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MONTANA FIRST JUDICIAL DISTRICT COURT
LEWIS AND CLARK COUNTY

RIKKI HELD, et al., Plaintiffs, v. STATE OF MONTANA, et al., Defendants.	Cause No. CDV-2020-307 Hon. Kathy Seeley **PLAINTIFFS' MOTION *IN LIMINE* NO. 5: BRIEF IN SUPPORT OF MOTION RE: DR. JUDITH CURRY'S EXPERT TESTIMONY**

I. INTRODUCTION

Plaintiffs Rikki Held, *et al.*, by counsel, and pursuant to the Court's Modified Scheduling Order (Doc. 145), entered June 15, 2022, respectfully submit the following brief in support of their motion ***in limine*** to exclude and/or limit the scope of Dr. Judith Curry's expert testimony[1] at trial on the grounds that Dr. Curry lacks the necessary knowledge, skill, experience, training, or education to proffer expert testimony on a number of topics she covers in her Expert Report.

Specifically, Dr. Curry should not be permitted to provide expert testimony in the following areas:

1. Energy Transition and Montana's Renewable Energy Resources and Capacity.
2. Engineering and Electric Power Systems.
3. Government Energy Policy or the Law.
4. Economics and Greenhouse Gas Accounting.
5. Montana's Environment and Montana Climate Change Impacts.
6. Children's Mental Health, Psychology, Psychiatry, Children's Physical Health, Medicine, or Social Sciences.
7. Glaciology, Mountain Snow Hydrology, Fish Biology, Forest Management, or Forest Fire Science.
8. Google Research Expertise.
9. "Wicked Science."

Further, this Court should exclude the expert opinions of Dr. Curry based on her methodology. Recently, the expert testimony of Dr. Curry was excluded in *Michael Mann, Ph.D. v. National Review, Inc., et al.*, No. 2012 CA 008263 B (D.C. Super. Ct.). This defamation case was brought by climate scientist Dr. Michael Mann against National Review for two blog posts written by two of the defendants in that case, Steyn and Simberg, and published on the National Review's website criticizing Mann's climate research. At page 13 of an order excluding the expert testimony of Dr. Curry based on her methodology, the D.C. court wrote:

[1] As set forth in Defendants' original and supplemental Expert Witness Disclosures (Docs. 228, 236), dated, respectively, October 31 and November 22, 2022.

> As explained in greater detail below, Dr. Curry has merely summarized the conclusions of other experts and presented them as her own. Such methodology is not derived from the scientific method. "Even a supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are based on some recognized scientific method."

See Exhibit 1 to the Declaration of Julia Olson ("Olson Dec.") (Order in *Michael Mann, Ph.D. v. National Review, Inc., et al.*, No. 2012 CA 008263 B (D.C. Super. Ct.), citing *Smith v. Ford Motor Co.*, 215 F.3d 713, 718 (7th Cir. 2000)).

Finally, Defendants did not name Dr. Curry as a rebuttal expert to any of Plaintiffs' experts pursuant to the court-ordered deadline to disclose witnesses, and her Expert Report[2] was prepared without a thorough and detailed review of the Expert Reports of Plaintiffs' experts. *See* Defendants' Rebuttal Expert Witness Disclosure (Doc. 242), November 30, 2022. Dr. Curry's trial testimony should be limited to the four corners of her Expert Report, should not be allowed to rebut Plaintiffs' experts, should be limited to the topics for which this Court finds she has the necessary knowledge, skill, experience, training, or education to proffer expert, as opposed to lay, testimony, and her testimony should be excluded where Dr. Curry did not apply an appropriate methodology.

II. APPLICABLE STANDARDS

A motion *in limine* is a "request for guidance by the court regarding an evidentiary question, which the court may provide at its discretion to aid the parties in formulating trial strategy." *Hunt v. K-Mart Corp.*, 1999 MT 125, ¶ 11, 294 Mont. 444, 981 P.2d 275; *see also Speaks v. Mazda Motor Corp.*, 118 F. Supp. 3d 1212, 1217 (D. Mont. 2015) (a motion *in limine* is a "procedural device[] to obtain an early and preliminary ruling on the admissibility of evidence.").

[2] Dr. Curry's Expert Report, her curriculum vitae, and her peer-reviewed publications are attached as Exhibit 2 to Olson Dec.

The purpose of a motion *in limine* is to "prevent the introduction of evidence which is irrelevant, immaterial, or unfairly prejudicial." *Cooper v. Hanson*, 2010 MT 113, ¶ 38, 356 Mont. 309, 234 P.3d 59 (quoting *State v. Krause*, 2002 MT 63, ¶ 32, 309 Mont. 174, 44 P.3d 493). The district court's authority to grant or deny a motion *in limine* "rests in the inherent power of the court to admit or exclude evidence and to take such precautions as are necessary to afford a fair trial for all parties." *City of Helena v. Lewis*, 260 Mont. 421, 425-26, 860 P.2d 698, 700 (1993) (quoting *Feller v. Fox*, 237 Mont. 150, 153, 772 P.2d 842, 844 (1989) (overruled on other grounds by *Giambra v. Kelsey*, 2007 MT 158, 338 Mont. 19, 162 P.3d 134)).

In circumstances where "scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue," M.R. Evid. 702 permits "a witness qualified as an expert by knowledge, skill, experience, training, or education" to offer testimony "in the form of an opinion or otherwise." M.R. Evid. 702. Thus, to admit expert testimony, the district court must determine "(1) that the subject matter requires expert testimony, and (2) that the witness qualifies as an expert *in the particular area on which the witness intends to testify*." *State v. Harris*, 2008 MT 213, ¶ 8, 344 Mont. 208, 186 P.3d 1263 (emphasis added). "In Montana, an expert's reliability is tested in three ways under Rule 702, M.R. Evid.: (1) whether the expert field is reliable, (2) whether the expert is qualified, and (3) whether the qualified expert reliably applied the reliable field to the facts." *Beehler v. E. Radiological Assocs., P.C.*, 2012 MT 260, ¶ 35, 367 Mont. 21, 289 P.3d 1331 (*quoting Harris v. Hanson*, 2009 MT 13, ¶ 36, 349 Mont. 29, 201 P.3d 151). The district court's role is to "determine whether the field is reliable and whether the expert is qualified." *McClue v. Safeco Ins. Co. of Illinois*, 2015 MT 222, ¶ 16, 380 Mont. 204, 354 P.3d 604 (citing *Beehler*, ¶ 35); *see also Cottrell v. Burlington N. R. Co.*, 261 Mont. 296, 301, 863 P.2d 381, 384 (1993) ("Implicit in Rule 702 is the requirement that before a District Court

allows a witness designated as an expert to express an opinion, *some foundation must be laid to show that the expert has special training or education and adequate knowledge on which to base an opinion.*") (emphasis added). The third factor—whether the qualified expert reliably applied the reliable field to the facts—is determined by the finder of fact. *Harris v. Hanson*, ¶ 36.

Here, an order that constrains and limits the scope of Dr. Curry's proffered trial testimony is necessary because, as set forth below, Dr. Curry lacks the requisite knowledge, skill, experience, training, or education to proffer expert testimony on several topics on which she opines in her Expert Report and did not apply an appropriate methodology.

III. ARGUMENT

Dr. Curry's Expert Report, her curriculum vitae, her peer-reviewed publications, and her December 16, 2022, deposition testimony establish that Dr. Curry is no more qualified than any other highly educated and resourceful internet researcher on the topics set forth below and should not provide expert testimony at trial in the following subject areas.

A. Dr. Curry is Not an Expert on the Energy Transition and Montana's Renewable Energy Resources and Capacity.

In her Expert Report, Dr. Curry renders opinions on whether Montana can have a 100% renewable energy portfolio and the process of moving society away from dependence on a fossil-based energy system to an energy system that does not contribute to the atmosphere's burden of greenhouse gases, "the Energy Transition." Curry Report at 1, 16-26. Dr. Curry is unqualified to render expert opinions in those areas set forth in her Executive Summary on page 1, and section 3 of her Expert Report, pages 16-26.

Dr. Curry admitted in deposition[3] that she is not an expert on the engineering aspects of

[3] A condensed version of Dr. Curry's deposition transcript is attached as Exhibit 3 to Olson Dec.

the Energy Transition away from fossil fuels. Curry Dep. 63:11-17 ("The engineering aspects of this, no, I am not an expert.").

Dr. Curry maintains that she is an expert in "energy meteorology," which she defines as "atmospheric science, weather-related science that is targeted directly at the needs of the energy sector." Curry Dep. 63:20-24. However, Dr. Curry also admitted in deposition that she has never studied atmospheric or weather-related science in Montana, has no clients for whom she has done work in Montana, had never reviewed the scientific literature on climate change in Montana until the weeks preceding her Expert Report submission, has never conducted her own analysis or model run on the feasibility of renewable energy in Montana, and has never visited Montana. Curry Dep. 78:3-20, 120:3-5.

Dr. Curry has no peer-reviewed publications on the "Energy Transition" or renewable energy potential in Montana, a prerequisite to demonstrate expertise in that field. *See* Curry Report, Appendix A at 31-40. Dr. Curry admits she never researched or published on the physical footprint (the area of land required) of fossil fuel energy infrastructure. Curry Dep. 127:4-6.

Moreover, Dr. Curry revealed at her deposition that she heavily relied on the work of her assistant, Mark Jelinek,[4] to prepare portions of her Expert Report, including on renewable energy.[5] Curry Dep. 28:17-29:3. Mr. Jelinek spent 70 hours on Dr. Curry's Expert Report, whereas Dr. Curry spent 50 hours total on her Expert Report. Curry Dep. 14:9-12, 58:22-25.

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[4] For clarity, in early portions of the deposition, Dr. Curry would not disclose the name of her assistant, Mark Jelinek. She later disclosed his name. Mr. Jelinek was the only person who helped Dr. Curry write her Expert Report and any reference to an assistant is to Mr. Jelinek. Curry Dep. 26:13-29:3.

[5] Dr. Curry's Expert Report does not disclose the extensive participation of Mark Jelinek in preparing her Expert Report, or the basis for her relying upon Mr. Jelinek as a consultant. Nor does Dr. Curry's Expert Report set forth any background information on Mark Jelinek in order to determine if he has any expertise in the relevant areas.

According to Dr. Curry, Mr. Jelinek was responsible for "Googling around to understand Montana's renewable resource[sic] and capabilities" for Dr. Curry. Curry Dep. 26:16-19, 28:17-29:3. For example, with respect to Montana's hydroelectric power, Mr. Jelinek found and plotted the data and prepared the graph for monthly mean streamflow at Fort Benton, Montana. Curry Report at 17, Figure 3.1; Curry Dep. 22:1-2, 26:13-19. Mr. Jelinek also "did a lot of support work." Curry Dep. 26:18-19. Dr. Curry's Expert Report does not disclose the extensive participation of Mark Jelinek in preparing her Expert Report, or the basis for her relying upon Mr. Jelinek as an expert consultant. Nor does Dr. Curry's Expert Report set forth any background information on Mark Jelinek that would allow Plaintiffs' counsel or the Court to determine if he has any expertise in the relevant areas. In fact, her Expert Report does not disclose Mark Jelinek at all!

In sum, Dr. Curry does not possess the requisite knowledge, skill, experience, training, or education to provide expert opinion on Montana's renewable energy resources, capacity, portfolio, land use, or Energy Transition.

B. Dr. Curry is Neither an Engineer Nor an Expert in Engineering or Electric Power Systems.

Dr. Curry does not have the requisite "knowledge, skill, experience, training, or education" to qualify as an expert witness in the fields of engineering or electric power systems. M.R. Evid. 702. During her deposition, when asked, Dr. Curry did not claim to be an expert in electric power systems, stating only that she had "a fair amount of operational knowledge in terms of having interacted closely with people who do that." Curry Dep. 75:3-13. She admitted she does not have "any specialized training in how electric power systems operate," and only has associations with others who do. Curry Dep. 76:6-14.

Dr. Curry could not give a "straightforward answer" as to whether she was an expert in engineering. Curry Dep. 70:2-4. She claimed some expertise in engineering by virtue of serving

as faculty in a university aerospace engineering department and by co-publishing a paper on "manned aerial vehicles" in an engineering journal, while admitting that she would not claim to be an expert in nuclear engineering. Curry Dep. 67:5-68:16, 69:12-70:4.

> THE WITNESS:· -- there is a very nuanced – there are very nuanced meanings to expertise. I could easily claim that I'm an expert in that field with justification for having served for ten years as a tenured faculty in an aerospace engineering department. Beyond that, I don't have anything to say about that.

Curry Dep. 68:7-12.

However, Dr. Curry's Expert Report and CV make clear that Dr. Curry has no "knowledge, skill, experience, training, or education" in the field of engineering, including nuclear engineering or electric power systems, which would qualify her to provide expert testimony on any of the particular topics involving engineering and electric power systems in her Expert Report, including the viability of nuclear power or the timeline necessary to engineer and bring to scale solar, wind, and geothermal energy, including battery and hydro storage, referenced on pages 16-26 of her Expert Report. Further, while she claims to have been "faculty in an aerospace engineering department," Dr. Curry does not claim to have taught any courses or written any peer reviewed papers on engineering, including nuclear engineering or electric power systems, which could qualify her to provide expert testimony on any of the particular topics involving engineering and electric power systems on which she opines in her Expert Report.

C. Dr. Curry is Not an Expert on Government Energy Policy or the Law.

Dr. Curry is not qualified to render expert testimony in the arena of government policy:

> **Q. Okay. Do you consider yourself a government policy expert?**
> A. No. I have engaged in the policy process, okay. So whatever a government policy expert means, I don't know.

Curry Dep. 64:10-14. Dr. Curry also admitted that, while knowledgeable, she is *not an expert* in energy policy. Curry Dep. 74:23-75:2.

Dr. Curry's opinions in section 3.3.2 of her Expert Report, where she opines on "Competing values in the energy transition," amount to a policy analysis comprised of her personal views on "wise policy," given a "prioritizing and balancing" of "values and concerns." Curry Report at 23-24. Dr. Curry should not be permitted to provide expert testimony at trial on those topics, as it is outside her area of particularized "knowledge, skill, experience, training, or education." M.R. Evid. 702. Defendants have not disclosed Dr. Curry as a fact witness to provide lay opinion on competing policy values in Montana, so she should not be permitted to testify to these issues in any capacity and, if she does, the Court should accord no weight to such testimony. *See* Defendants' Amended Lay Witness List (Doc. 235), November 22, 2022.

Similarly, Dr. Curry admitted to not having read the statutes being challenged in this case or the Montana Constitution, and she agrees that she is not a legal expert. Curry Dep. 239:19-240:19. Thus, Dr. Curry's personal opinions outside her area of expertise that the "[e]limination of the two laws challenged by the Plaintiffs would have essentially no impact on the climate of Montana" should also be precluded in her trial testimony. Curry Report at 29. Thus, her trial testimony should be limited to the areas of particular *scientific* expertise Dr. Curry can establish she has based on her "knowledge, skill, experience, training, or education." M.R. Evid. 702.

D. Dr. Curry is Neither an Economist Nor an Expert in Greenhouse Gas Accounting.

Dr. Curry is not an expert in the accounting practices of greenhouse gases, which is a subject addressed by Plaintiffs' expert Peter Erickson, and Dr. Curry has no knowledge of the amount of emissions that result from the fossil fuels extracted but not combusted in Montana. Curry Dep. 76:15-22, 121:4-15.

Dr. Curry is also not an expert in economics; she has not trained as an economist or published in the field. She claims only a "license to learn" and to be "more knowledgeable about

microeconomics topics than macroeconomics topics." Curry Dep. 76:23-77:9. Dr. Curry's opinions on pages 13, 22-29 of her Expert Report involving economics and Montana's responsibility for greenhouse gas emissions, the accuracy of which depends on an accurate accounting of such emissions, should be excluded. Curry Report at 13, 22-29.

E. Dr. Curry is Not an Expert on the Impacts of Climate Change in Montana.

Prior to the 50 hours Dr. Curry spent preparing her Expert Report, she had never conducted any research on climate change in Montana, had never studied the climate of Montana, had never engaged in her own research on the climate of Montana, had never published a peer-reviewed paper on the climate in Montana, and had never even reviewed any scientific publications on the climate in Montana. Curry Dep. 78:3-20. Dr. Curry had no memory of ever reading the Montana Climate Assessment, authored by Plaintiffs' expert Dr. Cathy Whitlock, prior to preparing her Expert Report. Curry Dep. 78:21-79:8. Dr. Curry has never spent any time in Montana. Curry Dep. 79:9-14. Dr. Curry's company, Climate Forecast Applications Network, LLC (CFAN),[6] has never created any of its products to address mitigation of weather and climate risk in the State of Montana. Curry Dep. 78:3-79:14.

> **Q. Okay. And prior to your work in this case, had you done any research on climate change in Montana?**
> A. No.
> **Q. So you began studying the climate of Montana for the first time with respect to your work in this case?**
> A. Yes.

[6] In her Expert Report, Dr. Curry describes CFAN as follows: "My company CFAN supports the energy sector with extended-range probabilistic forecasts of temperature extremes, severe convective weather, hurricanes, fire weather and renewable energy. CFAN's climate scenario projections and impact assessments support power plant siting and investment decisions, insurance decisions, electric power demand, and severe weather vulnerability." Curry Report at 2. Importantly, Defendants refused to produce any documents related to Dr. Curry's work at CFAN: "CFAN's regional climate scenarios do not serve as the basis for any of the arguments presented in Dr. Curry's Expert Report." Response to Plaintiffs' Request for Production No. 36.

Q. And have you conducted any of your own research on the climate of Montana?
A. No.
Q. And have you published any peer-reviewed papers on the climate in Montana?
A. No.
Q. And was -- when you were preparing your expert report in this case, was that the first time that you began reviewing scientific publications on the climate in Montana?
A. Yes. Yeah.
Q. And was it in conjunction with preparing your expert report in this case the first time you reviewed the Montana Climate Assessment?
A. Probably, yeah. Who knows if I would have encountered it. It never made -- if I encountered it some previous time, it didn't make much of an impression.
. . .
Q. And have you ever been to Montana?
A. I don't think so. I might have driven through. Drive by or something.
Q. Do you have any other ties to Montana besides your work on this case?
A. None.

Curry Dep. 78:3-79:14. When asked, for example, whether Dr. Curry agreed with Montana climate experts Drs. Running and Whitlock as to the observed warming trend in Montana since 1950, Dr. Curry raised an issue she had only that week discovered in internet research that an undisclosed number of weather measurement stations might be poorly sited (she could provide only one example from Helena with no information on how the station was poorly sited), surmising that airport runways were interfering with accurate temperature measurements. Curry Dep. 261:18-262:16. She stated: "apparently the same thing is going on in Montana." Curry Dep. 262:14-16. The truth is, having never performed research in Montana as to observed warming trends, Dr. Curry does not know what is going on in Montana and has no knowledge of the number or location of Montana's weather stations because she lacks "knowledge, skill, experience, training, or education" about climate change impacts (or weather monitoring) in Montana. M.R. Evid. 702. She has never studied it and Dr. Curry should not be permitted to pass off as expert opinions her beliefs informed by cursory internet "research" conducted solely for purposes of this case.

For purposes of M.R. Evid. 702, Dr. Curry did not become a Montana climate expert in the 50 hours she spent between October 1-31, 2022, preparing her Expert Report. Curry Dep. 13:16-14:12. Dr. Curry's trial testimony should be limited to the specific areas of climate science where she has particular "knowledge, skill, experience, training, or education," and her opinions on the impacts of climate change on Montana on pages 2-8 of her Expert Report should be excluded.

F. Dr. Curry is Not a Mental Health, Psychology, Psychiatric, Children's Health, Medical, or Social Science Expert.

Dr. Curry is not qualified to provide expert testimony at trial regarding the subject of section 2.3 of her Expert Report entitled: "Harm to children from apocalyptic climate change rhetoric." Curry Report at 13-16. Dr. Curry has strong personal opinions about the causes of childhood depression, poor parenting today, the role of social media, K-12 curricula on climate change, and her views on "hyperbolic alarmism." *Id.*; Curry Dep. 234:17-235:4, 277:5-19 ("My issue is how children are being raised these days. They're lot more fragile, okay, and vulnerable and neurotic given the way they're being raised, you know, they're too coddled . . . ."); 170:25-171:10. However, none of those personal opinions meets the standard for qualified expert testimony in this case, and they should be excluded at trial.

Dr. Curry admits she is not an expert in clinical psychology. Curry Dep. 72:11-16. Dr. Curry admits she is not an expert in psychiatry. Curry Dep. 73:6-17. Dr. Curry admits she is not an expert in children's mental health. Curry Dep. 73:18-20, 73:25-74:5. Dr. Curry admits she is not an expert in children's physical health and is not a pediatrician or otherwise a medical expert. Curry Dep. 74:6-13.

Dr. Curry has never worked professionally as a social scientist of any kind. Curry Dep. 65:20-66:2. Dr. Curry claims that her Doctor of Philosophy, her PhD, gives her "license to learn"

in the field of social science. Curry Dep. 66:3-7. However, her doctorate was "based on [her] work in the department of geophysical sciences . . . ." Curry Dep. 66:10-18.

Dr. Curry's claim to "a fair amount of understanding of social psychology" through "[i]ndependent learning . . . and engagement with experts in a variety of venues" does not qualify her as an expert to testify at trial to the opinions stated in section 2.3 of her Expert Report. Curry Dep. 72:11-23. Dr. Curry lacks formal education or training in the field of social psychology; social psychology is outside her area of research and professional work experience, and she has no peer reviewed publications to date on social psychology.[7] Curry Dep. 72:11-73:5.

In sum, Dr. Curry should be precluded from providing any expert testimony on the mental health of these Youth Plaintiffs, or young people more broadly, and should not be permitted to provide lay testimony because she was not designated as such a witness.[8]

G. Dr. Curry is Not an Expert in All Areas of Climate Science and Adjacent Scientific Fields, Including Glaciology, Mountain Snow Hydrology, Fish Biology, Forest Management, and Fire Ecology.

In addition to not being an expert on Montana climate impacts, Dr. Curry does not have expertise in particular fields within and adjacent to climate science. Dr. Curry claims to be "fairly knowledgeable about glaciology" and says she is a "snow/ice person," but, when asked if she considered herself an expert, she did not answer yes, and she admitted to never having published a peer-reviewed paper on the topic of glaciers. Curry Dep. 74:14-22. Further, Mr. Jelinek appears to have prepared the portion of Dr. Curry's Expert Report addressing glaciers. Curry Dep. 90:19-

[7] Just before her deposition, Dr. Curry produced a draft of a book she has written, which she claims is currently going through peer review, but has not yet been published. Curry Dep. 82:25-83:15.
[8] While not Plaintiffs' legal basis for moving to exclude Dr. Curry's testimony, it would be harmful for the Youth Plaintiffs in this case to have to listen to Dr. Curry's ill-informed, trauma-insensitive criticism of their generation and their response to the climate crisis, a crisis their generation did not create, but is being and will continue to be disproportionately affected by.

91:3. Finally, Dr. Curry admitted that scientists who study ice sheets, for instance, have different areas of expertise from scientists who study the effects of climate change on fire ecology. Curry Dep. 267:3-7, 267:12-16. Neither Dr. Curry's CV, nor her answers in deposition, suffice to qualify her as an expert on Montana's glaciers, and Dr. Curry's opinions on glaciers at pages 7-8 of her Expert Report should be excluded from her expert testimony.

Similarly, Dr. Curry does not have expertise in Montana's declining snowpack, which falls in the research field of mountain snow hydrology. Dr. Curry has no peer-reviewed publications or any evidence of "knowledge, skill, experience, training, or education" in the field of mountain snow hydrology. She relied on Mr. Jelinek's work to depict Montana's snowpack and could not answer whether or not there was a long-term trend toward a declining snowpack in Montana. Curry Dep. 186:2-7, 186:25-187:5.

Dr. Curry admits to not being an expert in fish biology, forest management, forest fire science (apart from "some knowledge" in predicting wildfire risk), or species extinction. Curry Dep. 77:10-78:2, 209:18-210:1 ("No, I don't deal with species extinction. That was way beyond the scope of what I was asked to deal with.").

H. "Dr. Google" Syndrome and a "License to Learn" Does Not Qualify a Witness as an Expert.

Before an expert may express an opinion at trial, the expert must demonstrate she has adequate knowledge, by training or education, and sufficient factual information on which to base an opinion. *Cottrell*, 261 Mont. at 301, 863 P2d at 384-85; *Hulse v. State*, 1998 MT 108, ¶ 48, 289 Mont. 1, 961 P2d 75. As recognized by other courts, Dr. Curry's lack of empirical or scientific methodology in rendering her conclusory opinions discounts any evidentiary value those opinions may have.

Questions concerning her methodology were the reason for excluding the expert testimony of Dr. Curry in *Michael Mann, Ph.D. v. National Review, Inc., et al.*, No. 2012 CA 008263 B (DC. Super. Ct.). In an order excluding the expert testimony of Dr. Curry based on her methodology, the DC. court wrote at page 14:

> At bottom, Dr. Curry's report is not that of an expert. If permitted by the evidentiary standards of this jurisdiction, it may be possible for Dr. Curry to offer testimony of her knowledge. But, Defendants have not shown her to have applied principles and methods suitable for a relevant expert opinion in this case. The Court will not permit her to testify as an expert.

In excluding her testimony based on the insufficiency of Dr. Curry's facts and data, the DC. court found "Defendants have simply failed to show that Dr. Curry offered any scientific opinion of her own, and her testimony must be foreclosed for that reason." (Pages 14-15.) In ruling on the reliability of her principles and methods, the DC. court excluded her testimony, finding:

> Defendants have not met their burden of establishing that Dr. Curry used reliable methodologies. To wit, her expert report does not contain any explanations of her methodologies, making it impossible for the Court to find her testimony reliable. *See Sacchetti* [*v. Gallaudet Univ.*, 344 F. Supp. 3d 233, 250-51 (DDC. 2018)]; *Campbell v. Nat'l R.R. Passenger Corp.*, 311 F. Supp. 3d 281, 300 (DDC 2018). Based on the Court's own assessment, her "methodologies" appear to be that she reviewed several articles and documents, and then opined that the conclusions of those documents are correct. Such methodologies are not derived from the scientific method and, thus, render Dr. Curry's opinion unreliable as expert testimony.

(Page 17.) (Citations omitted.)

The court in *Mann v. National Review* applied the Federal Rules of Evidence, and as the Montana Supreme Court has explained:

> Montana has not adopted any of the recent versions of Federal Rule of Evidence (FRE vid.) 702, which sets the standard for the admission of expert testimony in many jurisdictions. As currently written, both FR. Evid. 702 and M. R. Evid. 702 state that a witness who is "qualified as an expert" may testify if her "knowledge will help the trier of fact to understand the evidence or determine a fact in issue." FR. Evid. 702(a); M. R. Evid. 702.

McClue, ¶ 19.

Important here, under the Montana Rules of Evidence, a proffered expert must be qualified as an expert in **each field** in which they are offering opinions, and the purported **"expert field"** must be reliable. *Id.*, ¶ 16. These are threshold determinations made by the trial court. *Id.* As in *Mann*, here Dr. Curry's facts, data, principles, and methods are similarly suspect. During her deposition, Dr. Curry stated that her "superpower" was her ability to Google and explore the metadata on the internet. Curry Dep. 20:19-25. When asked about whether she considered herself an expert in different fields where she does not have specialized training, education, or professional experience, Dr. Curry replied that she has "a license to learn" and that she does not agree with the idea of qualifying someone as an expert. Curry Dep. 66:3-9; 70:5-10.

> **Q. And do you have any specialized training in the field of social sciences?**
> A. Okay. I have a Doctor of Philosophy, okay, which I received in 1982 which I regard as a license to learn, and I've learned about an awful lot of different topics over the years. So do I have relevant knowledge? Yes.

Curry Dep. 66:3-9.

> **Q. And am I understanding that it's your position that your expertise can stem from the type of journal in which you are publishing?**
> A. No. I'm just saying you're trying to put a label on expertise and categorize it, and I'm saying it's a fairly pointless thing to do.

Curry Dep. 70:5-10.

The wealth of information on the internet has created "Dr. Google" syndrome, where people believe that they can be an expert in anything that they can research online.[9] However, in a court of law, there are higher standards by which to judge expertise, for good reason. *State v. Southern*, 1999 MT 94, ¶ 49, 294 Mont. 225, 980 P2d 3; *State v. Maier*, 1999 MT 51, ¶ 89, 293 Mont. 403, 977 P2d 298. Just as a Chief of Surgery at Providence in Missoula should not perform

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[9] *The Dangers of Doctor Google*, Rochester Dermatologic Surgery, https://rochesterdermsurgerycom /the-dangers-of-doctor-google/ (last visited Jan. 31, 2023).

spinal fusion if they are a general surgeon untrained in that specific field, Dr. Curry's decades-old faculty position within an aerospace engineering department at the University of Colorado at Boulder does not make her an expert in aerospace engineering, glaciology, fire ecology, or child psychology—by way of relevant example—when that is not where her "knowledge, skill, experience, training, or education" lie.

Even accepting, for the sake of argument, that her Google searches did so qualify her, Dr. Curry's reliance on her Google searches as a basis for her expert opinions should be rejected because she does not describe a scientific methodology in her searches and has not produced to Plaintiffs any of the Google search parameters or results on which she relies to form her opinions. Curry Dep. 24:10-25:1. *See State v. Southern*, ¶ 49.

I. "Wicked Science" is a Newly Coined Term by Social Scientists and Is Not a Qualified Area of Physical Science Expertise.

In a similar vein as Dr. Curry's "Google superpower," Dr. Curry claims to be a "wicked scientist," with "meta expertise." Curry Dep. 79:16-80:11. "Wicked science" is not a currently-recognized scientific field, but a "conceptual framework" being proposed as of 2021 by a group of social scientists to create new graduate level programs that would train a new generation of "wicked scientists" to solve "wicked problems."[10] Dr. Curry has adopted this language to claim for herself the title of "wicked scientist." When asked whether she could name any other wicked scientists, the only scientist she respected enough to name was Dr. James Hansen, perhaps the most renowned American climate scientist and former head of NASA's Goddard Institute of Space Studies, and the first climate scientist to warn Congress of the dangers of climate change in the

[10] Nicholas C. Kawa et al., *Training Wicked Scientists for a World of Wicked Problems*, 8 Human. Soc. Scis. Comm'ns 189 (2021), https://doiorg /101057 /s41599-021-00871-1; *See* Curry Dep. 81:14-21.

1980s. Curry Dep. 243:1-11, 266:13-267:2, 282:7-9. Dr. Hansen is widely cited by Plaintiffs' experts. *See* Fagre Report at 15; Running and Whitlock Report at 9, 39; Van Susteren Report at 1, 19, 22 (Doc. 222). Dr. Curry cannot claim "wicked science" expertise, when such a field does not yet exist or have a scientific methodology; nor can she qualify as an expert across all of the disciplines in which she conducts Google searches or has a network of bloggers on her website.

J. Dr. Curry's Expert Testimony is Not Rebuttal Testimony.

Defendants' Expert Witness Disclosure of October 31, 2022 (Doc. 228) disclosed Dr. Curry as an expert and provided her Expert Report. On November 22, 2022, Defendants served their Supplemental Expert Witness Disclosure (Doc. 236), which included a Corrected Expert Report correcting errors that Dr. Curry discovered in her original Expert Report. Defendants stated that "Dr. Curry's disclosure is unchanged in all other respects." Doc. 236 at 1. Defendants' Rebuttal Expert Disclosure did not name Dr. Curry as a rebuttal expert. Defendants' Rebuttal Expert Disclosure (Doc. 242, dated November 30, 2022).

Defendant's expert disclosure of Dr. Curry stated: "Dr. Curry's opinions and conclusions are set forth in her expert report attached as Exhibit A. Dr. Curry's opinions are based on her knowledge and expertise as set forth in her CV, as well as her review of the pleadings, discovery, and expert reports. Dr. Curry's CV is attached as Appendix A to her report and sets forth her qualifications as an expert." Doc. 228 at 2. In deposition, Dr. Curry stated that when she prepared her Expert Report, she "hadn't read a lot of [Plaintiffs' Expert Reports] terribly carefully, and I certainly didn't have time to do that when I was preparing this report." Curry Dep. 54:23-55:3. Dr. Curry did not read Plaintiffs' expert reports carefully until she was preparing for her deposition, which took her about 16 hours. Curry Dep. 54:17-55:7. Dr. Curry confirmed at her deposition that she had read Plaintiffs' Expert Reports and Rebuttal Expert Reports and that the rebuttal reports

did not cause her to reconsider any of her opinions. Curry Dep. 54:12-16 ("**Q. [D]id any of them cause you to reconsider any of your opinions in the case?** A. Not at all."). Thus, Dr. Curry should not testify to any of Plaintiffs' Experts, and she should be limited to testifying to the portions of her Expert Report on which she is qualified as an expert to opine.

K. Dr. Curry Cannot Testify Concerning Her Work at CFAN.

In opposing this motion and for purposes of Dr. Curry's testimony at trial, Defendants cannot rely on Dr. Curry's work at CFAN as both Defendants and Dr. Curry refused to permit any discovery concerning CFAN. As an example, Defendants responded to Interrogatory No. 30:

> Defendants object to this Interrogatory on the grounds that CFAN's regional scenarios of future climate variability and change are propriety. They are the property of CFAN's clients who have paid for them. Subject to and without waiving this objection, please see the information found at https://wwwcfanclima tene t/climate-change. No regional scenarios for Montana have been produced by CFAN. CFAN's regional climate scenarios do not serve as the basis for any of the arguments presented in Dr. Curry's Expert Report.

Or as Defendants stated in response to Request for Production No. 43: "Defendants further object to this Request on the grounds that CFAN's electric utility clients and any interactions that CFAN has with them are proprietary, outside the scope of discovery in this case, and do not serve as a basis for Dr. Curry's expert opinions in this matter." Further, Dr. Curry claims "[t]he facts and data that I considered in forming my opinions are available from public sources *and* cited in this report." Curry Report at 1 (emphasis added).

IV. CONCLUSION

Access to the internet and Google can be a powerful tool, but it is not enough to qualify a person as an expert at trial under MR. Evid. 702. Dr. Curry should be limited to testify at trial on the narrow topics in portions of section 22 of her Expert Report where she has the requisite "knowledge, skill, experience, training, or education" to offer expert opinion. An order *in limine*

is necessary because Dr. Curry lacks the requisite "knowledge, skill, experience, training, or education" to proffer expert testimony on a number of topics on which she opines in her Expert Report, as detailed above and summarized here, including the Energy Transition (section 33 at 22-26; section 5 at 28-29), Montana's renewable energy resources (section 31 at 16-22; section 5 at 28-29), engineering and electric power systems (section 3 at 16-22; section 333 at 25-26; section 5 at 28-29), government energy policy (section 332-333 at 23-26; section 5 at 28-29), law (section 5 at 28-29), economics (section 222 at 12-13; section 333 at 25-26), greenhouse gas accounting in Montana (section 4 at 26-27; section 5 at 28-29), Montana's environment and the impact of climate change in Montana (section 1 at 2-8; section 5 at 28-29), children's mental health (section 2 at 8-9; section 23 at 13-16; section 5 at 28-29), psychology, psychiatry, children's health and medicine (section 222 at 12-13; section 5 at 28-29), social sciences (section 222 at 12-13; section 5 at 28-29), glaciology (section 12 at 7-8), mountain snow hydrology (section 12 at 3-8; section 311 at 17), fish biology (section 11 at 2), forest management (section 12 at 8), forest fire science (section 12 at 8; section 333 at 26); "wicked science" (section 5 at 28 and throughout Report), and the meta data of Google searches (throughout Report).

Dr. Curry describes her research as "including climate dynamics of the Arctic, climate dynamics of extreme weather events, cloud microphysics and climate feedbacks, climate sensitivity and scenarios of future climate variability, and reasoning about climate uncertainty." Curry Report at 1. Dr. Curry should be limited to providing expert testimony on those topics discussed in limited portions of section 22 of her Expert Report for which she is qualified.

For the foregoing reasons, Plaintiffs respectfully request this Court enter an order *in limine* as provided herein.

DATED this 1st day of February, 2023.

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I certify that a true and correct copy of the foregoing was delivered by email to the following on February 1, 2023:

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EXHIBIT 1

IN THE SUPERIOR COURT OF THE DISTRICT OF COLUMBIA
CIVIL DIVISION

MICHAEL E. MANN, PH.D., Plaintiff, v. NATIONAL REVIEW, INC., *et al.*, Defendants.	2012 CA 008263 B Judge Alfred S. Irving, Jr.

ORDER

Before the Court are: (1) *Plaintiff's Motion in Limine to Strike the Expert Testimony of Dr. Judith Curry* ("MIL Curry"), filed on January 22, 2021 and (2) *Plaintiff's Motion in Limine to Strike the Expert Testimony of Dr. Abraham Wyner* ("MIL Wyner"), filed on January 22, 2021. Defendants, too, have filed motions to exclude Plaintiff's proffered expert witnesses, as follows: (1) *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Naomi Oreskes* ("MIL Oreskes"), filed on March 3, 2021; (2) *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Peter Frumhoff* ("MIL Frumhoff"), filed on March 3, 2021; (3) *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. John Holdren* ("MIL Holdren"), filed on March 3, 2021; (4) *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of John Mashey* ("MIL Mashey"), filed on March 3, 2021; (5) *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Gerald North* ("MIL North"), filed on March 3, 2021; (6) *Defendant Mark Steyn's Motion in Limine to Strike the Expert Testimony of John Abraham* ("MIL Abraham"), filed on March 3, 2021; and (7) *Defendant Mark Steyn's Motion in Limine to*

Strike the Expert Testimony of Raymond Bradley ("MIL Bradley"), filed on March 3, 2021. Oppositions and replies were filed concerning each of the aforementioned motions.

BACKGROUND

A more extensive recitation of the facts of this case are set forth in the Court's Orders dated July 22, 2021. The Court, here, only references the facts pertinent to resolution of the instant motions.

Importantly, this is a defamation action arising out of two blog posts written individually by Defendants Steyn and Simberg. The litigation does not intend to answer any questions about the existence of climate change or global warming. The subject statements concerned and criticized Dr. Mann ("Plaintiff") personally for his work in producing a model of rising global temperatures, which model is known publicly as the Hockey Stick graph. The statements accused Plaintiff, *inter alia*, of "molest[ing] and tortur[ing] data in the service of politicized science[,]" "engaging in data manipulation[,]" and creating the "fraudulent climate-change 'hockey-stick' graph[.]" *Competitive Enter. Inst. v. Mann*, 150 A.3d 1213, 1262-64 (D.C. 2016), *as amended* (Dec. 13, 2018), *cert denied* 140 S. Ct. 344 (2019). Plaintiff claims that the statements are defamatory and false. Defendants, on the other hand, contend the statements are not defamatory and are, indeed, true. Defendants seek to offer the testimony of two experts in the field of climate science and statistics, to lend to the credence and the legitimacy of the allegedly defamatory statements. For his part, Plaintiff proffers seven experts to support his claim that the statements are defamatory. The question for the Court is whether it may, as gatekeeper, admit into evidence the witnesses' opinion testimony and, if so, whether the subject matter of the testimony should be limited in any fashion.

DISCUSSION

As to the admissibility of the proffered expert opinions, this Court takes its guidance from the District of Columbia Court of Appeals' decision in *Motorola Inc. v. Murray*, 147 A.3d 751 (2016). Therein, the Court of Appeals adopted Federal Rule of Evidence 702 and the evidentiary standards for apprehending expert testimony that the United States Supreme Court established in *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 579 (1993)). The court focused on the following articulation of Rule 702:

> A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:
>
> (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
>
> (b) the testimony is based on sufficient facts or data;
>
> (c) the testimony is the product of reliable principles and methods; and
>
> (d) the expert has reliably applied the principles and methods to the facts of the case.

Motorola, 147 A.3d at 756 (emphasis added); *see also Parker v. United States*, 249 A.3d 388, 401-02 (D.C. 2021). The *Motorola* decision provides that trial judges, as gatekeepers of the admission of opinion testimony, are required to determine whether the proposed expert testimony is sufficiently reliable before allowing the testimony to be heard by a jury. *Motorola*, 147 A.3d at 757. In determining whether an expert opinion is based on specialized knowledge and has used reliable methodologies, the Court will look to such factors as: (1) "whether the theory or technique ... can be (and has been) tested;" (2) "whether it has been subjected to peer review and publication;" (3) "the known or potential rate of error;" (4) "the existence and maintenance of standards controlling the technique's operation;" and (5) "whether the technique

has been accepted by the scientific community." *Daubert,* 509 U.S. at 593-94. Determining reliability is a flexible inquiry that focuses "solely on principles and methodology, not on the conclusions that they generate." *Id.* at 594-95.

It is important to note that Rule 702 "does not operate in isolation." *Motorola*, 147 A.3d at 754. Indeed, the court recognized that Rule 702 is meant to operate in concert with Federal Rules of Evidence 703 and 403. *Id.* at 754 n.7. Rule 703 provides that the facts or data relied upon by an expert may be "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject[.]" *In re Melton*, 597 A.2d 892, 901-02 (D.C. 1991) (en banc). Rule 403 permits the exclusion of relevant evidence where "the danger of unfair or undue prejudice substantially outweighs the probative value [of the evidence.]" *Johnson v. United States*, 683 A.2d 1087, 1099 (D.C. 1996) (en banc).

As the Parties appreciate, trials are expected to feature competing expert testimony, so long as the testimony is reliable. Indeed, as the Court of Appeals observed in *Motorola:*

> The goal is to deny admission to expert testimony that is not reliable, but to admit competing theories if they are derived from reliable principles that have been reliably applied . . . . Indeed, we expect that many cases will feature expert witnesses espousing different views of the evidence. Their testimony will be tested by the adversary process and evaluated by the jury.

Motorola, 147 A.3d at 757.

The court further acknowledged that, "[a]lthough we have not formally adopted [Federal] Rule [of Evidence] 104, 'it accurately states the rule of evidence we generally follow.'" *Id.* at 754 n.7 (citing *Jenkins v. United States*, 80 A.3d 978, 991 (D.C. 2013)). The court instructed that, "[t]o perform the gatekeeping function, the trial court normally will apply Rule 104(a)." *Id.* at 754. Rule 104(a) requires the court to decide preliminary questions about whether a witness is qualified or evidence is admissible. And, Rule 104(b) requires that, where the relevance of

evidence depends on the existence of a fact, sufficient proof to support a finding of that fact must be offered. The court may admit such evidence "on the condition that the proof be introduced later." Fed. R. Evid. 104(b).

Finally, "[t]he burden is on the proponent of the testimony to establish its admissibility by a preponderance of proof." *United States v. Libby*, 461 F. Supp. 2d 3, 6 (D.D.C. 2006) (internal quotations omitted); *see also United States v. Tibbs*, Case No. 2016 CF1 19431, 2019 D.C. Super. LEXIS 9, at *14 (D.C. Super. Ct. Sept. 5, 2019) (citing *Daubert*, 509 U.S. at 592 n.10).

Plaintiff asks the Court to strike the expert opinions of two of Defendants' expert witnesses, Dr. Judith Curry and Dr. Abraham Wyner. Defendants ask the Court to strike the testimony of seven of Plaintiff's experts: Dr. Naomi Oreskes; Dr. Peter Frumhoff; Dr. John Holdren; Dr. John Mashey; Dr. Gerald North; Dr. Raymond Bradley; and Dr. John Abraham. The Court will first address a shortcoming that is common in all but one of the expert reports, and then will address each report individually.

A. An Expert Opinion Must Be Predicated on a Methodology Derived from the Scientific Method; Summarizing Publicly Available Information Without Conducting a Scientific Analysis is not a Reliable Methodology

First, none of Plaintiff's proffered experts explain the methodologies that they used to formulate the opinions contained in their reports. This error, in and of itself, is fatal because the Court is rendered unable to determine whether the Parties' experts used reliable methodologies. *See Sacchetti v. Gallaudet Univ.*, 344 F. Supp. 3d 233, 250-51 (D.D.C. 2018); *Campbell v. Nat'l R.R. Passenger Corp.*, 311 F. Supp. 3d 281, 300 (D.D.C 2018). Second, as gatekeeper, the Court cannot allow an expert to testify concerning documents and articles that they have reviewed, unless the expert can establish that they have used some technique or methodology that

systematically gathers, organizes and catalogs the documents such that another expert with similar training could follow the same procedure and arrive at the same result. *See Danley v. Bayer*, 169 F. Supp. 3d 396, 478 (S.D.N.Y. 2016) (finding that an expert may rely on documentary evidence in rendering her opinion, but may not "present these documents to the jury with no analysis or merely read, selectively quote from, or regurgitate the evidence.") (Internal citations omitted); *S.E.C. v. Lipson*, 46 F. Supp. 2d 758, 763 (N.D. III. 1998) ("expert testimony may not be used merely to repeat or summarize what the jury independently has the ability to understand.").

The methodologies of the expert must be grounded in the scientific method, such that another person with similar expertise could replicate them. *See Daubert* 509 U.S. at 591. Reviewing a selection of documents, summarizing them, and giving an opinion about their conclusions is not a proper methodology grounded in the scientific method, but, unfortunately, it is precisely the methodology used by most of the proffered experts, here. For that reason, the Court is constrained to grant all of the subject motions and exclude all of the proffered expert testimony, with the exception of Dr. Wyner's expert testimony.

Despite this common shortcoming, and with the expectation that the Parties will likely attempt to elaborate on the methodologies that their experts used in subsequent pleadings, the Court herein provides a *Daubert* evaluation of each expert's opinion.

B. Plaintiff's Motion in Limine to Strike the Expert Testimony of Judith Curry

Dr. Curry is Professor Emerita and a former Chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. Williams Decl., Ex. 7, at 2 ("Curry Rep."). She holds a Ph.D. in atmospheric science, has worked for a number of

universities and has published extensive research on a variety of climate-related topics. Curry Rep. 2.

Dr. Curry explains that her "observations and opinions" include a discussion of: "(I) the nature of the scientific and public controversy concerning the Hockey Stick graph; (II) whether the Hockey Stick graph can be regarded as 'fraudulent[;'] and (III) [Plaintiff's] role in the downward spiral of climate science discourse." Curry Rep. 1. Dr. Curry notes that she "present[s] sections (I) and (III) mostly in [her] capacity as a fact/lay opinion witness and section (II) in [her] capacity as an expert witness." Curry Rep. 1.

Plaintiff has no quarrel with Dr. Curry's credentials. Rather, he challenges the admissibility of several of Dr. Curry's conclusions. He argues the following: (i) Dr. Curry has been proffered to provide "state of mind" expert testimony; (ii) Dr. Curry's opinions are not rooted in sufficient facts and data, and are indeed contradicted by facts; (iii) Dr. Curry's opinions are not based on reliable principles or methods, as the overwhelming consensus of the scientific community has reached a contrary conclusion; (iv) Dr. Curry's opinions are not relevant to the facts of this case; and (v) Dr. Curry offers impermissible opinions that should be excluded. MIL Curry Mem. 14-19.

1. Dr. Curry's Expert Testimony Regarding State of Mind and the "Reasonableness" of Defendants' Statements

In her report, Dr. Curry opines that "it is reasonable to have referred to the Hockey Stick in 2012 as 'fraudulent,' in the sense that aspects of it are deceptive and misleading[.]" Curry Rep. 1. Dr. Curry offers various definitions of "fraud" and "scientific misconduct," and cites to the Climategate emails and public accusations of fraud levied at Plaintiff that would generally support an observer's view that the Hockey Stick was fraudulent. Curry Rep. 15-18.

Plaintiff contends that, if Dr. Curry intends to testify in such areas, this Court must find that she is legally precluded from submitting such opinions to a jury. As support, Plaintiff notes that courts have "rejected attempts to have experts testify on issues relating to someone else's state of mind" because to do so "would invade the province of the jury and address an ultimate issue in the case." MIL Curry Mem. 14.

In opposition, Defendant Steyn asserts that "[Dr.] Curry's use of the word 'reasonable' in her testimony is not about anyone's *subjective* mindset, but rather explains why it is *objectively* reasonable to refer to [Plaintiff's] work as fraudulent." Steyn Opp'n MIL Curry 8 (emphasis in original).

Plaintiff relies upon several cases that do not unequivocally support his position. For example, in *OAO Alfa Bank v. Center for Public Integrity*, the United States District Court for the District of Columbia rejected a plaintiff's attempt to show actual malice through the testimony of an expert in journalism, and granted summary judgment in favor of the defendants. 387 F. Supp. 2d 20, 55-56 (D.D.C. 2005). The court concluded that the "plaintiffs cannot survive summary judgment on the shoulders of their journalism expert's opinion that defendants violated journalism ethics and the article does not hold up to normal standards of investigative reporting." *Id.* (internal quotations omitted). The court's finding was rooted in the well-settled principle that actual malice does not necessarily result from a failure of adhering to certain journalistic standards of investigation. *Id.* at 56; *see also Harris v. Quadracci*, 856 F. Supp. 513, 518-19 (E.D. Wis. 1994) (granting summary judgment where plaintiff relied on an "expert journalist" to show actual malice). There, the plaintiff seemed to suggest a bright-line rule barring any expert opinion in the determination of actual malice. *Id.* The court, however, further elaborated: "The Court cannot say that the views of an expert in the field could never be helpful

in illuminating the options available to a publisher in investigating a piece." *OAO Alfa Bank*, 387 F. Supp. 2d at 56.

Similarly, in *Lohrenz v. Donnely*, the court concluded that "plaintiffs may not establish malice, a subjective state of mind, solely through expert testimony[.]" 223 F. Supp. 2d. 25 (D.D.C. 2002), *aff'd* 350 F.3d 1272 (D.C. Cir. 2003). There, a plaintiff, pursuing a defamation claim for defendant's accusations that she was underqualified for her position as a navy pilot and the beneficiary of preferential treatment, sought to offer expert testimony regarding F-14 piloting and pilot training. *Id.* at 35-36. The court rejected the expert's testimony as it related to actual malice, explaining that "an expert in piloting F-14s and training F-14 pilots may not render legal opinions concerning defendants' alleged malicious or deceptive motives." *Id.* at 36. At the same time, however, the court found that the expert's opinion was appropriate in other aspects of the case because the expert was likely "intimately familiar with the method and practice of evaluating F-14 pilots," which is "an area of fact where technical expertise dominates and where the Court and jurors would likely be inexperienced; [the expert] would likely be able to 'assist the trier of fact.'" *Id.* (citing Fed. R. Evid. 702). As such, the court allowed the expert's Declaration to remain part of the record solely because it spoke directly and appropriately to his technical expertise. *Id.*

In *Iacangelo v. Georgetown University*, another case that Plaintiff cites, a plaintiff brought claims of medical malpractice, breach of fiduciary duty, and failure to warn adequately. 560 F. Supp. 2d 53, 54 (D.D.C. 2009). There, the plaintiffs hoped to offer expert testimony to show that defendants violated a national standard of care in the employment of certain medical treatments. *Id.* at 59-61. The court did not allow certain of the experts' opinions, reasoning that they "state impermissible opinions on Defendants' state of mind," by opining that "[Defendant]

knowingly participated in the illegal importation of a Class III medical device" and conclusively opining that Defendant's "willful and wanton misbehavior [was] not permitted." *Id.* at 60 n.10.

The instant case is somewhat comparable to the latter case because determining actual malice turns on Defendants' state of mind at the time that they made the allegedly defamatory statements. *See Harte-Hanks Communications v. Connaughton*, 491 U.S. 657, 659 (1989). Dr. Curry, concisely and conclusively, writes in her report that "[r]eferring to the Hockey Stick as 'fraudulent' is supported by the public understanding of fraud and how the issues surrounding the Hockey Stick have been portrayed in the media." Curry Report 28.

Defendant Steyn does not shrink from his position that Dr. Curry's testimony should be deemed admissible because she provides the necessary evidence of the Defendant's lack of actual malice. Steyn Opp'n 8. He argues that "[a]n expert's opinion about whether there is a 'reasonable basis' for an allegedly defamatory statement 'could be considered by the fact finder' not only on the statement's truth but also on whether it was published with actual malice." *Id.* (citing *Houlahan v. World Wide Ass'n of Specialty Programs & Schs.*, Case No. 04-01161 (HHK)(AK), 2007 U.S. Dist. LEXIS 95970, at *11 (D.D.C. Mar. 30, 2007)).

In *Houlahan*, a plaintiff-journalist sued for defamation after the target of one of his writings accused him of lying. 2007 U.S. Dist. LEXIS 95970, at *10-11. The court permitted the plaintiff to offer expert testimony supporting his allegedly defamatory statements. The court concluded that such evidence may be used to support a showing of actual malice, by way of "show[ing] the truth of [plaintiff's] findings by presenting evidence that there existed a reasonable basis for his statements[.]" *Id.* at *10.

Despite Plaintiff's attempt to portray a bright-line rule barring any expert from opining on "issues relating to someone else's state of mind[,]" a review of his offered authority betrays that conclusion.[1] MIL Curry Mem. 14.

Still, many aspects of Dr. Curry's proposed testimony improperly invade the province of the jury. Federal Rule of Evidence 702(a) provides that an expert may testify in the form of an opinion if the expert's "specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue." *See also Motorola*, 147 A.3d at 756. In *United States v. Libby*, the United States District Court for the District of Columbia offered an extensive review of the blurry line that courts must sometimes straddle when applying *Daubert* and Federal Rule 702. 461 F. Supp. 2d 3, 5-18 (D.D.C. 2006). Factors a court must consider include whether expert testimony is within the juror's common knowledge and experience, and whether it will usurp the juror's role of evaluating a witness's credibility. *Id.* at 7; *see also Kidder, Peabody & Co. v. IAG Int'l Acceptance Group N.V.*, 14 F. Supp. 391, 399 (S.D.N.Y. 1998). The court in *Kidder* noted, "[w]hether a party acted with objective reasonableness is a quintessential common law jury question." *Kidder,* 14 F. Supp. at 399. It further acknowledged that, "[b]y the same token, juries traditionally decide whether an individual acted knowingly, or willfully, or maliciously, or with specific intent, or with any other relevant state of mind." *Id.*

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[1] Plaintiff further cites to a short line of cases from federal courts in Texas that are similarly unavailing. In *Charalambopoulos v. Grammer*, the court determined that an expert may not offer opinion on the state of mind of the members of a grand jury in declining to issue an indictment, as such testimony would amount to speculation. Case No. 3:14-cv-2424-D, 2017 U.S. Dist. LEXIS 33488, at *28 (N.D. Tex. Mar. 8, 2017). In *Fisher v. Halliburton*, the court disallowed expert testimony describing "specific intent" as it related to the plaintiff's claims, as that legal conclusion would clearly usurp the role of the judge and the jury. Case Nos. H-05-1731, H-06-1971, H-06-1168, 2009 U.S. Dist. LEXIS 118486, at *2 (S.D. Tex. Dec. 21, 2009). The decisions in these cases were highly fact-specific, and the Court finds them unhelpful with the instant analysis.

Dr. Curry is careful to explain that she does not conclude, as an expert, that the Hockey Stick was fraudulent. Her deposition provides, as follows:

> My arguments regard[] and my written testimony relates to whether it's reasonable for the general public or a journalist . . . to regard [Plaintiff's work] as fraud. That's what I was asked to do, not to pas[s] judgment on research misconduct, but whether it's reasonable for the public, somebody, a member of the public to infer that this was somehow fraudulent.

Williams Decl., Ex. 1, at 52:6-21 ("Curry Dep."). When questioned as to why a section of her report specifically addresses whether it is "reasonable to regard the hockey stick as fraudulent," she explained that "it was hopefully to forestall people from asking me whether I think the hockey stick is fraudulent, because . . . it's a very complex issue and I'm not personally making a judgment here on that." Curry Dep. 138:17-139:5. Rather, referencing the analysis in her report, she explains that "these are things that contribute to a perception, public perception of fraudulent. That was the gist of the points that I made in my report." Curry Dep. 83:22-25.

Dr. Curry's report goes well beyond providing expert testimony as to scientific deficiencies in the Hockey Stick. She proffers testimony as a historian of the climate change debate and as an authority on the use of the word "fraud." Curry Rep. 16-17. Dr. Curry surveys scientific publications, blogs, articles, books, congressional hearings and investigations, dictionary definitions of "fraud," and Plaintiff's behavior in engaging in debate over the Hockey Stick, all to support her general opinion that there is a reasonable basis for public criticism of the Hockey Stick. Curry Rep. 3-14; 16-17; 28-38. The Court must ask whether such testimony is pertinent to the question of defamation and whether a jury is helped by Dr. Curry's opinions.

The Court concludes that Dr. Curry's testimony is inadmissible; it speaks directly to the question of actual malice, which is a question that the jury is singularly suited and mandated to answer. It is the jury's role to determine whether Defendants recklessly disregarded truth in

making their statements. *See Harte-Hanks*, 491 U.S. at 667. Should Dr. Curry so conclusively state, as a purported expert, that Defendants' statements were justified by a public perception of Plaintiff's work, her opinion would irreparably supplant the jury's determination of that very question. Moreover, Dr. Curry is not an expert in the etymology of the word "fraud," and has not been proffered as such. The Court will not permit her to testify directly that Defendants, as members of the public, did not recklessly disregard the truth. Dr. Curry's conclusion that there was a rational basis for Defendants' statements is not "beyond the ken of the average juror." *Libby*, 461 F. Supp. 2d at 18.

But, there may be value in aspects of Dr. Curry's proposed testimony. "[A]n expert may offer [her] opinion as to facts that, if found, would support a conclusion that the legal standard at issue was satisfied, but [she] may not testify as to whether the legal standard has been satisfied." *Burkhart v. Washington Metro. Area Transit Auth.*, 112 F.3d 1207, 1212-13 (D.C. Cir. 1997). This distinction is slight, and worth illuminating through example. Dr. Curry spends considerable space in her report reviewing criticisms of Plaintiff's work. Curry Rep. 3-14. Dr. Curry concludes that "[t]he scientific and public controversy surrounding the Hockey Stick provides ample rationale for public statements that criticize the Hockey Stick." Curry Rep. 14. The Court, as well, cannot permit testimony of this nature. As explained in greater detail below, Dr. Curry has merely summarized the conclusions of other experts and presented them as her own. Such methodology is not derived from the scientific method. "Even a supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are based on some recognized scientific method." *Smith*, 215 F.3d at 718. A jury is sufficiently qualified to review criticisms of Plaintiff's work and determine whether there was "ample rationale" for Defendant's statements. Therefore, Dr. Curry may, as a fact witness, speak to the extent to

which others in the public sphere criticized Plaintiff's work during the relevant period. Of course, such testimony must first be established as relevant, i.e., that Defendants were aware of such public criticisms and relied upon them in making the statements at issue.

Section three of Dr. Curry's report opines, as follows: "[Plaintiff] has been instrumental in the downward spiral of discourse surrounding climate change" and "[h]is loose use of the word 'fraudulent' with regard to research that is critical of his own . . . contributes to an 'anything goes' environment for discourse surrounding this controversial and contentious topic." Curry Rep. 38. This is not scientific opinion and is inadmissible as expert testimony. If Defendants wish to offer evidence of Plaintiff's conduct in public discussions of climate change, if relevant, they may do so through fact witnesses. A jury is sufficiently qualified to come to that conclusion without the assistance of an expert.

At bottom, Dr. Curry's report is not that of an expert. If permitted by the evidentiary standards of this jurisdiction, it may be possible for Dr. Curry to offer testimony of her knowledge. But, Defendants have not shown her to have applied principles and methods suitable for a relevant expert opinion in this case. The Court will not permit her to testify as an expert.

2. Sufficiency of Dr. Curry's Facts and Data

Plaintiff argues that "Dr. Curry's opinions are not only unsupported, they are contradicted by the facts." MIL Curry Mem. 15. As such, they fail "[t]he second *Daubert* test," which asks "whether the expert's testimony is based on sufficient facts and data." MIL Curry Mem. 15; *see Motorola Inc.*, 147 A.3d at 756 (citing Fed. R. Evid. 702(b)).

The Court does not find fault in the facts and data upon which Dr. Curry relies. She reviewed Plaintiff's work, which is the subject of Defendants' statements and which is enough for her to form an opinion in this case. As explained above, Defendants have simply failed to

show that Dr. Curry offered any scientific opinion of her own, and her testimony must be foreclosed for that reason. The Court takes the opportunity, here, to elucidate the deficiencies in the Parties' offered expert testimony and arguments in opposition, in anticipation of further briefing in subsequent pleadings.

Scientific expert testimony is used for a variety of ends. It is used to prove causation, i.e., that exposure to harmful materials resulted in disease. *See Motorola*, 147 A.3d at 752; *see also General Electric Co. v. Joiner*, 522 U.S. 136, 139-40 (1997). It is used to challenge the veracity of certain kinds of evidence. *See United States v. Libby*, 461 F. Supp. 2d 3, 5 (D.D.C. 2006); *Burgess v. United States*, 953 A.2d 1055, 1057 (D.C. 2008). And, it is used to explain a standard of care in negligence cases, where liability may lie upon a finding that a defendant violated that standard of care. *See Kordas v. Sugarbaker*, 990 A.2d 496, 498 (D.C. 2010). Expert opinion that Plaintiff's Hockey Stick does not rise to adequate levels of scientific muster is most akin to the last category.

Dr. Curry offers critiques of choices that Plaintiff made in his studies and analyses. Dr. Curry explains that observers have commented that the use, misuse, or exclusion of data in creating the Hockey Stick casts doubt on its reliability. To render sound opinions on the matter, experts must rely solely upon Plaintiff's work.

In *Govan v. Brown*, the Court of Appeals considered an opposition to expert testimony that "primarily challenge[d] the evidentiary basis" underlying the expert's opinion, explaining that "the trial court properly understood these concerns as relevant to the weight to afford the opinion, rather than its admissibility." 228 A.3d 142, 155 (D.C. 2020). The Court must come to a similar conclusion with regard to Plaintiff's argument on the issue, here. Plaintiff cannot

genuinely dispute the factual basis for an expert opinion predicated on a review of Plaintiff's work.

3. Reliability of Dr. Curry's Principles and Methods

Plaintiff argues that "it is the overwhelming consensus of the scientific community that [Plaintiff] and his colleagues have published diligently and with integrity." MIL Curry Mem. 16. As such, he asserts that Dr. Curry's testimony is not "the product of reliable principles and methods" as required by Federal Rule of Evidence 702(c).

The Court of Appeals has plainly established the principle that "minority status is not a proxy for unreliability." *Motorola*, 147 A.3d at 758. However, where "experts on one side are in a distinct minority[,] [t]hat may well raise a red flag[.]" *Id.* at 757-58. Plaintiff highlights the numerous investigations that the Court of Appeals considered on appeal in this case. MIL Curry Mem. 16. Plaintiff's reliance is misplaced. Certainly, the Court of Appeals was "struck by the number, extent, and specificity of the investigations, and by the composition of the investigatory bodies." *CEI*, 150 A.3d at 1253. The Court of Appeals did not, however, consider the weight of the investigations as evidence, as that task is for a jury. Rather, the court acknowledged that a jury could find the existence and conclusions of the investigations to be probative of actual malice. *Id.* at 1253-54.

Plaintiff does not explicitly attack the principles and methods that Dr. Curry employs, only her conclusions. This tactic is specifically rebuffed by *Daubert*, where the Supreme Court instructed that "[t]he focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." 509 U.S. at 595. Plaintiff identifies groups that came to opposite conclusions, and reasons that Dr. Curry's conclusions are therefore unsupported. In one example, Plaintiff cites to a 2006 report of the National Research Council ("NRC") that

commented on Plaintiff's work, claiming that "[the NRC] found no flaws in the data selection process, and even the critics did not allege any pre-determined bias." MIL Curry Mem. 16-17 (citing Williams Decl., Ex. 8, at 114-15 ("NRC Report")). Plaintiff contends that the NRC cited to "other scientific peer-review studies published in the wake of the MBH papers—all replicating and validating the MBH methods and conclusions." MIL Curry Mem. 17. To be clear, the NRC Report does not definitively refute any of the conclusions that Dr. Curry recites. The cited selection of the NRC Report simply surveys criticisms of temperature reconstruction techniques. NRC Report 112-15. The NRC Report's conclusions tend to corroborate Plaintiff's own, but even the NRC disclaimed that at least one method employed by Plaintiff was "not recommended[.]" NRC Report 113.

While Plaintiff's attacks on Dr. Curry's methodology are not well-founded, the Court must, regardless, find that Defendants have not met their burden of establishing that Dr. Curry used reliable methodologies. To wit, her expert report does not contain any explanations of her methodologies, making it impossible for the Court to find her testimony reliable. *See Sacchetti*, 344 F. Supp. 3d at 250-51; *Campbell v. Nat'l R.R. Passenger Corp.*, 311 F. Supp. 3d 281, 300 (D.D.C 2018). Based on the Court's own assessment, her "methodologies" appear to be that she reviewed several articles and documents, and then opined that the conclusions of those documents are correct. Such methodologies are not derived from the scientific method and, thus, render Dr. Curry's opinion unreliable as expert testimony. *See Danley v. Bayer*, 169 F. Supp. 3d 396, 478 (S.D.N.Y. 2016) (finding that an expert may rely on documentary evidence in rendering her opinion, but may not "present these documents to the jury with no analysis or merely read, selectively quote from, or regurgitate the evidence.") (internal citations omitted); *S.E.C. v.*

Lipson, 46 F. Supp. 2d 758, 763 (N.D. Ill. 1998) ("expert testimony may not be used merely to repeat or summarize what the jury independently has the ability to understand.").

4. Relevance of Dr. Curry's Testimony

Plaintiff argues that, "[e]ven were it appropriate for Dr. Curry to express the opinion that it was reasonable for the defendants to regard the hockey stick as fraudulent, this testimony would be relevant only if the defendants had actually known about these issues *before* they made the defamatory statements." MIL Curry Mem. 18 (quotations omitted) (emphasis in original). Plaintiff argues that Dr. Curry's testimony, therefore, fails the fourth *Daubert* test: Whether the expert has "reliably applied the principles and methods to the facts of the case." *Motorola*, 147 A.3d at 756.

The Court broadly agrees that an expert's opinion has no bearing on actual malice if the Defendants were entirely unaware of the issues the experts raised in their opinions and instead wrote the subject statements in a vacuum. *See CEI*, 150 A.3d at 1252. Plaintiff argues that there is no evidence that Defendants knew of the issues that Dr. Curry raises in her report. Defendant Steyn, in opposition, provides that the Defendants were aware of the issues that Dr. Curry raises, to varying degrees, although during deposition they were unable to describe the issues with the specificity offered by Dr. Curry. Defendants may offer proof of the relevancy of an expert's opinion.

5. Relevancy of Other Aspects of Dr. Curry's Report

Plaintiff challenges sections of Dr. Curry's report explaining the breadth of the public climate change debate and Plaintiff's participation in it. MIL Curry Mem. 19. Plaintiff argues that "[n]one of these issues are relevant to the issues in this case." MIL Curry Mem. 19.

Defendant Steyn argues that Dr. Curry's opinion on these topics is relevant to show the broader social context of the disputed statements.

Defendant Steyn relies upon the ruling in *Farah v. Esquire Magazine*, where the United States Court of Appeals for the District of Columbia Circuit affirmed dismissal of a defamation claim on the grounds that the statements at issue were properly understood as satire. 736 F.3d 528, 533-39 (D.C. Cir. 2013). The court explained that the "broader social context . . . is vital to a proper understanding of the disputed statements." *Id.* at 535 (quotations omitted).

The Court, here, makes no comment on Defendant Steyn's theory. The instant dispute is whether Dr. Curry may offer testimony reviewing the social context of the climate change debate. Dr. Curry claims to present such evidence "mostly in [her] capacity as a fact/lay opinion witness." Curry Rep. 1. The limits of the term "mostly" are not clear. Nevertheless, Dr. Curry makes the following conclusions: "The scientific and public controversy surrounding the Hockey Stick provides ample rationale for public statements that criticize the Hockey Stick[;]" and "[Plaintiff] has been instrumental in the downward spiral of discourse surrounding climate change." Curry Rep 14, 38.

As discussed above, conclusions such as these must be reserved for the jury. Dr. Curry may have experience in the contentious world of climate science, but her opinions on the effect of the polemic on a member of the public and on Plaintiff's effect on that polemic are no different than that of a layperson. "[W]here the jury is just as competent to consider and weigh the evidence as is an expert witness and just as well qualified to draw the necessary conclusions therefrom, it is improper to use opinion evidence for the purpose." *Gilmore v. Palestinian Interim Self-Government Auth.*, 843 F.3d 958, 973 (D.C. Cir. 2016). Defendants may present evidence detailing the social context in which their statements were made, but the jury

determines whether such evidence supports or defeats the elements of a defamation claim, not an expert.

C. Plaintiff's Motion in Limine to Strike the Expert Testimony of Abraham Wyner

Dr. Wyner is a Professor of Statistics at Pennsylvania's Wharton School. Williams Decl., Ex. 1, at ¶ 1 ("Wyner Rep."). He offers opinions on "matters relating to statistical methods for reconstructing the earth's temperature over the past millennium." Wyner Rep. ¶ 3. He was "retained to offer [his] opinions on specific statements made by the defendants that have been alleged to be defamatory." Wyner Rep. ¶ 9.

Plaintiff argues that Dr. Wyner's opinions "violate the standards set forth in two of the *Daubert* standards." MIL Wyner Mem. 4. He contends that Dr. Wyner's opinion relates solely to the Defendants' state of mind and that his opinions are not relevant as they assume Defendants were aware of his work when making the statements at issue.

In sharp contrast with the reports of the other experts that the Parties have proffered, Dr. Wyner's report offers substantial analysis and explanation of the scientific principles and methods he employed in forming his opinion. Dr. Wyner, a trained and recognized statistician, explains there are "aspects of Dr. Mann's work that can reasonably be construed as manipulative, if not in intent than in effect, as the word is used in common parlance." Wyner Rep. ¶ 9. Plaintiff argues that Dr. Wyner's opinion is "little different than the Curry opinion expressed in her report." MIL Curry Mem. 9. A comparison of the two reports controverts this theory. Dr. Curry seeks to offer a review of criticisms of the Hockey Stick and excerpts of the polemic surrounding the graph, all to support her expert opinion that it would be reasonable to call it fraudulent. Dr. Wyner, in contrast, offers detailed analysis of the statistical methods used to

construct the Hockey Stick graph, and why the methods may be reliable and, thus, tending to support a basis for Defendants' statements.

For example, Dr. Wyner states that "constructed random sequences, simulated like playing cards drawn from a deck, are no less skillful for reconstructing temperatures than naturally occurring proxies." Wyner Rep. ¶ 33. He explains in detail how he applied "cross-validation," which is "an effective method of exploring and countering overfitting and measuring model reliability accurately." Wyner Rep. ¶ 38 n.13. Plaintiff does not, and likely cannot, assail the principles and methods that Dr. Wyner applies. His opinion is plainly beyond the ken of the average juror, and his testimony regarding the reliability of the Hockey Stick graph will be useful in aiding the jury's determination of actual malice and falsity.

1. Dr. Wyner's Expert Testimony Regarding State of Mind and the "Reasonableness of Defendants' Statements

The Court has already addressed Plaintiff's theory regarding expert state of mind testimony. As the Court has discussed, "an expert may offer his opinion as to facts that, if found, would support a conclusion that the legal standard at issue was satisfied, but he may not testify as to whether the legal standard has been satisfied." *Burkhart*, 112 F.3d 1207, 1212-13 (D.C. Cir. 1997). Dr. Wyner was asked the following at his deposition: "And you're not an expert in how the public would perceive a word that may have been used in an article, correct?" He answered: "I'm not an expert in that[.]" Wyner Dep. 43:19-22. Dr. Wyner explained that his testimony will explain "what was done statistically that would connect or relate in some way to a statement that says kept the blade or engaged in data manipulation to keep the blade on the famous hockey stick graph." Wyner Dep. 47:3-48:6.

The Court appreciates that Dr. Wyner walks a fine line between permissibly offering facts that would support a jury determination on the issue of actual malice and impermissibly

opining directly on actual malice. For example, he provides: "There are three specific conclusions in [his analysis] in particular that would support a political commentator using language like 'manipulated' when describing Dr. Mann's work." Wyner Rep. ¶ 32. But, Dr. Wyner's opinion on this issue is not that Defendants' statements were reasonable. His opinion is targeted at the Hockey Stick graph itself. As explained above, the Court will allow him to present expert testimony in that regard.

2. Relevance of Dr. Wyner's Expert Testimony

In similar fashion to his arguments regarding Dr. Curry's testimony, Plaintiff argues that neither Defendant had read or reviewed Dr. Wyner's analysis, prior to writing the alleged defamatory statements. MIL Wyner Mem. 14. As such, Plaintiff contends that Defendants are unable to satisfy the fourth *Daubert* standard, "whether the expert has reliably applied the principles and methods to the facts of the case." MIL Wyner Mem. 14.

This argument again misses the point. No matter, the Court's analysis and conclusion relative to Dr. Curry's testimony are apt, here. Dr. Wyner's opinions may only bear on the question of actual malice if it can be shown that Defendants were aware of the points that Dr. Wyner raises. Defendants are free to make that offering of proof. And, Dr. Wyner's opinions regarding the veracity or reliability of Plaintiff's work bears directly on Plaintiff's required showing of falsity, and should be admitted for that purpose.

D. CEI's Motion in Limine to Strike the Expert Testimony of Dr. Naomi Oreskes

Dr. Naomi Oreskes is a "professor of the History of Science at Harvard University" where she "teach[es] on the history of science and scientific thought." DeLaquil Decl. Supp. Dr. Oreskes, Ex. 1, ("Oreskes Rep.") at 1. She is a coauthor of *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming,*

which she claims addresses the "agenda, policies and practices of industry and think tanks, including the Competitive Enterprise Institute, in regards [sic] to many of the issues in this case." *Id.*

Dr. Oreskes intends to offer her opinion that scientific research is made reliable by "the collective vetting and critical interrogation of claims through scientific workshop, meetings, conferences, and above all, publication in peer-reviewed journals, formal scientific assessments and reports of government scientific agencies and laboratories." *Id.* at 2. She will also opine that "think-tanks (including CEI) ... ignore, misrepresent, or reject principled scientific thought on environmental and climate issues." *Id.* at 3.

a. Dr. Oreskes' Discussion of General Principles of Scientific Reliability

As an initial matter, the Court is skeptical that Dr. Oreskes' opinion would be helpful to the jury. The bulk of her opinion focuses generally on what makes scientific research reliable and not on the specific inquiry at bar, whether Plaintiff's research was reliable. Plaintiff avers that such information "will be necessary to assist the jury in understanding the credibility and validity of the sources of information that [Plaintiff's] experts relied upon, as well as the quality of the sources that the defendants relied upon in making their allegations against [Plaintiff]." Opp'n Mem. 55. The Court is not convinced that a separate expert is needed to define terms which other witnesses will inevitably discuss, witnesses who have first-hand knowledge of Plaintiff's work.

The Court appreciates that Dr. Oreskes' testimony may provide a framework from which the jury could more easily assess and determine whether Plaintiff's work was fraudulent. As such, the Court does not exclude her testimony on that basis. Rather, the Court's decision to exclude the testimony is based upon Dr. Oreskes' failure to use a scientific technique which

applies reliable methodologies. The Court must exclude an expert opinion that fails to explain the methodology underlying the expert's opinion. *Sacchetti v. Gallaudet Univ.*, 344 F. Supp. 3d 233, 250-51. As is the case with several of Plaintiff's proffered experts, Dr. Oreskes' report is devoid of any discussion of her methodologies.

In his opposition, Plaintiff attempts to persuade the Court that Dr. Oreskes described her methodologies during her deposition, as follows:

> Defendants' assertion that Dr. Oreskes applied an improper methodology to analyze CEI's public statements also disregards her testimony, in which she testified at length about the content analysis methodology applied in her research and in this case:
>
> "So we read the documents. And as I said before, we applied a well-established method in social science, which is broadly accepted as being, you know, a reputable method of analyzing something, content analysis, in order to show that there was this fairly substantial disparity between what the company scientists were saying in their private reports and publishing in peer-reviewed scientific literature which was essentially consistent with what other scientists were saying versus what the company was saying in public in advertisements that were aimed at the general public."

Opp'n Mem. 56 (quoting DeLaquil Decl. Supp. Dr. Oreskes, Ex. 4, ("Oreskes Dep. Vol. 2") at 55:18-56:5). The complete text of her deposition testimony on this subject is much more helpful to the court and it reads, as follows:

> In the case of ExxonMobil, we had the opportunity to do this analysis because the company itself had made public these documents. And they claimed in public that if you read these documents, you would see that everything was fine and that ExxonMobil had done nothing wrong.
>
> We applied a well-established method in social science, which is broadly accepted as being, you know, a reputable method of analyzing something, content analysis, in order to show that there was this fairly substantial disparity between what the company scientists were saying in their private reports and publishing in peer-reviewed scientific literature which was essentially consistent with what other scientists were saying versus what the company was

> saying in public in advertisements that were aimed at the general public.

Oreskes Dep. Vol. 2. At 55:12-56:5. Notwithstanding Plaintiff's contentions to the contrary, Dr. Oreskes did not perform Content Analysis for her report in this case. She was directly asked whether she performed Content Analysis for this case and she replied "no." *See Id.* at 33:5-15.

When asked about the methodologies that she used in *this* case, Dr. Oreskes responded: "If you want me to tell you what my method is, it's reading and thinking. We read. We read documents. And we think about them." *Id.* at 34:13-15.

That is the problem, here. Reading and thinking about documents are not the types of "reliable methodologies" typical of an expert witness, which leaves the Court unable to distinguish why Dr. Oreskes is more capable than the average juror, who can also read and think about documents. *See Parsi v. Daioleslam*, 852 F. Supp. 2d 82, 89 (D.D.C. 2012) (rejecting an expert opinion based solely on the experts "reading and viewing" and finding that reading, alone, does not constitute an acceptable methodology). Dr. Oreskes "reading and thinking" have not been peer-reviewed, have no known success rate, and cannot be replicated by other experts in her field. *See Daubert*, 509 U.S. at 593-94; *see also Meister v. Med. Eng'g Corp.*, 267 F.3d 1123, 1127 (D.C. Cir. 2001). Dr. Oreskes opinion is not derived from the scientific method and is more aptly described as a historical narrative or research compilation than scientific testimony. *See Daubert*, 509 U.S. at 590; *Meister*, 267 F. 3d at 1127 (finding that to identify scientific testimony, "forces the court to focus on principles and methodology, not on the conclusions they generate, and thus demands a grounding in the methods and procedures of science, rather than subjective belief or unsupported speculation.") (internal citations omitted.)

The Court acknowledges that there are instances where an expert's opinion can be based substantially on her experience, but in those instances the expert must explain "how that

experience leads to the conclusions reached, why that experience is a sufficient basis for the opinion and how that experience is reliably applied to the facts." *Arias v. DynCorp.*, 928 F. Supp. 2d 10, 15-16 (D.D.C 2013). Dr. Oreskes' opinion is not derived from her personal experience, but rather, it is derived from her review of documents and reports created by third-parties.

b. Dr. Oreskes' Opinion Concerning CEI's Agenda

In her report, Dr. Oreskes offers an expansive history of CEI's actions opposing progressive policy goals by advocating against scientists in an attempt to show that CEI routinely rejects valid and widely-accepted scientific research. The Court finds, as it did above, that her opinion is not based on reliable methodologies. The Court further finds that expert testimony is unnecessary to present the types of information that Dr. Oreskes' offers concerning CEI's agenda. Her opinion amounts to a historical summary of CEI's actions, basically a recounting of articles published and actions taken by CEI in its opposition to a wide array of progressive policies including tobacco abatement, the limitation of greenhouse gasses, and climate change. The Court agrees with Defendants' assertion that "Dr. Oreskes made no effort to compile or catalogue CEI's publications according to an objectively defined set of metrics." MIL Oreskes Mem. 9. Accordingly, the Court shall exclude Dr. Oreskes expert testimony.

E. CEI's Motion in Limine to Strike the Expert Testimony of Dr. Peter Frumhoff

Dr. Frumhoff is the Director of Science and Policy and Chief Climate Scientists at the Union of Concerned Scientists, a nonprofit organization composed of "nearly 250 scientists, analysts, policy and communication experts" who "engage in advocacy on public policy issues." Union of Concerned Scientists, *About,* https://www.ucsusa.org/about, Last Accessed July 15, 2021; Bailen Decl. Supp. Dr. Frumhoff, Ex. 1, at 1 ("Frumhoff Rep."). Dr. Frumhoff has a Ph.D.

in Ecology and an extensive career working at prestigious universities across the country. He has authored several influential reports and is a leading member of several organizations working in the climate change field.

Dr. Frumhoff will offer his opinion concerning "how unfounded attacks – such as attacks on the Climate Research Unit scientists and their colleagues in the wake of the incident known as 'climategate,' as well as the attacks on Dr. Mann that are the subject of this litigation – can have detrimental effects on scientists, on the scientific enterprise, and on the public understanding of information and its societal implications." Frumhoff Rep. 2-3.

a. Dr. Frumhoff's Methodologies

Dr. Frumhoff's report fails to include an explanation of his methodologies. Accordingly, the Court must exclude his expert testimony. *See Sacchetti*, 344 F. Supp. 3d at 250-51; *Campbell*, 311 F. Supp. 3d at 300. Plaintiff's explanation that "Dr. Frumhoff will rely upon a public opinion study which shows a significant drop in the public trust of scientists as sources of information on global warming in the wake of the climategate disclosures" is unavailing. It is not enough that an expert's opinion contains citations to reliable authority to support his conclusions; the expert himself must employ a methodology based in the scientific method. Here, Dr. Frumhoff's testimony would merely serve as a conduit for the admission of the public opinion study upon which his opinion is based. *See United States v. Johnson*, 587 F.3d 625, 635 (4th Cir. 2009) (explaining that an expert witness's reliance on hearsay evidence "only becomes a problem where the witness is used as little more than a conduit or transmitter ... rather than as a true expert whose considered opinion sheds some light on some specialized factual situation[.]"). The Court is not persuaded that a jury would be unable to understand that public opinion study without the aid of an expert.

b. Dr. Frumhoff's Testimony Regarding Reputational Harm

Dr. Frumhoff will testify that "false allegations like those that followed the release of stolen emails from the CRU and the subsequent statements made by National Review and the Competitive Enterprise Institute ... caused damage" by: (1) inflicting harm to the reputation of the individual scientists; (2) requiring the scientists to redirect time away from their profcssional and personal lives to respond to the unfounded accusations; (3) limiting a scientist's ability to attract research funding; (4) stifling climate science research and the public understanding of climate science; and (5) disrupting "efforts to address important public policy concerns." Frumhoff Rep. 3-5.

It is important here to remind the Parties that the case Dr. Mann filed concerns the question of defamation, not whether climate change is real. While certain criticisms generally and historically, including those of Defendants, may have stifled climate science research and disrupted efforts to address important policy considerations, those concerns are not the subject of this litigation and to deal with them in this case will only serve to obfuscate the actual issues and confuse and waste the jury's time. Those concerns cannot be reasonably tied to any specific harm that Plaintiff allegedly suffered. The Court will not equate Plaintiff with all climate change scientists or with the field of climate change and allow him to assign harm caused to those scientists or the field to himself. Dr. Frumhoff's testimony that "[t]he timing of the release of the stolen emails derailed discussions at the Copenhagen Summit" and "made it less likely that governments would adopt a climate deal at that conference" has no bearing on Plaintiff's defamation claim. *See* Frumhoff Rep. 7. Testimony seeking to establish that "there was a significant drop in the public trust of scientists as sources of information about global warming" is similarly not relevant. Frumhoff Rep. 13; *see Daubert,* 509 U.S. at 592 (finding that the first

determination that the Court must make concerning the admissibility of expert testimony is whether it would be helpful to the jury).

Concerning Dr. Frumhoff's testimony about the effect of spurious attacks on individual scientists other than Plaintiff, the Court again finds that such testimony is irrelevant to the inquiry at hand. Dr. Frumhoff explains that other scientists with whom he has worked have received death threats, "faced intimidation such as receiving a dead rat," and having their "names dragged through the mud." Frumhoff Rep. 13. Dr. Frumhoff further testifies concerning several types of harm that scientists in general could face such as losing funding and having their time and resources directed away from their work. As Dr. Frumhoff does not have personal knowledge that Plaintiff experienced such harm, his testimony would be entirely speculative. Plaintiff proffers that "Dr. Frumhoff's testimony will provide a framework for the jury to consider the more specific testimony it will hear regarding the effect of the defamations in this case against [Plaintiff]." Opp'n 68. The Court is not persuaded that such framework is necessary. Given the nature of this case, the Court cannot find that the jury requires the proposed background information to guide them in determining whether the facts support the claimed defamation. Certainly, without the aid of an expert, a jury can understand that defamatory attacks may have an untoward effect on one's reputation or professional career. As an example, the concept that "grant funders base their funding decisions, in part, on the reputations of the applicants" is a matter within the ken of the average juror. Opp'n Mem. 69.

Plaintiff is free to submit evidence and elicit witness testimony which shows how he, personally, has been harmed, but allowing Dr. Frumhoff to testify to specific instances of harm, such as receiving a dead rat, when Dr. Frumhoff has no factual basis to believe that Dr. Mann has experienced such harm, would be unnecessarily prejudicial. Dr. Frumhoff's deposition

testimony reveals that he does not have any factual basis to discuss harm that Plaintiff suffered. *See* Bailen Decl. Supp. Dr. Frumhoff, Ex. 2, ("Frumhoff Dep.") at 112:4-10, 111:23-112:3, 131:14-18, 116:2-5, 149:2-4 (showing that Dr. Frumhoff was unaware of, and unable to quantify: (1) the amount of time Plaintiff spent responding to criticisms; (2) the number of academic opportunities Plaintiff was unable to pursue; (3) how Plaintiff's research output was diminished; (4) whether Plaintiff had received any threats; and (5) whether Plaintiff's ability to obtain research grants diminished). The Court finds that Dr. Frumhoff is unable to provide reliable testimony regarding any harm that Dr. Mann may have suffered because he lacks the facts and the data to support any such testimony. *See Motorola*, 147 A.3d at 756.

The concepts of being threatened, losing money, and having your reputation damaged are well within the ken of the average juror. *See Steele*, 854 A.2d at 181 (quoting *Payne v. Soft Sheen Prds., Inc.*, 486 A.2d 712, 727 (D.C. 1985)) (holding that expert testimony is improper when "the jurors are as capable of understanding and drawing correct conclusions from the facts as an expert witness."); *see also King v. United States*, 74 A.3d 678, 683 (D.C. 2013) (distinguishing the difference between lay and expert testimony and holding that observations that are common and can be formed through "simple, personal observations of human conduct" are not expert opinions.). For these reasons, the Court must exclude Dr. Frumhoff from testifying about the putative harm that Plaintiff may have suffered. *Motorola*, 147 A.3d at 756.

c. Dr. Frumhoff's Testimony Regarding Emails Stolen from the Climate Research Unit at East Anglia University and Subsequent Investigation Reports Concerning Stolen Emails

Dr. Frumhoff also devotes a substantial portion of his expert report summarizing investigations into whether the emails stolen from the CRU at East Anglia University established that Plaintiff had manipulated data in reaching his scientific conclusions. This testimony

concerns the "falsity" element of the defamation claim and, thus, could be said to be helpful to the jury in resolving a fact at issue. *See Motorola*, 147 A.3d at 756. In particular, his testimony could assist the jury in understanding whether the phrases from the emails such as "Mike's Nature trick" and "hide the decline" refer to legitimate scientific techniques.

In describing the methodology that he used to determine that the stolen emails were not incriminating, however, Dr. Frumhoff indicates only that he has reviewed a number of the emails that were released, "particularly those that were alleged to suggest misconduct on the part of the climate scientists." Frumhoff Rep. 7. The Court finds that reading the emails alone and particularly, reading only a subset of the emails, would not constitute a reliable methodology. To allow Dr. Frumhoff to give his opinion without his having utilized a reliable methodology would be to allow Plaintiff to supplant Dr. Frumhoff's testimony on the issue of falsity for that of the jury.

Dr. Frumhoff's report summarizes findings made by other organizations that investigated the emails including the Associated Press, Media Matters, Politifact.com, The Penn State Inquiry Committee, the Oxburgh Panel, the Independent Climate Change E-mails Review, the UK House of Commons Science and Technology Committee, and the Department of Commerce Office of Inspector General. Critical here, is that Dr. Frumhoff did not participate in the investigations; his summary of those reports amounts to a superficial recitation of their findings. Dr. Frumhoff has no special knowledge concerning how the investigations were conducted or the legitimacy of their conclusions. Any testimony that he would offer concerning those reports would not be beyond the ken of the average juror.

F. CEI's Motion in Limine to Exclude the Expert Testimony of Dr. John Holdren

Dr. Holdren is a professor of Environmental Science and Policy at Harvard University and Director Emeritus and Senior Advisor to the Director of the Woodwell Climate Research Center, a nonprofit organization that "advances scientific discovery and solutions to address the world's climate challenges." Woodwell Climate Research Center, *About*, https://www.woodwellclimate.org/about/, Last Accessed July 16, 2021; Bailen Decl. Supp. Dr. Holdren, Ex. 1 ("Holdren Rep."). Between 2009 and 2017, Dr. Holdren served as the Science and Technology Advisor to President Barrack Obama and held several other high-ranking positions in the federal government. Dr. Holdren holds a master's degree in Aeronautics and Astronautics and a Ph.D. in theoretical plasma physics.

Dr. Holdren will give opinions "regarding human-caused global climate change, including the meaning of terminology used in this domain, key milestones in the history of climate research, and the scientific standing of Plaintiff." Holdren Rep. 2. In particular, he intends to opine on "the use of proxy data to estimate global-average temperatures prior to the advent of thermometer measurements." *Id.* Dr. Holdren will also discuss "the wider scope of [Plaintiff's] contributions to climate science." *Id.*

a. Dr. Holdren's Opinion Concerning General Concepts Related to Global Warming

Dr. Holdren begins his report with an all-encompassing history of climate change that starts with the definition of "weather," discusses reasons for the Earth's changing temperatures "over the millennia" and attempts to define terms such as "greenhouse gases," "anthropologic climate change," "paleoclimatology" and "climate-change mitigation." Plaintiff posits that an understanding of general concepts relating to climate change is necessary "in order to explain

how [Plaintiff's] research became so important in the field of climate change...." Opp'n Mem. 62.

In considering how much climate change background information is necessary, the Court must tread a thin line. "The only thing that is relevant here is Defendant's knowledge and/or serious doubts about the truth of the [purportedly defamatory] statements." Order Denying Motion to Compel Re: Steyn 6. Accordingly, any testimony that is intended to show that Plaintiff's work was important in the field of climate change is not relevant. To establish the "falsity" element of a defamation claim, Plaintiff must show that his work was not fraudulent. Plaintiff's research is highly technical and, as such, for a jury to determine whether Plaintiff acted fraudulently, the jury will likely need expert testimony defining certain terms and concepts.

The problem with Dr. Holdren's discussion of general climate change concepts is that many of the concepts that he explains are not directly related to whether Plaintiff manipulated data and acted fraudulently. The Court agrees that "[i]t would be difficult to assess the defendants' reliance on such terms as 'Mike's Nature trick' and 'hide the decline' without knowing what they [are] related to," but the Court does not yet appreciate how the history of climate change is necessary to assist with defining such terms. Opp'n Mem. 63.

b. Dr. Holdren's Opinion Concerning the Use of Proxy Data

Plaintiff's use of proxy data to determine historic temperature levels, his exclusion of particular types of proxy data, and his use of principle component analysis are at the heart of whether Plaintiff acted fraudulently. Such concepts are indeed beyond the ken of the average juror and will necessarily require scientific and technical explanation. Accordingly, the Court finds that expert testimony is necessary for the jury to understand Plaintiff's use of proxy data, and principle component analysis. The next issue the parties dispute is whether Dr. Holdren

possesses the requisite experience, education, or training to testify knowledgeably about such matters.

Defendants note that, by Dr. Holdren's own admission, he is not an expert. *See* Bailen Decl. Supp. Dr. Holdren, Ex. 2 ("Holdren Dep.") at 29:15-30:6, 141:16-142:3 (showing that Dr. Holdren has indicated that he is not an expert in tree rings, proxy analysis in general, or Principal Component Analysis and that he has never participated in a paleoclimate reconstruction or published a peer-reviewed article on statistics). Defendants also highlight that Dr. Holdren cites extensively to a report from the National Academy of Sciences but concedes that he has not read the report in over fifteen years. *See* MIL Holdren Mem. 10; Holdren Dep. 69:11-14.

Plaintiff counters that "Dr. Holdren does not need to be conversant with all aspects of highly specialized fields to be able to offer an opinion on global warming research in general and the basic research tools that are used in that field." Opp'n Mem. 64. The Court has already concluded that opinions on global warming research in general would not be helpful. Regardless, whether Dr. Holdren's qualifications make him the best expert is not a determination for the Court. The extent of an expert's knowledge and the reliability of the facts on which he bases his opinion go to the weight of the expert's opinion, not its admissibility. *See Smith v. Ford Motor Co.*, 215 F.3d 713, 719 (7th Cir. 2000) (overturning a trial court's holding that experts were not qualified "in a relevant field solely because their expertise related to an area other than the one concerning the ultimate issue to be decided by the trier of fact."). The Court finds that Dr. Holdren's extensive career in climate-related fields and scientific background are sufficient for a jury to find him credible.

Rather than disqualifying Dr. Holdren because he is unqualified to render his opinion, the Court must disqualify him because his opinion is not based on reliable methods. "Even a

supremely qualified expert cannot waltz into the courtroom and render opinions unless those opinions are based on some recognized scientific method." *Smith*, 215 F.3d at 718 (internal citations omitted). Dr. Holdren's report contains zero explanation for how he arrived at his conclusions, leaving the Court to conclude that he has not conducted any scientific analysis beyond reciting the findings and conclusions of other experts in the field.

c. Dr. Holdren's Opinion Concerning Other Reports Which Confirmed Plaintiff's Research and Investigation into Plaintiff's Research

Dr. Holdren's report also contains a history of research and investigations conducted by other scientists that he claims, "definitively validated" Plaintiff's research. Defendants aver that Dr. Holdren "cannot offer any scientific or specialized knowledge on this topic" and that "[a]ll he did was read a Wikipedia entry about the reports; glance at them many years ago ... and then relay their conclusions to the Court." Holdren MIL Mem. 10. Plaintiff responds that "the 45-page Wikipedia entry is considered 'the most extensive and authoritative account of the hockey-stick controversy in all of its long-running complexity.'" Opp'n Mem. 65-66 (quoting Holdren Rep. 12).

The Court must exclude such testimony. A review of Dr. Holdren's deposition testimony reveals that he likely has not read all of the reports and investigations in their entirety, and, at the very least, that he has not read them for several years. *See* Holdren Dep. 75:1-5. Because Dr. Holdren's expert opinion concerning the investigation reports is based primarily on his having read a publicly editable Wikipedia page, and not the reports, themselves, the Court finds that any testimony that he would offer would not be based on adequate facts. Further, regurgitation of secondary sources of information is not a reliable methodology. *See Danley*, 169 F. Supp. at 478 (finding that an expert may rely on documentary evidence in rendering her opinion, but may not "present these documents to the jury with no analysis or merely read,

selectively quote from, or regurgitate the evidence.") (Internal citations omitted); *S.E.C*, 46 F. Supp. 2d at 763 ("expert testimony may not be used merely to repeat or summarize what the jury independently has the ability to understand.").

d. Dr. Holdren's Discussion of Plaintiff's Subsequent Research and Career Achievements

Dr. Holdren's report also contains a section titled, "The Stature of Professor Mann as a Climate Scientist." Therein he summarizes several of Plaintiff's career achievements and the impact that they had on other scientists and the field of climate change research. This information will not help the trier of fact to understand the evidence or to determine a fact in issue. *See Motorola*, 147 A.3d at 756. A recitation of Plaintiff's curriculum vitae has no bearing on whether Defendants' statements were defamatory or whether Plaintiff conducted his research fraudulently.

Plaintiff avers that Dr. Holdren will testify that Plaintiff's admittance to the U.S. National Academy of Sciences is evidence that his research was sound because "[t]he election procedures of the NAS are not made public, but they are famously rigorous" and that "[a]ny significant flaw in one's research record or in one's conduct in public debate about scientific issues is likely to prove fatal to the prospects for election." Holdren Rep. 20-21. Dr. Holdren was not a member of any selection committee at the NAS and does not possess any special knowledge or experience that would help the jury to understand why the NAS elected Plaintiff. His testimony concerning the reasons for Plaintiff's election is entirely speculative and must be excluded.

G. CEI's Motion in Limine to Exclude the Expert Testimony of Dr. John Mashey

Dr. Mashey holds a Bachelor of Science in Mathematics and a Ph.D. in Computer Science. Dr. Mashey does not rely upon his education to form the basis of his expertise, however. Rather, after retiring in 2001, he began studying "climate science denial and the

attacks against scientists, especially analyzing tactics of online amplification and disinformation." DeLaquil Decl. Supp. John Mashey, Ex. 3, at 1 ("Mashey Rep."). Dr. Mashey has presented at several universities on topics concerning climate and tobacco industry disinformation and "was profiled in the AAAS journal, *Science*, for [his] efforts in defending climate scientists." Mashey Rep. 2.

The Court's initial reaction to Dr. Mashey's curriculum vitae is that he lacks the training in the relevant field to render an opinion on the dispositive issues in this case. Further, the Court is skeptical of Dr. Mashey's role as an expert in "disinformation" because the Court has not previously been made aware of a field of study dedicated solely to tracking misinformation. Rather, Dr. Mashey's CV suggests that he is a passionate advocate whose expertise was developed specifically to testify on behalf of climate scientists. *See In re Welding Fume Prod. Liab. Litig.*, No. 1:03-CV-17000 (MDL Docket No. 1535), 2005 U.S. Dist. LEXIS 46164 at *60 (N.D. Ohio Aug. 8, 2005) ("a person does not become an expert in an area outside of his regular field merely by reading up for the specific purpose of testifying."). Dr. Mashey does appear to be well-read on such matters, however, as his report indicates that he has extensively reviewed the scientific communities and public's reaction to Plaintiff's article.

Regardless, the extent of Dr. Mashey's knowledge and his expertise in the field of disinformation go to the credibility of his opinion, not its admissibility. *See Smith,* 215 F.3d at 719. Accordingly, while the Court questions Dr. Mashey's qualifications, it finds that he has a very limited, specific expertise which could be helpful to a jury.

The Court cannot, however, so easily assuage its concerns about the methodologies that Dr. Mashey uses to formulate his opinion. Plaintiff explains that "Dr. Mashey was not attempting to provide an encyclopedic collection of all of the internet information on [Plaintiff],

but only to show a number of examples of articles that were within the defendants' easy reach." Opp'n Mem. 81 (internal quotations omitted). Defendants' aver that "Mr. Mashey could not point to any literature that supports the methodology he utilized to compile this information." Mashey MIL mem. 7. In describing his process, Dr. Mashey explained that "[i]t's just what people do with using the Internet to find things." Mashey Dep. 68:9-19. Defendants then identify several articles that Dr. Mashey omitted from his report, "from publications he conceded are credible that were critical of Plaintiff...." Mashey MIL mem. 7.

The Court must conclude that Dr. Mashey's report is not based upon reliable principles and methods. A review of his deposition testimony reveals that his opinion is derived from reviewing articles, websites, and blogposts that were submitted to him by Plaintiff's counsel and from his own, non-scientific, scouring of the internet. Mashey Dep. 129:6-131:17 (admitting that he "did not do the detailed analysis," of his sources, did not have a list of the publications that he had reviewed, and that his opinion was primarily based on his "rummaging around and looking at things," seeing what some of the widely known denier blogs were saying, but not writing down his findings until he was provided with a list of sources by Plaintiff's attorneys, years after having done his "analysis."). Dr. Mashey even admits that the sources upon which his opinion is based are not a good statistical sampling of articles, but are rather, in his opinion, "a pretty reasonable sample of what is going on." *Id.* at 131:20-132:7. Performing internet searches and selecting articles without an explanation or methodology for how particular articles were chosen is not a methodology based in the scientific method. *See Sun Ins. Mktg. Network, Inc. v. AIG Life Ins. Co.*, 254 F. Supp. 2d 1239, 1245 (finding that an expert having read articles compiled by others without knowing what searches produced those articles is not a reliable

methodology). Dr. Mashey's methodology is particularly unreliable given that he did not write down his sources at the time he reviewed them. *See Id.* at 130:12-16.

H. CEI's Motion in Limine to Exclude the Expert Testimony of Dr. Gerald North

Dr. North is the University Distinguished Professor Emeritus at Texas A&M and holds a Ph.D. in Physics with specialties in climate modeling and energy balance climate models. DeLaquil Decl. Supp. Dr. North, ("North Rep.") Ex. 3, at 1-2; DeLaquil Decl. Supp. Dr. North, Ex. 2 (North Dep.) at 41:15-22. In 2006, the National Research Council of the National Academy of Sciences created the Committee on Surface Temperature Reconstructions for the Last 2,000 Years in order to "review the attacks on MBH research by a number of climate change skeptics." *Id.* at 2. Dr. North served as the chair of that committee during its investigation of Plaintiff's work. *Id.*

Dr. North will offer his opinion that, "the research [was] valid and was performed in an honest and scientifically appropriate manner" and that methodologies used by Plaintiff have been replicated "by a large number of similar reconstructions since the MBH research was conducted." *Id.* at 3. Dr. North also intends to opine that "any improprieties on Dr. Mann's part would have been addressed – and dismissed – by the National Academy of Sciences in connection with Dr. Mann's recent election to that organization." *Id.*

a. Dr. North's Testimony Concerning the Validity of Plaintiff's Work

Dr. North presided over an investigation of Plaintiff's work "conducted by credentialed academics and professionals." *CEI*, 150 A.3d at 1253. The Committee's investigation directly addressed whether Plaintiff manipulated data or acted fraudulently. The findings of the Committee are technical in nature, certainly beyond the ken of the average juror. As such the Court finds that Dr. North's opinion concerning whether Plaintiff conducted his work

fraudulently would be helpful to the jury and that Dr. North is qualified to give that opinion by both his education and his involvement on the committee.

Defendants take issue with Dr. North's methodologies, explaining that:

> "[h]is opinion is mostly the historical recounting of work by a committee he chaired in 2006 and his (inaccurate, in many cases) spin on the work of nearly a dozen scientists composing that committee. Reciting what that committee did and the contents of its report is not the exercise of a reliable methodology...."

MIL North Mem. 1. In response, Plaintiff explains that Dr. North will discuss the Committee Report "both as a fact and an expert witness. ... describe the work of the committee, which he chaired, and provide his opinion that its findings and conclusions were well researched by a number of eminent climatologists and that he agrees with the committee's findings and conclusions." Opp'n Mem. 41.

In strong opposition, Defendants cite to *SEC v. Mudd* to support their assertion that describing the work, and summarizing the conclusions of a committee is not applying a reliable methodology under *Daubert*. *See SEC v. Mudd*, No. 11 CIV, 9202 (PAC), 2016 WL 2593980 at *14 (S.D.N.Y. May 4, 2016) (acknowledging that an expert cannot "merely closely summarize documentary evidence without applying any analysis"). In determining whether an expert has used reliable methodologies, the Court must look to such factors as (1) "whether the theory or technique ... can be (and has been) tested;" (2) "whether it has been subjected to peer review and publication;" (3) "the known or potential rate of error;" (4) "the existence and maintenance of standards controlling the technique's operation;" and (5) whether the technique has been accepted by the scientific community. *Daubert* at 593-94. The Court need not perform an exhaustive analysis of these factors to find that Dr. North's opinion does not constitute an expert opinion which has used and applied reliable methods. Dr. North's "technique" has not been

tested, it has not been peer reviewed, there is no known error rate or standards controlling the techniques operation. Such is the case because Dr. North has not implemented any scientific analysis or technique; he has merely summarized the findings of the Committee Report.

While Dr. North is, without doubt, qualified to discuss the findings of the Committee Report as a fact witness, because he has not conducted his own scientific analysis using methodologies which can be replicated or analyzed, the Court must preclude him from testifying as an expert.

b. Dr. North's Testimony Concerning Plaintiff's Election to the National Academy of Sciences

Dr. North will opine that Plaintiff's election to the National Academy of Sciences "demonstrates the high quality of his work as a scientist." North Rep. 20. During his deposition, however, Dr. North conceded that he has no knowledge of the criteria that the National Academy of Sciences considers when determining whether it will accept a scientist into its ranks. North. Dep. 189:2-12. Dr. North's opinion regarding Plaintiff's admission to NAS is not based on any reliable methodology and amounts to mere speculation. He cannot state, with any certainty or inside knowledge, the reasons for which Plaintiff was admitted to the National Academy of Sciences. Plaintiff, for his part, concedes that, "of course, Dr. North does not know the specific consideration of [Plaintiff's] candidacy, but he is certainly familiar with the Academy's stringent standards for admission." Opp'n. Mem 54. The Court finds that Dr. North's general knowledge of the Academy's stringent admission standards would not aid the jury in deciding the discrete question of whether Plaintiff manipulated data to further his personal political agenda. He has demonstrated no specialized knowledge concerning Plaintiff's induction into the Academy.

I. Defendant Steyn's Motion in Limine to Strike the Testimony of Dr. Raymond Bradley

Dr. Bradley is a professor in the Department of Geosciences and the Director of the Climate System Research Center at the University of Massachusetts, Amherst. *See* MIL Bradley, Ex. A, Expert Report of Raymond S. Bradley, D.Sc., ¶¶ 2-4 ("Bradley Rep."). Dr. Bradley, along with Dr. Mann and Dr. Hughes, co-authored the *Global-Scale Temperature Patterns and Climate Forcing Over the Past Six Centuries* ("MBH98"), and *Northern Hemisphere Temperatures During the Past Millennium: Inferences, Uncertainties, and Limitations* ("MBH99"). *Id.* at ¶¶ 1, 7-10.

Plaintiff proffers Dr. Bradley as an expert to provide testimony on the MBH research, the scientific standards used in the study, and the methodology and data that were used to create the graph. Opp'n Mem. at 47. Dr. Bradley's testimony will also include a discussion of the peer review of the MBH study, its validation by the International Panel of Climate Change ("IPCC"), and an acknowledgement that the MBH scientists recognized the uncertainties and limitations of their research. *Id.* Dr. Bradley will address Stephen McIntyre and Ross McKitrick's criticisms of the MBH research, as well as Mr. Steyn's personal criticisms of Plaintiff and the hockey stick research. *Id.*

Mr. Steyn argues that Dr. Bradley must be disqualified to provide testimony as an expert witness because of his co-authorship of the Hockey Stick graph and his likely biases stemming therefrom. Mr. Steyn contends that Dr. Bradley's testimony would be biased because of his personal interest in redeeming Dr. Mann personally and professionally and because of his personal interest in ensuring the legitimacy of the Hockey Stick graph. *See* MIL Bradley 1, 4-6; Def.'s Reply 1-2; s*ee also Phoenix Restoration Grp., Inc. v. Liberty Mut. Grp., Inc.*, No. 18 Civ 2121, 2020 U.S. Dist. Lexis 22434, 2020 WL 622152, at *4 (D.D.C. Feb. 10, 2020).

Critically, Mr. Steyn asserts that Dr. Bradley's analysis fails to provide the foundation necessary to satisfy Rule 702's reliability requirements because the analysis does not detail his understanding of whether and how the research data was properly incorporated into the MBH98 and MBH99 studies. *Id.* at 7; Def.'s Reply at 4-7. Further, Mr. Steyn argues that Dr. Bradley's opinions on the falsity of Mr. Steyn's statements are unreliable because Dr. Bradley had no hand in the eleven investigatory reports upon which he relies for his opinion. *Id.* at 7-9. Quite pointedly, Mr. Steyn argues that Dr. Bradley is unqualified to testify about the investigations, as he lacks the knowledge, skill, experience, training, or education in "the methods of academic, institutional, or congressional investigations to testify on their veracity." *Id.* at 9.

Finally, Mr. Steyn asserts that Dr. Bradley's testimony on general global warming research and the methodology of IPCC assessment reports are simply not relevant to address the question of defamation. *Id.* at 2, 10-12.

Plaintiff, on the other hand, argues that hybrid witnesses are routinely permitted to testify, and that the issue of whether Dr. Bradley's testimony is self-serving because he was a co-author of the MBH research is an issue that is subject to cross-examination and a matter for the jury to decide. Opp'n Mem. 48. In short, it is a question of weight and credibility rather than a question of admissibility.

Plaintiff explains that Dr. Bradley's support for his conclusions stems from consideration of scientific literature generally, his personal climate change research, his MBH research, and the formal institutional investigations into the MBH research. *Id.* at 48-49. Plaintiff asserts that Dr. Bradley is indeed qualified to provide opinion testimony on the results of the Climategate investigations because the investigations concerned scientific research about climate change. *Id.* at 50.

Plaintiff contends that Dr. Bradley's opinions on global warming are relevant because his testimony on global temperatures is rooted within the context of the MBH research's conclusions. *Id.* at 50. Finally, Plaintiff notes that he has withdrawn the portion of Dr. Bradley's testimony about the credibility of the IPCC reports. *Id.*

In his Reply, Mr. Steyn argues that Dr. Bradley did not, and is unable to, verify the veracity of the investigatory reports; he does not have any knowledge of the standards or process employed by the authors of the investigatory reports; and, ultimately, his testimony amounts to reading comprehension because he only provides the conclusions of the reports, which interpretation does not require specialized knowledge. Def.'s Reply at 7-8.

The Court will first discuss whether Dr. Bradley can testify as a fact and expert witness and whether his relationship with Dr. Mann disqualifies him based on bias. To support his position, Mr. Steyn cites to *Phoenix Restoration Grp., Inc. v. Liberty Mut. Grp. Inc.*, 2020 U.S. Dist. Lexis 22434 at *3. In that case, plaintiffs Phoenix Restoration Group, Inc. ("Phoenix") and AVSmoot, LLC purchased commercial insurance through defendant Liberty Mutual Group Inc., with the policies underwritten by defendant Ohio Security Insurance Company. *See Phoenix Restoration Grp., Inc.*, 2020 U.S. Dist. Lexis 22434 at *3. After a fire in July 2016, the defendants assigned plaintiffs' claims to a claims adjustor, resulting in the hiring of David R. Elmore and Elmore's firm, MDD Forensic Accountants ("MDD"). *Id.* The defendants intended to call Mr. Elmore, who was identified as a certified public accountant, valuation analyst and a master analyst in financial forensics, to testify both as a fact witness and defendants' sole expert witness. *Id.* at 2. The plaintiffs objected, asserting that Mr. Elmore made "critical misrepresentations about how plaintiffs' claims would be treated, upon which misrepresentations the plaintiffs relied to their detriment." *Id.* The plaintiffs filed a motion in limine to exclude or

limit Mr. Elmore's testimony under Federal Rule of Evidence 403. The plaintiffs objected to Mr. Elmore providing both factual testimony and independent expert testimony to rebut plaintiffs' proffered experts on general industry standards for processing insurance claims and forensic accounting because of the danger of prejudice and jury confusion. *Id.* at *7.

The court recognized that "having a witness testify as both a fact and expert witness is permissible under Federal Rules of Evidence 701 and 702." *Id.* at *8-*9. The court, however, cautioned that, "[a] 'two-hatted' witness providing closely related lay and expert opinion testimony" presents special risks because of the "'aura of special reliability and trustworthiness surrounding expert testimony.'" *Id.* at *10 (quoting *United States v. Williams*, 827 F.3d 1134, 1160-61 (D.C. Cir. 2016). It opined that, when hybrid testimony is not presented properly, "the manner in which [the] expert and lay opinions [are] interspersed during the trial" can "require[] mental gymnastics of the jurors in determining when [the witness] was testifying as an expert and when he was not, risking confusion." *Id.* (quoting Williams, 827 F. 3d at 1160). Concerns over juror confusion could warrant the exclusion of such expert testimony or imposition of strict limits on the scope of the expert portion of a hybrid witness's testimony or employment of procedural safeguards against jury confusion. *Id.* at *10-*11.

Further, the court noted that "expert testimony from a hybrid witness may be excluded based upon a finding of insufficiency under Rule 702." *Id.* at *11. Rule 702 "requires that 'the [expert] testimony [be] the product of reliable principles and methods' and that 'the expert has reliably applied the principles and methods to the facts of the case.'" *Id.* (quoting Fed. R. Evid. 702(c), (d)). The District Court explained that the reliability of expert testimony may be undermined if the expert witness has a clear interest in the outcome of the proceeding or if the expert witness has become an advocate for a cause. *Id.* at *11-*12.

The court found that Mr. Elmore's total and sole involvement in the claims adjustment process gave rise to the plaintiffs' pending legal claims. Because of his role, that court concluded that, allowing Mr. Elmore to provide expert testimony about the consistency of his conduct with industry standards on claims processing and accounting would bolster his factual testimony by "imbuing it with undue weight under Rule 403." *Id.* at *13-*14. In addition, the court found that, because Mr. Elmore is purported to have engaged in the alleged misrepresentations to the plaintiffs, "he has a clear incentive to determine, in his expert capacity, that the defendants' conduct (which, at bottom, rests in significant part on his conduct) was appropriate and proper, for a number of reasons." *Id.* at *14. On these facts, the court was constrained to grant plaintiffs' motion in limine, but allowed Mr. Elmore to provide expert opinion testimony about opinions he formed while working on plaintiffs' claim, so long as his testimony satisfied Rule 702. *Id.* at *17-*18.

Here, Dr. Bradley's involvement in the Hockey Stick research does not figure prominently in the factual allegations underlying Plaintiff's claim of defamation. Dr. Bradley testified:

> [Plaintiff] was responsible for developing the statistical approach, writing the computer code, and calculating the uncertainties. Prof. Hughes and I selected the different records that would be used in the analysis and collaborated with [Plaintiff] on interpreting the reconstructed temperature record.

Bradley Rep. ¶ 11. Dr. Bradley, however, provides: "Some of [defendants'] statements impugn my integrity as well as that of my co-author, Malcom Hughes, as well as [Plaintiff's]." *Id.* at ¶ 56. In addition, Dr. Bradley indicates that, "[w]hile these statements were principally directed at [Plaintiff], by implication, they also accuse his co-authors, including me, of wrongdoing[.]" *Id.* Dr. Bradley's testimony does not show sufficient bias to justify exclusion of his testimony in

its entirety. Indeed, to the extent necessary, the Court could restrict the scope of Dr. Bradley's testimony to counter any potential risk of bias. *See Phoenix Restoration Grp., Inc.*, 2020 U.S. Dist. Lexis 22434 at *11, *13.

Dr. Bradley provides expert testimony about the findings from the MBH research, how global temperatures were calculated, and the use of proxy data in the hockey stick research. Bradley Rep. ¶¶ 12-39. The Court will, however, exclude this testimony because Dr. Bradley fails to put forth the scientific technique or methodology underlying his expert opinion. *See Sacchetti v. Gallaudet Univ.*, 344 F. Supp. 3d 233, 250-51.

The type of proxy data used and whether it was properly incorporated into the hockey stick research is a fact at issue in this case. Dr. Bradley, as a co-author of the MBH98 and MBH99 studies, has first-hand knowledge of the data used in the hockey stick research. In arriving at his conclusion that the "technique was properly incorporated into, and used appropriately in, the MBH98 and MBH99 studies," Dr. Bradley's testimony skips a significant step that is required of all expert testimony. *See* Bradley Rep. ¶¶ 36-39. Dr. Bradley only speaks to how the proxy data was chosen but fails to establish the principles and methodologies he used to arrive at his conclusion that the data and technique in the MBH98 and MBH99 studies were properly incorporated and used appropriately. *See Arias v. DynCorp.*, 928 F. Supp. 2d 10, 15-16 (D.D.C 2013) (indicating that an expert's opinion can be based on their experience, but in those instances the expert must explain "how the experience leads to the conclusions reached, why the experience is a sufficient basis for the opinion and how that experience is reliably applied to the facts."). The Court must, therefore, exclude Dr. Bradley's testimony.

Further, the Court will exclude Dr. Bradley's expert testimony as to the peer review process and the investigative reports. Although Dr. Bradley has impressive credentials and is a

co-author of the MBH studies, he fails to explain the principles and methods by which he draws conclusions from the investigatory reports that ostensibly exonerate Plaintiff and support his conclusion that the research was not fraudulent. *See* Fed. R. Evid. 702 (c)-(d).

What is more, because he is a co-author of the MBH studies, to allow Dr. Bradley to make conclusory statements as an expert witness concerning the findings of the various investigations runs the risk of improperly bolstering his factual testimony by imbuing it with undue weight, in violation of Rule 403 of the Federal Rules of Evidence. The Court must strike the testimony for this reason, as well.

Finally, the Court must also exclude Dr. Bradley's expert testimony on global warming. Although Plaintiff explains that Dr. Bradley's testimony will be presented solely within the context of the MBH research findings, Dr. Bradley's expert report contains testimony concerning occurrences of global warming outside the context of the MBH98 or MBH99 studies. *See* Bradley Rep. ¶¶ 12-27. That testimony, instead, provides information about global warming and evidence that it is occurring. *Id.* As the Hon. Jennifer M. Anderson concluded in her October 22, 2019 order addressing a motion to compel discovery, "[t]he broader question of global warming is [not] before the Court." *See* Order Denying Pl.'s Mot. Compel Disc. at 6. Indeed, the policy debate over global warming is not before this Court. Although Plaintiff must prove that Defendants' purportedly defamatory statements are false by showing that Plaintiff's research was not conducted fraudulently, that assessment does not require an understanding of the totality of scientific research underlying or buttressing the debate over global warming.

J. Defendant Steyn's Motion in Limine to Exclude the Expert Report of John Abraham

John P. Abraham, Ph.D., is a professor of thermal sciences at the University of St. Thomas, Minnesota. *See* MIL Abraham, Ex. A, Report of Dr. John P. Abraham ("Abraham

Rep."). Dr. Abraham received a Ph.D. in Mechanical Engineering. Professionally, his specialty is Thermal Science, which is a sub-division of Mechanical Engineering dealing with heat and energy transfer. *Id.* Dr. Abraham indicates that his research includes "work on climate change, renewable energy, and access to drinking water in the developing world." *Id.*

Plaintiff offers Dr. Abraham's testimony to provide opinions on the science of climate change, the centrality of Plaintiff's research to the climate change conversation, and the investigations into Plaintiff's conduct. Opp'n Mem. at 72-73. Plaintiff has also designated Dr. Abraham as an expert to opine upon the damage to Plaintiff's reputation within the scientific community and how Defendants' statements stymied Plaintiff's ability to collaborate with other researchers and receive funding for his research. *Id.* at 73, 76.

More specifically, Plaintiff proffers Dr. Abraham's expert testimony to assist the jury in answering the following eight questions.

> Issue 1: Is there evidence that the Earth is warming and that the warming is caused by humans?
>
> Issue 2: If there is warming, is it unnatural, or at a rate that cannot be explained by natural phenomena?
>
> Issue 3: How central is [Plaintiff]'s research in the above two items?
>
> Issue 4: Is [Plaintiff]'s research correct? That is, are his findings related to climate change confirmed?
>
> Issue 5: Did [Plaintiff] participate in any fraudulent activities that misrepresented his research or otherwise exaggerated the impact of humans on the climate?
>
> Issue 6: Did colleagues of [Plaintiff] contribute to any activities that misrepresented their research or otherwise exaggerated the impact of humans on the climate?
>
> Issue 7: Did [Plaintiff] engage in unprofessional activities that interfered with others' ability to reproduce their work or interfere with scholarly process?

> Issue 8: Did [Plaintiff]'s colleagues engage in unprofessional activities that interfered with others' ability to reproduce their work or interfere with the scholarly process?

Abraham Rep. 2-4.

Mr. Steyn argues that most of Dr. Abraham's testimony is neither relevant nor reliable because he focuses much of his discussion upon the broader question of global warming. MIL Abraham at 1, 3-4, 6-7, 13-14. Mr. Steyn contends that Dr. Abraham lacks the expertise to provide expert testimony about global warming and the validity of Plaintiff's research in dendroclimatology because his specialty is in thermal science, not climate science. *Id.* at 1-2, 4-5, 8-9; Def.'s Reply 4-5, 10. Mr. Steyn asserts that, "offering generalized opinions based on a summary of documents that can be read and understood by the Court does not qualify a person's testimony as expert." Def.'s Reply 3, 6-7; *see also Arias v. Dyn Corp.*, 928 F. Supp. 2d 10, 18 (D.D.C. 2013).

What is more, Mr. Steyn contends that Dr. Abraham has no expertise investigating professional research misconduct and should not be permitted to testify as an expert about any financial or reputational damages that Dr. Mann may have suffered as a result of Defendants' statements. Def.'s Reply 1, 3, 7-8.

Mr. Steyn asserts that Dr. Abraham's opinions are not reliable because he only provides conclusions, relies on his own personal summaries of the investigation reports, and cannot independently confirm the veracity of the reports. MIL Abraham 2, 10, 13, 15-17; Def.'s Reply 8. Further, Mr. Steyn argues that Dr. Abraham's testimony is biased because he is closely aligned with Plaintiff on climate change, has co-authored with Plaintiff multiple articles on ocean temperatures, has personally supported Plaintiff, and has called Plaintiff a "hero" among his

colleagues. *Id.* at 17- 20; *see also Phoenix Restoration Grp., Inc. v. Liberty Mut. Grp., Inc.*, No. 18 Civ 2121, 2020 U.S. Dist. Lexis 22434, 2020 WL 622152, at *4 (D.D.C. Feb. 10, 2020).

In his opposition, Plaintiff argues that thermal science has bearing on climate change and that Dr. Abraham is qualified to testify about the investigation reports and climate issues because he is an active climate researcher and has published a number of peer-reviewed studies on "global warming, impacts of warming to society, recent temperature trends, and methods to determine paleoclimate temperatures." Opp'n Mem. at 72-75. Plaintiff asserts that the methodology underlying Dr. Abraham's opinions on global warming is reliable because an "expert's review of the published literature in light of the expert's education, training, and experience is a clearly appropriate 'methodology.'" *Id.* at 73-75. In addition, Plaintiff argues that Mr. Steyn's objection about the relevance of global warming to the issues at bar "disregards the Court of Appeals' observation that issues relating [to] the defendants' positions on this issue may be considered by the jury." *Id.*

Having considered the arguments, the Court must conclude that the eight aforementioned questions are simply not relevant to the questions before this Court. *See* Dr. Abraham Rep. 2-4. Issues 1, 2, and 3 concern how Plaintiff's research is central to the conversation about global warming. *Id.* Contrary to Plaintiff's arguments, a discussion about global warming is not necessary to counter Defendants' "zeal in advancing their cause against the hockey stick graph's depiction of a warming global climate[.]" *CEI*, 150 A.3d at 1259. The Court will not permit this defamation case to expand into litigation over whether the Earth is warming. *See* Fed. R. Evid. 702(a); *see also Daubert,* 509 U.S. at 592.

Plaintiff has correctly withdrawn issues 6, 7 and 8, as those issues are not relevant.

Concerning Issues 4 and 5, Mr. Steyn argues that Dr. Abraham is not qualified to testify as an expert about Plaintiff's research and the investigation reports. "To be qualified as an expert, a witness must have 'sufficient skill, knowledge, or experience' in the relevant area that [their] opinion testimony will 'probably aid' the trier of fact to arrive at the truth. The determination that a proposed expert has the necessary qualifications is committed to the trial court's sound discretion." *See In re A.B.*, 999 A.2d 36, 41 (D.C. 2010). "The training and specialization of the [expert] witness goes to the weight rather than the admissibility of the evidence generally speaking." *Kling v. Peters*, 564 A.2d 708, 716 (D.C. 1989) (quoting *Baerman v. Reisinger*, 363 F.2d 309, 310 (D.C. Cir. 1966)); *see also Coleman v. Parkline Corp.* 844 F.2d 863, 865-866 (D.C. Cir. 1988).

In his deposition, Dr. Abraham explains that, "thermal sciences, which include climate change[,] and the editorial and publication process, which includes peer review, are two areas that I claim expertise in." *See* MIL Abraham; Ex. B, Abraham Dep. 68:18-25. Dr. Abraham indicates that the thermal sciences field includes climate change and that he is an active publisher in the peer review literature of climate science. *Id.* at 69:1-15. Although Dr. Abraham concedes his doctoral studies did not include a focus in climate change, he explains that, "radiative heat transfer is one of my expertise. Something called connective flow, and the flow of heat and fluid. So those topics form the basis of our understanding of climate change and that's what I have my Ph.D. in." *Id.* at 70:1-10. Dr. Abraham concedes that he has never participated in an institution's investigation of faculty research misconduct. *Id.* at 71:7-10.

Even though Dr. Abraham has impressive credentials, Dr. Mann has failed to explain satisfactorily how Dr. Abraham's academic and professional experience qualify him to testify about whether Plaintiff manipulated data or conducted his research fraudulently. See *Arias v.*

DynCorp., 928 F. Supp. 2d 10, 15-16 (D.D.C 2013). Dr. Abraham represents that he read eleven reports and passages from the investigation reports to inform his conclusion, as follows:

> [The] investigation[s] found no evidence of data manipulation or scientific misconduct on the part of [Plaintiff] or his colleagues. I agree. The underlying science is sound, is reproducible, and is evidence of rapid warming caused by human emission of heat trapping gases.

See Abraham Rep. 7-8, 10, 30, 33-34, 37, 43, 50.

Dr. Abraham fails to provide the principles and methodologies underlying his conclusions beyond his citation to findings in the investigative reports. His opinions are not the result of a scientific method. *See* Fed. R. Evid. 702 (c)-(d); *see also Parsi v. Daioleslam*, 852 F. Supp. 2d 82, 89 (D.D.C. 2012) (rejecting an expert opinion based solely on the experts "reading and viewing" and finding that reading, alone, does not constitute an acceptable methodology); *Daubert*, 509 U.S. at 593-94; *Meister v. Med. Eng'g Corp.*, 267 F.3d 1123, 1127 (D.C. Cir. 2001) (finding that to identify scientific testimony, "forces the court to focus on principles and methodology, not on the conclusions they generate, and thus demands a grounding in the methods and procedures of science, rather than subjective belief or unsupported speculation."). What is more, it appears Dr. Abraham lacks the specialized knowledge to explain how the investigations were conducted or the legitimacy of their conclusions. The Court will exclude Dr. Abraham's expert testimony as it relates to the investigation reports.

Finally, as to Dr. Abraham's proffer concerning Dr. Mann's reputation, expert testimony is not necessary and the basis for Dr. Abraham's expertise on the subject is unclear. *See* Abraham Dep. 202:7-24; Fed. R. Evid. 701(c), 702(a); *see also Steele*, 854 A.2d at 181; *Payne v. Soft Sheen Prds., Inc.*, 486 A.2d 712, 727 (D.C. 1985)) (holding that expert testimony is improper when "the jurors are as capable of understanding and drawing correct conclusions from

the facts as an expert witness."); *King v. United States*, 74 A.3d 678, 683 (D.C. 2013) (distinguishing the difference between lay and expert testimony and holding that observations that are common and can be formed through "simple, personal observations of human conduct" are not expert opinions). Expert testimony is not necessary to aid the jury as to Dr. Mann's reputation in the scientific community. *Motorola*, 147 A.3d at 756.

ACCORDINGLY, it is by the Court this 26th day of July 2021, hereby

ORDERED that *Plaintiff's Motion in Limine to Strike the Expert Testimony of Dr. Judith Curry* is **GRANTED**; and it is further

ORDERED that *Plaintiff's Motion in Limine to Strike the Expert Testimony of Dr. Abraham Wyner* is **DENIED**; and it is further

ORDERED that *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Naomi Oreskes* is **GRANTED**; and it is further

ORDERED that *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Peter Frumhoff* is **GRANTED**; and it is further

ORDERED that *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. John Holdren* is **GRANTED**; and it is further

ORDERED that *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of John Mashey* is **GRANTED**; and it is further

ORDERED that *Defendants Competitive Enterprise Institute and Rand Simberg's Motion in Limine to Exclude the Expert Testimony of Dr. Gerald North* is **GRANTED**; and it is further

ORDERED that *Defendant Mark Steyn's Motion in Limine to Strike the Expert Testimony of John Abraham* is **GRANTED**; and it is further

ORDERED that *Defendant Mark Steyn's Motion in Limine to Strike the Expert Testimony of Raymond Bradley* is **GRANTED**.

Judge Alfred S. Irving, Jr.

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EXHIBIT 2

Report of Judith Curry, PhD

I submit this report to the Montana First Judicial District Court of Lewis and Clark County, with regards to Rikki Held et al. versus the State of Montana et al. as an expert witness for the State of Montana on the topics of climate change and the energy transition. The facts and data that I considered in forming my opinions are available from public sources and cited in this report.

Executive Summary

This report responds to the Plaintiffs' claims that:

- the release of greenhouse gases from fossil fuel emissions into the atmosphere is already triggering a host of adverse consequences in Montana;
- the threats posed by fossil fuels and the climate crisis are existential;
- Montana's energy system should transition to a portfolio of 100% renewable energy by 2050.

My report provides evidence that supports the following conclusions:

- The climate-related concerns observed by the Plaintiffs are well within the range of historical natural weather and climate variability, with worse occurrences of weather and climate extremes observed during the early 20th century.
- Plaintiffs' concerns about climate change in the 21st century are greatly exaggerated, and not consistent with the most recent assessment reports and research publications.
- In 2021, Montana ranked 10th among U.S states in terms of the share of electricity generated from renewables, about 52%. There are significant problems with a portfolio of 100% renewable energy for Montana by 2050.
- Emissions from fossil fuels generated in Montana provide a miniscule contribution to global greenhouse gas emissions and do not influence directly Montana's weather and climate.

Qualifications

I am Professor Emerita and former Chair of the School of Earth and Atmospheric Sciences at the Georgia Institute of Technology. I am currently President and co-founder of Climate Forecast Applications Network (CFAN).

I received a Ph.D. in Geophysical Sciences from the University of Chicago in 1982. Prior to joining the faculty at Georgia Tech, I held faculty positions at the University of Colorado, Penn State University and Purdue University. My published research spans a variety of topics including climate dynamics of the Arctic, climate dynamics of extreme weather events, cloud microphysics and climate feedbacks, climate sensitivity and scenarios of future climate variability, and reasoning about climate uncertainty. I have been elected to the rank of Fellow of the American Meteorological Society, the American Association for the Advancement of Science, and the American Geophysical Union. I have previously served on the NASA Advisory Council Earth Science Subcommittee, the Department of Energy's Biological and Environmental Research

EXHIBIT A

Advisory Committee (BERAC), the National Academies Climate Research Committee and the Space Studies Board, and the National Oceanic and Atmospheric Administration (NOAA) Climate Working Group. My company CFAN translates cutting-edge weather and climate research into forecast products that support the mitigation of weather and climate risk, on timescales from days to decades.

Additional information can be found at:
http://curry.eas.gatech.edu/
http://www.cfanclimate.net/
http://judithcurry.com/about/

My particular qualifications relevant to this Report include:

- Extensive published research on the topics of climate dynamics and change
- My expertise on these topics is supported by my invitations to provide Congressional testimony twelve times since 2006.
- My company CFAN supports the energy sector with extended-range probabilistic forecasts of temperature extremes, severe convective weather, hurricanes, fire weather and renewable energy. CFAN's climate scenario projections and impact assessments support power plant siting and investment decisions, insurance decisions, electric power demand, and severe weather vulnerability.
- I have provided consulting services to numerous electric utility providers on topics related to weather variability and climate change, and the pros and cons of various energy sources in context of climate change and political frameworks.
- I have authored a book entitled "Climate Uncertainty and Risk" that is in press at Anthem Press.

My complete curriculum vitae is included in Appendix A.

1. Weather and climate variability in Montana

Montana has a highly variable climate and is subject to weather extremes. The Plaintiffs attribute recent adverse weather and climate conditions to human-caused climate change associated with fossil fuel emissions. These impressions of the Plaintiffs do not hold up to scrutiny against Montana's historical weather and climate records.

1.1 Concerns of plaintiffs about the current climate

Concerns of the individual Youth Plaintiffs on pages 5-26 of the Complaint are generally related to concerns about climate change impacts on their physical and psychological health and safety, challenges to family and cultural foundations, economic deprivations, and degrading and depleting natural resources. Their specific weather- and climate-related concerns are summarized as follows:

- Variability in river levels and stream flow, ranging from drought to flood
- Summertime warm temperatures in rivers and streams that impact fish
- Reduced water availability for livestock during summer

- Severe hail storm
- Trees and large animals under stress from disease carrying insects that are surviving warmer winters
- Wildfires
- Reduced winter snow pack
- Abnormally wet, cold and muddy weather
- Extreme summer heat
- Disappearance of glaciers in Glacier National Park

Impacts of "Climate Disruption" in Montana provided on pages 57-75 of the Complaint are summarized as:

- Increase in temperatures from 2-3°F between 1950 and 2015
- More heat waves
- Snow is melting earlier in spring
- Days above 90 °F have increased by 20 days between 1970 and 2015
- Warmer springs and delay of frost in fall
- Reduced irrigation capacity
- Decreasing snowpack
- Melting glaciers

1.2 Historical context

By considering only data since 1950 and 1970, the Plaintiffs have erroneously assumed that recent adverse weather and climate conditions in Montana are unusual, and have inferred that they are caused by fossil fuel emissions. The slow increase in average temperature for Montana has not translated into an increase in weather/climate extremes. Ancestors of the Youth Plaintiffs living in the 19th and early 20th century encountered weather and climate extremes that are as bad as, or worse than, those that have been encountered by the Youth Plaintiffs.

Here are Montana's historical record temperature and precipitation extremes:

- Hottest temperature: 1 17°F, Medicine Lake, 7/5/1937 and Glendive 7/20/1893[1]
- Record hottest years: 1934 and 2015[2]
- Record driest year: 1931, avg precipitation 12.62 inches[3]
- Record wettest year: 1927, avg precipitation 26.15 inches[4]
- Precipitation record for 24 hours: Circle (Springbrook), 6/20/1921, 1 1.50 inches[5]
- Worst floods: 1908, 1948, 1964, 1978, and 201 1[6]

The NOAA State Climate Summary for Montana (2022) provides an up-to-date summary of Montana's climate.[7]

While the two decades in the 21st century have overall been the warmest for Montana since 1900, there has been no trend in weather and climate extremes. Average winter temperatures show an overall increase, although comparably warm years were observed from the 1920-50s. The warmest summer temperatures were in the 1930s. In terms of annual average temperature, 2015 is tied with 1934 for the hottest year on record.[8]

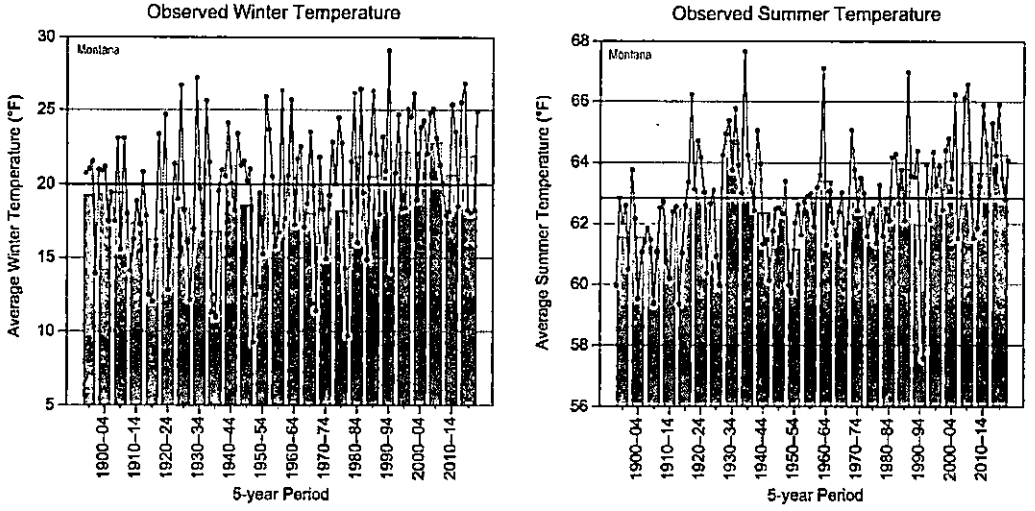


Figure 1.1 – Reprint of Figure 4a-b from Frankson et al. 2022 – (left) winter (December-February) and (right) summer (June-August) average temperature from 1895 through 2020. Dots represent annual values, bars show 5-year averages and horizontal lines show long term averages.[9]

The number of very hot days (≥95 °F) and warm nights (≥70 °F) was highest in the 1930s.

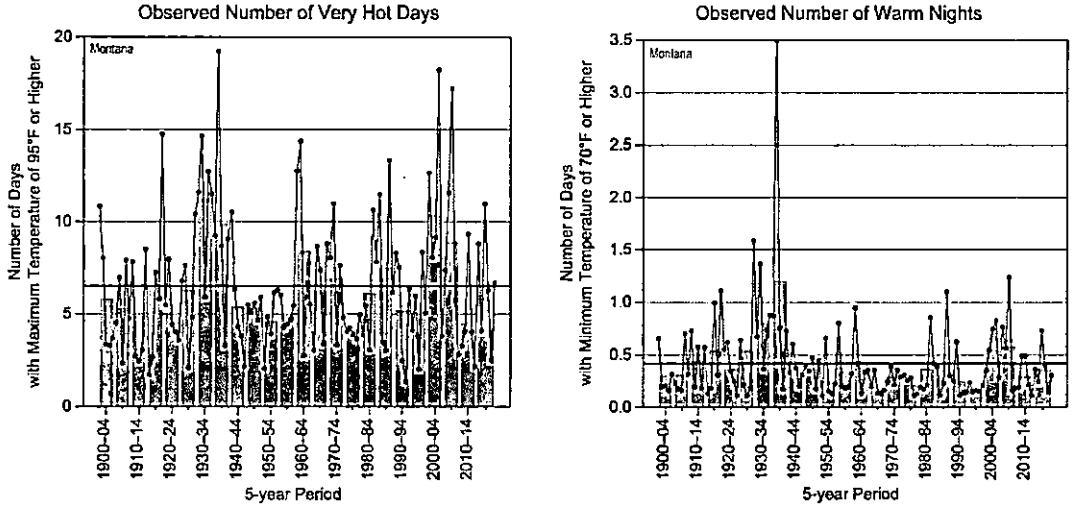


Figure 1.2 – Reprint of Figure 2a-b from Frankson et al. 2022 – (left) very hot days (≥95 °F) and (right) very warm nights (≥70 °F) 1900 through 2020. Dots represent annual values, bars show 5-year averages and horizontal lines show long term averages.[10]

3.1.4 Geothermal Power

An area of relatively untapped energy production across the U.S. is geothermal power. Today less than 1% of U.S. electricity production comes from geothermal sources. Recognizing the opportunity, the Advanced Geothermal Research and Development Act was passed in 2007.[107] This has contributed to a sharp increase in related patents awarded in the US. [108]

Montana has a long history of leveraging its geothermal resources for tourism as well as other non-power production uses.[109] As can be seen in Figure 3.4, much of the state demonstrates geothermal potential with the most validated area being in the southwestern portion near the Yellowstone Caldera.

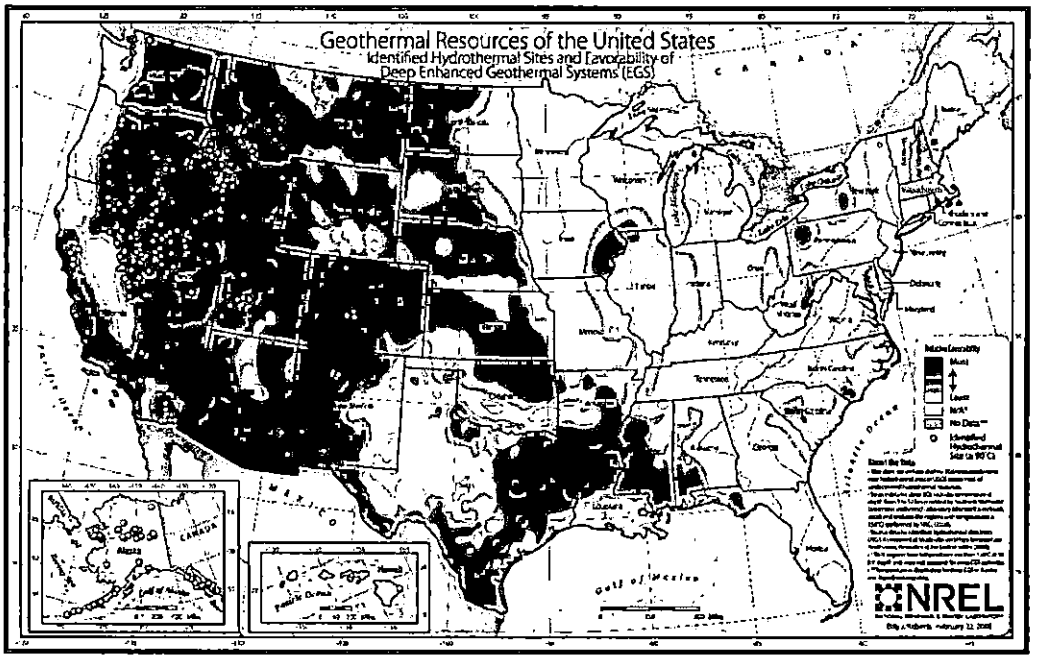


Figure 3.4 – NREL developed geothermal resources in the United States.[110]

With the advent of Enhanced Geothermal Systems,[111] there is an increasing opportunity to leverage this resource with a minimal footprint and environmental impact.[112] This also provides an opportunity for Montana to distribute renewable energy production to a region of the state not particularly well suited for wind and solar.

3.2 Feasibility of 100% renewable energy for Montana

Montana has abundant renewable energy resources from hydropower and wind. Even so, an electric power system based solely on hydropower, wind and solar is not viable without storage on a scale that is anywhere close to feasible or affordable by 2035 and 2050. Advanced geothermal energy, while showing much promise, requires substantial research and development for large-scale deployments.

The key issue is the variability and intermittency of the renewable energy sources, ranging from intermittency on time scales of minutes, diurnal variations, variations from weather systems, seasonal cycles, interannual variability and even decadal-scale variability.

Mark Jacobson's Expert Report proposes to address this intermittency/variability using electricity storage in batteries, pumped hydroelectric storage (PHS) and hydroelectric dams. Current battery technology can provide electricity storage on time scales of minutes to hours, and long-term utility-scale energy storage using batteries may be infeasible. Green hydrogen is a possibility for energy storage, but this requires substantial research and development before it can be considered for large-scale applications for energy storage.

The Gordon Butte PHS project is being designed to take advantage of the unique geological features to create a new PHS facility within Montana. While this is very promising technology and a recent NREL study shows technical PHS potential within Montana,[113] the Gordon Butte PHS has even been described as a "spotted, multicolor unicorn" by the CEO of Absaroka Energy who is developing Gordon Butte.[114] These projects can take over a decade to come to fruition and much of the process is outside the purview of Montana. For example, Gordon Butte began permitting with the federal government in 2013,[115] is being funded by a Danish group of investors,[116] and is not anticipated to be online until 2029.[117]

Mark Jacobson's plan also relies on the WECC transmission grid to keep the grid stable in Montana. Montana currently exports about 40% of its electricity, primarily to Oregon and Washington.[118] When weather and climate conditions are sufficiently adverse that Montana would need to import electricity, it is likely that much of the western U.S. would also be impacted by the same weather conditions and would also be looking to import electricity.

Consider the following scenario, which can be expected to occur multiple times each winter with varying magnitudes and durations. "Arctic outbreaks" periodically bring exceptionally cold temperatures to large regions of the continental U.S., even in this era of global warming. An exceptionally cold outbreak occurred during February and March 2019, with similar outbreaks in 2014 and 2017. In February 2019, average temperature departures from normal in Montana were as much as 27 to 28 °F below normal, with Great Falls at the heart of the cold. Temperatures did not rise above 0 °F on 11 days and dropped to 0 °F or below on 24 nights. While the cold in February was remarkable for its persistence, the subsequent Arctic blast in early March 2019 delivered the coldest temperatures. Almost two dozen official stations in Montana broke monthly records, with an all-time record state low temperature for March of -46 °F.[119]

While Arctic outbreaks generally impact the northern Great Plains states the worst, the spatial extent of these outbreaks can be very large. The cold outbreak during February 2021 that impacted Montana also covered half of the U.S. and extended down to Texas, where massive power outages ensued that resulted in considerable loss of life.[120]

In addition to exceptional power demand for residential heating during such Arctic outbreaks, any power generation from renewables is at a minimum during such periods. Montana's solar and hydropower capacity are at their lowest during winter. While winter winds are generally strong, the Arctic cold air outbreaks are accompanied by large regions of high pressure that are called

cold-core anticyclones (note: Arctic cold air outbreaks and the formation of cold-core anticyclones was the topic of my PhD thesis).[121] [122] The nature of these circulations is that wind speeds are very low within the high pressure system, resulting in very low amounts of wind power production. The large horizontal scale of these high pressure systems indicates that the WECC transmission grid is not going to be of much help if much of the region is also suffering from cold temperatures and low winds.

Providing sufficient power for Montana during such an Arctic outbreak with 100% renewable energy requires hugely infeasible amounts of energy storage. Apart from the possibility of advanced geothermal energy, there seems to be no options other than nuclear or fossil fuels to produce the needed amounts of energy under these conditions. Renewable-only energy for Montana is an exceptionally challenging and costly endeavor, and the proposal put forward by Marc Jacobson is little more than a fairy tale, particularly on the proposed time scales and with available technology.

3.3 Challenges of the mid-21st century energy transition

For the past two centuries, fossil fuels have fueled the progress of humanity, improved standards of living and increased the life span for billions of people.[123] In the 21st century, a rapid transition towards eliminating CO_2 emissions has become an international imperative for climate change mitigation under the auspices of the UNFCCC Paris Agreement.

Currently there is rapid technological innovation across all domains of the global energy sector. Innovation is transforming every part of the modern energy system, including long-distance transmission and power grid control, energy storage, residential heating, electric vehicles, and remarkable progress in advanced designs for nuclear power. In context of carbon management (carbon capture and storage, direct air capture), rapid technological innovation is also underway.

3.3.1 Status of the energy transition

The U.S. electricity system began transitioning two decades ago. The old system was characterized by a relatively small number of large generators that were connected to a transmission grid. There were baseload and peak generators to accommodate variations in weather-driven demand. Coal reserves guaranteed an inexpensive supply of fuel if demand was high or there were supply or cost issues with natural gas.

Over the past two decades, the electricity system has connected enormous numbers of smaller generators from wind and solar to the grid. Weather-driven variations now occur in both supply and demand, which are managed by demand response, storage, overcapacity, and interconnections with neighboring systems. Wind and solar power have developed synergistically with natural gas power plants (and to a lesser extent coal), since it is easy to turn gas power plants off and on to balance the intermittent energy supplies from wind and solar.

The realization is growing that countries and states face substantial economic and geopolitical risks if they reduce production of fossil fuel-based energy under the assumption that renewables can quickly replace them. Premature retirements of baseload generating units, such as coal and nuclear

plants, combined with the intermittency of wind and solar as power sources, have seriously impaired grid resiliency and reliability in some regions and countries. These risks have been emphasized by Russia's war on Ukraine, with the ensuing gas and oil shortages and price spikes, leading to political pressures to abandon green energy pledges and return to coal and burn biomass. The energy transition has been further disrupted by supply-chain problems, declining government subsidies and an affordability crisis for materials needed for wind, solar and batteries.

There are substantial institutional and structural barriers in the U.S. that are slowing down or preventing wind and solar generating capacity from being quickly integrated into transmission grids. The U.S. transmission grid has been growing very slowly in recent decades, at a pace that is a fraction of that required for net-zero emissions plans. Transmission and renewable energy projects are being blocked across the country by landowners, consumer and environmental groups. Even when all relevant parties agree to proceed with new transition lines, the cost allocation process can take years.[124] A further challenge is that utilities and grid operators need to analyze the impacts of new generating projects when added to the grid.[125]

In the U.S., electric vehicles (EVs) are rapidly growing in popularity, but it is becoming increasingly difficult to actually purchase an EV. Tesla CEO Elon Musk said his electric-car factories are "losing billions of dollars" as global supply-chain disruptions and challenges in battery manufacturing constrain the company's ability to scale up production.[126] According to the CEO of Rivian, a manufacturer of electric adventure vehicles: "All the world's cell production combined represents well under 10% of what we will need in 10 years…meaning 90% to 95% of the battery supply chain does not exist."[127]

The net outcome of the energy transition to date is that in 2022, very few of the world's countries are on track to meet their emissions reductions commitment. Further, the shortages and price spikes in the global natural gas and oil supply caused by Russia's war on Ukraine and supply chain issues for materials have demonstrated the current fragility of the transition and the importance of maintaining the capacity to burn natural gas and coal.

3.3.2 Competing values in the energy transition

The overall vision for future energy systems as per the IPCC AR6 WGIII Report is predicated around net-zero emissions, with energy systems having the following characteristics: (1) electricity systems that produce no net CO_2 or remove CO_2 from the atmosphere; (2) widespread electrification of end uses; (3) substantially lower use of fossil fuels; (4) use of hydrogen, bioenergy, and ammonia in sectors less amenable to electrification; (5) more efficient use of energy; (6) greater energy system integration across regions and components; and (7) use of CO_2 removal technologies.[128] It is noted here that the IPCC vision is far less constraining and restrictive than the vision put forward by Mark Jacobson in his Expert Report.

A more holistic vision for future energy systems considers a broader range of values plus potential dangers and risks associated with the transition. Table 3.1 provides a list of relevant values and the associated risks or dangers to be considered while envisioning electric power systems humans will want and need to thrive during the 21st century.

Table 3.1 Values and risks/dangers associated with electric power systems.[129]

Values	Risks//Dangers
Abundant	Structural inadequacies to meet energy needs
Reliable	Catastrophic power cuts in the face of weather extremes
Secure	Subject to supply shocks (availability, cost); cyberattacks
Clean	Pollution from emissions, mining; ecosystem and human health concerns
Food & Water	High cost and/or lower food supply; competition for scarce water resources
Local Control	Loss of autonomy; loss of economic opportunity
Minimal Land Use	Interference with other land use priorities and ecosystems
Minimal Material Use	Scarcity of rare minerals; scope and scale of mining; supply chain issues
No CO_2 emissions	Long-term concerns about adverse impacts of climate change

On this list, the key values for the state of Montana seem to be abundance, reliability, security and clean in terms of conventional pollution.[130] In context of this Complaint, it seems we need to add the value of "urgency" of reducing CO_2 emissions to allay the dangers of psychological injuries to the Youth Plaintiffs. We should also add "coal on tribal lands" to allay concerns of the Crow Nation, who is actively seeking to develop the coal resources on their land.[131] The Crow Nation's coal and resource assets are worth an estimated $27 billion, making it among the largest coal owners worldwide. "Resource tribes depend on the development of their resources to create better tomorrows for our children," states Conrad Stewart, director of energy and water for the Crow Nation of Montana.[132] One wonders whether the children of the Crow Nation are suffering psychological injuries from the prospect of continued poverty from being unable to benefit from the natural resources on their land.

Prioritizing and balancing these values and concerns is what the political process is for. Rather than focusing on the single value of CO_2 emissions reductions, wise policy seeks to balance the competing objectives. Focusing only on one goal without due attention to other major goals can result in worsening conditions for all goals.

In considering the energy transition, we need to acknowledge that the world, including Montana, will need much more energy in the future than it is currently consuming. Apart from supporting human development and emergence from poverty, more electricity can help reduce our vulnerability to the weather and climate: air conditioners and cleaners, water desalination plants, irrigation, vertical farming operations, water pumps, and environmental monitoring systems. Further, abundant electricity is key to innovations in advanced materials, advanced manufacturing, artificial intelligence, blockchain, robotics, photonics, electronics, quantum computing and others that are currently unforeseen or unimagined.

The energy choices are fossil fuels (with carbon capture and removal as needed), renewable energy and nuclear energy. Of these three choices, nuclear has the greatest potential to provide the very large amounts of energy that we will need through the 21st century with minimal impact on the environment. Different countries and locales will use different combinations of these energy sources based upon their climate, local resources, power needs, and sociopolitical preferences.

3.3.3 Managing Transition Risk: Electric Power Systems

The tightly integrated system of systems that provides the backbone for advanced economies—power, transport, telecommunications, health services, logistics, payments, emergency services, public information—all depend on electricity. The rapid transition of electric power systems away from fossil fuels to meet net-zero emissions targets is introducing substantial new risks to electric power systems. A transition of the electric power system that produces reduced amounts of electricity, less reliable electricity and/or more expensive electricity to achieve net-zero goals would be a tourniquet that restricts the lifeblood of modern society, hampering development and thwarting sustainability efforts.

The Russian war on Ukraine provides a stark conflict between net-zero emissions goals versus immediate needs for abundant, reliable and secure energy. The dangers from inadequate, unreliable and insecure electricity supply are well known and becoming increasingly apparent as European and other countries struggle with inadequate natural gas supplies that they had been receiving from Russia. By contrast, the dangers from CO_2 emissions are much more uncertain, with a long time horizon and a far weaker knowledge base. The debate is then between imposition of certain, intolerable risks from the rapid transition away from fossil fuels, versus the highly uncertain long-term, future impacts from climate change.

This conflict can be resolved by relaxing the time horizon for the 21st century energy transition (including reducing CO_2 emissions) and maintaining energy abundance, reliability and security through the energy transition. Yes, CO_2 emissions are a problem and should be reduced, but not as an urgent problem that trumps the need for abundant, reliable and secure sources of energy for the global population or the population of Montana.

The low feasibility and high costs of reaching net-zero emissions targets by 2050 while maintaining energy security and reliability are at the heart of the debate over allowing near-term net-zero targets to dominate future energy systems. Attempts to speed up the transition away from fossil fuels by restricting the production of fossil fuels and new generating plants has backfired, with increasing power shortages during extreme weather and by making many countries reliant on Russia's fossil fuels.

The long time horizons of the transition and uncertainties about both the technologies that will be available and future climate impacts are best handled by adaptive risk management. Adaptive risk management includes learning from trial and error and incorporating changes in the technologies and knowledge base over time.[133]

The 21st century energy transition can be facilitated with minimal regrets by:

- Accepting that the world will continue to need and desire much more energy.
- Accepting that we will need more fossil fuels in the near term to maintain energy security and reliability and to facilitate the transition in terms of developing and implementing new, cleaner technologies.
- Continuing to develop and test a range of options for energy production, transmission and other technologies that address goals of lessening the environmental impact of energy production, CO_2 emissions and other societal values (Table 3.1).

- Using the next two to three decades as a learning period with new technologies, experimentation and intelligent trial and error, without the restrictions of near-term targets for CO_2 emissions.

In the near term, laying the foundation for abundant, secure, inexpensive and clean electricity is substantially more important than trying to stamp out fossil fuel use. A practical and humane transition focuses on developing and deploying new sources of clean energy. A practical and humane transition does not focus on eliminating electricity from fossil fuels, since we will need much more energy to support the materials required for renewable energy and battery storage and building nuclear power plants, as well as to support electric vehicles and heat pumps.

Coal production in the U.S. declined by one third between 2000 and 2019.[134] However, since 2021 coal production has risen sharply to meet surging global coal demand.[135] Coal's current demand is largely driven by the shortages and high prices of natural gas.[136] The EIA says the increase in coal generation is unlikely to continue in the long term due to continued power plant retirements and competition from other generation alternatives like natural gas.[137] The long-term future of U.S. coal production (including Montana's) and global demand will depend on geopolitics, macroeconomics and technology developments.

The push for weather-based renewable energy (wind, solar, hydro) such as Mark Jacobson's proposal seems somewhat ironic. One of the main motivations for transitioning away from fossil fuels is to avoid the extreme weather that is alleged to be associated with increasing CO_2 levels. So why subject our energy supply to the vagaries of water droughts and wind droughts, icing and forest fires?

4. Role of Montana in mitigating climate change

A central tenet of the Complaint is apparent in this paragraph:

> "Importantly, there can be prompt redress for Youth Plaintiffs' psychological injuries with declaratory and/or injunctive relief. If the Court granted declaratory relief, it would help redress Youth Plaintiffs psychological injuries by making it clear that their fears were understood by the judiciary and by restoring their confidence that there is recourse for government conduct that violates their constitutional rights–it would give them hope and restore their confidence in their government. Injunctive relief would also provide redress for Youth Plaintiffs psychological injuries because they would then know that their government was taking meaningful action to respond to the dangers posed by the climate crisis."[138]

Apart from the issues described in earlier sections of this report, this paragraph reflects three mistaken assumptions:

- Global reductions in fossil fuel emissions will meaningfully influence Montana's climate on the time scale of the 21st century.
- Reduction of emissions from Montana would result in a meaningful fraction of global emissions.
- The two Montana laws challenged by the Plaintiffs meaningfully contribute to Montana's climate change.

With regards to Montana's CO_2 emissions, based on 2019 estimates Montana produces 0.63% of U.S. emissions and 0.09% of global emissions.[139] [140] CO_2 is a well-mixed gas in the atmosphere, and local CO_2 emissions do not influence the local climate. The premise behind the UN treaties and agreements on climate change is that reducing global emissions is required to stabilize the global climate, with the implicit assumption that reducing CO_2 emissions will rapidly decrease atmospheric CO_2 and improve regional climates. Reducing 0.09% of global emissions will not make a meaningful difference in atmospheric CO_2 or improve Montana's climate.

The Plaintiffs seem to assume that the two laws they challenge are responsible for a significant percentage of Montana's GHG emissions. Even if this were the case, it would not make any noticeable difference in the global amount of atmospheric CO_2 or in Montana's climate. Simply put, Montana is powerless on its own to influence the global or its local climate.

It is a substantial scientific challenge to understand how atmospheric CO_2 will evolve in response to emissions reductions, and how the fast and slow elements of the climate system will respond. The vagaries of the carbon cycle, in combination with natural climate variability, makes it difficult to identify a measurable change in the evolution of global warming in response to emissions reduction. Inertia in the ocean and ice sheets along with natural internal variability of the climate system will delay the emergence of a discernible response of the climate in the 21st century even to strong CO_2 emissions reductions.[141]

Even with large reductions in carbon emissions, a corresponding significant shift in surface temperature evolution is not anticipated until decades later.[142] It is unclear how the climate will evolve after net-zero emissions is achieved. To address this issue, the Zero Emissions Commitment Model Intercomparison Project (ZECMIP) used multiple Earth System Models to investigate how the climate system including the carbon cycle will respond 50 years after an immediate cessation of CO_2 emissions.[143] The models exhibit a wide variety of behaviors, with some models continuing to warm for decades to millennia while others cool. Carbon uptake by both the ocean and the terrestrial biosphere is shown to be important in counteracting the warming effect created by reduction in ocean heat uptake anticipated decades after emissions cease. This response is difficult to constrain primarily given the high uncertainty in the effectiveness of ocean carbon uptake.[144]

The bottom line is that there is substantial inertia in the global carbon cycle and the climate system. Even if emissions are successfully reduced/eliminated, it takes time for the CO_2 concentration in the atmosphere to respond to the emissions reduction and it takes time for the climate to respond to the change in atmospheric CO_2 concentration. There is substantial uncertainty regarding how much time this will take – we may not see much of a beneficial change to the climate before the 22nd century even if emissions are successfully eliminated, particularly against the background of large natural climate variability.

Climate change is an ongoing predicament.[145] Even if CO_2 and other GHG emissions are eliminated, natural climate variability and inevitable surprises will provide ongoing challenges that require continuing adaptation by communities and states. The 21st century energy transition will be driven by politics, economics and technological developments, with each state and community responding in a different way that best balances their values and perceived risks and opportunities.

5. Conclusion

Climate change and its interactions with humans and their societies are exceedingly complex issues. The misidentification of climate change as a "crisis" and the ensuing precautionary mandate to rapidly eliminate the use of fossil fuels is creating new risks associated with an energy supply that is not adequate for Montana's cold winter temperatures.

Our hubristic aspirations for control fail to acknowledge the wickedness and systemic aspects of the climate change problem and its proposed solutions. We can seek to lower our emissions, but we should not pretend that we are controlling the climate.[146]

This Complaint reflects an unfortunate cycle of:

- Psychological injuries of the Youth Plaintiffs associated with unjustified apocalyptic rhetoric about climate change targeted at children and young adults.
- The rhetoric in the media and political motivations that blames these adverse weather events and environmental changes on fossil fuel companies and government inaction.
- Further validation of the Youth Plaintiffs' concerns and psychological distress through this Complaint, which is largely driven by the adults in these childrens' lives (particularly for the 2-year old Plaintiffs).
- Demands that are being made of the Defendants that would have no material impact on the weather and climate of Montana, but that would allegedly lessen the anxiety and psychological injuries being suffered by the Youth Plaintiffs that have been triggered by unjustified apocalyptic rhetoric about climate change.

The Plaintiffs challenge two laws: the codified "State Energy Policy" and a 2011 amendment to the Montana Environmental Policy Act (MEPA) that cabins environmental review to intra-Montana impacts. It is my understanding of the Complaint that the only relief available to Plaintiffs moving forward is an order from the court declaring these two statutes unconstitutional and enjoining them.

Based on the evidence presented in this report, the Plaintiffs' challenge of these two laws is based on the following mistaken assumptions and assertions:

- *Plaintiffs:* the release of greenhouse gases from fossil fuel emissions into the atmosphere is already triggering a host of adverse consequences in Montana. *Section 1 of this Report* demonstrates that the climate-related concerns observed by the Plaintiffs are well within the range of historical natural weather and climate variability, with worse occurrences of weather and climate extremes observed during the early 20th century.

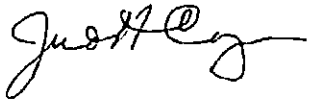
- *Plaintiffs:* the future threats posed by fossil fuels and the climate crisis are existential. *Section 2 of this Report* demonstrates that the Plaintiffs' concerns about climate change in the 21st century are greatly exaggerated, and not consistent with the most recent assessment reports and research publications.

- *Plaintiffs:* Montana's fossil-fuel based emissions are causing harm to Montana and the world. *Section 4 of this Report* demonstrates that emissions from fossil fuels generated in Montana provide a miniscule contribution to global greenhouse gas emissions and do not influence directly Montana's weather and climate.

- *Plaintiffs:* to avoid the alleged existential threat of climate change, Montana's energy system should transition to a portfolio of 100% renewable energy by 2050. *Section 3 of this Report* demonstrates that Montana's energy mix already has a larger than average share of renewables relative to other states in the U.S., and that a rapid transition to 100% renewable energy on the timescale of 2030 or 2050 risks substantial adverse impacts on the reliability and security of Montana's energy supply.

Elimination of the two laws challenged by the Plaintiffs would have essentially no impact on the climate of Montana, even if their elimination in fact acted to reduce Montana's emissions.

Signed this 27th day of October, 2022 in Reno, Nevada



Judith Curry

APPENDIX A

JUDITH A. CURRY

GENERAL INFORMATION

Education

1982	Ph.D.	The University of Chicago, Geophysical Sciences
1974	B.S. cum laude	Northern Illinois University, Geography

Professional Experience

2016-present	Professor Emerita, School of Earth and Atmospheric Sciences Georgia Institute of Technology
2006-present	President, Climate Forecast Applications Network, LLC
2002-2016	Professor, School of Earth and Atmospheric Sciences Georgia Institute of Technology
2002-2014	Chair, School of Earth and Atmospheric Sciences Georgia Institute of Technology
1992-2002	Professor, University of Colorado-Boulder Department of Aerospace Engineering Sciences Program in Atmospheric and Oceanic Sciences Environmental Studies Program
1989-1992	Associate Professor, Department of Meteorology, Penn State
1986-1989	Assistant Professor, Dept of Earth and Atmospheric Sciences, Purdue University
1982-1986	Assistant Scientist, Dept of Meteorology, University of Wisconsin-Madison

Awards/Honors

2017	Top 50 Women in STEM – Best Schools
2011	Graetzinger Moving School Forward Award, Georgia Tech
2007	Fellow, American Association for the Advancement of Science
2006	Best Faculty Paper Award, Georgia Tech Sigma Xi
2004	Fellow, American Geophysical Union
2002	NASA Group Achievement Award for CAMEX-4
2002	Green Faculty Award, University of Colorado
1997	Elected Councilor, American Meteorological Society
1995	Fellow, American Meteorological Society
1992	Henry G. Houghton Award, the American Meteorological Society
1988	Presidential Young Investigator Award, the National Science Foundation

Professional Activities (since 2000)

World Meteorological Organization / International Council of Scientific Unions / International Ocean Commission / World Climate Research Programme

- Global Energy and Water Experiment (GEWEX) Radiation Panel (1994-2004)
- GEWEX Cloud System Studies (GCSS) Science Steering Group (1998-2004)
- Chair, GCSS Working Group on Polar Clouds (1998-2004)
- Chair, GEWEX Radiation Panel SEAFLUX Project (1999-2004)
- Steering Committee, IGAC/SOLAS Air-Ice Chemical Interactions (2003-2006)
- Science Steering Group, Arctic Climate System (ACSYS) Programme (1994-2000)

National Research Council – National Academies

- Space Studies Board (2004-2007)
- Climate Research Committee (2003-2006)
- Panel: A Strategy to Mitigate the Impact of Sensor Descopes and De-manifests on the NPOESS and GOES-R Spacecraft (2007-2008)
- Committee to review CCSP SAP 1.1 Temperature Trends in the Lower Atmosphere: Steps for Understanding and Reconciling Differences (2007)

U.S. Federal Agencies

- DOE Biological & Environmental Research Advisory Committee (BERAC) (2012-2015)
- Earth Science Subcommittee, NASA Advisory Council (2009-2013)
- Search Committee, NSF Director for Geoscience (2007)
- External Advisory Board, NCAR Atmospheric Technology Division (2004-2006)
- Science Board, DOE ARM Climate Reference Facility, (2008-2011)
- External Review Committee, COSIM Program, Los Alamos National Laboratory (2007)
- NOAA Climate Working Group (2004-2009)

Professional Societies

- Executive Committee, American Physical Society Topical Group on Physics of Climate (2013-2016)
- Member, Fellows Committee, American Geophysical Union (2013-2014)
- Executive Committee of the Council, American Meteorological Society (1998-2000)
- Councilor, American Meteorological Society (1997-2000)

RESEARCH

Books

Curry, J.A, 2023: *Climate Uncertainty and Risk*, Anthem Press, 250 pp, in press.

Khvorostyanov, V.I. and J.A. Curry, 2014: *Kinetics and Thermodynamics of Clouds and Precipitation. Cambridge University Press*, Cambridge University, 762 pp

Curry, J.A. and P.J. Webster, 1999: *Thermodynamics of Atmospheres and Oceans.* Academic Press, London, 467 pp (second edition under contract).

Holton, J.P., J.A. Curry, and J. Doyle, eds., 2003: *Encyclopedia of Atmospheric Sciences.* Academic Press, London, 6244 pp.

Refereed Journal Publications

1. Curry, J.A., 1983: On the formation of continental Polar air. *J. Atmos. Sci.,* 40, 2278-2292.
2. Herman, G.F. and J.A. Curry, 1984: Observational and theoretical studies of solar radiation in Arctic stratus clouds. *J. Clim. Appl. Met.,* 23, 5-24.
3. Curry, J.A. and G. F. Herman, 1985: Infrared radiative properties of Arctic stratus clouds. *J. Clim. Appl. Met.,* 24, 525-538.
4. Curry, J.A. and G.F. Herman, 1985: Relationships between large-scale heat and moisture budgets and the occurrence of Arctic stratus clouds. *Mon. Wea. Rev.,* 113, 1441-1457.
5. Curry, J.A., 1986: Interactions among turbulence, radiation and microphysics in Arctic stratus clouds. *J. Atmos. Sci.,* 43, 90-106.
6. Curry, J.A., 1986: Reply to comments on "Interactions between turbulence, radiation and microphysics in Arctic stratus clouds." *J. Atmos. Sci.,* 43, 2753-2755.
7. Curry, J.A., 1987: The contribution of radiative cooling to the formation of cold-core anticyclones. *J. Atmos. Sci.,* 44, 2575-2592.
8. Curry, J.A., E.E. Ebert, and G.F. Herman, 1988: Mean and turbulence structure of the summertime Arctic cloudy boundary layer. *Quart. J. Roy. Met. Soc.,* 114, 715-746.
9. Curry, J.A., 1988: Arctic cloudiness in spring from satellite imagery: some comments. J. Climatol., 8, 543-549.
10. Curry, J.A. and C.-H. Moeng, 1989: Role of cloud-top radiative cooling in the production of turbulence kinetic energy. *IRS'88: Current Problems in Atmospheric Radiation,* 60-63.
11. Curry, J.A., F.G. Meyer and E.E. Ebert, 1989: Cloudless ice-crystal precipitation in the polar regions. *IRS '88: Current Problems in Atmospheric Radiation,* 80-83.
12. Tian, L. and J.A. Curry, 1989: Cloud overlap statistics. *J. Geophys. Res.,* 94, 9925-9935.
13. Curry, J.A. and E.E. Ebert, 1990: Sensitivity of the thickness of Arctic sea ice to the optical properties of clouds. *Ann. Glaciol.,* 14, 43-46.
14. Curry, J.A., F.G. Meyer, L.F. Radke, C.A. Brock, E.E. Ebert, 1990: The occurrence and characteristics of lower tropospheric ice crystals in the Arctic. *Int. J. Climatol.,* 10, 749-764.
15. Curry, J.A., C.D. Ardeel, and L. Tian, 1990: Liquid water content and precipitation characteristics of stratiform clouds as inferred from satellite microwave measurements. *J. Geophys. Res.,* 95, 16659-16671.
16. Meyer, F.G., J.A. Curry, C.A. Brock and L.F. Radke, 1991: Springtime visibility in the Arctic. *J. Appl. Meteor.,* 30, 342-357.
17. Ebert, E.E. and J.A. Curry, 1992: A parameterization of cirrus cloud optical properties for climate models. *J. Geophys. Res.,* 97, 3831-3836.
18. Sheu, R-.S. and J.A. Curry, 1992: Interactions between North Atlantic clouds and the large- scale environment. *Mon. Wea. Rev.,* 120, 261-278.
19. Curry, J.A. and G. Liu, 1992: Assessment of aircraft icing potential using satellite data. *J. Appl. Meteor.,* 31, 605-621.
20. Curry, J.A. and E.E. Ebert, 1992: Annual cycle of radiative fluxes over the Arctic Ocean: Sensitivity to cloud optical properties. *J. Climate,* 5, 1267-1280.
21. Liu, G. and J.A. Curry, 1992: Retrieval of precipitation from satellite microwave measurements using both emission and scattering. *J. Geophys. Res.,* 97, 9959-9974.
22. Ebert, E. and J.A. Curry, 1993: An intermediate one-dimensional thermodynamic sea ice model for investigating ice-atmosphere interactions. *J. Geophys. Res.,* 98, 10085-10109.
23. Tan, Y.C. and J.A. Curry, 1993: A diagnostic study of the evolution of an intense North American anticyclone during winter 1989. *Mon. Wea. Rev.,* 121, 961-975.
24. Liu, G. and J.A. Curry, 1993: Determination of characteristics of cloud liquid water from satellite microwave measurements. *J. Geophys. Res.,* 98, 5069-5092.
25. Wilson, L.D., J.A. Curry, and T.P. Ackerman, 1993: On the satellite retrieval of lower tropospheric ice crystal clouds in the polar regions. *J. Climate,* 6, 1467-1472.

26. Curry, J.A., J. Schramm and E.E. Ebert, 1993: Impact of clouds on the surface radiation budget of the Arctic Ocean. *Meteor. and Atmos. Phys,* 57, 197-217.
27. Curry, J.A. and L.F. Radke, 1993: Possible role of ice crystals in ozone destruction of the lower Arctic atmosphere. *Atmos. Environ.,* 27, 2873-2879.
28. Curry, J.A. et al., 1994: New Program to Research Issues of Global Climate in the Arctic. *EOS,* 75, 249-252.
29. Liu, G., J.A. Curry and M. Weadon, 1994: Atmospheric water balance in Typhoon Nina as determined from SSM/I satellite data. *Meteor. Atmos. Phys.* 54, 141-156.
30. Curry, J.A., J. Schramm and E. E. Ebert, 1995: On the sea ice albedo climate feedback mechanism. *J. Climate,* 8, 240-247.
31. Curry, J.A., 1995: Interactions Among Aerosols, Clouds and Climate of the Arctic Ocean. *The Science of the Total Environment,* 160/161, 777-791.
32. Liu, G., J.A. Curry, and C.A. Clayson, 1995: Study of tropical cyclogenesis using satellite data. *Meteor. Atmos. Phys.,* 56, 111-123.
33. Pinto, J.O., J.A. Curry and K.L. McInnes, 1995: Atmospheric convective plumes emanating from leads. Part I: Thermodynamic structure. *J. Geophys. Res.,* 100, 4621-4632.
34. Pinto, J.O. and J.A. Curry, 1995: Atmospheric convective plumes emanating from leads. Part II: Cloud microphysical and radiative properties. *J. Geophys. Res.,* 100, 4633-642.
35. Alam, A. and J.A. Curry, 1995: Lead-induced atmospheric circulations. *J. Geophys. Res.,* 100, 4643-4652.
36. McInnes, K.L. and J.A. Curry, 1995: Modelling the mean and turbulent structure of the summertime Arctic cloudy boundary layer. *Bound. Lay. Meteor.,* 73, 125-143.
37. Liu, G., J.A. Curry, and R.S. Sheu, 1995: Classification of clouds over the western equatorial Pacific Ocean using combined infrared and microwave satellite data. *J. Geophys. Res.,* 100, 13,811-13,826.
38. Curry, J.A., J.L. Schramm, MC. Serreze, and E.E. Ebert, 1995: Water vapor feedback over the Arctic Ocean. *J. Geophys. Res.,* 100, 14,223-14,229.
39. Ebert, E.E., J.L. Schramm, and J.A. Curry, 1995: Disposition of shortwave radiation in sea ice. *J. Geophys. Res.,* 100, 15965-15976.
40. Curry, J.A., D. Randall, and W.B. Rossow, and J.L. Schramm, 1996: Overview of arctic cloud and radiation characteristics. *J. Clim.,* 9, 1731-1764.
41. Webster, P.J., C.A. Clayson, and J.A. Curry, 1996: Clouds, radiation, and the diurnal cycle of sea surface temperature in the tropical western Pacific. *J. Clim.,* 9, 1712-1730.
42. Considine, G. and J.A. Curry, 1996: A statistical model of drop size spectra for stratocumulus clouds. *Quart. J. Roy. Meteor. Soc.,* 122, 611-634.
43. Sheu, R.-S., J. A. Curry, and G. Liu, 1996: Satellite retrieval of tropical rainfall using ISCCP analyses and microwave measurements. *J. Geophys. Res.,* 101, 21291-21301.
44. Liu, G., J.A. Curry, 1996: Large-scale cloud features during winter in the north Atlantic Ocean determined from SSM/I and SSM/T2 observations. *J. Geophys. Res.,* 101, 7019-7032.
45. Clayson, C.A. and J.A. Curry, 1996: Determination of surface turbulent fluxes for TOGA COARE: Comparison of satellite retrievals and in situ measurements. *J. Geophys. Res.,* 101, 28,503-28,513.
46. Clayson, C.A., C.W. Fairall, and J.A. Curry, 1996: Evaluation of turbulent fluxes at the ocean surface using surface renewal theory. *J. Geophys. Res.*, 101, 28,515-28,528.
47. Sheu, R.-S., J.A. Curry, and G. Liu, 1997: Vertical Stratification of Tropical Cloud Properties as Determined from Satellite. *J. Geophys. Res.,* 102, 4231-4246.
48. Duane, G. and J.A. Curry, 1997: Entropy of a convecting water-air system and the interpretation of cloud morphogenesis. *Quart. J. Roy. Meteorol. Soc.,* 123, 605-629
49. Schramm, J.L., M. Holland, J.A. Curry, and E.E. Ebert, 1997: Modeling the thermodynamics of a distribution of sea ice thicknesses. Part I: Sensitivity to ice thickness resolution. *J. Geophys. Res.,* 102, 23079-23092.

50. Holland, M., J.A. Curry, J.L. Schramm, 1997: Modeling the thermodynamics of distribution of sea ice thicknesses. Part II: Ice/ocean interactions. *J. Geophys. Res.*, 102, 23093-23108.
51. Pinto, J.O., J.A. Curry, and C.W. Fairall, 1997: Radiative characteristics of the Arctic atmosphere during spring as inferred from ground-based measurements. *J. Geophys. Res.*, 102, 6941-6952.
52. Liu, G. and J.A. Curry, 1997: Precipitation characteristics in the GIN Seas determined using satellite microwave data. *J. Geophys. Res.*, 102, 13987-13998.
53. Curry, J.A., J.O. Pinto, T. Benner, and M. Tschudi, 1997: Evolution of the cloudy boundary layer during the autumnal freezing of the Beaufort Sea. *J. Geophys. Res.*, 102, 13851-13860.
54. Pinto, J.O. and J.A. Curry, 1997: Role of radiative transfer in the modeled mesoscale development of summertime arctic stratus. *J. Geophys. Res.*, 102, 13861-13872.
55. Alam, A. and J.A. Curry, 1997: Determination of surface turbulent fluxes over leads in arctic sea ice. *J. Geophys. Res.*, 102, 3331-3344.
56. Considine, G., J.A. Curry, and B.A. Wielicki, 1997: Modeling cloud fraction and horizontal variability in boundary layer clouds. *J. Geophys. Res.*, 102, 13
57. Schramm, J.L., M.M. Holland, and J.A. Curry, 1997: Applications of a single-column ice/ocean model understanding the mass balance of sea ice and snow in the Central Arctic. *Ann. Glaciol.*, 25, 287-291.
58. Holland, M.M., J.L. Schramm, and J.A. Curry, 1997: *Thermodynamic feedback processes in a single-column sea ice/ocean model. Ann.* Glaciol., 25, 327-332.
59. Arbetter, T., J.A. Curry, M.M. Holland, and J. M. Maslanik, 1997: Response of sea ice models to perturbations in surface heat flux. *Ann. Glaciol.*, 25, 193-197.
60. Tschudi, M., J.A. Curry, and J.M. Maslanik, 1997: Determination of areal surface feature coverage in the Beaufort Sea using aircraft video data. *Ann. Glaciol.*, 25, 434-438.
61. Considine, G. and J.A. Curry, 1998: Role of entrainment and droplet sedimentation on the microphysical structure in stratus and stratocumulus clouds. *Quart. J. Roy. Meteorol. Soc.*, 24, 123-150.
62. Randall, D., J. A. Curry, et al., 1998: Outlook for Large-Scale Modelling of Atmosphere Ice-Ocean Interactions in the Arctic. *Bull. Amer. Meteor. Soc.*, 70, 197-219.
63. Liu, G. and J.A. Curry, 1998: Remote sensing of ice water characteristics in tropical clouds using aircraft microwave measurements. *J. Appl. Meteor.*, 37, 337-355.
64. Liu, G. and J .A. Curry, 1998: An investigation of the relationship between emission and scattering signals in SSM/I data. *J. Atmos. Sci.*, 55, 1628-1643.
65. Alam, A. and J.A. Curry, 1998: Evolution of new ice and turbulent fluxes from freezing Arctic leads. *J. Geophys. Res.*, 103, 15,783-15,802.
66. Benner, T.C. and J.A. Curry, 1998: Characteristics of small tropical cumulus clouds and their impact on the environment. *J. Geophys. Res.*, 103, 28753-28768.
67. Webster, P.J. and J.A. Curry, 1998: The Oceans and Weather. *Scien. Amer.*, 9, 38-43.
68. Stamnes, K., Ellingson, R.G., J.A. Curry, J.E. Walsh, and B. D. Zak, 1999: Review of science issues and deployment strategies for the North Slope of Alaska/Adjacent Arctic Ocean (NSA/AAO) ARM site. *J. Climate,* 12, 46-63.
69. Pinto, J.O., J.A. Curry, and A.H. Lynch, 1999: Modeling clouds and radiation for the November 1997 period of SHEBA using a column climate model. *J. Geophys. Res.*, 104, 6661-6678.
70. Liu, G. and J.A. Curry, 1999: Tropical ice water amount and its relations to other atmospheric hydrological parameters as inferred from satellite data *J. Appl. Meteor.*, 38, 1182-1194.
71. Khvorostyanov, V.I., and J.A. Curry, 1999: A simple analytical model of aerosol properties with account for hygroscopic growth. Part I: Equilibrium size spectra and CCN activity spectra. *J. Geophys. Res.*, 104, 2163-2174.
72. Khvorostyanov, V.I., and J.A. Curry, 1999: A simple analytical model of aerosol properties with account for hygroscopic growth. Part II: Scattering and absorption coefficients. *J. Geophys. Res.*, 104, 2175-2184.

73. Perovich, D. K., E.L. Andreas, J.A. Curry, et al., 1999: Year on ice gives climate insights. *EOS,* 80, 481.
74. Khvorostyanov, V.I. and J.A. Curry, 1999: Theory of Stochastic Condensation in Clouds. Part I: A General Kinetic Equation. *J. Atmos. Sci,* 56, 3985-3996.
75. Khvorostyanov, V.I. and J.A. Curry, 1999: Theory of Stochastic Condensation in Clouds. Part II: Analytical Solutions of the Gamma-Distribution Type. *J. Atmos. Sci,* 56, 3997-4013.
76. Arbetter, T.E., J.A. Curry, and J.A. Maslanik, 1999: On the effects of rheology and ice thickness distribution in a dynamic-thermodynamic sea ice model. *J. Phys. Oceanog.,* 29, 2656-2670
77. Holland, M.M. and J.A. Curry, 1999: The role of different physical process in determining the interdecadal variability of Arctic sea ice. *J. Climate,* 12, 3319-3330.
78. Curry, J.A. et al., 1999: High-resolution satellite-derived dataset of the ocean surface fluxes of heat, freshwater and momentum for the TOGA COARE IOP. *Bull. Amer. Meteorol. Soc.,* 80, 2059-2080.
79. Kosovic, B., and J.A. Curry, 2000: A quasi steady state of a stable stratified atmospheric boundary layer: a large-eddy simulation study. *J. Atmos. Sci.,* 57, 1052-1068.
80. Jiang, H. W.R. Cotton, J.O. Pinto, J.A. Curry, and M.J. Weissbluth, 2000: Sensitivity of mixed-phase Arctic stratocumulus to ice forming nuclei and large-scale heat and moisture advection. *J. Atmos. Sci.,* 57, 2105-2117..
81. Liu, G. and J.A. Curry, 2000: Determination of ice water path and mass median particle size using multichannel microwave measurements. *J. Appl. Meteor.,* 39, 1318-1329.
82. Schramm, J.L., G. M. Flato, and J.A. Curry, 2000: Towards the modeling of enhanced basal melting in ridge keels. *J. Geophys. Res.,* 105, 14081-14092.
83. Khvorostyanov, V.I. and J.A. Curry, 2000: A New Theory of Heterogeneous Ice Nucleation for Application in Cloud and Climate Models. *Geophys. Res. Lett.,* 27 , 4081-408 4.
84. Curry, J.A., J.L. Schramm, D. Perovich, and J.O. Pinto, 2001: Application of SHEBA/FIRE data to evaluation of sea ice surface albedo parameterizations. *J. Geophys. Res.,* 106, 15345-15356.
85. Pinto, J.O., J.A. Curry, and J. Intrieri, 2001: Cloud-aerosol interactions during autumn over the Beaufort Sea. *J. Geophys. Res.,* 106, 15077-15098.
86. Haggerty, J.A., and J.A. Curry, 2001: Microwave emissivity of sea ice estimated from aircraft measurements during FIRE-SHEBA. *J. Geophys. Res.,* 106, 15265-15278.
87. Tschudi, M., J.A. Curry, and J.M. Maslanik, 2001: Airborne observations of summertime surface features and their effect on surface albedo during SHEBA. *J. Geophys. Res.,* 106, 15335-15344.
88. Benner, T., J.A. Curry, and J.O. Pinto, 2001: Radiative transfer in the summertime Arctic. *J. Geophys. Res.,* 106, 15173-15184.
89. Girard, E. and J.A. Curry, 2001: Simulation of arctic low-level clouds observed during the FIRE Arctic Clouds Experiment using a new bulk microphysics scheme. *J. Geophys. Res.,* 106, 15139-15154.
90. Khvorostyanov, V.I., J.A. Curry et al., 2001: Evaluation of an explicit microphysics scheme using observations of an upper-level cloud system observed during FIRE.ACE. *J. Geophys. Res.,* 106, 15099-15112.
91. Curry, J.A., 2001: Introduction to special section: FIRE Arctic Clouds Experiment. *J. Geophys. Res.,* 106, 14985-14989
92. Holland, G.H., P.J. Webster, J.A. Curry, et al., 2001: The Aerosonde robotic aircraft: A new paradigm for environmental observations. *Bull. Amer. Meteorol. Soc,* 82, 889-901.
93. Lin, B., P. Minnis, A. Fan, J.A. Curry, et al., 2001: Comparison of cloud liquid water paths derived from in situ and microwave radiometer data taken during the SHEBA/FIREACE. *Geophys. Res. Lett.,* 28, 975-978
94. Liu, G., J.A. Curry, J.A. Haggerty, and Y. Fu, 2001: Retrieval and Characterization of Cloud Liquid Water Path Using Airborne Passive Microwave Data during INDOEX. *J. Geophys. Res.,* 106, 28,719-28,730.

95. Tschudi, M., J.A. Curry, and J. Maslanik, 2002: Characterization of springtime leads in the Arctic Ocean from airborne observations during FIRE/SHEBA. *J. Geophys. Res.,* 107, art no. 8034
96. Uttal, T., Curry, J.A., and 26 others, 2002: Surface Heat Budget of the Arctic Ocean. *Bull. Amer. Meteor. Soc.,* 83, 255-275.
97. Curry, J.A. and A.H. Lynch, 2002: Comparing Arctic Regional Climate Models. *EOS,* Trans. Amer. Geophys. Union, 83, p 87.
98. Pinto, J.O., A. Alam., J.A. Maslanik, and J.A. Curry, 2003: Characteristics and atmospheric footprint of springtime leads at SHEBA. *J. Geophys. Res.,* 108, art no 8051..
99. Haggerty, J.A., J.A. Maslanik, and J.A. Curry, 2003: Heterogeneity of sea ice surface temperature at SHEBA from aircraft measurements. *J. Geophys. Res.,* 108, art no. 8052.
100. Curry, J.A., J.L. Schramm, A. Alam, R. Reeder, T.E. Arbetter, P. Guest, 2002: Evaluation of data sets used to force sea ice models in the Arctic Ocean. *J. Geophys Res.,* 107, art. no 3102.
101. Haggerty, J.A., J.A. Curry, and G. Liu, 2002: The potential for estimating cloud liquid water path over sea ice from airborne passive microwave measurements. *J. Geophys. Res.,* 107, art. No. 4007.
102. Randall., D., S. Krueger, C. Bretherton, J.A. Curry, et al., 2003: Confronting Models with Data: The GEWEX Cloud System Study. *Bull. Amer. Meteor. Soc.,* 84, 455-469
103. Khvorostyanov, V.I. and J.A. Curry, 2002: Terminal Velocities of Droplets and Crystals: Power Laws with Continuous Parameters Over the Size Spectrum. *J. Atmos. Sci.,* 59. 1872-1884.
104. Khvorostyanov, V.I., J.A. Curry, I. Gultepe, 2003: Simulations and observations of springtime cloud over the Cape Bathurst polynya. *J. Geophys. Res.,* 108 Art. No. 4296
105. Liu, G. and J.A. Curry, 2003: Observation and Interpretation of Microwave "Hot Spots" Over the Arctic Ocean During Winter. *J. Appl. Met.,* 42, 51-64.
106. Liu, G., H. Shao, J.A. Coakley, J.A. Curry, et al., 2003: Retrieval of Cloud Droplet Size from Visible and Microwave Radiometric Measurements during INDOEX: Implication to Aerosols Indirect Radiative Effect. *J. Geophys. Res.,* 108 (D1): art. no. 4006.
107. Morison, H., M. Shupe, J.A. Curry, 2003: Evaluation of a bulk microphysical scheme using SHEBA data. *J. Geophys. Res., 108,* art no. 4225.
108. Brunke, M.A., C.W. Fairall, X. Zeng, L. Eymard, J.A. Curry, 2003: Which bulk aerodynamic algorithms are least problematic in computing ocean surface turbulent fluxes? *J. Clim.,* 15, 619-635.
109. Liu, J.P., J.A. Curry, and D.G. Martinson, 2004: Interpretation of recent Antarctic sea ice variability. *Geophys. Res. Lett.,* 31, Art. No. L02205.
110. Khvorostyanov, V.I., J.A. Curry, 2004: Toward the theory of heterogeneous ice nucleation. Part I: Critical radius, energy and nucleation rate. *J. Atmos. Sci.,* 61, 2676-2691.
111. Curry, J.A., J.M. Maslanik, G.J. Holland, and J.O. Pinto, 2004: Applications of Aerosondes in the Arctic. *Bull. Amer. Meteorol. Soc.,* 85,1855-1861.
112. Agudelo, P.A. and J.A. Curry, 2004: Analysis of spatial distribution in tropospheric temperature trends. *Geophys. Res. Lett.,* 31, Art. No. L222207.
113. Inoue, J. and J.A. Curry, 2004: Application of Aerosondes to high-resolution observations of sea surface temperature over Barrow Canyon. *Geophys. Res. Lett.,* 31, Art. No. L14312.
114. Liu, J.P., J.A. Curry and Y.Y. Hu, 2004: Recent Arctic sea ice variability: connections to the Arctic Oscillation and the ENSO. *Geophys. Res. Lett.,* 31, L09211.
115. Curry, J.A. and 22 others, 2004: SEAFLUX. *Bull. Amer. Meteor. Soc.,* 85, 409-419.
116. Khvorostyanov, V.I. and J.A. Curry, 2004: On the Thermodynamic Theory of Freezing and Melting of Water and its Solutions: *J. Phys. Chem. A,* 108, 11073-11085.
117. Lynch, A.H., J. A. Curry, et al., 2004: Towards an integrated assessment of the impacts of extreme wind events on Barrow. Alaska. *Bull. Amer. Meteorol. Soc.,* 85, 209+
118. Khvorostyanov, V.I. and J.A. Curry, 2005: Toward the theory of heterogeneous ice nucleation. Part II: Parcel model simulations. *J. Atmos. Sci.,* 62, 261-284.
119. Mirocha, J.D., B. Kosovic, J.A. Curry, 2005: Vertical heat transfer in the lower atmosphere over the Arctic Ocean during clear sky periods. *Bound. Layer Meteorol.,* 117, 37-71.

120. Inoue, J., B. Kosovic and J.A. Curry, 2005: Evolution of a storm-driven boundary layer in the Arctic. *Bound. Layer Meteorol.*, 117, 213-230.
121. Morrison, H., J.A. Curry, V.I. Khvorostyanov, 2005: A new double-moment microphysics parameterization. Part 1: Description. *J. Atmos. Sci.*, 62, 1665-1677.
122. Morrison, H. J.A. Curry, et al., 2005: A new double-moment microphysics parameter-ization. Part 2: Application to Arctic stratiform clouds. *J. Atmos. Sci.*, 62, 1678-1693.
123. Liu, J., J.A. Curry, W. B. Rossow, J.R. Key, X. Wang, 2005: Comparison of surface radiative flux data sets over the Arctic Ocean. *J. Geophys. Res.*, 110, Art. No. C02015.
124. Khvorostyanov, V.I., J.A. Curry, 2005: Fall Velocities of Hydrometeors in the Atmosphere: Refinements to a Continuous Quasi - Power Law. *J. Atmos. Sci.*, 62, 4343-4357.
125. Morrison, H., M. Shupe, J.O. Pinto, J.A. Curry, 2005: Possible role roles of ice nucleation mode and ice nuclei depletion in the extended lifetime of arctic mixed phase clouds. *Geophys. Res. Lett.*, 32 (18): Art. No. L18801.
126. Webster, P.J., G.J. Holland, J.A. Curry, H.-R. Chang, 2005: Changes in tropical cyclone number, duration and intensity in a warming environment. *Science.* 309 (5742): 1844-1846
127. Inoue, J., J. Liu and J.A. Curry, 2005: Intercomparison of arctic regional climate models: Modeling clouds and radiation for SHEBA in May 1998. *J. Climate,* 19, 4167-4178.
128. Agudelo, P.A., J.A. Curry, C.D. Hoyos, P.J. Webster, 2006: Transition between suppressed and active phases of ISOs in the Indo-Pacific warm pool. *J. Climate,* 19, 5515-5530.
129. Rinke, A., K. Dethloff, J. Cassano, J.A. Curry, et al., 2006: Evaluation of an Ensemble of Arctic Regional Climate Models: Spatiotemporal Fields during the SHEBA Year. *Climate Dyn.*, 26, 459-472.
130. Khvorostyanov, V.I., H. Morrison, J.A Curry, P. Lawson, D. Baumgardner, 2006: High supersaturation and modes of ice nucleation in thin tropopause cirrus: Simulation of the 13 July 2002 CRYSTAL case. *J. Geophys. Res.*, 111., Art. No. D02201.
131. Curry, J.A., P.J. Webster, and G.J. Holland, 2006: Mixing Politics and Science in Testing the Hypothesis that Greenhouse Warming is Causing an Increase in Hurricane Intensity. *Bull. Amer. Meteorol. Soc.*, 87, 1025-1037.
132. Khvorostyanov, V.I. and J.A. Curry, 2006: Aerosol Size Spectra and CCN Activity Spectra: Reconciling the Lognormal and Power Laws. *J. Geophys. Res.*, 111, Art. D12202.
133. Hoyos, C.D., P.A. Agudelo, P.J. Webster, J.A. Curry, 2006: Deconvolution of the factors contributing to the increase in global hurricane activity. *Science* 312, (5770).
134. Webster, P.J., J.A. Curry, J. Liu, G.J. Holland, 2006: Response to comment on "Changes in tropical cyclone frequency and intensity in a warming environment". *Science,*311 (5768).
135. Liu, J.P. and J.A. Curry, 2006: Variability of the tropical and subtropical ocean surface latent heat flux during 1989-2000. *Geophys. Res. Lett,* 33, Art. No L05706.
136. Inoue J, Liu JP, Pinto JO, et al., 2006: Intercomparison of Arctic Regional Climate Models: Modeling clouds and radiation for SHEBA in May 1998 *J. Climate,* 19, 4167-4178
137. Agudelo PA, Curry JA, Hoyos CD, PJ Wbster, 2e006: Transition between suppressed and active phases of intraseasonal oscillations in the indo-pacific warm pool. *J. Clim.*, 19, 5519-5530
138. Khvorostyanov VI, Curry JA, 2007: Refinements to the Kohler's theory of aerosol equilibrium radii, size spectra, and droplet activation: Effects of humidity and insoluble fraction *J. Geophys. Res.*, 112 (D5): Art. No. D05206
139. Liu JP, Curry JA, Dai YJ, et al., 2007: Causes of the northern high-latitude land surface winter climate change. *Geophys. Res. Lett.*, 34 (14): Art. No. L14702
140. Wyser, K., Jones, CG, . . ., Curry JA et al., 2008: An evaluation of Arctic cloud and radiation processes during the SHEBA year: simulation results from eight Arctic regional climate models. *Climate Dynamics,* 30, 203-223.
141. Inoue, J., Curry JA, Maslanik JA, 2008: Application of Aerosondes to melt pond observations over Arctic sea ice. *J. Atmos. Ocean Tech.*, 25, 237-334.

142. Khvorostyanov, V. I., J. A. Curry, 2008. Analytical solutions to the stochastic kinetic eqn for liquid and ice particle size spectra. Part I: small-size fraction. *J. Atmos. Sci.,* 65, 2025-2043
143. Khvorostyanov, V. I. and J. A. Curry, 2008. Analytical Solutions to the Stochastic Kinetic Equation for Liquid and Ice Particle Size Spectra. Part II: Large-Size Fraction in Precipitating Clouds. *J. Atmos. Sci.,* 65, 2044-2063.
144. Khvorostyanov, V. I. and J. A. Curry, 2008. Kinetics of cloud drop formation and its parameterization for cloud and climate models. *J. Atmos. Sci.,* 65, 2784-2802
145. Morrison, H., J.O. Pinto, J.A. Curry, G.M. McFarquhar, 2008: Sensitivity of M-PACE mixed-phase stratocumulus to cloud condensation and ice nuclei in a mesoscale model with two-moment bulk cloud microphysics. *J. Geophys. Res.,* 113, D05203
146. Agudelo, P.A., C. D. Hoyos, P. J. Webster, J. A. Curry, 2008: Prediction skill of intraseasonal variability of an operational model in a serial extended forecast experiment. *Climate Dynamics*, 32, 855-872.
147. Khvorostyanov, VI and JA Curry, 2009: Critical humidities of homogeneous and heterogeneous ice nucleation: inferences from extended classical nucleation theory. *J. Geophys. Res.,* 114, D04207.
148. Kim, HM, PJ Webster, JA Curry, 2009: Impact of shifting patterns of Pacific Ocean Warming on North Atlantic tropical cyclones. *Science,* 325, 77-80.
149. Khvorostyanov, VI, JA Curry, 2009: Parameterization of cloud drop activation based on analytical asymptotic solutions to the supersaturation equation. *J. Atmos. Sci.,* 66, 1905-1925.
150. Khvorostyanov, VI, JA Curry, 2009: Comment on "Comparisons with analytical solutions from Khvorostyanov and Curry (2007) on the critical droplet radii and supersaturations of CCN with insoluble fractions" by Kokkola et al. (2008). *Atmos. Chem. Phys.,* 9, 6033-6039.
151. Belanger, JI, JA Curry, CD Hoyos, 2009: Variabiity in tornado frequency associated with U.S. landfalling tropical cyclones. *Geophys. Res. Lett.,* 36, L17805.
152. Liu, J. and JA Curry, 2010: Accelerated warming of the Southern Ocean and its impacts on the hydrological cycle and sea ice. *PNAS,* 107, 14987-14992.
153. Sokolik, I.N., J. A. Curry, and V. Radionov, 2010: Interactions of Arctic aerosols with land-cover and land-use changes in Northern Eurasia and their role in the Arctic climate system. In *Arctic land-cover and land-use in a changing climate: Focus on Eurasia,* G.Gutman and A. Reissell (Eds.), Springer.
154. Romanou A, Tselioudis G, Zerefos CS, Curry JA et al. 2010: Evaporation-precipitation variability over the Mediterranean and the Black Seas from satellite and reanalysis estimates. *J. Climate,* 23, 5268-5287.
155. Webster PJ, Jian J, Hopson TM, Hoyos CD, Agudelo PA, Chang HR, Curry JA, Grossman RL, Palmer TN, Subbiah AR, 2010: Extended-range probabilistic forecasts of Ganges and Brahmaputra floods in Bangladesh. *Bull. Amer. Meteorol. Soc.,* 91, 1493-U121.
156. Belanger JI, Curry JA, Webster PJ, 2010: Predictability of North Atlantic Tropical Cyclone Activity on Intraseasonal Time Scales. *Mon. Weather Rev.,* 138, 4362-4374.
157. Liu JP, Curry JA, Zhang ZH, et al. 2011: Evaluation of satellite sea surface temperatures in the southern hemisphere using Chinese Antarctic research cruise observations. *Int. J. Rem. Sens.,* 32, 171-184.
158. Agudelo PA, Hoyos CD, Curry JA, Webster, PJ, 2011: Probabilistic discrimination between large-scale environments of intensifying and decaying African Easterly Waves. *Clim. Dyn,* 36, 1379-1401.
159. Kim HM, Webster PJ, Curry JA, 2011: Modulation of North Pacific Tropical Cyclone Activity by Three Phases of ENSO. *J. Climate,* 24, 1839-1849.
160. Liu, J., Curry JA, Clayson CA, Bourassa, MA 2011: High resolution satellite surface latent heat fluxes in North Atlantic hurricanes. *Mon Weather Rev.,* 139, 2735-2747.
161. Curry, JA 2011: Reasoning about climate uncertainty. *Climatic Change,* 108, 723-732 (invited).
162. Curry, JA and Webster PJ 2011: Climate science and the uncertainty monster. *Bull Amer Meteorol. Soc.,* 92, 1667-1682.

163. Curry, JA 2011: Nullifying the climate null hypothesis. *WIRES Climate Change*, 2, DOI: 10.1002/wcc.141
164. Zhang, H., I. N. Sokolik, and J. A. Curry, 2011: Impact of Saharan dust as nucleating aerosols on Hurricane Helene's early development, *Atmos. Chem. Phys. Disc.*, acp-2011-246, 2011.
164. Liu, J. J.A. Curry et al. 2012: Impact of declining sea ice on Arctic snowfall. *PNAS*, 109, 4074-4079.
166. Choi, S., Wang, Y., . . .Curry, J., et al., 2012: Analysis of satellite-derived Arctic tropospheric BrO columns in conjunction with aircraft measurements during ARCTAS and ARCPAC, *Atmos. Chem. Phys.*, 12, 1255-1285.
167. Curry, JA and VI Khvorostyanov, 2012: Assessments of parameterizations of ice heterogeneous nucleation in cloud and climate models. *Atmos. Phys. Chem.*, 10, 2669–2710
168. Belanger, J. I., P. J. Webster, J. A. Curry, and M. T. Jelinek, 2012: Extended Prediction of North Indian Ocean Tropical Cyclones, *Weather & Forecasting*, 27, 757-769.
169. Kim, H. M., P. J. Webster and J. A. Curry, 2012: Seasonal prediction skill of ECMWF System 4 and NCEP CFSv2 retrospective forecast for the Northern Hemisphere Winter, *Climate Dynamics*, DOI: 10.1007/s00382-012-1364-6.
170. Kim, HM, PJ Webster, JA Curry 2012: Evaluation of short-term climate change predictions in multi-model CMIP5 decadal hindcasts. *Geophys. Res. Lett.*, 39, L10701.
171. Liu, J and JA Curry, 2012: Reply to Li and Wu: Arctic sea ice and winter snowfall. PNAS, 109, E1899-E1900.
172. Young, AH, JJ Bates, JA Curry, 2012: Complementary use of passive and active remote sensing for detecting penetrating convection from CloudSat, CALIPSO, and Aqua MODIS. *J. Geophys Res. – Atmos.*, 117, D13205.
173. Khvorostyanov, VI and JA Curry, 2012: Parameterization of homogeneous ice nucleation for cloud and climate models based on classical nucleation theory. *Atmos. Chem. Phys.*, in press.
174. Hellmuth, O., JA Curry, et al. 2013: Review on the phenomenology of and mechanism of atmospheric ice formation: selected questions of interest. In JWP Schmelzer, G Ropke, VB Priezzhev, eds.: *Nucleation Theory and Its Applications*, JINR Dubna, p 424-543.
175. Liu, J., JA Curry, HJ Wang, JM Horton, MR Song, 2012: Reply to Li and Wu: Arctic sea ice and winter snowfall. PNAS, 109, E1899-E1900.
176. Muller, R., J.A. Curry, et al. 2013: Decadal variations in the global land temperature. *J. Geophys. Res.*, 118, 5280–5286.
177. Wickham, C., R. Rohde, R. Muller, J. Wurtele, J.A. Curry, et al. 2013: Influence of urban heating on the global temperature land average using rural sites identified from MODIS classifications. *Geoinformatics & Geostatistics*, doi:10.4172/gigs.1000104.
178. Rohde, R., R. Muller, R. Jacobsen, S. Perlmutter, A. Rosenfeld, J. Wurtele, D. Groom, J.A. Curry, C. Wickham, 2013: Berkeley Earth Temperature Averaging Process. *Geoinformatics and Geostatistics*, doi:10.4172/gigs.1000103.
179. Muller, R., J. Wurtele, R. Rohde, R. Jacobsen, S. Perlmutter, A. Rosenfeld, JA Curry, et al, 2013: Earth atmosphere land surface temperature and station quality in the United States. *Geoinformatics and Geostatistics*, doi:10.4172/2327-4581.1000107.
180. Curry JA, 2013: Climate change: No consensus on consensus. *CAB Reviews*, 8, 001.
181. Holley, AH, JJ Bates and JA Curry, 2013: Application of cloud vertical structure from CloudSat to investigate MODIS-derived properties of cirriform, anvil, and deep convective clouds. *J. Geophys. Res.*, DOI: 10.1002/jgrd.50306.
182. Wyatt, MG and JA Curry, 2013: Dynamics of the propagation of a secularly varying hemispheric climate signal during the 20th century. *Climate Dynamics*, DOI 10.1007/s00382l-013-1950-2.
183. Liu, J., JA Curry, H. Wang, R. Horton, MR Song, 2014: Reply to Li and Wu: Arctic sea ice and winter snowfall. *PNAS*, 111, E530.
184. Curry JA, 2014: Climate science: Uncertain temperature trends. *Nature Geoscience*, 7, 83-84.

185. Kravtsov, S., MG Wyatt, JA Curry, A Tsonis, 2014: Two contrasting views of multidecadal climate variability in the 20th century. *Geophys. Res. Lett.*, 41, 6881-6888.
186. Lewis, N. and JA Curry, 2015: The implications for climate sensitivity of AR5 forcing and heat uptake estimates. *Climate Dynamics,* DOI 10.1007/s00382-2342-y.
187. Kravtsov, S., M.G. Wyatt, J.A. Curry, A.A. Tsonis, 2015: Comment on 'Atlantic and Pacific multidecadal oscillations and Northern Hemisphere Temperatures.' *Science*, 350 DOI: 10.1126/science.aab3570
188. Belanger, J.I., J.A. Curry, M.T. Jelinek, 2016: A climatology of easterly waves in the tropical Western Hemisphere. *Geoscience Data Journal*
189. Lewis, N. and JA Curry, 2018: The impact of recent forcing and ocean heat uptake data on estimates of climate sensitivity. *Journal of Climate*, 31, 6051-6071
190. Curry, JA 2018: Climate uncertainty and risk. *CLIVAR Variations*
191. Lewis, N. and JA Curry, 2020: Reply to Comment on: The impact of recent forcing and ocean heat uptake data on estimates of climate sensitivity. *Journal of Climate*, 33, 397-404.

Congressional Testimony

- Testimony, House Commit ee on Oversight and Reform, "Recovery, resilience and readiness – contending with natur al disaster in the wake of climate change 6/12/19 hps ://judithcurr y.com/wp-content/uploads/2019/06/testimony-overs ight-and-reform-2019-v2.pdf
- Testimony, House Commit ee on Natur al Resources, "Climate change – the impacts and the need to act," 2/6/19 hp s ://judithcurr y.com/wp-content/uploads/2019/02/curr y-testimony-house-natur al-resources.pdf
- Testimony, House Commit ee on Science, Space and Technology, "Using Technology to Address Climate Change," 5/16/18 hp s ://judithcurr y.com/wp-content/uploads/2018/05/curr y-house-science-testimony.pdf
- Testimony, House Commit ee on Science Space and Technology, "Climate Science: Assump tions, Policy Implications and the Scientific Method," 3/29/17 hp s ://curr yja.files.wordp ress.com/2017/03/curr y-house-science-testimony-mar- 17.pdf
- Testimony, Senate Subcommit ee on Space, Science and Competitiveness, "Data or Dogma? Promoting Open Inquiry in the Debate Over the Magnitu de of Human Impact on Climate Change,"12/8/15 hp s ://curr yja.files.wordp ress.com/2015/12/curr y-senate- testimony-2015.pdf
- Testimony, House Commit ee on Science, Space and Technology, "The President's U.N. Climate Pledge," 4/15/15, hp s ://curr yja.files.wordp ress.com/2015/04/house- science-testimony-ap r15-final.pdf
- Testimony, Senate Environment and Public Works, "President's Climate Action Plan," 1/16/14 hp : //www.epw.senate.gov/p ublic/index.cfm?FuseAction=Files.View&FileStore_id=07472bb4-3eeb-42da-a49d-964165860275
- Testimony, Senate Commit ee on Environment and Public Works, "Natur al Resource Adap tation: Protecting Ecosystems and Economies," 10/2/13 hp s ://curr yja.files.wordp ress.com/2020/05/curr y-senatetestimony-2013.pdf
- Testimony, House Subcommit ee on Energy & Environment, "Policy Relevant Climate Issues in Context", 4/26/13 hp : //curr yja.files.wordp ress.com/2013/04/curr y-testimony-2013-il.pdf

- Testimony, House Subcommit ee on Energy & Environment, "Rational Discussion of Climate Change: the Science, the Evidence, the Response," 11/17/10 hp : //curryja.files.wordpress.com/2013/02/curry-epw-testimony.pdf
- Testimony, House Select Commit ee on Energy Independence and Global Warming, "Dangerous Climate Change," 4/26/07 hp : //curryja.files.wordpress.com/2013/02/energy-curry-testimony.pdf
- Testimony, House Reform Commit ee, "Hurricanes and Global Warming," 7/20/06 hp : //curry.eas.gatech.edu/climate/pdf/testimony-curry.pdf

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[1] "State Climate Extremes Committee (SCEC)," State Climate Extremes Committee (SCEC) | National Centers for Environmental Information (NCEI), accessed October 5, 2022, https://www ncei noaa.gov/access/monitoring/scec/records.
[2] R. Frankson et al., 2022, "Montana State Climate Summary 2022. NOAA Technical Report NESDIS 150-MT," Montana - State Climate Summaries 2022 (NOAA/NESDIS, 2022), https://statesummaries ncics.org/chapter/mt/.
[3] "NOAA National Centers for Environmental Information, Climate at a Glance: Statewide Time Series, Precipitation," Climate at a Glance | National Centers for Environmental Information (NCEI) (NOAA/NCEI, September 2022), https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/rankings/24/pcp/193112.
[4] Ibid.
[5] "State Climate Extremes Committee (SCEC)."
[6] "Flooding in Montana," National Weather Service (NOAA/NWS, March 12, 2018), https://www.weather.gov/safety/flood-states-mt.
[7] R. Frankson et al., 2022, "Montana State Climate Summary 2022."
[8] Ibid.
[9] Ibid.
[10] Ibid.
[11] Ibid.
[12] Ibid.
[13] Ibid.
[14] "Statewide Maps - Snow Water Equivalent (% of Normal)," Snow Water Equivalent Data Stations (Montana State Library Services), accessed October 5, 2022, https://mslservices mt.gov/geographic_information/maps/watersupply/statewide/StatewideSWE.aspx.
[15] Gregory T. Pederson et al., "The Unusual Nature of Recent Snowpack Declines in the North American Cordillera," *Science* 333, no. 6040 (June 9, 2011): pp. 332-335, https://doi.org/10.1126/science.1201570.
[16] "Time Series of Glacier Retreat Active," Time Series of Glacier Retreat | U.S. Geological Survey (Northern Rocky Mountain Science Center, May 9, 2017), https://www.usgs.gov/centers/norock/science/time-series-glacier-retreat#overview.
[17] Stephen C. Porter et al., "Late Wisconsin Mountain Glaciation in the Western United States," in *Late-Quaternary Environments of the United States*, ed. H. E. Wright (Minneapolis, MN: University of Minnesota Press, 1983).
[18] Jeffrey S. Munroe et al., "A Lacustrine-Based Neoglacial Record for Glacier National Park, Montana, USA," *Quaternary Science Reviews* 53 (August 11, 2012): pp. 39-54, https://doi.org/10.1016/j.quascirev.2012.08.005.
[19] "Brief History of Glaciers in Glacier National Park Active," Brief History of Glaciers in Glacier National Park | U.S. Geological Survey (Northern Rocky Mountain Science Center, April 6, 2016), https://www.usgs.gov/centers/norock/science/brief-history-glaciers-glacier-national-park.
[20] Charles Apple, "1910 Fire - the Big Burn across Montana and Idaho," Spokesman.com (The Spokesman-Review, January 21, 2020), https://www.spokesman.com/stories/2020/jan/19/1910-fire-big-burn-across-montana-and-idaho/.

[21] "Blazing Battles: The 1910 Fire and Its Legacy," National Forest Foundation, accessed September 28, 2022, https://www nationalforests.org/our-forests/your-national-forests-magazine/blazing-battles-the-1910-fire-and-its-legacy.
[22] "The 1910 Fires," Forest History Society, accessed September 28, 2022, https://foresthistory.org/research-explore/us-forest-service-history/policy-and-law/fire-u-s-forest-service/famous-fires/the-1910-fires/.
[23] "Blazing Battles: The 1910 Fire and Its Legacy."
[24] "Managing Fire," US Forest Service, September 28, 2022, https://www fs.usda.gov/science-technology/fire.
[25] Lauren Sommer, "Let It Burn: The Forest Service Wants to Stop Putting out Some Fires," KQED, November 7, 2016, https://www kqed.org/science/1134217/let-it-burn-the-forest-service-wants-to-stop-putting-out-some-fires.
[26] Scott L Stephens et al., "Fire, Water, and Biodiversity in the Sierra Nevada: A Possible Triple Win," *Environmental Research Communications* 3, no. 8 (August 6, 2021): p. 081004, https://doi.org/10.1088/2515-7620/ac17e2.
[27] S. I. Seneviratne et al., "Weather and Climate Extreme Events in a Changing Climate," in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, CH: Intergovernmental Panel on Climate Change, 2021), 1513-1766.
[28] Held vs. State, ¶¶ 28.
[29] Held vs. State, ¶¶ 32.
[30] Held vs. State, ¶¶ 42.
[31] Held vs. State, ¶¶ 45.
[32] Held vs. State, ¶¶ 51.
[33] Held vs. State, ¶¶ 61.
[34] Held vs. State, ¶¶ 143.
[35] Held vs. State, ¶¶ 7.
[36] Held vs. State, ¶¶ 144.
[37] Held vs. State, ¶¶ 150.
[38] Held vs. State, ¶¶ 152.
[39] V. Eyring et al., "Human Influence on the Climate System," in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, CH: Intergovernmental Panel on Climate Change, 2021), 3-32.
[40] D. Chen et al., "Framing, Context, and Methods Supplementary Material," in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, CH: Intergovernmental Panel on Climate Change, 2021), 147-286."
[41] Zeke Hausfather, "Explainer: The High-Emissions 'RCP8.5' Global Warming Scenario," Carbon Brief, August 21, 2021, https://www.carbonbrief.org/explainer-the-high-emissions-rcp8-5-global-warming-scenario.
[42] IEA, "Global Energy Review: CO2 Emissions in 2021," IEA, March 2022, https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2.
[43] "Race To Zero Campaign," UNFCCC, accessed September 29, 2022, https://unfccc.int/climate-action/race-to-zero-campaign.
[44] IEA, "Net Zero by 2050."
[45] Ibid.
[46] Keywan Riahi et al., "The Shared Socioeconomic Pathways and Their Energy, Land Use, and Greenhouse Gas Emissions Implications: An Overview," *Global Environmental Change* 42 (January 2017): 153-168, https://doi.org/10.1016/j.gloenvcha.2016.05.009s.
[47] IEA, "Net Zero by 2050," IEA, May 2021, https://www.iea.org/reports/net-zero-by-2050.
[48] Roger Pielke Jr et al., "Plausible 2005–2050 Emissions Scenarios Project between 2 °C and 3 °C of Warming by 2100," *Environmental Research Letters* 17, no. 2 (February 11, 2022): 024027, https://doi.org/10.1088/1748-9326/ac4ebf.
[49] D. Reidmiller et al., eds., "Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Volume II," 2018, https://doi.org/10.7930/nca4.2018.
[50] "COP26: Update to the NDC Synthesis Report," UNFCCC, November 4, 2021, https://unfccc.int/news/cop26-update-to-the-ndc-synthesis-report.
[51] Nicholas Lewis, "Objectively Combining Climate Sensitivity Evidence," *Climate Dynamics*, September 19, 2022, https://doi.org/10.1007/s00382-022-06468-x.
[52] Nicola Scafetta, "CMIP6 GCM Ensemble Members versus Global Surface Temperatures," *Climate Dynamics*, September 19, 2022, https://doi.org/10.1007/s00382-022-06493-w.

[53] Judith Curry, *Climate Uncertainty and Risk* (London, UK: Anthem Press, In Press 2023).
[54] Held vs. State, ¶¶ 143.
[55] Held vs. State, ¶¶ 7.
[56]United Nations, "United Nations Framework Convention on Climate Change," (New York: United Nations, General Assembly, 1992), https://unfccc.int/resource/docs/convkp/conveng.pdf.
[57] "UN Official Stresses Need for Renewed Momentum towards Achieving Climate Accord," United Nations (United Nations, June 4, 2015), https://news.un.org/en/story/2015/06/500672.
[58] Carlo C. Jaeger and Julia Jaeger, "Three Views of Two Degrees," *Regional Environmental Change* 11, no. S1 (August 2010): 15-26, https://doi.org/10.1007/s10113-010-0190-9.
[59] Robert H Socolow, "Truths We Must Tell Ourselves to Manage Climate Change," Vanderbilt Law Review (Vanderbilt University Law School, November 2012), https://scholarship.law.vanderbilt.edu/vlr/vol65/iss6/2.
[60] Judith Curry, *Climate Uncertainty and Risk.*
[61] Giuseppe Formetta and Luc Feyen, "Empirical Evidence of Declining Global Vulnerability to Climate-Related Hazards," *Global Environmental Change* 57 (2019): 101920, https://doi.org/10.1016/j.gloenvcha.2019.05.004.
[62] Emma Marris, "We're Heading Straight for a Demi-Armageddon," *The Atlantic*, November 3, 2021.
[63] David Ropeik, *How Risky Is It Really?: Why Our Fears Don't Always Match the Facts* (New York, NY: McGraw-Hill, 2010).
[64] Mary Douglas and Aaron Wildavsky, *Risk and Culture an Essay on the Selection of Technological and Environmental Dangers* (Berkeley, CA: Univ. of California Press, 1983).
[65] Judith Curry, "The Toxic Rhetoric of Climate Change," Climate Etc., December 15, 2019, https://judithcurry.com/2019/12/14/the-toxic-rhetoric-of-climate-change/.
[66] Judtih Curry, "Eco-Anxiety," Climate Etc., May 6, 2021, https://judithcurry.com/2021/05/06/eco-anxiety/.
[67] Danielle F. Lawson et al., "Children Can Foster Climate Change Concern among Their Parents," *Nature Climate Change* 9, no. 6 (May 6, 2019): pp. 458-462, https://doi.org/10.1038/s41558-019-0463-3.
[68] Sally Guyoncourt, "Children Push Parents to Be More Climate-Conscious, Research Reveals," inews.co.uk, January 4, 2022, https://inews.co.uk/news/climate-change-children-push-parents-global-warming-conscious-research-1382018.
[69] Aspen Institute, "K12 Climate Action Plan 2021," This Is Planet Ed, September 2021, https://www.thisisplaneted.org/img/K12-ClimateActionPlan-Complete-Screen.pdf.
[70] "Climate Change Education," Office for Climate Education (United Nations Educational, Scientific and Cultural Organization), accessed October 10, 2022, https://www.oce.global/en.
[71] "North American Association for Environmental Education," North American Association for Environmental Education, accessed October 10, 2022, https://naaee.org/.
[72] Katy Mamen et al., "100% Clean Energy School Districts Campaign - Organizing Toolkit," Sierra Club, April 2019, https://www.sierraclub.org/sites/www.sierraclub.org/files/program/documents/Clean_Schools_Toolkit.pdf.
[73] Anne Umali, "EEINSPIRE Webinar: Mapping the Landscape of K–12 Climate Change Education Policy in the United States," eePRO (North American Association for Environmental Education, August 10, 2022), https://eepro.naaee.org/eepro/learning/webinars/eeinspire-webinar-mapping-landscape-k-12.
[74] "About Us," Office for Climate Education (United Nations Educational, Scientific and Cultural Organization), accessed October 10, 2022, https://www.oce.global/en/about-us.
[75] "Our Actions," Office for Climate Education (United Nations Educational, Scientific and Cultural Organization), accessed October 10, 2022, https://www.oce.global/en/oce/nos-actions.
[76] Aspen Institute, "K12 Climate Action Plan 2021."
[77] Ibid
[78] Jeanette Winter, *Our House Is on Fire: Greta Thunberg's Call to Save the Planet* (New York, NY: Beach Lane Books, 2019).
[79] Ibid.
[80] John Bowden, "Ocasio-Cortez: 'World Will End in 12 Years' If Climate Change Not Addressed," The Hill (The Hill, January 22, 2019), https://thehill.com/policy/energy-environment/426353-ocasio-cortez-the-world-will-end-in-12-years-if-we-dont-address/.
[81] Extinction Rebellion, "Vandana Shiva, Naomi Klein, Noam Chomsky and More Sign Global Call-to-Arms on Climate Emergency," Extinction Rebellion UK, December 10, 2018, https://extinctionrebellion.uk/2018/12/10/vandana-shiva-naomi-klein-noam-chomsky-and-more-sign-global-call-to-arms-on-climate-emergenc/?fbclid=IwAR39tESw_kIRjdFOrervUmRoO2j4yj0rI6n479uoU_By44bi762aORlb8dg.

[82] Caroline Hickman et al., "Climate Anxiety in Children and Young People and Their Beliefs about Government Responses to Climate Change: A Global Survey," *The Lancet Planetary Health* 5, no. 12 (December 2021), https://doi.org/10.1016/s2542-5196(21)00278-3.
[83] Judith Curry, "Alarm about Alarmism," Climate Etc., July 15, 2017, https://judithcurry.com/2017/07/15/alarm-about-alarmism/.
[84] Jason Plautz, "Eco-Anxiety Is Overwhelming Kids. Where's the Line between Education and Alarmism?," The Washington Post Magazine (WP Company, February 3, 2020), https://www.washingtonpost.com/magazine/2020/02/03/eco-anxiety-is-overwhelming-kids-wheres-line-between-education-alarmism/.
[85] David Wallace-Wells, "When Will the Planet Be Too Hot for Humans? Much, Much Sooner than You Imagine.," Intelligencer, July 10, 2017, https://nymag.com/intelligencer/2017/07/climate-change-earth-too-hot-for-humans.html.
[86] David Wallace-Wells, "Here's Some Good News on Climate Change: Worst-Case Scenario Looks Unrealistic," Intelligencer, December 20, 2019, https://nymag.com/intelligencer/2019/12/climate-change-worst-case-scenario-now-looks-unrealistic.html.
[87] Greg Lukianoff and Jonathan Haidt, *The Coddling of the American Mind How Good Intentions and Bad Ideas Are Setting up a Generation for Failure* (New York, NY: Penguin Press, 2018).
[88] António Guterres, "Secretary-General's Remarks to Economist Sustainability Summit Secretary-General," United Nations Secretary General (United Nations, March 21, 2022), https://www.un.org/sg/en/content/sg/statement/2022-03-21/secretary-generals-remarks-economist-sustainability-summit.
[89] V Masson-Delmotte, ed., "Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C above Pre-Industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty," 2018, pp. 1-616, https://doi.org/10.1017/9781009157940.
[90] "State Profiles & Energy Estimates," EIA (Department of Energy), accessed October 10, 2022, https://www.eia.gov/state/seds/data.php?incfile=%2Fstate%2Fseds%2Fsep_sum%2Fhtml%2Frank_use_capita.html&sid=US.
[91] "Montana Bureau of Mines & Geology - Coal Program," MBMG, accessed October 10, 2022, http://www mbmg mtech.edu/MontanaGeology/EnergyResources/coal.asp.
[92] "Montana State Energy Profile," Montana Profile (U.S. Energy Information Administration , March 17, 2022), https://www.eia.gov/state/print.php?sid=MT.
[93] Ibid.
[94] Butch Larcombe, 2021, *Golden Kilowatts: Water Power and the Early Growth of Montana.*
[95] "Montana State Profile and Energy Estimates," EIA (U.S. Energy Information Administration), accessed October 3, 2022, https://www.eia.gov/state/?sid=MT#tabs-4.
[96] "Montana State Profile and Energy Estimates - Analysis," EIA (U.S. Energy Information Administration), accessed October 3, 2022, https://www.eia.gov/state/analysis.php?sid=MT.
[97] "USGS 06090800 Missouri River at Fort Benton MT," USGS Surface Water Data for USA: USGS surface-water monthly statistics (USGS), accessed October 3, 2022, https://waterdata.usgs.gov/nwis/monthly?site_no=06090800&agency_cd=USGS&por_06090800_81026=65217%2C00060%2C81026%2C1890-10%2C2021-10&referred_module=sw&format=html_table.
[98] "Global Horizontal Solar Irradiance over Continental US," NREL, February 22, 2018, https://www nrel.gov/gis/assets/images/solar-annual-ghi-2018-usa-scale-01.jpg.
[99] Ibid.
[100] "Wind Energy in Montana," WINDExchange (Energy.gov, October 4, 2022), https://windexchange.energy.gov/states/mt.
[101] Michael L. Roderick et al., "On the Attribution of Changing Pan Evaporation," *Geophysical Research Letters* 34, no. 17 (September 13, 2007), https://doi.org/10.1029/2007gl031166.
[102] Wenxin Fan et al., "Evaluation of Global Reanalysis Land Surface Wind Speed Trends to Support Wind Energy Development Using in Situ Observations," AMETSOC (American Meteorological Society, January 1, 2021), https://doi.org/10.1175/JAMC-D-20-0037.1.
[103] Daran Rife et al., "A New Kind of Drought: U.S. Record Low Windiness in 2015," Earthzine (IEEE, June 10, 2016), https://earthzine.org/a-new-kind-of-drought-u-s-record-low-windiness-in-2015/.
[104] Fred Pearce, "Mystery Wind Drought That Cut Us Wind Power in 2015 Is Back," New Scientist (New Scientist, July 14, 2016), https://www.newscientist.com/article/2078374-mystery-wind-drought-that-cut-us-wind-power-in-2015-is-back/.

[105] "Montana Land-Based Wind Speed at 100 Meters," WINDExchange (Energy.gov, October 4, 2022), https://windexchange.energy.gov/maps-data/382.
[106] "Montana's Electric Transmission and Distribution Grid," Montana State Legislature - Energy-and-Telecommunications Committee - July 2020 (State of Montana, October 4, 2022), https://leg.mt.gov/content/Committees/Interim/2019-2020/Energy-and-Telecommunications/Meetings/July-2020/Exhibits/July15/Exhibit1.pdf.
[107] "A History of Geothermal Energy in America," Office of Energy Efficiency & Renewable Energy (Department of Energy, October 4, 2022), https://www.energy.gov/eere/geothermal/history-geothermal-energy-america.
[108] "The Influence of Geothermal Patents Funded by the U.S. Department of Energy's Geothermal Energy Technologies Office and Other DOE Offices," Office of Energy Efficiency & Renewable Energy (Department of Energy, October 4, 2022), https://www.energy.gov/eere/analysis/influence-geothermal-patents-funded-us-department-energys-geothermal-energy.
[109] Jeff Birky, "Geothermal Energy in Montana - A Consumer's Guide ," Montana DEQ (State of Montana, June 2012), https://deq mt.gov/.
[110] "Geothermal Resources of the United States," NREL, February 22, 2018, https://www.nrel.gov/gis/.
[111] "What Is an Enhanced Geothermal System (EGS)? - Energy," Geothermal Technologies Office (Department of Energy, May 2016), https://www.energy.gov/sites/default/files/2016/05/f31/EGS%20Fact%20Sheet%20May%202016.pdf.
[112] "5 Common Geothermal Energy Myths Debunked," Office of Energy Efficiancy & Renewable Energy (Department of Energy, May 8, 2017), https://www.energy.gov/eere/articles/5-common-geothermal-energy-myths-debunked.
[113] Evan Rosenlieb et al., "Closed-Loop Pumped Storage Hydropower Resource Assessment for the United States" (NREL, May 2022), https://www.nrel.gov/docs/fy22osti/81277.pdf.
[114] Johnathan Hettinger, "Montana's Energy Importers Want Renewables. Renewables Require Storage. A Pumped Hydro Project in Meagher County Aims to Provide It.," Montana Free Press, September 20, 2019, https://montanafreepress.org/2019/09/20/montanas-energy-importers-want-renewables-renewables-require-storage-a-pumped-hydro-project-in-meagher-county-aims-to-provide-it/.
[115] "Project Overview," Gordon Butte Energy Park, accessed October 10, 2022, https://www.gordonbuttepumpedstorage.com/project-overview.
[116] Johnathan Hettinger, "Montana's Energy Importers Want Renewables."
[117] "Order Granting Extension of Time to Commence and Complete Construction Pursuant to Article 301," Gordon Butte Energy Park, July 31, 2020, https://www.gordonbuttepumpedstorage.com/.
[118] Department of Environmental Quality, "Understanding Energy in Montana," 2017-2018 Energy and Telecommunications Interim Committee (Montana State Legislature, 2018), https://leg mt.gov/committees/interim/.
[119] Ian Livingston, "Montana Just Endured One of the Nation's Most Exceptional Cold Spells on Record," The Washington Post (WP Company, March 11, 2019), https://www.washingtonpost.com/weather/2019/03/11/some-nations-most-exceptional-cold-record-has-finally-left-montana/.
[120] Peter Hartley et al., "ERCOT Froze in February 2021. What Happened? Why Did It Happen? Can It Happen Again?," Baker Institute (Rice University, February 2, 2022), https://www.bakerinstitute.org/research/ercot-froze-february-2021-what-happened-why-did-it-happen-can-it-happen-again.
[121] Judith Curry, "On the Formation of Continental Polar Air," *Journal of the Atmospheric Sciences* 40, no. 9 (September 1, 1983): pp. 2278-2292, https://doi.org/10.1175/1520-0469(1983)040<2278:otfocp>2.0.co;2.
[122] Judith Curry, "The Contribution of Radiative Cooling to the Formation of Cold-Core Anticyclones," *Journal of the Atmospheric Sciences* 44, no. 18 (September 15, 1987): pp. 2575-2592, https://doi.org/10.1175/1520-0469(1987)044<2575:tcorct>2.0.co;2.
[123] Alex Epstein, *The Moral Case for Fossil Fuels* (New York, NY: Portfolio/Penguin, 2014).
[124] "2021 Annual Energy Paper - J.P. Morgan," J.P. Morgan, May 2022, https://am.jpmorgan.com/content/dam/jpm-am-aem/global/en/insights/eye-on-the-market/future-shock-amv.pdf.
[125] Jeff St. John, "The US Has More Clean Energy Projects Planned than the Grid Can Handle," Canary Media, April 20, 2022, https://www.canarymedia.com/articles/transmission/the-us-has-more-clean-energy-projects-planned-than-the-grid-can-handle.
[126] Annabelle Timsit, "Elon Musk Says Tesla's Car Factories Are 'Gigantic Money Furnaces'," The Washington Post (WP Company, June 23, 2022), https://www.washingtonpost.com/technology/2022/06/23/elon-musk-tesla-factories-gigantic-money-furnaces/.

[127] Sean McLain and Scott Patterson, "Rivian CEO Warns of Looming Electric-Vehicle Battery Shortage," The Wall Street Journal (Dow Jones & Company, April 18, 2022), https://www.wsj.com/articles/rivian-ceo-warns-of-looming-electric-vehicle-battery-shortage-11650276000.
[128] S Priyadarshi et al., "Summary for Policymakers," in *Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (Geneva, CH: Intergovernmental Panel on Climate Change, 2022).
[129] Judith Curry, *Climate Uncertainty and Risk.*
[130] "Montana Code Annotated 2021," 90-4-1101. Legislative findings and policy, MCA, accessed October 10, 2022, https://leg.mt.gov/bills/mca/title_0900/chapter_0040/part_0110/section_0010/0900-0040-0110-0010 html.
[131] Valerie Volcovici, "In Montana's Indian Country, Tribes Take Opposite Sides on Coal," Reuters (Thomson Reuters, August 21, 2017), https://www reuters.com/article/us-usa-trump-energy-tribes-insight/in-montanas-indian-country-tribes-take-opposite-sides-on-coal-idUSKCN1B10D3.
[132] Thomas Catenacci, "Native American Tribes Dependent on Fossil Fuel Resources Rip Biden Admin for Double Standard," Fox News (FOX News Network, October 3, 2022), https://www.foxnews.com/politics/native-american-tribes-dependent-fossil-fuel-resources-rip-biden-admin-double-standard.
[133] Terje Aven, "Climate Change Risk – What Is It and How Should It Be Expressed?," *Journal of Risk Research* 23, no. 11 (November 9, 2019): 1387-1404, https://doi.org/10.1080/13669877.2019.1687578.
[134] "Annual Coal Report 2020," Energy Information Administration (EIA) (US Department of Energy, October 2021), https://www.eia.gov/coal/annual/pdf/acr.pdf.
[135] Kayla Desroches, "U.S. Coal Production Is up Sharply after Hitting a 50-Year Low Last Year," NPR (NPR, October 22, 2021), https://www npr.org/2021/10/22/1048108267/u-s-coal-production-is-up-sharply-after-hitting-a-50-year-low-last-year.
[136] "Global Natural Gas Demand Set for Slow Growth in Coming Years as Turmoil Strains an Already Tight Market - News," IEA, July 5, 2022, https://www.iea.org/news/global-natural-gas-demand-set-for-slow-growth-in-coming-years-as-turmoil-strains-an-already-tight-market.
[137] "Coal Will Account for 85% of U.S. Electric Generating Capacity Retirements in 2022," Energy Information Administration (EIA), January 11, 2022, https://www.eia.gov/todayinenergy/detail.php?id=50838.
[138] Held vs. State, ¶¶ 180.
[139] "State Carbon Dioxide Emissions Data," U.S. Energy Information Administration (EIA), April 13, 2022, https://www.eia.gov/environment/emissions/state/.
[140]"International," U.S. Energy Information Administration (EIA), accessed October 3, 2022, https://www.eia.gov/international/data/world/other-statistics/emissions-by-fuel.
[141]B. H. Samset et al., "Delayed Emergence of a Global Temperature Response after Emission Mitigation," *Nature Communications* 11, no. 1 (July 7, 2020), https://doi.org/10.1038/s41467-020-17001-1.
[142] Ibid.
[143] Andrew H. MacDougall et al., "Is There Warming in the Pipeline? A Multi-Model Analysis of the Zero Emissions Commitment from CO_2," *Biogeosciences* 17, no. 11 (June 15, 2020): 2987-3016, https://doi.org/10.5194/bg-17-2987-2020.
[144]Ibid.
[145] Mike Hulme, "Climate Change Forever."
[146] Mike Hulme, "Climate Change Forever: The Future of an Idea," *Scottish Geographical Journal* 136, no. 1-4 (February 14, 2021): 118-122, https://doi.org/10.1080/14702541.2020.1853872.

EXHIBIT 3

MONTANA FIRST JUDICIAL DISTRICT COURT

LEWIS AND CLARK COUNTY

RIKKI HELD, et al.,	)	Case No. CDV-2020-307
	)	
	)	Hon. Kathy Seeley
Plaintiffs,	)	
	)	
vs.	)	
	)	
STATE OF MONTANA, et. al.,	)	
	)	
	)	
Defendants.	)	

VIDEOTAPED DEPOSITION OF DR. JUDITH CURRY

Taken on Friday, December 16, 2022

At 9:00 a.m.

At Sunshine Litigation Services

151 Country Estates Circle

Reno, Nevada

REPORTED BY: NICOLE J. HANSEN, NV. CCR NO. 446
CAL CSR 13,909, RPR, CRR, RMR

REPORTED BY: JULIE ANN KERNAN, CCR #427, RPR

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Litigation Services

I N D E X

THE VIDEOGRAPHER: This is the beginning of Media Number 1, in the deposition of Dr. Judith Curry, in the matter of Held, Rikki, et al., versus the State of Montana, et al., held at Sunshine on December 16th, 2022. The approximate time is 9:05 a.m. The court reporter is Nicole Hansen. I am Rachel Mosley, the videographer and employee of Litigation Services. This deposition is being themselves beginning with the witness. Sorry. This deposition is being videotaped at all times, unless specified to go off the record.

Would all present please identify themselves, beginning with the witness.

THE WITNESS: Judith Curry.

MS. OLSON: Julia Olson, counsel for plaintiffs.

MR. GREGORY: Philip Gregory, counsel for plaintiffs.

MR. CARLSON: Anders Carlson, with Our Children's Trust.

THE VIDEOGRAPHER: And on Zoom, would you please identify yourselves.

MR. RUSSELL: Michael Russell, for defendants.

THE VIDEOGRAPHER: And would you please swear in the witness.

THE COURT REPORTER: Please raise your right hand.

DR. JUDITH CURRY,
having been first duly sworn, was
examined and testified as follows:

EXAMINATION

BY MS. OLSON:

Q Good morning, Dr. Curry. I am Julia Olson. And just for the record, I am counsel for the plaintiffs in this case. And could you please state and spell your name for the record.

A Judith Curry: J-U-D-I-T-H. Last name: C-U-R-R-Y.

Q Thank you. Do you go by any other names?

A People call me Judy or Judith. Either is fine.

Q And is it okay if I call you Dr. Curry today?

A Whatever you prefer. Thank you.

Q What city and state do you live in?

A Reno, Nevada.

Q And are you employed?

A I'm president of Climate Forecast Applications Network, so I own the company.

Q And is that network based here in Reno?
A Yes.
Q And what is your work address?
A 20 Woodchuck Court. Reno, Nevada. 89519.
Q Thank you. All right. So, Dr. Curry, I'm going to just go over some ground rules for today so that this whole deposition can go smoothly. And the first thing is, if you don't understand a question completely or don't hear me, please ask me to restate my question and/or to rephrase it, and I'll try to clarify so that you can understand. And if you want to hear a question again, you can ask the court reporter to read it back to you as well.

For the court reporter's sake, it's important that just one of us speaks at a time, and so if you could let me finish --
A Of course.
Q -- answering or asking a question before you give your answer, then that will make it easier for the court reporter. Does that make sense?
A Of course.
Q And with respect to your answers, if you could use whole complete words or phrases to answer instead of nodding or "uh-huhs," those are harder for the court reporter to take down. Does that make sense?

A Yes.
Q Great. And I will also try not to interrupt you, and if I do, I'll stop or you can let me know you haven't finished completing your answer and I'll let you finish before I go on. Okay?
A Okay.
Q Okay. The other thing that may happen is the attorney defending you today, Michael Russell, he may state an objection for the record, and if he does, you can still go ahead and answer the question unless he instructs you not to. Does that make sense?
A Yes.
Q Great. Do you understand that your testimony is under oath today and it carries with it the same penalty of perjury as if you were testifying in a court of law?
A I do.
Q And is there any reason you are not able to give complete and truthful testimony today?
A There was certain things about my company and my clients that I will decline to answer because of contractual agreements that I have with my clients.
Q Okay. And we can get into that when we get to those questions.
A But there is nothing -- I would say I can't

answer that and I will explain why, but I would certainly never be untruthful about anything.
Q Okay. So do you mind -- I'll just ask that question for clarity of the record -- is there any reason you are not able to give complete and truthful testimony today with the exception of information you may deem confidential with respect to your company?
A No, there's nothing.
Q All right. Thank you. So we do have a number of exhibits, and we'll do our best to keep it simple. Some have already been marked for the record and some will be marked with new numbers today. So the first question I have related to some of these documents is have you read Dr. Lise Van Susteren's expert report in this case?
A Yes, I have.
Q And have you reviewed Dr. Van Susteren's confidential attachment three to her expert report?
A No, I haven't.
Q Okay. And you don't have attachment three to Dr. Van Susteren's report; is that correct?
A I don't recall seeing it. I'm sure if I would have seen it, I would have read it.
Q Okay. And have you signed the protective order in this case?

A No.
Q Okay. Thank you. So I need the deposition notice and subpoena or subpoena, actually, and we'll mark that as 175.

Michael?

MR. RUSSELL: Yeah.

MS. OLSON: I'm going to mark the -- It's Number 3: Curry Updated Subpoena in your electronic file as Exhibit 175.

MR. RUSSELL: Okay.

(Exhibit No. 175 was marked.)

Q (BY MS. OLSON:) Okay. So before you is the subpoena that was issued to you, Dr. Curry, and we marked that as Exhibit 175. Have you seen that document before?
A Yes.
Q And can you identify it for the record, please?
A Exhibit 175: Amended Deposition Subpoena Duces Tecum.
Q Great. Thank you. And when did you review that document?
A Yesterday afternoon.
Q Was that the first time you had seen it?
A Yeah.
Q And did you gather documents that are

responsive to that subpoena and turn them over to counsel for production to plaintiffs?

A I gathered a few that I felt that I could disclose without violating confidentiality, and I did send them to the State of Montana.

Q And you did that yesterday?

A I sent them a few — Okay. I saw a version of this list, but not this, the actual subpoena. Let me just double-check. Yeah, this is the first time I saw the actual time and location. So I did not see this document until yesterday. I did see this list from a previous — from something previous, and I did send some notes to Montana counsel, and I sent them a few documents that I felt I was able to send.

Q Okay. So am I correct in understanding that you did not send all documents —

A No, I did not.

Q — that you have that might be responsive to this request?

A Within the — like I said, I will not violate client confidentiality. The only thing that I didn't send that I subsequently found was a few letters of invite to a Congressional testimonies. I have no problem with sending you those.

Q Did you bring those with you today by chance?

A No, I didn't. I understood that these were due December 20 something or they weren't due yet. I mean, I have copies on my laptop of these. I put them in a file so they're accessible.

Q Okay. And can you — There's a category of information related to your company that you did not produce; correct?

A Oh, yeah. All my forecasts, all of my report, all of these things that are confidential things that are owned by my clients, even the names of my clients are confidential and many of the contract is actually a no-publicity clause that I am not to mention that these people are my clients, you know, so there's all sorts of reasons why I'm not providing information about my clients. I'm providing only some publicly-available reports or information.

Q Okay.

MR. RUSSELL: Counsel, if I may interject for one brief moment here. It's my understanding that the discovery requests that were served on plaintiffs or responses rather that were served on the plaintiffs yesterday touch on the same request of material in the subpoena duces tecum, and defendants would refer to those objections stated therein and responses to those requests.

Q (BY MS. OLSON:) Okay, Michael. Thank you. Dr. Curry, when did you first hear about this case: Held versus Montana?

A I was contacted by Timothy -- and I don't even remember his last name -- from the Montana Attorney's Office something like September 20th. I don't remember the exact date, so I had not heard about this prior to being contacted by their office.

Q And how were you contacted?

A By phone.

Q Were you ever told why you were being asked to serve as an expert in this case?

A No. It's part of what my company does, so I assume something, somebody either I was recommended by somebody or they spotted that I do this kind of work from my company's website. I don't know.

Q Did you review any documents before you agreed to serve as an expert in this case?

A No.

Q Do you have a consulting or retainer agreement concerning this case?

A I don't know if you would call it a retainer agreement. It's like a one-paragraph we agree to pay you at such-and-such a — to prorate to provide whatever. So it's not what I would call an agreement or a contract.

Q No problem. Who prepared that agreement or who prepared the document that you referred to?

A I believe it was Timothy, and I'm forgetting his name. I think he has since left the Montana government office.

Q And do you recall when you signed that agreement?

A Probably within — I didn't even sign anything. It wasn't an agreement. It was a letter from him saying we agree to pay you. So I didn't regard it as a contract. I don't believe I was asked to sign it.

Q Okay. And was it Timothy Longfield —

A Timothy Longfield.

Q — who you're referring to?

A Exactly. Yeah.

Q When did you start working on your expert report?

A At the time, I was in the throes of Hurricane Ian, which was an extremely big deal for many of my clients, both within the electric utilities and the insurance sector. And it was not just in the lead-up to Hurricane Ian but also during and after with reconstructions and whatever. So I was very tied up immediately following this, and I didn't really start in earnest until maybe — I'd have to check my records, but

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other than just sort of reading some things and gathering my thoughts, I didn't start in earnest until, I believe, about October 1st.

Q Do you recall how long it took you to prepare your report?

A I think I had a draft ready by -- Well, I believe it was filed October 31st, something like that, so it was ready before then. A few days before then.

Q And do you recall about how many hours you spent preparing it?

A I'm going to say it was 50ish hours of my time and 70ish hours of a technical assistance.

Q Do you know why, Dr. Curry, you were not asked to be an expert during the first round of expert disclosures in this case which took place last summer?

A I have absolutely no idea.

MS. OLSON: All right. The Curry Report. Michael, I'm going to now mark the Curry Report corrected 2022 to 1027. It's number four in your electronic file as Exhibit 176.

(Exhibit No. 176 was marked.)

Q (BY MS. OLSON:) Dr. Curry, is this a complete copy of the expert report that you prepared for this case?

A Yes.

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Q Will you turn to page 29 and tell me if that's your signature, please.

A Twenty-nine.

Q Is this your signature —

A Yes, it is.

Q -- on the report? Does this report include a complete statement of all of the opinions that you anticipate giving as an expert witness at trial in this case?

A I don't know. It's if something new comes up or I don't know. I would have to see what new emerges and what my counsel advises me in this regard. I don't know.

Q So you're not sure if you will be asked to testify to something that is not in that expert report; is that correct?

A Yeah, I -- you know, I just don't know.

Q Does this report set forth the complete basis and reasons for your expert opinions?

A At this time, I have come up -- I have encountered some new information since I submitted this which may or may not be relevant, but like I said, knowledge is not static in the broader community or stuff that I encounter, so --

Q What new information have you discovered since you completed your expert report?

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A Well, the most significant piece would be related to the surface observation stations in the State of Montana, that many of them are very poorly sited. Give an example of the one the long historical record that Helena is sited right next to an airport, an airplane parking lot at the airport. Not only is it a cement-covered area, but presumably, it's impacted by wash from the engines. So there's a number of problems with the siting of these surface temperature stations. I would say that's the most interesting thing that I've come to understand since I submitted this.

Q When did you discover that new information about the surface observation stations?

A Last week or this week really.

Q Did someone give you that information?

A No. I wondered about it, and this was in particular in response to Kevin Trenberth surrebuttal in this sort of factoring that Montana is warming so fast, and I wondered about it. And then I thought ah, surface, you know, is there something going on with these surface stations? And I contacted somebody who has investigated this and has taken Google snapshots of all of these locations and has even written a report. So that's how I come -- It was triggered by Kevin Trenberth's rebuttal to my report.

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Q And who did you contact?

A Anthony Watts.

Q And has Anthony Watts sent you any materials, documents regarding this?

A Yeah. He sent me a link to a report, and he sent me some information about -- I don't know. I certainly remember Helena, but at least a half a dozen stations and sent me some plots of the co-op stations. It's stuff that he easily had on hand. I mean, he sent it to me like two hours after I made the request, so it's material he clearly had on hand.

Q And I'm sorry. Maybe I missed this. How did you learn about Anthony Watts?

A Oh, I know of him. Yeah.

Q Can you tell me who he is, please?

A Oh, he's a well-known TV weatherman in the Northern California area. He's published research on surface temperature siting, and he also hosts a blog.

Q What's the name of his blog?

A Watts: W-A-T-T-S Up With That.

Q So, Dr. Curry, as of today, have your opinions in your report -- Strike that. As of today, are the opinions expressed in your report the opinions that you will give at trial with the exception of this

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possible new information regarding surface observation stations?

A Unless I'm asked to investigate something else or unless I come across something that's in my head and somebody actually questions me on it, I'm not going to deny that that's in my head and that I have a new understanding of something. So that's about all I can say. But as of right now, you know, this material that is here, I stand by this material as being robust, and this is what I will -- if this goes to trial, what I would be expected to be questioned about.

Q In terms of the opinions stated as of today in your expert report, does your report set forth the complete basis and reasons for those opinions?

A Yes, including the 146 references that I site obviously in A: On a period of three weeks that I had to write, there's only so much I can write, and there's only so much that people want to actually read. And so I have -- I've defended all of my statements with extensive observations and references to the published literature and other reports.

Q Does your report contain all of the assumptions that you rely on in forming your expert opinions?

A I don't quite -- my understanding -- Okay.

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I'm not quite sure I can answer the question as it's put. So, I mean, my knowledge and understanding of the broad climate issue -- apart from Montana-specific issues, which I only, you know, began investigating as part of this -- my broad understanding of climate stuff has been developed over decades, okay, as a university researcher and in my company in actually engaging with clients who deal with these issues on a day-to-day basis and, you know, have hired me to write reports on various topics and do various analysis for them.

And I also am an active engager, you know, with my own blog: Climate, Etcetera. I learn a lot from guest posters from a range of fields of expertise and from comments and whatever. So I read the literature, so I'm constantly learning and constantly re-evaluating things and integrating new knowledge into my head and into the framework of how I think about this problem. So it's a dynamic, you know, my brain didn't freeze, you know, at a certain point.

Q And your company, Climate Forecast Applications Network?

A Yes.

Q May I call it CFAN?

A Please, much easier. Yeah.

Q Thank you. So I imagine -- and tell me if I'm correct -- that the work you do at CFAN, the reports you put together for your clients, that that's part of the underlying assumptions or information you have that informs your expert opinion; is that correct?

MR. RUSSELL: Foundation.

THE WITNESS: Not really. My expert opinion I draw on to, I mean, my background knowledge that I draw on to write these reports, the experience of working on some of these reports and with these clients has sent me into some new directions, okay, and new applications, things that I wouldn't have looked at specifically if it hadn't been for the client request.

One of the reports that I agreed to make public was this report I did on New Jersey sea level rise. For example, while I have a lot of background knowledge about sea level and climate, I never would have looked at New Jersey unless I hadn't had a request by a client.

Q Going back to the basis for your report, does your report contain all of the underlying facts and data that you considered in forming your opinions?

A I read broadly. I Googled. I mean, this is my super power. I'm a great Googler and finder of information, so I looked at a lot of material, read a lot of it, glanced through some of it, and then selected some

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of it to actually be referenced in this report as it became integrated into my argument.

Q And do you -- all of the facts that are important to your opinions, are those contained in your expert report?

A Yeah, anything cited, you know, my report, I mean, there's what? 146 footnotes. So, I mean, that's a fair amount. There aren't too many paragraphs that didn't have a footnote.

Q Is there any data that you considered and relied on in forming your opinion that is not referenced or contained in your expert report?

A No, not at all. Only -- I only looked at published, you know, the only diagram that we created -- and this was done by my assistant was I'm not sure which -- okay. It was the hydropower. Let's see if I can find it. This one: Figure 3.1. This figure was created by my assistant.

Q And for the record, you're referring to page 17?

A Page 17, Figure 3.1, and this is using data from the U.S. Geological Survey. Everything else, I used figures that were published by U.S. government agencies basically. There were no NREL, you know, agencies like this. So this was the only one because I assume that he

didn't find a diagram that made a similar point, so he used USGS data to plot this. Everything else is diagrams actually pulled from government websites or reports.

Q Do you regularly use government data like the NREL data when you're --

A When writing a report like this, Congressional testimony, I use IPCC, U.S. government, NOAA, whatever. If those aren't sufficient, I'll do like a recently-published paper. I will rarely actually do one of my own diagrams. Oh, so what went into that secret analysis? No, I don't do that. I rely on PICC and government agency publications to the absolute extent that I can.

Q Thank you. Related to exhibits, does your report contain all of the exhibits you will reference or may reference when testifying at trial?

A You mean in terms of tables or plots or whatever?

Q Any exhibits?

A I have no intention of pulling in an exhibit from left field that, you know, my counsel has not asked me to provide or to work on. So, you know, I don't know when a trial might occur, but I presume it would be some months away, and I don't know how things will evolve over that time or what I might be asked to do. So that's all

I can say.

Q So for clarity, as of today, your report contains --

A Yeah.

Q -- the exhibits you would use at trial?

A Yeah.

Q Okay. And just a gentle reminder for us not to talk over each other for the benefit of the court reporter, Dr. Curry. Thank you. Will you please turn to pages 32 -- well, start at page 32 of your expert report. Are these documents referenced on pages 32 to 46 all of the documents that you relied upon in forming your opinions in this case?

A Apart from the issue that what is in my head has evolved over decades of research, reading, analysis, etcetera. So there's a framework there that goes beyond what is cited in my own publications and in the footnotes to what is here.

Q So apart from your career and everything that's in your head and the knowledge that you contain, do you recall relying on any other documents that aren't listed in your expert report?

A Well, I read a lot of documents, okay? And I learned from them, but they did not -- I mean particularly with regard to what goes on in Montana, you

know, which I had never had an opportunity to investigate before. So I read a lot of background about the energy system, about the climate, about, you know, whatever, many of which were not directly referenced. It was part of building up my background knowledge and framework for thinking about what's going on in Montana. But I did not reference them because they weren't used directly. It was part of building up that web of understanding in my head.

Q And, Dr. Curry, the reason I'm asking is one of our goals today is to make sure that we're able to identify and on the record all of the documents that you reviewed or you considered in forming your opinions in this case. That's one of the purposes for us of the deposition, and so are there any documents that you reviewed and you considered and they helped to form your opinions stated in your expert report that we've not covered and that you have not referenced?

A Well, if somebody can figure out how to go back into my Google search history for the last month, including the thousands of things that I might have searched for that had nothing to do with this case, I don't know how to address that. I don't. There would be, like I said, this could be like maybe ten percent of what I might have been Google searching for over the last

two months, so --

Q Okay. And have you identified all of the documents that were provided to you by counsel for defendants in your expert report?

A Okay. Shortly after I agreed to do this, Timothy Longfield sent me a complaint and he sent me the expert reports, and I read a few. I started -- I have to say that during the period of writing the report, I didn't carefully go through all of the other expert reports.

The one that I did go through carefully was Mark Jacobson's, and I glanced at the running report to confirm my suspicion that it heavily relied on RCPA.5. So I did probably pay most attention to Jacobson and Runnings' report prior to writing this. Subsequent to submitting this, I did go back and read all of those reports more carefully, particularly in context of the rebuttals to my own report. So I didn't have time to really get up. So this does not constitute in any way a rebuttal of all of those original reports.

Q And, Dr. Curry, there were different sets of expert reports, so just so that I can understand and the record is clear, when you were working on your report, were you given the initial set of plaintiffs' expert reports that were produced last summer?

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A No, I was not. I don't even know who their experts were or are for that matter, although in the rebuttal, I mention Anderson, and I don't know that person and haven't seen his report, so I have seen none of the other defendant reports, current or previous.

Q So which expert reports have you seen?

A Okay. Fager. Okay. The Running, the Fager, the Byrons, Van Susteren, Erickson, Jacobson. I'm not sure if I'm forgetting somebody.

Q Okay. We'll turn back to that. That's fine for now. Thank you.

A Okay.

Q Did anyone help you draft your expert report?

A I had an assistant who helped with technical things. I mean, apart from formatting and footnoting and referencing, he also did some of the groundwork and Googling around to understand Montana's renewable resource and capabilities. So yeah, he did a lot of support work. Yeah, he did a lot of support work.

Q Who is your assistant?

A I'm not sure if — I would like to ask his permission to name. I have a — he's a consultant that I have worked with for a long time. I don't know that he wants to be dragged into this. He's someone with a Master's degree in atmospheric science, and he worked on

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a range of projects that are relevant here, and I have used him frequently in the past. I don't know if he wants to be named publicly or brought into this. I would have to discuss with — he is someone with no public profile.

Q And, Dr. Curry, unfortunately, he doesn't — he's not entitled to confidentiality in this process since he helped you with your expert report?

A Okay. Mr. Russell, do you have an opinion on this? Do I name this person?

MR. RUSSELL: If your assistant has a specific reason to remain anonymous or, you know, is concerned about being publicly named or, you know, the subject of threats given the politically charged nature of this case, I think that might be an appropriate subject for a motion for protective order. Perhaps for purposes of today, we simply have Dr. Curry refer to him as her assistant and then maybe work out those issues subsequently.

THE WITNESS: He may be totally fine with it. I don't know. I haven't asked him. But if he's not fine with it, I want to be careful. I'm always very careful of the people that I work with and my clients.

MS. OLSON: Michael, do you have a confidentiality agreement with this assistant?

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MR. RUSSELL: No.

MR. OLSON: Do you know?

THE WITNESS: No. No, there isn't one.

MS. OLSON: Sorry, Dr. Curry. I need to ask you again what's the name of the assistant that helped you with your expert report?

THE WITNESS: Okay. And your advice at this point? I'll defer to whatever you say, but —

MR. RUSSELL: Unless you're aware of any specific confidentiality agreement.

THE WITNESS: Okay.

MR. RUSSELL: I think you —

THE WITNESS: His name is Mark Jelinek: J-E-L-I-N-E-K. He has a small consulting company. I can't think of the name of it. Revector: R-E-V-E-C-T-O-R.

Q And does — I may pronounce this wrong. I apologize. Mark Jelinek work for CFAN?

A He has in the past. He does not now. Only on a consul -- as-needed consulting basis.

Q And what role did he play in preparing your expert report?

A He did the formatting, all of the footnoting, all of the figure captions, he did document preparation. He identified the references used relative to the

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glaciers, and he also identified the key information about that was in Section 3.1: Montana's renewable energy resources. So that's the role that he played.

Q And did anyone else gather data for you --

A No.

Q — besides Mark?

A No.

Q Did anyone else gather documents for you that you relied on besides Mark?

A No.

Q Did you consult with anyone else about the preparation of your expert report?

A No. Nobody knows I'm working on this outside of Kevin Trenberth. He already had an email exchange with my partner but yeah, other than it being linked via Kevin Trenberth, I have told nobody that I'm working on this.

Q And your husband's name is Peter Webster?

A Peter Webster. Yeah.

Q And did your husband consult with you at all on your expert report?

A No. He was in Europe for much of the time. Then he came home sick, so he's sort of been —

Q Has he read it?

A I'm not even sure. If he read it, it would

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be after I submitted it.

Q And did counsel for defendants ask you to change any of your opinions in your expert report?

A No, they asked me to add. They didn't ask me to change. They said: Oh, could you also cover this?

Q Which areas did they ask you to add that you hadn't originally covered?

A The fourth bullet on page one. They wanted me to emphasize, you know, this point about Montana versus U.S. versus global and what does all of this mean. They wanted me to clarify that, and that resulted in, I guess, Section 4. Some of the material from Section 4 was originally in a previous section. I moved it to Section 4 and expanded on it.

Q And for the record, Dr. Curry, would you mind just reading the bullet number four?

A The bullet number four. Emissions from fossil fuels generated in Montana provide a minuscule contribution to global greenhouse gas emissions and do not influence directly Montana's weather and climate.

This is my statement. This is not — they asked me to address the issue, the general issue of Montana versus U.S. versus global emissions. They did not ask me to push a particular conclusion into my report.

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Q Okay. And then Section 4, which is on pages 26 to 27 was added after they asked you to address that topic; is that correct?

A Some of the material was already there, okay, but then I moved it into Section 4 and added some new material.

Q And did you draft all of this --

A No.

Q -- content?

A Oh, I also suggested that I add a conclusion section. They did not tell me what to put in it, but say I think it would be helpful to have a conclusion section that summarizes your main points which I added.

Q How many different versions of your expert report did you prepare?

A Not a huge number. In terms of complete versions of it, I gave them a draft maybe after two weeks just so they could see what was coming down the pike, and then not many. There wasn't time for a lot of drafts.

Q We're going to -- we'll go back to your expert report, but right now, I'm going to ask you some questions about your history of prior testimony. Have you ever testified under oath before today?

A Yes, I have.

Q In what situations?

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A Okay. Well, Congressional testimony is a slightly different situation, but there's truth in testimony and stuff like that. People lie in those testimonies with no consequences, you know. I've seen that happen. But it is — I have approached it as if I was under oath beyond truth and testimony. I have been subpoenaed twice before. I mean, deposed twice before.

The first one, I'm going to say it was around 2015. This was the Georgia Florida Alabama water wars, okay. I was subpoenaed. I was not an expert witness for anybody, but I was subpoenaed as somebody they wanted to hear from, okay, and Georgia -- because I was employed by the State of Georgia, Georgia treated me as, you know, their witness and whatever, and I was deposed for something like it was a long day. Seven hours, something like that. They wanted to pick my brains, okay. I wasn't an expert for either side, but somebody had it in their mind that they wanted to pick my brains on this issue, so --

Q Was it the State of Georgia that subpoenaed you?

A I have no idea. I think it was — I suspect it was Florida. I suspect it was Florida. It was Florida. I'm not -- I honestly don't know. I couldn't tell you. The subpoena was sent to the Georgia — the

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university, and they told me about this, and this is where you need to be and when. I had very little -- I knew about the case obviously, okay. You can't live in the Southeast U.S. without knowing about that case, but I had no context for what was going on. I just answered questions that were thrown at me.

Q Is this the case that ended up at the --

A It went to the Supreme Court. Yeah.

Q The Florida versus Georgia?

A Yeah, yeah. It went to the -- so I'm pretty sure -- the guy from Florida had a lot of questions of me, okay, so I assume Florida requested it. But like I said, I have no context for understanding who invited me or why I was invited.

Q Do you recall the precise date in 2015?

A Oh, my gosh. No idea. And I may not even have a record of it because I don't recall receiving anything written. I didn't write anything, you know. It was -- and it was -- yeah. I think pretty sure it was 2015, but that's my recollection.

Q After that deposition, you had no further involvement --

A Nope.

Q -- in that case; correct?

A Huh-uh.

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Q And you said you were deposed twice. What was the second time?

A Sometime during COVID within the last year or two. This is part of an active case. We actually go to trial in February. This is a libel case. Michael Mann versus Mark Stein and the National Review online. Michael Mann is suing them for $20 million dollars for something that they wrote about him, okay, so and I am the Mark Stein and National Review online case.

Q And has Mark Stein and the National Review online hired you as their expert witness?

A Yeah.

Q Have you prepared an expert report in that case?

A Yes, I have. Okay. This is an interesting story. Both sides submitted a lot of expert reports, okay. The judge threw all of the plaintiffs' expert reports out. They accepted one for the defendant, and they rejected my expert report but allowed me to testify as a fact witness. They said there was too much here that the jury should be able to figure out themselves, okay, so I was -- so all of the other side's expert witnesses were rejected. I'm allowed to testify as a fact witness. Okay.

Q And what facts will you be asked to testify

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to in that case?

A Related to the history of the so-called hockey stick, if you're familiar with that. Okay. It's related to the history and the debate, public debate, scientific debate over the hockey stick.

Q And what -- other than the history of the hockey stick, was there other content to your expert report that was thrown out by the judge?

A No. That was that I'm allowed -- I'm allowed to testify on the political history of this whole issue as it evolved because I lived through it and carefully watched it, read about it, whatever, so I'm allowed to testify on the history like the political history of this whole situation. I was originally -- yeah. I have to say that this is better because I was originally asked to assess whether this was fraud or not and I wouldn't. I gave them all of the different definitions of what's regarded as fraudulent and son on and so forth.

And the judge, very rightfully, said well, that's for the jury to decide. We don't need this from expert witnesses. So that's the part that was thrown out much to my relief because I don't want to answer questions on that. I'll give you the criterion. I'll give you all of these other different cases and examples of this, that and the other, but I'm not going to pass

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professional judgment on this particular situation in a court of law. I didn't want to do that. So I was pleased that that part was thrown out.

Q And did you think that was outside your area of scientific expertise?

A No, no, no. Oh, no. I'm an expert on scientific -- I'm a published expert on scientific integrity. I've been invited to give presentations to the National Academy of Science Committee on Science and Public Policy on this issue. I've been invited by a U.N. committee to speak on this issue, so this is within my expertise. But I am not going to pass judgment in a particular case.

THE VIDEOGRAPHER: Can I real quick have you adjust your microphone?

THE WITNESS: Okay.

THE VIDEOGRAPHER: There you go.

MS. OLSON: Is it up high enough?

THE VIDEOGRAPHER: Yeah. It was just covered.

Q (BY MS. OLSON:) And are you being paid by Mark Stein or the defendants in the case --

A Yes.

Q -- to serve as an expert?

A Yes.

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Q And how much are you being paid for that?

A Well, normally I'm being paid $400 an hour, but I'm charging for less than half of my hours. They have a budget, and I do my best job for my clients. So if it takes more, that's what I do.

Q Do you have a transcript of the deposition that you gave in either of those cases?

A A transcript exists, okay, but I have to say it was absolutely bizarre because their lawyers spent the whole time trying to put words in my mouth, and I said no, that's not what I said. So it was a very strange experience. A transcript does exist. I'm not sure if I could find it.

Q But you might have a copy?

A I might.

Q Okay. Well, I will try not to put words in your mouth today, Dr. Curry.

A I've learned my lesson. Nobody puts words in my mouth.

Q And have you ever testified at a trial yet?

A No, I have not.

Q But you anticipate you will testify in the February trial in this --

A Yeah. Yes.

Q -- Michael Mann case?

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A Yes.
Q **Do you know the date it's set for trial specifically?**
A I think it starts on January 31st, jury selection, and I'm tentatively making my flight plans to fly in on Saturday, I think, the 11th. Something like that. But that could change, depending on how the schedule emerges.
Q **So other than the Georgia-Florida-Alabama dispute and the Michael Mann case, am I correct in understanding there are no other depositions and no other testimony at trial that you've given?**
A Huh-uh.
Q **Have you been -- Do you have any other experience providing expert testimony for litigation that didn't go to deposition or trial?**
A Yeah. I wrote an expert report -- this is another Michael Mann lawsuit. This was Tim Ball. It didn't go to trial, and the judge found in favor of Tim Ball, but it never went to trial. So I wrote an expert report, and it was frankly sort of strange. They wanted me to describe climate models, you know, climate models, how do they work, how they should be used, what do we know, what don't we know. So it was very much a technical kind of thing that in all honesty, I didn't see

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how it related to the case, but it gave me an opportunity to write something that I was quite pleased with.
I have provided advice to people who were being sued but did not reach the level of writing an expert report. It was more about educating the defendants about okay. What's going on here. What are we facing, you know, what are the strengths of the argument. This is what we have. Do you agree with this?
So I have advised maybe a half a dozen additional clients on a range of climate issues that didn't directly involve me officially as an expert. It was really more of an educational and evaluating the materials kind of thing.
Q **And who did you advise regarding litigation but didn't prepare a report?**
A Those are my clients that I won't name.
Q **And do you have a confidentiality agreement with them?**
A Probably. I'm not entirely sure, but I make it a practice -- one was a U.S. government agency, a couple of electric utilities companies and an oil company and a state business group, you know, so it's a range. And a few of those, I know there are hard confidentiality things in place.
Q **So if there aren't confidentiality agreements**

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in place that would protect your client's identity from being disclosed in a deposition or at trial in this case, then it is incumbent upon you to answer that question, Dr. Curry. So can we start with the U.S. government agency? Which agency did you advise?
A I'm -- before answering this, I have to check and see what kind of confidentiality things are in place. I mean --
MR. RUSSELL: You've been going about an hour. Can we take about a ten-minute break?
MS. OLSON: Let me ask just one more question, Michael, and then we can take a break?
MR. RUSSELL: That's fine.
Q (BY MS. OLSON:) **Okay. Thank you. So I just want to make sure we're wrapping this piece up.**
A Okay.
Q **So I understand about the litigation that you participated in where you prepared expert reports or were deposed and may testify at trial this spring, and then I understand there's a category of litigation in which you consulted with defendants but didn't prepare an expert report.**
A Uh-huh.
Q **Is that correct?**
A Yes.

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Q **And you aren't sure whether you can disclose who those defendants are?**
A I know at least two of them I cannot. Probably three of them, I cannot.
Q **And my last question, now that I understand that, is have you testified on behalf of defendants -- let me restate that. Have you either consulted or served in an expert capacity on behalf of defendants one hundred percent of the time as opposed to plaintiffs?**
A Yeah, probably. I think that's the case.
MS. OLSON: Okay. We can take a break and go off the record. Thank you.
THE VIDEOGRAPHER: We are going off the record, and the approximate time is 10:02.
(Recess.)
THE VIDEOGRAPHER: We are going back on the record, and the approximate time is 10:16.
Q (BY MS. OLSON:) **Dr. Curry, have you ever prepared a declaration for a court proceeding?**
A I don't really know what that is. I haven't.
Q **It's another form of written testimony that gets submitted to a court that's not a report. It's called a declaration or an affidavit.**
A Hard to know. I suspect -- I wrote two reports, and I included them in the -- I gave to the

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Montana attorneys of what I can make available. One was on hurricanes and sea level rise. The other one -- or hurricanes and climate change, and the other was sea level rise and climate change. I think those two reports might have been submitted by one of my clients because it was relevant to the siting of a power plant, and it was questions related to storm surge and things like that. So I suspect it might have been but not directly to my knowledge was it submitted.

Q And do you mean submitted to a court?

A It was a lawsuit, yeah. Yeah.

Q Do you know the name of the lawsuit?

A Again, this speaks to my client confidentiality because I was a hired consultant for them, okay, advising them and gave them these reports. I was not named in the expert whatever. I don't recall to what extent that information was ever made public, whether I have a confidentiality agreement with that client. I don't know.

I can tell you this much. The plaintiff was the Sierra Club, who was suing a lot of anybody trying to put in a natural gas or whatever power plant, they were bringing a lawsuit against them. So it was one in a long -- I had one client who was being sued by -- there were so many of them, I think I'm not violating any

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confidentiality by saying that the plaintiffs was the Sierra Club.

Q And they were suing a fossil fuel company or the government?

A A public utility. Is it public or investor owned? I'm not sure, but it's a utility company.

Q Okay. And the name of the lawsuit or the fact that the lawsuit exists would not be a confidential matter. It would be public, so it's okay to tell me the name of the lawsuit.

A Okay. It was -- Okay. Tampa Electric Company. So that's one that I can probably tell you about.

Q Okay. And you said there were -- you think there may have been two instances?

A No. Two reports that I submitted to them. It would be they probably would have -- if they chose to submit them both, I assumed they would have been submitted together, but I don't know.

Q And can you think of any other court proceeding where you have provided any kind of expert testimony or support?

A Apart from educating the defendants, I mean, what they actually did with the information, I honestly don't know.

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Q And so there's a body of work that you've done for a U.S. government agency, electric utilities and oil company and a state business group, and you are unsure whether you have confidentiality agreements with them --

A Yeah.

Q -- so we haven't yet talked about them on the record today; correct?

A Yep.

Q Have you ever prepared an amicus brief in support of a party?

A Yes. This was in the early days of the National Review online Mark Stein thing. I think this was for the National Review online. I submitted an amicus brief, and it was basically in support of freedom of speech, and it was drafted with the help of the attorneys in terms of legalese. In hindsight, if I were more experienced, I would not do amicus briefs again. But I did — I did — my name is on an amicus brief that was submitted in the Michael Mann versus National Review online. They all have separate -- it's a very complicated situation.

Q Did you agree with the content of that amicus brief?

A Yeah. Yes.

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Q And did anyone pay you to prepare --

A No.

Q — that amicus brief? And would you consider your experience as an expert in climate litigation to be extensive?

A No. I mean, I'm experienced. You know, I generally identified the cases, so I do have experience, you know, relative to what is extensive. So people can be the judge of that. I don't need to judge.

Q Outside of court and litigation, have you been an expert in any administrative proceeding?

A Such as? I don't really know what that might be.

Q For instance, in a public utility commission administrative proceeding where sometimes they have expert testimony?

A No, I've been invited to talk and be on panels and whatever like FERC, NARUC. Let me see. I'm on some committee for the State of New Jersey, I think it is. We haven't met yet, but these are, I would say, committees, workshops, conferences kind of thing that I've been invited to.

Q Are all of those invitations or times you've participated in those types of proceedings, are they listed in your CV?

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A No, I don't list the presentations, but I can provide -- the FERC one wasn't all that long ago. Yeah, I do have — I can make those available. Yeah.

Q Are all of your expert services that you provide in the litigation or administrative proceeding context done through CFAN?

A Any compensation that I receive goes to CFAN, but like when FERC invites me to their conference to make a presentation, you know, I list my name, Judith Curry, president, Climate Forecast Applications Network. So that's my affiliation. So yeah, but any income that I get related to any of this stuff goes to my company: CFAN.

Q Did you provide any climate-related litigation services prior to your work at CFAN?

A Well, CFAN has been in existence since 2006, so I definitely did nothing of relevance prior to 2006. There may have been a world — a personal consulting project for the World Bank where they sent the consulting money directly to my bank account rather than the CFAN, but that may have been a while ago like 2008 or something like that. So some of the early stuff and the main client in the early days was World Bank, and they may have sent stuff directly to me personally not to CFAN.

Q What consulting work were you doing for the

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World Bank in 2008?

A Several projects. The one that I'm thinking of directly that was probably sent to me personally and again, this sits on -- this is a publicly-available report. It sits on CFAN's website.

This was providing scenarios of hurricane loss in Latin America, the Caribbean, Central America for the period 2020 to '25. And it was written in 2009 so, so it was sort of a look-ahead scenario, and it was not only scenarios of actual what the hurricanes were doing and where they might be landing, it was also related to they were looking to see where they could best invest their resources to help protect the region, and so I did an interpretation of the economic losses and context of the human development index, you know, trying to find a sweet spot where a place was at high risk for being damaged but they were far enough along where they could actually effectively use aid to improve the situation. So that was the idea behind the report.

Q And how far out were you forecasting scenarios?

A Well, it was 2009, and I was forecasting out to 2025, so it was like a 15-year outlook.

Q Does CFAN provide any other type of expert testimony and litigation apart from the work that you do?

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A No. I'm the only person in CFAN that's ever called upon to do this constantly.

Q And have you ever provided testimony before a political body other than what is listed on pages 40 to 41 of your expert report CV?

A Okay. A political body such as?

Q So your CV references your testimony before the U.S. Congress.

A Oh, yeah. No, I've never done any stage or — okay. In Florida, I've been involved — this is way back in the day, maybe 2006. I've been involved in a briefing of the legislature in Florida about hurricane risk. But that was not testimony. It was like more of a State Congressional briefing. It was mostly attended by staffing rather than actual Congress people.

Q And what year was that?

A I suspect it was 2006 or 2007.

Q Did you submit any written documents in conjunction with that?

A No, just a PowerPoint presentation that I gave that I may still have a copy of. I don't know. It's a while ago.

Q Okay. And in terms of your Congressional testimony before the U.S. Congress, does pages 40 and 41 reflect all of the congressional testimony you have ever

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given?

A Well, it should. I don't think I missed anything going back to, yeah, 2006-2007. Yep, no, that's a complete list.

Q Have you produced all of your Congressional testimony to plaintiffs as part of the document production?

A No, because the links are in my CV. I mean, do you really need copies in the Dropbox?

Q Okay. So everything here is —

A Yes.

Q — linked and accessible?

A Yes, there's links. Yes.

Q And that's the full and complete testimony --

A Yes.

Q — that you gave to Congress?

A Yes.

Q Who invited you to testify each of these 12 times?

A It's the chairman of the committee that issues the invitations, and they're fairly vanilla invitations. You're invited or you're expected and they give the name of the hearing, the time and the place, and then truth in, you know, you have to be truthful and some instructions for this, that and the other, but they don't

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tell you what to say. They just tell you the topic of the hearing.

Q Right. Do you know who worked with members of Congress to put your name forward as someone who should come testify before these?

A Okay. Invariably, I will be contacted by a staffer of the chair of the committee or the ranking member of the committee and say we're having a hearing. Do you have any thoughts on this? Do you have any recommendations who might be good? So I assume they call around and get a lot of people and then my name bubbles up to somebody's invite list, and then I get a letter from the chairman of the committee.

Q And do you know — I don't need to know the names of the specific staffers, but do you know which members' offices were contacting you to testify?

A Okay. I think what you mean is for the staffers who contacted me.

Q Which member of Congress did they work for?

A Okay. Prior to 2010, it was Democrats. And subsequent to 2010, it was Republicans who were the staffers that initially contacted me. That's who they worked for.

Q And why do you think there was that switch from Democrats prior to 2010 and Republicans after 2010?

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A That would be the nature of the climate debate. What I had to say in this period was deemed interesting by the Democrats, and what I had to say subsequently was deemed interesting by the Republicans. Don't ask me to explain that.

Q What was the content that you think the Republicans found interesting after 2010?

A You know, I don't know. Basically, I testified on many topics. Basically, it was providing a context for you have to read all of these things and decide why these things were interests. Certainly, the more recent ones. Many of them were related to extreme weather events and whether we should be blaming that on human-caused warming. And my point is that these are very complex issues and on and on and on. So that's circa -- I don't have a direct memory of each of these.

There was one on dogma, something about — this was in the Senate. This was on basically scientific integrity and the scientific process and the damage of the politicization, so I testified on that. That was actually Ted Cruz's. Vader dogma. That was the 15th. That was a memorable hearing.

Q So Ted Cruz is one of the members --

A Was the chairman. He was the chairman of the Senate subcommittee on whatever. I remember that one.

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Q Do you remember the name of any other members that whose offices worked with you to have you come speak?

A No. The House Committee on Science, Space and Technology, I frequently testified there and there was a long-term Republican in charge there, and I don't remember his name. I don't remember his name.

Q And were you ever paid by anyone to provide testimony to Congress?

A Huh-uh. No.

Q And am I right in understanding that you have not been involved in any cases in Montana's courts before?

A No.

Q Have you ever testified before any Montana governmental body?

A No.

Q Have you ever been a consultant for any Montana agencies prior to this case?

A No.

Q Have you ever appeared before any Montana legislative committees?

A No.

Q And have you met with the governor's office in Montana?

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A No.

Q Have you met with any Montana government employees apart from counsel in preparing your expert report?

A No.

Q All right. When you were preparing for this deposition, how many hours did you spend getting ready for it?

A Okay. I received the rebuttal on a week ago today, Friday, in the afternoon, so I spent some time reading it.

Q And which rebuttal are you referring to for clarity of the record?

A I don't know. It was a rebuttal. I couldn't tell you. It was a rebuttal that I received. I don't know of any other -- it was a big report that included, you know, for most of the plaintiffs' experts critiquing me and also another witness, Anderson.

And I would be surprised if the Montana office received it before then because it really — you know, I read it and I took some time going through it trying to understand. And I sorted out well, what did we actually agree on? And there's quite a bit. I identified a bunch of straw man arguments, and then I identified some more substantive areas that I needed to

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reflect upon and to understand where they were coming from and figure out how I wanted to respond.

Q And just for clarity of the record, you received basically a package of rebuttal expert reports?

A No. It was one document.

Q So it was one pdf document?

A It was one pdf. Yeah.

Q Containing plaintiff's rebuttal --

A And this was the first time I realized that Kevin Trenberth was an expert witness. I hadn't seen anything from Trenberth prior to that document.

Q As it was helpful to hear that your different reflections or categories of reflection on the rebuttal reports, did any of them cause you to reconsider any of your opinions in the case?

A Not at all.

Q And so about -- if you could just estimate how many hours you spent preparing for deposition today.

A I'm going to say 16 hours.

Q Did you review your own expert report before the deposition?

A I did.

Q Did you review any other documents besides the rebuttal reports and your --

A Some of the original expert reports because I

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hadn't read a lot of them terribly carefully, and I certainly didn't have time to do that when I was preparing this report. So and particularly, I went through Daniel Fager's report in more detail than I had originally. That was the one that I went through that I didn't pay much attention to prior to receiving the comments.

Q Did you meet with the attorneys for the defendants prior to your deposition today?

A We had a brief phone call yesterday, and it was more about procedures, introducing me to Mr. Russell, who I haven't met before. It was -- I don't think it lasted an hour.

Q And did anyone else help you prepare for your testimony today?

A No.

Q And even your husband? You haven't talked to him about your deposition or your expert report?

A He's manly interested that Kevin Trenberth is involved. That's all he talked about.

Q And did he give you any directions or advice with respect to your deposition?

A No. If he did, I wouldn't pay attention.

Q And your husband, Peter Webster, he's also a climate scientist; correct?

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A Oh, yes. Yes.

Q And what is his area of specialty?

A He's a tropical meteorology, monsoons, Asian monsoons. Yeah, he's big in tropical meteorology and climate: El Ninos, Asian monsoon, that kind of thing.

Q And your husband is also your business partner and cofounder?

A He's coowner. He's not very active in the company at this point. He is a co-owner though.

Q Is he mostly retired?

A Yeah. He's over 80 years old. He's earned it.

Q Absolutely. Did you review any of your refereed publications that are listed in your CV, Dr. Curry, prior to your deposition today?

A No.

Q And did you review any of the references that you cite in footnotes one through 146 of your report?

A Only when writing the original report. Not in preparing for the deposition.

Q Did you review any of CFAN's documents --

A No.

Q -- prior to today?

Exhibit 1, Phil.

Have you reviewed the complaint in this case, Dr. Curry?

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A Yes, I have.

Q Have you reviewed any of the Court's orders?

A No. I don't -- no, I haven't.

Q Judge Seeley is the judge in the case, and she's issued a handful of orders.

A I haven't seen those.

Q You haven't reviewed anything?

A Huh-uh.

Q Have you reviewed any other documents filed with the Court like the defendant's answer in this case?

A No.

Q Did you review any of the prior depositions that have been taken in this case?

A No.

Q All right. You're getting paid for your work on this case; correct?

A Yes.

Q And is CFAN receiving the compensation --

A Yes.

Q -- from defendants?

A Uh-huh.

Q And what is your rate of compensation in this case?

A $400 an hour. But like I said, I don't

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charge for all of my hours.

Q And who is paying you?

A I got -- I received one check. I cashed it. I didn't really particularly -- I assume it's --

Q Is it from the State Treasury of Montana?

A Probably. I don't recall. I said oh, this is from Montana and deposited it. I didn't pay more attention to it than that.

Q So you don't know who is funding your expert testimony in this case?

A No idea.

Q And it sounds like $400 is your standard rate that you charge all of your clients; is that correct?

A Yeah, for this kind of work.

Q How much have you billed in this case to date?

A I don't remember exactly.

Q What would you estimate?

A It might be $30,000 for basically preparing the written report. I don't know. Something like $30,000.

Q Do you recall how many hours you've billed?

A It was something like 50 for me and something like $70 for Mark Jelinek. And I charge $200 for Mark Jelinek's time.

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Q Okay. Are you aware that the plaintiffs' experts are all donating their time in this case?

A I don't know.

Q Have you ever donated your time to serve as an expert witness?

A I'm trying to think. I've helped a lot of people for very little compensation like the Tim Ball libel case, that Michael Mann. I think I charged next to nothing for that one. It gave me an opportunity to write something I wanted to write.

No. This is my business, and if I'm spending my time doing this, I'm not spending my time doing other things that would help support the business unlike the witnesses who have government paychecks from universities or whatever. I'm in a very different situation.

Q Are you currently doing any research independent of your work on this case?

A Research? Tons of it.

Q And what kind of research are you doing?

A Right now, I'm trying to figure out a better way to forecast hurricane landfall winds, okay, and how the models and the roughness and transitions and the asymmetry and all of these kinds of things. That's a big project right now.

We're also working on how to incorporate

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artificial intelligence into operational weather forecasts from the global forecast models. Those are, I think, the two current big research projects. No, we do a lot of research and development at our company and also doing a lot of research and development on seasonal forecasting of hurricanes, temperatures, monsoon rainfall like six to 12 months ahead. That's an ongoing research effort at our company to support our clients.

Q Do you have partners you work with outside of CFAN on this research?

A Oh, a number of consultants. Well, Mark Jelinek. I've already told you he's a consultant. We have some consultants who are in Central America -- South America, actually, who were former graduate students of Peter Webster's who have moved to their home countries, and they have jobs in their country that pay them a pittance, and then they consult with us to actually make enough money to live.

Q Are all of your partners individuals as opposed to companies?

A No companies. Yeah, a couple of consultants who actually have their own company, a one-person company like Mark Jelinek. Yeah.

Q And how is this research being funded?

A Directly through clients or from profits. I

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send a lot of -- most of the profits back into the company for research and development just because I'm so passionate about it and also because it's the way to improve our products and eventually grow our business.

Q Have you ever received funding from the fossil fuel industry?

A Defined by electric utilities? Yeah, I have clients in the energy sector. This is broadly -- this includes electric utilities, wind farm owners, solar farm owners, energy traders who trade natural gas. And I have two clients that you would call petroleum companies, okay, and they're mostly interested in my hurricane forecasts for the safety of oil platforms.

Q Okay. And have you ever received funding from research institutions for the research you conduct?

A Research institutions?

Q Like what, about the American Chemical Society?

A No, I've received money from government, you know, the standard, you know, National Science Foundation, NOOAH, etcetera. I haven't received any funding from what I would call other than World Bank, that would be in the .org world.

Q Okay. And what about organizations like the Petroleum Research Fund?

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A No.
Q Have you -- so apart from the U.S. government grants that you've referenced that you've received in your expert report, have you received any other funding from governments for your research outside of the U.S. government research grants that you identified?
A No. Huh-uh.
Q So no foreign government grants?
A Huh-uh.
Q And no state government grants; is that correct?
A No. Oh, okay. And this is a client that is part of the public record. This is for the citizens insurance, okay, and this is a dot gov organization, and as part of — they're a subscriber to my CFAN's hurricane forecast. And as part of that, they have funded a few research projects to develop improved forecast products. So technically, that is coming from the Florida government.
Q Okay. Dr. Curry, do you know Dr. Howard Corcasin?
A No.
Q All right. I am going to hand you this is exhibit -- never mind. I'm going to have you refer to your expert report. On page one, you state that you were an expert witness on the topic of the energy transition.

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A What what -- okay.
Q Page one of your expert report.
A Page two possibly? My particular qualifications relevant to this report include? Is that -- I have page two. Where do you have it?
Q I think it's right at the top in the first paragraph.
A Oh, the energy transit. Okay. Yes, the energy transition.
Q Do you consider yourself an expert on the energy transition?
A Okay. I have expertise in energy meteorology which sits at the intersection between weather and the energy sector broadly defined, okay? I have part three of my book is on risk. The engineering aspects of this, no, I am not an expert. I would regard myself as an expert on the transition risk as written about extensively in part three of my book.
Q Okay. And can you define energy meteorology for me?
A It's atmospheric science, weather-related science that is targeted directly at the needs of the energy sector. This includes demand forecasts, forecasts of wind power and solar power. It includes forecasts of extreme weather events that would impact either demand or supply of energy.

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It's in support of -- it's applied products in support of, you know, predicting load products of direct relevance to energy trading and so on, so it is an interface with the energy sector. And I work quite closely with several electric utility companies, big ones, and we have developed customized products for them over the years, okay, to help them manage their risk.
Q Okay. Do you consider yourself a government policy expert?
A No. I have engaged in the policy process, okay. So whatever a government policy expert means, I don't know.
Q And do you consider yourself a public policy expert? And yes or no is fine to these questions. We're going to go through a lot of areas of expertise.
A I have experience and knowledge. I read widely on the topic. I mean —
Q And I just want to know if you consider yourself a public policy expert.
A Okay. I need to clarify. I have written a lot about the social psychology, philosophy, political issues surrounding the term "expert" and the use of expert, so I have a very nuanced view of this whole issue of experts. So I don't have simple yes-or-no answers to those kind of questions.

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Q Okay. So are you a public policy expert?
MR. RUSSELL: Objection, asked and answered, vague.
THE WITNESS: Yeah.
Q (BY MS. OLSON:) Do you consider yourself a legal expert?
A No.
Q What about a constitutional law expert?
A No.
Q Are you a social scientist?
A My book is under extensive peer review. It's really a social sciences book, so it is being extensively peer reviewed by social scientists. So I would say on certain aspects of social science relative to climate change, there are at least some who would regard me as an expert on some of the social sciences of relevance to the climate debate.
Q Okay. And outside of the drafting of your book, do you have professional experience working in the field of social science?
A In what sense?
Q Have you worked professionally as a social scientist?

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A No, no. In a university or hired with a title that says social scientist? No.

Q And do you have any specialized training in the field of social sciences?

A Okay. I have a Doctor of Philosophy, okay, which I received in 1982 which I regard as a license to learn, and I've learned about an awful lot of different topics over the years. So do I have relevant knowledge? Yes.

Q Okay. And your Doctor in Philosophy Doctorate of Philosophy was as a geophysical scientist; is that correct?

A University of Chicago confers a degree of Doctor of Philosophy. It's not Doctor of Philosophy of Geophysical Sciences, so it's just a Doctor of Philosophy degree. It was based on my work in the department of geophysical sciences, but it's a philosophy that reflects a broader meaning.

Q Do you consider yourself to be a geophysical scientist?

A That's certainly what my original training was.

Q And can you describe for me what that means?

A Well, I studied within geophysical sciences. It includes many things: Geosciences, geology,

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atmospheric science, oceanography, geochemistry, atmospheric chemistry, space physics, planetary sciences. It's a fairly broad field. My education, my Ph.D. thesis focused on the atmospheric part of geophysical sciences.

Q And do you consider yourself an expert in engineering?

A What kind of engineering?

Q Any kind of engineering.

A Well, I was a faculty member for ten years in the Department of Aerospace Engineering at the University of Colorado-Boulder. So does that make me an expert? I can let other people judge. Like I said, I have -- talking about expert and expertise is a very nuanced and misused --

Q Do you have expertise in any kind of engineering?

A I have a -- for ten years, I was a tenured faculty member at the University of Colorado in aerospace engineering. I will leave it to you to decide if that makes me some kind of an expert or not.

Q Are you an aerospace engineer?

A I had a faculty position --

Q I understand that.

A -- for ten years.

Q I understand that.

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A Yeah. So how do you define -- yeah, so I can't answer it beyond that.

Q Okay. So you can't answer whether you are an expert in the field of engineering?

A I've told you --

MR. RUSSELL: Objection, asked and answered.

THE WITNESS: -- there is a very nuanced -- there are very nuanced meanings to expertise. I could easily claim that I'm an expert in that field with justification for having served for ten years as a tenured faculty in an aerospace engineering department. Beyond that, I don't have anything to say about that.

Q (BY MS. OLSON:) Do you have expertise in nuclear engineering, Dr. Curry?

A I've read some. I would not claim to be an expert nor would anybody else label me as an expert.

Q Okay. And what about in the field of physics? Would you identify as an expert in physics?

A In some areas of physics.

Q Which areas?

A Fluid dynamics, at least conventional fluid dynamics, spectroscopy, I mean there's a lot of overlap, you know. In some academic departments, atmospheric science might be under a physics department, so there is a fairly broad, you know, physics doesn't have a settled

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boundary.

Q Do you have specialized training in fluid dynamics?

A Yeah, I took in my main courses at the University of Chicago were in geophysical fluid dynamics.

Q And do you have specialized training also in spectroscopy?

A I took a number of courses at the University of Chicago, and I've published many papers on radiative transfer in the atmosphere that indirectly use spectroscopy.

Q Okay. And so just going back to my engineering question, have you published anything in the field of engineering?

A In actual engineering journals yeah, there was some papers on manned aerial vehicles that must exist somewhere on my CV.

Q Okay. And any other areas of engineering in which you've published other than manned aerial vehicles?

A Okay. Now, environmental engineering is a field that overlaps in many ways. So whether you choose to publish in an environmental engineering journal or more of an I would say a geophysical journal and how you classify papers becomes fuzzy. So there are some things that I have published on that could have easily been

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published in an environmental engineering about aerosols in the atmosphere and things like that. So like I say, these become issues to which there is no straightforward answer.

Q And am I understanding that it's your position that your expertise can stem from the type of journal in which you are publishing?

A No. I'm just saying you're trying to put a label on expertise and categorize it, and I'm saying it's a fairly pointless thing to do.

Q And do you consider yourself an expert in renewable energy?

A Yes. I've investigated renewable energy quite a bit. I provide forecasts of renewable energy. I have read extensively. I've worked with electric utilities and understanding I've read very widely on the subject.

Q Have you taken any classes in renewable energy?

A No. I stopped taking classes in 1982. I do my own learning.

Q And have you ever worked in the field of renewable energy?

A Well, yeah. My company provides weather forecasts tailored to renew — I predict wind power, for

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example.

Q Okay. So apart from the weather and climate forecasting that you're doing for some renewable energy companies, have you otherwise worked in the field of renewable energy?

A In the sense of researched and written about it, yes, I have.

Q Okay. And have you published papers on renewable energy?

A My book. I no longer publish in academic journals because I've left the university. There's no point. There's no reward. Only a bunch of grief. I would just dotting the i's and submitting it to online and, you know, I see no point to publishing in peer-reviewed journals now that I am no longer since I've retired from university.

Q Okay. And is it correct that your book is not a peer-reviewed publication?

A Oh, it's undergoing peer review four months and counting. It's undergoing extremely extensive peer review. It is published by an academic press.

Q Okay. And what's involved in that peer review for your book?

A They send it out to I don't know how many — probably a half a dozen experts — many of which I

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suspect are in the social sciences. I don't know who the peer reviewers are.

Q Okay. So it's blind peer review?

A I don't know who they are, but they know who I am.

Q Okay. Just going to go through a couple more areas of expertise. Are you a sociologist?

A No, I'm not a sociologist.

Q What about an anthropologist?

A I'm not an anthropologist.

Q Do you consider yourself to be an expert in psychology?

A I have a fair amount of understanding of social psychology, and that's something that I've written on and explored quite a bit, so clinical psychology, absolutely no. But I do — I have read fairly extensively in the area of social psychology, and there's a lot of references to social psychology in my book.

Q Okay. And is that through your independent learning not through coursework that you've done in social psychology?

A Independent learning and engaged in — and engagement with experts in a variety of venues.

Q And do you have any other specialized training in social psychology other than your independent

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study?

A No.

Q Have you published anything in the field of social psychology?

A Only in my book.

Q Okay. And do you consider yourself to be an expert in psychiatry?

A Like I said, social psychology, I have a substantial knowledge base in many areas. Clinical psychology, absolutely not.

Q Okay. And would you agree that social psychology and psychiatry are two different —

A Yes. Psychiatry —

Q — areas of expertise?

A — is one field. Clinical psychology is another field. Social psychology is another field. They have different objectives, different areas of focus.

Q Okay. And are you an expert in children's mental health?

A No. I have some personal experience with communicating with children about their experiences, and I've read extensively in the literature, although it's a very young literature. It goes only back to about 2018-2019.

Q And would you agree that communicating with

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children doesn't qualify someone as an expert in children's mental health?

A Yes. I'm just saying I have knowledge, firsthand knowledge of engaging, and I have read extensively.

Q And do you consider yourself an expert in children's physical health?

A No.

Q And you're not a pediatrician; correct?

A I'm not a pediatrician.

Q And do you have any other experience in the medical field?

A No.

Q Do you consider yourself an expert in the glaciology?

A I've taken -- I have education and I've read extensively. My Ph.D. thesis was actually related to the Arctic, so I'm a snow/ice person, so I'm fairly knowledgeable about glaciology.

Q Do you have any peer-reviewed publications on glaciers specifically?

A No.

Q And do you consider yourself an expert in energy policy?

A I'm fairly knowledgeable.

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Q But not an expert?

A No.

Q And do you consider yourself an expert in electric power systems?

A In the engineering aspects of it?

Q Yes.

A In the operational, I have a fair amount of operational knowledge in terms of having interacted closely with people who do that.

Q Can you describe what you mean by "operational knowledge"?

A People who work at trying to keep the electricity flowing. And I will mention one because this company was never a client of mine. This is Russell Schusler, who is a former vice-president of planning for the Georgia Transmission Corporation. He writes a long -- many, many blog posts for my blogs explaining issues. He's invited me out to visit them and talk to the whole team several times, and I visited.

Another one I can mention is Georgia Power. These are -- never were paying clients. This is a Southern company. I've interacted extensively with them over the years in terms of trying to grapple with all of the problems and what they want, what they think they need to do in terms of keeping the power going while at

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the same time trying to incorporate more renewable energy. And then there are my paying clients who I am not going to disclose, but I have interacted with people who are involved in the operational aspects both of planning and keeping the power running right now.

Q Have you received any specialized training in how electric power systems operate?

A No, only in my engagement with that community over a period of decades. Like I've been invited to give presentations at FERC and at NARUC and various what I would say electricity-related organizations.

Q Okay. And have you published anything on electric power systems?

A No, only in my blog and my presentations.

Q Do you consider yourself to be an expert in greenhouse gas emissions accounting practices?

A The physical processes of greenhouse gases, but in terms of --

Q I'm just talking about the accounting.

A Oh, you mean this factor of five of Erickson and all of that kind of stuff? No, I just bring common sense. I bring common sense to the table.

Q And are you an expert in economics?

A An ex -- I'm fairly widely read, and I'm knowledgeable about environmental economics and some

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aspects of microeconomics. I'm more knowledgeable about microeconomics topics than macroeconomics topics.

Q You haven't trained as an economist; correct?

A No, I have not. Like I said, I have a license to learn that I've been very actively using for the past many decades, four decades now.

Q And have you published anything in the field of economics?

A No.

Q Do you consider yourself to be an expert in forest management?

A No.

Q What about fish biology?

A No.

Q Forest fire science?

A I have some significant knowledge in the sense that my company does predict wildfire risk, okay. I have testified on the topic. One of my Congressional testimonies presents my analysis on the topic, so I have -- it's something that I have developed some knowledge that people seem to be interested in.

Q Did you take any classes back when you were in school in forest fire science?

A No.

Q And have you published anything on forest

fire science?

A No.

Q Okay. And prior to your work in this case, had you done any research on climate change in Montana?

A No.

Q So you began studying the climate of Montana for the first time with respect to your work in this case?

A Yes.

Q And have you conducted any of your own research on the climate of Montana?

A No.

Q And have you published any peer-reviewed papers on the climate in Montana?

A No.

Q And was -- when you were preparing your expert report in this case, was that the first time that you began reviewing scientific publications on the climate in Montana?

A Yes. Yeah.

Q And was it in conjunction with preparing your expert report in this case the first time you reviewed the Montana Climate Assessment?

A Probably, yeah. Who knows if I would have encountered it. It never made — if I encountered it

some previous time, it didn't make much of an impression.

Q But it's accurate that you don't remember —

A I don't remember.

Q -- sitting here today —

A No.

Q -- that you've ever reviewed it prior to working on this case?

A No.

Q And have you ever been to Montana?

A I don't think so. I might have driven through. Drive by or something.

Q Do you have any other ties to Montana besides your work on this case?

A None.

Q Okay. And would you agree -- actually, before I go there, Dr. Curry, do you consider yourself an expert in any other field that I haven't already covered?

A Yes. Okay. What I bring to the table is meta expertise, something that is increasingly called wicked science where — wicked science which focuses on extremely complex problems with dimensions that are growing that experts don't even agree on the dimensions that have a political component to it where there's no easy solution. Sometimes the problems are worse than the solutions. And this is increasingly being called wicked

science, okay.

And so before there was a label for it, my particular superpower, if you will, is that I can -- I'm a very fast reader. I can assimilate a lot of information. I can delve deeply and learn new things and synthesize them into addressing large complex problems. So that's what I do.

Do I have expertise in every one of these things? No. But I have a network of people that I'm connected with that I can draw on like, for instance, okay, I did — okay. When you asked if I consulted with anybody, I did ask a friend of mine. I didn't tell them Montana or whatever. This whole issue of, you know, the children and whatever, this is a person who is an expert in military psychology and one of the world's leading experts on stress. And I'm not going to give you his name because he's a military officer and he probably does not want to get mixed up in this, but the point is I did consult with him. This is an example of, you know, a very wide network of people that I've developed over the years that I can engage with when I need additional expertise and insights and as a sounding board for ideas.

Q And who are some of those other people who are part of your network who you rely on as experts in their field?

A Oh, my gosh. All over the place. Economists, social psychologists, engineers, computer specialists, philosophers of science. All, you know, it's a very large network of people that I've developed over the years, people who contact -- who have found out about me through my blog mostly, just through my public profile, who I've developed lawyer, lawyer in the Netherlands who is a very valued resource. All over the world in many different fields. And this is the kind of thing that you need to do wicked science. Like I can't do it all on my own. I do a lot on my own, but it's this network that I've developed that helped me pull these analyses together.

Q And who coined the term "wicked science"?

A Oh, it's well, the term "wicked problem" has been around for a while. In fact, there's a lot of this in my book. Wicked science is a more recent term, and I think it was Nature Scientific American. Universities are trying to figure out how do we train students to deal with these complex problems that go beyond a single discipline.

So this is why to me a lot of your questions about are you an expert in this or an expert in that, you know, just don't mean anything to me or resonate. Okay. So there are -- It's all referenced in my book. There's

a whole chapter or a section on wicked problems and then in part three, actually, Chapter 15, I introduce the wicked science concept.

MR. RUSSELL: Been going another hour. Do you mind taking another break, about ten minutes?

MS. OLSON: Do you want to take a break in ten minutes or now, Michael? Sorry.

MR. RUSSELL: Now for ten minutes.

Q (BY MS. OLSON:) Yeah. If Dr. Curry could just answer the question. Do you know who coined the term "wicked science"?

A It's referenced in -- I don't know the person personally. I can't recall the name.

Q Okay.

A It is referenced in Chapter 15 of my book.

Q Okay. And are you ready to take a break, Dr. Curry?

A I'm good either way. Yeah, let's take a break.

THE VIDEOGRAPHER: One second. We're going off the record, and the approximate time is 11:15 a.m.

(Recess.)

THE VIDEOGRAPHER: We are going back on the record, and the approximate time is 11:32 a.m.

Q (BY MS. OLSON:) Dr. Curry, several times

you've referenced your book, and so just for clarity of the record, are you referring to your book Climate Uncertainty and Risk?

A Yes.

Q And is it correct that Anthem Press will publish your book, but it's not published yet?

A It's not published yet.

Q And I believe you said it's still going through peer review --

A Yes.

Q -- correct? Okay. And do you know the anticipated date of publishing?

A Well, the anticipated date of publication, I think is June 1st, but these dates can slip. I hope it doesn't.

Q Okay. For how many years did you conduct research on extreme weather events from climate change?

A Since 2005.

Q And have you stopped doing your own research on extreme weather --

A It's ongoing. This is a key activity of CFAN.

Q And are you familiar with the science that warmer air holds about four percent more water vapor per degree Fahrenheit of warming?

A Yeah.

Q And so you agree with that?

A Okay. All other things being equal, the issue is that all other things are never equal. But just from a back-of-the-envelope thermodynamic calculation, that relates to the saturation vapor pressure. It does not relate to the actual amount of water vapor in the air.

Q Do you agree that warmer air holds more water vapor?

A If you're talking about the saturation vapor pressure at higher — is at higher temperatures is greater than at lower temperatures. The amount of humidity in the air depends on circulation patterns, a whole host of things.

Q Okay. And do you agree that if all things are equal, approximately — there's approximately four percent more water vapor in the air per degree Farenheit of warming?

A Yes, with the caveat that all things are never equal.

Q Okay. And do you know of any scientific publications that dispute that scientific fact?

A Yes. The key issue is in terms of how much it relates to the process of convection, and there's been

an ongoing debate about tropical convection and whether it moistens or dries the air.

For a long time, it was how shall I say a skeptical argument that tropical -- by Richard Lindzen that the tropical convection could actually dry the tropical atmosphere, but more recently, a very mainstream how shall I say slightly alarmed scientist had some research that supported Lindzen's idea. And the bottom line is that we really don't know how the dynamics of tropical convection are acting to redistribute and overall moisten or dry the atmosphere, so it's —

Q What's the name of the scientist who you just mentioned?

A Kerry Emanuel.

Q And other than Richard Lindzen's work on this area of tropical convection and now Kerry Emanuel, are there any other scientific publications you can think of that dispute?

A Yeah, one of my own, actually, probably in 1995, and this relates to humidity in the Arctic. And my argument is that especially during winter -- see if I can find the exact. Do you want me to find the exact publication? Probably 1995. Water Vapor Feedback in the Arctic. I'm sure it was '95. Let's see.

Q Interactions Among Aerosols, Clouds and

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Climate of the Arctic?
A No.
Q Study of tropicals?
A Number 38. Number 38. Water Vapor Feedback Over the Arctic.
Q Okay.
A Okay. The story — and this relates to very cold temperatures probably in Montana during winter. Sometimes you see this little ice crystal haze. It's not really a cloud, but it's almost like an ice crystals in the air. It doesn't reduce visibility that much. It's not like a fog, but it reduces visibility somewhat.
And so the point in this paper is that the phase of the condensate in the lower atmosphere, whether it's liquid or ice, has a key component on the relative humidity of the lower atmosphere. And my argument was actually that in the Arctic during winter — I mean, this is years ago, the argument was that if you warm, you're going to have more liquid than ice, and you will be referencing to the saturation vapor pressure over liquid rather than the saturation vapor pressure over ice.
And so if you're, you know, without going into details, it wasn't a simple scaling. Okay. It had to do with the phase of the condensate in the atmosphere. So like I said, very complicated issue both in dynamics

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and thermodynamics and a simple back-of-the-envelope calculations that only relate to the saturation vapor pressure as a function of temperature which has been known for 150 years doesn't tell us a heck of a lot about the amount of moisture in the Earth's atmosphere.
Q Okay. Related to your refereed journal publications, have you ever had to publish a retraction for anything that you —
A No.
Q So you stand by all of the references?
A There have been comments, there have been published comments that we've responded to, but —
Q But apart from that?
A Never a retraction. No.
Q So you stand by all of your refereed journal publications?
A Sure. But things change with time, okay, but I can't think of anything that I would say oh, if I could wipe this one off the books, I would. No, I can't think of anything.
Q Thank you.
A Science has moved on it and may be relevant or I missed something or whatever, but —
Q Is it your opinion, Dr. Curry, that there might be a global warming signal in the more extreme

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weather events that have been occurring in the last two decades?
A According to the IPCC -- I will refer directly to the IPPC. This is the sixth assessment report. They don't find a heck of a lot. I can cite, yeah, I'd just go to IPPC.
They found in some regions an increase in heatwaves, but that's confounded with urban heat island effects and urban development, so it's very difficult to attribute that. There has been no increase in meteorological or hydrological drought.
There's, with regards to flooding, they say well, in some regions, there's more flooding. In some regions, there's less flooding.
With regards to hurricane intensity, they look for a signal and say there might be some sort of a signal, but it's not very high confidence and, you know, it's fairly disputed. Again, thermodynamically, you would expect one, but given the large amount of natural variability, you don't see it.
2022 was like a record-breaking low activity hurricane year globally, okay, since 1980 records. So there's no simple way to untangle the signal from natural variability. There's no increase in tornadoes, no increase in severe convective weather. They say that

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cold events should decline. Recite that one to your friends in Montana next week. They're going to get hit by a big cold outbreak.
Q So for clarity of the record, Dr. Curry, which IPPC assessment are you talking about? AR6?
A AR6. And the story hasn't changed from AR4 and AR5, but AR6 is more authoritative.
Q And the full AR6 has not yet been published —
A Oh, yeah.
Q -- correct? Oh, it has?
A They have.
Q Are you referring --
A They haven't done the integrated summary. They haven't published that yet, but they've published the working group one report, working group two, working group three, including the technical summary reports. I don't believe they've done the synthesis report yet.
Q And are you referring primarily to the conclusions in working group one?
A Working group one, which is where they do the scientific assessment. In working group two, they assume a lot of things that they shouldn't be assuming.
Q Okay. We're going to jump into your expert report.

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A Good.
Q You have that in front of you. And I understand that you may be asked to do more by the State than what you have done in your expert report, but just for clarity, as of today, as you're sitting here, all of the opinions that you intend to testify to at trial that you've been asked to testify to are stated in that expert report with the exception of the new information you have on the citing of surface observation stations; correct?
A Yes, but I — if there is some new assessment or new important research result —
Q Right.
A — I would say I would reserve the right to mention that if asked about that topic.
Q That's fair. But sitting here today --
A Yeah.
Q -- we have your opinions.
A Yeah.
Q Great. Okay. And can you point me to the pages in your expert report where your technical assistant, Mark, worked on different sections?
A Okay. He — okay. There's Figure 1.5. He -- on page six.
Q Okay.
A He put that together after I asked him say

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well, in the complaint, they only go to 2015. Can you investigate and see what's been going on with the snow since 2015? And he came up with this figure, okay.
On page seven, he spotted the publication in Figure 1.6. I had spotted something different that was similar, but this is a better figure, and he put that red box around the 1930s.
Q Okay.
A Okay. Let's see. We have to skip to — oh. Minor point. In Table 2.1, which is the IPPC projections, I asked him to convert from Centigrade to Fahrenheit for so it could be more easily understood by the people who would likely read this.
Then we go to — okay. Section 3. I already mentioned before that he created this Figure 3.1 and provided I wrote the actual text, but he provided the information I used in 3.1.1 in solar power. I'm pretty sure I found that figure. Figure 3.3, I found a different figure, but he found what I think is probably a better figure than the one I found. The geothermal power, he definitely found that one.
Q Figure 3.4?
A Yeah, this would be 3.4. He found that one.
Q Okay.
A Okay. I pointed him to the Gordon Butte

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project and asked him to look into that particular project more deeply and to see what else he could find on pumped hydro storage in Montana, so he added some stuff to that third paragraph on page 21.
Okay. Let me see if there is anything else that he did that is apart from footnoting and that kind of thing. No. Those were — that summarizes his substantive contributions to the report.
Q Okay. And was Mark Jelinek, was he one of your graduate students at Georgia Tech?
A He got Master's degree under me.
Q And so you were his advisor; is that correct?
A I was his advisor. Yeah.
Q And what was his research in at the time when you were advising him?
A Snow. North American snow and the record.
Q So snowpack?
A It was — I couldn't tell you the details, but snow. Topic of snow in North America and the climatology and the record and how we sense it and I couldn't -- long time ago.
Q At the time when you reviewed it, did you agree with his —
A Oh, yeah. It was --
Q -- conclusions and --

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A — 2006 that he might have gotten his Master's degree. I mean, that's sort of a long time to remember.
Q Okay.
A But it was a good thesis.
Q And was Mark Jelinek employed by CFAN or did he always just consult?
A No, he was employed for a while, and he left when his wife became seriously ill and eventually died. And then a couple of years after that, he said: Hey, I'm available. And he said he's doing some consulting for us on a project basis.
Q Okay. So again -- and this is just sitting here today, Dr. Curry, the four bullet points that you referenced earlier on page one of your expert report, are those your four primary opinions that you are offering as an expert witness in this case and plan to testify to at trial?
A Yes.
Q And when you say "historical natural weather and climate variability" in the first bullet, what time frame are you referring to by "historical"?
A Back to 1900, a little bit earlier if possible, maybe 1850 where there's some actual historical records.

Q And what do you mean when you say "with worse occurrences of weather and climate extremes observed during the early 20th Century"?

A Okay. Which bullet are you referring to?

Q It's still in that first bullet point on page one.

A Okay. Yes.

Q And what I'm curious about is what you mean by worse than what? You discussed worse occurrences of weather and climate extremes observed during --

A Relative to the last two decades, which seems to be the reference point for any concerns that the youth plaintiffs might have.

Q Okay. And is it your expert opinion that weather and climate extremes of the early 20th Century were worse than the weather and climate extremes of the first two decades of the 21st Century?

A In the U.S.?

Q Yes.

A And in Montana, yes. And elsewhere in the world, no. The 1930s were horrendous. The worst hurricanes were in the '20s and '30s, the worst forest fires were in the early decades and even worse in the 19th Century, so there's nothing exceptional about what we're seeing even with regard to the extreme heat. The

records were set in those early decades of the 20th Century.

Q And what is the basis for your opinion that the extreme weather and climate events in the early part of the 20th Century were worse than the extreme climate events in the first two decades of this century?

A Okay. Particularly with regards to the State of Montana, I reference whatever it is -- a NOAA report on Montana climate that was, I think, published in early 2022. The figures on page four and five, there's also additional statistics cited, okay, in various places. Okay.

On page three, a lot of the records — again, they're cited in footnotes one through six, and then those graphics are from the NOAA report. So all of this comes from information that's somewhere that resides somewhere or another in NOAA websites, reports, whatever.

Q Okay. And so all of -- the basis for your opinion is contained in these pages primarily --

A Yes.

Q -- three, four and five?

A Yep.

Q And is there any uncertainty in your opinion about that conclusion?

A Yeah, the temperature records. Like I said,

all data is messy, okay. And the temperature records, like I've already said, there's problems with citing. I mean, the longest station is Helena, and that's like sitting in a very bad airport location.

So there's problems with all data, but I don't think we can do any better for these purposes, you know, without doing a real forensic analysis and if this case ever decides they need a forensic analysis to get to the bottom of what the uncertainties are and all of these things, I mean, for right now, I don't think we can do better than go with what NOAA has published.

Q Can you tell me how much scientific uncertainty there is in your expert opinion?

A In terms of the temperature records, Montana's temperature records?

Q In terms of your opinion in that first bullet point on page one.

A Pretty much zero. The 1930s were so overwhelmingly awful in the Great Plains states. I mean, there's nothing that's recently happened that comes close to it. And none of the rebuttals disagree with my statements about the 1930s. They would say oh, but that was caused by La Ninas. Okay, but it doesn't mean it didn't happen. So none of the expert rebuttals disputed what I had to say about the 1930s.

Q Would you agree that the climate conditions in Montana today are a function of both fossil fuel driven climate change and natural weather and climate variability?

A Yeah, the relative proportions is, you know, what's --

Q And would you agree similarly that with respect to temperatures in Montana, it is a function of both?

A It's both. It's both. Yeah.

Q And just for the record --

A Yes.

Q — both fossil fuel driven climate change and natural weather and —

A Yes.

Q -- natural weather and climate variability?

A (Indicating.)

THE COURT REPORTER: Is that a yes?

THE WITNESS: Yes. Sorry.

Q (BY MS. OLSON:) And I'm going to ask you a similar question with respect to precipitation patterns. Is that also a function of both fossil fuel driven climate change and natural weather and climate variability?

A Yes, but I want to make the point that with

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regards to precipitation, there is no evidence of any trend, and several of the rebuttal reports agreed with my statement that there is no trend in precipitation in Montana over the last 120 years.

Q Would you agree that the weather conditions in Montana today are a function of both fossil fuel driven climate change and natural weather and climate variability?

A I would like to qualify that statement in terms of there is evidence of a temperature increase associated -- some component of that is associated with fossil fuels. There is much less evidence supporting any influence on many extreme weather events if not all weather events, so there is a little observational evidence for much of it, and there is little theoretical support for much of it.

Q Would you agree that burning fossil fuels, especially since 1970, has been a significant driver of climate change?

A We want to -- I agree with you that it's the period since 1970 where fossil fuels emissions have been significant. If you look further back than that, you know, you don't see it in much of anything. We have seen an increase in temperatures since 1970 which also coincides with the Grand Solar Maximum, the biggest one

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in a millennium. It also coincides with the Pacific Decadal Oscillation, okay, being in a phase that contributed to warming between 1976 and 2000. So how you separate all of that out from a fossil fuel impact versus natural impact, I don't think that's been done very well with high confidence. Yes, there is for temperature. For extreme weather events, the link is much more dubious.

Q Would you agree that the burning of fossil fuels, especially since 1970, has been a significant driver of increasing the concentration of carbon dioxide --

A Yes.

Q -- in the atmosphere?

A Yes.

Q And do you agree that in 1970, atmospheric CO2 was about 326 parts per million?

A Yes, because I remember when I did my thesis, my first draft, it was 300 because that was, you know, people just talk about it's 300. And then you go oops, it's 330 circa 1980, so that sounds about right.

Q And what are CO2 levels today in the atmosphere?

A Oh, they fluctuate. 418. Something like that.

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Q And 418, 417 is the global annual average of CO2?

A The last value that I saw.

Q Okay. Do you, Dr. Curry, object at all to the basic science of climate change?

A In what sense?

Q The science that increasing greenhouse gases especially carbon dioxide in the atmosphere raises the temperature of the Earth and the increasing temperature of the Earth then has impacts to the natural systems?

A All other things being equal.

MR. RUSSELL: Leading, compound.

THE WITNESS: I missed that.

MS. OLSON: You can answer.

THE WITNESS: All other things being equal, I would agree. Yes.

Q (BY MS. OLSON:) Okay. So we're going to go to bullet two on page one. What is the basis for your opinion that plaintiffs' concerns about climate change in the 21st Century are greatly exaggerated?

A Okay. Well, that's outlined in great detail. If you go to page nine, you can see that in my assessment, I referred to the IPCC fifth and sixth assessment reports, the EU Framework Convention on Climate Change Reports, the International Energy Agency

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Global Energy Review, and I mention the fourth U.S. National Climate Assessment. Okay. These are pretty unimpeachable sources.

Q Okay. And apart from those unimpeachable sources, was there any other data that you relied upon in coming to that opinion?

A No. I mean, the arguments are outlined here in terms of include rejection of the RCP 8.5, the extreme emissions scenario, which the policymakers are ignoring at this point even though the IPPC AR6 continued to like them. They had -- it was the most cited emissions scenario in the IPPC reports. They told all of the climate modelers to make sure you run RCP 8.5, and then now it's apparently like okay, this is just an implausible scenario.

So a lot of times these things in the IPPC are moving slower than what's happening at the front lines of both policy making and the science, and I'll get to this point in a minute is that one chapter in the IPPC hasn't really caught up to what's going on in another chapter. And I'll give you some instances of that.

Q And would you agree that with the IPCC reports, there's also often some -- they're observed effects of climate change on the ground that are not accounted for in the IPCC reports because the IPCC

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reports are often out of date?
A Yeah, IPCC —
MR. RUSSELL: Objection, lacks foundation. Go ahead.
Q (BY MS. OLSON:) You can answer. It's okay.
A Okay. But I couldn't really --
Q He said lacks foundation.
A Okay. The IPCC has a particular framing of the climate problem which I and others think is too narrow. Okay?
Q Well, what makes it too narrow?
A They focus only on dangerous human caused climate change. They relatively neglect natural climate variability. They neglect any aspect of warming that might be beneficial. And although in terms of the AR6 is more holistic in looking at a broad range of impacts, the previous ones, most definitely, were not.
Q Okay. And we'll talk more about IPCC.
A Okay.
Q But going back to your expert report, in that second bullet on page one —
A Yeah.
Q -- Dr. Curry, you reference plaintiffs' concerns?
A Yes.

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Q And I just want to be clear I understand what that means.
A It's what was cited. It was statements.
Q Are you, just for clarity, are you referring to their claimed injuries on pages five through 26 of the complaint? And if --
A Okay. I'm referring -- the specific things are at the bottom of page eight and the top of page nine. Okay. It's specific concerns cited in the earlier part of the youth plaintiffs, and then I also cite the further concerns that were written later in the report that were written by somebody -- clearly an adult who was writing these and who had read literature not the young plaintiffs who were responding to what they've observed. So it's on page eight and page nine.
Q Okay. So your conclusion, your opinion on page one in that second bullet is only responding to the concerns that you have identified on pages eight and nine of your expert report; is that correct?
A Yeah, it's directly targeted to these concerns.
Q Okay. And have you ever met any of the plaintiffs?
A No.
Q Have you ever spoken to any of the

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plaintiffs?
A No.
Q Did you ask to review any of the documents that plaintiffs reviewed in this case?
A No.
Q Did you review any of the plaintiffs' depositions?
A No.
Q And when you say that the plaintiffs' concerns are greatly exaggerated, you are not referring to all of their allegations in the complaint; is that correct?
A No. Section 2 relates to their concerns about the future. You know, we might not have a future. I don't think I should have children. You know, these things.
Q Dr. Curry, I'm going to pass you — this has already been labeled as Exhibit 1 in our depositions.
A Uh-huh.
Q And it's the complaint in this case.
A Yeah.
Q And I just want to point you to starting at page five and through pages 26, those are the pages --
A Yeah, those I've read that. Yeah.
Q You've read all of those?

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A Yes, and I cited. I cited from that.
Q So you aren't addressing all of the concerns that plaintiffs raise in the complaint. You're just addressing the ones you specifically identified in your expert report; correct?
A I have two separate classes of on page two and three, I summarize concerns about what they've been experienced throughout their decade or so of life, so I reference those concerns. Severe hailstorm, reduced winter snowpack. They cited those things. On this page, I address concerns about the future. Okay. So I address them one in Section 1, the other list of concerns in Section 2.
Q Okay. And is it your opinion of the concerns you've identified in your expert report, present-day concerns or past concerns as well as future concerns, that all of those are greatly exaggerated?
A They feel what they feel. I'm not questioning what the plaintiffs feel and think and have experienced. I'm questioning they're blaming it on fossil fuelled climate change and having concerns about the future that go well beyond anything that can be justified based on IPCC reports and current thinking of the U.N. Framework on Climate Change.
Q Do you believe that any of the statements by

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the plaintiffs referenced in your report are not greatly exaggerated?

A Okay. The ones over here, page two and three, I do not question that they have experienced these things. What I question is blaming all that on fossil fuelled global warming because, you know, worse things have happened in the early 20th Century that have nothing to do with fossil fuel climate change.

Q So your opinion is not questioning the veracity of the plaintiffs' statements?

A I don't question those young plaintiffs about anything that they think or feel. Absolutely do not.

Q Okay. And so just as one example to make sure we're on the same page, Dr. Curry, if you look at the bottom of page five of the complaint, exhibit --

A Okay. This is Rikki.

Q Paragraph 15?

A Uh-huh.

Q Do you see that?

A Uh-huh.

Q So in that paragraph, Rikki Held alleges that due to changes in the climate, there is increased variability in the water levels and the river that her family has water rights to for their ranch. Is it your opinion that Rikki is not exaggerating that fact?

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A Oh, yeah.

Q Do you think that Rikki is exaggerating that fact?

A Rikki sees what Rikki sees. Okay. Caused changes in climate with the inference that all of these changes are associated with fossil fuels.

To rebut that, again, the records, if you look on page three, we have the record wettest year is in 1927, and the precipitation record was 1921, so you had huge swings in precipitation in the 1920s that you can't blame on fossil fuels. So I don't question what Rikki is seeing is climate variability most likely related to the El Nino and La Nina cycles and how this impacts rainfall in Montana.

Q And just one other example for clarification. On paragraph on page 10 and 11 of the complaint is paragraph 29.

A Eleven. 29. Okay.

Q And Soriel is a member of the Confederated Salish Kootenai Tribes?

A Yes.

Q And so one of Soriel's allegations is that the lack of winter snowpack in recent years is harming her and her community on the Flathead Reservation. You don't disagree with that; correct?

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A I see over her short life this is what she sees, but this was written before 2020 when there was a record snowfall for Montana, and she didn't know about the snow draught in the 1930s, okay, so there's a lot of natural variability implied. And blaming this on fossil fuel warming, you can't do that based on her experience.

Q Okay. Let's turn to back to your bullet number two in your report where you are referencing the most recent assessment reports. And just for clarity, you're referring to the IPCC reports, the National Climate Assessment the United States prepares and the Montana Climate Assessment; is that correct?

A I didn't — I don't -- I didn't reference the Montana report, and I didn't -- I down weighted the fourth U.S. National Assessment Report because it is nowhere near the quality of the IPCC report.

Q Okay. And so when you refer to most recent assessment reports?

A The following most recent assessment reports that I itemized by bullets on page nine. Bottom of page nine of my report.

Q Okay. Great. Thank you.

A Okay.

Q And do you believe that the assessment reports you rely on are greatly exaggerated in any way?

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A The IPCC's sixth assessment report, working group one, I think they got some things wrong, and I think they're overconfident on a few things, and there's a couple of things that they missed with one chapter saying one thing and then the other chapter ignoring it kind of thing. But apart from that, I think the sixth assessment report is pretty good. I thought the working group two report per the sixth assessment was very -- was poor. The fifth assessment working group two report was much better.

Q Okay.

A That's why I say I also include the fifth assessment report.

Q And last question about that bullet point you refer to research publications that you also rely upon, and are you referring just to research publications that are cited in your expert report either your refereed publications or your footnoted publications?

A No, the footnoted references are the ones that I referred to.

Q Great. So moving to the bullet number three.

A Bullet number three. Okay. Yes, and this is sort of chapter three which starts on page 16.

Q Yeah, and right now, I'm just looking at page one and --

A The bullet.

Q -- so is it -- is that the opinion you will testify to at trial that there are significant problems with the portfolio of 100 percent renewable energy for Montana by 2050?

A Yes.

Q And what is the basis for that opinion?

A The documentation of the variability of hydropower, wind power, and also the large fluctuations in energy demand associated with the extreme cold outbreak such as the one that I cited. 2020 -- 2020 was a bad one. That, my consultations with many experts in the energy industry, wide readings, most of which is, but it basically relies on the variability which can be extreme variability in the hydropower, wind and solar; that batteries will never be adequate in storing, the western -- the WECC, they rely on Montana to export energy. If Montana needs more energy, they're not going to get it from anywhere.

Mark Jacobson talks about again, this is the criticism. We'll get to, I assume, more criticisms of Mark Jacobson's ideas, but that the issue of pumped hydropower storage in Montana, I mean, you can't double count -- you can't use downstream and then pump it back up. You can't double count the hydropower for both. You

can't produce both at the same time, and that kind of double counting seems to have been done in Mark Jacobson's analysis. And the assessments of the Gordon Butte is that there isn't that many geological opportunities for pumped hydropower in Montana.

Q So, Dr. Curry, am I correct in understanding that your primary concern about a 100 percent renewable energy system is the variability in the availability of wind or solar or hydropower?

A Yeah. And it's also the other act is land use, which is probably less of an issue in Montana than many other places because you have a low population density, but there is land use and large amount of resource use and these -- the wind turbines have a lifespan of and solar panels of about 15 years, and you have to keep replacing them. And the additional transmission line, there's huge political and regulatory and economic and resource problems to overcome, and these issues -- none of these issues are simple.

Q All right. And you reference that you relied on the documentation around concerns about variability of availability of wind, solar and hydropower. Which references in your report best support that?

A I make forecasts two times a day of all of this. I see it happening on the ground. My clients, who

rely on this information, are communicating: Did you see that? What do you think, Doc? You know, and I see this on a day-to-day basis. This is what my company does.

Q So your own forecasting would be the best information that you rely on?

A Well, yeah, but there's lots of publications on this.

Q And which publications best support your opinion that renewable energy --

A Off the top of my head --

Q -- is problematic?

A Well, there's a whole series of blog posts written by a planning engineer. I've already mentioned him. This is Russ Schussler, who was.the recently retired vice-president of Trans -- of planning at Georgia Transmission Corp. He's written a whole series of articles on this issue.

Q On his blog?

A On my blog. He posts them on my blog.

Q Oh, on your blog?

A Yeah, he publishes them on my blog. I mean, people -- I don't think there's anybody who would argue that this variability doesn't exist. Even Mark Jacobson says oh, well, we'll just import energy from California, you know.

Q And, Dr. Curry, have you produced the blog posts that you just referred to that you rely upon for support for the concerns about variability of availability of wind, water and solar?

A Oh, I probably have. It's not that I rely on my blog post. It's that my blog posts were written as part of my background knowledge on a subject that was timely at a certain period.

Q Are there any peer-reviewed publications that support your opinion?

A There's hundreds on -- I don't think anybody would question Whitlock or Running or Trenberth or any of those people would question that there is variability in demand, there is variability in hydropower, there is variability in wind and variability in solar. I mean, this is widely known.

Q And I'm just looking for the best, you know, say the top two peer-reviewed publications that support your position.

A There's probably 10,000.

Q And have you cited to any of those 10,000 in your expert report?

A It's so well -known, I don't think anybody with any knowledge would challenge me on that. Not Mark Jacobson, not Kevin Trenberth, not --

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Q So my understanding that you can't cite to me a peer-reviewed publication?

A Oh, I can. I can. Off the top of my head, no. I can do a Google search and send you a list of 10,000 publications.

Q Is there one in your expert report that you can point to?

A That directly — I don't know. I have to look. Okay. An extreme seasonal wind drought occurred in early 2015 that set records across most of the western U.S. Publication 103 -- Footnote 103 and 104. I mean, there is stuff in the report.

Q Okay. So Footnotes 103 and 104 --

A Yeah, are relevant.

Q -- are a good place to look?

A 101 and 102 are also relevant references.

Q Okay.

A Let's see. Footnote number 120 is relevant. Okay. So these are some examples of stuff that was already cited in my report.

Q And with respect to Russ Schussler -- Am I pronouncing that correctly?

A Russ Schussler. Yeah.

Q Schussler. He posts as the planning engineer on your blog —

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A Yes.

Q -- is that correct?

A Yes.

Q And so you also rely upon some of his blog posts for this information?

A That has been part of my education as well as he's invited me to visit is Georgia Transmission Corp. where I engage with a whole host of engineers: Operational engineers, the whole works. So he's been a very — He's part of my network in the wicked science world.

Q Okay. Let's look at -- Do you think there's a significant problem with a portfolio of 95 percent renewable energy for Montana by 2050?

A Once you get over 50 percent, it gets very difficult, okay, in terms of integrating and grid stability. It's very difficult over 50 percent.

Q How about I ask it this way. What percentage of renewable energy for Montana by 2050 does not pose a significant problem in your opinion?

A I haven't done that analysis, but I would certainly not give a number over 50 percent. The concern in Montana is those extreme cold periods. Extremely cold. You say well, people can, you know, just huddle up for a few days. Well, what happens when the pipe

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freezes, okay, then when they thaw, you have massive damage to all of the residential stuff like that.

When you start burning wood in the wood-burning stoves, that causes a huge pollution problem in Montana during winter because you have a temperature inversion. You know, burning coal or gas or something is far cleaner and better for the air quality in winter than is the wood-burning stoves.

Q And by what year could Montana have a 100 percent renewable energy portfolio in your opinion?

A If they embrace geothermal -- this is the key. They need to embrace geothermal. And I think there is good geothermal resources in Montana. I mean, solar is a waste of time in Montana unless somebody wants it, you know, for their rooftop solar or whatever. It's not ever going to be a major source of power in Montana. Wind is potentially, but it's not there when you need it the most.

Q So by what — so if Montana included geothermal energy in its renewable energy portfolio, by what year would you opine that they could have a 100 percent renewable energy portfolio?

A Okay. The other factor is everybody's energy demand is growing. It's not just growing population, but if you're going to do electric vehicles, if you're going

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to do heat pumps, electric heat pumps, do everything electric, I mean, just my own household, I have solar power.

And since I installed solar power in 2020, I've added an electric heat pump, two electric hot water heaters, an induction stove, and my power has doubled. Solar now only provides half of what I need. It was covering everything for a while, and now it's like less than half even during the summer, so a huge increase in demand. But not only that, all of our advances that we, you know, hope for in the 21st Century, you know, fancy robotics, quantum this and, you know, all of these things that we hope for to make life -- new materials to make life better in the 21st Century, and it all relies on electricity.

Q So, Dr. Curry, is it outside your area of expertise to say by what time frame Montana —

A No —

Q — would go —

A It's not a matter of —

Q Let me finish my question. Could go to a 100 percent renewable energy portfolio? Is that outside of your area of expertise?

A No, it's not a matter of expertise because I do not pretend to be able to predict the technology

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advances. I mean, geo — advanced geothermal is not ready for prime time, although there's a new investment in the State of Nevada in geothermal energy. I cannot predict the regulatory issues. I mean, getting transmission, new transmission lines in the U.S. is a nightmare.

Q So if we took the regulatory issues off the table —

A Yeah.

Q Let's say Montana said we want to go for it. We're ready to go a hundred percent renewal energy portfolio. By what year — Are you able to tell me by what year you think they could do that transition technically?

A What I can tell you about is the risks they are facing with a rapid transition to renewable.

Q So the answer is no. You couldn't tell me by what year they could do the transition?

A Nobody can. You can make stuff up. You can do academic exercises based on toy models, okay, and if anyone believes that stuff, you know, I can sell you the Brooklyn Bridge or whatever.

Q So nobody can answer that question —

A Nobody can answer that question.

Q -- including you?

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A Yes.

Q Okay. Thank you. All right. Just so that we're clear about what a 100 percent renewable energy portfolio means, how would you define a 100 percent renewable energy portfolio?

A Well, personally, I don't find -- wind and solar because of the — until there's a circular economy that reuses all of that stuff in some way, I'm not going to say it's all that renewable because we're still continuing, you know. So geothermal, I think, is a good one. I mean, people have argued that biomass is renewable. Not on any kind of a meaningful time scale, so I am not buying biomass.

Q In your opinion, is there anything else that qualifies as renewable energy besides geothermal energy?

A Like I said, if you had a circular economy to reuse all of the wind turbine and solar panels, then that would be essentially renewable, but that infrastructure is extremely resource intensive. The amount of cement and steel and not to mention copper and whatever else that goes into building it, it's enormous. It's enormous.

Q Have you ever run any models on the viability of 100 percent renewable energy system in Montana?

A No, I haven't. I regard anyone's that I've

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seen to be toy models with oversimplifications and flawed assumptions.

Q Have you run any models on the viability of a 100 percent renewable energy system for any jurisdiction?

A No, for those same reasons.

Q Which of the energy models have you reviewed closely?

A I've looked at Mark Jacobson's. I've also looked at the extensive critique of Mark Jacobson's. That was a huge -- it was a pretty thorough takedown that was published in 2017 by 21 renewable energy experts. It was published in the preceding of the National Academy of Sciences. I mean, it was a scaling takedown.

There's a more recent report published by -- published under the auspices of NREL and DOE. I believe it was published earlier this year, and it was — they talked about what do we know and what don't we know about the feasibility of a hundred percent renewable systems for the U.S. And their conclusion is that there's a whole lot of research and development that's needed before we can really address this in a meaningful way and —

Q Are you aware that there are peer-reviewed studies that contradict your opinion?

A I know. And for every peer reviewed study

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like that, there's a scathing rebuttal, so this is why I think the experts at the NREL and DOE provide a more unbiased and authoritative assessment of this.

Q Okay. Do you know how much fossil fuel is extracted in Montana and transported out of state for use elsewhere?

A The exact number, no, but I know it's considerable. I will give one anecdote here. Do you want an anecdote or not?

Q I don't need one right now. Thank you.

A Okay. Good.

Q And do you know what percentage of the fossil fuels extracted in Montana stay in Montana for use?

A I've read Erickson's — I'm not challenging Erickson's number, but what I challenge is the relevance.

Q Okay. And have you researched or studied where Montana would site renewable energy sources or systems?

A Actually, one of my clients does own a wind farm in the State of Montana. I'll say that much without anything further.

Q So you do have a client who is based in Montana?

A No. They're a big wind farm owner. Out of the many wind farms that they own, one of them happens to

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be in Montana.

Q Have you advised that client on siting issues with their wind farm in Montana?

A No, I have provided them a lot of climate and weather analyses across the U.S. and in even overseas where they have wind farms that I suspect they may use to make future decisions about siting, but I didn't make any recommendations about siting.

Q And when you're advising a client such as that client on wind farms in Montana, what data are you relying upon in providing your assessments?

A Okay. For historical data, we look at the European reanalysis five product which is the one that is generally used. In the U.S. and for shorter time periods, I also look at the analyses from the HRRR model which is provided by NOAA, which is at higher resolution, but it's not as long time.

I found that using actual hub height data from wind farms itself, the data is incredibly noisy, and it's not necessarily representative, you know, it's influenced by the wind farms and the wind turbines itself, so I tend to -- although I look at it if it's available, I don't heavily rely on it.

Q And when you're doing these types of assessments, are you looking out many decades for climate

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and weather conditions?

A Three decades. Yeah, I look out as far as three decades into the future.

Q Do you look out six decades ever?

A They want it out to 2070, but I discourage them from that.

Q And are you incorporating climate data into those assessments that you're producing?

A Look at historical data, climate model simulation, look at a whole host of information.

Q And which of those scenarios from the IPCC or the IEA are you relying on when you're looking at climate change this century?

A I mostly rely on the 4.5. I have used 7.0, but in the past, I'm not using that one anymore. Right now, I like 4.5 and 3.4. I mean, of all of the uncertainties in what's going to happen in the future climate, I think the emissions scenarios are relatively constrained compared to all of the others uncertainties in all of this.

Q And I'm curious, Dr. Curry. When you have a client who comes to you, do you take into account their level of risk when you're looking at which of the scenarios for climate projections that you're utilizing to advise them?

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A I put a proposal out there. I said: This is what I propose to do. Okay. Do you want to add anything? Is there anything I'm proposing to do that you don't want? And I get feedback from the client. And invariably, they say: This looks good. And sometimes I would say: Could you look at this also?

Q Would you say that your clients across the board are concerned about climate change?

A I'm sorry?

Q Would you agree that your clients are coming to you because they're in part concerned about climate change this century?

MR. RUSSELL: Objection, vague.

THE WITNESS: Well, they're concerned about either the actual occurrence or the policy implications. Either way, I would say they're all concerned about climate change.

THE COURT REPORTER: And was that an objection?

MR. RUSSELL: Yes, vague.

THE COURT REPORTER: Thank you.

THE WITNESS: I'm not really catching this.

THE COURT REPORTER: The audio was bad.

THE WITNESS: Yeah.

Q (BY MS. OLSON:) Do you know, Dr. Curry,

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whether Montana imports any fossil fuels into the state to power with its energy system?

A I don't know, but they do have a small amount of natural gas that maybe I don't know if it's produced in state or not.

Q And is it your belief that having an entire energy infrastructure system in the United States that was powered by renewable energy would cause a lot of harm to a lot of people?

A Oh, yeah. I mean, yes. I mean —

Q And what's your basis for that?

A Lots of publications, lots of people I talk to. In Montana, the land use issue is not a big concern because you have low population density. But if you look in the Northeast U.S., I mean, even the environmental groups are against renewables. They don't want to import hydropower from Canada. They don't want the transmission lines. They don't want the wind turbines. They don't want anything close to the shore that they can even see, which means it needs to be at least 30 miles offshore. There's all of this kind of the pushback. There's concerns about reliability which I said that there's no, you know, you need for the extreme events which is when you need the power the most, this is the time when you're most likely to have the least amount of renewables,

energy.

Q Do you personally dislike the idea of a landscape with wind turbines and solar plans and transmission lines?

A Okay. I live in Nevada. 85 percent -- Did you see the movie Nomad Land?

Q No.

A It won the Academy Award. It's about homeless people traversing the great expanse of Nevada where there is nothing there, you know, forever. Okay. There's nothing there. I mean, there's even the ecosystems are even pretty much very minimal.

Of course I have no problem with wind turbines in the central and eastern parts of Montana where there's absolutely nothing. The issue is when it's disturbing ecosystems, when it's competing with land use for agriculture or recreation or whatever. So this whole land use issue is a big one in most places. I can believe it's not a big one in Montana.

Q Do you prefer a landscape with fossil fuel infrastructure over renewable energy infrastructure?

A The footprint for fossil fuel infrastructure isn't all that large. I mean, the actual generating stations are pretty small and localized. So as far as the aesthetics go, I would say, you know, I don't know

how relevant this is, but in terms of actual power density, nuclear has the great highest power density and has the lowest footprint of any of these energy sources.

Q Have you researched or published on the footprint of fossil fuel energy infrastructure?

A No, but in my going to be Chapter 14 point whatever of my book, I discuss this issue at length and there's -- I've read all of that, all of the relevant literature.

Q And does -- so I haven't read your book yet. We just received it yesterday.

A Okay.

Q Thank you. In Chapter 14, do you provide measurements of the land footprint for renewable energy system?

A Yeah, I reference papers that do. Yeah.

Q It's 12:35. Does lunch sound good right now, Dr. Curry? We'll take a break and then come back?

A Okay. For how long?

MS. OLSON: Phil, do you have a preference? 45 minutes?

MR. GREGORY: Forty-five minutes.

MS. OLSON: Does 45 minutes for work for you?

THE WITNESS: Sure. I prefer less than more, but 45 works.

MS. OLSON: Okay. Sounds good.

THE VIDEOGRAPHER: We're going off the record. The approximate time is 12:37.

(Recess.)

THE VIDEOGRAPHER: We are going back on the record, and the approximate time is 12:44. 1:44. Sorry. 12:44.

Q (BY MS. OLSON:) Dr. Curry, assuming it were possible to power the United States energy system on renewable energy, would renewable energy be preferable to fossil fuel energy in your opinion?

A Okay. The answer is is in the immediate term, we need fossil fuels, and we need fossil fuels to actually build the infrastructure for renewable energy.

Q But at the end of the day, if it were technically feasible.

A And at the end of the day, by the time 2100 rolls around, fossil fuels will be increasingly more expensive to extract. Okay. And there are geopolitical concerns with fossil fuels. So I've never argued that we need to keep fossil fuels like there are a number of reasons to transition away from fossil fuels apart from CO2. Okay.

Q You agree that fossil fuels cause other harmful pollutions to human health; correct?

A Okay. You can — apart from CO2, you can manage the pollution, you know, with scrubbers and air quality and whatever. A lot of that can be managed from fossil fuels. The main pollutant issue of concern is CO2. Okay.

That said, to me, the bigger reasons for moving away from fossil fuels over the course of the 21st Century are geopolitical concerns about, you know, which countries actually have the big fossil fuel resources and the fact that fossil fuel resources are not finite. They will become increasingly expensive to extract. So I've always been in favor of envisioning a new infrastructure for 21st Century electricity and transportation so that we have abundant clean whatever. I just haven't — not to think that fossil fuels are the -- I mean that renewable wind and solar are the answer.

Q Okay. And is it your greatest fear that we won't have a replacement for fossil fuel energy infrastructure?

A Eventually, we will. I mean, nuclear. This is my whole point about transition risk. We can do some really stupid things over the next two decades that will harm us and put us in a worse place than we would otherwise be for an eventual transition to a much better place by towards the end of the 21st Century. So I think

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this rush to renewables is misguided.

Q Would you agree that it's a stupid thing to keep putting CO2 up into the atmosphere at the rates we are presently?

A I think it's really a very long-term issue. The issue of it's a century scale problem like if we were to stop this, you know, emitting right now not clear we would even notice much of a change before the end of the 21st Century, so it's really a century scale problem in, you know, beyond the 21st Century and that we're better off in the long run if we drop the urgency and make the transition in a way that maintains current energy security and the economy and provides a basis for much more energy that we're going to need in the future. That's my view on this.

Q Do you agree that the price fluctuations that come with fossil fuel energy are greater than price fluctuations that would come with renewable energy or nuclear energy?

A Okay. There's a lot of --

MR. RUSSELL: Foundation.

THE WITNESS: -- price fluctuations.

THE COURT REPORTER: I'm sorry. I didn't hear your objection.

MR. RUSSELL: Foundation.

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THE COURT REPORTER: Thank you.

THE WITNESS: Okay. There's a lot of price fluctuations in natural gas recently. Again, I can give you an anecdote related to Hurricane Katrina. This is really what put us in the business in the energy sector. Crazy natural gas fluctuations follow. Any time there was a hurricane coming, they would go through the roof. And our claim to fame is that we could predict all of this two days ahead of the National Hurricane Center, and our clients, you know, made a killing in natural gas trading, okay. That was my first big client, okay. So I get the price fluctuation.

They've been pretty -- following 2008, they've been pretty stable, and then all of a sudden, with the last couple of years, it's gone completely crazy. Coal is much more stable in terms of its prices, so there's a lot more stability there.

Again, no fluctuations in terms of nuclear energy. I mean, that's pretty not a -- the issue is not price fluctuation. The price fluctuations for wind and solar is the materials. Okay. Without enough fossil fuels, steel and cement are very expensive right now. I mean, all of Europe is pretty much cutting off its industrial supply, and the materials that you need become very expensive. So, I mean, there's going to be

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fluctuations in the costs of the materials required for wind and solar. So none of it, apart from nuclear energy and probably geothermal, is immune from these kind of price fluctuations.

Q Do I understand you correctly that you would agree that we can eliminate fossil fuels as our source of energy, and where you may disagree with some of the experts in this case is on the time frame --

A Exactly. Exactly.

Q -- of when we can make the transition?

A By 2100 --

MR. RUSSELL: Objection, compound.

THE WITNESS: -- I would not expect that we're burning fossil fuels for fuel. We may need them for materials, polymers and whatever, but I would not anticipate we would be burning fossil fuels for energy and transportation.

Q (BY MS. OLSON:) Would you also agree that it would be in the best interest of these plaintiffs to make that transition off of fossil fuel energy?

MR. RUSSELL: Objection, vague, foundation. Go ahead.

THE WITNESS: Okay. The issue is sooner rather than later, okay. If we destroy our energy infrastructure and economy in this pursuit over the next

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ten, 20 years, their young adulthoods is going to be pretty grim. Okay.

We want to maintain, through this transition, we have to keep burning fossil fuels until we've done all of the research and development and the learning curves and whatever, a lot of small experiments, different regions, different countries, to see what works. And by the second half of the 21st Century, we're going to have some good solutions okay, that we can deploy. So the issue is the timing. Trying to kneecap fossil fuels right now and run headlong into renewables which we don't really have the resources to actually implement all of the regulatory issues, these things don't change overnight.

Q So just to like really hone in on this point though, if there were solutions, alternative energy solutions available that could be implemented and there were not policy limitations that prevented that, do you agree that it would be beneficial to the plaintiffs to make that transition as swiftly as possible as long as it was feasible?

A Next generation nuclear. It's starting to come on.

Q Was that a yes or no, Dr. Curry?

A Go for it. Yes.

Q Yes.
A If it's nuclear, yeah, because I see that's the quickest thing that can potentially happen on a large scale. And I think that's -- if when I look to the 22nd Century, I mean, it's hard not to see nuclear that we're going to be powered by nuclear power. We're going to need huge amounts of energy.
Q And you would agree that these young people, they would be better off if we were not burning fossil fuels as long as there's an alternative energy supply that can power their lives. Yes?
A It has to be a replacement not just kneecap fossil fuels --
Q I hear you. And would --
A -- and hope that --
Q -- you agree with that?
A Yeah, and hope that --
Q For the record?
A Okay.
Q We're talking about young people and their --
A For the next ten years --
Q -- future and what would be good for them.
THE COURT REPORTER: I'm sorry. One at a time. Thank you.
MS. OLSON: Sorry.

THE COURT REPORTER: That's okay.
THE WITNESS: For the next ten years, we're better off with fossil fuels than a mad rush to renewable. But we need to use the next 20 years to figure out how to make a transition, not to -- forget the targets. Forget the deadlines. Okay. Lots of research and development. Lots of learning curves. You know, wind and solar is a niche solution. You've got a lot of open land, a lot of wind that can be part of the Montana portfolio. It's not the solution to Montana's overall energy problem.
MS. OLSON: Okay. Why don't we stop there, go eat and we'll come back at 1:30.
THE VIDEOGRAPHER: Okay. We are going off the record, and the approximate time is 12:54.
-o0o-

(The following proceedings were taken by Julie Ann Kernan, CCR #427 RPR)

PURSUANT TO NOTICE AND STIPULATION, and on Friday, the 16th day of December, 2022, at the hour of 1:52 p.m. of said day, at the offices of Sunshine Litigation Services, 151 Country Estates Circle, Reno, Nevada, before me, Julie Ann Kernan, a notary public, personally appeared DR. JUDITH CURRY.
---o0o---

VIDEOGRAPHER: We're back on the record in the continuing deposition of Dr. Judith Curry. The time is approximately 1:52 p.m.
CONTINUATION OF EXAMINATION
BY MS. OLSON:
Q All right, Dr. Curry, we're back and I have a couple of follow-up questions about CFAN that I didn't ask you the first.
Does CFAN run its own climate model simulations?
A No.
Q And do you use the IPCC climate model simulations?
A Only indirectly.
Q Can you explain that to me?
A Okay. I believe it's Chapter 10 of the IPCC AR6 describes the challenges of doing regional assessments and projections. A whole lot of reason that the climate models

don't do terribly well, largely owing to natural variability and its spatially varying imprint.
The approach that we use, and it is described in the AR6, is a climate dynamics-based storyline approach where you develop scenarios that can be based off climate model simulations, historical data records that may be spiked a little bit to account for warming. And worst case scenarios, a range of different tools to try to put together a range of plausible scenarios for what might happen in the future in a particular region, so I don't use climate models directly.
And, in fact, the IPCC AR6 is really downgraded their use of the global climate models in that report and they talked a lot more about climate emulators which are very simple models and even back of the envelope calculation that are then used to feed the independent great assessment models. So what I'm doing is, or what I have been doing for the past I don't know how many years is now sort of in the mainstream of what the IPCC is recommending.
Q Okay. But you're not doing your own --
A No.
Q -- model simulations. So you are taking from what the IPCC --
A To some extent, yeah, it's one source of

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scenarios. There are other sources of scenarios.

Q What are the other scenarios that, the IEA scenarios that you --

A Not a scenario. A scenario is a possible future. This can arise from many things not just from emissions. Like I said, for the emissions scenario CI said this previous -- my favorite scenario to use is 4.5 and 3.4, I think those are the two most realistic going forward, but I have used the range from 2.6 to 7.0. But, invariably, even with the more extreme scenarios, I found that when you're looking at regional future scenarios you really natural variability that dominates over that next 30 years.

Q Okay. And how do you derive weather predictions from climate models?

A Weather predictions are not derived from climate models, they're derived from weather prediction models. They count atmosphere models, which, are -- okay. Okay.

MS. OLSON: Melissa, I think we need your line muted.

THE WITNESS: Yeah, there's two --

MS. BORNBEIN: Yeah, I'm sorry about that. I'm having sound issues. Give me ten seconds and I'll figure it out.

THE WITNESS: Okay. While there are some

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similarities, and a few climate models are derived from weather forecast models, they're actually a lot of differences, the weather -- the global weather forecast models I use mostly are the European Center for Medium Range Weather Forecast, it was generally regarded to be the best weather forecast system in the world, and also the NOAA global forecast models. For NISHA application like hurricanes I use a broader range of models which include other global models including the UK met office and the Canadian model, and also regional models run by NOAA.

Q Okay. Thank you. All right. We're going to go back to your expert report. Do you have that in front of you?

A Uh-hum.

Q And on Page 1 you have your 4th bullet. This is the final opinion that you summarize in your expert report.

And can you read that for me, please, that 4th bullet?

A "Emissions from fossil fuels generated in Montana provide a minuscule contribution to global greenhouse gas emissions and do not influence directly Montana's weather and climate."

Q How do you define minuscule?

A Okay. A simple calculation but without any paper and pencil. Okay. Let's say we're talking about two

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degrees by 2100. We've already accomplished 1. more by 1.1 degrees so there's nine-tenths of a degree centigrade left. The amount of emissions, direct emissions that are burned in Montana is .09 percent of global emissions. If you multiply .09 percent, which is .0009 times .9 degrees, you other get .0008 degrees centigrade, which would be the amount of warming that's prevented by eliminating Montana's fossil fuels. When you're talking about, like, one one-thousandths of a degree that would be avoided by not burning fossil fuels in Montana, I would call that minuscule. It's not something that's measurable.

Q So you -- is it your opinion that Montana's contribution of emissions to the atmosphere is not measurable?

A You can measure the amount of emissions, okay, but in terms of the impact on the climate, it's immeasurable. You can say how many gigatons or whatever, you can measure that. And that's, like, .09 percent of total global emissions.

Q Okay.

A And it's in the noise, it's in the noise of our ability to accurately calculate global emissions.

Q And Dr. Curry, are you aware that the CDC uses blood-led reference values of 3.5 micrograms per deciliter as a blood-level level -- as a blood-led level in children

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13 years or younger that is too high?

A I'm no fan of that --

MR. RUSSELL: Go ahead.

THE WITNESS: Okay. I'm no fan of led, but it has nothing to do with CO2.

BY MS. OLSON:

Q I understand. I'm just wondering if you're familiar that their levels that are deemed safe for children of led in their blood?

A Uh-hum.

Q Is that a yes?

A Yes.

Q And would you agree that one microgram per deciliter is a minuscule amount of led in a child's blood?

A It's a different context, completely different context.

Q Is it minuscule?

A In terms of --

MR. RUSSELL: (Unintelligible.)

REPORTER: I'm not understanding what he's saying. What did you say?

MR. RUSSELL: Object, relevance.

THE WITNESS: I'm not going to answer that one because I agree it's not relevant, I don't know.

BY MS. OLSON:

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Q Okay. He can object, but you still need to answer the question, Dr. Curry.
A Please repeat the question so that it makes sense in context of what this hearing is about because I don't get it.
Q I'm just wondering if -- if you think one microgram by deciliter is a minuscule amount of a substance --
A Not in terms of someone's body in terms of the context of led which is something that's toxic in pretty much any context.
Q Okay. So you would agree that in scientific terms it depends on how the size of a contribution of a substance affects a living organism, for example, to determine whether minuscule is relevant or significant?
A Okay. CO2 in terms of, you know, unless you have, like, 30,000 parts per million, I mean, a human wouldn't really notice, okay? They wouldn't really notice. You could increase -- if you're in a room and, in fact, my guess is that the carbon di -- it's closed. I mean, it could be pretty high, over a thousand parts per million in here.
Q Would you agree that a minuscule -- so just separating out climate change for a minute.
A Yeah.

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Q I want to use it because you used this term minuscule.
A Yeah.
Q And I'm wondering if you would agree that there are certain instances where a minuscule amount of something can still have a significant affect. Would you agree with that?
MR. RUSSELL: Objection, vague, relevance.
THE WITNESS: Yeah. In the context of led, something that is generally toxic, small amounts can be important.
BY MS. OLSON:
Q Okay. And do you agree that there are thresholds that scientists can define as being dangerous for earth's natural systems?
A Not really. Because there's been such a wide range of earth's natural conditions over the past four billion years, I mean, the amount of variation that we're talking about is pretty small.
Q And can there be thresholds of dangers to earth's natural systems for humans?
A Humans are the most adaptable species that have ever inhabited the earth. Some friends of mine are down in Antarctica weather -- you know, it's extremely cold. We put people on the moon, and we're talking about a degree or

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two of warming, I mean, it's -- this is not beyond the range, this is well below the range of what humans have adapted to in the past, and are increasingly capable of adapting to in the future as technology increases overall weather increases, et cetera.
Q So is it your positions that there's no dangerous condition on earth that can exist for humans?
A Well, would you want to go to Antarctica without a lot of support?
Q Dr. Curry, we're going to be here a long time if you don't answer my questions.
A Your question doesn't make any sense to me is what I'm saying.
Q I'm just asking is there ever a dangerous threshold for human species --
A A threshold of what?
Q -- in terms of changes to a natural system.
A I don't -- I don't understand the question. I mean.
Q Okay. What level of atmospheric carbon dioxide would you define as dangerous for humans?
A I would have to go over 30,000 parts per million, I mean, where humans couldn't breathe it. I mean, it's been much higher in the past. I don't -- if carbon dioxide isn't prima facie a danger. Plants like it.

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Humans have adapted to climate change over a relatively short history on this earth.
Q So if the atmosphere's CO2 went to 29,000 parts per million that would not pose a danger to humanity.
A In terms --
MR. RUSSELL: Objection, misstates testimony.
THE WITNESS: In terms of actually breathing the air, no.
BY MS. OLSON:
Q Would 29,000 parts per million as a level of atmospheric carbon dioxide pose any other threat to humanity?
A Not if they adapted to a slowly increasing CO2, I mean, see -- it would probably all of the things being equal, you know, sea level would be higher. We wouldn't be living on what we currently call the coasts. But this is not something that's gonna happen very quickly. I mean, human -- there's a lot of natural climate variability that has always happened and will continue to happen irregardless of whether we keep burning fossil fuels or not.
Q Okay. So -- and just to be clear so I understand. When I'm asking you about the dangers posed by atmospheric carbon dioxide, I'm not referring to the dangers of humans inhaling carbon dioxide. So if we put

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that -- can we agree to put that aside for my next question?

A Okay.

Q Okay. So am I understanding you to say that unless we get to levels in the tens of thousands, 30,000, as a parts per million as a concentration of atmospheric carbon dioxide, those kind of high levels otherwise don't pose a threat to humanity. Am I understanding that correctly?

A No, because of the whole way you're framing this makes no sense to me.

Q I just want to know at what level atmosphere CO2 poses a danger to humanity in your opinion? And I'm not talking about breathing CO2.

A Okay. The dangerous part of the whole argument is the weakest part of the argument. I mean, the physical change -- you know, the physical basis, yes, it is warming, carbon dioxide is contributing. But what do we call it dangerous? I mean, you've got people --

Q How do you define dangerous?

A This is a very, very subjective thing. The IPCC's in the UN framework for climate convention struggled over this definition for decades. I mean, it showed up in the UN FCC treaty in 1992 danger -- prevent dangerous anthropogenic climate change.

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Q So Dr. Curry, right now I don't have the IPCC here, so I am --

A I know.

Q -- just asking you for your expert opinion on that.

A Nobody -- okay. It's very subjective. It's a value laden thing.

Q What is your subjective opinion about when CO2 levels pose a danger to humanity?

A That is not what I'm worried about. I'm worried about a big cluster of volcanic eruptions you saw in the early 100's.

Q Okay.

A Okay. I'm more worried about an asteroid impact. I'm more worried about a whole lot of other things other than the CO2 increasing.

Q Dr. Curry, can you define what scientists mean by a climate forcing?

A Okay. It's very subjective as to how you define the system. Okay, if you say CO2 is a forcing, I don't regard CO2 as a forcing, I regard it as part of a feedback system between the earth, the ocean, humans, and the whole works so I regard that as a feedback system rather than a forcing. I would --

Q So do you reject the scientific definition of

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carbon dioxide as a forcing of climate change?

A It depends on how you define the system. If you define the system the way that they did prior to when they actually had geochemistry in the climate models, then CO2 wasn't external forcing.

Q Is CO2 a forcing within the climate system?

A No, it's a feedback okay. --

Q Okay.

A -- because -- yeah, temperature influences -- CO2 influences temperature, temperature influences CO2 and on and on it goes, many feedback loops in the earth's system in the carbon cycle.

Q And is it your opinion that the rise in temperature of the earth from a doubling of carbon dioxide could be one degree or it could be ten degrees?

A No. The IPCC in the sixth assessment report put an upper limit of four degrees centigrade, and I still think that's too high. I think at anywhere between, say, one, and five is, like, the extreme limits.

For equilibrium climate sensitivity, which I regard to be an imposed value because the earth is never an equilibrium so there's a lot of debate on the subject, I've published papers on that subject, but nobody's talking about ten degrees of warming.

Q Do you agree that there are tipping points with

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earth's natural systems?

A Tipping points is one of those little journalistic lingo things. There are abrupt climate changes. There have always been abrupt climate changes in the system. There was a huge -- I mean, at the end of the little -- at the end of the big ice age, okay, it was warming up nicely and then kaboom, it rapidly froze and then kaboom, it rapidly melted again, like, ten degrees fluctuation on time scales of centuries. I mean --

Q Do you reject the concept of a tipping point?

A You have to define it and it has to be defined in a way that I find meaningful. But the way it's used in the lingo, there can be abrupt climate changes both from natural and human causes. And they can be on different scales, spatial scales. So it --

Q Okay.

A It's --

Q Let's go back to the word minuscule. I'm wondering at what level is a contribution of greenhouse gas emissions to the atmosphere not minuscule in your opinion?

A In terms of it's influence on climate? Okay. If you're talking about a contribr -- an addition of greenhouse gases that changes the temperature by .0008 degree centigrade, something we can't even measure, that's minuscule.

Okay. If it's something that increases by a degree or two, that is meaningful, but it's very difficult to attribute recent warming to natural versus human-caused variability. And in terms of projecting forward that there's a factor of three to a factor of five uncertainty in a climate sensitivity.

Q So are you able to tell me what level of a contribution of greenhouse gas emissions is more than minuscule?

A A doubling of CO2 is meaningful.

Q So is there -- is there any level of emissions by any government around the world that you would consider not to be minuscule?

A China's emissions count for 30 percent of the global, which is a lot more than 0.09 percent. I'm —

Q So would every other country's emissions around the world be considered minuscule —

A No.

Q -- in your opinion?

A The integral of US emissions are significant at about 15 percent. European union's emissions are comparable at around 15 percent. But if you're talking about an individual state or an individual small country, or even a whole continent like Africa, yeah, it's minuscule.

Q Is it your opinion that global greenhouse gas emissions are made up of many minuscule contributions around the world?

A Big giant ones from coal power plants in China. There's an integral amount, but if you considered only the five emitters you would have most of the emissions.

Q Do you know how much coal fire power plant in China emits?

A A lot.

Q Any number?

A In terms of megatons? Off the top of my head, no.

Q Do you know if China gets any of its coal from Montana?

A I doubt it. They have their own very, very dirty coal. Montana has high quality coal. We'd all be better off if China -- if they insist on burning coal that it would be high quality coal.

Q So you're in favor of Montana's coal.

A Montana's coal is better --

MR. RUSSELL: Objection, misstates testimony.

THE WITNESS: Yeah. Montana's coal is higher quality than most.

BY MS. OLSON:

Q So Dr. Curry, if you're evaluating contributions

of greenhouse gas emissions to atmosphere globally, do you think the appropriate scale is to look at the continent scale, a nation scale, state, local, city, individual, what scale do you think is a the proper scale to determine whether a contribution is significant?

A Well, the global scale is the appropriate one to consider, I mean, that's what matters is global carbon dioxide. I mean, carbon dioxide is a well-mixed gas and the troposphere. It's not larger over China not by much because a lot of the emissions are there. And there's a whole dynamic sources and sinks and complicated carbon dioxide cycle and transport and whatever. So you don't — you can't relate Montana's emission to the CO2 over Montana—

Q Okay.

A — or to Montana's local. It's a global — it's a global thing.

Q Is it your expert opinion that the stream flow in Montana's streams is not affected by anthropogenic climate change?

A There is so much natural variability in rainfall in Montana, we've seen from the data that we presented, and that we've most recently seen by record snow because fall in 2020 in Montana, there's a lot of natural variability.

Q I understand. But my question is is there any

affect on Montana's streams from anthropogenic climate change?

A Nothing that can be discerned from the historical record. Again, the IPCC finds no link between global warming and meteorological and hydrological drought. In terms of flooding, what they concluded is that well, it's flooding more in some places and flooding less in other places and, you know, there's really —

Q So it's your opinion there's no climate change signal in what's happening to stream flow in Montana?

A If there is it's not discernible given the large natural variability.

Q Okay. And what's the basis for that opinion?

A The IPCC, logical reasoning, all sorts of things.

Q And which of the references in your report best supports that opinion?

A The IPCC AR6.

Q And is it your expert opinion that the drought conditions in Montana are not made worse by the anthropogenic climate change?

A Well, according to the IPCC they find no evidence of meteorological or hydrological drought being caused by global warming. And if you look at the worst droughts in Montana's historical record it was in the

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1930's.
Q So is that a no?
A There's no evidence.
Q There's no evidence that drought conditions in Montana --
A Can be made worse based on expert judgment and analysis of IPCC, and it's based on actual history data record. I mean, if you'd had much worse conditions in the 1930's, why would we think that a more moderate drought consequence would be caused by human cause only.
Q Okay. And so the evidence you rely on for that opinion is the IPCC AR6, as well as the data on the 1930's in Montana; is that correct?
A Yeah, historical data record as provided by NOAA.
Q Okay. And anything else that supports that opinion?
A Well, in terms of the overall condition, the snow drought from the Paleo climate analysis which I reference which is one of the pages, let's see if I can find it. I don't know if I can find it. Oh, yeah. Okay. It's figure 1.6.
Q Okay. From your expert report.
A Yeah, that's from my expert report.
Q Okay. And is it your expert opinion that

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anthropogenic climate change has played no role in the increase in summer time temperatures and in rivers and streams in Montana?
A There's a slow creep of average temperature, if you look at Figure 1.1 in my report you can see what the summer time temperatures are. Again, you see that the summer time temperatures were worse in the 1930's. Um, in terms of the warmest summers I think 2015 and -- no, actually -- no, the warmest temperatures were definitely in the 1930's. So fossil fuel emissions didn't cause those warm temperatures in the 1930's.
Q Are fossil fuel emissions causing warm temperatures today in Montana streams?
A Not above a level that exceeds the natural variability of the historical climate record.
Q Is there any uncertainty that you have about whether the increase in stream temperatures is as a result of natural variability versus anthropogenic climate change?
A It's something that can't be detected, given the -- the magnitude of the natural variability, I mean. I mean, it's possible that there's some signal there, but you can't detect it at this point because of the high amplitude natural variability.
Q So it's possible the anthropogenic climate change is increasing stream temperatures in Montana.

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A Having an influence, yeah.
Q Okay. And --
A But --
Q -- it's possible --
A But that is at this point undiscernible.
Q And it's possible the anthropogenic climate change is making drought conditions worse in Montana. Correct?
A It is possible, but it is undiscernible at this point owing to the large amplitude of natural variability.
Q And it's possible the anthropogenic climate change is affecting the stream flow in Montana as well. Correct?
A It's possible, but there is no discernible detection of that owing to the natural high amplitude variability.
Q All right. And -- so same question related to extreme weather events in Montana. Is it your opinion also that it's possible the anthropogenic climate change has a signal in those extreme weather events but you can't measure it?
A You can't discern it because of the high amplitude of natural variability. And most of the extreme events nobody even has a theoretical rationale. For example, hail storms, was it Rikki who had damage to one of

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the structures on their property from a big hail storm maybe in 2015. There is nobody claiming based on observations or theory that hail storms are getting worse in global warming.
Q Okay. And do you agree that insects like pine beetles are surviving warmer winters and causing more diseased trees in Montana?
A Okay. If you look at Figure 1.1, -- actually, okay let's go to Figure 1.3 of my report. This shows the observed number of very cold days in the winter. So what we've seen over the last two decades is very similar to what was seen in the 1940's in terms of number of cold days in the winter. So yes, there is a temperature factor in terms of the ecosystem and population dynamics in insects, but in terms of blaming this on a lack of cold days in the winter doesn't really hold up against the historical data.
Q Do you agree that insects like pine beetles are surviving warmer winters and causing more diseased trees in Montana in the last couple of decades?
A Again, that's one factor in the population dynamics of bark beetles or whatever.
Q Okay. And would you agree the anthropogenic climate change has a role in causing these insects to over winter and lead to more diseased trees in Montana?
A Okay. The question that I have that needs to be

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addressed is how many cold days and what is a temperature threshold? I mean, Montana has seriously cold winters, okay? There is cold weather in the winter, and you have a big blast coming up next week. So until somebody says this is the threshold temperature and if you -- and if you don't at least get below that temperature for so many days and some sort of objective thing, that I can deal with it. But a qualitative statement that, you know, the winters are a little bit warmer, you know, than they were a little while ago, even though the 1940's was the same, the temperatures during winter in Montana are still seriously cold.

Q Dr. Curry, have you read the entire Montana Climate Assessment?

A Yes, I have.

Q And you read the section that addresses the increase in diseased trees and pine beetles in Montana?

A I know. And if they would have done a similar survey back in the 1940's, there's a whole host of environmental stresses. And to blame it all on temperature without doing a comparable analysis of what was going on in the 1940's, I mean, I don't find any global warming argument to be terribly convincing along those lines.

Q Can you cite to any peer-reviewed publication that contradicts that climate change is leading to the over wintering of pine beetles and the diseased trees in

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Montana?

A Okay. Have to repeat that.

Q Can you cite to any peer-reviewed study, publication that contradicts what the Montana climate assessment said which is pine beetles are over wintering and they're leading to more diseased trees in Montana?

A I could probably find some references. The point is I'm making a very simple logical argument. If you're blaming it on temperature, and the temperatures were the same in the 1940's, I would expect to see comparable bark beetle damage, whatever, in the 1940's. And until somebody demonstrates to me that that was the case, I don't find their argument very convincing that any recent bark beetle damage is caused by fossil fuel global warming.

Q But you don't have anything to cite that disproves what the Montana Climate Assessment says?

A Not off the top of my head, and I don't believe they have looked back far enough into the historical record in terms of understanding, I don't know, but I'm just saying just as a matter of logic and attribution that is what I would need to see in order to be convinced by their argument that this is an issue of fossil fuel global warming.

Q Is it your expert opinion that there's not an increase in the wild fire, the length of wild fire season

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in Montana as a result of anthropogenic climate change?

A The whole issue of forest fires is a very complex one, and I did find an exceedingly interesting paper last week that I should probably add to the list of things that I might be talking about in the future. This looked back, you know, over, you know, hundreds of years, and their conclusion is that because of the — you know, after the enormous 1910 fire in Montana, the U.S. started a fire suppression program. And this program has built up too much forest mass, and this paper argues that there's a major fire suppression debt, okay, that, you know, this is gonna burn at some point, you know, in terms of they have ecosystem balance there should have been a lot more forest fires in the 20th Century.

Q And who's the author of that paper that you just found?

A Off the top of my head I can't, but it's an extremely relevant and important paper. And I will include it in the stuff that I'm sending.

Q Okay. And Dr. Curry, you understand, as you sit here, that I have asked you previously for any additional information that you will rely on for your testimony at trial that isn't contained in your expert report and that hasn't been produced to us, and this is the first time you're mentioning this particular --

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A I know --

Q -- paper.

A -- because I just encountered it about four days ago, and I understood that the deadline for submitting this stuff is next week sometime or something. I just thought of this. It was in my -- the notes that I prepared, my rebuttal notes I spotted. It's an important paper.

Q Okay. Is it your opinion that the wild fires and smoke that Montana has experienced is getting worse over the last two decades compared to the prior 200 years?

A No. No. In the US west there were terrible, terrible fires in the 19th Century, huge big ones. They were much bigger. There's been this fire suppression thing that's been going on for much of the 20th Century, but they're trying to manage it more rationally. So I agree with that paper there is a fire deficit and we're going to see more fires because of, you know, we spent too much time interfering with mother nature in a way that we're now paying a bill.

Q And so is it your opinion that the increase severity of wild fires and increase in smoke that results in Montana is not a result of anthropogenic climate change?

A Again, if there is a signal. It can not be discerned based on natural climate variability and the land

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use and forest management practices that were put in place in the 20th Century.

Q Have you attempted to discern whether there's a signal with your own research and study?

A The variability is so huge and the land use — and the forest management issue is such a huge factor, I mean, there's just logically there is very little you could do to discern a signal.

Q So that's something you have not attempted to do that.

A I have not, no.

Q Okay. And is it your expert opinion that there has not been a reduced winter snow pack in Montana in the 21st Century?

A There was -- okay. The declining trend that was cited maybe in the main report from a main complaint from 1970's to 2015, there was a declining trend, okay, there's been a recovery since then, um, with a record-breaking snow fall in 2020, and then there was a snow drought in the 1930's, so there's a lot of multidecadal variability and variability with El Nino and La Nina events.

Q So you see no trend as a result of climate change in the snow pack in Montana?

A It's very difficult. Now, I'm going to bring up something that was in the Running Whitlock rebuttal to my

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article, they mentioned a paper of mine 2012, I was a coauthor. It related to the shrinking Artic sea ice to winter temperatures and snow fall in the U.S. And they were using it to support one of their arguments in a convoluted way and it didn't work because the finding of our paper was that as a result of the shrinking Artic sea ice you would expect greater snow fall in the high latitudes of North America.

Okay, whether that's holding up, I don't know, but that was something I put forward. It's a Liu and Curry published in 2012, it's referenced by the rebuttal from Running and Whitlock.

So, you know, this is an open debate. In the short term when you have warming often you get more snow fall. And there's no prima facie reason to think that there's less snow just because you have warming temperatures.

Q And Dr. Curry, does anthropogenic climate change play a role in the extreme summer heat that Montana has experienced?

A It's difficult to know because the records in Montana are -- the temperature records in Montana are contaminated by dubious locations from the main weather station's, like, on the airport parking lots and things like that, so it's difficult that the temperature records

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aren't good enough to say oh, well, this, you know, half a degree is a record or whatever, so.

Q So your opinion on the effect of anthropogenic climate change in Montana in terms of heat may be changing based on the phone call that you had about the citing of the different measuring.

A No. Okay, two issues here, want more of a longer explanation. The simplistic argument that if you increase the average temperature, you should increase the extremes. Well, that depends on does the shape of the distribution change, and it does. So in some places you do see -- as the average temperature increases you do see more extreme heat. And in other places the average temperature it's a negatively skewed thing and you don't see it. So it depends on some local factors.

There was a -- another paper that tried to get around all the surface data problems and whatever urban heat on, by looking at 850 millibar temperatures which is about a thousand feet above the surface and looked at the distribution. And he found that there was a lot of variability as to which regions were seeing an increase in extremes versus which regions were not even, yeah.

Q So related to temperature, do you agree that there's been an increase in annual average temperatures in Montana of two to three degrees Fahrenheit between 1950 and

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2015?

A In context of the caveat of the data problems that I've mentioned in Montana in terms of the overall global increase that is measured in whatever, that's not inconsistent. I'm not convinced by the arguments that there's some sort of special amount of warming in Montana.

Q Let me ask you this. How much of global average temperatures increased between 1950's and 2015?

A Off the top of my head, I mean, since 1850 to 1900, the reference period, there's been 1.1 degree centigrade which is about two degrees --

Q It's not --

A Fahrenheit.

Q It's not at 1.2 degrees Celsius now, above the industrial temperatures?

A 1.1 is what the IPCC AR6 said and -- and the 2021 temperatures were by no means a record so I don't see that that is increased.

Q Okay. And do you agree that the northern latitudes are heating more quickly and have higher temperature increase as an annual average than the global annual average?

A Okay. Over what period? The high latitudes, I mean, genuine Artic latitudes in Montana is not quite an Artic latitude. They show huge variations with the Pacific

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decadal oscillation and the Atlantic multidecadal oscillation. This was a huge spike of warming in the Artic circa the 1930's, again, in the famous 1930's and there was accumulation in Greenland — no, melting in Greenland, and then there — it was more accumulation following. So there's huge influences from the natural internal variability, and also solar impacts have a greater impact in high latitudes, so what's going on at high latitudes is very complex.

Q Okay. Do you agree that temperatures are increasing in Montana as an annual average compared to the 1970's?

A Yeah, it's increased.

Q Is it your expert opinion those temperature increases are not a result of anthropogenic climate change?

A That what you said earlier, it's a combination of natural climate variability and anthropogenic climate change.

Q And are you able to say whether it's 50/50 or 25/75?

A Well, we don't really know because people haven't done the hard — again, they've framed this problem too narrowly. They haven't adequately dealt with the solar component. They haven't adequately factored in the multidecadal ocean oscillations into the attribution. So

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we're stuck with the real hard work to figure that out it hasn't really been done because people have been fixated and anthropogenic climate change.

Q So this is helpful. So when you talk about natural variability, the two components that you are unsure of how much of a role they play are the solar component and the ocean oscillations.

A Yes.

Q And you are concerned that those two components of the climate system may be having a more dominant effect than anthropogenic greenhouse gas —

A Or a larger one that is commonly attributed. There are a lot of what I'm saying you can find this in the IPCC report.

Q Is that your best support for that concern about those two components claim —

A Okay. There's other —

Q Dr. Curry, just remember to try not to talk over each other.

A Right. Okay. This is dealt with at length in my book, so without repeating all of that. But the IPCC, in Chapter 2 they acknowledge that there's wide uncertainty in what the solar forcing has been over the last 20th Century, low variability and a high variability thing. The low variability is what they claimed in the AR5, and now at

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the AR6 they have a genuine high variability scenario to increase the range.

If you look at all the climate model projections, they use a low variability forcing so, you know, that's an example of inconsistency that does not further our understanding of what's going on so it will take the next round of ICC reports to -- presumably to catch up to that issue. But there's a lot of broad, wide literature in the solar physics community that talks about this issue.

Q Are you aware that the vast majority of scientists who study climate change would agree that the temperature increases we're seeing on earth are caused by humans and predominantly burning fossil fuels?

A There's a lot of activists --

MR. RUSSELL: Objection, vague.

THE WITNESS: A lot of activists and group thinking people out there, and there's a lot of people who are digging deep into these issues.

BY MS. OLSON:

Q I'm just asking about the scientific community--

A No, no, I'm talking about the scientific community. There's a lot of activists and group thinking people in the scientific community, okay? And then there are a lot of in peripheral field, oceanographers and solar physics and whatever that are dealing very carefully with

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this and are critical of a lot of this sort of main stream. So there's a whole silent minority, I don't know it's a majority, a minority, but there's a whole lot of silent scientists who stay out of public debate, okay, who are nose in the grindstone trying to figure things out, and these don't factor into your impression of the scientific community.

Q And so I have seen in social media posts I've seen some of this, Dr. Curry, and --

A Yeah.

Q — I've seen you refer to the craziness of the climate science --

A The what?

Q The craziness of climate science?

A Oh, yeah.

Q Is this what you're referring to where you think there's a group think --

A It's very politicized in case you haven't noticed. It's very politicized and that's damaging climate science.

Q And you're also referred to the rotten academia?

A Oh, absolutely. Absolutely.

Q So you agree that -- and is that rotten academia and the politicization of science, is that just across the board? Is it the majority of what's happening in academia?

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A It's anything that has societal relevance. Gender is probably bigger than climate change. GMOs, anything biomedical.

Q COVID-19?

A COVID, yeah. So I mean, anything that's societally relevant, I mean, people that are black listed, some people, you know, losing their jobs, all sort of not very good things happening.

Q So how do you determine what science that's coming out of academia that you can trust or rely on?

A It's hard. You have to dig in deep, okay, and go to the root of the problems, I mean, and -- this was -- you have to dig deep. Like I said, the IPCC is a mixed bag. Like in the AR6 I like the working group 1 report. I didn't like working group 2 and working group 3. In the AR5 I didn't like working in group 1, but I thought working group 2 was quite good.

Okay. So a lot of it depends which experts. And you have to spend a -- you know, just don't trust the experts, while you can always find experts who will say different things and this is, you know, what you see in trial, but you have to dig deep, okay? And you have to -- it's a challenge to -- it's a very complex problem. There's no easy answers.

Q Did your views in this respect cause you to

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leave Georgia Institute of Technology?

A Um, yes. I didn't like the way academia was going. We had administrators who, you know, wanted to go full-blown alarmism and to hire people that I didn't think were suitable, it's time to go. And I --

Q When you say alarmism are you referring to what you called climate change alarmism?

A Yeah. I mean, people who are activists first and scientists second, you know, and there's a lot of them with PhDs and in universities. And I said no, this is not an environment I want to work in, I had another option. So then I started, you know, full-blown working with my company.

Q Were you tenured at --

A Oh, I was a full professor. I was Chairman of the Earth and Atmospheric Sciences for 13 years.

Q Chairwoman.

A Chair, yeah. Okay. Yeah. No, I was -- I had an esteemed position at the University.

Q And you just chose to --

A Leave.

Q -- give all of that up.

A Yeah.

Q Were they pushing you out?

A No. I mean, I was tenured. The provost at the

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time didn't like me.

Q Uh-hum.

A Okay. But provosts come and go. And the previous interim president and provost, they thought I was the greatest thing since sliced bread. So, you know, the administrator come and go. I could have stayed and sucked my big salary. I say no, I'm gone.

Q What year did you leave?

A 2000 -- yeah, 2016 was my last year.

Q Okay. So you had already founded CFAN.

A Yeah, it was -- yeah, it was -- it was sort of like a University start-up. It never was really took off and so I took it to the next level after I retired.

Q Okay. And did you try to get other jobs in academia after you left Georgia?

A You know, I -- see, before I left -- okay. I started -- I was head hunted for a number of other jobs, I mean, like, I got a lot of head hunts and I wanted to move out west. So I applied for a few. I got interviewed for a few. And I got feedback from the head hunters who thought I was a fantastic candidate. He said the people trashing you on social media, if you Google Judith Curry, you see what garbage shows up they would have a very hard time defending themselves and wanting to hire you, he said that was the issue with people who didn't like what I was

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saying.

Q In terms of your views of climate science?

A Yeah. I was -- I was saying there's uncertainty. We don't really know the answers, they're a complex problem, I mean, that was my main issue, and I was interfering with a political agenda consensus building, speaking consensus to power, I was interfering with that. And people went after me big time. For a while I was public enemy number one to the activists' climate community, which is fairly ridiculous.

Q And even within the climate science community?

A No. No, no, not -- no. A lot of them regard me as a hero and I get -- and it's especially concerning the people from -- who have government jobs like at Noah or whatever said I can't speak up, but thank god for what you're doing.

Q All right. So back on your expert report, you do agree that Glacier National Park has lost most of its glaciers at this point, correct?

A Yeah.

Q And do you agree that climate change has caused the melting of the glaciers in Glacier National Park?

A Well, what do you mean by climate change? Climate changes all the time. You mean fossil fuel climate change? Or do you mean?

Q Yeah. When did Glacier start to diminish?

A Okay. They reached -- okay. In the little ice age which was, like, 1300 to the mid 1800s, something like that, it was cooling. It was -- there was an 80-year period about 1740 to 1820 when snow fall was very heavy, and this is when there was a huge accumulation of snow in what became the glaciers in Glacier National Park.

Okay. Around 1850 the glaciers started melting. Most of the glaciers melted before 1950. Okay. And they've continued melting since then, but it has slowed down in the last maybe ten years or so, I don't know if you're aware that based on some model predictions at Glacier National Park actually had signs posted the glaciers will be gone in 1920, and then they quietly took those signs down in 2017, I mean, in 2020. They took the signs down in 2017 because the glaciers clearly weren't gone, okay. So it's complex dynamics.

Q Do you agree that the -- that the lower elevation base of a glacier is going to melt more quickly than the elevation of the glacier that --

A It depends on a lot of geometry, you know, in terms of what's shaded from the sunlight and whatever. You know, the bigger factor, in all honesty, is snow fall, I mean, the summer melt season isn't all that long. So it's a big driver is as how much snow fall you have. So there

are some complex dynamics, and the big glacier melt occurred before 1950, I mean, that's a period that you can't blame much on fossil fuel drawing. And Fagre did not agree with my interpretation of this. He tried to present -- it was some little table and he said that he didn't like the way I presented something, but it was not incorrect.

Q Do you agree that Dr. Fagre's an expert in this area of glaciers in Montana?

A Sure, which is why I was impressed that he had really nothing very much to criticize my report in this regard.

Q So you don't question his qualifications.

A I don't question his qualifications, no.

Q Okay. Do you agree that there have been more heat waves in Montana in the last 50 years compared to the preindustrial era?

A No, not if you look at -- okay. If you look at Figure 1.2, of my report, and you look at the observed number of very hot days and observed number of warm nights, there are colossal spikes in the 1930's.

Q How do you define a heat wave, Dr. Curry?

A Okay. In this particular article, they looked at the number of very hot days greater than 95 degrees Fahrenheit and warm nights greater than 70 degrees Fahrenheit. I mean, there's lot of different definitions

that you can use, but this is not an unreasonable one, and this is -- these are criterion selected by NOAA.

Q Okay. So what is written in Figure 1.2 that's how you are defining heat wave?

A Very hot days. Okay. A heat wave also has an element of the duration of the period. And again, I could tell you what it's been like since I've been forecasting heat waves, but I don't know if anybody's run through the data to look at durations of period above certain thresholds.

Q Based on what you know about climate change would you anticipate there's going to be a trend towards more heat waves in Montana?

A Probably. Probably.

Q And would you anticipate a trend towards a decreased snow pack in the future based on what's happening with climate change?

A No. No, because it cuts two ways because the warmer -- like I said, the Artic sea ice study sometimes with warmer temperatures you can get more snow fall, so that doesn't necessarily hold. And what you say for an overall trend doesn't really help you with any particular year like the crazy, crazy cold that lasted for, like, six weeks in the winter of, I guess, 2020.

Q Okay. So I understand your opinion to be that

because there's increased moisture content in the atmosphere, and you may still get big snow dumps --

A Yeah.

Q -- right? Okay. And would you agree, though, that the snow is melting earlier in the spring in Montana as compared to the preindustrial era?

A There seem to be -- overall in the west, I couldn't tell you Montana, there's a shift to earlier snow falls in the fall, then earlier melting in the spring, so the length is relatively the same. And again, Mark Jelinek, this is the kind of stuff did he for his Masters thesis, so.

Q Okay. And you would anticipate that there would be a continuing trend to that earlier spring snow melt because of climate change?

A Hard to know because a lot of that could be the ocean circulation patterns that could be driving that because that's a kind of thing that wouldn't surprise me that there's a big factor in that, in the ocean circulation patterns.

We might see a shift to the cold phase of the Atlantic multidecadal oscillation on the time scale of a decade, that could change a lot of patterns like that.

Q Do you think it's possible that the earth could start cooling again with current greenhouse gas

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concentrations in the atmosphere?
A Yes. In my -- my book there's an extensive, cite extensive lecture where we would do decades in the 21st Century no warming or even a cooling. I mean, the big one would be if we had a cluster of major volcanic events, eruptions like we did in the early 1800's. They suggest that you could see a cooling of five-tenths of a degree that lasts several decades. Okay, that would be the big one.
Q But that's a shorter term-period so if we look--
A I know, but they're still a couple decades, that would last a couple decades.
Q If we look over the course of the century.
A Over the course of --
Q If you don't have a volcanic eruption, would you anticipate that the earth is going to continue to heat?
A Okay. Well, the solar -- okay, we had a grand solar maximum in the second half of the 20th Century. We are headed for some sort of relative minimum in the 21st Century. Whether this is going to be of a big magnitude or a relatively modest centuries-scale minimum, we don't know. One of the biggest uncertainties in climate. We don't know how to predict that, but is solar in direct effect. These are not adequately considered in the climate models that can amplify solar impacts. And even if it's -- the solar

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impacts are asymmetrical, strong is at the poles, so that there's a lot of stuff about solar that we don't adequately understand.
The third point is, like I said, I would expect, and many other people do also who pay attention to this is expect a shift to the cold phase of the Atlantic multidecadal oscillation some time on the time scale of a decade. So you've got a lot of things that are lining up that could make the climate cooler, you know, for the next whatever, 30, 50 years. And at some point when the tide turns we could see a bounce back in the ocean circulations that would be in the more warming regime. The point is there's a whole lot of other things going on in the climate system that make it sort of full-hearty to think we know how this is going to play out.
Q So before the preindustrial revolution, when fossil fuel or burning became a thing.
A Yeah.
Q Was the earth in a cooling period or a warming period?
A Okay. Depends on how long before. There was some medieval warm period around, like, a thousand A.D. And then there was the little ice age which was more from 1300 to 1850ish, so there have been millennial scale fluctuations, mostly solar driven to some extent by

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volcanos, and then the ocean circulation is not just on multidecadal, there are millennial scale ocean circulations slow overturning the deep water in the oceans that go on to, you know, explain all this. And in the preindustrial which was, you know, nominally measured around 1750, this was an extremely cold and unpleasant climate. There was famines, and particularly in Europe, China and the U.S., if you remember stories about George Washington and Valley Forge, I mean, this was pretty -- the winters were really horrible during that period, huge famines in China, very rough time in Europe also. So to thinking, you know, whether the current climate is more dangerous than what we saw in the late 18th Century? I'm not so sure.
Q So the earth was in a cooling period prior to the preindustrial revolution?
A For about 500 years, yeah.
MS. OLSON: Is it time for a break?
THE WITNESS: Okay.
MS. OLSON: We'll take a -- just a five, ten-minute break. Okay with you, Michael?
MR. RUSSELL: Sure. See you in ten minutes.
VIDEOGRAPHER: We're off the video record at approximately 2:56 p.m.
(Short break.)
VIDEOGRAPHER: We're back on the record at

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approximately 3:14 p.m.
BY MS. OLSON:
Q Okay. Dr. Curry, does a single extreme weather event indicate a global climate change trend?
A Okay. Say this again?
Q Does a single extreme weather event indicate a global climate change trend?
A Not at all.
Q And does a single extreme weather event disprove a global climate change?
A Not at all.
Q What about -- would you give me the same answers if I asked you about a single climate event as opposed to a single extreme weather event?
A You mean like a drought or something?
Q Yes.
A Yeah. No, same answer.
Q What kind of a record temperature trend would you need to see that indicate that global climate change is happening?
A Global climate change, there's no question that global -- that climate has always changed. Global climate change is happening. What's at issue is disentangling all the myriad contributors to it.
Q And on Page 4 of your expert report, at the top,

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you do agree that the two decades in the 21st Century have overall been the warmest for Montana since 1900 —

A Yes.

Q -- correct? Okay. And yet you don't believe that there's been any — that's the -- that doesn't constitute a trend; is that correct?

A That's a trend in the average temperature, but as I've demonstrated here that overall trend and average temperature is not translating into an increase in the number or severity of extreme weather event.

Q Okay. But there is a trend towards warming.

A Yes.

Q Yes. Okay. Thank you. And would you agree that climate scientists like Dr. Kevin Trenberth, for example, don't contend that extreme weather events have not always happened throughout human history? That's not Dr. Trenberth's contention, correct?

A That's a couple of double negatives.

Q Yeah, that hard to understand.

A I'm not exactly sure.

Q Let me -- so scientists like Dr. Trenberth, they're not suggesting that there haven't always been extreme --

A No.

Q -- weather events. Okay. Would you agree that

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the 1930's warm period that you refer to in your expert report in Montana is dwarfed by the warm periods after 1985 in Montana?

A Say this again?

Q Let me say it another way. Does the 1985 and onward warming trend in Montana dwarf the warm period that you've identified in the 1930's?

MR. RUSSELL: Objection, vague.

THE WITNESS: Not in terms of extreme events. I mean, the average temperature since 1958 is greater than the average temperature in the 1930's, but it does not translate into more extreme weather events.

BY MS. OLSON:

Q Okay. And so you think that there were extreme weather events in the 1930's that were more extreme than weather events since 1985 in Montana.

A Uh-hum.

MS. OLSON: Okay. So Michael, I am marking the rebuttal expert report of Kevin Trenberth as 177, and that's one of the new exhibits, number 12 in your electronic file.

(Exhibit 177 is marked.)

MR. GREGORY: Excuse me, Dr. Curry, is your expert report 176? Just go to the first page.

THE WITNESS: This one?

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BY MS. OLSON:

Q Yeah. What's the number on that?

A This has 176.

Q Okay. You can keep that.

Dr. Curry, if you could turn to Page 6 of Dr. Trenberth's report and look at Figure 5?

A Uh-hum.

Q Is there anything wrong with the depiction of temperature and carbon dioxide data in Figure 5?

A Say this again?

MR. RUSSELL: Vague.

BY MS. OLSON.

Q Do you see anything inaccurate?

A Off the top of my head, no.

Q Okay. Sorry. I'm behind you here. And you agree that there is an overall decline in the number of very cold days in Montana. Correct?

A Going back to the number of very cold days over the last two decades was comparable to what was seen in the 1940's. There's a lot of year-to-year and multidecadal fluctuations, but overall there is a declining trend in the number of cold days.

Q Okay. And on Pages 4 and 5 of your expert report?

A Uh-hum.

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Q You depict a number of graphs, and they each have black horizontal lines across them. Correct?

A Uh-hum.

Q And do those horizontal lines depict the averages over the time periods that are represented in your graphs?

A Yes.

Q And those horizontal black lines do not show the trend of the same time period.

A They don't show the trend, no.

Q Why did you align depicting the trends in this graphs?

A This is directly reproduced from the NOAA report. And I was more interested in showing the variability and portraying the extremes in the 1930's relative to extremes over the last two decades.

Q Okay.

A But with such year-to-year variability apart from -- yeah, I mean, the trends wouldn't be particularly large or all that statistically significant.

Q But you haven't attempted to depict the trends or --

A No.

Q -- in these graphs?

A These figures are reproduced from that NOAA

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report.
Q Okay. Do you agree there has been a trend toward declining a snow pack in Montana since the 1950's?
A At least up until 2015. The Figure 1.5 that Mark Jelinek prepared shows that there was crazy high snow fall in 2018 and 2020. I don't know how that would influence the trend.
Q Are you aware that the heavier snow pack that occurred in the last decade was followed by flash melting and then flooding due to raising temperatures?
A Wouldn't surprise me.
Q And in your graph on Page 7.
A Uh-hum.
Q And that is one I believe that Mark helped with, correct?
A Yeah. Well, he put the red box on it.
Q And there you depict only the 800-year average by your horizontal line. Correct?
A That's the figure pulled directly from the publication.
Q Okay. And there's no trend depicted --
A No.
Q -- in that graph?
A No.
Q If you were to depict a line shows the long-term

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trend with snow pack, would it start to slope downward as you move in time towards and beyond 2000?
A I wouldn't even attempt to eyeball that one.
Q You don't know?
A Yeah.
Q Okay. All right. You -- you cite two sentences in the complaint on Page 9 of your expert report.
A On page?
Q Page 9 of your expert report.
A Okay.
Q And you are quoting from allegations of fact in the complaint where plaintiffs --
A Yeah.
Q -- are alleging harms or future harms, correct?
A Concerned about future harms.
Q And do you disagree with every one of these sentences as being inaccurate?
A Um, I don't disagree in the first part with what the youth plaintiffs feel. They feel what they feel --
Q Uh-hum.
A -- okay? Whether -- it's misattributed to human-caused global warming in my tenue, but I don't question what they feel.
Q And do you disagree that there is an overwhelming scientific consensus that human-caused climate

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disruption occur and damage to humans and other life and ecosystems on which humans depend?
A Okay.
MR. RUSSELL: Objection, foundation, compound.
BY MS. OLSON:
Q It's a statement on Page 9 of --
A Yes.
Q -- Dr. Curry's expert report. I'm asking if she agrees or disagrees with that sentence.
A The scientific consensus relates to the climate itself. Science has nothing to say about what's dangerous or not. So calling the dangerous part of that part of a scientific consensus is mistaken. In fact, the AR4 and AR5 particularly stayed away from that and called reasons for concern.
Q Okay. So let's break that out. Do you agree or disagree with the first part of that statement there is an overwhelming scientific consensus that human-caused climate disruption is occurring? Is that --
A Human-caused climate change is occurring and it's an unknown proportion of overall climate change because we haven't adequately sorted out the natural component. So I would -- to make it truthful I would rephrase it. But that's more defensible than the dangerous part so, you know --

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Q Do you agree there's overwhelming --
A -- I can't really support the statement as it is.
Q Do you agree there's overwhelming scientific consensus that human-caused climate change is dangerous?
A That humans are contributing to climate change, yeah, overwhelming scientific consensus. That's very different from saying humans are causing all climate change.
Q Okay. And then the third bullet down, do you agree that atmospheric CO2 is the primary forcer of climate change?
A What -- say this again? Third bullet.
Q The third bullet you agree that atmospheric CO2 is the primary forcer of climate change?
A No, it's been a factor maybe since 1950. Climate has changed naturally over the billion years that the earth -- or four billion years that the earth has been in existence. The proportion of human-caused climate change relative to natural variability is something that's unresolved.
Q Okay. And is earth's climate -- strike that. Is carbon dioxide in the atmosphere the single-most important factor in earth's climate over those hundreds of thousands of years?

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A Not even close.
Q What's the most important factor?
A Well, the sun.
Q So --
A Volcanos.
Q so if we look at earth's systems --
A Yeah.
Q -- so not the sun itself, but earth's systems, which is -- what's the most important factor in the temperature of the earth?
A Okay. Forgetting the sun? Well, volcanos, tectonics, the movements of the continents, large-scale ocean circulations.
Q That's more important than the composition of gases in the atmosphere?
A Okay. The atmosphere composition -- you know, if you take a planetary science perspective, and you look at, you know, like millennial scale averages type of thing, the atmospheric composition is a big deal, okay? But it's the distance of the earth and the sun, the earth -- the state of earth's magnetic field, I mean, these are the big, large drivers and constraints on the earth's climate.
Q So you disagree that the composition of earth's atmosphere has been the largest factor in the changes in earth's temperature over hundreds of thousands of years.

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A Absolutely I disagree.
Q You disagree. Okay. Do you agree that plaintiffs face physical risks arising from extreme weather events such as wild fires, floods and heat waves?
A Through all of human history humans have faced risks from extreme weather events, droughts, and wild fires.
Q And would you agree that plaintiffs are facing increasing risks due to climate change?
A No, because they have -- okay, let's think about their great grandparents in the 1930's. They had structures that were less robust, they didn't have central heating, they didn't have air conditioning, they didn't have air purifiers, they didn't have all sorts of things, okay, that the children now have, presumably, in their lives. So they're much better equipped to weather whatever severe events they might encounter compared to their great grandparents in the 1930's.
Q Um-hum. Okay. And do you agree that plaintiffs are facing chronic and emerging risks that include more gradual impacts from drought conditions and sea level rise?
A Well, I don't think anybody in Montana is directly affected by sea level rise.
Q What about drought conditions?
A There were far worse droughts that occurred

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previously in the millennium.
Q So you don't think plaintiffs --
A Even in the 1930's there were far worse droughts in the 1930's.
Q Are there any chronic and emerging risks that include impacts from drought for these plaintiffs?
A No, I don't see anything that is yet approaching what was going on in the 1930's.
Q Do you believe your clients who hire you face any of these chronic risks of increasing impacts from drought emerging as a result of climate change?
A I don't have any clients who have asked me specifically about drought; mostly sea level rise, hurricanes, wild fires, winds, global stilling, there was concerns about that a decade ago whether the winds were all gonna slow down. No, but I haven't had any of my clients who are particularly concerned about drought.
Ah. Okay, I do. This would be World Bank, worried about monsoons, and I did a study on Paleo monsoon on droughts. And I said okay. By looking at the historical record in the 20th Century you're missing the whole show. If you go back even to the 1890's, and especially to the 1700s, there were crazy periods of monsoon droughts. There was, like, a multidecadal, like, 30-year monsoon drought that occurred, like, around 1760,

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something like that. And this was all natural variability.
And so I said well, what's gonna happen with global warming, could we see something like that? Conceivably, but overall, with warming, you can expect more water in the atmosphere, more rainfall so the IPCC concluded that they would expect more rainfall in the monsoon regions of Asia. But that's my only drought study that I've done for a client.
Q Dr. Curry, you agree that carbon dioxide has an infrared emissions spectra which acts to warm the planet. Correct?
A Absolutely.
Q And you agree that humans cause emissions of carbon dioxide.
A Absolutely.
Q And the single greatest cause of humans releasing CO2 emissions is from burning fossil fuels, correct?
A Yes. There is a -- other trace gases, methane, nitrous oxide, whatever, on and on it goes, but yeah.
Q And -- and you agree that global temperatures have been warming since the industrial revolution. Correct?
A No. They were sort of cooling until about 1850 or 1860. They started warming around 1860.

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Q Okay.
A They were still cooling in, say, the first century, if you will, of the industrial revolution.
Q Okay. And the trend now is towards warming, correct?
A Towards warming — yeah.
Q You don't think that human-caused climate change is a hoax, correct?
A Of course, no, I don't.
Q okay. Do you consider yourself a climate science skeptic? Or how would you characterize your --
A I'm a climate scientist.
Q Okay.
A Okay? My job is to continually evaluate the evidence to question the assumptions and reevaluate conclusions, that's my job as a scientist. And there's a lot of people who found what I do inconvenient.
Q Would you agree that the increase of accumulated CO2 in the atmosphere's happening at a faster pace than ever before in human history on the planet?
A Hard to know. There's stuff in ice cores and people looking at the stomata of leaves has come up with very different interpretations, so there is -- there is some uncertain in terms of how to interpret all that.
Q Do you agree that CO2 has risen by about 120

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parts per million in the last 150 years?
A Yeah.
Q And can you cite to any other time in -- in human history when CO2 levels have risen by that much in that short of a time frame?
A Not really, other than some of the leave stomata kind of inference about CO2, so there is another line of reasoning about what CO2 — what's going on with CO2. This is, like, new research. I won't say that I believe it, but it's out there, and there's some uncertainty in all this.
Q So as a lay person, I'm not a scientist, but when I look at the CO2 levels on earth —
A Yeah.
Q -- climate scientists have been able to determine them through ice cores —
A Yeah.
Q -- all the paleo climate record, to me it looks like a really big increase in CO2 in a really short time. Would you agree with that?
A Yeah, based on those typical graphs that you see. I'm just saying there is some evidence out there that challenges that interpretation.
Q And so like at minimum would you say that humans are performing a grand experiment on the earth's climate system?

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A Yeah, we will learn --
MR. RUSSELL: Objection, vague.
THE WITNESS: -- how sensitive the earth's climate really is to rapid increases in CO2.
BY MS. OLSON:
Q And it could go either way.
A It can be either way, not very scientific or — it might not be very sensitive.
Q And would you say that there's enormous risk in that uncertainty?
A Yeah, whenever there is uncertainty there's risk. That's really about what my book is about, okay? It's decision-making under deep uncertainty is a major theme. How we should think about climate risk, how we misperceive, how our perceptions of climate risk fool us relative to the actual risks. A whole host that are dealt with in Part 3 of my book.
Q Is it possible that your theories about natural variability playing a stronger role than what other climate scientists believe, is it possible that you could be wrong about that?
A No, there is so much literature supporting that. The --
Q So it's impossible -- you are not wrong, you are certain that --

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A No — okay. I'm not certain about the magnitude but the IPCC AR6 have cross chapter box 4.1 talking about the potential risks of a cluster of volcanic eruptions similar to what was seen in the early 1800's. They said that could fundamentally change the trajectory of the 21 Century in climate. I mean, this is in the IPCC 6 assistant report. The IPCC cites all sorts of information about natural internal variability and the magnitude. I mean, this is not particularly controversy. What the climate models failed to do is get the timing of all this right, all the noise and wiggles and whatever, but if you time it and you actually account for the fact that a major shift in 1976 occurred in the Pacific that led to warming until the end of the 20th Century, that's not factored into the attribution, it's just one of those squiggly lines that doesn't — that misappropriates the phasing of the natural variability.
And, again, the solar, there's a big debate. The assumption in the IPCC is a low variability scenario, but in Chapter 2 of the AR6, they're giving equal credence to the high var — okay, there's a big range, okay? Oh, my gosh.
Q Is it ever as big as CO2?
A Okay. The issue -- no. The issue is apart from the forcing you also have solar indirect effects which

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aren't adequately treated by the climate models. The point is when you add together volcanos and natural internal variability and the sun, you get something that rivals the increase from CO2. Could potentially counteract it, could potentially amplify it, but it looks like in the coming decades it will act to counteract it. And, of course, what -- the two big wild cards are volcanic eruptions, you don't know when they're gonna happen, but the period since 1850 until now has been the quietest in the previous millennium, I mean, we're gonna get hit at some point.

And the other big uncertainty is the silver indirect effects, which -- where people are understanding and making hypotheses and testing these things out in terms of the climate interaction, but they are not yet incorporated into climate models.

Q And would you agree with me that carbon dioxide is -- is not such a wild card and that the only wild card--

A Oh, I agree. I mean, one of the most certain things in all this is we now have a pretty good idea what the emission scenarios looks like for the 21st Century. It's close to RCP 4.5 or a little less. I mean, that's one of the more certain things.

Q And the forcing that that CO2 will have --

A Yeah.

Q -- that's pretty certain.

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A Yeah.

Q The volcano eruption is a wild card.

A The sensitivity of the climate for the CO2 forcing is uncertain by a factor of three to five.

Q Okay. And what's -- and you rely on the AR6 report for that; is that correct?

A Okay. Not entirely because what happened. Okay.

Q And if you just want to tell me, just point me to your best reference for that, that's all I need.

A Okay. With the AR5, the best reference is Lewis, 2022? It will be referenced in my book, Chapter 7, I believe.

Q Is that Nicholas Lewis --

A Nicholas Lewis, yeah.

Q -- who you indicated? Is this the Nicholas Lewis who is a banker, I believe?

A He's a financier. His training was a physicist and a mathematician, and then he worked as a financier. He knows a lot of math and statistics. And then almost two decades ago he became interested in climate science and he published a dozen papers, is invited to all the big conferences on this subject to, you know, been accepted into that community which is fairly remarkable.

Q Because he doesn't have any specific training as a climate scientist.

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A No, he doesn't.

Q Okay. All right. You would agree, I think, that carbon dioxide in the atmosphere is going to be with us for a long time. It has a long life.

MR. RUSSELL: Objection, vague.

THE WITNESS: There's a spectrum of time scales for how this gets recycled. One of the biggest uncertainties is the ocean uptake of carbon dioxide. There's a lot of uncertainties in what I would call the biogeochemical cycling of carbon through the system so these time -- time horizons -- sorry, I have shingles --

Q Sorry.

A -- yeah, in my -- I don't want to break because we can't take time, but you'll just have to hopefully not strike that if I have to -- rub my face. Where was I?

Q Why don't I ask you a -- um, I think a question that gets at this. So if we stop putting carbon dioxide into the atmosphere from burning fossil fuels, would you agree that it will change the climate trajectory on earth?

A Okay. And I actually dealt with that, I think it's in Chapter 4. I did -- okay. Page 27. Okay. So we don't know how the climate will respond to a cessation of emissions. One of the -- under the auspices of the CMIP program where they do all these model experiments and

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models intercomparisons, there was what's called ZEC-MIP which used multiple earth system models which means they have an interactive carbon cycle to see what would happen if we immediately stopped emitting carbon dioxide, and then let the models run out for 50 years.

Well, some models warmed, continued to warm, others cooled. And none of them were at equilibrium, so -- and the biggest uncertainty is to -- because of the high uncertainty in and effectiveness of the ocean carbon uptake. So we don't .,know um, how this -- how the climate system and how the carbon cycle would actually respond. There's so many time scales and so much complexity in all this, it's hard to reason through how it might happen, so these earth system models are helpful on that regard, but they're only as good as the assumptions and parameterizations that are put in the model.

Q And you said going back to the IPCC scenarios, the emission reduction pathways, I know that RCP 4.5 is your preferred IPCC emissions scenario, correct?

A Uh-hum.

Q And how do you take carbon emissions and then calculate climate change?

A Okay. Well, you can --

Q How do you do it?

A How do I do it? I use the Transient Climate

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Response to Emissions, TCRE, which essentially takes -- and this is in -- would it be Chapter 7 somewhere of my book. Okay. What -- it's based on a linear relationship between short-term temperature increase and carbon emissions. It sort of gives you a climate sensitivity that doesn't rely on equilibrium, it's more of a short-term response. So what I do is take, you know, if a client says well, run this scenario I can say okay, this many emissions, this much emissions out to such-and-such a year, run it through a little simple equation that you can calculate on the back of the envelope and you get the warming. And this kind of thing is done in the so-called climate emulator models, they aren't that much more sophisticated than that.

Q Okay.

A They're bypassing these big global models in favor of these simple climate emulators, the simplest of which would be a TCRE calculation.

Q Okay. So if Bozeman wanted to hire you --

A What?

Q If the City of Bozeman, Montana wanted to hire you --

A Yeah.

Q -- your company, and you went to advise them on whether they can be in the running to host the Olympics Games, the Olympics Winters Games, and they need to know

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what temperatures to expect and what kind of snow pack might be predictable, would you be able to give them that kind of analysis?

A Okay. Here's what I do. I would look at the historical record. Okay? Look at the year-to-year variability. I would look at underlying trends. I would say are there any trends here that make sense in terms of global temperature increase, in terms of global temperature increase. I would give them a range of scenarios that related to not just switch emissions scenario, just say 4.5, but also to the what might happen if it's an El Nino year, a La Nina year, what would happen if there was a cold shift to the Atlantic multidecadal oscillation, I'd run it through all sorts of these scenarios, though they would have all these possibilities to consider. If anybody purported to say the snow's gonna be fine or the snow's gonna be terrible, I would call them a charlatan.

Q There would be uncertainty in your --

A There's a lot of uncertainties --

Q -- projections?

A -- but I can bound the scenarios, okay, based on historical observations, based on expected warming, what know about local and regional and, you know, global trends and temperatures and whatever, and give them a range of scenarios to consider. So that's how I approach it. And I

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don't need a climate model at all for that.

Q Okay. Okay. Dr. Curry, I know you've had objections to the concept of scientific consensus; is that correct?

A Okay. There's a difference between a scientific consensus and a consensus of scientists. A scientist -- okay, let's think about the fact that the earth orbits around the sun. Nobody talks about a consensus, I mean, it's just so establishes a fact and so that's a scientific consensus.

This is very different from a consensus of scientists where to achieve some political objective or whatever, scientists are asked to come to an agreement on something, okay, this is what the IPCC did. They said, you know, find a consensus on this. Another real -- you know, in terms of medical treatments for insurance, they have the -- they sit around a table, they come to a consensus. Whatever it means is what, you know, the policies at the insurance company follow whether you can use -- get reimbursed for this treatment for that disease, that kind of thing, that's done on, like, medical consensus.

But for the climate change one this is a forced consensus, a manufactured consensus, this is an exceedingly complex problem. It's a fairly young field. As a graduate student in the late '70's and early 80's there was no such

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thing as climate science, I mean, people were trained in geology or atmospheric science or geochemistry or whatever. I mean, it wasn't even a formal field back then. People considered various aspects of climate variability, but climatology was really a subfield of geography where people just kept the statistics. So it's a very young field. It's an exceedingly complex one. And manufacturing a consensus -- again, it was the idea, it was a misconception about how policymaking deals with uncertainties. This was like an effort to speak consensus to power, and it just developed into a big polarized mess. If you said, you know, we don't know what's gonna happen, you know, but there are some scary things that might happen, you know, let's think about how we can reduce our vulnerability, you know, making more robust and cleaner energy systems would be part of it, it could have been a very different dialogue that would not have had to rely on the consensus, a manufactured consensus of scientists.

Q And what's your best basis for your position that the consensus -- consensus around human-caused climate change is manufactured?

A Oh, my gosh, I mean, explicit statements from the IPCC, when you ask a body to find -- a group of scientists to find consensus, that's manufactured. It's very different than the earth orbits around the sun, okay,

it's when politicians ask scientists to find a consensus, and then they come up with one. That's a manufactured consensus, it's not one that naturally emerged over a long period of time based on a very wide body of evidence that stood the test of time.

Q So you don't object to there being broad agreement among scientists that carbon dioxide is the most important forcing of climate change?

A Okay. The first assessment report of the ICC was not a consensus-seeking one. He said here's what we know, here's what we know, here's what we don't know. Here's where the disagreements are. Here's where the biggest uncertainties are. But by the time the second assessment report rolled around, they were supposed to be consensus seeking and, you know, consensus was part of their operational charter so that — it didn't need to be that way at all, and it didn't start out that way. And what they have done, you know, by claiming consensus they've subjected themselves to decades of attacks by people who just aren't buying it.

Q Do you agree that one of the biggest problems with climate change is that it's causing the seas to rise?

A It -- this is the one thing that you can unambiguously attribute to warming temperatures. Sea level expands, glaciers may melt but, again, in the warmer

temperatures you can get an increase of snow fall so, you know, it can work both ways. But yeah, this is something that is one the more of the unambiguous impacts, far more than floods, droughts, whatever, is sea level rise, yeah.

Q And do you agree that the seas will generally rise slowly as the earths heats unless there is a catastrophic event like the collapse of the West Antarctic --

A That's the big wild card. And, you know, the Greenland ice sheet is heavily influenced by the Atlantic multidecadal oscillation which I mentioned before, once it shifts to the cold phase, expect more snow accumulation and the melt on Greenland to slow down, that's sort of facilitatory. But the big wild card is the potential collapses of the West Antarctic ice sheet. If it did collapse it's as likely to be caused by under ice volcanos as it is to be caused from global warming. I mean, it's very unstable, it's dynamically unstable without going into a lot of explanation. You can find an explanation in Chapter 8 of my book, 8.5.

Q And Dr. Curry, I know you've done research up in the Artic. Have you ever done research on the ice sheets?

A On ice sheets, no. Sea ice, my focus was on sea ice.

Q I read about that. And how much sea level rise

would you expect to see if the West Antarctic ice sheet collapsed?

A Okay. It would take centuries to millennia to actually melt. A total collapse hasn't been seen even over the last several inter glaciers, so there's no — how shall I say, recent analog, you know, back when the dinosaurs were around I don't think there was a West Antarctic ice sheet but, you know, in the interglacials and the ice age, you know, there isn't an analogue for a full collapse.

What people think in extreme case that we might see in the 21st Century would be, like, a total of six feet of sea level rise. Global sea level rise, and that's an extreme case. And what was extremely interesting about the IPCC this time is they divided the sea level rise projections into the stuff that we have some kind of a handle on, um, models that include hypothetical stuff that we have no evidence of, and then structured expert judgment.

You know, the really high stuff comes from the models that we have, you know, basically have no particular basis in reality and structured expert judgment. If you focus on the stuff that we have some understanding of, 4.5 scenario would be less than three feet.

Q Okay. And do you have concern about species extinction that's occurring as the earth warms and climate

changes?

A Species extinction is a big deal, but it's way more determined by land use insults and habitat destruction than it is by actual warming climates, I mean, the earth -- in previous geological epox the earth has much, much warmer and life is thrived so there's no prima reason that warm temperatures is unfavorable to species. It's really the land use and the habitat destructions that are the real big insults.

Q Would you agree that the rate of change has a big impact on how species adapt to changing temperatures?

A Species move a little bit north or a little bit south. Makes adaptation not all that challenging for the amount of change that we're talking. The year-to-year variability that animals or plants or whatever face is, you know, far greater impact than, you know, this slow creep of warming.

Q Do you agree that we're facing a sixth big species extinction event?

A I think that's overwrought, but if we are it's related to land use, not to climate change.

Q And what's your basis for that?

A Things that I've read.

Q Anything in your report specifically or --

A No, I don't deal with species extinction. That

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was way beyond the scope of what I was asked to deal with.

Q I've seen that you've had experience with CFAN advising clients related to extreme flood events and perhaps agriculture. Is that part of the work that you've done at CFAN?

A Oh, my gosh, yes. In South Asia, we predict in the monsoon regions, again, CFAN's actual first client was USAID, they were predicting a scheme to predict and give advance warning for floods in Bangladesh. They periodically they just get — the country just gets inundated due to monsoon rainfall. Nothing to do with climate changes, it's always happened. So that was one of our very first projects was dealing with flood forecasting in Bangladesh.

Q But you'd agree that sea level rises is also exacerbating the flooding in countries like Pakistan and Bangladesh, correct?

A Compared to — okay. The issue for them is a massive -- is the land is sinking, a lot, because of ground water withdrawal. So whenever you see sea level rise is a problem someplace, the worst places like Indonesia, Jacada sinking, like, 22 feet because of ground water withdrawal they had to moved the capital it's no longer in Jacada. You know, the biggest sea level rise problems relate to land use, particularly withdrawal of ground water.

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Q Okay. So on Page 9 of your expert report you list the different assessment reports that you rely upon in rendering your expert opinions?

A Uh-hum.

Q And I'm wondering if you rely on any of the other IPCC reports like the special 1.5 report?

A I looked at it. I didn't think it added anything, frankly, that wasn't in the 6 assessment report which I thought was a much more thorough and comprehensive analysis, so I didn't really regard that as a —

Q Okay.

A -- contribution that was really beyond the AR5 or the AR6.

Q And would you agree that while the 8.5 scenario is less likely, in your opinion, than scenario 4.5, it can't yet be eliminated as a possible pathway?

A It's implausible. People regard — the assumptions we need to increase coal use by 6.5 times worldwide to make it happen, I mean, it's -- to say — I mean, anything's possible, but this is as close to impossible as pretty much anything you're gonna run into. It's -- nobody's paying attention to that anymore other than some die-hard people who really like the model simulations using 8.5 that show big impacts of warming. They're just not plausible. It's not a plausible scenario.

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Q Is it your expert opinion that the RCP 4.5 is business as usual?

A I mean, no, it's not technically a business as usual, but it's — currently aligns the closest with the IEA's best assessment of what they think the trajectory is going to look like based on current actions, current pledges, their understanding of how the technologies are gonna development, whatever goes into the IEA, but the IEA is really doing a better job at scenario development than the IPCC is at this point. The IPCC was given some weird guidelines, um, so I don't blame the people who were preparing the scenarios for the IPCC, they were just given some weird guidelines.

Q So in your opinion, is -- if we followed the emissions trajectory of the RCP 4.5, would that be a climate policy success?

MR. RUSSELL: Objection, vague.

THE WITNESS: Okay.

MR. RUSSELL: Go ahead.

THE WITNESS: Okay. I think I know where she's coming from on this. Three or four years ago when people, you know, thought we could be seeing four or five degrees Centigrade of warming 8.5, people regarded 4.5 as policy and said oh, only 2 or 3 degrees centigrade wow, success. Okay. Now, two degrees is regarded as the threshold of

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catastrophe by Gutierrez, the current IP — you know, UNFCC person. So they've changed the goalposts quite a bit on the time a few years.

I think that we will stay within two degrees. Remember, I'm talking just about another nine-tenths of a degree over the course of I would expect that we will stay within that for a whole variety of reasons. I think climate sensitivity's on the low end. I think that natural variability, at least in the first half of the 20th Century, points towards some cooling effects. And, you know, another less than one degree Centigrade of warming is far from a catastrophe.

Q Do you know what level of atmospheric carbon dioxide would correspond with an RCP 4.5 scenario?

A Oh, gosh. Off the top of my head, no.

Q And for temperature increase, two, three, what?

A I think we'll stay within two degrees relative to 1900s; that means another nine-tenths of a degree.

Q And you would agree that the two degrees' threshold that was set by the Paris agreement was not scientifically based, correct?

A Oh, no, it's politically. They keep changing these targets in order to maximize the pressure for action. When it looked like we are in reach of two degrees, then they knocked to down to 1.5 degrees, you know, it's all a

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political game.

Q And would you agree that the IPCC confidence in human-caused global warming is stronger than ever before?

A The IPCC?

Q The IPCC's confidence in its findings that humans are causing global warming is stronger than ever before.

A Okay. That's a very vague statement, but I do want to say is that the IPCC 6 assessment did a much better job of treating uncertainties than any previous assessment report. A lot of their findings are over confident, but they are getting serious about realistic portrayals of uncertainty, and I think they did a particularly good job on the portray of uncertainty in the sea level rise issue.

Q Would you agree that providing a range of possible scenarios, including worst case scenarios, enables decisions that are robust across a range of possible outcomes?

A Chapter 9 in my book, what's the worst case? Okay. It's all about worst case scenarios, I mean —

Q Do you use 8.5?

A No, I use, you know — what I look at, I have a whole subsection there on sea level rise, you know, how do we think about what could be the worst case, and I go through that whole argument about what's justified, what's

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not justified. But I look at specific extreme events, okay, and I look at people are gonna feel extreme events more than they're gonna feel the slow creep of warming and so I use three examples. One was that crazy monsoon drought in the 1700s. The other one was the arc storm scenario in California, I don't know if you've heard of this one where in the winter of 1816 to 1862 a sequence of atmospheric rains dumped ten feet of rain in Central California, okay, and those have happened, like, every 200 years, for a long time, and there have been some worse ones. Okay.

You know, we're due for one in the 21st Century. Could it be worse? Yeah, there could be more rain and there — it could be one of the more extreme cases that were in the record and so I talk about how do we think about how that extreme events? The IPCC doesn't -- that would never come out of a climate model, I mean, it's just too severe, extreme and crazy, okay, but it happened, so let's develop a worst case scenario based upon a historical extreme event.

I talked about well, what could global warming do? The other one was okay, what's the worst case Florida hurricane, land falling hurricane, and I looked back to 1935, the infamous 1930's which is the worst historical land fall in Florida hurricane by a long shot. Okay. I

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think what could global warming do to this? A little bit more rain, a little bit more intensity. It won't affect size it won't affect this, that and the other. And so I came up with an extreme, a worst case that is based on a historical worst case that is juiced up a little bit by global warming.

Q So — okay. So let me see if I understand. What were CO2 levels in the 1930's, do you remember?

A Not much. 300ish.

Q 300? Okay.

A Yeah.

Q So if CO2 levels in the 1930's had been 4/18 parts per million, what they are today?

A Uh-hum.

Q Would you have expected the 1930's to have looked even worse than what you have described in your --

A Not very much. There's so much variability. You can't see the signal. Hurricanes are rare events, more driven by favorable atmospheric circulation patterns, you know, the sea surface temperature isn't an overwhelming driver.

Q What about the drought conditions, if the earth had been warmer from climate change as it is today, would that drought had been worse?

A It's hard to know because there's feedbacks and

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atmospheric circulation patterns and whatever. There's an interesting new development in experimenting about this is to take a weather forecast model, and -- that actually resolves all these things, and just run it with 300 parts per million CO2 and see what — see how a particular weather event would have evolved. And I think this is the way to approach that problem. This was a guy's PhD thesis at Oxford, which I said this is wonderful, okay, what's next? Um-huh, taking a job and doing something else, you know, I hope somebody else picks up on that because I think that's the way to answer those kind of questions, people haven't done it. They've tried to answer it with course resolution models, models that aren't fit for purpose. So what does that — then you're left with back-of-the-envelope calculation.

Q So in your expert opinion, Dr. Curry, in your report you say that we're bound to be surprised particularly by unpredictable natural climate variability--

A Yeah.

Q — correct? And so would you agree that you aren't able to predict with any certainty what role natural climate variability will have on the climate system through the rest of the century?

A Let me put it this way. I'm less likely than anyone to be surprised because I've considered a much

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broader range of scenarios that includes a range of natural variability scenarios, so I'm looking at a much broader range of scenarios than the IPCC is looking, so I'm less likely to be really surprised.

Q And how do you factor in that uncertainty when you're advising clients about impacts 30 years out?

A Oh, my gosh, it's all about uncertainty. There's -- okay. The way -- the way scenario planning works, it's a risk assessment tool decision-making under deep uncertainty as you take a lot of scenarios and you -- if you have specific vulnerability thresholds, oh, my power system is gonna crash if we see a temperature of 105 degrees for so many days. If you have a certain vulnerability threshold, then you can say well, how many of these scenarios would put us over the vulnerability threshold.

Q Okay.

A If it's only one, you say well, maybe I'm okay. Okay. On the other hand, if it's a lot of scenarios, they say I better do something about it. So people use these scenarios in different ways in terms of how to reason about their risk is, you know, and the trade-offs between doing something to accepting the risk, you know, I'm trying to prevent the risk or just trying to manage the risk if it comes. Okay, I know we're not set up to avoid this

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particular risk but we can develop some operational plans to minimize the impacts if we know it's coming. With five days' warning, we can figure out how to avoid of the worst impacts.

Q Is it fair to say that when governments look at the vulnerability threshold for climate change that they should look at risks in terms of the vulnerability of children and the impacts they will face?

A All --

MR. RUSSELL: Objection, vague.

THE WITNESS: Okay. All over the map, I mean, there are so many -- there's different regional vulnerabilities.

BY MS. OLSON:

Q But should governments be looking at the vulnerabilities that will affect children who may be alive through the end of the century? In your opinion.

A I don't see how that is an add-on to overall vulnerability. I mean --

Q So you don't think children have any special vulnerability around climate change?

A No, that's not true. Okay. The issue is -- okay. 2100 is 78 years from now, okay, let's go back 78 years, 1944. Okay. Would we expect our grandparents or parents or whatever to have spent a lot of time worrying

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about what people are gonna be facing in 2022? When they had -- I mean, they would be so shocked by even the existence of the European union, not to mention China being a super power, and the fact that we have eight billion people on the planet that are all, you know, much more affluent than anything they could imagine. They could not imagine the technological --

Q We'll get to some of this. I promise we'll get to some of this.

A Okay. But my point is, trying to worry -- look, that far ahead and worry about what society is going to care about, I mean, is a little bit pointless. What we can do is, you know, do our best to provide a foundation for peace and prosperity and, you know, whatever.

Q Would it surprise you if greenhouse gas emissions stayed at the same level as today and the earth's temperature kept rising?

A If emissions stabilize the rate of emissions is?

Q If the emissions stay what they are today.

A Temperatures will be slowly increasing, yeah.

Q Okay. And would it surprise you if greenhouse gas emissions stay at the same level they're at today and the seas kept rising?

A Oh, the sea level's gonna keep rising for centuries, I mean, there's huge time lags in the system.

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Q Because of the increased CO2 in the atmosphere.

A No, no, no, because of the time lags in the ocean. The bottom of the Pacific Ocean in the northern hemisphere is still cooling responding to the forcing from a little ice age. I mean, there's huge long-time scales involved here.

Q And would it surprise you, Dr. Curry, if greenhouse gas emissions stay at the same level as today and Montana's precipitation fell more as rain than snow?

A Could go either way.

Q You don't know whether if the temperatures rise that Montana's precipitation will fall more as rain than snow?

A It could go either way, yeah.

Q And when you say there's unpredictability and uncertainty, is it possible that anthropogenic climate change impact are being underestimated by the scientific community?

A Impacts on what? It's exceedingly difficult to sort out the impacts from natural climate variability, man-made climate variability, land use, poor governance decisions, a whole host of issues go into determining the vulnerability of a community or a region.

Q I'm just wondering if you think the uncertainty is only on one side.

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A Uncertainty, a lot of uncertainty, but the -- there's a lot of uncertainty.

Q So it could be that the impacts of anthropogenic climate change are actually worse than what is being reported by the scientific community.

A Well, they've over exaggerated the impacts of human cause warming by compounding it with natural climate variability and land use changes.

Q And who --

A So the fact that they've over amped the anthropogenic climate change impacts, I would not expect to be surprised in that other direction.

Q And who are the people who are exaggerating the certainty around anthropogenic climate change?

A I think the worst example is the IPCC AR4 working group 2 report. It was absolutely outrageous.

Q Would you agree that there is not so much uncertainty that governments can not make decisions today to reduce the exposure of their citizens to climate risk?

MR. RUSSELL: Objection, vague.

THE WITNESS: Okay. I will answer it, though, because it's something that people should be paying attention to. The no-brainer thing to do is to reduce our vulnerability to extreme weather which is happening. We already have extreme weather, we always have had, we will

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in the future no matter what the CO2 emissions are. Paying attention to better operational practices, better structural integrity, better land use and zoning, and on and on it goes. These are some things that can be done right now to improve the situation for everybody.

Now, in terms of emissions reductions, I don't think emissions reductions as a primary goal makes sense. I think we need to try to envision a 21st Century electricity and transportation system that is gonna meet the needs of the population in the 21st Century, and while we're at it can we please make it cleaner.

Q Would you agree that the uncertainty around climate change is more about year-to-year variability as opposed to the long-term trends?

A Okay. I missed a word in there.

Q Would you agree that the uncertainty --

A The uncertainty.

Q -- is more about the year-to-year variability as opposed to the long-term trends that scientists are seeing?

A It's all -- it's all — there's multi -- there's variability on all scales from decadal to multidecadal century scale to millennial scale, there's all of this. And then there is, you know, any changes in external forcing from carbon dioxide, the sun. Whatever.

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Q Do you believe your climate scenarios and impact assessments for your clients are reliable?

A Yeah. They're very transparent. I tell them what I'm doing, the basis that it's based on, the arguments that I use is very transparent. And I give them a broader range scenarios that are tailored to their specific thresholds of vulnerability.

Q And — .

A And the reason they come to me, they'll tell you this, is because they've already gone to people who take climate models and say look at Montana, they do dynamical or statistical downscaling and way overinterpret them and give them a bunch of garbage that's don't believe for a minute, and that's why they come to me.

Q How long has it been? Okay. Can you look at Dr. Trenberth's report again on Page 3? I think it's Exhibit 177.

A Okay. Page 3. 1, 2, 3. Yes.

Q Are you familiar with — if you -- sorry. I was on the wrong page, sorry about that. If you look at that Figure 1.

A Yeah.

Q Are you familiar with this type of graph that shows global temperatures --

A I am.

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Q — and CO2? Okay. And do you agree that their scientific agreement that the temperature on earth is highly correlated to the level of carbon dioxide?

A No. I mean over — if you go back over, you know, millennia whatever, there's all sorts of odd relationships.

Q So you disagree that in terms of long-term trends ---

A You have to define long term.

Q Let's say over 10,000 years does earth's temperature generally correlate with the trajectory of CO2?

A No. Over sort of ice agey time scales you see some relationship and it's really the CO2 lagging the temperature rather than causing the changes. It — yeah.

Q Is there any correlation between CO2 and temperature over the historic record?

A Okay. This is not a historic record, this is the paleo climate record which is hotly debated. This is the subject of my court case as to what's wrong with the way the community is dealing with this issue. Hotly disputed.

Q Do you have a sense of how many scientists are on one side of the dispute versus the first another side?

A That's not really relevant, it's about the arguments. It's about the evidence and the arguments, I

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mean, you get scientists in a room, the climate gate emailed, I don't know if you're familiar with those, the unauthorized release of emails from the University of East Anglia in 2009, it showed how certain people in the Paleo climate community were bullying other people into submission, getting rid of editors, all sorts of stuff. There's all sorts of Skullduggery that have gone on with regards to this particular reconstruction.

Q Is it a relatively small number of scientists that are on the side that say that there is not a correlation between temperature CO2 compared to the scientists who agree that there is a strong correlation?

A Okay. I'm gonna ask you to look at -- here, where are we? This one.

Q What page are you on for the record, Doctor?

A This is 6. I mean, what kind of a correlation do you see here? I don't see much of a correlation. I see all sorts of variability. I see a big increase here, even though temperature wasn't doing anything. I see a big decrease there, even though carbon dioxide started to increase. And I see an accelerating thing and it looks pretty flat in here. So I don't see a huge correlation with carbon dioxide on interannual to multidecadal climate variability. I mean, this is not a simple -- there's no simple relationships here.

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Q So you would not agree that the -- that, let's say, the Montana line, the green line, is not natural variability from year to year but that the trend is that the temperatures are increasing in Montana consistent with the trends that's CO2 temperatures --

A There's a much bigger trend --

Q Please let me finish the question.

A I see a much bigger trend between 1900 and 1940, okay? When things really start increasing it's flat. Between 1940 and about 1980 when you've got a big slope.

Q All right. So Dr. Curry, you see no trend in figure 5 --

A No, I did not --

Q -- of Kevin Trenberth's --

A -- see no correlation. I do not -- they're both have some overall increasing

Q I need to ask the complete question otherwise the record's going to be a mess.

A Okay.

Q So you do not see any correlation between the temperature trend and the CO2 trend in Figure 5 on Page 6 of Dr. Trenberth's expert report. Correct?

A I see two things that are overall increasing. But the magnitudes of the periods of increasing, the rate of increase and all of that, I mean, if you did an actual

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numerical correlation you would not find a huge correlation coefficient, I can tell that just by eyeballing it. CO2 versus temperature in Montana, it's not a big correlation cause for sure.

Q Okay. On Page 13 of your expert report you --

A Of my report?

Q Of your report. On Page 13 of your expert report, Dr. Curry, you say that the earth will likely heat only up to two degrees Celsius by 2100. Correct?

A Which paragraph are you referring to? I'm on Page 13. I don't see what paragraph you're referring to. Because Kevin Trenberth misquoted me and I want to clarify this. Oh, okay.

Q Did you find it?

A It's the top paragraph on Page 13.

Q Okay.

A Okay.

Q So you agree with that.

A I'm gonna agree with the statement that I wrote. I do not agree with the mischaracterize of that statement by Kevin Trenberth.

Q Okay. And what equilibrium climate sensitivity underlies your conclusion about the two degrees --

A Say that again? What about the equilibrium?

Q Equilibrium climate sensitivity, ECS, underlies

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your conclusion about that temperature?

A Just on the lower end. The numbers that Kevin Trenberth cites are 2.4 to 2.5 degrees Centigrade. Okay. And if that isn't close to two degrees, I mean, I don't know what it is. So that's with assuming equilibrium climate sensitivity of probably 3.3, I think, is probably what went into those numbers that Kevin Trenberth cites. And so if you're down to 2.8 or something like that, you're within two degrees Centigrade.

Q So your equilibrium climate sensitivity --

A It is on the lower end.

Q -- is around 2.8?

A On the lower end of the likely range. That's sufficient to keep it below two degrees, based on this entire set of assumptions by the IPCC.

Q And how does the equilibrium climate sensitivity you use compare with that of the IPCC?

A It's within a likely range.

Q And where does the uncertainty, in your opinion, about temperature projections at 2100 lie?

A Oh, my gosh. All over the place. Okay. All over the place. At the most fundamental -- it uncertainty about how the ocean uptakes and stores heat. And also the clouds feedback, how cloud processes respond to a warmer climate. There's been an assumption that clouds, how the

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clouds' response will actually amplify the warming? Recent research suggests that there is probably little net cloud effect. I actually, based on my understanding, and I did a lot of work on this, in the naughties, if you will, it could very likely be negative. But it varies with cloud types, with region, and whatever. It's an exceedingly complex problem and being how this is interpreted in the context of climate feedback is way oversimplified.

Q All right. We're going to turn and talk about children.

A About children.

Q Children.

A Okay.

Q So Page 13. In Section 2.3, that first paragraph.

A Uh-hum.

Q You agree that there have been numerous studies on the psychological health effects of climate change on children --

A I agree.

Q -- correct?

A And they've all been published since 2019, which leads me to think it's a recent phenomena.

Q Okay. And have you conducted any research or per-reviewed studies that were contrary to the

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conclusions--

A I have not personally --

Q Remember to just let me finish, just for the benefit of the court reporter.

A Okay. I've read the literature extensively, and I have heard from some children who are troubled and what is -- what exactly what they're troubled about.

Q And the emails that you've received from children, are those consistent with what these academic studies reference in terms of what young people are experiencing?

A Yeah. It's depression and worried about -- worry about the future.

Q And Dr. Curry, you've referenced that media get more clicks and views with alarming stories, I think you've have said that; is that correct?

A Yeah. I've got a whole chapter on that in my book.

Q And do you receive a lot of clicks because of your dissident views on climate change?

A In order of magnitude now less at least at than what I would say the leading activists.

MS. OLSON: It's 13 and 14, I think, Phil.

BY MS. OLSON:

Q Okay. And have you done any kind of survey of

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media to support those claims that people who receive the most media attention are those that are raising the alarms and being more activists?

A I've read literature on that. I haven't conducted any personal studies.

MS. OLSON: Okay. Michael, I'm going to show Dr. Curry the -- it's number 13 in your electronic file, Dr. Judith Curry Google search, and we'll mark that as Exhibit 178.

And then the next one will be number 14 in your file, Michael.

(Exhibit 178 is marked.)

BY MS. OLSON:

Q Okay. Dr. Curry, can you just look at the top of Exhibit 178 and see that that is a Google search of --

A Yes.

Q -- your name?

A Yes.

Q Do you see that?

A Yes.

Q Okay. And can you tell me the results, the number of hits it got when Dr. Judith Curry was typed in?

A Um.

MR. RUSSELL: Object to foundation. Go ahead.

THE WITNESS: Okay. It varies with time. I

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don't know when you pulled that. When I checked recently it wasn't nearly as high, um, and not all of those hits are for me, Judith Curry. If you do Judith Curry the past week, they'll be obituaries for Judith Curry and Judith Curry, you know, so a lot of these have nothing to do with me.

Okay. In terms of if you do a Google search news under news Judith Curry, the hits are pretty meager compared to, say, Michael Mann or --

Q So Dr. Curry, just --

A Yeah.

Q -- quick answers. So at the very top left there's a date. Can you tell me the date?

A I can't see it. 12-12?

Q 22?

A Okay.

Q 12-12-22?

A Okay. I had in my profile interviews so it is bumped up. It looks like it's bumped up.

Q The total hit number around 2,580,000?

A Yes.

(Exhibit 179 is marked.)

Q Okay. And I'm going to hand you Exhibit 179 which is the Dr. Trenberth Google search.

A Yeah.

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Q And that's from the same date. Correct?
A Yeah.
Q And that exhibit shows a Google search results of 71,900 hits. Correct?
A Yeah.
MR. RUSSELL: Objection. Foundation on this also.
BY MS. OLSON:
Q And does it surprise you that you have 2.5 million hits?
A Yes, because the last time I looked it was, like, more like 500,000. I had a very high profile interview several weeks ago that —
Q What interview was that?
A — that picked it up. It was on BizNews. Yeah, search for BizNewsTv. And then you'll see it. You-tube has shadow-banned it, so it's a little hard to find. Yeah, that's why this is very high right now.
But Kevin Trenberth, frankly, isn't in the media very much these days. If you search for Michael Mann or Katharine Hayhoe or some of these people, orders of magnitude. If you look at Twitter followers, Kevin — they both have order magnitude more Twitter followers than I do, so.
Q I believe you.

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A Yeah.
Q Do you believe that the plaintiffs in this case are being used as political tools?
A Yeah.
Q And who is using them as political tools?
A The particular — I'm not gonna say these plaintiffs in particular, I'm just saying children in general. Okay, but I have to wonder the two-year-old plaintiff, what he knows about all this? Okay.
Q So is that your personal opinion?
A That the two -- yeah, my personal -- that I have never encountered a two-year-old who can grasp this level of thing, okay?
Q And these are assumptions you're making about the role why these plaintiffs are plaintiffs in this case--
A Yeah. Yeah.
Q -- correct?
A I'd be especially the very young ones. The high school kids, they know enough.
Q And since you've never spoken to them, you don't have any evidence of this, correct?
A Okay. If you can provide me evidence of a two-year-old that can grasp — that can read this and can grasp all of this and even know what climate changing can -- even say the word anthropogenic, I mean, you know, I'll

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eat all this paper. I mean, there's just no way that a two-year-old gee, mom, help me, I'm really worried about global warming in my future and CO2 and all this kind of thing, I didn't think so.
Q Seems like you have strong feelings.
A I do.
Q And you don't think that they should be doing this. Correct?
A They can do what they want. But this is -- this is—
Q But you don't like it.
A No. I'm just saying they're being manipulated by their, parents at least the two-year-old is.
Q Okay. And do you also have strong feelings about climate change curriculum that's taught in schools?
A Oh, yeah.
Q And are you a K through 12 curriculum expert?
A No, but it's something that I — particularly when I was at Georgia Tech I consulted with a lot of people on the curriculum, something that I followed, and it's something I've looked at. Again, the curriculum that's being prepared in the last four to five years goes — I mean, they're not — if the students should be learning something about geology and earth science and, you know, weather science and their regional climate and stuff like

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that. And what they're being taught is, you know, basically a bunch of propaganda. They don't have any understanding of the science or the physics.
Q Should -- do you think kids should be taught about anthropogenic climate change at all in K through 12 schools?
A In high school, sure, it should be part of, you know, science studies, current events, that kind of thing, but that they should have had a good solid earth science class to start with where they actually understand some of what's going on.
Q On Page 15 of your expert report you quote Dr. Kate Marvel?
A Yeah.
Q Do you respect the opinions of Dr. Marvel?
A Um, some of them.
Q And —
A So she seems to be an honest scientist. I don't — can't say that I've read everything she's written or that I would agree with everything she's written.
Q Well, you quoted her as saying "One can have a sense of optimism by working towards a solution to climate change".
A Uh-hum.
Q Do you agree with that?

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A Yeah.
Q And would you agree that these youth plaintiffs are working towards a solution to climate change in their home state?
A Not at all.
Q Okay. And do you know whether seeking to protect their Constitutional Rights to a clean and healthful environment including the climate system gives these plaintiffs a sense of optimism?
A If it is --
MR. RUSSELL: Foundation.
THE WITNESS: If it is it's a false optimism because none of this is going to change the climate. We've already talked about the 0.00008 degrees Centigrade of warming that might not prevented.
BY MS. OLSON:
Q What solution — if you were to tell these plaintiffs this is what you should be doing to improve the climate, what would you recommend that they do to feel a sense of optimism?
A Okay. They need to go to school and they need to take some ecology science, engineering, math courses so they have the tools to become part of the solution. Okay, by being all depressed and doing nothing and gluing themselves to runways, you know, this is not helping with

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the solution. They need the tools and the skills to be part of the solution.
Q And those are all assumptions that you're making about these youth plaintiffs because --
A I know nothing. I'm just telling you about what they can do to be part of the solution, okay? And they can help, you know, design cities, neighborhood where they live, you know, live, work, play kind of environments to maybe they can be the ones who figure out how to make geothermal really happen in the state of Montana. They can be a part of the solution, but the -- there's the solution, and then there's politics. I mean, this is a political solution that they're seeking to, you know, change — it's something that's not gonna have a material impact, even if they were to get what they wanted out of, you know, getting rid of these two laws or directives or whatever they are, it's — that's not really gonna change the climate of Montana.
Q Dr. Curry, are you familiar with the laws being challenged in this case?
A With the who?
Q With the laws in Montana being challenged in this case?
A The?
Q So the plaintiffs are challenging certain

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statutes --
A Yes.
Q -- in Montana.
A Yes.
Q are you familiar with those laws?
A Oh, yes, yes.
Q Have you read them?
A No, I haven't read them. I've read comments about them, I haven't read the statutes. I certainly read what was in the complaint, I googled around, you know, just to see, I didn't actually read the things.
Q Do you have any familiarity with how Montana's energy policy is implemented in Montana?
A Not much.
Q Okay. And do you have any familiarity with how Montana implements the Montana Environmental Policy Act?
A Not directly, no.
Q And have you read the Montana Constitution?
A No.
Q Do you agree that -- that there should be a Constitutional right to clean and healthful environment for citizens?
A I agree that it is one value, but it — sometimes there's conflicts.
Q Is it a value you would support in your state

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constitution?
A It's — it's — politics is all about conflicts of values, okay, there are many — okay, what do you do when it's not helpful —
Q Dr. Curry, I'm sorry to interrupt.
A Okay. The question doesn't mean anything to me. Okay?
Q Okay. So you don't have a position on that Constitutional Rights —
A No.
Q -- specifically. Okay. That's fine. So going speaking of geothermal energy, have you conducted any --
MS. OLSON: Sorry. We will take a break, I apologize.
REPORTER: Thank you.
VIDEOGRAPHER: We're off the record at approximately 4:38 p.m.
(Short break.)
VIDEOGRAPHER: We're back on the record at approximately 4:50 p.m.
MS. OLSON: Okay, Michael, I'm going to pull your file Exhibit Number 16 which is the IPCC AR6 Summary of policymakers. And I'm marking that as Exhibit 179.
MR. GREGORY: I'm sorry, 180.
(Exhibit 180 is marked.)

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BY MS. OLSON:

Q Dr. Curry, are you familiar with this IPCC AR6 summary for policymakers?

A Yes, I am. I don't read it very careful, I tend to dive into the chapters.

Q Okay. Could you turn to Page 28 for me, please? And do you agree with the IPCC conclusion there that every ton of CO2 emissions adds to global warming?

A A ton of CO2 emissions isn't very large, I mean, gigatons are meaningful. A ton of CO2 isn't all that meaningful.

Q Do you disagree with the IPCC that every time a CO2 emissions adds to global warming?

A A minuscule amount. If you see the scale down here it's 4500 gigatons of CO2, so one ton is a -- is a small fraction of a gigaton, let alone 4500 gigatons. I mean, every --

Q But it matters -- even if it matters a little amount it still matters, correct?

A It adds to emissions, add to the atmospheric CO2 concentration.

Q Thank you.

A In terms of how much of this adds to global warming, again, we're back in minuscule territory.

Q Have you reviewed peer- reviewed publications of

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Dr. James Hansen?

A Oh, yeah, I've read a lot of his papers.

Q Have you ever met him?

A Oh, yeah. Back in the day we used to serve on the same committees and stuff like that.

Q And do you respect Dr. Hansen --

A I do.

Q -- as a climate scientist?

A I do. I don't agree with him all the time but I respect him a lot more than many other people, let's put it that way.

Q Are you aware of any peer-reviewed scientific publications that have disproved Dr. Hansen's findings as to the level of carbon dioxide in the atmosphere that would stabilize the climate system this Century?

A Yeah, there's a way to interpret that whole issue. A lot of people are unconvinced by his arguments. That doesn't mean they're gonna go to the effort to write a peer-reviewed article that refutes it.

Q So I have searched, and I have not found a peer-reviewed publication.

A I find to be a weird analysis, that is -- does haven't a heck of a lot of meaning in my opinion.

Q So do you agree that the earth has an energy imbalance?

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A You can't measure it, yet there probably is one, but it's -- we can't -- we don't have the tools to measure it, the satellites aren't good enough to measure the precision of what would actually demonstrate the earth's energy imbalance. People do indirect calculation. I suspect there is an earth energy imbalance. As to whether we're actually measuring in a meaningful way? No.

Q Okay. But just to be clear, you're not aware of a publication that would contradict what Dr. Hansen has said about the earth energy imbalance. Correct?

A Off the top of my head, no.

Q Would you agree that decisions being made today about carbon dioxide emissions will have consequences on the climate system for decades or millennia to come?

A No, um, because most of the decisions and policies that are being put in place aren't gonna slow down the CO2 emission if we're going with wind and solar, they haven't been displacing any fossil fuels so I don't see anything that's going on right now that's going to slow down emissions in a meaningful way.

Q So if -- if governments make policy decisions to either increase, allow CO2 emissions to increase or to force them to decrease will that have an effect on the climate system?

A Well, the government policy so far has been a

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lot of hot air. With all this targets, agreement, on and on --

Q I agree with you.

A -- blah, blah, blah. Okay. So the policies by themselves without action are meaningless, so.

Q So if there was action to implement policies --

A Well, there's no --

Q -- would it have an impact?

MR. RUSSELL: Objection.

THE WITNESS: If there was action to implement good policies, they would have an impact. For the most part I'm not seeing good policies.

BY MS. OLSON:

Q But what kind of good -- what policies by government? On CO2 emissions do you think would be good policies?

A Increasing energy and particularly geothermal and next generation nuclear. Figure out how to clean up the water, air and the soil, I mean real pollution, not CO2 pollution, and/or to reduce our vulnerability to extreme weather events, your operation adaptation, infrastructure, lots of, you know, community practices, there's lots of different things you can do in adaptation phase. If I were in charge this is what I would be doing.

Q Okay. And would you agree that there are

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feedback loops in the climate system?
A Yes, I've written many of the seminal papers on climate system feedbacks.
Q And they're big feedback — feedback loops in the Artic —
A Yes.
Q — in particular, correct?
A Yes. Artic is very complicated case, a lot of counter-intuitive things go on there.
Q Do you agree that as the — the ice in the Arctic melts that there's no beetle effect with the darker surface temperatures of the ocean that increases heat absorption?
A Okay. Yes, there is — it's very complicated, and there's a lot of counterintuitive things so I don't want to go on record saying something agreeing with a simple statement about climate feedbacks in the Artic.
Q And do you agree that the release of methane from the Artic and the Tundra will also cause a feedback loop that can increase the heating of the planet?
A Yeah. The whole issue of permafrost release and the dynamics of all that is a lot of disagreement on what's going on there and what might happen so it's something that we don't know a heck — as much as we would like to know to really understand all that.

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Q Given that there are high risk areas, including with feedback loops, would you agree that the rational course would be to reduce carbon dioxide emissions as quickly as is feasible in order to minimize the effect that humans are having on the climate system?
A Absolutely no. We risk —
REPORTER: We didn't hear that. Did you say objection?
MR. RUSSELL: Yes. I said vague and compound.
THE WITNESS: Okay. I do have an answer for it. We could make things a lot worse, okay, look in Europe, all the efforts to try to implement wind and solar. Now people are cutting down trees to burn wood, and opening up coal burning plants. There's all sorts of bad decisions that you can make that will actually make things worse in the name of urgently fixing the problem.
BY MS. OLSON:
Q Okay. Dr. Curry, on Page 28 of your expert report —
A My report?
Q Of your report in your conclusion, what do you mean by "the wickedness of the climate change problem"?
A Okay. I — early on I talked — we talked about wicked science?
Q We did.

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A Okay.
Q So that's what you're referring to —
A Yes.
Q — as wicked science —
A Yes.
Q — it's complex, is that what you mean?
A Yes. Complex, unbounded with no good solutions, political dimensions, et cetera.
MS. OLSON: Okay. All right. Phil, I'm going to need number 22, please, of the new ones.
And Michael, we're going to number 22 in your electronic file, it's Curry CV 126, 2005 changes in tropical cyclone number?
MR. RUSSELL: Okay.
(Exhibit 181 is marked.)
BY MS. OLSON:
Q Sound familiar, Dr. Curry?
A Okay.
Q Flashback.
A Yeah.
Q Okay. This is Exhibit 181.
A As if I could ever forget. Go on.
Q Okay. Did I give you the wrong one? Sorry, I lost my place.
Okay. So on Page 1846 — first of all, did you

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author this peer-reviewed publication?
A I was a co-author. I was not the lead author.
Q Okay. And can you turn to Page 1846, please?
A Trying to find — okay, yeah, last page.
Q Do you agree with the statement you wrote that says "We conclude that global data indicate a 30-year trend toward more frequent and intense hurricanes, corroborated by the results of the recent regional assessment"?
A Yeah.
Q Great. Okay. And now number 23, Phil?
MS. OLSON: Great. Okay. And now number 23, Phil? Sorry, Michael, now we're going to your file number 23 which is Curry CV 1312006, Mixing Politics and Science.
THE WITNESS: Such fond memories.
MS. OLSON: Michael, this is Exhibit 182.
THE WITNESS: Uh-hum.
(Exhibit 182 is marked.)
BY MS. OLSON:
Q And if you could — did you coauthor this publication?
A I was the first author on this, yes.
Q Great. And if you could turn to Page 1031? Right-hand column, first paragraph after the Figure 3.
A These simulations. Ah. Good.
Q And do you agree with your statement there that

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"These simulations and analyses provide solid evidence that the global surface temperature trends since 1970 (including the trend in tropical SSTs) can not be reproduced in climate models without the inclusion of anthropogenic greenhouse gases"?

A Okay. I no longer stand by this particular paragraph because my understanding of what goes into climate models and what isn't in climate models and how they're tune has changed drastically since 2006.

Q Okay. So let's look at the last sentence of that same paragraph.

A Uh-hum.

Q Do you agree that the null hypothesis is rejected because the trend in Tropical SST cannot be explained by natural internal variability and/or volcanic eruptions or solar variability and/or the observed trend is consistent with model simulations associated with forcing from greenhouse gases"?

A I do not agree with that statement because it was a totally inadequate simulation of the natural climate variability. Further, there are problems with the data set that was used, if you want me to go into that, the original data set from the 2005 paper, and the interpretation of the variability, I don't know if you want me to go into all that.

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Q So Dr. Curry, are you saying that you no longer stand by this paper?

A Oh, this paper is a brillant paper. I no longer stand by that particular paragraph. The rest of the paper I stand by, but not that particular paragraph.

Q Do you stand by your finding that there was a 50-percent increase in the total number of tropical storms, number of hurricanes and number of category 4 and 5 storms?

A I addressed it — one of the arguments was that the issue of data quality was raised by some people, and I left that open as to whether that was unresolved. Let me try to find it.

Um. Category 3. Well, let me tell you what I know now that I didn't know then about all this? In terms of data. People who -- you know, the various hurricane centers around the world, operational hurricane centers, stated that the data between 1970 and 1985 is very poor outside of the Atlantic, North Atlantic and West Pacific Oceans, so all the southern hemisphere stuff the data quality is not sufficient to say anything about what was going on prior to 1985.

Q Have you -- Dr. Curry, have you published any papers that correct what you believe to be wrong in that paragraph that we just discussed on Page 1031?

A No, it's not wrong. It was consistent with what

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we understood at that time. And it was based on reference, but there's a lot of things in — you know, you don't -- just because the science evolves and you get more information that's not sufficient reason to retract something.

MS. OLSON: Okay. We're going to turn to — Michael, this is number 24, Curry CV 134, 2006 Response to comment on changes in tropical cyclone number.

And this will be marked as Exhibit 183.

(Exhibit 183 is marked.)

THE WITNESS: Okay. Was this published in?

BY MS. OLSON:

Q 2006.

A Oh, yes. Yeah, people criticized the data.

Q So Dr. Curry, did you coauthor this paper?

A Yes.

Q And your husband, I see is on this paper as well, correct?

A Yeah, he was the original first author on paper here, the 2005 paper.

Q Okay. And if you look on Page 1713 c?

A Yeah.

Q The very last sentence "Should SSTs continue to rise under anthropogenic forcing, it is reasonable to expect" --

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A I'm finding it, I'm sorry. I'm on Page 1713 c.

Q Oh, I'm sorry, it's -- they're both labeled 1713 c so if you turn to the back.

A So it's this paper, okay.

Q So do you agree with that concluding sentence that "Should SSTs continue to rise under anthropogenic forcing it is reasonable to expect that this relationship will be maintained and that there will be an associated increase in the intensity of typhoons"?

A Yeah. Here's the issue. Here's what the IPCC says, and they -- this has been hotly debated but the IPCC has been consistent since the 4th assessment report on this. Theoretically you expect an increase in hurricane intensity with warming. People aren't really seeing it in the observations. They see it a little bit in the Atlantic, but that's mostly multidecadal. The variability, the warm phase of the Atlantic multidecadal oscillation, they see it in the Indian Ocean, which is hard to understand what the heck is going on there and why you see this increase in the Indian Ocean. The Pacific, again, it seems — the whole thing in the Pacific seems to be dominated by the mulitdecadal variability. So it's hard to find a trend.

Q Do you agree that anthropogenic greenhouse gas forcing has caused ocean warming?

A Yeah.
Q Okay.
A If it's contributed to ocean warming. It's not the sole cause.
MS. OLSON: Phil, 27.
THE WITNESS: But there's no simple relationship between hurricane intensity and SST when you look at an individual storm or an individual season or an individual ocean basin.
MS. OLSON: Okay.
THE WITNESS: There's a whole lot of other things going on.
MS. OLSON: Okay. Michael, we're turning to 27, Curry CV 163 2011, nullifying the climate null hypothesis.
MR. RUSSELL: Before we go any further I just wanted to point out that we've been -- we hit the seven-hour mark, I don't know how much longer you plan to go, but if you're planning on going much longer we need to talk about that.
MS. OLSON: No, actually, not at the seven-hour mark. Do you note what the time is right now?
VIDEOGRAPHER: I know what the time is that I have been on the record. I don't know the morning.
THE WITNESS: Yeah, we started at nine a.m.
VIDEOGRAPHER: We have been on the record two

hours and 47 minutes.
MS. OLSON: And this morning we were on for three something?
MR. GREGORY: 3:10.
THE WITNESS: I don't want to come back. I hope we --
MS. OLSON: It's been 3:10 plus 2:47 that we've been on the record, Michael.
MR. RUSSELL: Okay.
MS. OLSON: And we're -- we're moving.
(Exhibit 184 is marked.)
BY MS. OLSON:
Q Okay. So this is Exhibit 184.
A I remember it well.
Q And did you author this paper, Exhibit 184?
A Yes. It was invited, the editor of WIREs climate change invited me to write this article. Kevin Trenberth had written a rather polemic article as an abstract, it wasn't a pure review journal, it was an abstract book for the American Meteorological Society, and it raised what the editor thought was something provocative, and he asked me to respond.
Q Okay. And on Page 920.
A 920.
Q On the right column, the first full paragraph.

A Uh-hum.
Q Do you still agree that no one denies the role of land use changes, pollution aerosol and anthropogenically produced greenhouse gases in modifying the climate?
A That's correct.
Q And I know we've touched on this but I don't know that I've asked in this way. Without anthropogenic climate forcing, wouldn't the earth naturally be in a cooling period?
A No.
Q Do you agree that Dr. Kevin Trenberth is an excellent scientist?
A No.
Q Would you agree that he's one of the most well regarded scientists in his field of research and study among other scientists?
A No.
Q What was your basis for suggesting that Dr. Trenberth's scientific hypothesis was a political act rather than a scientific one?
A You'd have to read the original AMS. This reference number 1, you have to read it. It was an absolute rant polemic. That is not a scientific paper.
Q Okay. And how -- how long have you known Dr.

Trenberth?
A I don't know him that well. My husband went to graduate school with him so he's known him, you know, for God knows. Since 1970 or something. I don't know Trenberth well. I see him at meetings. Um. You know, I guess, whatever. I don't know him personally terribly well.
Q Did you meet him when you were in CU Boulder?
A Um, I probably met him before. We were involved in a big experiment called Tobacore in the Tropical West Pacific. We were both involved in this big thing and I probably met him at meetings then would be in the late 1980's.
Q Okay. And if you turn to Page 914 of that same exhibit?
A Uh-hum.
Q Under the acknowledgement section, you say you would like to acknowledge the Denizens of my climate, of my blog Climate, et cetera.
A Yeah.
Q And who are your -- what do you mean by the Denizens?
A The people who make comments on my Blog or read my Blog posts and e-mail me personally.
Q Does -- I -- maybe I'm out of the social media

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loop, but does Denizens stand for anything?
A It's just a label I give to the participants of my blog.
Q Does it have any meaning?
A Well, Denizens is like a citizen. Look at, I don't know, but it's something that seemed to fit.
Q Okay. Something that you came up with.
A Yeah, that I referred to them. And that there's several early posts where people would, you know, write their short biosketches so people knew who they were.
Q I know in your book, Dr. Curry, although I haven't read it yet, but that you do talk about COVID-19, and I'm wondering if there were the 991 scientific experts that agreed that COVID-19 met the scientific criteria of a global pandemic and nine scientific experts disagreed, which scientific opinion would you find to be more credible?
A I don't judge it based on how -- you know, votes or anything like that. I would look at the arguments, who's making the good arguments. I would look at the arguments being made by both groups. But generally there's a whole spectrum of perspectives and people don't usually, you know, separate into tribes very early on, you know, in an extremely complex highly uncertain situation such as the COVID pandemic.

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Q Okay. Going back to the IPCC AR6 summary for policymakers?
A Um-hum.
Q Do you agree with their conclusion that human influence is very likely the main driver of the global retreat of glaciers since the 1990's and the decrease in ARTIC sea ice area between 1979 and 1988 and 2010 and 2019?
A Well, by main driver they mean more than 50 percent.
Q Do you agree with that?
A I mean, it's a pretty weak statement so I'm not gonna disagree and insist that it's less than 50 percent.
Q Okay.
A We don't know.
Q Is it your opinion that -- excuse me -- indigenous knowledge and the living history of indigenous peoples is a valid source for supporting scientific conclusions?
A It's valuable information, in fact. And, in fact, in my -- probably I was up in Barrow, Alaska, I guess I was talking with the previous reporter or something, yeah, we had a project working with the Aleut in Alaska.
Q And have you relied upon indigenous perceptions of the changing climate in your own research and studies?
A In that particular research up in Barrow,

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Alaska, we did. I have a paper who got published, Lynch, the first author is Lynch, it might have been published 2003, on that particular issue.
Q I think it's your paper Toward an Integrated Assessment of the Impacts of Extreme Wind Events on Barrow, Alaska?
A That would be it, yes.
Q And you talked about the living memory --
A Yes.
Q -- and the clear perception among residents --
A Yes.
Q -- on the changes. And so you do think that's important -- it's not necessarily hard physics science, but it is information --
A It's better than a lot of Paleo climate reconstructions, let me tell you that.
Q Okay. So you have a respect for indigenous knowledge.
A Sure.
MS. OLSON: Okay. Phil, do we have Exhibit 22 still? I don't think we've given that to Dr. Curry here yet, have we? The Running Whitlock.
MR. GREGORY: Correct.
MS. OLSON: Michael, I'm going to give her the previously marked Exhibit 22 which is the Running Whitlock

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expert report.
BY MS. OLSON:
Q So this one's already been marked. It's a copy of the -- Dr. Steven Running --
A Okay. Is this their main report?
Q Yes, their --
A Okay.
Q -- primary expert report.
A Okay.
Q If you wouldn't mind looking at Page 7, Figure 1. And you don't have any reason to dispute that the NOAA measurements of rising global atmospheric CO2 levels are accurately depicted there. Correct?
A Yeah, that's fine.
Q And then, again, if you could turn to page 13, and look at Figure 3?
A Uh-hum.
Q Do you agree with Drs. Running and Whitlock that the trend in Montana since 1950 is that Montana has been warming at a rate of .42 degrees Fahrenheit per decade?
A With the caveat of the poorly sighted weather stations I see no reason that Montana should be increasing faster, much faster than the rest of the globe other than the fact that their weather stations are sighted in the middle of airports.

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Q So just to be clear, do you agree with their --
A No, I don't.
Q -- figure? You don't agree because --
A I don't agree because this is the data put a trend line through it. I don't believe it accurately reflects what's been going on with Montana's climate.
Q And basis for that is this new information?
A Is it sighting of the — I mean, it didn't make sense to me when I first saw it. Because I've seen — okay. The fastest warming city in the country is Reno, Nevada. Go figure. Why? Okay. And it has to do with the weather station located on the airport tarmac which is shown warming over the decades when they've added more runways. Okay. So I mean, that's been studied in great detail, that situation, and so apparently the same thing is going on in Montana.
Q Okay. Dr. Curry, have you -- have you read the entire rebuttal report of Dr. Kevin Trenberth?
A Yes, I have.
Q And do you plan to change your expert opinions in this case in response --
A Not one word.
Q Okay. I've heard you say that climate change was turned into a political issue. Which political party do you believe is responsible for turning climate change into a political issue?
A Well, back in the day -- okay. George Bush Senior seemed to be fairly proglobal warming. I mean, he was trying to do something about it. It -- I think it really became a political football during the Obama Administration. I think that was sort of the turning point in US politics. It was mostly ignored. I think we were on track, the Waxman-Markey bill, you know, some sort of — I don't know, carbon cabin trade kind of thing during the first Obama Administration, then Climategate struck and everybody thought oh, these climate scientists are up to maybe shenanigans, we need to put the skids on this. And then President Obama didn't really resurrect it again until the second term, and with a lot of alarmists' rhetoric which turned people off. So I see in the US a turning point was really the Obama Administration.

Then, of course, George W. Bush went off the deep end in the other direction, um, you know, so there you have it, you know. We have a big mess that's just been increasingly polarized.

Q And what is your basis for believing that climate scientists are motivated politically to exaggerate their scientific opinions?
A On my gosh, there have been many, many, many articles on this, many of which are referenced in Part 1 of my book. You know, they're all social psychologists, all big social psychology literature on this.
Q And were you --
A Even philosophers of science have weighed in.
Q Were you a reviewer for the IPCC third assessment report?
A I was. I was a contributing author to something related to Artic sea ice, and I was a reviewer on two sections, one was related to aerosols, and the other one was related to something else. I was a reviewer for two separate whatever chapters.
Q And did you volunteer your time to do that work?
A I wasn't paid. I mean, I wanted to help, and when I saw how the report turned out and that they paid no attention to the review comments I said okay, I'm done. I'm done here.
Q Is it your understanding that — that the scientists around the world volunteer their time to —
A They don't get paid for it. Yeah. Okay. If, they're government employees, like in the US if you're a NOAA employee or a NASA employee or whatever that's part of your duties that you get paid for.

University scientists who participate usually get time off from teaching or some other kind of release from duties to participate in this. And so nobody gets paid for it.

Q And do you believe that Dr. Running and Dr. Whitlock have conducted their research in a bias manner in order to benefit politically?
A I think they're both honest scientists. I don't — I'm not aware that either of them is an activist or a particular advocate. I believe, you know, that they're doing an honest job, but that their work is far from the last word on this issue.
Q And do you have any evidence, Dr. Curry, that any of plaintiffs' experts are biased in their research and publications that are peer-reviewed?
A Um, I would say not so much as peer-reviewed publications but in his public statements, I mean, Kevin Trenberth has a lot of stuff that makes me not think he's terribly objective about all this.
Q But in his peer-reviewed publications you don't think he's biased?
A Apart from this WIREs climate change, his -- his article, the companion article to this one was fairly ridiculous in my opinion.
Q Okay. And would you agree that the field of climate science has — it's quite broad and has become increasingly specialized?
A No, it's becoming very broad. I don't think

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it's increasingly specialized, it's becoming so broad that everybody knows everything about nothing, so this is what we're suffering from. They're very few people who take a deep dive and -- you know, we've got people who just stay out of the whole global warming stuff and focus deeply on their disciplinary research. Then you've got a few people like me, you know, in the wicked science arena who are trying to wrap their head around the whole thing, and doing it with a team, you know, a formal team, informal team. And you've got various think tanks, but there's very few thing answer it that, objectively. They're usually on one side or the other.

Q And I'm sorry, can you name the other scientists who you would consider to be part of the wicked science movement?

A Of the names that you would recognize, I would say Jim Hansen might be closest. He's made the effort to understand policy and energy systems and nuclear power. Um, I don't know to what extent. He used to work with Al Gore, I don't know to what extent that he's actually working with policymakers at this point. But I would say Jim Hansen of the names you would be familiar with comes close.

Q Can you give me two more who I may not know, but who you would consider to being wicked scientists?

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A Okay. That are wicked, I'd have to think about that one.

Q Okay. Would you agree that scientists who study ice sheets in their potential disintegration have a different area of expertise than scientists who study, say, the fire ecology implications of climate change?

A Yeah. I mean, this doesn't mean to say that an individual scientist can't have expertise or knowledge in multiple areas, but for the most part they're separate communities, they would go to separate conferences and so on.

Q Would you agree that it's -- it's virtually impossible just with time limitations to go really deeply down any particular specialty in climate science across the broad array of topics, correct?

A That's why you need a network of people.

Q Right. Okay. Dr. Curry, I've heard you say that you think that people are getting sued left and right over climate; is that right?

A Are getting?

Q That people are getting sued left and right over climate change.

A Oh, yeah.

Q And does that bother you?

A I don't think — I think that this is up to —

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and most of the cases that I've heard about, very few of them have progressed to the level of an award for the plaintiffs because the judges invariably think this is something that should be settled through the political process or the legislative process, executive, not through the judicial, so that seems to be a lot of people's opinion.

Q Do you -- are you familiar with the relief or the remedy that the plaintiffs are seeking in this case?

A Yeah.

Q And are you aware that it doesn't involve any kind of money damages?

A Oh, no, it's about changing policy. Yeah.

Q And do the lawsuits against the fossil fuel industry for money damages, do those cases bother you?

A Um, not in principal, but many of one of the ones that I've heard about, I mean, they're blaming land fills and bad land use developments and the fact that stuff is flooding, they're blaming that on fossil fuel driven sea level rise, not account for local subsidence, the fact that San Francisco airport was built on landfill, you know, there's so many bad decisions that were made that are causing the problems that fossil fueled warming is a relatively minor cause of all that.

Q Going back to the 1930's, big part of your

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report, if the weather was much worse in the 1930's, by any measure than what you see today, is it your opinion that the climate was much worse in the 1930's by any measure?

A The climate. Well, what do you mean by climate?

Q I'm wondering how you would define the difference between weather and climate.

A Okay. Weather is what happens on time scales of days and weeks. Okay. Climate is what's going on in a particular season, or a particular year. And so in the 1930's you had this big blob of ten years that just really stood out as being awful. So that's — I would say that ten-year period is sort of more in the climate. But there's a spectrum that it's certainly more climate than weather.

Q Do you agree that we should minimize our human footprint to protect our planet?

MR. RUSSELL: Objection, vague.

THE WITNESS: It's -- it's a goal. There are many other goals that conflict, you know, as low — as much as reasonably possible, you know, what does -- there's a principle in risk management, ALARP, as low as reasonably practiticable. Okay. How do we define reasonably practical? That becomes a point of debate, but overall value, I get it, but we have the as reasonably practicable becomes, you know, a central determinant really.

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BY MS. OLSON:

Q And is it your opinion that developed countries like the United States have a smaller environmental footprint than countries in Africa?

A Yeah. A little bit complicated but yeah, because they have to tear down, you know -- they're burning wood, they're destroying forests, they're degrading their land. Yeah usually developed countries do a better job of protecting their environment.

Q I'm going to turn to your judithcurry.com.

A Okay.

Q And is that your personal website and blog?

A It's my blog, yeah.

Q Do you have any other personal websites?

A I have my Georgia Tech website. I'm a professor emeritus, my website still sits on there, it hasn't been updated in, like, a decade. My company has a website. And I have a biosketch in my company's website. I control the content, my company's website, it needs updating, but nothing is there that I didn't put there.

Q Okay. And do you also manage and control the content on judithcurry.com?

A I don't control the comments. I do write moderation to make sure people, you know, aren't obscene or, you know, violating certain social behaviors, but I

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don't moderate for content, if you will.

Q Do you control the blogs that are posted?

A They submit -- yeah, I'm -- other than myself, Nick Lewis is the only other person who has authority to actually post something on my blog. Anything is submitted to me. And I evaluate it, and if it's something I like I actually edit it for readability and tell them look, you've gone over the top with this statement, I would like to take it out. I always get their approval before I actually publish something, but I do edit things.

Do I guarantee everything is correct or whatever? A lot of things are just put out there for discussion, you know, it's an interesting topic, new idea out there, you know, let's discuss. So it's not intended to be a truth factory, it's intended to spark debate, help people think outside the box.

Q Do you publish blogs that you disagree with?

A A couple, yeah, in the old days I did, you know, just to get -- I said I would give skeptics, the people who self-describe as skeptics, I would give them a chance. You know, if their paper made it through pier review literature, they wanted me to post it on my blog for discussion, I would do it. And I did it in the early days. You know, no. It has to be meet some sort of threshold of interest and credibility for me to publish it.

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Q Okay. And when did you first secure your domain and start publishing blogs?

A It would be September, 2010.

Q Why did you start it?

A Oh, my gosh. Okay. Well, after the episode of all this, I mean, the media attention that all of us got.

Q And for the record you're discussing the dueling papers that you and Dr. Trenberth --

A Oh, no, no, no. This is the hurricanes and global warming, when we are in agreement.

Q And which exhibit is that, for the record, Dr. Curry?

A It was the Webster, it was 82 and -- 181 and 182.

Q Okay. So this is when you and Dr. Trenberth and your husband, you were all in agreement --

A Yes.

Q -- about --

A Okay. The media attention was insane, okay, and it was -- it was insane. I mean, it was -- it was horrible and, you know, the responsibility and couldn't get anything done or whatever. Then after being misquoted at some point I said okay, I'm done. I'm done with interviews, just say no, and I wrote this paper and there's the whole media thing, you know, that I got into.

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Okay. After that, I went relatively quiet in the public arena. When the climate gate struck in November of 2009, I was trying to calm the waters and I posted some articles on skeptics' blogs trying to calm the waters. Okay. This was met with great interest. I mean, it was my second one was actually published in the New York Times, okay. And I became a big part of the story where I was, you know, trying to -- I was engaging with skeptics, they needed to be more open and transparent. We need to pay more attention to uncertainty. And I had this, you know, motherhood and what I thought was motherhood and apple pie stuff. Well, a lot of people in the -- hush hush, important people in the climate community in charge at IPCC and stuff didn't like what I was doing. Oh, you know, we just need to let this die down, it will go away. Well, it wasn't gonna go away. And so I became active in communicating on other people's blogs and at some point, you know, said I need my own blog. So I started my own blog, and I seated it with a series of climate science and the uncertainty monster, which was a whole series on uncertainty. A lot of philosophy of science in there is what it was, that's how I seated my blog. And, you know, it's been more or less active. It was -- once I retired in 2000 -- at the beginning of 2017, it went quiet for a couple of years and has picked up -- since I finished my

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book I've picked up activity on my blog.

Q Do you have any funding for your blog?

A No, not a nickel. Oh, a couple people contribute through Patreon, but you know.

Q Nothing more than a couple of hundred dollars here and there?

A Well, at best, yeah.

Q Okay. And I notice you've been blogging about your expert testimony in this case.

A No, no, nobody knows I'm an expert witness.

Q Oh. Okay.

A I have blogged on topics of relevance. I've blogged on the glaciers of Montana. I've blogged on children. Nobody knows -- I have mentioned to nobody that I'm an expert witness in this case.

Q Have you blogged about your -- the content of your expert report without referencing the case specifically?

A Um, there might have been some tiny overlap in the glacier one, but the glacier article was much broader than what I included here. There might be some overlap.

Q And do you know how many blog posts you've made about Our Children's Chest? The organization I founded.

A I think I mentioned it in one recent blog post. I'm not sure if I did. I don't know. I certainly haven't

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written explicitly about it. Whether it's been mentioned I couldn't tell you. Did I write about Juliana case? I can't even remember. I don't remember.

Q And does anyone ask you to post about climate litigation or Our Children's Chest?

A People ask me to write stuff all the time but it's usually something technical that I said I don't have time or the interest to dig into it.

No, I haven't mentioned -- outside of whatever Kevin Trenberth has spread around, nobody knows what I'm involved in this particular case. Or if they know it's certainly not because I mentioned it to them.

Q Okay. And I've seen that you've referred to people who are trying to stop climate change as a big cult; is that correct?

A I don't know that I used the word cult. That's not a Judy word.

Q So you don't think that groups like working to stop climate change --

A Oh, just stop oil? No, I think they're nuts. I wouldn't call them a cult. I just think they're nuts.

Q And what about our Children's Chest, do you have a --

A No, that's a serious organization.

Q And do you hold a view that youth climate

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activists like Greta Thunberg who is one of the most well known is causing psychological problems for children?

A Well, let me put it this way. The psychological problems that really seem to have accelerated since 2018 are coincident with Greta's appearance on the scene. I actually like Greta, and I've never trashed her. I never -- I wrote something on the children's, said I know Greta's in a totally different category from these -- you know, tomato soup with the van Gogh kind of people. You know, I actually like Greta. I think she's wrong about a lot of things, but I like Greta.

I think that the coincidence of Sunrise Movement, the extinction rebellion and on and on it goes starting in 2018, 2019, this is really ramped up, you know, anxiety, you know, the whole extinction thing and AOC and the only 12 years and all of this kind of stuff is just sent a message to children and young adults that is just way over the top and it's stressing them out. And the coincidence -- okay. If you do a Google search climate anxiety, Google scholar, scholar.google.org and search for climate change anxiety and related terms, there's almost nothing published prior to 2018, and then an explosion starting in 2019. So this is a recent phenomena that in terms of timing is coincident with Greta. I don't blame Greta, I'm just not gonna blame Greta but extinction rebellion and all this

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other stuff, and there's big -- Greta is doing -- she's not paid as far as I can tell, but there's big money behind, you know, just stop oil and all that kind of stuff. You know, there's a big agenda there.

Q Do you believe that any of these young people who are working to stop climate change are being paid?

A Oh, yeah, apparently they are. They just stop oil and, you know, when they do these demonstrations or whatever, apparently they are being paid. This is -- do I have personal knowledge of that? No, but I have read people who seem to be in the know claiming that they're being paid.

Q And is it your view, Dr. Curry, that young people should be more hearty?

A My issue is how children are being raised these days. They're lot more fragile, okay, and vulnerable and neurotic given the way they're being raised, you know, they're too coddled, they are -- stuff like that. I mean, children have always been exposed to scare stories. I grew up in the '50's and '60's, you know, the Communists are coming after us, they've infiltrated the bomb shelters, you know, on and on and on, and personally scared the pants off of me when I was in second and third grade. You know, I -- I get how children can be made afraid and they don't have the framework or the mental capacity for filtering this

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stuff and putting it in perspective so I think a lot of this has been exacerbated by what the kids are fed.

Q Have you raised children?

A Oh, yeah.

Q How many do you have?

A I have one child and two stepchildren. One daughter child, she's 40, 47, she just had her birthday. And I have a granddaughter and five step grandchildren, they're all high school age so they're all of that age.

Q So you have six grandchildren in your life; is that right?

A Yes.

Q I'm wondering do you know when the first scientific paper was published on climate change?

A It depends on how you define climate change, I mean.

Q Are you familiar with Sponte R. Haynes?

A Who?

Q Sponte R. Haynes.

A That's not about climate change, that's about a CO2 molecule, and he made some inferences about what that might be. That's not what I would call a paper on climate change.

Q He turned out to be pretty correct. Right?

A In a basic physical mechanism but, you know, the

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climate is not a collection of CO2 molecules, it's a very complex system so I don't call that a climate science.

Q You call it global warming?

A No. I call it a chemistry paper.

Q Okay. Are you familiar with Eunice Newton Foote?

A I've heard the name. Oh, yeah, okay. Yes. Yes. Yes, I know.

Q Okay. And I assume that you don't believe that those early scientists who were connecting the dots between carbon dioxide molecules and fossil fuel burning and protected increase in earth's temperature, that those scientists weren't politically motivated at that time, correct?

A No, no, they actually thought warming was good, for the most part, but way back when.

Q Okay. And are you -- are you familiar with when the U.S. government first learned that climate change was in part caused by humans?

A I've looked at that early history and I've written a series of blog posts on it, you know in the 1970's, you know, there were two groups, one who was worried about coming ice ages and one network was talking about CO2, okay. There were two groups and they barely talked to each other. Both of these narratives were in

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play in the 1970's.

Q Are you familiar with Lyndon B. Johnson's White House Report in 1965?

A Sure.

Q That talked about atmospheric --

A People -- again, this is -- there have been so many ideas out there have been many, many ideas out there. At the time of the first assessment report, IPCC first assessment report, circa whatever it was, 1990 whatever it was, that gives a very good reflection of the -- you know, what we don't know and what we know and where the disagreements are. And there was a whole lot that wasn't known even at the very beginning of the IPCC in 1999, a different story line's out there, a lot of political interests in place.

Q Do you know which political party in the United States supported initiating the intergovernmental panel on climate change?

A Well, that was in the late '80's. Um, I can't remember --

Q Was it George H. W. Bush Administration?

A It probably was. Like I mentioned that first -- the first Bush president was relatively favorable towards all this.

Q And do you know when the fossil fuel industry's

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scientists were first warning their companies about the dangers of fossil fuel pollution and that it would cause climate change?

A Yeah, there had been --

MR. RUSSELL: Objection, vague.

THE WITNESS: There had been research on it, you know, over the decades and I think Exxon Oil, Exxon actually had their own research team, but --

BY MS. OLSON:

Q Do you remember which decades some of that research was being conducted?

A I don't know. Certainly in the '80's, I think. At some point they didn't do it anymore. But my point about this is why would anybody look to oil company scientists about this issue when you have IPCC reports. I mean, just look at the IPCC report, you know, and say well, what did Exxon know in the 1990s? Well, who cares. Everyone was paying attention to the IPCC reports.

Q But certainly you would agree that those scientists working, their paychecks were coming from the fossil fuel industry, they were not politically motivated or monetarily motivated to warn that industry --

A Hard to know. Hard to know --

MR. RUSSELL: Lack of foundation, vague.

THE WITNESS: -- what was going on down there.

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Hard to know what was going on down there.
BY MS. OLSON:
Q Have you read the book Merchants of Doubt?
A I'm sorry?
Q Have you read the book Merchants of Doubt?
A Yeah. I think it's trash.
Q Okay. And are you aware that Dr. Hansen testified before Congress in 1981 for the first time?
A Yeah, but the most famous one was 1988.
MS. OLSON: Okay. I think if I can just have a few minutes with counsel, then we can wrap up.
THE WITNESS: Okay.
VIDEOGRAPHER: We're off the record at approximately 5:48 p.m.
(Short break.)
VIDEOGRAPHER: We're back on the record at approximately 5:56 p.m.
MS. OLSON: Yes. So Michael, we are going to enter into the record as Exhibit 185 what is should be number 5 on your new exhibit folder. It's the CFAN website documents.
(Exhibit 185 is marked.)
BY MS. OLSON:
Q And Dr. Curry, all we're doing is having you authenticate that these are images taken as of 12 —

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12-12-22?
A Yeah.
Q And it you could just look through those and tell me if those are the images of your web pages on your CFAN website?
A Sure. We're in the process of revising the website, so may not look like this in a month's time, but this is what it looks like now.
MS. OLSON: Great. And the next one is — what's that number, Phil?
MR. GREGORY: 44.
MS. OLSON: Michael, for your record it's number 44 in your new exhibit file, and it will be Exhibit 186 for the deposition.
(Exhibit 186 is marked.)
BY MS. OLSON:
Q And this, Dr. Curry, is the Prospectus, Scenarios For Future Regional Impacts of Climate Change from CFAN?
A Who knows what kind of a date is on that, but you know. Can't remember when this was written, but this is —
Q Is that the prospectus that you have for —
A Oh, I can't recall the last time this might have been given to a client, but it's — but somebody would look

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at if they hit my website.
Q Okay.
A Still the same staff.
Q So as of today that's the prospectus that's on your website.
A That's what's on my website. Yeah.
Q Okay. Thank you.
And then Michael, number 41, this is a blog post from November 7th, 2022, on judithcurry.com, and we'll enter this as Exhibit 187.
(Exhibit 187 is marked.)
BY MS. OLSON:
Q Dr. Curry, if you could just authenticate that you wrote that blog post and posted it without your website?
A Without reading every word this looks like -- and I don't want to take the time to read every word at this point.
Q Okay. And on the first page of that blog post do you see that you reference the Juliana litigation and Dr. Lise Van Susteren's expert testimony?
A In context of the Juliana complaint, yes.
Q Okay. And can you just read the title of that blog post for the record, please?
A "Victims of the faux climate crisis: Part 1:

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Children."
Q And is there a Part 2 to that blog post?
A Coming, yes. Underdeveloped countries.
Q Okay. So Dr. Curry, just a couple of last questions and then we'll wrap. I'm wondering do you plan to do any work on this case between now and trial?
A I have other things to do. If ideas come up or I get requests from counsel, then I'm not gonna say I'm not gonna do any work between now and trial.
Q When you say you have other things to do do you mean you have other things to do apart from this case?
A Yes. Yes, I have a lot of things on my plate.
Q So as of right now you don't have any plans.
A I'm done. I mean, like, in, like, hopefully, like, 30 seconds. I'm done for now.
MS. OLSON: Okay. That's it. All right, Dr. Curry, thank you. I have no further questions for you.
THE WITNESS: Okay.
MR. RUSSELL: We'll reserve for trial. And we'll read and sign.
VIDEOGRAPHER: All right. This concludes the deposition of Dr. Judith Curry on December 16th, 2022. We're off the video record at approximately six p.m.
(Deposition concludes at 6:00 p.m.)
—oOo—

DECLARATION UNDER PENALTY OF PERJURY

I, DR. JUDITH CURRY, do hereby certify under penalty of perjury that I have read the foregoing transcript of my deposition taken on December 16, 2022; that I have made such corrections as appear noted herein in ink, initialed by me; that my testimony as contained herein, as corrected, is true and correct.

Dated this day of , 20 ,

at , Nevada.

DR. JUDITH CURRY

DEPOSITION ERRATA SHEET

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DR. JUDITH CURRY DATED

STATE OF NEVADA)
COUNTY OF WASHOE)

I, Nicole J. Hansen, Certified Court Reporter, State of Nevada, do hereby certify:

That prior to being examined, the witness in the foregoing proceedings was by me duly sworn to testify to the truth, the whole truth, and nothing but the truth;

That said proceedings were taken before me at the time and places therein set forth and were taken down by me in shorthand and thereafter transcribed into typewriting under my direction and supervision;

I further certify that I am neither counsel for, nor related to, any party to said proceedings, not in anywise interested in the outcome thereof.

In witness whereof, I have hereunto subscribed my name.

Dated: January 13th, 2023

Nicole J. Hansen

Nicole J. Hansen
NV. CCR NO. 446, RPR, CRR, RMR
CA. CSR 13,909

STATE OF NEVADA)
COUNTY OF WASHOE)

I, JULIE ANN KERNAN, a notary public in and for the County of Washoe, State of Nevada, do hereby certify:

That on Friday, the 16th day of December, 2022, at the hour of 1:52 p.m. of said day, at the Offices of Sunshine Litigation Services, 151 Country Estates Circle, Reno, Nevada, personally appeared DR. JUDITH CURRY, who was duly sworn to testify the truth, the whole truth, and nothing but the truth, and thereupon was deposed in the matter entitled herein;

That said deposition was taken in verbatim stenotype notes by me, a Certified Court Reporter, and thereafter transcribed into typewriting as herein appears;

That the foregoing transcript, consisting of pages numbered 136 through 285, is a full, true and correct transcript of my said stenotype notes of said deposition to the best of my knowledge, skill and ability.

DATED: At Reno, Nevada, this 13th day of January, 2023.

Julie Ann Kernan

JULIE ANN KERNAN, CCR #427

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