NORTH CAROLINA DEPARTMENT OF INSURANCE
RALEIGH, NORTH CAROLINA

STATE OF NORTH CAROLINA
COUNTY OF WAKE

BEFORE THE COMMISSIONER OF INSURANCE

IN THE MATTER OF:

THE FILING DATED JANUARY 3, 2024 BY NORTH CAROLINA RATE BUREAU FOR THE REVISION OF HOMEOWNERS INSURANCE RATES

COPY

Docket No. 2157

BEFORE: AMY FUNDERBURK, HEARING OFFICER

TRANSCRIPT

OF

HEARING

VOLUME V - A.M. SESSION

Raleigh, North Carolina

October 11, 2024

9:00 a.m.

A P P E A R A N C E S:

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Hearing in the matter of the filing dated January 3, 2024 by the North Carolina Rate Bureau for revised homeowners' insurance rates, at the North Carolina Department of Insurance, 3200 Beechleaf Court, Raleigh, North Carolina, on the 11th of October, 2024, at 9:00 a.m., before Renee M. Habrack, RPR, and Notary Public.

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P R O C E E D I N G S,

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MS. FUNDERBURK: Good morning, everyone.

AUDIENCE: Good morning, Your Honor.

MS. FUNDERBURK: Today is Friday, October 11th. Before we get started, there were a couple things I wanted mention to counsel.

The first is there will be a few issues that I expect I'm going to ask you to brief, and I will be honest, I haven't fully fleshed out exactly what those -- the question is going to look like. But topically there's been some discussion about -- and disagreement about controlling law, the 2014 order versus the Court of Appeals' decision, which I think was actually handed down in 2015 on the 2014 case. I expect I will ask for some briefing on the parties' allegations as to controlling law. I haven't heard anybody mention 1999 Supreme Court yet. I have a feeling it may come up. But just be aware the controlling law issue will be something that I anticipate asking you to brief.

MR. FRIEDMAN: Can I ask, ma'am, one clarification? By 1999 Supreme Court, is that -- that's the decision by the Supreme Court regarding 1996 auto you're referring to? I guess that's technically, when 1996 auto made it up --

MS. FUNDERBURK: Okay.

MR. FRIEDMAN: -- just so I can get my own frame of reference.

MS. FUNDERBURK: I can get the citation for you. But, again, it sounds like the biggest issue is the 2014 order of the Commissioner and it's precedential value and what exactly was addressed in the Court of Appeals' opinion and what may be controlling, and it sounds like there's some dispute amongst the parties as to what exactly is controlling law. I will flesh that question out as we get further in the hearing, but I know that you all have had a lot going on, and I wanted give you a heads up as soon as I could. It may be that the Supreme Court opinion doesn't come into play, but certainly the 2014 order and the subsequent Court of Appeals' opinion are at issue. So, I wanted put that on your radar.

MR. BEVERLY: If it please the Court, Your Honor, do you have an idea now of the timing that you will request that to be tendered to you?

MS. FUNDERBURK: I don't. I had a little bit of an opportunity last night to start going over some of my notes and making some notes for myself on what I thought I would need. And that was one of the issues that I had identified.

Also -- and I will apologize. I had my notes up and it looks like I had a little bit of a computer crash, so it didn't save exactly what I had retyped. There were some changes in the deviation rate, I believe, that were identified over the years in 2014. There was a deviation of 5 percent, I believe, identified, and then in subsequent filings there was a zero deviation. And that is something I'm going to need to get some clarity on.

MR. SPIVEY: Essentially the history about that?

MS. FUNDERBURK: What's the history, maybe over the last ten years, what's the history of the deviation that has been requested. That would be helpful for me to know. And I'm clearing my throat, but so far I have avoided whatever is making the rest of you sneeze, so I'm going to hold on to that.

I believe it was Mr. Anderson that had also mentioned consent to rate, and I believe he mentioned -- and I'd have to go back and look at the transcript, the current -- currently 54 percent, I believe, and, again, I don't have the notes in front of me now, but I believe he said 54 percent of premiums in North Carolina are on a consent to rate basis. I believe in 2014 -- and you'll have to forgive me on the percentages because it would was one of the first things I read when I was preparing the transcripts from the 2014 hearing. I believe at that time there was a statement that we were in the 30 percent range for consent to rate. I would like to know what the progression has been over about the last ten years on consent to rate.

I would also like to know what the Bureau's position is on potential changes in consent to rate should the manual rate be increased. I believe that was something Mr. Anderson addressed. I am open to how that information is presented, if that's presented via testimony of your witnesses, Mr. Anderson or otherwise, or if that's something that you would choose to brief and provide in writing to the Court. I'm flexible on how that may be submitted.

But I would like more information on how that progression has gone over the last ten years, and I would like the Bureaus's position on what impact -- what impact there may be on consent to rate should the manual rate increase. I believe Mr. Anderson mentioned there may be some data on that. And, again, I apologize, I don't have a transcript in front of me, but there may be some data that could show what that progression and change has been, and that would be helpful for me to see and review.

Are there any housekeeping matters counsel needs to address before we proceed?

MR. SPIVEY: None that I am aware of.

MR. FRIEDMAN: I was just going to say, I think we are making progress toward at least a stipulation by both parties that at least the copies of the pleadings that are in the notebooks, plus the data responses and discovery responses, are what we say they are. But I know that we produced a lot of -- we've put into the record a lot of data responses and discovery responses, but I do know that Mr. Beverly told me they are working on double-checking that those are the accurate copies.

MS. FUNDERBURK: Well, and as to data responses, Mr. Spivey, do you know where the consent to rate data came from? Where -- how was that data produced?

MR. SPIVEY: Your Honor, the consent to rate data is collected by the Department. They issue a data call to all companies. They collect the data.

They issue a report. It's public. They put it on the website, I think. So, that's where we get that data.

MR. FRIEDMAN: I guess I would -- where is -- do you re-reflect it in the filing or just state it? I mean, do you actually include a printout, for instance, of that data?

MR. SPIVEY: I don't think that we have any exhibits in the rate filing from that that I am recalling right at the moment. It's incorporated. It's within some of the numbers, like the net deviation number, things like that, but the actual data call and what's happening with consent to rate is -- that's not in the rate filing, to my knowledge.

MR. FRIEDMAN: Okay. Thank you.

MS. FUNDERBURK: And as full of information as you can provide as to how you calculated the -- or as to how Mr. Anderson may have calculated the current figures on consent to rate, and how you may calculate the trend over the years would be helpful to me. I'd like to see something that another actuary could, perhaps, look at it come to the same conclusion, if that makes sense.

Anything else we need to address before we proceed?

MR. FRIEDMAN: No, ma'am.

MS. FUNDERBURK: Okay. All right.

Ms. Mao, thank you for returning with us and coming back to the stand. I will, again, remind you that you do continue to be under oath. Mr. Friedman is going to continue his cross-examination. If you need a break, we are only planning to go until noon today, that's still three hours of testifying time, which can seem a lot longer than three hours when you're the one on the stand. So, if you need a break, just let us know. And I will probably check in in about an hour and a half to see if you need a break.

THE WITNESS: Okay. Thank you.

MS. FUNDERBURK: Thank you.

Mr. Friedman, please proceed.

MR. FRIEDMAN: Yes, ma'am.

CONTINUED CROSS-EXAMINATION

BY MR. FRIEDMAN:

Q. Ms. Mao, has you seen some of the press conferences the Bureau officials have been giving in the past couple days?

A. No, I haven't seen the press conference.

Q. Have you seen them meeting with the press?

A. I see them in the meeting, yes, but I didn't watch the news in the evening.

Q. Have you read any written articles about the hearings since when it started on Monday?

A. I remember reading one article, yes.

Q. Okay.

A. Yeah.

Q. And so, you're aware this proceeding is receiving, at least, some media attention?

A. Oh, yes, I am aware.

Q. Okay. And are you aware that the -- so far the complete transcripts of the meeting of this hearing are being placed on the internet?

A. No, I'm not aware, but thank you for letting me know.

Q. Yes. And, of course, we go back and edit those.

A. Okay.

Q. So, but I am going to refer you to -- I've placed with you a copy of yesterday's transcript from the afternoon.

A. Okay.

MR. FRIEDMAN: Can everybody see that?

Q. So, ma'am, one thing counsel does, and sometimes they involve their witnesses, when they are -- later we get a copy of this, and we have a

period within which to tell the court reporter whether what she got down was actually what they said or if there are typographical errors, et cetera, but we do have a recording also.
A. Okay.
Q. So, if you could you turn to page 710 of that testimony?
A. Is there a page number on the --
Q. I think it's on the upper right.
A. Okay. 710?
Q. Yes, ma'am.
A. Okay.
Q. So, I'm going to read some things and ask you if that's -- if that appears to be accurate based on what you said yesterday?
A. Which one?
Q. Okay. So, starting with -- on 710 with Q -- the first question, and the first answer. I am going to read that into the -- I'm going to read them paragraph by paragraph and ask you whether that's -- seems to be accurate to you, not holding you to it, but of what you said yesterday. So, I will read them in.
"Do you know if actuaries calculate the return on equity in part by considering the net income of the shareholders' equity?"

"Answer: I think I already told you. There are nine different ways to calculate return on capital and with specific context. Now that's not my major responsibility. It's irrelevant to this filing."

Are those accurate so far in your memory? I'm not asking whether your statement was accurate. I'm asking you if that is what you said yesterday.

A. That is not what I mean. It's probably what I said.

Q. It is probably what you said?

A. But it's not what I mean.

Q. I appreciate that. Now, the next two -- next question, "Does one of those nine ways include consideration of the shareholders' equity?"

"Answer: So I believe so. Yeah. One way would be."

Does that accurately reflect what you remember saying?

A. I don't remember. I don't remember exactly what I say, but if you would allow me to clarify this question, I would like to.

Q. That's not the question I'm asking you. That's for the other side's attorneys when they get to redirect you.

Next question, if you could turn to page 711.

And I'm asking about the first question, and the answer.

"Question" -- at the top of the page -- "Okay. Dr. Zanjani also -- did you hear him testify or have you reviewed his testimony that when he uses the term cost of capital, he's using it not in the actuarial sense, but as an economist?"

"Answer: If he testified, but I don't -- yeah. I'm aware you asked those questions, but my responsibility in this filing has nothing to do with the cost of capital."

Does that appear to be an accurate written statement of what you said yesterday?

A. The last sentence, yes.

Q. Is the question?

MR. SPIVEY: Are you asking her if --

MR. FRIEDMAN: I mean --

MR. SPIVEY: -- the question is what she said.

MR. FRIEDMAN: -- if the question and answer appear to be what she recalls maybe. But I can limit it to the answer. That makes good sense.

Q. Does the answer appear to be what you remember saying?

A. Yeah, that's fine.

Q. Okay. Then going a couple down, "And do actuaries treat the term return on equity as roughly synonymous to the cost of capital?"

"Answer: I see filings. Sometimes it does interchangeably used."

Is that what you recall your answer being?

A. Yes.

Q. Turning to page -- well, I'm going to still stay on 711, read into the record the next question at the bottom.

"All right, thank you. And when they are considering actuaries, not economists, considering -- or not economists who have an actuarial certificate, but are ^ "for" in the transcript testifying as economists -- the -- do affect -- take into account -- do actuaries in computing the cost of capital take into effect -- take into account the expected return that the market demands on the capital and surplus investments."

Turning to the next page top answer. "I don't -- I don't know what you're getting into because that's not my job for this" --

A. For this filing.

Q. Yes. You don't -- okay. Going down midway, starting with the question that about -- it's on line

11, if you look off to the left.

"Question: Okay. And when they calculate cost of capital, do they not take into account what the market expects of the return on investment of capital and surplus?"

"Answer: So are you, again, you are talking about those accounting firm -- accounting terms and investment terms, and we already have hours of discussions on that topic, I believe, in prior days. I don't know what this is."

And then -- so, does that appear to be your -- an accurate reflection of your answer?

A. There are some typos like "accounting terms," and I don't think that that -- I don't know what this -- I don't remember I say that, but I was just trying to tell you I am hiring -- I am hired to do other piece of work. Cost of capital is not my responsibility. I didn't do the work. I didn't review the work. I have general concept as an actuary, but it's not my expertise.

Q. I appreciate that. Go on to page 713. Top question.

"Yes, ma'am. Do they not calculate cost of capital based on what the market demands, in part, from -- or from, in part, investments of capital and surplus?"

"Answer: As I recall, the cost of capital does reflect reasonable expectation for the return."

"Question: On the investment of capital and surplus?"

"Answer: So I think -- I have to think about that, these questions, because these are not my typical job responsibilities."

A. Yeah, that's correct.

Q. Okay. And those appear to be your accurate answers?

A. Yes.

Q. Thank you. Now, first I am going to turn to hearing Book 3. First of all, do you want to take a second to look through this presentation?

A. Which page?

MR. BEVERLY: What presentation?

Q. I am trying to get you to see if you recognize the whole document.

MR. SPIVEY: What book?

MS. FUNDERBURK: Which document are you --

THE WITNESS: Which document?

MR. FRIEDMAN: No, Exhibit 11.

MR. SPIVEY: I'm sorry, I didn't hear

you identify Exhibit 11.

MR. FRIEDMAN: Okay. Exhibit 11 in Book 3. I'm sorry.

(WHEREUPON, Exhibit DOI-11 was marked for identification.)

Q. Do you recognize this document, ma'am?

A. Yes. I contributed to this document because I served this account.

Q. Were you present for the presentation of this document by Aon if it was pres- -- was this document presented visually to -- by Aon to the Texas Windstorm Reinsurance Association?

A. Yes. This presentation was -- yeah, this was presented to the Texas Windstorm Association in their board meeting.

Q. Were you present for that?

A. What?

Q. Were you present for that meeting?

A. I was virtually. I listened to that meeting, yes.

Q. Okay. Thank you.

Would you turn to page 31, and I'm looking at the right column, the column that says, "Reinsurance premium to written premium ratio." The first bullet point, "Effective catastrophe risk management requires measuring and recouping all catastrophe risk cost components?"

A. Sorry, what's your question?

Q. I'm just reading it into the record. Now it's going to be my question.

A. Yeah, okay.

Q. When it speaks of recouping all catastrophe risk cost components, is that referring to recouping the losses and, I suppose, the reinsurance calculations on the models that you did?

A. So, if you move to the bottom of this page.

Q. Ma'am, it's a question about that first bullet point.

MS. FUNDERBURK: Mr. Friedman --

MR. FRIEDMAN: I'm sorry.

MS. FUNDERBURK: -- do not interrupt the witness.

MR. FRIEDMAN: I'm sorry.

A. Yeah, I'm trying to answer your question.

Q. Okay. Yes, ma'am.

A. So, expected catastrophe loss -- recoup all catastrophe risk costs, that include the component in the chart in the bottom, that is the expected loss that is determined by model and the reinsurance margin, that is a net cost of reinsurance.

Q. Okay. So, those are products -- and I want to apologize, very sorry for interrupting you like that.

So, when you are -- you're -- the losses or, excuse me, the losses and the reinsurance numbers that you generate with your use of the models then contribute to measuring and recouping all catastrophe risk costs components, so those are two of the catastrophe risk cost components?

A. Yeah, on this page, yes.

Q. Okay. And when it says "recouping," does that refer to recouping through rates?

A. That means -- yes, that means recouping through the rates. That means price the risk in the rate. And also I also want to clarify recouping because it's -- sometime it's can be misunderstood thinking about the word just recouping what happened in the last year, but in this context it is expected loss, which is clarified at the bottom of this page.

Q. Okay. And second bullet point, "Differences in reinsurance costs and capital risk by geography necessitate a risk-adjusted view of the reinsurance margin."

What are you referring -- what is this referring to when it refers to capital risk?

A. This is what referring to is because your concentration is different and in the coastal some areas are more concentrated. And so, in theory, for that, if you are more exposed to the risk, then you need more capital to support that risk. It's talking about you have certain capital, then you need to -- you need more capital when the risk is more concentrated. And this bullet is more about how you want to allocate those -- your reinsurance cost based on your concentration.

Q. Thank you.

But, particularly, when you're talking about capital risk there, and just we are talking about "the capital," what are you talking about?

A. So, this is -- so, this is, in theory, it is related to -- you have this risk, you need a certain amount of capital to support that risk.

Q. Uh-huh. Okay. And where -- is that capital -- where is that capital located within an insurance company? Is it sitting in an account? Is it invested in, for example, a building? Or is it invested in the market?

A. So, can I reference to one of the ASOP that generate -- that has an explanation of the capital?

Q. Yes.

A. So, that's my general understanding, that ASOP 30, it's page 51 on your binder, and ASOP 30 --

Q. Give me one second to get there, ma'am. I will --

A. Sure. Okay.

Q. Let me -- so, what exhibit is that? Is that Exhibit 12?

A. Oh, sorry. Exhibit 12.

Q. Okay.

A. Page 51.

Q. Okay.

A. Section 2.3. So, yeah, also Section 2.1. "The capital means the fund intended to assure payment of obligations from insurance contract over and above those fund backing the liabilities." That is the definition of capital. That is my general understanding of capital.

And also 2.3 is, "The rate of return that capital could be expected to earn in alternative investment of equivalent risk, also known as opportunity cost."

So, since I am not an expert in cost of capital calculation, this is my general understanding of capital.

And in my review of many filings, I see

different capital numbers are used in different filings. In some cases, it is market value of the book. Some cases it is the determined by PML, TVaR. So, it's -- there is various ways to calculate capital, but I don't want to get detailed, into the detail of that.

Q. So, looking back at what you just referred me to, page 51 of Exhibit 12, the definition you read at 2.3, cost of capital.

A. Which one? Sorry about that. I lost --

Q. That's okay. We were in Exhibit 12.

A. Okay.

Q. 51.

A. 51. Okay.

Q. Page 51.

A. Yeah, uh-huh.

Q. And the -- where it defines cost of capital, you read that.

A. Yes.

Q. All right. How do you determine what is expected to earn in alternative investments of equivalent risk? What's the measuring stick for that?

A. That is not typically my job. My observation is they look at the industry, the average return, the benchmark of the average return. That's my understanding, but that's not really my job to determine what is adequate return.

Q. Okay. But it is returns on investments?

A. It's an alternative investment of equivalent risk. It's not investment -- investment here is a more broader term. It means investors' investment. It's not an investment term in the insurance. That's my understanding.

Q. So, you do have an understanding of -- that's your understanding -- excuse me -- of cost of capital?

A. It's general understanding. It's in one of the actuarial exams. So, in order to pass that, I need to have some general understanding. But that's -- that specific job is handled by different actuaries in -- within Aon, that's not my daily responsibilities.

Q. Okay. So, let's go back to Exhibit 11.

A. Okay.

Q. I guess, first, at page 37, you can see the little numbers on the right?

A. 37?

Q. Yes, ma'am.

A. Okay. Yes.

Q. Is everybody there?

A. Yes.

Q. You're listed here as one of the contacts about this report?

A. Yes. I served the account, yes.

Q. Okay. Then on the next page, 39.

A. Uh-huh, yes.

Q. I'm going to read a couple of sentences from the second paragraph, at the end.

A. Uh-huh.

Q. "Calibration of the models using actual loss experience is based on very sparse data and material inaccuracies in this model -- in these models are possible. The loss probabilities generated by the models are not predictive of future hurricanes, other wind storms, or earthquakes or other natural or manmade disasters, but provide estimates of the magnitude of losses that may occur in the event of such catastrophes."

Is that accurate?

A. It is a general disclaimer. What it is trying to tell you is these -- using the model will not tell you in, for example, in 2025 -- in 2025 what storm you would see in North Carolina. It's just -- this is the disclaimer is intended to exclude some misuse.

Q. But is -- are those two sentences, in fact, true?

A. Which two?

Q. The last two sentences I just lead -- read. If you want me to read them into the record again, I can. They are the last two sentences of the second paragraph.

A. So, Aon recommends that the result from this model in this report not be relied upon in isolation and -- when making decisions. So, I think the emphasis is in isolation, and that may affect the underwriting appetite risk adequacy and the solvency of the company. So, we recommend our clients use these tools and use their other judgment to make decisions but not thoroughly rely on one, two numbers out of the model. That's what we intended to say.

Q. I understand what you say you intended to say. But are those statements true, the last two sentences of the second paragraph on page 39?

A. Yes, the decision should not be made in isolation, that is true.

Q. Are the -- are the word -- are those two statements, what they say, true?

A. So, you mean the total paragraph or only the last?

Q. The last two sentences of the second paragraph?

A. Sir, are there only two sentences in the

last --
Q. Of the second paragraph. I will read them into the record again.
A. Okay. Sure.
Q. "Calibration of the models using actual loss experiences based on their" --
A. Oh, excuse -- sorry, I didn't see that. Is that page 39?
Q. Yes, ma'am. It's up top, far corner. Limited to the -- this --
A. Are we talking --
Q. It says, "Limitations regarding use of catastrophe models."
A. Yeah, right, are you reading --
Q. And I'm referring to -- there are three paragraphs there. The second one --
A. Okay.
Q. -- begins with "The results in this report."
A. Uh-huh.
Q. Do you see that paragraph?
A. Oh, yeah. Okay.
Q. So, I'm reading --
A. Uh-huh.
Q. -- the last two sentences, and I will read them into the record again --

A. Uh-huh.

Q. -- so there is no uncertainty.

"Calibration of the models using actual loss experience is based on very sparse data" --

A. Uh-huh.

Q. -- "and material inaccuracies in these models are possible. The loss probabilities generated by the models are not predictive of future hurricanes, other wind storms, or earthquakes or other natural or manmade catastrophes but provide estimates of the magnitude of losses that may occur in the event of such catastrophes."

A. Yeah.

Q. Are those statements true?

A. Those are true statements.

Q. Okay.

A. However, you got to read that in the full context. Yeah, we all recognize historical data is sparse. So, therefore, we cannot rely on historical data alone. So, this is actually an advantage of using data because the -- not only the historical data, but we also have experts who interpret and to smooth out historical data to give you more credible estimates than historical data alone. So, these are the standard disclaimers in our model practice. They are true statement, but should be really interpreted in the right way, not just taking the words out of the context.

Q. Okay. In -- when you ran the models, as far as reinsurance, hurricane losses, did you, personally, look at any actual hurricane loss experience?

A. Oh, yes. That is part of my job.

Q. Okay.

A. And at Aon, we have a routine exercise is we compare. We collect our clients' vintage exposure data, say for 2004, 2005, you know, there are two busy hurricane seasons. We have database of clients' exposure data at the time when that happened. And then we run those exposure using the model, different version of model we use for rate filing and for reinsurance.

And for these two specific model use for these rate filing, we tested -- we compared those model actual versus the modeled result, and then we look at individual company bases that we routinely show to individual company for their reinsurance purchase, and then we also aggregate the results to see, yeah, overall how model performed against those historical storms.

Q. So, are you speaking about -- so, what you review are the historical storms within the five-year experience period?

A. It's back to, as I recall at 2004, since 2004. We collect all those historical storms to the extent we have client exposure data. We run that year over year. Every time we got the new model, we run those new model on those old exposure again and compare with the actual claims.

Q. Okay. So, you don't go back any prior -- any farther prior to 2004?

A. To the extent it's just a data limitation. As you know, sometimes go older, companies' data is incomplete. To the extent we have the exposure, we go as far as we can. But if we don't have the data, then we are not able to do the comparison. But the most data we have is since 2004. And another reason is just policy change a lot and the old -- also the data quality is problematic with the old data.

Q. Okay. So, Aon has data back to 2004?

A. We have some client data back to 2004. That's what I see in our report when I conduct actual versus modeled result.

Q. Okay. Is there any other source for historical loss data you could turn to, to, for example, see the historical loss data back to 1970?

A. I believe there are other source, but when you use other source, you probably know the 1970's dollar is not today's dollar. When you use those data to trend to today's dollar, you've got to make different assumptions in the data. What is a trend? What is inflation? And after you apply 50 years of inflation data, your result could be very uncertain because it all depends on what -- what assumption you make on the inflation from 1970 to today, and is that assumption on the inflation, how does that impact your loss?

So, this is what I mean, the best comparison with historical is apple-to-apple comparison. Using the exact exposure data at that point and using the model to run on that exact exposure, and then compare to the actual dollar loss at that time, that is apple-to-apple comparison, that is the best comparison, and that is also the comparison model inventor used to calibrate their models.

Q. Do you work on the hurricane submission of it's X-wind losses. Do you know what X-wind means?

A. Yes, I know X-wind. What do you mean submission?

Q. There are in the filing, separate from your hurricane models --

A. Uh-huh.
Q. -- calculations of excess wind losses. Are you familiar with that?
A. I had -- I am familiar with that concept. Yes, I'm familiar with X-wind, yes.
Q. Okay. And are you familiar with, particularly, how the Bureau calculates it?
A. I'm not familiar with that calculation.
MR. SPIVEY: May I just get a clarification? I think I've heard "X-wind" and "excess wind," which I understand to be different things. Can we make sure we know which one we're speaking of here?
Q. What is the difference between X-wind and excess wind?
A. X-wind means exclude wind.
Q. Okay. Excuse me. And then "excess wind" means?
A. I am not sure what you're talking about.
Q. What does "excess wind" mean? Does that mean a wind event that is of less significance than a hurricane but is still a serious event?
A. I am not sure what the terminology you are -- excess, I don't use "excess wind." We use "excessive loss," that is a typical term in reinsurance.

Q. Okay.

A. I don't know what you are referring to "excess wind."

Q. Okay. Thank you.

All right. Could you please turn to Exhibit 14?

A. Yes.

(Exhibit DOI-14 was marked for identification.)

Q. First, could you turn to the second-to-last --

A. Yes.

Q. -- page, and I don't think -- page 18. 18 is there on the left. Do you see that?

A. Yes.

Q. Okay. And you're -- do you see where you're listed as a contact for this?

A. Yes. I contributed to this paper.

Q. Okay. Was the paper presented in anyplace?

A. What?

Q. Was the paper presented anywhere?

A. The paper is -- this is our annual paper released to the public, and Aon's clients all receive a copy.

Q. Okay. So, there was no physical, oral, or presentation of it, it was just a published?

A. My colleague may have done some presentation, but I wasn't part of presentation for that year.

Q. Okay. So, first of all, I guess this is not a numbered page, but technically the second page from the start.

A. Uh-huh.

Q. It's a big, dark -- is that purple?

A. Yes.

Q. Okay. Do you see that? And do you see at the bottom "Return on equity study methodology"?

A. Yes.

Q. I'm going to read into the record. "The basis for the prospective return on equity estimate is state and aggregate statutory filing data, including reported direct losses, expenses, payout pattern, and investment yields."

Do you recall yesterday you stated that you have heard people refer to return on equity to mean the same thing as cost of capital?

A. Yes. I said those terms sometimes are interchangeably used, whether it's proper or improper.

Q. Okay. Turning to the next page, I think that is page 3, you can see the page numbers in the lower left-hand side.

A. Yes.

Q. I will just read in the whole first paragraph. "Aon's headline prospective ROE for the national cohort is 6 percent."

Do you understand ROE to mean return on equity?

A. Yes.

Q. Okay. "The simplicity of that statement and the reported 6 percent return underemphasizes that this is a prospective calculation. As in prior years' versions of this study, Aon takes an actuarial view of trends, capital requirements, catastrophe, and non-catastrophe losses and reinsurance, among other inputs. In prior years we assumed all of the loss trend, exposure trend, and rate impact were fully earned in, not so for this year's study."

When -- when it says, "Aon takes an actuarial view of trends, capital requirements, catastrophe, and non-catastrophe losses and reinsurance," when it does that, what does it mean by "capital requirements"?

A. In this specific study, Aon just used our -- we use one model, that is Aon's internal model, generate expected catastrophe loss countrywide, and then we consult our rating agency capital advisory team, ask them what is adequate capital to support this level of catastrophe. This is a capital assumption built into this report.

Q. Okay.

A. Those are not real capital. Those are the capital assumed needed to support this type of risk.

Q. And is one of the measuring sticks for that capital requirement that you say is assumed, what an investor can expect to get back on -- for returns on his ownership interest, his shares?

A. It's -- on returns, we are just talking about general return, and we don't really care the form of the return, in which format is it, dividend or anything. We just talk about the total return. As an investor, if I invest this amount of money, I want a 10 percent return. It's easy to say, example, 10 percent. We are talking general terms.

Q. Okay. So, you are -- but they are estimating the total return?

A. Yes. Our capital advisory, not me, yeah.

Q. And total return in -- and that's total return within the meaning of actuaries?

A. That's a total return in our -- to our capital team. It's more from investor's perspective.

Q. Right. But who is in your capital team? Are they actuaries?

A. They are -- we have a mixture of capital -- actuary and non-actuaries in the capital advisory team.

Q. Okay.

A. And, in fact, most of them are non-actuaries.

Q. Could you turn to page 7 of that handout?

A. Yes.

Q. And I'm reading from the start of the top paragraph.

A. Uh-huh.

Q. "In its 22 years of publication, the perspective of this report has always been toward measuring the long-term health of the homeowner's line of business. The insurance marketplace will fail to attract the private capital necessary to create strong balance sheets capable of withholding -- withstanding the volatility both from catastrophes and other sorts if it cannot produce returns commiserate -- commensurate -- excuse me -- with the return requirements of the owners of capital."

Is that true?

A. Yes.

Q. Okay. And how do you measure the return requirements of the owners of capital, in your understanding?

A. Again, we just compare with similar

investment, use those as a benchmark. For example, the capital deployed in the similar field if they earn 15 percent. While in homeowner business, they only earn 6 percent. That means homeowner business is not attractive. This is just my general understanding of our methodology.

Q. When you say capital employed in the comparable business, is part of measuring that capital employed looking at what the earnings on capital and surplus investments are?

A. I am talking about a general capital provider, such as investor, because now in insurance industry investors even include private equity firms. So, I am talking about the capital from investors' perspective.

Q. Right. And how do investors estimate their expectations from capital?

A. I believe Dr. Zanjani is an expert on that. And, to me, my general understanding is I just rely on those experts' estimate, and I look at the number. For me what is a reasonable return, is that 15? Is that 18? So, those are the number I care. I don't really care how that number is derived.

Q. Okay. And -- but you agree that your measurement of catastrophe or the hurricane loss and your measurement of the net cost of reinsurance become part of the analysis of what the cost of capital is?

A. Yes, I agree. But not vice versa because what cost of capital is doesn't really come -- impact my job. My job is to provide input to their study.

Q. Okay. Turn to page 16.

A. Yes.

Q. And I'm looking at that -- the second of the two maps of the United States.

A. Yes.

Q. Excuse me. And just to remind us, this -- if you want to go back to the first page, this is a report as of November 2023?

A. Yes. Our new report just released recently.

Q. Okay. Well, looking as of November 2023, that was still before you -- the Bureau filed its current filing; is that correct?

A. That's before the Bureau filed the current filing, but most of the work for that filing has been accomplished at that time.

Q. Okay. When did you sign your Rule 38 certificate?

A. It was in late 2021.

Q. Okay.

A. One model -- those models were released in summer 2021. I completed my ASOP review for both models in late 2021. Those two models were used for this rate filing.

Q. What date did you sign off on your direct testimony for the Bureau in this filing?

A. That, I don't recall. It's -- yeah, I can find that date, but it's weeks before the filing was made.

Q. Okay. So, do you recall whether you signed off on that after November 2023?

A. No, it's -- I don't remember. I don't remember that date.

Q. All right. So, going back then to page 16.

A. Sure.

Q. Is my understanding right that this map and the map on the following page show the rate needed for the national and specialist cohorts to achieve a 10 percent return on equity on a direct basis; is that correct?

A. Yes.

Q. Okay. Then I am going to read into the record the last sentence of that first paragraph.

"The actual rate and return needs of any individual carrier will vary depending on portfolio distribution, competitive and strategic decisions, risk appetite, and the demands of the policyholders, owners, and other stakeholders."

Do you know how you meant -- how they are measuring the demands of the policyholders, owners, and other stakeholders? I guess, particularly, the owners and other stakeholders.

A. This is a general statement. I don't know whether each company will measure their demand on policyholder, owner, and other.

Q. Okay.

A. No, because this risk appetite and the demand of that return, it really vary by company. So this is our statement was saying is their actual look different from our study. It's really depend on each company.

Q. Okay. So, now I am going to look at the map, the color map there on the left.

A. Sure.

Q. And, I'm going to be honest, I am kind of color blind. It comes out with reds and oranges and yellows, and it also comes out blue. So, I am going to try to identify the colors, but I may not -- if I am looking -- describing it as the wrong color, please tell me.

A. Sure.

Q. So, these -- according to the color codes, these are the rates needed for the national specialist cohorts to achieve a 10 percent rate of equity. Would those national and specialists cohorts include the members of the Rate Bureau to write homeowners'?
A. Yes.
Q. And so, the darkest color represents 15 or above?
A. Correct, but this is national carrier. The next chart has a different view for the specialist carrier, and you can see the rate need for specialists are much higher because the color is much, much darker in the next page. Yes, this one, Exhibit 21.
Q. Okay. But I am talking about Exhibit 20 right now.
A. Okay. That's fine.
Q. When you say that -- you just said "this is national"?
A. Correct.
Q. Is that a national estimation of what is rate of equity or return on equity is needed in North Carolina, in part?
A. Yes. Those are our national carriers include eight largest national carriers.
Q. And out of the 110 or so homeowners' writers

in North Carolina that belong to the Bureau, how many of them are the national carriers?

A. That, I don't have that number readily available.

Q. Okay. Would you say it's more than half, less than half?

A. I don't know the answer.

Q. Okay. How many of them are Aon national clients?

A. I don't have that exact number without the detailed information ahead of me.

Q. And you said -- Exhibit 21, when you say "specialist carriers," does that mean -- what does "specialist carriers" mean?

A. Specialist carriers mean those are more regional carriers and they write in one single state or multiple states within that region, and those carriers are typically have different type of operation and different pattern of reinsurance buying.

Q. So, specialist carriers can include either regional or state-specific carriers?

A. Correct.

Q. Do you know how many state-specific carriers there are in North Carolina?

A. The only one I am aware is the North Carolina

Farm Bureau.

Q. Okay. So, going back to Exhibit 20. The --

MS. FUNDERBURK: And just for clarification, it's Exhibit 20 contained on page 16 of -- sorry. Let me actually identify the exhibit for DOI.

MR. FRIEDMAN: It is -- oh, would you like me to clarify, Your Honor? It's exhibit --

MS. FUNDERBURK: Of Exhibit 14. It is not DOI Exhibit 20. It's Exhibit 20 contained within Exhibit 14 from DOI, correct?

MR. FRIEDMAN: Yes.

MS. FUNDERBURK: I just want to clarify for purposes of the record.

Q. The -- according to this color, this exhibit, the -- for the national carriers that do business in North Carolina, they need 15 percent or above as of November 2023; is that correct?

A. Yeah. If I read the color, yes, that's correct.

Q. Okay. And then it looks like Louisiana also needs, according to this report, 15 percent or above?

A. Yes, according to our analysis.

Q. Okay. Meanwhile, Florida, as far as I can understand the colors, doesn't need any rate change?

A. That's correct, because Florida had significant rate activities in 2023.

Q. Okay. Because -- so, the cost of their insurance was really going up when you say --

A. Yes. Remember our report is prospective. So, the rate level reflected in our report is what is the rate level for next year after -- the year after this report. So, we reflected those rate activities in our on-level premium analysis. We collect rate increase among various carriers, and we calculate expected rate level for these calculation.

Q. Okay. So, Exhibit 20 reflects Aon's expected necessary rate for the national carriers that do business in those states?

A. Do business countrywide, yeah.

Q. Right.

A. Yeah. It's by state, yeah. This is our view of how much additional rate national carrier will need in order to achieve 10 percent ROE.

Q. And Texas also -- it looks like Texas needs -- the national carriers that are writing homeowners' in Texas only need a 1 to 4 percent increase?

A. I think, based on this chart, it's 5 -- it's in 5 to 9 category.

Q. Thank you. I could not, honestly, tell that color. So, they need a 5 to 9?

A. Yeah.

Q. All right. And, then, is it -- sorry. I'm so color blind. But the South Carolina --

A. Yes.

Q. -- is it a 5 -- is that saying it needs a 5 to 9 percent increase?

A. It's 10 to 14 percent -- oh, sorry, it's 5 to 9, yes. 5 to 9, yeah.

Q. Okay. And, then, you're saying, I believe, this says Georgia needs a 10 to 14 percent increase?

A. Correct.

Q. Okay. Are any of the states --

MR. FRIEDMAN: One second, Your Honor. Just understand my chicken scratch here.

Q. Are any of the states on this -- from Texas through the Gulf states, through the Eastern seaboard, to your knowledge, are any of those completely unregulated states as far as rates go?

A. As far as I know, none of hurricane states are completely unregulated.

(Exhibit DOI-26 was marked for identification.)

Q. I've also handed up what's been marked as

DOI-26, and it is Use of Catastrophe Model Output. It's a publication by the American Academy of Actuaries?

A. Yes.

Q. Do you recognize this publication?

A. Yes, I am one of the contributors to this paper. To be specific, I contributed page 11 through 23.

Q. So, you contributed to pages 11 through 23?

A. Yes.

Q. So, if you could turn to page 13.

A. Yes.

Q. Above that calculation, I guess the second paragraph. I will read from the first two sentences. "To adequately insure a risk, an insurer must commit a certain level of capital beyond the expected annual loss to cover the potential for catastrophic loss. This risk load should be sufficient to cover the cost of capital, including a profit provision."

What do you mean when you wrote, "should be sufficient to cover the cost of capital, including a profit provision"?

A. This is what I mean, one, hurricane provision is volatile and one -- for any insurer they -- when they have these exposure, they put their capital at risk. And so, therefore, they need to be compensated. And it really -- the carrier may elect to retain that risk by themselves. In that case, they also need to charge an adequate provision. If they decide to cede that risk, they -- that -- yeah, either they retain or they cede. Adequate return should be adequate compensation, they should receive adequate compensation for that risk.

Q. And what is "to cede the risk" in this context mean?

A. Cede the risk means buying reinsurance.

Q. Okay. And so, when you wrote "sufficient to cover the cost of capital," could you just explain to me what your measurements of the cost of capital were?

A. So, again, that is -- I am using a general term. And so, what is an adequate return is really depend on company's risk appetite. Is that the company -- what is their investors' appetite? So, generally, I leave to company to decide what is the adequate return for them. And, here, I am just saying, yeah, they need to have adequate return in their view.

Q. So, the cost of capital here would depend on what's an adequate return -- or depend, in part, on what is an adequate return for the company's investors?

A. Yes, and also -- yes, that's correct. And also depend on the concentration, the volatility of this risk. So, if you look at my -- that equation, it's just in hurricane risk, the standard deviations, the volatility of the risk, also drives the need for return.

Q. That's all I've got about this ar- -- well, first of all, I appreciate you're trying to explain the formula to me. I have no idea if you're right. I can't understand higher math. You can. That's why you're an actuary.

All right. How -- so, is it true that some homeowners' policyholders have supplemental coverage that would cover some of the losses that might otherwise fall under their homeowners' policies?

A. I am not sure. Can you clarify? I'm not sure what you are talking about.

Q. Sure. Are there homeowner's who, in addition to having their homeowners' insurance, have coverage for water or sewage backup and either that's a rider or it's, as I understand it, a separate policy?

A. Those could be through endorsement, I believe. Some risks, like an earthquake, shake, it is -- it is through endorsement. And the water backs up your drains, those are also endorsement. But sometimes it could be a separate policy.

Q. When you're receiving data from -- well, does your use of the models include any offset that would represent those additional policies, the coverage provided by those?

A. I didn't compile the data, so I am not sure what assumptions goes into that data. However, after we receive the data, we do not -- we do not assume those policies have separate coverage. Those are the -- those are the -- we just import those data based on the limit of policy conditions into the model. We make no further assumptions.

Q. Okay. Would you agree that if you were measuring the homeowner carrier's loss for a particular policyholder who had not just homeowners' but a separate policy covering water or sewer backup --

MR. SPIVEY: Objection. There's been no foundation laid to establish that that's a separate policy. It's actually part of the same policy.

MR. FRIEDMAN: She just testified that sometimes the water or sewer backup --

MR. SPIVEY: It's an endorsement.

MR. FRIEDMAN: No, well --

MS. FUNDERBURK: One at a time.

MR. SPIVEY: It's an endorsement to that policy.

MR. FRIEDMAN: So, she testified, actually, that sometimes it can be a separate policy, and you're saying it's an endorsement, but those were her words. She said sometimes it's an endorsement.

A. That's what I said.

MS. FUNDERBURK: Just a moment, Ms. Mao.

THE WITNESS: Sorry.

MS. FUNDERBURK: I appreciate your willingness to clarify, but just a moment.

MR. FRIEDMAN: Just that. I'm going off of what she said.

Q. Do you need to clarify? Is your understanding of all water or sewer backup coverage only being an endorsement and not a separate policy?

A. Usually it's through endorsement, yes.

Q. Okay. So, assuming, then, the water and sewer -- assuming they have an endorsement for water or sewer backup --

A. Yes.

Q. -- that a policyholder has that endorsement.

A. Uh-huh.

Q. I will drop that question.

What's a debris removal endorsement?

A. Debris removal means if there is -- say if a tree fall on your home and those -- there are debris, and it costs policyholder extra to remove those debris. Yeah, it's just, by words, it's pretty obvious.

Q. So, do homeowners' policies cover the cost of removing trees that may fall on a hurricane but don't actually hit the house?

A. I think you're talking about homeowner policies and each company's homeowner policy could be different. So, we really cannot generalize what is covered and what is not covered. If you give me a specific policy, I could read it and interpret what is covered.

Q. Have you ever seen a homeowners' policy that would cover merely removing trees that didn't hit the house?

A. I don't remember I specifically read that part of the policy.

Q. Okay. After hurricanes, are you aware of whether any local government, state government, will, themselves, go and clear trees that have fallen on houses instead of the insurer doing that?

A. Am I aware of that? No, I am not aware. I don't remember.

Q. So, you don't know one way or the other whether --

A. I don't know one way or the other.

Q. Okay. And as far as contamination and associated cleanup costs, do you know whether sometimes governments, not the homeowners' carriers, take on that cost?

A. I am not aware. I don't know one way or the other.

Q. Okay. So, I handed up a one-page exhibit. It's marked DOI-27.

A. Yes.

(Exhibit DOI-27 was marked for identification.)

Q. Have you ever -- from what I understand is a report from a publication named Business Insurance. Have you ever seen this report?

A. I believe I see it. If not before, I see it now.

Q. Okay. So, did Aon, I guess at some point, it sounds like in late 2023, issue a report pertaining to property and catastrophe reinsurance renewals?

A. Yes, it's our -- I believe it's, like, a semiannual report or even sometime I see more frequent than that. The reason is the major renewal of reinsurance happen either June 1st, July 1st, or 1/1, January 1. So, we typically publish our observation based on those renewals.

Q. So, January 1st of 2024 --
A. Uh-huh.
Q. -- that would have been addressed in Aon's report?
A. Yes. These report plus posted January 3 should reflect our observation of the January 1, 2024, renewal.
Q. Okay. And is that assuming that the renewal is for the calendar year?
A. The renewal is not for calendar year. It's if you are 1/1 renewal, then it's -- yeah, your next renewal is 1/1, but if you're a 7/1 renewal, that means your treaty effective 7/1 this year to June 30th next year.
Q. Okay. So, this report, as I understand what you are saying, would have addressed what the average increases were as of July 1, 2024?
A. It's -- yes. It's an increase from July 2023 to January 2024, that is -- yeah, we -- if we say single-digit hike at a property, that means for January 2024 renewal that is the price increase.
Q. And the January 2024 renewal goes from what period?
A. From the June or July of the 2023.
Q. Okay. Thank you for clarifying that.

So, the January 1st renewal, the price, then, would last until June or July 2024?

A. These price will be for this -- for the companies purchasing renewal reinsurance for June -- for January 2024. However, there will be batch of reinsurer -- batch of insurers that renew their treaty in June and July in 2025.

Q. June or July of 2023?

A. I'm sorry, June or July of 2025, there will be other -- because companies on different renewal schedule.

Q. So, all I'm trying -- and this is, truly, I am not understanding it.

A. Uh-huh.

Q. The report that Aon issued saying --

A. Okay.

Q. -- that the average increases were in the single digits --

A. Oh.

Q. -- is -- for what period of time is that report covering?

A. For the -- just a second. Let me read. So, you are asking -- so, what is your specific question?

Q. My question is, Aon issued a report --

A. Uh-huh.

Q. -- that estimated single-digit increases in reinsurance costs --
A. Yeah.
Q. -- is that correct?
A. Yes.
Q. And over what period of time is Aon predicting there will be single digits in reinsurance renewal costs?
A. Okay. Yeah. This is -- this is a good question. And, yeah, initially I was thinking this single digit is from June or July 2023 because that's the last time we publish our report. But I have to confirm that information.
Q. Okay. But the report, you said there was a report published in -- I thought you said right before this date at the start of January or --
A. We have those reports published on a semiannual basis. It be will be around this time. So, this report, this article referenced that report.
Q. Okay. Do you see a reference in this report or in this article to what period of time Aon's prediction --
A. Yes. Now, I see. I see it said, "hike of a year ago during what many described as an arduous or even contentious process." Yeah, now -- yes, the

article reference a year ago.
Q. So, what paragraph is that in?
A. It's the second paragraph.
Q. The seventh paragraph that says, "The" -- is that the one that begins with "The record cat bond"?
A. No, the second paragraph said, "The more modest rate increase were in marked."
Q. Oh, I'm sorry. I misunderstood you. I thought you were saying the seventh paragraph.
A. Oh, sorry. Yeah. Okay.
Q. Okay. So, that's -- I will read it into the record. "The more modest rate increases were in marked contrast to the double-digit property hikes of a year ago" --
A. Uh-huh.
Q. -- "during what many described as an arduous, even contentious, process."
So, it's comparing your report's estimates to the double-digit property hikes of a year ago; is that right?
A. Correct. It said a year ago there was double digits. This time it's single-digit increase. However, the increase are still cumulative. So, if you have double digits last year, and this year you only have single digits, that means you still -- it's still

multiplicative. It doesn't mean your rate is any lower than last year.

Q. Okay. So, I guess go back to the first question then. When Aon issued its report, sounds like sometime early in January 2024, what period of time was that report estimating the increases in the net cost of reinsurance?

A. I don't have a definitive answer to that. It could be one way or the other, it could be from one year ago, it could be from last report. I don't have definitive answer for that question.

Q. Okay. And how much of an increase in reinsurance costs does your analysis of the North Carolina -- well, how much North Carolina reinsurance costs did you estimate?

A. We use Aon's database. Those are the actual pricing that reflected these changes, but our data vintage is for mid of the 2023. We use that data footprint for these Bureau rate filing. So, it is reflected on the rate we see at the time of renewal.

Q. And what was the average increase or what was the -- how much of an increase in the net cost of reinsurance did you estimate the Bureau members needed?

MR. SPIVEY: Is that a comparison? Like how much of an increase? I mean --

Q. In the report how much of -- how much is the Bureau asking for an increase in terms of the -- I believe you testified yesterday that it was around 31 percent of the premium dollar for the net cost of reinsurance.

MR. SPIVEY: But that's a portion of the rate. Are you talking about an increase from something? What is it you're asking?

MS. FUNDERBURK: Can you, Mr. Friedman, break the question down into subparts rather than compound and ask the subparts as you go?

MR. FRIEDMAN: Yes, ma'am.

MS. FUNDERBURK: Thank you.

Q. For beginning on the effective date requested in the filing --

A. Uh-huh.

Q. -- how much of an increase in the manual rate, what percentage is the Bureau asking for its members?

A. Your question is how much rate increase Bureau is filing for this rate?

Q. No, no. How much of a rate increase that's attributable to the net cost of reinsurance?

A. That is not part of my analysis. That would be in Mr. Anderson's analysis, I believe. Or it --

because there will be an exhibit showing each component contributed to the rate change, but I am not the one who generated that piece of information. So, I don't have the number.

Q. Okay.

A. Yeah.

Q. And my understanding from Mr. Anderson was simply that he had -- the only thing he had firsthand calculated was the contingency provision. Is it possible that it's Mr. Ericksen?

A. It could be Mr. Ericksen. But, yeah, it's not a part of my job for Bureau.

Q. Okay. Thank you.

A. And I also want to point out that since you're talking about the increase in the reinsurance, the increase we are talking about here is not just one year. It's from our last filing and that filing was 2020 rate filing. So, we are talking about four years of increase in reinsurance, and those four years is the hardest market of insurance and the magnitude of reinsurance cost increase in the four years are unprecedented.

Q. You calculate -- in looking at the net costs for those four years, are you actually looking at what the Bureau members paid for reinsurance?

A. We are -- we are -- we already talk about our methodology. We are using the actual data to reflect the composite one company, treat Bureau as one company, and our data include those Bureau members who are doing business in North Carolina.

Q. Who are North Carolina -- who are Aon clients, right?

A. Who are Aon clients, that's correct.

Q. And you don't know how many of those there are?

A. I don't have exact number. I can find out, but I don't memorize those numbers.

Q. When you're looking at that number, the actual costs for however many Aon clients are doing business in North Carolina, are you including the price that they charge for or what they receive from their consent to rate policies?

A. Consent to rate, those -- your question is do I include their premium in my calculation?

Q. Yes, and would that premium include consent to rate?

A. So, just to clarify, reinsurance costs is not -- we are not looking at their policy premium. We are looking at their modeled loss and the indicated reinsurance cost based on their modeled loss and based on the standard deviation of the risk. We are not looking at the rate, either consent or manual rates. That's not part of our reinsurance calculation.

Q. Okay. But you are looking, for however many Aon clients there are, you're looking at, in some way, the actual premium they are paying for the net cost of reinsurance?

A. Correct. We are looking at the actual reinsurance premium they are paying in order to calculate the net cost of reinsurance.

Q. Okay. And in determining what they are actually paying, are you taking into account the proceeds they have from CTR in any part?

A. So, you're asking their proceed from CTR? CTR is what, consent to rate?

Q. Yes, ma'am, sorry. I should have clarified.

A. Yeah, I think I just want to clarify again. We are not using their policy premium. So, CTR premium is not part of the reinsurance calculation. Reinsurance calculation using the expected loss, expected reinsurance loss, and the correlation of the reinsurance pricing. So, the actual policy premium on CTR are not part of our reinsurance calculation.

Q. Oh, okay.

So, for those, however many Aon clients, you're not actually calculating your modeled reinsurance based on their actual premium costs for net -- for reinsurance?

A. We are using their actual reinsurance premium costs but not their actual policy premium.

Q. What's the difference between measuring reinsurance premium costs versus policy premium costs for reinsurance?

A. There is no such term on policy premium for reinsurance. Policy premium means if you're a policyholder, this is your total premium you will pay to ensure your home. And --

Q. Okay.

A. -- among that premium, part of that is to pay your expected loss, part of that is pay reinsurance. So, reinsurance premium is a subset of your total policy premium. However, when we determine the reinsurance premium, we use reinsurance expected loss and the risk concentration and the market pricing, and then we calculate the reinsurance premium. Then the other actuary will take that into account to develop the total premium, but not the other way around. We don't use the total premium to derive the reinsurance premium.

Q. So, I may have very fundamentally

misunderstood this from the get-go. When you say that you are taking into account the premium costs for reinsurance of Aon's clients, are you saying what you are taking into account is their estimation of how much of the policyholders' premium dollar --

A. No.

Q. No?

A. No. We are estimating how much these -- those insurance companies spent on their reinsurance and to buy certain layers of coverage.

Q. Okay. Right. And so, you are including the actual numbers that those Aon clients in North Carolina are paying to buy their reinsurance?

A. Yes. We are using marketing data for those real companies buying reinsurance to cover their catastrophe risk, including North Carolina risk.

Q. Okay. Sorry, I got over my head. So, moving on to demand surge.

A. Okay.

MS. FUNDERBURK: I will ask, Ms. Mao, do you need a break or --

THE WITNESS: No, I'm good.

MS. FUNDERBURK: -- because we're about mid morning. Okay. Thank you.

Counsel, are you fine to proceed or do

either of you need a break?

MR. FRIEDMAN: I am fine to proceed. I'm looking around the room to see if anybody else needs.

MS. FUNDERBURK: Okay. Please proceed, Mr. Friedman.

MR. SPIVEY: I might just inquire, are we anywhere near concluding cross-examination, because I would expect to ask for a short break to regroup for redirect. And if we are not close, I would say it's pretty middle of the morning. It might be time for a break. But if we are pretty close, then we would be getting a break then.

MS. FUNDERBURK: Mr. Friedman?

MR. FRIEDMAN: Obviously, the pace of the questions depends on both my understanding of the concepts and Ms. Mao's phrasing of the responses.

MS. FUNDERBURK: What's your estimate?

MR. FRIEDMAN: My best is estimate, honestly, is about an hour.

MS. FUNDERBURK: Okay.

THE WITNESS: Okay. Yeah, let's continue.

MS. FUNDERBURK: Why don't we go ahead and take a break then. We are in recess for ten minutes.

Ms. Mao, I will again remind you, when you return, you will continue to be under oath. Thank you.

(Recess from 10:39 to 10:54 a.m.)

MS. FUNDERBURK: We are back on the record.

Counsel, is there anything we need to address before we resume the cross of Ms. Mao?

MR. FRIEDMAN: No, ma'am.

MR. SPIVEY: No, Your Honor.

MS. FUNDERBURK: Ms. Mao, I will, again, remind you, you continue to be under oath.

Mr. Friedman, please proceed with your cross-examination.

Q. When you are calculating the net cost of reinsurance, is that also considering that reinsurance that is obtained by purchasing cat bonds?

A. No. It's only -- we only use the database as reflecting the occurrence-based reinsurance.

Q. Okay. So, a policy base- -- in other words, you're reflecting the cost that would cost to buy the policy --

A. Right.

Q. -- of reinsurance?

A. Yeah. We only include those treaties to cover the catastrophe excessive loss type of reinsurance transactions.

Q. Okay.

A. Cat bonds are totally in a separate database not included in this.

Q. Do some North Carolina homeowners obtain the equivalent of their reinsurance by purchasing cat bonds?

A. That, I don't -- I don't have that information. And also, like, cat bond, cat bond just similar to reinsurance. They are not state specific. It's typically company issues a bond, cover a region, cover all the perils, so, yeah, there is really no North Carolina-specific cat bond.

Q. Okay. But they -- some carriers can obtain the equivalent of reinsurance by purchasing a regional cat bond; is that fair?

A. It's not always equivalent. That is because a cat bond and the reinsurance are very different risk transfer mechanisms and reinsurance are typically attach and exhaust lower, and the cat bond typically attach and exhaust at a higher layer. Yeah, it's just there are a lot of differences in reinsurance and the cat bond.

Q. Okay.
A. But it's possible that a company have both.
Q. Okay.
A. Yes.
Q. And you don't know how many homeowners' carriers in North Carolina, whether they are national or local, are achieving some portion of their reinsurance, or the equivalent of it, by purchasing cat bonds?
A. I have a general number of -- from the global risk transfer perspective. Reinsurance capital accounts for 85 percent of the global risk transfer, while cat bond is account for about 6 percent of the global risk transfer.
Q. Okay. And in North Carolina do you have a sense of what that percentage is?
A. No. We don't have that -- we don't have state specific information.
Q. Okay. In your experience, are cat bonds purchasing the equivalent of coverage from reinsurance coverage through a cat bond, is it less expensive or more expensive than purchasing a policy?
A. It also varies by time because cat bond is event -- so, they are in the similar trend with reinsurance, but because they are attaching at place,

you can really -- you cannot really compare the apple-to-apple pricing. But in recent -- the recent data point shows us the margin of the cat bond are actually become similar to margin of reinsurance based on the January 2024 data point.

Q. Okay. So, moving on to demand surge -- and I will go through this really briefly. In the demand surge functions for either the AIR models or -- well, let me ask this. You used, as I understand it, the AIR standard and the RMS historical to calculate demand surge; is that correct?

A. We use the AIR -- AIR long-term and RMS historical to calculate hurricane loss costs, including demand surge. Because demand surge is -- it is a factor that's applicable to all events, yeah.

Q. Okay. So, from the data that you provided the Commissioner with your report, can the Commissioner tell what percentage of demand surge is attributable to hurricanes that made landfall in another state versus those that made landfall in North Carolina?

A. We provided an event loss table, including both AIR and RMS. And in that loss table, there is a field with and without demand surge, and it's by event information. And also in the same table, there is an event description showing what is -- where the event is making landfall.

So, yeah, if you go through the database in the detail, it's possible you derive something. However, it's only the -- in the description, it's only the first landfall. It doesn't account for the second and the third landfall. So, to the extent it's possible a hurricane making the landfall in Florida, then later making a second landfall in North Carolina, but our database will just show it's a Florida landfall hurricane. So there is a limitation for that data and it's not perfect, but you can get some idea from the info.

Q. And that's for those calculations you've run with demand surge?

A. Correct, both calculation we run with demand surge.

Q. Can you discern if it was a modeled hurricane with modeled demand surge -- first of all, is demand surge modeled, or is it based on actual data about the prices being charged for all those elements of demand surge that surround a hurricane?

A. Yeah, I can talk high level generally how demand surge function was developed. So, the demand surge is -- for every vendors when they get the claims' data to calibrate their model, the claims' data itself include demand surge, to a degree, because it's a result of demand surge. And, then, from there, vendors study the typical pricing patterns with and without those large event, and, then, they try to estimate how much is driven by the event. And the modeling vendor generally apply a demand surge based on the industry event, based on the industry loss of the surge event. So, the higher the event, the higher the demand surge.

And for AIR model, it also has a concept of the residual demand surge. So, that means if an event happened before this event, there will be some residual demand surge passed over to this event. So, you will get a cumulative demand surge. So, this is the general methodology.

And so, in my opinion, the loss with demand surge is more credible because this is based on the actual data they collected and the loss included, already included demand surge. However, in order to calculate loss without demand surge, then you need to figure a way to back the demand surge out of the loss. So, it's in that process you introduce more uncertainties into the result. So, it's my professional opinion loss without demand surge is more credible than loss -- sorry, loss with demand surge is more credible than loss without demand surge.

Q. Okay. So, are you saying that the AIR and RMS models you ran for the demand surge function include the demand surge -- the actual demand surge related to actual hurricanes?

A. The demand surge function was developed based on vendors' study of actual hurricane results.

Q. Okay. And it was based on -- did that include a study of how much the people creating the demand surge, the people charging -- let me finish my question.

A. Go ahead.

Q. Yeah, thanks. How much they were actually charging for all the things that contribute to the demand surge?

A. The demand surge function include both material costs and the labor costs.

Q. Okay. So, the demand surge function includes some actual hurricane -- I mean, it includes how much was actually being charged insurers for actual hurricane losses; is that correct?

A. It is derived from data that includes hurricane loss with demand surge, yeah, include the actual claims dollar.

Q. Okay. And is some part of that also derived from modeled loss and modeled demand surge?

A. That part I am -- I don't -- I don't quite get your answer because they are -- they derive the demand surge factor, then modeled loss with/without demand surge is an output of the demand surge function. That's my opinion. They use, based on economic data, to derive the demand surge function. They don't use the modeled result to derive the demand surge function.

Q. Okay. I think that clarifies it. I appreciate that. You've taught me a great deal about hurricane modeling.

So, can the Commissioner, if you stated that it is possible to figure out where -- which hurricane's creating -- which modeled hurricane's creating demand surge in North Carolina are non-landfall and which ones are landfall; is that correct, as I understood you?

A. There is limitations in the information that -- yeah, you could -- yeah, it's possible that you missed some hurricanes that make second landfall in North Carolina, but you would think it never make landfall in North Carolina, yeah.

Q. Okay. Now, with regard to the actual percentage of demand surge, is -- are you making any difference in those between the percentage of demand surge for modeled non-landfall hurricanes and the percentage of demand surge for modeled landfall hurricanes?

A. It's vendor's decision, and I believe they don't vary the demand surge by landfall or non-landfall. They determine the demand surge factor based on the total industry loss and also where the hurricane hit. For example, if the hurricane hitting Hawaii and the demand surge will be much higher because the transportation cost is higher, and they do have some regional demand surge function. However, the demand surge factor is based on the total industry loss regardless where is the -- where is the storm making landfall.

Q. Okay. So, as to the Aon standard model and it's demand surge function, the -- so, it's your understanding that Aon is applying the same percentage of demand surge to a modeled non-landfall hurricane as it does to a modeled landfall hurricane?

A. Are you asking that did Aon apply same demand surge for landfall hurricane and then non-landfall hurricane?

Q. Yes, ma'am.

A. So, you're not asking Aon model, right? You're asking --

Q. No, I totally misspoke. I meant to say the AIR model, for the AIR model.

A. Okay. It's my understanding -- so, the demand surge factor is based on the total industry loss of that event. It doesn't matter if it's make landfall or not or if it made landfall in North Carolina or South Carolina. It's the same demand surge function factor.

Q. Okay. And is that the same for the RMS historical, it can't -- it applies the same demand surge percentage, whether it's a landfall or non-landfall event?

A. That's my understanding, yes.

Q. Would you agree that it's possible that if there is a landfall hurricane in South Carolina, and it drifts into North Carolina and causes damage, that the amount of demand -- actual demand surge in South Carolina is higher than the demand surge in North Carolina?

A. That is -- actually, it's -- I disagree with that because hurricane really has no boundary, and it cross the state borders, and so as building materials and the labor. Those materials can be transported across state borderlines and also laborers will across the borderlines as well. I think it's just driven by the total economic impact of the event, and I don't necessarily see the demand surge factor would be different.

Q. Okay. If there were a landfall event in South Carolina, and it only hit rural coastal areas in South Carolina --

A. Uh-huh.

Q. -- and then when it came into North Carolina, it hit Charlotte, which has a lot of people --

A. Uh-huh.

Q. -- and a lot of homes --

A. Uh-huh.

Q. -- more than the regions in South Carolina that were affected --

A. Yeah.

Q. -- are you saying that the demand surge in those rural areas of South Carolina that were affected is going -- you believe it would be the same as it would be in Charlotte?

A. I believe we are talking about modeling assumption, and as we all know, those modeling assumptions are applied to some general situation. For that specific situation, that is probably one event in the event catalog. However, there will be other events that, for example, it may pass over -- it may first hit in South Carolina, but then generate a much stronger wind in North Carolina, and then generate a lot more loss in North Carolina than South Carolina. So, what I'm saying is, so, generally, those different events, and then when you account these methodology for those overall, those will be a relatively aggregate measure, but you cannot really pick one event out of the category showing, okay, this is wrong, then pick another one showing this is wrong to justify, to some different methodology because it's modeling is just like reinsurance pricing. It's not about to get every single data point right. It is using a lot of data points to derive assumptions that is good enough to apply to certain purposes.

Q. Okay. And -- but I'm using one modeled event.

A. Uh-huh.

Q. Not the whole many thousands of model events that you're looking at when you --

A. Uh-huh.

Q. But if you were to take one modeled event, and in that modeled event, the hurricane hit South Carolina in very rural areas --

A. Uh-huh.

Q. -- then moved into Charlotte.

A. Uh-huh.

Q. In real world terms, do you believe that the demand surge for materials, for contractors in those rural areas of South Carolina is going to be the same as it is in Charlotte where there are many more contractors, many more materials not having to be trucked in?

A. Again, these are all single related scenario. They cannot be used for this purpose because you don't know what event happened before that event. You also don't know what event happened after that event. So, I think for that -- like I said, each individual event, they may not have a perfect fit, but the modeling purpose is to get the overall demand surge factor right for the general usage of the model.

Q. Okay. So you don't have a belief about whether, with regard to a hypothetical -- that one hypothetical modeled event and that one hypothetical modeled demand surge, that whether there would be higher demand surge in the rural areas of South Carolina than in a large metropolitan center like Charlotte?

A. I don't believe model is supposed to get every data point right. I believe the modeling purpose is to get overall results right. Yeah. You will have observations that justify your -- your argument, but there will be also handful of events that against your argument, but my point is the overall, if you look at the whole -- the event catalog holistically, they get the demand surge factor right.

Q. So, to the extent I'm making an argument, are you saying that it is possible that for that one modeled event the demand surge in the rural areas of South Carolina is, in fact, much higher than the demand surge in Charlotte?

A. It's possible for one event it could be higher or it could also possible there are thousand of events that generate lower. Again, demand surge factor is not meant to predict every, every location, every event right, but the intention is to get the overall loss reflect the economic impact of the demand surge.

Q. Okay. I appreciate that.

So, I'm going to go on to very specific questions about the numbers, and I am valiantly trying to finish that by noon.

A. Okay.

MR. FRIEDMAN: Give me one second, Your Honor.

Q. And if you need to refer to your report for these questions.

A. Which book?

Q. It is -- sorry, your report, I understand, is at -- it's in Book 1.

MR. FRIEDMAN: Mickey, do you happen to know which -- where in Book 1 her particular report is?

MR. SPIVEY: You're talking about her prefiled testimony?

MR. FRIEDMAN: Yeah.

MR. SPIVEY: They start her testimony at 7, and then they are sequential after that.

MR. FRIEDMAN: Okay. Thank you.

Q. So, going to RB-7, and the exhibits that are after that, do you recall that you selected an exhaustion point for your modeled reinsurance program for the hypothetical company, the hypothetical one of 15.693 billion?

A. Excuse me, which page?

Q. RB-14.

A. Okay. Yes.

Q. RB-13. Excuse me.

A. Okay.

Q. Both of them. I guess, we are going to look at RB-13 and RB-14.

A. Okay.

Q. So, looking at -- I see it now -- at RB-14 --

MR. FRIEDMAN: Your Honor, that's all I

have for Ms. Mao on cross.

MS. FUNDERBURK: Okay. So you don't have any questions related to RB-13 or 14?

MR. FRIEDMAN: No.

MS. FUNDERBURK: Okay. Thank you, and you've concluded your cross-examination. All right.

Mr. Spivey, redirect?

MR. SPIVEY: Yes, Your Honor. There's going to be redirect, and I am just debating whether we ought to break for a couple of minutes now or -- take ten minutes now, make sure I've got everything I need. I'm hoping not to take all that long. We should be able to finish the day.

MS. FUNDERBURK: Thank you.

We are in recess for ten minutes.

Ms. Mao, as stated before, you continue to be under oath. Thank you.

We are in recess at 11:21. We will return to court ready to go at 11:31. Thank you, Counsel.

(Recess taken from 11:21 to 11:34 a.m.)

MS. FUNDERBURK: Counsel, are we ready to proceed?

MR. SPIVEY: Yes, Your Honor.

MS. FUNDERBURK: Back on the record.

Ms. Mao, you continue to be under oath.

Mr. Spivey, please continue with your redirect.

REDIRECT EXAMINATION

BY MR. SPIVEY:

Q. Ms. Mao, Department counsel asked you a number of questions yesterday about building codes and whether you had seen data about whether and how buildings codes were taken into account by the models. Do you generally recall those questions?

A. Yes.

Q. Is it your understanding that the North Carolina building codes and the enforcement of those building codes are, in fact, taken into account by the catastrophe models?

A. Yes.

Q. What about building characteristics, are they taken into account in the models?

A. Yes, building characteristics, primary, secondary. Primary building characteristics including things like construction, year built, occupancy, those are primary building characteristics. And then as well as secondary such as the roof shape, roof attaching, foundation type, those are also accounted, both primary and the secondary.

Q. Now, do you know all the specific details or all the detailed data that reflect how those matters are taken into account in the models, or are you more generally knowledgeable about the fact, based on your years of experience, that they are, in fact, taken into account in the models?

A. Both. I review model documentations and when they discuss how those characteristics are developed, as well as I, as a user, I tested model, and I tested relativities of those characteristics. And so, as part of my ASOP review, I confirm those characteristics are reflected by model and that the output are reasonable.

Q. It is correct, is it not, that houses built in different time periods may well be built under different building codes?

A. That's correct, so that's why modeling vendors typically use year built as a proxy of building code and building code enforcement.

Q. So, to your knowledge, is year of construction or year built one of the data elements that is provided in the North Carolina exposure database that is an input into the models you ran in this case?

A. That's correct.

Q. Similarly, are the building characteristics that we spoke of a moment ago, such as -- well, let me strike that. Let me start again.

Do building characteristics include things like whether a home is a frame built house or a masonry construction house?

A. Yes. Those are included, yeah.

Q. So, are those -- are building characteristics, such as that, also data elements that are included in the North Carolina exposure database that was an input in the models that you ran in this case?

A. That's correct.

Q. And is it correct, then, that that exposure database is real, actual data about houses in North Carolina?

A. That's correct.

Q. Do you recall Department counsel's questions about whether North Carolina has adopted all or maybe portions of the International Building Code?

A. Yes, I recall.

MR. FRIEDMAN: If I could just clarify, I was talking specifically about the Residential Building Code in North Carolina.

MS. FUNDERBURK: Mr. Terence, let him continue his questioning.

MR. SPIVEY: And, certainly, we are all focused on the residential aspects in this case.

Q. Do you recall his questions suggesting that bathroom plumbing or electrical repairs might be required, following damage, might be required to be made to a higher standard than was required when the house was originally built?

A. I recall that.

Q. If, hypothetically, that were the case, that -- that damages to a bathroom plumbing or electrical had occurred and had been repaired to a higher standard, and then if, hypothetically, the models did not take that into account, what would the result be if a hurricane subsequently damaged that house?

A. That would underestimate the loss because the repair cost for those plumbing will cost more for insurance company. But if the model doesn't take that into consideration, it would underestimate the loss. And, also, I also want to comment, the plumbing and the wiring itself doesn't impact modeled loss. It's not a part of the vulnerability function.

So, in other words, it's just simply -- it has more to -- it doesn't take more to damage -- more to repair. However, on the other hand, those features doesn't necessarily mitigate hurricane loss.

Q. All right. Allow me to pose you another hypothetical. If the models assume that the building code is more stringent in North Carolina than it actually is.

A. Uh-huh.

Q. For example, if the building codes assume, perhaps, that the Residential International Building Code is enforced enforce here, but it really is not, then how would that situation impact whether the models would be accurate or would understate or would overstate the losses when a hurricane damages houses here?

A. The model -- in that case, the model would underestimate the losses because it would assume a building is stronger than it actually is.

Q. Regardless of the hypothetical situations we've just spoken of, is it correct, based on your knowledge, your experience, and your expertise, that the model vendors have experts on the building codes and that they build into the models any relevant changes to those building codes?

A. It's correct.

Q. Do you recall a number of questions over the past couple days about the Aon model?

A. Yes.

Q. Ms. Mao, what is the name of the Aon model?

A. The name of Aon's in-house catastrophe model is Impact Forecasting.

Q. Was the Impact Forecasting model run for any direct purpose in connection with this rate review or this rate filing?

A. No.

Q. Now, there are other models in addition to AIR, RMS, and Impact Forecasting; are there not?

A. Yes, there are. There are other models such AquaCAT, now CoreLogic, ARA model, and the Karen Clark model. Those are additional vendor models.

Q. Were any of those other models run for any direct purpose in connection with this rate review or rate filing?

A. No.

Q. So, just to make clear, for the rate review performed here and the rate filing that resulted from that, that is what we're here about, you ran the AIR and RMS models using the North Carolina Exposure Database; is that correct?

A. That's correct.

Q. Okay. And the results of that are what are presented in your testimony and your exhibits, correct?

A. That's correct.

Q. Did you ever run the Impact Forecasting model using the North Carolina Exposure Database?

A. Not for these rate filings North Carolina Exposure Database, no.

Q. Did you ever run any of the other models that you just identified using the North Carolina Exposure Database?

A. No.

Q. Ms. Mao, do you recall questions regarding your ASOP 38 attestation?

A. Yes.

Q. Is it correct that your work with the models effectively requires that you evaluate each model and new model versions of those models that are introduced over time?

A. Yes.

Q. And when you do those evaluations, you document your evaluation in accordance with ASOP 38; is that correct?

A. Yes.

Q. Did I understand your testimony correctly that you included North Carolina in your evaluation of the AIR and RMS models for your ASOP 38 review?

A. Yes.

Q. Can you please describe the various steps that you undertake in your evaluation of the models for the purpose of your ASOP 38 review?

A. Sure. I follow ASOP 38's guideline in my review. The ASOP 38, the first part is the -- related to scope, the second part are definitions. So, actuaries work on ASOP 38 typically start from Step 3.2 and 3.3. So, in my review, I included my reviewing modeling documentation to understand their model components, and then I reviewed the user input data that Aon used to run client exposure and identify what is the specific characteristics need to be included with each new version. Then, I reviewed the appropriateness of catastrophe model for the intended purpose. So, in my review scope, I included average annual loss and the event loss table. Those are the output used for the rate filing and the reinsurance purpose that cover the general usage of Aon's use model. And, then, I also reviewed the historical comparison that I just described to Mr. Friedman. And so, we compare historical loss with modeled loss for many individual storms, for many individual companies.

And, then, also as part of the model review, I reviewed other sensitivities of the model characteristics, such as construction, occupancies, and the secondary modifiers we just discussed. And, then, in addition to that, I also evaluated the demand surge functions medium-term, long-term differences of those aspects. And, in the end, I conclude, based on my observation, what had -- I opined on whether or not this model is appropriate for rate filing and the other usages.

MR. FRIEDMAN: Your Honor, could I have -- I am sorry to interrupt the flow, but I just was wondering what Ms. Mao is reading from so that I can be there, too.

THE WITNESS: Oh, I'm reading just the ASOP 38 guideline.

MR. FRIEDMAN: Okay. Thank you.

MS. FUNDERBURK: Is that ASOP 38 that you referenced earlier in your testimony, ma'am?

THE WITNESS: Yeah, that's ASOP 38 standard, the specific exhibit. I just want to demonstrate, I strictly follow that guideline.

MR. FRIEDMAN: Yes, ma'am.

MS. FUNDERBURK: Thank you.

Q. Ms. Mao, can you identify which one of the exhibits by number that you're looking at?

A. Yeah, it is Exhibit 12, page 57 through 61.

Q. I believe that's Exhibit RB-12.

A. Yeah. Yeah, that is our Book 3 exhibits --

MS. FUNDERBURK: Is that Book 3 from DOI?

THE WITNESS: Yeah, from DOI.

MR. SPIVEY: I'm sorry, I may have just fouled things up.

MS. FUNDERBURK: No, no, no.

THE WITNESS: It's also in our own exhibit. We also --

MR. SPIVEY: Your Honor, that exhibit is also in the Rate Bureau's filing.

MS. FUNDERBURK: Oh, it's also in the Rate Bureau's --

MR. SPIVEY: So, I probably cited a number incorrectly there.

MR. FRIEDMAN: Just so long, Your Honor, she's reading from the ASOP 38.

MS. FUNDERBURK: And we can clarify for purposes of the record because I -- honestly, I had flipped to the Department's Exhibit 12, 38.

MR. SPIVEY: And I agree, obviously it's going to be the same thing, but in the Rate Bureau's filing, ASOP 38 is included as Exhibit RB-10.

MS. FUNDERBURK: Okay. So, Ms. Mao is referring to Rate Bureau Exhibit 10.

THE WITNESS: Yes, yes.

MS. FUNDERBURK: ASOP 38. Thank you, ma'am.

THE WITNESS: Yeah, thank you.

Q. All right. Thank you, Ms. Mao.

Is it correct, when you do those things that you've just described, that you do them for each model separately?

A. That's correct.

Q. Now, within the various steps you just described, and as part of that, do you review the internal modules of each model?

A. That is not part of the scope of my review. Aon's model evaluation scientists review those model, and I review their results before I start my ASOP 38 because they have the process to validate those models, review those models, then pass their testing to me for further review.

Q. And now while we're speaking about the internal modules, do you recall that you were asked various questions on cross-examination that seemed to suggest that the model results are or could be generated separately for the different models or that the results could somehow be separately attributed to the different modules? Do you recall those questions?

A. Yes.

Q. Can, in fact, the model results be generated separately for those individual modules that are part of the model?

A. It will be impossible because model results is interactions of all three models.

Q. All right. Back to your ASOP 38 attestation. Is it -- I'm sorry. Is your review of each model performed independently of any other of the models?

A. Yes.

Q. Now, in your evaluation of the AIR and RMS models for the purposes of your ASOP 38 attestation, did you comply with all of your obligations under any of the applicable ASOPs?

A. Yes.

Q. Ms. Mao, is it correct that your ASOP 38 review and the work you performed for this rate review and rate filing are two completely separate things?

A. That's correct.

Q. As I recall, your testimony was that you performed your ASOP 38 work and attestation in late 2021 for the models used in this rate review and rate filing; is that correct?

A. That's correct.

Q. And your work on this rate filing was

performed in 20- -- in 2023; is that correct?
A. Yes.
Q. Did you update that attestation specifically for the work you did for the Rate Bureau that is presented in this filing?
A. No, I didn't. That's because the models are the same. There is no change in those models since my attestation.
Q. Do you have any obligation under ASOP 38 to perform a new review and attestation for each separate project that you undertake?
A. No. Our attestation is for the intended use is for those model for Aon. We don't do separate attestation for each project.
Q. And do you have any obligation under any other ASOP to perform a new, separate attestation each time you do a new project?
A. No.
Q. Do you recall questions from Department counsel that referred to global warming and climate change?
A. Yes.
Q. Do you recall some of his questions suggested there might be some bias built into the models in connection with either global warming or climate

change?

A. Yes.

Q. Based on your experience, do model vendors build into their models any particular bias on matters of scientific debate or even matters of societal or political debate?

A. No. I don't believe so. Yeah, I just want to further comment because if you think reinsurance transactions, that's between insurance companies and the reinsurance companies, these two parties in the same transaction have opposite interests, and these two parties are common users of catastrophe models, and it make -- so, modeling vendors have no interest to bi- -- to create bias that favor one party and damage another party.

Q. So, just to make clear, in a reinsurance transaction, we have companies that are writing homeowners' insurance directly for policyholders?

A. Correct.

Q. And, on the other hand, we have reinsurance companies that sell reinsurance --

A. Yes.

Q. -- to those homeowners' providers, correct?

A. Yes.

Q. So, when those two groups engage to negotiate reinsurance, one is trying to buy it and one is trying to sell it?

A. Correct.

Q. Correct?

A. Uh-huh.

Q. So, they have competing interests?

A. Yes.

Q. Would there be -- strike that.

Is there any reason or incentive for the model companies to bias the results one way or the other or in any direction or would they -- is their goal to get the most accurate results possible?

A. Their goal is to get accurate result possible because modeling community is also competitive. There are top two companies, but there are also three, four, second-tier companies, and if the model always bias, they will lose market share.

Q. Ms. Mao, is it also true that there are entities other than homeowners' companies, homeowners' insurance companies and the reinsurance companies that sell them reinsurance, are there other entities that rely on the models for work that they do?

A. Sure. There are catastrophe bond we discussed, and the catastrophe bond are the investors for cat bond are those in the capital market. So, some pension fund could be big banks. And so those model is used commonly for catastrophe bond transactions. So the insurance company and the capital market are the two sides of the transaction.

And there are also government entities to evaluate the risk. For example, mortgage lenders and the big banks, they are also using these models to estimate their exposure. Yeah.

Q. And are there rating agencies that are involved in the insurance industry in, sort of, a broad, general way?

A. Yes.

Q. And do they rely on the models?

A. Yes. Yeah, that's an important one because of each insurance company, they need to obtain a rating, agency rating. And in each major rating agency AM Best, Moody's, Fitch, S&P, all their capital adequacy model for catastrophe components is based on model output.

Q. Do you recall questions from Department counsel regarding the WSST and the medium-term rate models, and whether those models were reviewed or are reviewed by the Florida Hurricane Commission?

A. I recall that question.

Q. Are those models actually reviewed by the commission in Florida?

A. The warm sea surface temperature and the medium-term view are not reviewed by Florida. It's because Florida's review, according to statute, is for use models to set the hurricane loss cost, and Florida has no regulation on how models should be used for reinsurance purpose.

Q. Based on your experience and your expertise gained by working with all of these models over many years, do you have an opinion on whether the WSST and the medium-term rate models provide results that are reasonable and reliable for the purposes for which they are intended?

A. Yes.

Q. And what is that opinion?

A. It's for reinsurance purpose, and for these specific rate filing also for the CAR analysis. So, generally, those warm sea surface temperature view, medium-term view are widely used by reinsurance industry and also in the cat bond transactions.

Q. So, when -- so, when the homeowners' insurance companies that are writing homeowners' insurance, and the reinsurers that sell reinsurance, when those two parties engage with each other in the reinsurance market for the purpose of buying and selling reinsurance, what models do they use?

A. They use the warm sea surface temperature view and the medium-term view.

Q. Would or do AIR and RMS have any reason or incentive to build any bias into the WSST and medium-term rate models that are being used by the buyers and sellers of reinsurance?

A. No. Because both sides are their vendors' important clients.

Q. Do you recall questions on cross-examination about the Beach Plan's reinsurance program?

A. Yes.

Q. In your opinion, is it appropriate to use the Beach Plan's reinsurance agreement to determine the reinsurance structure for the composite single company in North Carolina that we are setting rates for?

A. Using that one company would not be appropriate. That's because it's only one data point, and also the Beach Plan's concentration is on the coastal area and it's not representative of the one composite aggregate company that North Carolina Rate Bureau is pricing for.

And another reason it's not appropriate is Beach Plan has -- Beach Plan's founding structure is heavily relied on the unlimited assessment capability.

So, Beach Plan's reinsurance attach higher and they exhaust lower because they have the assessment layer down below and on top. So, for this reason, Beach Plan has -- Beach Plan doesn't have to be rated by AM Best, while the regular companies, they have to get the rating. So, Beach Plan buy less reinsurance than the typical companies that North Carolina Rate Bureau is trying to reflect in this filing.

Q. Do you recall questions from Department counsel, I believe it was yesterday, I'm sorry, maybe this was -- well, I'm not sure which day it was.

Do you recall questions from Department counsel about whether a Cat 4 storm had ever hit North Carolina?

A. I recall about our discussion around Hurricane Hazel.

Q. And do I recall correctly that you testified that Hurricane Hazel hit North Carolina in 1954 as a Category 4 hurricane?

A. That's correct.

Q. And is that, in fact, your understanding, that Hurricane Hazel hit North Carolina, and it was a Category 4 hurricane?

A. That's correct. The Hurricane Hazel generate Category 4 wind speed in North Carolina and that information is published on the NOAA's website. And as I also discussed, when we evaluate hurricane's damageability, the wind field is the most important parameter we evaluate instead of where the eye first hit the land. But, you know, reality, eye is the calmest part of the hurricane system, that's why NOAA scientists they fly a helicopter into the eye to collect information. So, yeah, what matters is not that eye, what matters is the most damaging wind field.

Q. All right. So, do you know, today, whether HURDAT classifies Hurricane Hazel as a storm that made landfall in North Carolina?

A. Yes. Oh, sorry, no. I -- as I -- I don't have the exact definition on how HURDAT called it. However, I look at NOAA's website. It is hurricane Cat 4 impacting both South Carolina and North Carolina.

Q. Ms. Mao, earlier today now, you were asked questions about policy premium and reinsurance premium, and I'm not entirely sure how clear things were there. Can you explain what is -- what you understand we are talking about when we talk about what the policy premium is for homeowners' policy?

A. Policy premium is what policyholder is paying for his homeowner policy.

Q. All right. What is reinsurance premium when we use that term?

A. Yeah, reinsurance is how much an insurance company pay to reinsurance company to purchase reinsurance, and the reinsurance is cost for insurance company. And in the rate filing, it's -- it is part of the fixed expense built into the rate, along with other expenses.

Q. In connection with those same questions, there was some discussion about CTR premium. Is CTR premium part of the policy premium?

A. It's part of the policy premium, but it's not used to calculate reinsurance premium.

Q. Is any part of the policy premium used in calculating reinsurance premium?

A. No. None of the part of policy premium is used to calculate reinsurance premium. Reinsurance premium is driven by loss. Reinsurance -- expected reinsurance loss.

MR. SPIVEY: May I have just a moment?

Q. Ms. Mao, again, earlier today you were asked questions about testing of historical data in the Aon process. Do you recall some of those questions this morning?

A. Yes.

Q. Can you describe, again, what you did and what is the purpose of what you were doing there?

A. Yeah. The purpose of Aon's testing is to compare how model perform for those individual historical storms and for individual Aon's clients. So, what we did is we collected a lot of clients' portfolio, vintage portfolio at the time of the event. Then every time we receive a new model, we will run the model on those old exposure, and then compare modeled loss with the actual claimed dollars for that specific storm. So, this is the way we evaluate how model perform, individual policies -- on individual company's book. And, then, we also aggregate that result to see overall how model performed for group of clients.

Q. Is the process you just described something that is -- strike that. Let me try again.

When you are performing that kind of comparison, is that different from, say, comparing the modeled losses to the historical losses that we have in recorded history for hurricanes?

A. Yeah. Those are different comparison because our comparison is based on individual storm, not looking at average annual loss perspective. The methods you described is compare model average annual loss with the state's average annual loss for a specific year, and that is not a good comparison.

Because we know hurricane is very volatile, you could have many years without hurricane, then you have one big year. So, due to these volatility, that is exactly the reason model is used to determine average annual loss. It's simply because 20-year, even 50-year is too short, and because we really need a hundred, if not thousand years to do that type of comparison.

Q. Ms. Mao, do you have -- I believe it's Book 3, yeah, Book 3 still there before you somewhere?

A. Yes.

Q. Could you turn to Tab 14 in that book.

A. Okay. Yes.

Q. And you previously testified that this is a copy of an Aon report that was issued late in 2023, correct?

A. Yes.

Q. Would you turn to page 16 in that report?

A. Yes.

Q. And simply in looking at the diagram there of the United States with the individual states all outlined and in various colors.

A. Uh-huh.

Q. Am I reading it correctly that the color coding is broken into just five -- essentially five different colors?

A. That's correct.
MR. FRIEDMAN: Could I get a little clarification, Your Honor? There are two diagrams on page 16, both of which have color codes. I'm not clear what Mr. Spivey is referring to.
MR. SPIVEY: You're correct. Let me make sure we are clear.
Q. I am referring to the second diagram on that page that is immediately below the label "Exhibit 20."
A. Yes.
Q. All right. And, again, so there is five different color codings, correct?
A. Yes.
Q. And looking at that and following up on the questions from Department counsel, the darkest color indicates the need for -- the greatest rate need to achieve a certain percentage ROE, correct?
A. Correct.
Q. And North Carolina is one of the states that is colored in that darkest color, correct?
A. That's correct.
Q. How many states in total are in the group with that darkest color, if you can discern the differences from this diagram?
A. Yeah, if I see from this diagram, there are

four states are in that category including North Carolina, Louisiana, Mississippi, and -- is that Iowa?

MR. BEVERLY: Yes.

THE WITNESS: Yes.

MR. SPIVEY: Thank you.

Q. So, of the 50 states in the United States, all of which are shown on this diagram, North Carolina is among the four with the greatest rate need to achieve a given percentage ROE; is that correct?

A. That's correct.

Q. And that dark color that it's the darkest blue, I believe, is this a band of 15 or above, correct?

A. That's correct.

Q. It doesn't -- it's not saying the rate needed here is 15, is it?

A. It's not saying it's 15, it could be much larger than 15.

Q. If you would turn to page 11 in that same document.

A. Yes.

Q. Can you describe what the diagram of the United States shown on that page, under the heading "Exhibit 6," what is that map or diagram showing?

A. That diagram show for the single state writer what is their prospective return on equity for each individual state.

Q. And is this particular diagram showing that for single state, monoline specialist carriers?

A. Yes.

Q. And what is it showing for prospective ROE for North Carolina on that diagram?

A. It's showing negative one or less. It's showing the capital providers are not making return in North Carolina.

Q. And, again, these numbers are the prospective ROE at current rates, correct?

A. That's correct.

Q. All right. If you would turn back a page to page 10.

A. Yes.

Q. And can you describe -- well, first of all, let me just point you to, it appears there is a diagram on that page of the United States again that is color coded under a heading "Exhibit 5." Do you see that?

A. Yes.

Q. Can you describe what this diagram is showing?

A. So, this diagram is showing national carriers, their prospective ROE at current -- at current rate as of November 2023.

Q. And what does this diagram show for the state of North Carolina?

A. It shows the same conclusion as a monoline specialist. North Carolina's return on equity is negative one or less for national carriers, and that there are four states are in this category for national carriers.

MR. SPIVEY: Your Honor, may I have just a moment?

MS. FUNDERBURK: Yes.

MR. SPIVEY: Your Honor, that concludes my redirect questions for Ms. Mao.

MS. FUNDERBURK: Thank you, Counsel.

Mr. Friedman, do you have recross?

MR. FRIEDMAN: I do, Your Honor. And I guess I'm concerned about the scheduling today. There were not only many whole new concepts introduced on that direct, such as dealing with banks, mortgage lenders, rating bureaus, something -- stuff I didn't touch on, and -- but also pointing to whole new pages in the -- certain exhibits that I didn't ask about, and that's all fine. But my concern is that in going -- I do need to recross her about those, and I don't know how Your Honor wants to handle the timing.

MS. FUNDERBURK: My main concern is I understand that some of your witnesses, Mr. Spivey, have travel arrangements; is that correct?

MR. SPIVEY: I'm sure they do, Your Honor. I don't know exactly what they are, but we are certainly quite hopeful that we could conclude this witness today so that she is not required to be back to testify in -- later in the --

MS. FUNDERBURK: And my preference would be to conclude with her testimony today. Do you want to address any travel issues with your folks? I don't want anybody to miss flights.

MR. SPIVEY: We can certainly check.

MS. FUNDERBURK: Okay. Please do that. We are going to go briefly off the record but, literally, just take a minute to do that.

MR. FRIEDMAN: Your Honor, could I also ask, though, there were ten minutes or so to prepare the redirect, if I could have ten minutes to prepare my recross?

MR. SPIVEY: No objection.

MS. FUNDERBURK: We will take a ten-minute recess for you to address that, and I will remind counsel, recross is limited to redirect,

redirect is limited to cross.

MR. FRIEDMAN: Yes, ma'am.

MS. FUNDERBURK: We are in recess for ten minutes. Be back in ten minutes sharp, so we can proceed. Thank you.

MR. FRIEDMAN: Thank you.

(Recess from 12:19 to 12:27 p.m.)

MS. FUNDERBURK: Counsel, are we ready to proceed?

MR. FRIEDMAN: I am, Your Honor.

MS. FUNDERBURK: Okay. And, first, Mr. Spivey.

MR. SPIVEY: We are ready, yes, please. Yes, ma'am.

MS. FUNDERBURK: Thank you.

Mr. Friedman, please continue -- or please begin your recross.

MR. FRIEDMAN: Yes, ma'am.

RECROSS EXAMINATION

BY MR. FRIEDMAN:

Q. Ms. Mao, yesterday you said that you had seen in AIR and RMS materials stating that their models were updated to reflect the ICC; is that correct?

A. They -- their models updated to reflect building code. It could be ICC, it could be IBHS building code. Yeah, so they use different procedure, yeah.

Q. Putting aside what you assume AIR and RMS are doing, have you ever seen anything in any of their documentation getting more specific and specifically saying, we have updated our models or taken into consideration when we design our models, specifically the North Carolina Residential Code?

A. In AIR I see that line. AIR has a table maintaining with each state what is their ICC year and the building code year, yeah. I see that in AIR.

For RMS, I don't recall reading the specific line on that, but I know RMS is a member of IBHS, and they utilize research to enhance their model, that part I am -- I know.

Q. Okay. So, you know that because they are a member of IBHS and necessarily they must be looking specifically at the North Carolina Building Residential Code?

A. So, it's -- it is, in general, they have engineering employees to keep track of the national -- the building code on the nationwide basis.

Q. Okay. So, as to the AIR, are you describing a category in the AIR materials that shows state by state whether it has adopted the ICC?

A. It shows what the model is reflecting for each state based on the ICC. Yes.

Q. Okay. So, it doesn't show specifically in North Carolina's Residential Code what the residential code has adopted or not adopted or customized from the ICC?

A. It doesn't show that, and I -- again, I trust vendors' engineers because I don't have the expertise to evaluate that information. I don't have the expertise to follow that information. I have to rely on experts in that field.

Q. Okay. So, because Aon [sic] and RMS employ engineers, you have to trust that they've looked at the North Carolina Residential Code?

A. I have to trust the experts to do their work because I am not engineer expert.

Q. And I guess I would ask the same thing about the -- you had a term for it? I'm forgetting right now. But, basically, how North Carolina homes are constructed including by region.

A. That is also engineer's area of expertise.

Q. Have you ever seen anything in any of AIR or RMS's materials saying specifically that they have evaluated how homes in North Carolina are constructed?

A. I see AIR's documentation showing specific storm, how it impact certain counties due to their building code, yes, those are the information I provided to you in the first documentation request.

Q. What is ICAR?

A. It's AIR.

Q. Oh, AIR. Excuse me.

A. AIR hurricane model for the U.S., and in that documentation they discuss couple storms and how they evaluate based on two North Carolina counties' building code.

Q. Are those based on actual losses from those storms?

A. Yes, yes, yes. Those --

Q. Then --

A. Go ahead.

Q. And what two storms were those?

A. Hmm?

Q. What two storms?

A. I don't remember. Yeah, I have to get back to you, but you can also feel free to flip to those pages. I don't recall the storm name.

Q. Would you agree that those, whether they are showing actual losses to homes that, in some way, reflect what those homes are built, how they are built, they would be showing specifically the manner of build for those homes from the regions that were hit by the hurricane?

A. Can you repeat your question?

Q. Yes, ma'am. You said that AIR shows some information -- actual information about the losses to North Carolina homes from two storms.

A. They are showing the loss to North Carolina including they have more detailed discussion on two counties, but they are showing the whole North Carolina wind field map.

Q. And so, they are -- the whole North Carolina wind field map reflects the manner of construction of homes across all North Carolina?

A. The North Carolina wind field map from that specific historical storm and, then, from there, they will apply their understanding of the vulnerability applies -- vulnerability based on the wind field to calculate damage.

Q. Okay. Thank you for reminding me of the term "vulnerability."

Does it show the calculations of vulnerability only in the parts of North Carolina that sustained hurricane damage from that specific hurricane?

A. That part they didn't include in their report. But I also want to mention the vulnerability function, there is a wind, even the wind speed below the hurricane strength, it also will also cause damage, and that is also reflected in the model. So, hurricane below hurricane -- wind speed below hurricane strength. So, when the wind passing inland, the wind speed will reduce. Even though it's reduced, but it's still has damageability. So, it's not just a hurricane strength wind, it is the whole wind field.

Q. Right. But the losses that they have reported that -- as they relate to damageability or durability in North Carolina for those two storms, aren't going to -- there aren't going to be losses if there weren't for certain regions if those regions were not hit by the storm, right?

A. I think the definition of hurricane is once it reach the hurricane strength and even though subsequently if the hurricane reduced, so, for example, if a hurricane make landfall in another state as it's passing to North Carolina, and it become reduced speed below, it is still a hurricane in the model.

Q. So, are you telling me that AIR's models make assumptions about the durability of homes in North Carolina regardless of whether those homes were actually affected by a hurricane?

A. That is a definition of the hurricane -- National Hurricane Center's definition of hurricane is based on the wind speed at certain point. It doesn't reduce -- it doesn't declare it's not a hurricane only because it's not a hurricane on North Carolina.

Q. Okay. So --

A. It is hurricane in the system, then it's treated as a hurricane by model.

Q. Okay. And I guess I am a little confused here on the difference between whatever data there is about the wind speed and how that -- how you can look at that and discern its evaluation of the durability of homes across North Carolina.

A. I don't think I understand your question.

Q. So, I'd asked you the question whether you knew that AIR had -- and when it's evaluating the losses from these two hurricanes you said are in their data, whether their losses were based on an evaluation of durability in -- across all of North Carolina or only in those particular regions where they suffered losses?

A. I think you're getting to -- I still don't think I understand your question, but what I am telling you is a hurricane is a hurricane. If it started somewhere as a hurricane, once it passed through North

Carolina, even though in North Carolina it doesn't have any hurricane strength, but it's -- there is still damaging wind, and it will be reflected in model's calculation. The hurricane's wind speed is 74 mile per hour. So, if the -- even if a storm that in the whole North Carolina with a maximum wind speed as 70 but because it is a hurricane in another part of the country, then it is treated as a hurricane by the model.

Q. I understand that. I'm meaning to get specifically as to the durability or the engineering module.

A. Yes.

Q. And how it reflects -- how their losses reflect the durability of any homes in North Carolina and how that affects the losses. Would you agree that the durability part of the engineering --

A. Uh-huh.

Q. -- component or module is going to affect the --

A. Yes.

Q. Okay. So, my question is, for the AIR models, have you seen anything from AIR that specifically said, our estimation of the durability of North Carolina homes -- first of all, have you seen anything that says this is an estimation -- this is our engineering assumption about the durability of North Carolina homes?

A. That part of the information model would not release to their client. So, those are the information retained by model inventors, and I trust model inventors. They have a team of engineers, and they are doing exactly that type of work, cover the whole country of the United States.

Q. Okay. So, they haven't released that information to you either as a user of the model?

A. They don't release individual vulnerability function for a specific county in the region. No, they don't do that.

Q. Okay.

A. And our evaluation of the model is really the model output that reflect the hazard and the vulnerability. We look at if that result is -- overall if that is reasonable.

Q. So, Mr. Spivey talked to you about whether or not you had used CoreLogic or Aon's hurricane model in the results you have -- whether those are reflected in the results that you have produced?

A. They -- he asked that question. My answer is no. Only AIR and RMS models are used for North

Carolina Rate Bureau filing because it is the scope of our contract is for Aon to run AIR and the RMS model for the Bureau. No other model is covered by our scope of service.
Q. But AIR did run both the CoreLogic, and its own hurricane model for validation purposes of the AIR and RMS results, correct?
A. No.
THE WITNESS: Go ahead.
MR. SPIVEY: Objection. Can you be specific about "the AIR results"? What results are you talking about?
Q. So, yesterday you testified that you validated whether AIR's results were credible or actuarially reasonable.
A. I validated AIR result for the -- yeah, whether or not it's reasonable, and I also talked about our validation for each vendor model is independent. And the only reason I compare them is because ASOP, there is one item require me to compare one model with other models.
Q. Okay.
A. This is the only purpose I did it in 2021, well before this project started.
Q. Okay. So, your comparison -- in order to

determine whether it was actuarially re- -- whether these were good models, AIR and RMS --

A. Uh-huh.

Q. -- in 2021 --

A. Uh-huh.

Q. -- you've compared them to Aon's model results; is that correct?

A. Compared them to Aon's Florida model results. Florida only.

Q. Right. That's one point I wanted make, okay. And for -- what about CoreLogic, where is it -- does it have North Carolina centric data?

A. CoreLogic is a countrywide model, and it's not selected by the Rate Bureau. So, it's not used for this rate filing analysis. And, however, Aon licensed CoreLogic model, so we also independently validate CoreLogic model.

Q. And did you validate, in 2021, the AIR and RMS models or compare the CoreLogic results to the AIR and RMS models?

A. In my ASOP you probably see a loss cost comparison that is just to comply with the ASOP requirement. Has nothing to do with Rate Bureau filing.

Q. I understand that. And where -- you said

CoreLogic uses national data -- or I may have misunderstood you. Where -- does CoreLogic use North Carolina centric data?

A. All vendors use the same underlying data that includes historical storms, the United States building code, and by different regions, and, yeah, they all started from the same information. They use similar informations to develop their models.

Q. So, Aon uses, though, Florida data, it did in 2021?

A. So, again, you misinterpret. I validate the model because only Florida model -- Aon Florida model was available at the time, and I -- we don't have -- we haven't evaluate other part of the Aon's hurricane model. And it doesn't mean we used Florida data to develop other hurricane model, that's not true.

Q. Okay. And, then, as far as the CoreLogic model that you used to validate AIR and RMS in 2021 --

A. I didn't use CoreLogic model to validate AIR and RMS. Each validation is independently conducted.

Q. So, did -- okay. Separately, then?

A. Separately. Independent --

Q. Did you use CoreLogic to evaluate --

A. No.

Q. Are there CoreLogic results that show up in the data you've given us?

A. It's just for one purpose for comparison, but we validate each model independently. We validate AIR independently, then RMS independently, then CoreLogic independently, then Aon's Florida model independently. And in our validations, there is a part that the ASOP require me to just show different result from different models, that is a part. I pull information from each validation, and put together exhibit to complete ASOP 38 validation.

Q. So, when you completed -- your ASOP 38 reflects your consideration of whether the AIR models you used produce actuarially trustworthy data?

A. Correct.

Q. It also includes your evaluation about whether the RMS models you used -- no, not -- only AIR?

A. No. Because you probably notice, I have an attestation for AIR model. I have a different attestation for RMS model. My AIR attestation only says AIR is good to use, and my RMS model attestation is saying only RMS is good to use, and I didn't submit the CoreLogic attestation, didn't submit Aon's model attestation. That means I don't -- we don't use that for these purpose. They are not relevant to this filing.

And even though I show different comparison in one report, for AIR documentation, that AIR documentation what I intended is to say, I did these tests. I say AIR is good to use. But as a fact the other model, like CoreLogic, is also on that report, it doesn't mean CoreLogic doesn't have any implication if CoreLogic is good enough. It's possible that, in that year, I certified AIR and RMS good for use but not CoreLogic.

Q. I certainly understand that. So, my question is, though, for your ASOP certification that -- where you certified AIR is good for use --

A. Yes.

Q. -- as part of making that determination, did you compare AIR's results to the CoreLogic results?

A. No. I look at AIR result only because I look at the reasonability of the AIR result. I look at the relatively of the AIR result to determine the reasonability. I don't use CoreLogic to determine if AIR is reasonable to use or not.

Q. Okay. So, what did you use to determine whether AIR is reasonable or not?

A. It is follow the ASOP 38. We compare historical result for AIR model, and then we look at the user output. The output of the model, the output include a lot of sensitivity testings you see on my ASOP documentation, that includes construction, occupancy, year built, and those characteristics, does the output make logical sense. So, these are the base for my determination if AIR model is good enough for rate filing or not.

Q. Okay. So, you're saying that you -- in evaluating whether the AIR model is good enough, you looked at some actual hurricane results?

A. Yes, I -- we discussed -- we -- I discuss we look at our client's data for those historical storms, and we compared for individual client, we compared to aggregate results, and we compared -- we run several hundred model comparison just for that purpose.

Q. Okay. And how far back in terms of the hurricane -- actual hurricane data did you go?

A. As far as we can get exposure from our clients.

Q. I think you had said yesterday AIR was going back to, was it, 2001?

A. I don't recall the exact number, but the most storm in recent history happened in 2004 or 2005, then, you know, 2018, 2017, and yeah, I think whatever, wherever we get the exposure data, we do the testing.

Q. Okay. So, you talked about looking at actual data from -- and comparing that to AIR to certify that AIR was trustworthy. And you --

A. Not to certify. Just to evaluate the reasonableness of AIR model.

Q. Okay. And, then, you also said that you looked at other AIR results to determine whether they were actuarially credible?

A. What do you mean "other AIR results"?

Q. Whether they were good?

A. What other results do you mean?

Q. I don't know. You said that you looked, first of all, at historical hurricane data.

A. Yeah.

Q. And then you said we also looked at some of the number -- the other numbers put out by AIR.

A. Okay. So, now, I -- putting to that context the other information I mean is the relativity, such as the building characteristics, construction, year built, occupancy, and other characteristics such as shutter, the roof shape, and the foundation, those type of information we do sensitivity testing.

Q. Okay. And in the sensitivity testing --

A. Uh-huh.

Q. -- what data are you using to test against AIR's results?

A. We design a notional portfolio. That is, we use those notional portfolio with certain construction, certain policy limit, the same deductible. So, the reason we do this notional portfolio is to measure only the hazard, so we want to remove the exposure concentration from the test, so that way we can just test the hazard. And in our notional portfolio we put notional exposure in every coastal state that include four points in North Carolina, so, two points on the coast, two points inland.

So, for it's relativity testing, we want to test if the, geographically, if the model output makes sense. Does the coastal have higher relative -- higher loss costs than the inland, and it does. So, these are the things -- what common -- what is you would expect, what you see out of the model. I conduct a series of the sensitivity testing to -- these are the other things I am talking about.

Q. Okay. And for that notional portfolio that Aon has, and those two points, is that based on actual data as to the sensitivities from those two points in North Carolina?

A. As I said, notional is not actual. That's why we call it notional.

Q. Okay. Thank you.

And is that the same process for RMS that you go through --

A. Yes.

Q. -- looking at a notional portfolio that Aon has --

A. Yes.

Q. -- for RMS and then looking at actual hurricane --

A. Yes.

Q. Okay.

A. Yeah. Notional portfolio is widely used by insurance actuaries, and many companies develop their rating plan relativities based on notional portfolios because -- that is because in your actual portfolio, you may not have exposure in everywhere in the country, but by doing the notional testing, you can put the -- those portfolio in the place you want to measure, so that way you have the measure for every place you want --

Q. Okay.

A. -- for your rating plan.

Q. And what -- could you just, for the notional portfolio, what things are you measuring other than the actual hurricane -- obviously the actual hurricane loss. You've looked at actual hurricane data. What sensitivities, I think the term is, are you measuring in the notional portfolio?

A. Yeah, I think already discussed that. I measure a series of relativities, including construction, occupancy, year built, and for some models they also have square footage, number of stories. And, in addition, we know hurricane has the secondary modifiers also make difference. So, we tested roof shape, roof attaching, those type of -- yeah, the lengths of the nail, those type of variables. Those are all part of our testing and also shutter, whether or not you have engineering shutter or no shutter at all.

Q. Okay. Now, Mr. Spivey asked you some questions about whether if, in fact, the North Carolina Residential Code is stricter than the ICC, then that would mean the models were underestimating?

A. What I'm saying is the stronger your building, the lower the loss. So, if your portfolio reflect a stronger building code than it actually is, then the model would estimate, but it's also vice versa. So, yeah, both way will work.

Q. Okay. So, then, it's the vice versa there?

A. Yes. Vice versa is true.

Q. If, in fact, the North Carolina Residential

Code did not impose anything -- imposed far fewer requirements than the ICC, would that mean that there are fewer things that the insurers are having to pay to repair that home?

A. That is -- that is a claims question. So, it's based on what is required by law, what insurers need to pay, and what is cost to build to code. I think it's a case-by-case situation.

Q. So, you testified for Mr. Spivey that if the North Carolina codes were stricter, then, in fact, you would have been -- the insurers would have been having to pay more; is that correct?

A. If the -- if it cost the insurer more to build to code, yes, it will, yeah.

Q. And what if the North Carolina Residential Code were, in fact, less stringent than the ICC, would that mean that, in fact, the Bureau had overestimated the cost of repair?

A. Yes, this is one side of story that, yeah, it's possible if the building code is less stringent than the ICC, then the Bureau could -- yeah, the model would overestimate the loss. But on the other hand -- yeah, sorry, that's your -- yeah.

Q. Okay. Thank you.

A. But on the other hand, it's just from the damage part, it is probably also costs less for --

Q. For the insurers because they don't have to build it up --

A. Correct, yeah, yep.

Q. Okay. Thank you.

You talked about -- you -- I think you talked about you assuming that AIR and RMS as -- I don't know, were you talking about their bias? Were you talking about the meteorological bias or the engineering -- any possible engineering bias or meteorological bias or financial bias?

A. So, I talk about I don't test those individual com- -- sorry. I don't test those individual components as part of my testing, but Aon's model evaluation team, they tested those components. And the scope of my testing is output of the model, that is a combination of those modules.

Q. And is it your impression that, based on Aon's testing of the -- of any bias in the engineering, financial, or meteorological assumptions of, I guess, both AIR and RMS, is it your understanding that they have taken into account the possibility of bias in those three modules of AIR and RMS?

A. In my testing, I focus on the outcome. I don't identify any -- whether or not each model is bias -- bias or not.

Q. And do you know the results of Aon's testing of all three of those models for those AIR and RMS models?

A. Once those -- no, I am not aware they have concluded any of the models' bias or not, no.

Q. So why do you believe that the AIR and RMS models don't include some bias in any of the three modules?

A. I don't have -- I don't have reason to believe they have bias, but I have to see it, and I have to rely on other experts' testing because I -- this is not my part to test each module if they are biased or not.

Q. So, you really have no opinion about whether AIR and RMS include any bias in any of the three modules of their models?

A. My opinion is they don't have incentive to include any bias in their model. And Aon's model evaluation tested and showed their results are reasonable.

Q. Okay. So, let's go into that question of incentive. I believe you testified to Mr. Spivey that one reason you think they would have no incentive is to -- to bias any of those three modules is because both reinsurers and primary insurance companies rely on the models?

A. This is one of the reasons, and also people develop the models are scientists. Scientists are bound by their code of conduct, and I trust that they -- it's their interest to get the model right.

Q. Okay. So, those are two things, reasons why you think there wouldn't be any bias. The first thing as to -- you're saying that there is a difference of interest between reinsurers and insurance companies?

A. I think this is just a common when people on both sides of the transaction, one is a buyer, one is a seller, it's natural that they don't have the common interest. Because if you're thinking about you want to buy something, it's your interest to buy at the lower price, and it's the seller's interest to sell it at the higher price.

Q. Okay. Do you know what the Commissioner concluded in the 2014 order about whether there was, in fact -- there were, in fact, dueling interests between reinsurers and primary insurers?

A. I -- yeah, for that legal opinion, I need to rely on my -- on Bureau's counsel to advise me.

Q. I'm not asking you what his legal opinion was. Then, how about this, do you know whether he addressed that issue?

A. No, I don't know.

Q. Okay. And then as to the second thing, why you think there must not be any bias, is because both Aon [sic] and RMS employed scientists?

A. The other reason I think there is no bias is, yeah, those scientists, they want to develop the best model and their model are -- those core components are validated, peer reviewed by external scientists, by the Commission, by Florida Commission. And so, therefore, I feel if there is a clear bias, those bias would have been corrected during those process.

Q. So, the AIR standard and the RMS historical are reviewed by Florida, right?

A. Correct.

Q. Not the WSST and the medium-term?

A. Those are not reviewed. Those are only peer reviewed by their -- each vendor's probably internal/external scientists, yeah.

Q. Okay. So, rating bureaus -- I believe you testified that -- do carriers want to obtain the best rating possible from AM Best? Is that in their interest, to obtain a good rating from AM Best?

A. That is -- they need to obtain rating because insurance company, when they sell insurance to policyholders, say, for example, you borrow money from bank and to buy a house and your loan requirement will require you to have insurance with a rated insurance company. So, it is a must for insurance company to be rated by one of the rating agencies recognized by those large banks.

Q. Okay. And do insurance companies prefer that they get a better rating from AM Best than a poorer rating?

A. Better rating will be desired because better rating means when insurance company borrow money, they also have favorable rate. So, it's cheaper for them to borrow money.

Q. And do you know what affect the Bureau -- the rating bureaus have on whether or not the carriers have to run hurricane models?

A. I don't -- I don't understand your question.

Q. Okay. Do -- does AM Best expect that hurricane -- that carriers, homeowners' carriers, will run a hurricane model in order to garner a good rating from AM Best?

A. AM Best, BCAR test, that's their capital adequacy test, has specific input on return period for hurricane loss, second hurricane loss, and earthquake loss. All those are modeled output.

Q. So AIR Best [sic] advises the insurance companies that they expect them to run models for hurricanes, earthquakes, and -- I forget the third category?

A. Yes. Yeah.

Q. Okay.

A. And I also want to add, AM Best, for their evaluate hurricane, it's based on the medium-term, near-term view, warm sea surface temperature view. If the company doesn't use that view, AM Best would add additional load to those views. So, AM Best is taking a conservative approach when evaluate hurricane risk. So, they are utilizing the medium-term view and the warm sea surface temperature view for their rate capital adequacy test.

Q. Okay. So, you're characterizing WSST and medium-term as more conservative than AIR standard and RMS historical?

A. Conservative in this context means, yes, it is -- conservative means you need to have more capital to protect these hurricane risk. It's --

Q. Does conservative in this context mean --

A. Higher. Higher, yes.

Q. So, conservative, in this context, means that they expect them to use models that produce higher losses in order to ensure that they have enough capital to get a good AM Best rating?

A. It means AM Best, they believe, when they do the capital adequacy test, they should rely on medium-term view and the warm sea surface temperature view rather than historical and long-term view.

Q. Okay. And in your AIR and RMS results, based on the medium-term for RMS and the WSST for AIR, in this filing every one of the numbers was higher than the numbers for AIR standard and RMS historical, right?

A. In this filing, yes, for this specific version, yes.

Q. Okay. So, if you are -- let's just assume a North Carolina carrier is charging 200 percent of the manual rate under CTR. So, based on that, if there is a hurricane, then that carrier is -- let's just say there was exactly the same loss to a home that was for a holder -- policyholder carrier paying 200 percent of the manual rate and the same damage to a policyholder that's paying the manual rate to that company. Do you get that -- do you understand that part of my hypothetical?

A. You're hypothetical is -- if I can restate your question?

Q. Yes, ma'am.

A. That modeled loss is based on the building itself. It's not based on how much policyholder paid for their insurance, is that your question?

Q. No. I guess my question was Mr. Spivey asked you whether the reinsurance premium was affected at all by, as I understood him, consent to rate rates.

A. No, it's not.

Q. Okay. So, I'm asking you a hypothetical about that.

A. Reinsurance cost is determined by expected loss.

Q. Okay.

A. Expected hurricane loss. And so, yeah, you may have two houses that is the same, but one house is paying double rate -- double premium of the other. But for our purpose, the rate -- the loss and the cost of reinsurance would be the same for those two policies.

Q. Okay. But, in fact, and in that scenario --

A. Uh-huh.

Q. -- the actual insurer that is ensuring both homes, one of them -- they both suffered the same amount of damage, and it's -- that actual insurer is only receiving the manual rate on one home, but is receiving 200 percent of the manual rate in that other home. In that scenario, is that actual insurer suffering fewer economic -- fewer -- the claims are lower for the second one who is paying 200 percent of the manual rate?

A. What is your question, the second one what?

Q. So, for the second home --

A. Uh-huh.

Q. -- that has the same damage as the first home, but that second homeowner is paying 200 percent of the manual rate --

A. Uh-huh.

Q. -- does that mean that, ultimately, that insurance company has fewer losses than -- bottom line losses than it does as to the first home?

A. Yes. In other words, the first company will have worse loss results than the second company.

Q. I was talking about --

A. Yes.

Q. -- one company. That same company is having fewer losses for the second house as it is having for the first?

A. Yeah. I think those -- there are variations for those individual policy and the insurance ratemaking is never about to get individual policy all accounting balanced. It's about a class rating for the composite aggregate exposure.

Q. Uh-huh. I understand that but you are -- my example is just dealing with a single carrier that insures both homes. And in that scenario I gave you, that single carrier is, in fact, paying out less for the same home for the same damage -- or for the home that is -- suffers the same damage and is paying the CTR of 200 percent versus the home that suffers the same damage and is only paying the manual rate?

A. Yeah. For -- in that case, the insurer will pay the same loss to both policies, but also, yes, he is -- the insurer will collect more premium from the second policy.

Q. Okay.

A. Yes.

Q. And so that means there is actually less loss in the end to the carrier for that second policy?

A. There is not less loss in dollars, that might be less loss ratio for the first carrier.

Q. Okay.

A. Yeah. For the second carrier.

Q. For the second home?

A. Yeah, yes, yeah.

MR. FRIEDMAN: That's all I have for Ms. Mao on recross.

MS. FUNDERBURK: Thank you, Counsel.

MR. SPIVEY: May I have just a moment, Your Honor?

MS. FUNDERBURK: Yes.

(Brief pause.)

MR. SPIVEY: All right. Your Honor, I have just a very brief -- few -- couple of questions for Ms. Mao.

MS. FUNDERBURK: A re-redirect.

MR. SPIVEY: I guess that's what it called. I hesitated because I was going to mess it up. Yes, I guess it's re-redirect.

MS. FUNDERBURK: I will allow a few brief questions.

MR. SPIVEY: Thank you, Your Honor.

FURTHER REDIRECT EXAMINATION

BY MR. SPIVEY:

Q. Ms. Mao, Department counsel asked you questions about the building code, and I think the hypothetical that I posed this morning, and then I think maybe -- I'm not sure if he was posing hypotheticals or not, but let me see -- I got confused. Let me see if I can get myself clear, if you could help me with that.

If the building code is less stringent than -- well, let me just try again. If a building code is less stringent than whatever we might be comparing it to, is it correct that a given hurricane would result in greater damage to the houses built to that building code than they would -- than the damages that would result to homes that were built to a more stringent building code?

A. That's correct. Yeah. Hurricane always cause more damage on weaker buildings than stronger buildings, yes.

MR. SPIVEY: Thank you, Ms. Mao. That's all I have.

MR. FRIEDMAN: Your Honor, I have one question about that.

MS. FUNDERBURK: Limited to?

MR. FRIEDMAN: Just what he asked.

MS. FUNDERBURK: Correct.

FURTHER RECROSS EXAMINATION

BY MR. FRIEDMAN:

Q. So, in terms of damages, there would be more damages to a house if the residential code for -- that governs that house is less stringent than the ICC?

A. So, there will be more damage to the building if the code is weaker than ICC, right, yeah.

Q. But the repair costs that the carrier would have to pay to repair that home would be less if they don't have to build it up to a more modern, more expensive code provision, correct?

A. That's also correct.

MR. FRIEDMAN: Thank you.

MR. SPIVEY: One question, Your Honor.

MS. FUNDERBURK: We are getting beyond the typical points of cross and redirect. I am going to allow it, but caution you, we are past the normal bounds.

MR. SPIVEY: Thank you, Your Honor.

FURTHER REDIRECT EXAMINATION

BY MR. SPIVEY:

Q. Ms. Mao, Mr. Friedman just asked you about whether damages to -- damages from a hurricane -- let's assume there are damages and repairs have to be made. He asked you whether those damages would be less costly under a code that is weaker, correct?

A. Yes, to --

Q. That's what he just suggested?

A. Yes, that's what he suggest to build to a weaker code, then just -- yeah, then the cost is based on that weaker code.

Q. So, how many damages would have to be paid by an insurance company if the house were built to a stronger code and suffered no damage?

A. That will be much less, yes. And, overall, a strong building code will save both policyholder and the insurance company money.

Q. Thank you.

MR. SPIVEY: No further questions.

MR. FRIEDMAN: Your Honor, this is a whole new thought I haven't had, but if I -- I'm sorry, if they keep asking --

MS. FUNDERBURK: Ask a question related to the re-re-redirect. We are going to close this out. You can ask a follow-up cross question, and we are going to close out the hearing for the day.

MR. FRIEDMAN: Yes, ma'am.

FURTHER RECROSS EXAMINATION

BY MR. FRIEDMAN:

Q. So, in terms of what the company pays out in claims to repair a home in a jurisdiction where the residential code is -- doesn't require the home to be repaired to the modern ICC standard, you understand that scenario -- that I am posing that as my scenario?

A. I -- that is one of the -- I think that's outside of my area of expertise, and I don't know how North Carolina enforce a building code, what is a building code is in specific region, that I don't know, yeah.

MR. FRIEDMAN: Your Honor, I have to say that given this whole line of questioning, where I think she's already testified about a hypothetical, that where there is a residential code that's less restrictive than the standard, she says that she has seen the models say they are using, mainly the ICC, she's just asked repeatedly to try -- about that question, and she gave very forthcoming answers, saying that -- the forthcoming answers she gave to Mr. Spivey, for her to now say that in my example, which is literally the other side of the coin from the example that Mr. Spivey just asked, she can't speculate, essentially.

MS. FUNDERBURK: I'm going to allow to you restate your question. I am going to direct that you phrase it in a non-compound sentence.

MR. FRIEDMAN: Yes, ma'am.

MS. FUNDERBURK: And be very direct with what your question is.

Q. Okay. So, Mr. Spivey asked you to compare a hypothetical residential code --

A. Uh-huh.

Q. -- that was less restrictive than another hypothetical building residential code.

A. Yeah.

Q. Is that your understanding of what he asked you?

A. He is asking me a stronger building or weaker building which building costs more for insurance company. My answer is a weaker building costs more for insurance company. That's because the weaker building will suffer loss repeatedly when you run the model, and they have -- they will have more losses. And even though it may be a little cheaper to repair, but overall weaker building costs insurance company more to insure. So, this is why you see the mitigation credit in premium. Insurance company justifies those credit -- mitigation credit because stronger building, it perform better in hurricanes and save insurance company money.

Q. Okay. So, are insurance companies, in general, on homes pay out what it costs to repair the home, what it actually costs; is that fair?

A. They pay out -- there are different coverage. There is a replacement cost or there is an actual value cost, and it depends on your insurance to value, ITV, ratio. So, if you don't buy full coverage, then you don't get the full replacement cost. It's all -- it depends on your policy condition.

Q. And only certain levels of damage will even trigger a replacement cost provision; is that right?

A. What do you mean "certain level"?

Q. If you have a replacement cost of 300,000 --

A. Uh-huh.

Q. -- and you have a policy that has a provision like that in it --

A. Uh-huh.

Q. -- not just a repair cost --

A. Uh-huh.

Q. -- but you only suffered $25,000 worth of damage from the hurricane --

A. Right.

Q. -- that company is not going to pay you $300,000?

A. That's correct, yeah. They will pay up to the policy limit.

Q. Okay. So, as regards to the repair costs, whether you're -- they are only -- let's just assume they are only obligated to pay the repair costs, and you have an area with a less stringent building code that doesn't require the repair to bring it all the way up to some more stringent building code, are they -- is the insurance company paying out less if the code is weaker?

A. For just the one incident maybe. However, when we calculate hurricane loss costs, it is average annual loss. It is some product of the frequency and the -- and the severity of the loss. It's some product of the loss dollar amount multiplied by the annual rate. So, we cannot talk about just one scenario. When we talk about the hurricane results, you have to see the whole event catalog. So, what I will say is in -- if a house is weakly built, then there will be whole more -- a lot more storms that will cause loss for that specific location.

So, that's why, in our hurricane average annual loss calculation, the weaker building will have higher average annual hurricane loss.

Q. Based on your hypothetical modeled hurricanes and their hypothetical modeled loss?

A. It's -- yeah, but it is more comprehensive than your hypothetical one event.

MR. FRIEDMAN: I have no more questions for Ms. Mao.

MS. FUNDERBURK: Thank you, Counsel.

MR. SPIVEY: No questions. You knew that, didn't you?

MS. FUNDERBURK: I did, in fact, know that, Mr. Spivey. Thank you.

Thank you for all maintaining your sense of humor after quite a few days in hearing. Now, Counsel, I don't have the prehearing order in front of me, but I believe it we are scheduled to come back on October 23rd at 9:00 a.m.; is that correct?

MR. BEVERLY: Yes, Your Honor.

MS. FUNDERBURK: Okay. And I believe we will be beginning with Mr. Ericksen's testimony; is that correct?

MR. SPIVEY: I believe that is correct, Your Honor.

MS. FUNDERBURK: Okay. Are there any matters that need to be addressed before we recess until the 23rd?

MR. SPIVEY: Not that I know of.

MR. FRIEDMAN: Nor me, Your Honor.

MS. FUNDERBURK: Okay. I will thank the witnesses for their time, especially, Ms. Mao. You have spent quite a bit of time on the stand. Thank you for your patience and participation.

We are in recess until 9:00 a.m. on October 23rd. Thank you.

THE WITNESS: Thank you.

(Hearing adjourned at 1:27 p.m. with resumption scheduled at 9:00 a.m. on October 23, 2024.)

STATE OF NORTH CAROLINA)
) C E R T I F I C A T E
COUNTY OF CABARRUS)

I, Renee Habrack, Notary Public, do hereby certify that the above hearing was taken and transcribed by me; and that the foregoing pages are a true and accurate transcript of the testimony of said witnesses. I further certify that the persons were present as stated.

I further certify I am not of counsel for or in the employment of any of the parties to this action, nor am I interested in the result of said action.

IN WITNESS WHEREOF, I have hereunto subscribed my name, this 11th day of October, 2024.

RENEE M. HABRACK, CCR, RPR
Notary #20041960006
My Commission Expires: 7/20/29