NORTH CAROLINA DEPARTMENT OF INSURANCE

RALEIGH, NORTH CAROLINA

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| IN THE MATTER OF THE FILING DATED JANUARY 3, 2024, BY THE NORTH CAROLINA RATE BUREAU FOR REVISED HOMEOWNERS INSURANCE RATES | ) | BEFORE THE COMMISSIONER OF INSURANCE |
| | ) | DOCKET NO. 2157 |

**COPY**

BEFORE: AMY FUNDERBURK, HEARING OFFICER

# TRANSCRIPT

# OF

# HEARING

VOLUME III - P.M. SESSION

Raleigh, North Carolina

Wednesday, October 9, 2024

1:20 p.m.

A P P E A R A N C E S

On behalf of the North Carolina Rate Bureau:

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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 North Carolina Department of Insurance, 3200 Beechleaf Court, Raleigh, North Carolina, on the 9th day of October, 2024, at 1:20 p.m., before Wendy Sawyer, Court Reporter and Notary Public.

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INDEX OF EXHIBITS

(No exhibits offered.)

P R O C E E D I N G S

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HEARING OFFICER FUNDERBURK: Thank you. We are back on the record. When we recessed for lunch, Mr. Spivey had concluded his direct examination of Ms. Mao. Before we proceed with Mr. Friedman's cross examination of Ms. Mao, are there any matters we need to address?

MR. SPIVEY: None that I'm aware of, Your Honor.

HEARING OFFICER FUNDERBURK: Mr. Friedman?

MR. FRIEDMAN: Other than the fact that it is --

HEARING OFFICER FUNDERBURK: Please bring your microphone in or speak louder.

MR. FRIEDMAN: Yes, ma'am. Other than the fact that it is possible this afternoon that I may have to go into some confidential material, which obviously, I will tell everybody about in advance and we may have to go through the procedure for hearing evidence on that.

And I anticipate that there will be -- there may be questions about which Ms. Mao has to consult her Rate Bureau's attorney about. So not

to be ominous, but --

HEARING OFFICER FUNDERBURK: All right. Well, counsel, I will leave that up to you to raise an objection if you feel that we need to address something that could be privileged.

Ms. Mao, if you feel that you have been asked something that would require you to break privilege, that may be something we need -- privilege with your counsel -- that may be something that I need to address with the attorneys before you proceed with questioning.

And I believe you've testified before, but, generally, if while you're being questioned, if counsel raises an objection, you can wait until I rule on that objection to continue speaking, and we'll give you direction.

I'll remind you -- I'll remind you, again, that you are under oath. You're continuing to be under oath for the purposes of your testimony here today.

Mr. Friedman?

MR. FRIEDMAN: I should have clarified. I don't intend to ask her any privileged communications, but what she may need to seek counsel about is the extent of the proprietary

issue.

HEARING OFFICER FUNDERBURK: Okay. And we can address that as it arises.

Mr. Spivey, did you have a comment?

MR. SPIVEY: I was just going to say that I was going to clarify that. And I was assuming we're talking about materials that we are treating as being under the protection of the protective order.

And, you know, Mr. Friedman is doing a good job giving us notice, but I think it's sort of incumbent on you to tell us sort of when you're going to get into those things so that we all know some of the processes we need to do here in terms of who's in the room and that sort of thing.

MR. FRIEDMAN: Sure. Absolutely. I think I'll be able to clearly signpost when we're going into something that's been marked confidential. But based on Ms. Mao's answers this morning, the substance of my questions about certain assumptions in the models, which may -- which we haven't been produced data about may require her to --

MR. SPIVEY: Okay. I understand. And we'll try to be alert to that as well.

HEARING OFFICER FUNDERBURK: Thank you, counsel.

Mr. Friedman, are you prepared to proceed with your cross examination?

MR. FRIEDMAN: Yes, ma'am. Let me, if you could, just open up one file. There we go.

CROSS EXAMINATION

BY MR. FRIEDMAN:

Q. All right. Ms. Mao, could you turn to Exhibit -- the Book 3? And I'm going to be asking questions about the ASOPs, which are at Exhibit 12.

MR. FRIEDMAN: Sorry, Your Honor. I'm looking for one -- too many outlines that I haven't had time to consolidate. All right.

BY MR. FRIEDMAN:

Q. So, ma'am, looking at ASOP No. 1, and in particular -- tell you what, ma'am. I'll come back to the ASOPs. Why don't we go on to another subject?

So let's talk about the models, the four models that we discussed earlier. How has the AIR WSST been -- been -- been specialized for North Carolina with regard to the engineering module?

A. This is not just specific to AIR WSST model. For, in general, each model, when they develop their engineering module, they have some -- they have

the approach that, based on the theoretical study, then use some region-specific claims data to calibrate their model as well as they will reflect certain -- certain Building Code and building characteristics of the region. So this is a general approach of each vendor to their vulnerability function.

Q. Do you know whether the engineering modules for both RMS models are similar?

A. Yes. They are all similar. They take the similar process and approach.

Q. No. But I'm asking specifically about your knowledge of the engineering modules of RMS historical and RMS medium term. Do you know if those are the same?

A. The historical and the medium term view have the same engineering module, and the difference is on their hazard module specifically to the frequency of some events, intense events. So RMS module differs that.

And while we can go back to the AIR. AIR model, they have a different approach for warm sea surface temperature view. And for AIR model, it's a separate category. So AIR consider -- they have a subset of the event for during the warm phase.

And so they do the statistical study and

determine what is hurricane frequency during the warm phase. And based on that study, they developed the WSST event catalog. And that event catalog also applies the same underlying and vulnerability functions.

Q. Engineering module's another word for the vulnerability function. Is that correct?

A. Correct. Engineering and vulnerability are exchangeable term here.

Q. So between the two AIR models, it's your understanding that they have the same engineering module between them?

A. That's my understanding. Yes.

Q. And but it's not the same engineering module as in the RMS?

A. It's also -- it's also the same engineering module. I -- as I understand, it's engineering part is basically what is your wind speed, and the surface roughness, things like that, and how that generate loss. And what differ AIR from RMS is how they build the near term WSST modules. They use a different statistical methodology to build their warm sea surface or -- or the -- the near term module.

Q. So are the same engineers creating -- or not engineers, but all the other professionals who

contribute to the engineering module, are the same ones contributing to Aon's as are contributing to RMS?

A. That, I -- I cannot comment on RMS, but I believe it's the same engineering principle applied to both near term and long term modules.

Q. Okay. So but as to the actual people who are building those modules --

A. They could be. Yeah.

Q. But you don't know?

A. They could be different and they could be the same, but I -- I cannot disclose that to you.

Q. Okay.

A. But based on my understanding, those modules have the same engineering -- based on the same engineering principle, generate base1d on the same hazard. If the hazard is the same and the vulnerability the building is the same, it should generate the same loss. That's my understanding.

Q. And I'm not asking about what you can't reveal to me because I assume proprietary issues. Issues. But are you saying that other than principals, as far as the actual people who are contributing to AIR's engineering module versus RMS's, is that something that's proprietary too?

MR. SPIVEY: Mr. Friedman, are you

asking about people who build the models?

MR. FRIEDMAN: Well, she's talking about engineering principals. And what I'm interested in is, for example, the people who contribute to the Building Code assumptions that go into engineering models that affect damageability. And I don't know whether Aon employs its own engineers who contribute its own Building Code professionals who contribute to that or whether the same ones as RMS.

MR. SPIVEY: Okay. I'm just -- thank you for clarifying. I just -- go ahead and ask --

HEARING OFFICER FUNDERBURK: Restate the question.

MR. FRIEDMAN: Sure.

BY MR. FRIEDMAN:

Q. Does RMS employ its own building professionals who contribute to RMS-only engineering modules?

A. RMS listed -- listed their professionals in their ASOP 38 documentation, and you can find which engineer contributed to their hurricane model.

Q. And is there overflow between the engineers who contribute to RMS engineering modules and the ones who contribute to AIR?

A. I don't recall -- I don't believe they list them separately for that specific module. They will list all the engineers contribute to that module.

Q. Okay. Have you ever read any of the written explanation of the contributions by any of the persons who build the engineering module?

A. Yes. I review their documentations on the engineering module as well as the hazard modules that's part of my actuarial review.

Q. Um-hum. And have you talked to them, either the engineers at Aon or the engineers or Building Code professionals at RMS personally?

A. Yes. Aon has model evaluation team. That team include structure engineers, meteorologists, and also some data scientists. Once they conduct model evaluation, they will -- they will test those different components of the model, including the frequency, severity, and also the vulnerability. I -- I talk with them often.

Q. Okay. But -- but not just about their attestations, about the actual data or updated data they've contributed to each model in the -- in the engineering's module?

A. Generally, my review is if I feel the result is reasonable, I will accept it. If I have

questions, I will have further discussion.

Q. Okay. When you decide what's actuarially reasonable, have you ever just limited yourself to the attestations by the model makers?

A. Not just the attestation, and I fully documented my review in additional documentations that being submitted in the first discovery documentation request while I outlined what I did to validate those models.

And I based on Aon's model evaluations, dashboard, and I conducted review on a lot of aspects that outlined by the ASOP 38 that including the input into the data, what the sensitivity of each variable and how -- and how one model compared to other models. So I follow ASOP 38 outline to come, to perform my model evaluation.

Q. Okay. Do you know for a fact whether the RMS engineers took into account and added data to reflect the North Carolina Building Code for residential homes that's been in effect in the past five years?

A. For -- for that specific, I -- I did -- I don't -- I didn't discuss that with -- with our people. And I -- I trust they would evaluate these aspect of the model. So engineering component, the building code

model will cover by Aon's engineers.

Q. Have you ever seen anything in writing or heard anything from them about the North Carolina Building Code?

A. That, I don't recall. I -- I look -- I look at their testing that include North Carolina loss and in the dashboard. And in term of how to -- the -- the discussion around North Carolina Building Code, that part, I'm -- I don't recall, but I re -- I reviewed the model result related to North Carolina's loss as well as how the model perform in -- in term of sensitivity to different variables.

Q. Would you agree that North Carolina's Building Code affects the damageability of North Carolina homes?

A. The Building Code and the enforcement of Building Code impact the damage. That's true in each state.

Q. Okay. But you don't know specifically that RMS engineers took into account the North Carolina Building Code?

A. That is engineer experts. It's their expertise. I trust their judgment, and it's also part of my professional -- actuarial profession require me to rely on the expert that outside of my own expertise

rather than be the expert in every field.

So by actuarial standard, I need to rely on the expert, engineer expert, as well as meteorologist to do their work, to make their judgment. And I, yeah, I'm not the one who make decision for them.

Q. I understand that you're entitled to rely on another expert as an actuary, but that doesn't stop you from asking them to clarify things that they've attested to. Does it?

A. I -- in my -- in my model evaluation, I ask questions and I, yes, I agree. I -- I can ask additional questions.

Q. Did you ever ask, let's say, either the RMS engineers or the AIR engineers whether or not they had specifically considered the North Carolina Building Code?

A. I didn't ask that specific question.

Q. Okay. And with regard to the types of homes that are built in different regions of the state, have you ever seen any data on that from the RMS engineers or the AIR engineers? And I'm speaking specifically of North Carolina.

A. So what I evaluate in the model is, basically, based on the data we receive, for example, from Bureau and how the building -- what is the

building characteristics in different region, and we try to reflect in the model run.

Q. Have you ever seen any actual data speaking as to the building characteristics in one region of North Carolina versus another?

A. In our -- in our model evaluation work, we actually tested some notional portfolios. Basically, we evaluate how model perform in different regions, inland versus coastal, and what different constructions will perform, like a masonry, veneer, frame, how they perform in different regions. Those are all included in our model evaluation work. I didn't do the work, but I rely on Aon's model evaluation team doing that work.

Q. Okay. So that is Aon doing validation of the results of RMS and AIR. Correct?

A. Correct.

Q. Okay. Have you ever seen any data from either AIR or RMS engineers about the building characteristics of any region in North Carolina?

A. That, I have to go back. I don't recall.

Q. Okay. Have you ever asked for the AIR engineers or the RMS engineers to provide you any data about the building characteristics in specific regions of North Carolina?

A. I -- I haven't asked, because I don't see a specific reason to ask that question because what I see from model evaluation that make logic relationship, that results looks reasonable.

Q. So you have never asked for information from the AIR and RMS engineers about whether they've even considered North Carolina region-specific building characteristics?

A. That is a question I -- this is the information if they reflect, if they have a good reason to reflect, I would accept their results.

Q. Have the -- have you ever seen the data that they have input into the models, specifically about building characteristics in very -- in any zone in North Carolina or any region that's being -- that has been customized for the filing?

A. Yes. I see -- I think in the AIR documentation I provided in the hurricane methodology, there are pages that AIR discuss some Building Code in North Carolina, when they -- in one of the historical storms. That, I see that.

But what I try to tell you is my model evaluation and my ASOP work is general understanding of the model and look at -- look at different results to see if they make logical relationship.

I may not ask the questions that you specifically asked me at this time, but that also doesn't mean I'm not doing my model evaluation work because we have a standard way to conduct our model evaluation. I ask questions when I feel there's a reason to ask question.

Q. Okay. How do you decide that there's a logical relationship between what RMS or AIR engineers say about the engineering module without actually seeing proof that they've considered the different building characteristics in North Carolina regions?

A. There are some basic, I think, there are some common sense. For example, if you have same building in the sale -- in the same location, you would assume masonry would perform better than wood frame.

And there are also things like, if you have a hip roof of the house, it will perform better than gable roof. And if you have a nail that length is longer and all the nail interval are shorter, those building perform better because those roof will attach stronger. So those are the -- those are the principle I follow.

I verify those result. One reflects those individual building characteristics. They make sense. And also, I also follow some geographic relationship,

for example, if the coastal should perform worse than inland. So when I see something not logic, that is the time I will question.

And as part of my review, I also compare with last version. If I see drastic changes, I would question.

Q. Okay. So let me understand this. There are the results that AIR and RMS give you, and then there are the separate validations that Aon runs. And then after the validations, if you have any questions about what is or wasn't included in Aon's engineering models -- or excuse me -- in AIR or RMS engineering models, you would ask them questions.

A. Correct.

Q. Okay. Have you ever asked them questions about the -- their assumptions as far as the building characteristics -- characteristics of different regions in North Carolina?

A. I didn't ask for North Carolina, but I asked them about Florida, because I didn't see counterintuitive result in North Carolina, while I see counterintuitive result in Florida.

Q. Okay. And when did you ask them about the building characteristics in Florida in the course of this filing?

A. Not this time. It's sometime in the past. For example, I see model generate higher loss cost in -- for masonry for statewide than the frame in the Florida statewide basis. So this is counterintuitive. So in that case, I actually reach out to one of the model vendor and ask why.

And their explanation is it's really because, in South Florida, the hurricane frequency is higher than Northern Florida, while in Florida, the Building Code is masonry is predominantly built in the Southern Florida. So this is why the masonry is in high hazard area.

So that resulted in the masonry loss cost higher than the frame loss cost. But if you held everything equal in the specific location, I also look at that. I -- I confirmed masonry always perform better while everything else is equal. This is the type of testing I am doing for each model.

Q. I'm sorry. You said you asked for that additional information about building characteristics from Aon or RMS?

A. For -- for that one, I ask for a different vendor. It's ARA model. Yeah. But this is, basically, I'm just trying to identify anomalies and find answers. And I didn't see a lot of anomalies in

in North Carolina.

Q. I hope you understand. I'm not trying to question what methodology you use, but what you know about the North Carolina results. So when you -- you assumed that because you learned some information from AIR or from another modeler about building characteristics in Florida, then that must be reflective of building characteristics in North Carolina?

A. My understanding is, each vendor model, they study countrywide, building code, building characteristics. And when they make decisions, they take the similar approach in Florida and in North Carolina. They will reflect their knowledge in the model accordingly.

So I'm not saying they will do the same thing in North Carolina, but that they follow the similar procedure, decision tree once they build their vulnerability curve.

Q. But you never saw any actual data from Aon or RMS about building characteristics in North Carolina. That's just your assumption. They must have looked at them.

A. I -- I -- I don't.

Q. Okay. So when you talked about the

validation that Aon ran that included North Carolina Building Codes and North Carolina building characteristics, is that what you had said?

A. So, Aon's testing is really focusing on the countrywide testing. So we place notional portfolios in all coastal states. For every state, we have in -- we put in coastal as well as inland.

And we use those testing to look at the loss costs, the logical relationship of modeled loss costs, as well as the relativities of those loss costs. Those relativities are especially important because those are used by re-filing.

So we want to make sure those -- the relativities for different building characteristics are reasonable.

Q. Do you know when Aon ran its validations of the engineering modules or the building characteristic output, whether Aon's engineering module people actually looked at any North Carolina data?

A. Yes. We have, I, on our dashboard, I checked there are four data points in North Carolina, and there are other -- also data point in other states. So we build a notional database, cover every coastal states, both inland and coastal.

Q. Okay. So that shows up on your module.

A. Yeah. That shows up in our model evaluation dashboard that I rely on to perform my actuarial responsibilities.

Q. When you say model, Aon has its own model, hurricane model; does it not?

A. Yeah. Aon has our own hurricane model, but that's a separate topic. That hurricane model was not used for these rate filing. But Aon has our own hurricane model. I am their actuary for Aon's hurricane model.

Q. Did you, in the course of validating the AIR and Aon model output with regard to any of the modules, did you validate it by running Aon's hurricane model?

A. Each model is validated independently. We do comparison, but we don't validate one model by another model.

Q. So you did a compare -- so did you run Aon's model with regard to compare it with the output of the AIR and RMS models?

A. Our -- our model evaluation team validate AIR and the RMS model and with regard to their engineering and hazard module.

Q. So the validation is part of the Aon model?

A. The validation is part of Aon's model evaluation process. And, yeah, Aon models, they have the development process that's similar to AIR and RMS model. They follow similar model development process.

Q. And that is something the -- that -- so Aon's -- when you validate Aon's model, it would have shown what Aon's understanding was or what Aon's results for, say, wind speed are.

A. So your question is?

Q. When you validated AIR and RMS using Aon's model, did it show did Aon's model have a particular value assigned to severity?

A. I don't think I understand your question. We validate AIR and the RMS model by our model evaluation team. We don't use Aon's catastrophe model to validate RMS and AIR model.

Q. What does Aon's validation team look at if not using Aon's model?

A. They -- they use their professional training and the knowledge to test the model. And their job is to evaluate every component of the model and assess the reasonability of the model.

Q. And that includes assessing the reasonability of, say, the severity and frequency output of AIR and RMS?

A. Correct.

Q. And the evaluation team at Aon do not look at any data from the Aon model, the Aon hurricane model?

A. We don't because the -- it's a separate process. As you know, Aon's internal model is a competitor with AIR and RMS model. What we try to avoid is using the knowledge we learn to improve Aon model because there is a wall between the external vendor model and Aon's internal model.

Q. Is there any overlap between the results of the evaluation team at Aon and the results if you were to run the Aon model with regard, for example, to frequency and severity?

MR. SPIVEY: Sorry. Did you ask is there any overlap?

BY MR. FRIEDMAN:

Q. Yes. I'm -- what I'm asking is so is there any function, the frequency and severity function, of the -- that the validation team uses that is going to show the same data that is being calculated on the other hand by the Aon model?

A. Our model evaluation team did evaluate, like, for -- for example, the frequency from the different model, what is their frequency, severity, at

certain date. Those, I believe, is on the same basis because they are based on the same type of -- so -- so they get the information from the model.

And we also run source models on the same notional portfolio so that way we can look at, yeah, what is the outcome of the result. So on the same basis, we compare the loss cost.

When we see drastic difference, that's the time we will evaluate what is the driver of the major differences. And that is the time the model evaluation team will determine is that the frequency, severity, or engineering module cause a difference.

Q. So I guess what I'm asking is, does Aon's model evaluation team use, in any way, Aon's model's results for frequency and severity, or are they coming from the same source?

A. I don't understand your question. The frequency, severity are from different model vendors.

Q. So your evaluation team, when they evaluate, say, the output of damageability from RMS and AIR and they do their evaluation team calculation --

A. Yes.

Q. -- is the source of their calculation, in any way, the same source as the Aon model? Or is it completely independent? Do they come up with their own

severity or building characteristics results without looking at, say, the same code as the model would look at?

A. What code do you mean? The Building Code?

Q. No. The -- I'm sorry. The code, whatever computer code is entered for severity and -- or for building characteristics.

A. So you are talking about proprietary information of each vendor. That code is absolutely not visible by other vendors. They keep close to themselves, and no one, other than Florida commission, they can review the code, but under trade secret protection. But no one can compare the code on the side by side.

Q. I -- I -- I didn't make myself clear. What I'm asking is whether Aon's validation team uses, in some way, Aon's model code to evaluate the building characteristics or the severity and the frequency for their validation purposes?

A. Not sure if I understand your -- your -- when you say Aon's code.

Q. What the -- Aon's code for the Aon hurricane model?

A. No. They don't because Aon hurricane model is developed by a separate team, and the Aon

model evaluation team is not on the same team.

Q. So they're not on the same team, but do you know whether or not they're the people on the evaluation team, in fact, use any of the same computer functions as the Aon model has?

A. I'm not aware of that.

Q. Okay. So you don't know one way or the other?

A. My understanding is those are separate teams, and model evaluation team use their process, while impact forecasting team, they have engineers doing separate type of work.

Q. So it's your assumption that merely because they're on different teams, the validation team wouldn't have actually looked at severity and frequency results using the -- from the Aon model?

A. I'm saying they're on the same team. They may not share code, but the model evaluation team evaluate all models, including Aon's own model and AIR and RMS model, and we compare the model result based on notional portfolios.

Q. Okay. Thank you. Do you know whether you made available to the Commissioner that comparison of Aon's model results with AIR and RMS's model results?

A. So what's your question?

Q. Did you give anybody -- did you give the Commissioner any data on the comparison of Aon's model results as far as any factor in the model and error and RMS's results?

A. No. I didn't give that to the Commissioner because in our service agreement with NCRB, the scope of the service is to run AIR and RMS model. The service agreement doesn't include impact forecasting -- Aon's impact forecasting model.

Q. Okay. So are you saying that there is data that contributed to your report, namely because the evaluation team at Aon compared the Aon results to AIR and RMS, the Aon hurricane model results, that would have affected your root your calculation using AIR and RMS that because of proprietary concerns, Aon did not give to the Bureau?

A. That's not true because the model evaluation, my ASOP document, included the side by side comparison of AIR, RMS, and Aon's impact forecasting model. It is detailed -- it's documented in my ASOP 38 compliance.

Q. Does it show the differences between, for example, what the wind speed results of Aon's model were as compared to AIR and RMS?

A. It shows the overall difference. It is a

combination of the wind speed and -- and also the engineering component, and the actuarial component. So all the component, we show the outcome of the results.

Q. And that would include the financial component. They're all --

A. That -- yes.

Q. They're all rolled together?

A. Yes.

Q. So is there any way for the Commissioner to learn whether in fact AIR and RMS are pre- -- are resulting in higher wind speed calculations than Aon's model? Do you need me to explain that better? Or

A. What? Yeah. Please. Okay.

Q. Sure. Sure.

A. Yeah.

Q. Is there any way for the Commissioner to -- if you -- you've said there's one lump sum, basically, including all the modules results.

A. Um-hum.

Q. If the Commissioner wanted to see, for example, whether AIR or RMS were producing greater frequency or severity, would he be able to look at what you've provided as part of your ASOP 38 and say, ah, I see that -- that Aon's model, in fact, is producing lesser frequency and severity than RMS and -- RMS

and -- and AIR?

A. So there are some information -- there are certain information that included in vendor's documentation that may give Commissioner that information, especially related to the frequency and the severity of the events.

Q. I'm talking about the Aon, not the vendor's data, but Aon's data showing what frequent -- what severity and what -- and what frequency Aon's model yielded.

A. At the time of this filing, Aon's model was Florida only. So that's why -- Aon's hurricane model that I evaluated did was Florida only. That's why you see in my ASOP 38, documentation, that long documentation was AIR and RMS model. When I compare their loss cost, they -- you only see the Florida part from Aon's own model. You didn't see any other state in that model.

Q. Okay. So the validation team at Aon the validation team at Aon evaluates the results or compares the results of Aon's model with regard to building characteristics to those of RMS and AIR?

A. Yes.

Q. And that comparison is based entirely on what's in Aon's model, and that is Florida data.

A. So the reason we only have Florida on Aon's model is, Aon is in the process to rebuild our countrywide hurricane model. And at the time, when we conduct ASOP 38 for the two models used for the North Carolina rate filing, Aon's countrywide model wasn't ready yet.

Q. But so is it Aon is validating RMS and AIR by looking at its own model's data from Florida?

A. No. That's not true. Aon is independently validating AIR, RMS, and our own model. We are not using one model to validate another model.

Q. You said that they compare the model results to RMS and AIR?

A. Yes. In our model evaluation.

Q. And in your model -- your model evaluation is something that you run to beget yourself comfortable as an actuary with the results from AIR and RMS?

A. Yes.

Q. Okay. And all of Aon's model is Florida data?

A. We are in the process to develop, to expand that to countrywide. And, yeah, in this year, in 2024, a release, a countrywide hurricane model.

Q. Okay. But at the time you were doing the research for the filing, it was all Florida data.

A. It's Florida and a very extremely outdated countrywide model that we don't feel comfortable to use. So yeah.

Q. So in you testing whether AIR and RMS results with regard to durability, your -- your validation cross testing, if you will, was based on Florida data.

A. For -- for the -- for AIR, RMS model, it's for countrywide data. But for Aon's internal model that's not used for these refiling, yes, in my ASOP document, it's Florida only.

Q. But it was used for the validation of the AIR and RMS results that are in this filing. Correct?

A. It's -- it's a stretch to say it's validation because it's just to -- for the ASOP 38 purpose. We are required to compare the output of different model.

But the output itself, whether or not they are different, it doesn't really form any opinion on one model is validate, another is not validate. They are all validate models. And it's possible the model results are different.

Q. Okay. So your third -- your ASOP 38 attestation, is it fair to say that that is what makes you comfortable saying that AIR and RMS data for

durability is accurate?

A. What is durability?

Q. Okay. With regard to the engineering module?

A. Yeah. Vulnerability. Yes.

Q. Vulnerability.

A. Yeah.

Q. Excuse me. Yeah. I guess they're two sides of the same coin.

A. Yeah.

Q. Okay. And you only produce to the Commissioner a combined number from Aon's model that you use for Rule 38 purposes that combined the financial, the engineering, and the meteorological assumptions from Aon's model? They didn't split them out.

A. My responsibility is to apply the model result in insurance usage. And in order for insurance usage, the model output, average annual loss, and the PML (phonetic), those are the measures useful for rate filings.

Q. Would you agree that for the Commissioner's purposes and those of his actuaries, in order to come to an opinion about whether you'd complied with ASOP 38 in your certification, it would

have been helpful for them, as actuaries, to be able to see that number that combined all the results from all of the modules split out.

MR. SPIVEY: Objection. I guess, what -- what is that number that you refer --

MR. FRIEDMAN: Ms. Mao has said there was -- when to the extent she showed RMS's -- excuse me -- Aon's model --

HEARING OFFICER FUNDERBURK: Speak loudly or into the microphone.

MR. FRIEDMAN: Yes, ma'am.

Ms. Mao has testified that in her Rule 38 attestation, there is data that shows Aon's, during the course of its validation for her Rule 38 purposes or ASOP 38 purpose, that shows the combined number or output of the Aon model for all three of the modules.

BY MR. FRIEDMAN:

Q. Am I wrong that that number is in there?

A. In Florida loss costs.

Q. Right.

A. Yeah.

Q. But it's attached to your attestation, to your Rule -- to your ASOP 38?

A. Yes.

Q. Okay. And what I am asking about is whether, even though it's all based on Florida data, an actuary would be better able to evaluate that data if it were split out into different modules.

A. That the split out existed in our model evaluation, but as an actuary, my focus is output of the model and the usability for insurance purpose.

Q. So you didn't produce the split out that Aon's model actually created?

A. I didn't split.

Q. Okay. And under the ASOPs, you have a responsibility to any actuary who practices in the same area to reveal to them enough data to evaluate your conclusions. Correct?

MR. SPIVEY: Objection. Is that -- so that was a question and not a statement. Is that -- not what I've heard anything described about the obligations under the ASOPs.

MR. FRIEDMAN: Okay. We went through those certainly with, Mr. Anderson, but I'm happy to go through the same ones now unless she knows that's one of her obligations.

HEARING OFFICER FUNDERBURK: I'm going to -- I'm going to if we're arguing a objection instead of clarifying, address that to me.

MR. FRIEDMAN: Why don't I clarify that then?

HEARING OFFICER FUNDERBURK: I think it would be helpful if you clarified what the question was directly that you're asking, and let's go from there.

BY MR. FRIEDMAN:

Q. As an actuary, are you aware of any ASOP that obligates you to provide enough data to another actuary in your same field so that he can evaluate your evaluation?

A. I am aware of that. Yes.

Q. And would it have been helpful for the other actuarial -- actuaries to whom you owe that responsibility to have seen that number from Aon's model split out according to the different modules?

A. As I discussed earlier, those engineering module and the meteorology modules, they are considered trade secret of each modeling vendor. And as an actuary, I'm bound by actuarial professional conduct. And the Precept 9 said actuary should not disclose confidential information to a third party unless it's authorized by principals or required by law.

Q. Okay. So that's -- you're talking right -- right now, I'm talking about Aon's proprietary

information. And you -- and you're obligated you feel by the ASOPs not to share that by splitting out the number.

A. This is a similar situation because those engineering modules, their vulnerabilities, and how model determine how they sampling historical data. Those are all trade secret information of specific models.

Q. I understand that. So putting aside, though, the fact that Aon asserts trade secrets with regard to its modules on Aon's hurricane model, putting that aside, on an objective level, as an actuary, would providing that information have allowed North Carolina Commissioner of Insurance to better evaluate your testimony?

A. I -- it's my judgment that provide the outcome out of the model will give Commissioner better information. The reason is, modeling vendors, they calibrate their model, and based on the other historical real claims data. So the outcome is result of their calibration for each module.

And to the extent the modules may differ and you are not able to pick and choose, say, one module from AIR and another module from RMS just because you like that result better.

So you got to pick the outcome of the model result. And so I feel for Commissioner review, give him the total output is more helpful.

Q. Okay. So that means that you feel that even for the Commissioner's own actuaries, it's more helpful to see one number that aggregates all of these different results than to actually see them split out?

A. We provided the aggregate level. However, in vendor's documentations that submitted during this discovery, we'll also give him information if he is interested in other modules. It's just, for my review, I feel it's more, it -- it is more reasonable to show the final output because that has any -- relevant insurance impact.

Q. Okay. You keep talking about vendors or other vendors. Are you including Aon in that?

A. Aon is -- is a vendor, but when I talk of vendors, it's mainly AIR and RMS in this case.

Q. Okay. I think you've answered that question. You think it's better for our actuaries to only see the depart- -- or rather the Commissioner's actuaries to see the aggregated number instead of it being split out according to the modules?

A. That's correct. In term of the insurance usage, because you cannot just select one module from

one model and another module from another model. It's not practical in the modeling practice. Therefore, we feel look at the overall model output is more helpful for decision making.

Q. So it's not practical for the modeling purpose, but is the Commissioner of Insurance and his actuaries, are they bound to accept models as the only evidence of the results of hurricanes?

A. So its model is a better tool to assess hurricane risk than actual historical data. That has been widely accepted practice by the insurance industry in the past 30 years.

Q. So is it a better practice to accept the model results 100 percent without any comparison and perhaps reduction due to actual hurricane results?

A. It's not a good practice to reduce the hurricane loss. So just by simply compare model result with handful years of the historical losses is not a practice -- not a good practice. And actually, in Florida, Florida statute prohibit any insurance companies to alter modeled output.

Q. But does it prohibit the Commissioner from doing so in Florida?

A. Their Commissioner has never done that.

Q. Okay. So in North Carolina, have you read

the 2014 homeowners' order from the Commissioner?

A. I didn't read that closely because I was still working at State Farm in 2014.

Q. Since you've been providing hurricane model results for the Rate Bureau, have you reviewed it?

A. I reviewed the filings, 2018 filings, and I also look at 2014 filings. I didn't read that Commissioner's order.

Q. Okay. So you don't know -- and did you read the Court of Appeals decision on the Commissioner's order?

A. I read that through one of the testimony that you provided. Yeah. I'm aware of those orders.

Q. Are you aware that in the Court of Appeals decision, the Court held that it was reasonable of the Commissioner to have reduced the modeled results by -- I think it was a couple of decades' worth of actual hurricane results.

A. I respect Commissioner's order. However, as a catastrophe actuary, I disagree with that practice.

Q. Okay. So but -- but you are aware that he did that in 2014?

A. I'm aware. Yes.

Q. And it was upheld by the Court of Appeals?

A. Yes.

Q. Thank you. Now, about the Florida Commission, the Florida Commission certifications only apply to the use of those models in Florida. Is that correct?

A. That's correct.

Q. Okay. And are there other states that have passed laws or rendered decisions saying that we, too, will give respect or weight to the fact that the Florida Commission okayed this model?

A. There is no such law. However, Florida Commission's work is highly respected by the insurance industry for the transparency and the rigor around the process. And as a result, some jurisdictions, when they accept modeled hurricane losses in their questionnaires, sometimes they will ask, is your model approved by Florida Commission? And I see that question in other states.

And, also, another example is for Louisiana and South Carolina, for example, they will pass -- they will approve certain versions after the corresponding Florida model has been approved.

So they are -- it subsequently those state will -- will accept similar models --

Q. Have you ever --

A. Yeah.

Q. I'm -- I'm sorry, ma'am. Please.

A. Yeah. Those states, they don't -- they don't have a similar process. They don't have a model evaluation process. They just do based on what Florida accepted and sometimes based -- based on some additional questionnaires, they will accept the model as is.

Q. Okay. Have you ever seen any indication from the North Carolina Department of Insurance or the North Carolina Commissioner of Insurance that he gives any deference to the Florida Commission's findings for Florida about the models?

A. No. I -- I haven't. However, I'm not aware of North Carolina's modeling approval process. Since there is no approval process, we will just -- just assume the model that's being used by the industry is also appropriate for use in North Carolina.

Q. Even though the Commissioner found that it wasn't appropriate in 2014?

MR. SPIVEY: I'm sorry. What wasn't appropriate?

BY MR. FRIEDMAN:

Q. That the use of the model and accepting it

100 percent was not appropriate in 2014. You've testified that you assume it would be appropriate now and sufficient for the Commissioner.

A. So from -- as I said, I respect Commissioner's ruling. However, as an actuary, our profession, our judgment is the model should be considered 100 percent credible, and that's been the practice by the industry for the past 20 to 30 years in almost all jurisdictions.

Q. So you assumed it would be credible to the North Carolina Commissioner of Insurance? That is, the 100 percent acceptance of the hurricane model's results.

A. I'm aware of the ruling and -- but my professional judgment, my opinion models are 100 percent credible.

Q. Okay. Does -- is it -- is it among the ASOPs that you -- where you know there is a difference between the decision or the law and your actuarial opinion, you have to disclose and even perform your own version of the analysis using the legal requirements?

MR. SPIVEY: Objection. There's no foundation here for what he's asking her to compare to, as I'm understanding your question.

BY MR. FRIEDMAN:

Q. So are you aware of the various ASOP provisions, including in 38, that state that if there is a conflict between what you think are the actuarial methods and the legal methods, you have to reveal that conflict?

A. I'm aware of that, and I -- it's just a -- a terminology of law. I'm aware the statute is a law. So, what I'm not sure is the ruling for prior rate hearing, is that a law or not. That, I will confer to our counsel.

Q. Do you understand whether a decision by the Court of Appeals is a law?

A. Yes.

Q. You think it is? I'm sorry, ma'am.

HEARING OFFICER FUNDERBURK: We'll need you to answer on the record, but I think Mr. Spivey --

MR. SPIVEY: I guess I should object.

HEARING OFFICER FUNDERBURK: -- has an objection.

MR. SPIVEY: Yeah, I'm -- that is such a broad question about a Court of Appeals opinion being the law. I'm assuming that implicit in your question here is that the Commissioner's findings on the evidence presented to him from the results

of the models run in the 2014 filing that you're somehow implying that that is now the law in North Carolina. And if -- and if that's what you're suggesting, we object because that is certainly not our understanding.

MR. FRIEDMAN: Okay. But I'm talking about the Court of Appeals decision.

HEARING OFFICER FUNDERBURK: Mr. Friedman, I think it would be beneficial if you could specifically clarify and be very specific with your questioning question so that that could be evaluated and very clear which law you're referring to as is your belief is controlling.

MR. FRIEDMAN: Absolutely. Let give me one second if you could, ma'am, to let me pull up. So if you could turn to, where's I'm still at Exhibit No. 12 in Book 3.

MR. SPIVEY: I'm sorry. Did you say still in 12?

MR. FRIEDMAN: Yes. Exhibit 12 in Book 3.

MR. SPIVEY: Thank you.

MR. FRIEDMAN: And I'm looking -- let me move on from number 1. You turn to ASOP 17. I'll tell you what page that is at. That's at page

18 in the lower right hand corner. And I'm looking particularly at 3.4.

MR. SPIVEY: Did you say 3.4?

MR. FRIEDMAN: Yes. And that would be on page 20.

MR. SPIVEY: Thank you.

BY MR. FRIEDMAN:

Q. Do you agree that under the top -- if you want me to read it into the record, I will. If the actuary believes that a relevant law or regulation contains a material conflict with appropriate actuarial price practices, the actuary should disclose the conflict, subject to the requirements of the forum, including without limitation, all rules of evidence and procedure.

A. Yes. I'm aware of that.

Q. And you believe that the 2014 Court of Appeals opinion on, specifically, hurricane models is in conflict with your opinion as an actuary?

MR. SPIVEY: Objection. Again, you seem to be suggesting that the Court of Appeals opinion, I presume, on the issue of model output in that case, in the evidence presented in that case, the models used in that case, the witnesses who appeared in that case is -- is a "relevant law or

regulation", citing to this item you just quoted, that she's supposed to take into account now? Is that what you're saying?

MR. FRIEDMAN: Absolutely. Is it the Bureau's --

MR. SPIVEY: The question is about being in compliance with the law.

MR. FRIEDMAN: Is it the Bureau's position that the Court of Appeals analysis of the hurricane -- whether to give full deference to the hurricane model results in 2014 --

HEARING OFFICER FUNDERBURK: Hold on. I need to read over the standard.

MR. FRIEDMAN: Yes, ma'am.

HEARING OFFICER FUNDERBURK: Counsel, for purposes of the record, ASOP 3.4 reads conflict with laws and regulations. If the actuary believes that a relevant law or regulation contains a material conflict with appropriate actuarial practices, the actuary should disclose the conflict subject to the requirements of the forum, including, without limitation, all rules of evidence and procedure.

We're all in agreement, at least, that this -- this is applicable. Do we need to hear any

arguments on that? Is 3.4 applicable to this proceeding in your actuarial opinions that have been submitted? Yes. From --

MR. SPIVEY: Your Honor, I'm not -- I'm not saying that this provision of ASOP 17 doesn't apply generally.

HEARING OFFICER FUNDERBURK: Right. I'm just trying to step it all in. I'm starting at the beginning. If you could -- if you could indulge me. Is this ASOP applicable to the pre-filed testimony of your expert witnesses?

MR. SPIVEY: Again, I'm not contesting that the ASOP generally applied to the work of the actuaries who are appearing.

What I'm pointing out is that Mr. Friedman seems to be suggesting that the reference here to a relevant law, it -- he's equating what the Commissioner found on a set of facts ten years ago to now constitute relevant law in North Carolina, and we vehemently disagree with that.

HEARING OFFICER FUNDERBURK: And -- and I think we've got multiple issues going on. One is the issue if 3.4 applies. Second part of that is whether or not a Commissioner's order is controlling law versus Court of Appeals opinion.

Would you agree with that differentiation of the issues we're looking at? We've got two separate things going on.

MR. SPIVEY: I agree that there's those different levels of issues here, and I -- and, yes, I agree that there's questions as to whether the Commissioner's order is law. I think there's questions as to whether a Court of Appeals opinion on the order that was appealed in that case, whether that creates law that is governing on this particular topic.

HEARING OFFICER FUNDERBURK: Do you agree that if there is a relevant law or regulation -- and I'm not asking you to acknowledge the Commissioner's order or the Court of Appeals order as relevant in controlling because that may be an issue of law we deal with later. But do you agree if there is a relevant law or regulation that is in material conflict with the actuarial -- actuarial practice that the actuary would disclose the conflict?

MR. SPIVEY: Your Honor, I -- I understand that that's what this ASOP provision is addressing. When we start talking about how it applies to specifically to whether Ms. Mao or, you

know, Mr. Schwartz or Mr. Erickson or Mr. Anderson, I --

HEARING OFFICER FUNDERBURK: I'm not asking you to get to that point.

MR. SPIVEY: -- I'd have to defer to them to understand how they perceive it applies to them.

HEARING OFFICER FUNDERBURK: And I'm not asking you to get --

MR. SPIVEY: Yes.

HEARING OFFICER FUNDERBURK: -- to that point. I'm trying to -- it -- it sounds like we've had a lot on the table --

MR. SPIVEY: Right.

HEARING OFFICER FUNDERBURK: -- with this particular issue, and that is creating some of the confusion and the conflict. So what I'm asking you is not to apply it to a situation, but acknowledge does 3.4 applied to your pre- -- the pre-filed testimony that you have submitted to the actuarial opinions that have been submitted.

MR. SPIVEY: Again, as -- as I sit here, I don't know that I can speak for the actuaries who are subject to the provisions of ASOPs. We're not contesting that the ASOPs apply.

It's -- I think it's a question of what the provisions within an ASOP are referring to and whether there's a situation here in North Carolina that falls within that. I think that's a very big issue. Yes.

HEARING OFFICER FUNDERBURK: Would you agree that if there is a conflict between the law, and, again, we're not establishing what the law is, and the actuarial opinion, that there would need to be a disclosure of the conflict?

MR. SPIVEY: I think if, as this reads, if that actuary believes there's a conflict, then I think this ASOP says it's incumbent on that actuary to disclose that. Yes.

HEARING OFFICER FUNDERBURK: Okay.

MR. FRIEDMAN: Could -- could I -- I'm sorry. I don't mean to cut anybody off. Just to clarify the point I'm trying to make. First of all, from my perspective, Ms. Mao has both of her -- her report and her testimony today are expert opinion.

HEARING OFFICER FUNDERBURK: Correct.

MR. FRIEDMAN: And for my purposes, she has acknowledged today, here live, that she believes, from an actuarial perspective, that the

best practice is to accept the model results without any modification based on actual data. And she's also said, as I understand it, that she's aware the Court of Appeals said, at least in 2014, no, that is not required of us.

And in 2014, the method was to -- for the Commissioner that was upheld by the Court of Appeals very specifically was to modify the model results by actual experience and, as a result, lowered the model results significantly. And she's acknowledged there's a

MR. SPIVEY: And I would --

MR. FRIEDMAN: I'm sorry.

MR. SPIVEY: I'm sorry.

MR. FRIEDMAN: There's a difference between -- on that issue between the Court of Appeals opinion and her opinion as an actuary. So I feel like she's acknowledged that conflict in the law today. So really the only other question I have of her is whether she acknowledged it in her report.

THE WITNESS: I became aware of the 2014 --

HEARING OFFICER FUNDERBURK: Ms. Mao, Ms. Mao?

THE WITNESS: I'm sorry.

HEARING OFFICER FUNDERBURK: I'm sorry. Just a moment. We'll -- we'll finish up --

THE WITNESS: Okay.

HEARING OFFICER FUNDERBURK: -- and then I'll - I'll get you to respond.

Mr. Spivey, did you have a comment?

MR. SPIVEY: I -- I do. Mr. Friedman is representing and -- and basing his statements here on the position that what the Commissioner did and what the Court of Appeals ruled in the 2014 case is law that is pertinent to the interpretation of this ASOP.

We disagree. That is not -- that is simply not the case as far as we're concerned. What the Commissioner ruled and what the Court of Appeals did in the 2014 case on the evidence there, the models run there, all of those things did not create a law that says we have to give or we have to reduce the output of the models in North Carolina. It's -- it simply didn't do that.

That issue was not presented to them in that manner. It wasn't ruled on in that manner, and it wasn't. The effect of it is not to rise to the level of a law. It was a decision on a set of

facts in a given case.

HEARING OFFICER FUNDERBURK: And -- and again, we're going to try to take this in small steps, starting with 3.4. Mr. Friedman, you said you had -- and I'm going to allow, Mr. Friedman, you to proceed with your questions. I'm going to advise you to be very to the point and succinct so it's clear exactly what the question is. I may have some follow-up questions for Ms. Mao. Proceed with your questioning.

BY MR. FRIEDMAN:

Q. So, Ms. Mao, in your written report, did you acknowledge the 2014 Court of Appeals opinion at all?

A. When I produced my written report in last year, I wasn't aware of the 2014 ruling.

Q. Okay. So at the time you ran your whole analysis for everything related to hurricanes, including the net, the CAR, and the demand surge, you weren't aware of the 2014 decision?

A. Correct. I wasn't aware. I only became aware of that decision few weeks ago.

MR. FRIEDMAN: Okay. That's all I have on the issue of the extent of her compliance with that ASOP and the weight that should be given to

her analysis.

HEARING OFFICER FUNDERBURK: Thank you. Do you have additional cross?

MR. FRIEDMAN: Yes. Significant, unfortunately. But I -- I don't know if anybody needs a break. I don't. I'm good. But --

HEARING OFFICER FUNDERBURK: Ms. Mao, you've been on the stand a little over an hour, well, close to an hour and a half. Are you fine to proceed, or do you need a break?

THE WITNESS: I'm fine.

HEARING OFFICER FUNDERBURK: You're fine. Okay. Counsel?

MR. SPIVEY: I guess I'll be fine also, Your Honor.

MR. FRIEDMAN: Well --

HEARING OFFICER FUNDERBURK: I told -- I -- I told you earlier, like, I've got -- I've got water. I want to make sure everyone is okay. If you if you need a break, we can take a break.

MR. SPIVEY: Yeah. No. Honestly, Your Honor, I -- I think it'd be appropriate at some point in the afternoon to take a break. I mean --

HEARING OFFICER FUNDERBURK: Let's go ahead and take a 10-minute break. By my watch, it

is quarter till 3:00. We'll come back at 5 till 3:00.

MR. SPIVEY: Thank you.

HEARING OFFICER FUNDERBURK: We're now in recess.

(Recess taken from 2:45 p.m. to 3:00 p.m.)

HEARING OFFICER FUNDERBURK: Good afternoon, counsel. We're back on the record.

Ms. Mao, I'll remind you, you're still under oath.

Are there -- I understand there was some discussion while we were in recess. Is that something we need to discuss now?

MR. FRIEDMAN: I don't think so. We were just talking about the logistics of and giving them the particulars of the confidential information we may refer to tomorrow. And Ms. Pearce was informing us about the logistics of what to do. I'll certainly tell everybody well in advance. So I'm turning to this now, and we'll go through the processes we have to go through to clear the court.

HEARING OFFICER FUNDERBURK: Mr. Friedman, are you ready to proceed and resume your cross?

MR. FRIEDMAN: I am.

HEARING OFFICER FUNDERBURK: Please proceed.

BY MR. FRIEDMAN:

Q. So, Ms. Mao, I'm going to move on from -- I'm going to now move on from engineering module and go to the meteorological module of RMS. Well, I guess I'd be interested in the meteorological module of RMS, AIR, and Aon's model.

So could you explain to me, when you speak about meteorological modules, what -- what are examples of assumptions that a model maker is considering and building into the model that are meteorological?

A. It -- so we are talking about the hazard. Basically, that the hazard module of a hurricane model. So, hazard module has two major assumptions. One is frequency. Another is severity.

For the frequency, I -- I think the -- what the -- what they need to make assumption is, yeah, so for a certain category of the hurricane impact certain region, what is the annual probability of those type of events?

Q. Okay. And then as far as the severity?

A. Severity is, so given a hurricane of that strength hit the land, so what is wind field at a

different location as hurricane move inland? This is what I say is a severity module.

So that will require some interactions of the wind with topography of the surface, earth's surface. So because different, like, elevation or the roughness of the surface will result in the different wind speed after the landfall.

Q. Okay. Tell me if there's a better term, but I think I'm going to be talking about the assumptions as sort of what is loaded into the module. Is that fair? Or you have a -- I'm open to any better term.

A. I'm not sure if that's as simple what is loaded into the model. No. I'm not sure.

Q. Okay. That the assumptions that the model makers make in programming the frequency function, what are -- I mean, what's some examples of what would be the assumptions, the source of the assumptions? Maybe that's a better term.

A. The source of models, hurricane frequency is based on National Hurricane Center's record from 1851 to recent years.

Q. Okay. So, in part, the assumptions for severity and frequency are based on historical data?

A. Correct.

Q. Is there a part of it that's based on, for example, the anticipated future effect of global warming?

A. So to the extent, global warming, I -- I don't know. It's, in hurricane model, we don't use global warming terminology. We basically, we use warm sea surface temperature because hurricane strength is correlated to the sea surface temperature.

So and also sea surface temperature also impact the frequency of the intense hurricanes. So this is one of the consideration I know by AIR model.

Q. And so the AIR, does the RMS medium term also use sea surface temperature?

A. They also use sea surface temperature, but it's a very different methodology for RMS medium term view compared to AIR's warm surface temperature view. So those are different methodologies.

Q. Is the prediction for WSST or medium term as to frequency and severity, is that 100 percent historical, or is there -- because obviously, Mr. Spivey mentioned the whole issue of global warming and, you know, one way or another, whether it's true or not, you've got to acknowledge that people are talking about it, and it could be contributing. Is that fair?

A. Say for AIR model, I say their warm sea

surface temperature model is more historical. That is because AIR samples a -- a historical period while surface temperature is warmer, then they study the frequency of the hurricanes during those warm period and then come up with frequency for warm sea surface temperature.

However, for RMS, it's a different methodology. RMS, it's called medium term view. It is projecting the next three to five years' climate condition and project what is hurricane is expected in the near medium term.

So this is why for RMS model, sometimes medium term view is higher than historical view. Sometimes medium term view is lower than historical view, and we have seen that in the past few years.

Q. Okay. In terms of frequency and severity, the results you gave us from medium term and WSST, I believe I may have already asked this, but I'm -- I just want to clarify -- were always higher than the historical and the standard. Is that correct?

A. Yes. For the -- the two version used for these filing, medium term view is higher than historical view. Warm sea surface temperature view is higher than the -- the long term view.

However, in the past, there are years, while

medium term view is lower than historical view, but for AIR, since it's a subset of the warm sea surface temperature, so in AIR model, warm sea surface temperature view is always higher than the long term view.

Q. Okay. So for RMS, what are the sources of their projections? What data do they look at to project the next three to five years hurricane severity and frequency?

A. So I -- I -- I think I need to probably refer you to some white paper. But in high level, RMS have ensemble of climate model. And based on their scientists' interpretations, they assign different weight to those climate model and to come up with medium term view.

Q. Could you explain to me what a white paper means to actuaries?

A. It -- it is a technical, a -- a paper, a technical paper written by vendor.

Q. And but it's not -- it provides an example of how they're -- they may be projecting three to five years of hurricane strength and intensity, but it's not necessarily the -- that method they followed in the -- in programming the medium term for North Carolina. Is that fair?

A. It is their view of the medium term frequency for the Atlantic basin that include North Carolina.

Q. Okay. What is that method that they've described in the white paper? If you're able to describe it.

A. No. But based my -- based on my understanding, they have those, they study the different climate condition, and they also have expert elicitation. So they consult with different, scientists. In the past, I went to a workshop. I see people like Kerry Emanuel, Dr. Elsner from Florida State University, and those type of scientists who does study in -- in this field.

Q. Are those scientists -- do they offer opinions about the changes in global climate that they particularly think are going to happen in three to five years? I'm just trying to get a sense, really, of when those -- they are associated by RMS to help RMS estimate severity and frequency over the next three to five years, what sort of data or opinions they give.

A. That is very -- so are you -- who are they? You mean, RMS or -- or those scientists?

Q. So would you agree that -- I'm just going to use global warming in the term that people refer to

it. I'm not going to speak about whether it's correct or what have you. But in just the common sense of global warming, would you agree that some people believe it's really imminent or already taking place, and some people believe it might be taking place in the future, but not now?

A. I don't have opinion on global warming.

Q. I'm not asking your opinion, but I'm asking about would you agree that others have opinions? Some of them think that global warming is not only imminent, but already happening. And some of them may think it's never going to happen.

A. In fact, I haven't -- we haven't talked about global warming for a long time. And recent years, we've been referring climate change.

Q. Okay.

A. I think more scientists have the consensus that climate is changing.

Q. Okay. So with regard to climate change, would you agree that some people think it's already happening, and some people think it's not happening yet?

A. Based on my observation, yes, there is a strong consensus in the scientific community that climate change is happening.

Q. Okay. So do you know is there any -- is there a consensus about how severe it is already?

A. I -- I don't have -- I don't have the answer.

Q. Is there a consensus about whether it's going to become yet more severe in 10 years versus 20?

A. I -- I don't have answers to that question.

Q. Okay. Would you agree that whatever source RMS is using for its projections about severity and frequency of hurricanes, if that source believes they're very imminent and happening now, that is going to drive up the frequency and severity results of the RMS models. Do you need me to rephrase?

A. Yes, please.

Q. Sure. So if RMS talks to a scientist and uses that scientist's position to -- for its model results for frequency and severity, and if that scientist's position is that it's all happening now or about to happen, and they take that and use that as the basis for their model as far as frequency and severity go, then that is going to drive up the results of the frequency and severity that their model kicks out.

A. RMS, in their early years, they use the scientist elicitation, and then they have these -- they

develop those ensemble models. And they have their internal scientists evaluate those models and look at the likelihood of the -- each model and assign weight to each model.

Q. Okay. So whatever the source, whether somebody external or internal --

A. Yeah.

Q. -- would you agree that if they think that global -- with that -- I forgot what your term for it was -- climate change is already severe, then that is going to drive up the results of the RMS models as far as severity and frequency.

A. As far as I know, RMS ensemble model includes scenarios that generate higher loss, also includes scenarios that generate lower loss. And just a few years ago, RMS -- one of the RMS release has a medium term view lower than the long term view.

So they -- it's not their intention to just increase the loss. They're -- they want to evaluate what is a likely climate condition for the next few years and how they believe the frequency should be.

Q. Probably should clarify that I'm -- let's just say both RMS models, historical and medium term. I guess I'm probably not explaining myself well, but if whatever source they use for their estimate of

projected severity and frequency thinks that they're really -- it's very severe and very frequent already, is that going to mean that whichever of the RMS models kicks out higher frequency and severity estimates?

A. Not -- not sure I understand your question. Yeah. I -- I don't get your question.

Q. Okay.

A. Okay.

Q. Let's -- pure hypothetical. If RMS comes to me and I'm the only source of their estimates of frequency and severity --

A. Um-hum.

Q. -- and I say, yes, there are going to -- because I'm certain that climate change is happening right now. There's going to be ten Category 5 hurricanes that hit North Carolina next year, and I'm the only source of that data, then won't that mean that the RMS model kicks out a higher severity and frequency result than if, say, RMS relied on two different people? Some people who said five Category 5s next year and another person who said, no, probably five over 20 years.

A. You're -- that is very far from what RMS is doing. What they're doing is not that simple, not somebody saying there is five hurricanes each year,

every year. They're study ocean temperature and the climate. They are -- they are not doing that type of things. So that's why it's difficult to --

Q. But I was asking a hypothetical.

A. Yeah. That hypothetical is highly unlikely.

Q. So can you tell me the specific things that you say RMS, whichever model, is doing to -- how about just some of the sources that they go to to determine the frequency and severity in either RMS model? You said outside experts, in-house experts, do you know any of the names that RMS specifically is using?

A. It those are all in their documentations, and, I -- I -- I recall, Kerry Emanuel is one of the experts they used before. But Kerry Emanuel is a professor at MIT. He is not employed by RMS. There are also other scientists like Tim Hall used to work for NASA.

Q. Is that all documentation you produced?

A. Those are in RMS documentation. They listed what scientists they used, say, who peer reviewed their model.

Q. Is that information that is proprietary, or is that information that was produced, if you know,

by the Bureau in this case?

A. In the -- we -- some of the name yeah. So information for AIR model included those scientists. And for RMS model, we submitted RMS, ASOP 38 documentation should include those names as well.

Q. Thank you. Other than specific people, do you know what other sources of data, whether HURDAT --

A. Yeah.

Q. -- or another database RMS is turning to in addition to people?

A. HURDAT is their main source, is every vendor's main source. And, actually, in the Florida submission, it -- it's very specific, about yeah, the -- every vendor has to use HURDAT data and also the HURDAT data cannot be too old. So they all rely on HURDAT data.

Q. And that's the only database, if you will, that they rely on besides an actual person?

A. That's, I -- I can't say only is too extreme, that word. And when they develop models, they use different source of data, and they also make assumptions about that data.

As you know, the HURDAT data has 170 years of history, but not every inch of U.S. coastal has been hit by hurricanes. And in modeling vendors' process,

they are going to smooth the result and also fill gaps.

So this is why you see even each vendor started with the same underlying HURDAT, their frequency assumption could differ. That's because different assumptions were made when they viewed those historical information into their event catalog.

Q. So you -- I'm going to distinguish between three sources for the frequency and severity. An actual person, an expert professor, HURDAT, and then any other source, presumably a database of some sort.

A. Yeah.

Q. That third category, where does RMS turn for that? What databases?

A. So what -- what domain? So, third are -- there are some, as I understand, RMS also look at other aspect. So, for example, some scientists may study the deposit of the sand inland, use that information to restructure the past hurricane. So I think so that's why I say the SOAR (phonetic) database, that's not true. They use other information to try to fill the gaps of the historical data they have.

Q. Okay. So are you -- does RMS use this information about, I'm sorry, this the -- the -- the sand, in its model?

A. That -- that, I -- I'm not sure, but I --

those are the literature I read how science -- scientists determine the hurricane frequency.

Q. Okay.

A. The additional study other than HURDAT data they use. And in addition to that, they also look at topography data as -- as you know it.

Q. Yes, ma'am.

A. Yeah.

Q. Okay. Thank you. Sorry. It's all -- there's a reason you've been qualified as an expert. The -- the -- so you were you distinguishing between assumptions versus the source?

A. Yes.

Q. Okay. So for AIR and its frequency and severity, do you know what its assumptions are?

MR. SPIVEY: May I object? I'm not -- I guess I'm confused when you say what assumptions they use, Yeah, in a specific context and a specific item. I mean, we're talking about incredibly complicated models. So what assumptions do you ask --

BY MR. FRIEDMAN:

Q. What assumptions they use with regard to North Carolina when they are estimating the frequency and severity of hypothetical hurricanes in North

Carolina?

A. They -- they started with National Hurricane Center -- Center's database and review and restructure historical storms. And then they also look at the wide range of the possibility.

As you know, National Hurricane Center has 170 years of data, and the -- the early data may come from the ship data and their gaps in the early historical hurricane information because only one ship reports that you get that. Unlike after 1950, satellite data become available. The data is a lot more complete after 1950.

So scientists use the information to restruct (phonetic) the history. And, but, however, that's only 170 years of history, and it doesn't include -- may miss event in one -- in other year. So scientists will go from there and fill some gaps, use other statistical models to project other type of the hurricane that hasn't happened in the history.

Q. So are you -- but you're talking about sources. Is that fair? The -- the sources as opposed to the assumptions? I -- as I understood it, you made a distinction between the two. And now you're talking about the data that they may use to fill in gaps.

That's a source. Is that fair?

A. That's a source. However, when you talk about assumption, you need a source because you -- you made assumption based on your source.

Q. So what I'm asking about is the pure assumption outside of the source.

A. So those are, just what I said, is you -- when you see something missing, when you say, if you didn't see hurricane prior to 1950 and they -- when you believe there are missing hurricanes, then scientists make assumption certain things happen in this area may show up in other evidences.

Q. Has RMS ever told you how it has made those assumptions and filled in those gaps?

A. They talk about -- they show that to their clients, how they make assumptions. However, since the meteorology and as you know, meteorology and actuary, we practice in different field. And I understand what they are doing. I may not get into all the detail and why they make such assumptions.

Q. Okay. So is it fair to say you don't know the full range of their assumptions as far as meteorological -- the meteorological module?

A. If you are saying -- I -- I may not know every assumptions in they make. I understand the high level, the general assumptions they make, the general

process to derive their catalog.

Q. Okay. And the same for, you know, those same things about the AIR models?

A. That -- yeah. I, similarly, I study AIR model in a similar way.

Q. How about the Aon model?

A. Similarly.

Q. Okay. What are some things that Aon -- assumptions that Aon makes to fill in the gaps, for example, between HURDAT and their eventual number?

A. I -- I'm not sure -- I'm not sure I understand your question.

Q. So as I understand --

A. You are asking what different assumption Aon is making from AIR and RMS? I don't think it's appropriate to discuss that because those are getting to real detail about the -- the way they develop models.

Q. Okay. But you ran the Aon or at least your validation team ran the Aon model?

A. Yes. We ran the model because we are bound by ASOP 38. And ASOP 38 specifically require actuaries to evaluate the input into the model and the output of the model.

So this is why I focus on the output of the

model rather than the different component of the -- of a hurricane model in my testing.

Q. What percentage of the requested rate increase is based on the hurricane modeling, plus the CAR, plus the net, including the demand surge, roughly?

A. Is that -- that is in our indication.

Q. You have just an idea? Over 40 percent?

A. 40 percent is -- is the total rate indication.

Q. I'm talking 40 percent of the 42.4.

A. I -- it -- yeah. I don't have that number. I can get back to you.

Q. That's fine. No, no. That's fine. I'm sure that I can find it somewhere.

A. Um-hum. Yep.

Q. Would you agree that the Commissioner and his actuaries could better evaluate the actuarial reliability of the hurricane model, including all the other purposes you used it for besides hurricane losses if they knew those actuarial assumptions?

MR. SPIVEY: Object. When you say those actuarial assumptions --

MR. FRIEDMAN: That she -- so --

MR. SPIVEY: -- I think you need to be more specific.

MR. FRIEDMAN: Sure.

BY MR. FRIEDMAN:

Q. That -- you've just said that there are actuarial assumptions that Aon uses that you can't reveal here.

MR. SPIVEY: I -- I think that misrepresents what she said.

MR. FRIEDMAN: I may have misunderstood then what she said.

HEARING OFFICER FUNDERBURK: And I'll ask that you repeat the question.

MR. FRIEDMAN: Yes, ma'am.

BY MR. FRIEDMAN:

Q. Did I understand you to just say that the -- the particulars of the actuarial assumptions that Aon uses in its model are not something -- are something that Aon says is proprietary?

A. So in term of how you develop your event catalog, that is proprietary information to every vendor, not only Aon, but also RMS and AIR.

Q. Okay. Do you know those details but can't reveal them? Or do you not know them but just know that they're considered priority -- proper -- proprietary?

A. I don't say I know every detail in my

mind. I can probably find some details, but if I -- but those detail cannot be openly discussed.

Q. Okay. And is that the same for the AIR model? You may know some proprietary details about the assumptions, but you've agreed with Aon not -- with AIR not to discuss those?

A. That's correct.

Q. And is that the same with RMS?

A. Correct.

Q. Okay. So putting aside the fact that Aon, RMS, and AIR considers those details about the assumptions for frequency and severity to be proprietary, would you agree that the Commissioner's actuaries would have better data if they knew what those assumptions were?

A. Not necessarily. Because as we discussed, model is extremely complex. And for the different module, depend on what expertise they have, depend on what engineering expertise and the meteorology expertise they have in evaluating the model. It's not always more is better.

Q. One second. So are you saying that because of the possibility that the Commissioner's actuaries might not understand all of the assumptions, it's better for them not to know?

A. I'm saying, the model evaluation involves a very deep interdisciplinary expertise. And it's not just as simple as compare the frequency in the last 20 years with the model's assumption. That will give a very misleading information.

Q. And that's your judgment?

A. That's my opinion.

Q. Okay. Do you possess that level of highly complex interdisciplinary knowledge of the models?

A. I don't. I don't.

Q. Thank you.

A. That's why I rely on Aon's model evaluation team. They have the expertise and the knowledge to assist me evaluate those models.

Q. And some of that knowledge they've shared with you, but it's proprietary, and you can't share with the committee.

A. Correct. Yeah.

Q. So are you an expert in -- I understand you are an expert in the financial module.

A. I -- I give some guidance to my colleagues at Aon in terms of how model should reflect policy conditions.

Q. Do you consider yourself an expert in the financial module of the hurricane models?

A. I am a catastrophe modeling expert in term of use, but I'm not an expert in developing financial model of specific catastrophe models.

Q. Okay. So not as to the AIR models?

A. No.

Q. Not as to the RMS models?

A. Just to be clear, I am not an expert of model developing of their financial model. I give some -- my guidance on how insurance terms should be applied in financial models.

Q. Is it fair to say you're an expert in simply presenting the outcome of the models?

A. It is not that simple. I have understanding of what models are doing. I understand the results.

Q. You understand the results. Okay. Thank you.

A. I also understand the -- some drivers into what drives the results.

Q. Okay. As far as the meteorological drivers, do you consider yourself an expert in those?

A. I think we are going back. I'm not a meteorology expert.

Q. Sorry.

A. Yeah.

Q. So as to the financial module then?

A. I have -- I will say I have probably more understanding of financial models, but still I'm not a model developer.

Q. Do you agree that -- so first of all, are the issues of deductibles and limits part of the financial module?

A. Oh, yes.

Q. For the AIR and the AIR models in North Carolina, what are the presumed deductibles?

A. We don't use presumed deductibles. We use actual deductibles from the North Carolina Rate Bureau data that based on the actual policyholders' policy information.

Q. Okay. So as far as deductibles, is that based on -- I'm talking -- I guess, I should distinguish for what go -- what is programmed into the model. I'm going to distinguish between, as you said, I believe the design of the model versus the input that you put based on Rate Bureau data.

A. Correct.

Q. Okay. And are you an expert on the data that -- the financial data that the rate viewer gathers from its members and you input into the module?

A. Yes. We use financial -- we use the data

we receive from ISO and input, yeah. Input into the model.

Q. Are you an expert on that data from ISO that you input?

A. I lead a team, and I -- yes. My team perform the data cleanup and also import that data into the model and running the model.

Q. Do you consider yourself an expert in the quality of the data you get from ISO as well as the input process? Let's just go on the quality of the data. So you consider yourself an expert in the quality of the data that you get from ISO that you, in turn, input into the model?

A. Again, I -- I think, I would like to comment, the -- I review the data. The data is aggregate level. And based on the information I see, I think the data is -- has high quality because it -- we don't see a lot of missing datas.

So this is -- this is one benchmark when we evaluate whether the data is high quality or not. However, since it's aggregate data, we don't have the latitude/longitude information.

So -- so to that extent, yeah, the -- it's the resolution of the data for aggregate data is somehow limited, but that this is existed in a lot of data we

use.

Q. Is it fair to say, then, that you don't consider yourself an expert in the data that ISO provides for North Carolina?

A. ISO is a data expert. I am the receiver of the data, and my opinion is the data has reasonable quality.

Q. I understand that, ma'am. I'm just asking I mean, I'm really, really am trying to understand the difference between the purpose you've been offered as an expert versus what aspects of the whole model, the modeling process or the data input you actually have expertise in. That's all I'm trying to figure out. So do you believe you have expertise in the data that ISO aggregates and gives you to put into the model?

A. I have expertise evaluating data and determine if the data is reasonable quality to model.

Q. Okay. And the ISO data that is provided specifically for North Carolina, do you -- you have expertise in that?

A. It -- it -- just again, I struggle with your -- your use of word "expertise" because ISO collected the data. I received the data. I evaluate the data. The scope of how I use the data, I don't know how it forms the foundation of your word "expert".

Q. Okay. I'll give an example. For the purposes of the CAR, the -- do you receive the aggregated data about the surplus of the FAIR Plan and the Beach Plan from ISO?

A. We didn't receive that from ISO. We collected that data from FAIR Plan and Beach Plan's website.

Q. Okay.

A. They published a financial statement, and that information is readily available.

Q. Okay. Thank you. As far as the very actual hurricane losses, ISO reports to you actual hurricane losses from North Carolina. And I -- I understand you model, but they do report that to you. Is that correct?

A. I don't think so.

Q. Don't think so. Okay.

A. I don't think so.

Q. I may have -- misunderstand the order of these things.

A. We received exposure data from ISO. We didn't -- I don't believe we received actual hurricane data from ISO.

Q. Okay. So you received aggregated exposure data from ISO?

A. Correct.

Q. Okay. And do you ever do any follow-up questions about that?

A. Yes.

Q. Okay. So I'm still trying to understand myself between the line between the data that you receive an input versus what is preprogrammed in as assumptions to the models. As far as geographical variations in North Carolina in deductibles or limits, is that something you would receive from ISO, or is that something already in the model?

A. That's the information coded in the data we receive from ISO.

Q. So what -- what does coded in the data mean?

A. That means the aggregate data, what is a deductible for that, for that aggregate exposure? Those are included in --

Q. That is something that ISO produces the --

A. Correct.

Q. Okay. So let's move on to the CAR.

A. Okay.

Q. The CAR includes the surplus amounts from both the Beach Plan and the FAIR Plan. Is that correct?

A. Correct.

Q. And the model CAR is based on potential assessments by both the FAIR Plan and the Beach Plan.

A. As Mr. Anderson testified, yeah, the -- the -- the CAR analysis is, but it's a charge for the capital set to support the potential assessment. And we conducted model runs to estimate, yeah, the potential deficit of the NC -- of the Beach Plan and the FAIR Plan.

Q. So, okay, did you hear Mr. Anderson testify that he wasn't aware of a statutory provision allowing the Commissioner to consider a FAIR Plan assessment?

A. As Mr. Anderson testified yesterday, the statute did not disallow. The statute is silent about it.

Q. So you --

A. Silent about whether or not the assessment is recoupable or not.

Q. So because it was silent, you assumed it was permissible.

MR. SPIVEY: I'm sorry. I -- I didn't catch it. What was your --

BY MR. FRIEDMAN:

Q. Because the statute is silent on where --

whether the FAIR Plan assessments can be taken into account with the CAR, you assumed that it permitted that.

A. Because -- because it's silent, we assume that is a risk that insurance industry facing the -- the risk of the potential assessment from FAIR Plan.

Q. Okay. You're aware that there is a specific provision allowing the CAR to take into account Beach Plan assessments. Is that right?

MR. SPIVEY: Objection.

BY MR. FRIEDMAN:

Q. Are you aware that there is a specific statute allowing the Commissioner to take into account Beach Plan assessments?

MR. SPIVEY: Object to the characterization. I think the statute says that prospective exposure shall be a consideration or a provision in the --

MR. FRIEDMAN: Okay. Sure.

MR. SPIVEY: It doesn't say allow. It says it shall be.

BY MR. FRIEDMAN:

Q. Shall be a consideration. Are you aware that there's a Beach Plan per the statute saying that --

HEARING OFFICER FUNDERBURK: Restate the full question for the witness, please.

BY MR. FRIEDMAN:

Q. Are you aware that there is a Beach Plan provision that says the Commissioner should take into account Beach Plan assessments?

A. Yes.

Q. So that is specifically allowed by statute, but you assume -- strike that.

Did you read the 2014 Commissioner's order, stating that the only assessment history he could take into account on this CAR was that of the assessment history of the Beach Plan?

A. I'm aware of that ruling as early as few weeks ago. Yes.

Q. Do you disagree with that ruling?

A. From actuarial perspective, we are -- actuaries should make the rate based on the -- to reflect the cost of all risk transfer. So to me, the potential assessment from the FAIR Plan is a risk that insurance company is facing, and they put their capital at risk to support these potential risks, and that they should be compensated as well.

Q. And when they put their capital at risk, does that include the potential for returns on invested

capital and surplus?

A. That is a question I -- this is -- I understand, for -- for this purpose, we talk about the capital from the investment perspective, and that that's different from the accounting. I know we discussed this extensively, and this is just my general response. It's a return on capital from investors' perspective.

Q. Okay. But I'm asking, so you just stated that the return on investments from capital are part of the CAR. Did I understand you correctly?

A. No.

MR. SPIVEY: Objection. I think he mischaracterized her testimony.

THE WITNESS: No, it's not.

HEARING OFFICER FUNDERBURK: Just a minute, Ms. Mao.

BY MR. FRIEDMAN:

Q. So -- so when you just referred to capital, return on investments of -- of capital, what were you -- what were you saying that it was -- how that worked in the -- as part of the CAR?

A. As part of the CAR, we use methodology developed by Dr. Appel and the Milliman in the past. We just -- we use catastrophe models to calculate the

potential deficit from the Beach Plan and the FAIR Plan.

Then we use catastrophe bonds pricing to calculate the profit multiple of -- of each layer and apply the profit multiple to the expected loss. And the product -- some -- the product of those two numbers becomes the -- the profit margin that we are -- that that is our CAR number.

Q. So when you said capital in the context of CAR, you were meaning to refer to capital as used by Dr. Appel and now by Dr. Zanjani?

A. Why talk about -- it is -- I am talking about the pricing of cat bond. So when we calculate the CAR analysis, we treat it as a cat bond, and we use a cat bond pricing curve and apply that to the expected loss of each layer to get to -- to -- to calculate the profit margin.

HEARING OFFICER FUNDERBURK: Counsel, we're approaching the end of the scheduled day. When do you anticipate a transition point?

MR. FRIEDMAN: Your Honor, this is a complex issue. I probably have half a day left with Ms. Mao --

HEARING OFFICER FUNDERBURK: On this particular issue?

MR. FRIEDMAN: No.

HEARING OFFICER FUNDERBURK: What -- what -- okay.

MR. FRIEDMAN: Generally -- I can't promise three hours, but I certainly don't anticipate we will go all day tomorrow with Ms. Mao.

HEARING OFFICER FUNDERBURK: I'm -- I'm looking at today.

MR. FRIEDMAN: Oh, today.

HEARING OFFICER FUNDERBURK: And -- and the end point for today. I -- I apologize for breaking your -- your flow --

MR. FRIEDMAN: Not at all. Not at all.

HEARING OFFICER FUNDERBURK: -- but what I'm trying to determine is when we end for the day, what do you anticipate as a good transition point for her testimony so as not to break your flow or her concentration on the particular topic she's on right now?

MR. FRIEDMAN: How about I just finish talking about what she means by capital in the context of the CAR, and then that I'm certain that can be done in ten minutes.

HEARING OFFICER FUNDERBURK: Thank you,

counsel.

BY MR. FRIEDMAN:

Q. From an actuarial perspective.

HEARING OFFICER FUNDERBURK: One moment.

MR. FRIEDMAN: I'm sorry. I'm sorry, ma'am.

HEARING OFFICER FUNDERBURK: Please proceed, Mr. Friedman.

BY MR. FRIEDMAN:

Q. Do you ever calculate cost of capital? Do you ever calculate cost of capital for private clients? Or does Aon? How about?

A. Aon does that, but that's usually not specifically my team's responsibility.

Q. Okay. And when Aon does that, in your experience, does Aon rely on economists to define capital, or does it rely on its actuarial understanding of that meaning?

For example, for an individual carrier in another state who's filing a request for an increase in homeowners' rates.

A. As I remember, there are probably eight or nine different ways to calculate return on capital in the Casualty Actuarial Society's methodology. So it's

really hard to define this one because the cost of capital means different things in different jurisdictions. So there's no -- there are sometimes it's also -- we also base on rating agency requirement, so there's no standard answer to that.

Q. Okay. So let's say we step out of this jurisdiction. I'm going to pose a hypothetical, but it's based on, I hope, your experience with Aon's calculations of the cost of capital. So let's say we step out of North Carolina and into a state that does allow the cost of capital to be the basis of the profit factor.

MR. SPIVEY: Objection to the characterization. That is so -- so mixing up all the discussions that he had with Dr. Zanjani about these topics that I don't know how she can understand that question.

MR. FRIEDMAN: Yeah. I'm not talking about Dr. Zanjani's analysis at all. I'm talking about actuaries computing the cost of capital and the profit provision and whether when they're not relying on economists' definitions of cost of capital, what it means to them when they -- if they are just computing it based on their actuarial understandings.

And if she doesn't know how Aon's actuaries compute it or whether there are times when they don't rely on an economist's definition of cost of capital, that's fine.

But I am trying to figure out whether in another state that allows consideration of cost of equity, cost of capital, capital and surplus, however you want to define it, the -- are they -- do -- is -- are Aon's actuaries relying on the actuarial definitions or understandings of those terms, not an economist's understanding?

HEARING OFFICER FUNDERBURK: I'm going to ask you to restate your question for the witness as concisely as possible.

BY MR. FRIEDMAN:

Q. You stated that there are various ways that Aon's actuaries may compute cost of capital.

A. Correct.

Q. Is it fair to say that some of them might be from an economist's perspective?

A. Yes.

Q. Okay.

A. I think in this CAR analysis, it is more from the investment perspective, from investors' perspective. Because we are talking about CAR, I want

to address here. Here, the CAR is assuming the investors are cat bond investors.

When they put their -- when they are at risk to support North Carolina Beach Plan, FAIR Plan's risk, assessment risk, how they want to be compensated. And we base on the real time cat bond data pricing information to determine the -- the -- the returns.

And here, we don't even assume on certain capital, or we don't assume the -- the -- the dividend, all these things. We only assume for this level of the risk, for this probability of the risk, how the cat bond investors typically compensate it. And those are based on ten years of the cat bond yield data.

MR. FRIEDMAN: Okay. Your Honor, on this topic, what she means by using capital in the context of the CAR, I don't have any more questions.

HEARING OFFICER FUNDERBURK: I take that to mean then we are at a good transition point for the end of the day?

MR. FRIEDMAN: Yes, ma'am.

HEARING OFFICER FUNDERBURK: Okay. Ms. Mao, you may step down. We'll recall you tomorrow to testify. And I'll remind you, when you take the bench again, you will be under oath. You'll remain

under oath. Thank you, ma'am.

Counsel, is there anything we need to address before we recess for the day?

MR. SPIVEY: I'm not aware of anything, Your Honor.

MR. FRIEDMAN: No, ma'am.

HEARING OFFICER FUNDERBURK: Okay. We are scheduled to resume at 9:00 a.m. tomorrow. I will ask that counsel be seated and ready to proceed at 9:00 a.m. Thank you. We're in recess.

* * * * *

(Hearing adjourned at 4:00 p.m.)

CERTIFICATE OF REPORTER

STATE OF NORTH CAROLINA
COUNTY OF WAKE

I, Wendy Sawyer, court reporter, do hereby certify that the witnesses whose testimony appears in the foregoing hearing were duly sworn; that the testimony of said witnesses was taken by me to the best of my ability and thereafter reduced to typewriting under my direction; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this hearing was taken, and further that I am not a relative or employee of any attorney or counsel employed by the parties thereto, nor financially or otherwise interested in the outcome of the action.

This, the 9th day of October, 2024.

WENDY SAWYER, Court Reporter

Notary Public #202411500157

Commission Expires April 23, 2029