what you found in the unnamed tributary. What did you find in that investigation?

A. In the unnamed tributary we found no fish.

Q. Did that surprise you?

A. And no crayfish. Yeah, that surprised me. It's smaller than the main Elliot Creek, but I've sampled fish in streams that size many times.

Q. Was there habitat?

A. Yes, there was enough depth and enough flow. And by depth, you know, if you've got water up close to your knees and flow, there should be fish there.

Q. You spoke a little bit about time of year. How would this time of year--you sampled in August; is that correct?

A. Yes.

Q. So August--you said fish migrate up and down. What would you expect in August? Is that a low number or a high number, your expectation?

A. That should be the high point of the season. We do our sample in July and August because that's when the fish are up in these tributary streams. Typically there's reproduction going on, and it should be a high point in the season.

Q. Well, let me ask you this: Is there any chance there was some kind of one-time release that would have killed--would have taken out most of the fish you found there? Is there something like an acute toxic event that might explain what you saw?

A. The fish population that I sampled in Elliot Creek looks more like chronic, which is ongoing, it's been there. When an acute--when there's a fish kill caused by an acute event, one-time, there's a pollutant released into the water and it kills fish, the fish, within months, start repopulating that area, they start moving back in.

The Iowa DNR did a study a few years ago about fish kill in streams, and the response of the fish after those kills, looking at things like recovery time. And what they found was an acute fish kill will cause a void in the fish population. You kill off some of the fish, or all of the fish in a segment, in a kill zone, it causes a void in the population. The fish response to that void is once

the pollutant's removed, is they'll start repopulating that area.

THE ADMINISTRATIVE LAW JUDGE: From further downstream? They'll move back up?

THE WITNESS: They migrate back up from refuge sites, and that happens within months, once that pollutant is removed.

A. When we did that study--

BY MR. BREEDLOVE:

Q. What study are you referencing?

A. The response to fish kill study done by the Iowa DNR.

Q. Is this the Stream Fish Kill Follow-Up Assessment?

A. Yes.

Q. Complainant's Exhibit 49?

A. Is that in here?

Q. I believe 49--

MR. BREEDLOVE: May I approach?

THE ADMINISTRATIVE LAW JUDGE: Yes.

MR. BREEDLOVE: I just made a liar out of myself.

THE ADMINISTRATIVE LAW JUDGE: We don't want to have that on the record.

MR. BREEDLOVE: Here you are, Mr. Hayes.

It's in this book.

Would you like a glass of water?

THE WITNESS: I've got one there. Thank you.

BY MR. BREEDLOVE:

Q. So what did that fish kill follow-up study tell you?

A. A couple things I get from this study is, one, that fish populations will recover fairly rapidly after an acute event, within months, and it's kind of Mother Nature's way to fill a void in a population.

Also what they found in this study was that the stream that's in that recovery phase, the numbers within that kill zone actually oftentimes are higher than outside of it. Part of that is because there's been fish migrating into that, but there's also, you know--you create that void, and Mother Nature's response is to fill that void. So they actually oftentimes find higher numbers within a kill zone after the pollutant's removed than outside of it.

THE ADMINISTRATIVE LAW JUDGE: What's the exhibit number, Mr. Breedlove?

MR. BREEDLOVE: I believe it was 49.

THE ADMINISTRATIVE LAW JUDGE: Oh, it was

49.

THE WITNESS: It just wasn't in the book we were looking at.

BY MR. BREEDLOVE:

Q. Mr. Hayes, let's focus back on the map you had marked. If there had been some sort of recent event that killed the fish in, say, the unnamed tributary, would you have seen greater numbers in the upper Elliot Creek section? Would that have acted as a--what was the term you used earlier?

A. A refuge?

Q. A refuge.

A. Could you repeat the question?

Q. If there had been some sort of release, say, throwing out other--hypothetically, other contaminants, say ammonia, or something, would you have seen some sort of release--or threshold up in Elliot Creek? Would you have expected to see more fish? Would there have been refuge areas?

A. Yes. That upper Elliot Creek--if there had been a one-time release come down that unnamed tributary, that upper Elliot Creek would act like a refuge.

Q. Would the lack of numbers in upper Elliot Creek indicate to you that there hasn't been some

sort of acute release of something in the unnamed tributary?

A. The lack of numbers kind of points, again, to the chronic problem. The lack of diversity, only seeing creek chubs and fathead minnows, and the low abundance, that points to a chronic problem that's been there and ongoing.

There's a void in the fish population in Elliot Creek. I mean, there's room for more fish there and more species. Like--we almost always see white suckers, sand shiners, and back to these northwest Iowa stream inventories, white suckers were in 33 of the 34 streams surveyed, that these documents represent. Sand shiners are common in our samples. There's a void in the fish population in Elliot Creek, but there's been no opportunity for fish to repopulate that, that's why I think we saw low numbers above that.

Q. Does the presence of the crayfish eliminate the upper Elliot reach as a source of this chronic contamination?

A. The presence of crayfish indicates we have better water up there. The presence of crayfish in that upper Elliot Creek, and the lack of fish in that unnamed tributary, kind of points to that unnamed

tributary as the source of the pollutant.

Q. Is it possible--there's agricultural row crops all around these streams. Is it possible it's the cropland that's causing this?

A. We considered that, but you can't hardly find a watershed in Iowa that doesn't--or a stream in Iowa that doesn't have row crop, agriculture, adjacent to it.

Q. Do the streams in the two inventories, the 2006 and 2007 inventory, the HUC 12 streams studied in that, did they have row crops around them as well?

A. Yes, and I'll point to the 2005-2006. If you look at page 7--or page 6, excuse me--and this is from the Black Hawk Fish Management. And I can read this top--the top of page 6. It says--

THE ADMINISTRATIVE LAW JUDGE: Which exhibit are you on, sir?

THE WITNESS: I'm on the Stream Fish Inventory, Exhibit 46.

THE ADMINISTRATIVE LAW JUDGE: Exhibit 46. Okay.

THE WITNESS: The Stream Fish Inventory from the Northwest Fish Management District, July 2005 and September 2006.

BY MR. BREEDLOVE:

Q. Is that 45, Mr. Hayes? Is that 45? Check the front page.

A. Exhibit 44, excuse me.

MR. McAFEE: Excuse me. What page again?

THE WITNESS: Exhibit 44, page 6.

A. And if you read that top sentence, "All sites were characterized by bands of non-woody vegetation surrounded by row crop fields and low flows." So to answer your question, the streams in these assessments, Exhibits 44 and 45, have row crop agriculture adjacent to them. Nearly all the 200 streams I've sampled, you know, in Iowa have row crop agriculture adjacent to them.

BY MR. BREEDLOVE:

Q. Mr. Hayes, have you had an opportunity to look at what's up the unnamed tributary further upstream? You're aware Mr. Vos' feedlot is up there?

A. I've looked at aerial photos of the entire watershed there.

Q. What is your opinion as to the most likely cause of the low fish numbers and low diversity in Elliot Creek and the unnamed tributary?

A. The most likely source is that feedlot, is Lowell Vos' feedlot.

Q. Just a couple more questions, Mr. Hayes. What contaminants are present in feedlot runoff that impact fish and water quality?

A. Well, number one it's ammonia. Ammonia is very toxic to fish and it kills fish.

Q. What impact does the organic matter have?

A. Organic matter coming off the feedlot, the manure itself, can raise nutrient levels. The organic matter can put a demand on your oxygen and cause a fish kill by losing the oxygen in the stream. But usually coming off a feedlot it's the ammonia that kills the fish.

Q. Now, would it surprise you--this is the last question. Would it surprise you that at some times you might find minnows or chubs somewhere along the reach in the unnamed tributary?

A. No, it wouldn't. Those fish are migratory. They could easily move up there if they had the opportunity. We didn't find any of that in the unnamed tributary the day I was there sampling.

MR. BREEDLOVE: Okay. No further questions, Your Honor.

Thank you, Mr. Hayes.

THE ADMINISTRATIVE LAW JUDGE: Okay. Ready, Mr. McAfee?

MR. McAFEE: Your Honor, may we go off the record for a second?

THE ADMINISTRATIVE LAW JUDGE: Sure. Go off the record.

(Discussion off the record.)

THE ADMINISTRATIVE LAW JUDGE: Back on the record. Let me just note that pursuant to an off-the-record discussion, I ruled that I'm going to give Mr. McAfee some time to better prepare for cross-examination based on some information that he was not fully aware of and first heard of today relative to fish populations and the impact, according to this witness, of flow from Lowell Vos' feedlot. He's going to have this very brief opportunity--it's not a big inconvenience today because we're near the end of the day anyway. It's almost a quarter to 5 p.m.

So we'll begin tomorrow morning. I won't be five minutes late, as far as I can tell you right now. I'll try to be a little earlier, if possible. There's some other things I have to do before I get here, but we'll start sharp.

MR. RYAN: At 9:30, Your Honor?

THE ADMINISTRATIVE LAW JUDGE: Yes. All right?

MR. McAFEE: Yes.

THE ADMINISTRATIVE LAW JUDGE: All right. Thank you. Have a good evening.

By the way, I have to tell you, pursuant to what I tell all these witnesses, you're not to talk about your testimony with anyone, all right? And you'll be under oath tomorrow morning, and we'll try to get you done as soon as reasonably possible.

THE WITNESS: Thank you.

THE ADMINISTRATIVE LAW JUDGE: Thanks.

MR. BREEDLOVE: Your Honor, are we still on the record?

THE ADMINISTRATIVE LAW JUDGE: Yes, we are.

MR. BREEDLOVE: I believe I erred to move Complainant's exhibit into the record, I'm not sure if I did that. I'd like to make that motion now.

THE ADMINISTRATIVE LAW JUDGE: What number is this going to be? We had Mr. Ryan with two numbers we are not--we lost the sequence. So what is it now?

MR. BREEDLOVE: I believe it's 53, Your Honor, Complainant's Exhibit 53.

THE ADMINISTRATIVE LAW JUDGE: Yes, Mr. Ryan?

MR. RYAN: Yes.

THE ADMINISTRATIVE LAW JUDGE: Any objection?

MR. McAFEE: No objection.

THE ADMINISTRATIVE LAW JUDGE: Complainant's Exhibit 53 is admitted.

(Complainant's Exhibit 53 was received in evidence.)

THE ADMINISTRATIVE LAW JUDGE: Anything else before we call it a night?

(No response.)

THE ADMINISTRATIVE LAW JUDGE: Good. Have a nice evening. We'll see you tomorrow morning.

We'll go off the record.

(Recess at 4:45 p.m., until 9:30 a.m., Thursday, September 18, 2008.)

C E R T I F I C A T E

I, the undersigned, a Certified Shorthand Reporter of the State of Iowa, do hereby certify that I acted as the official court reporter at the hearing in the above-entitled matter at the time and place indicated;

That I took in shorthand all of the proceedings had at the said time and place and that said shorthand notes were reduced to typewriting under my direction and supervision, and that the foregoing typewritten pages are a full and complete transcript of the shorthand notes so taken.

Dated at Des Moines, Iowa, this 26th day of September, 2008.

Theresa Kaked

CERTIFIED SHORTHAND REPORTER