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1 IN THE UNITED STATES DISTRICT COURT  
2 FOR THE NORTHERN DISTRICT OF GEORGIA  
3 ATLANTA DIVISION

4 DONNA CURLING, ET AL., :  
5 :  
6 PLAINTIFFS, :  
7 vs. : DOCKET NUMBER  
8 : 1:17-CV-2989-AT  
9 BRAD RAFFENSPERGER, ET AL., :  
10 :  
11 DEFENDANTS. :

12 **TRANSCRIPT OF BENCH TRIAL - VOLUME 9 PROCEEDINGS**

13 **BEFORE THE HONORABLE AMY TOTENBERG**

14 **UNITED STATES DISTRICT SENIOR JUDGE**

15 **JANUARY 22, 2024**

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20  
21 ***MECHANICAL STENOGRAPHY OF PROCEEDINGS AND COMPUTER-AIDED***

22 ***TRANSCRIPT PRODUCED BY:***

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I N D E X   T O   P R O C E E D I N G S

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

**(Atlanta, Fulton County, Georgia; January 22, 2024.)**

THE COURT: Good morning. Have a seat.

So where are we?

MR. BROWN: Good morning, Your Honor. We will start, if Bryan doesn't have any preliminaries, with our -- our two last witnesses. Thanks.

MR. TYSON: And, Your Honor, I just had one administrative matter. I received an email from Dr. Jan Johnston last night. I have mentioned this to the plaintiffs.

She was -- she believes she made an error in her testimony about a document that she was shown by Mr. Oles. She said she testified she had not -- did not recall seeing it. She remembered later she did see it.

She wanted me to raise that to you just so you are aware. If she needs to come back down and testify to that, she's happy to do so. But I wanted to make sure that that was properly reflected on the record.

THE COURT: All right. Well, I'll let plaintiffs' counsel, and Mr. Oles in particular who called her, to cogitate about that and you can let me know after the next witness.

MR. OLES: Thank you.

THE COURT: Or if you make a determination when we take a break, why don't you let me know?

MR. OLES: All right. Thank you, Judge.

1 THE COURT: Do you want to call your next witness,  
2 Mr. Brown?

3 **THE PLAINTIFFS' CASE (Continued).**

4 MR. BROWN: Yes, Your Honor.

5 Plaintiffs call Kevin Skoglund.

6 COURTROOM DEPUTY CLERK: Please raise your right  
7 hand.

8 **(Witness sworn)**

9 COURTROOM DEPUTY CLERK: Please have a seat.

10 Please state your name into the microphone and spell  
11 your complete name for the record.

12 THE WITNESS: My name is Kevin Skoglund, and that's  
13 K-E-V-I-N, S-K-O-G-L-U-N-D.

14 Whereupon,

15 KEVIN SKOGLUND,

16 after having been first duly sworn, testified as follows:

17 DIRECT EXAMINATION

18 BY MR. BROWN:

19 Q. Good morning, Mr. Skoglund.

20 A. Good morning.

21 Q. Have you been engaged by the Coalition plaintiffs to --

22 A. Yes.

23 Q. -- give expert testimony in this case?

24 A. Yes, I have.

25 Q. We will explore this in greater detail below.

1 But at a high level, how would you describe your  
2 professional experience?

3 **A.** I am -- sorry. I do a lot of different things. I wear a  
4 lot of different hats.

5 But relevant to this Court, I am an expert on election  
6 security and on voting machine technology, how it is used and  
7 deployed, and on cybersecurity.

8 **Q.** Do you have a college degree?

9 **A.** I do. I received a Bachelor in Arts with honors from  
10 Harvard University in 1994.

11 **Q.** We don't need all the details of your career, but can you  
12 give the Court just an overview of your current work?

13 **A.** Yes. Like I said, I wear a lot of hats. I have been a  
14 professional programmer for 20 years. I run a development  
15 company that builds technology solutions and consults on  
16 cybersecurity.

17 And I develop course curriculum and teach online classes  
18 on programming topics and security topics for Microsoft's  
19 LinkedIn Learning library. And I work on a wide variety of  
20 election security issues in a number of capacities.

21 **Q.** Can you give the Court some examples of the work that you  
22 have done relating to election equipment and systems?

23 **A.** Yes, I can list some of those.

24 **Q.** Do you serve on any boards?

25 **A.** Yes. I am on the board of advisers for Verified Voting.



1 That is a national nonprofit organization that works on  
2 election policy. They also came up in this case because they  
3 maintain the databases and maps that were shown to  
4 Dr. Halderman last week showing where voting technology is  
5 used.

6 **Q.** What other organizations do you serve on either as a  
7 consultant or as an adviser?

8 **A.** Right. I was on the National Institute of Science and  
9 Technology's Election System Cybersecurity Working Group. It  
10 is a very long name. What we did was develop the requirements,  
11 the cybersecurity requirements that the U.S. Election  
12 Assistance Commission is using to test and certify the next  
13 generation of voting machines. And ...

14 **Q.** Have you ever worked to assist organizations in procuring  
15 election systems?

16 **A.** I have. I was hired as a subject matter expert in  
17 cybersecurity by the City of Toronto. I helped them to write  
18 the RFP for the new voting system they were hoping to procure  
19 and then scored the responses of the proposals that came back  
20 from the vendors.

21 **Q.** All right.

22 Mr. Skoglund, were you here for Dr. Halderman's testimony  
23 on Thursday and Friday?

24 **A.** Yes, I was.

25 **Q.** And do you recall his testimony relating to CISA's review

1 of his report?

2 **A.** Yes, I do.

3 **Q.** And was that described -- I think it was a coordinated  
4 review disclosure. Do I have it right?

5 **A.** Yes. Coordinated vulnerability disclosure.

6 **Q.** And have you personally ever participated in a disclosure  
7 like that relating to cybersecurity and elections?

8 **A.** I have. On two occasions. The first was related to  
9 discovering voting systems that were visible to the whole  
10 internet and were insecure.

11 And the second came out of my extensive research into  
12 barcodes and how they are used in elections. I had determined  
13 that one of the barcode scanners that is sometimes used with  
14 some voting systems had some vulnerabilities.

15 **Q.** And did you discover these vulnerabilities on your own?

16 **A.** Yes. Well, in the case of the voting systems left online,  
17 I had a collaborator.

18 **Q.** And were those disclosures about voting systems, the one  
19 about left on the internet, was that to CISA?

20 **A.** The voting machines on the internet was not CISA. We did  
21 that work in 2018 in the summer. And at the time CISA didn't  
22 exist. CISA was founded later that year.

23 So instead, we decided that the best place to report it  
24 was to an organization that is known by its abbreviation  
25 EI-ISAC, I-S-A-C, and that stands for Election Infrastructure

1 Information Sharing and Analysis Center.

2 Q. Thank you.

3 What about the disclosure about the barcodes? Was that to  
4 CISA?

5 A. That one I did make to CISA as well as to EI-ISAC as well  
6 as to the Election Assistance Commission and to the vendor.

7 Q. Mr. Skoglund, have you written any articles on elections  
8 and cybersecurity?

9 A. I have.

10 Q. And are those listed on your resume?

11 A. They are.

12 MR. BROWN: Your Honor, may I approach?

13 THE COURT: Yes.

14 BY MR. BROWN:

15 Q. Mr. Skoglund, I'm going to hand to you a document which we  
16 will mark as Coalition Plaintiffs' Exhibit 63.

17 Is that a copy of your current resume?

18 A. Yes, it is.

19 Q. And do you list on Page 2 and 3 a sum of your writings on  
20 elections and security?

21 A. Yes.

22 MR. BROWN: Your Honor, I move to admit Exhibit 63.

23 MR. RUSSO: No objection.

24 THE COURT: It is admitted.

25 Harry, this is the copy I got. I don't know whether

1 you have been given a -- do you have a copy for the record?

2 You'll work it out. Okay. Fine.

3 COURTROOM DEPUTY CLERK: I'll work it out.

4 BY MR. BROWN:

5 **Q.** Mr. Skoglund, we have gone over some of your experience  
6 consulting with other organizations and with your disclosures.

7 Do you have any hands-on experience with elections and  
8 election security?

9 **A.** I do. I am a judge of elections in my home county of  
10 Montgomery County, Pennsylvania. That is the equivalent of a  
11 poll manager position in Georgia. We call it judge of  
12 elections. It is an elected position in Pennsylvania. I have  
13 been doing that for six years. And because it is elected, I  
14 have another two years on my term.

15 **Q.** What do you do in that capacity?

16 **A.** I oversee all of the operations of my polling place,  
17 ensure that everything is set up and ready to go, and to, you  
18 know, help the elections run smoothly throughout the day and  
19 then close up at the end of the night.

20 **Q.** What is the voting equipment configuration in your polling  
21 location?

22 **A.** We use essentially exactly what the state of Georgia uses.  
23 The software is Dominion Democracy Suite 5.5-A. And we use the  
24 same hardware. My polling place has an ImageCast precinct  
25 scanner. It has an ImageCast X ballot-marking device. We even

1 use the same KNOWiNK Poll Pads when people check in. So it  
2 really is the same system.

3 **Q.** Are there any differences to Georgia's election  
4 configuration?

5 **A.** There are. The biggest difference is that when voters  
6 come into the polling place they check in and then they are  
7 offered a hand-marked paper ballot or if they want a  
8 ballot-marking device. But we don't by default put all voters  
9 on a ballot-marking device.

10 **Q.** The default is hand-marked paper ballot?

11 **A.** That's correct.

12 **Q.** And do you have -- do you ask people questions if they say  
13 they want to use the BMD?

14 **A.** No. Of course not. Voters can ask for it, if they like.  
15 And also, you know, the pollbooks that we have indicate whether  
16 voters have previously declared that they would like  
17 assistance. And sometimes we'll, you know, affirmatively offer  
18 it to them in those cases.

19 MR. RUSSO: Your Honor, I'm going to object. This is  
20 outside the scope of Dr. -- or Mr. Skoglund's expert testimony.  
21 He was -- he testified earlier that he has been retained as an  
22 election security expert and an expert in voting machine  
23 technology. Not an expert in election administration.

24 MR. BROWN: Your Honor, he is testifying on the basis  
25 of his personal knowledge just then.

1           THE COURT: I understand that. I'm going to allow it  
2 to the extent it is helpful to the Court. But it is not as an  
3 expert witness.

4 BY MR. BROWN:

5 **Q.** Mr. Skoglund, getting back to the BMDs that you use, is  
6 there anything special about a BMD that is used for  
7 accessibility?

8 **A.** Yes, there is. The ballot-marking device can be  
9 configured with a -- an accessibility kit. Dominion calls it  
10 an ATI kit, and that can be added to a ballot-marking device.

11           So on its own, a ballot-marking device looks like what was  
12 shown in court last week that Alex Halderman made demonstration  
13 --

14           MR. RUSSO: Your Honor, I'm going to object. He is  
15 not an expert in disabilities and using --

16           THE COURT: I don't think he's -- come on. We will  
17 never move if -- forward if we have every single thing as an  
18 objection. At the end of it, if you want to move to strike  
19 something, that is fine. If it is really vital for you to  
20 raise because we've gone off track, that is fine.

21           But the Court is able to parse what he is saying, and  
22 he is just describing what the machine is. He is not  
23 necessarily testifying as an expert at the moment to the  
24 disability. He is describing what they have.

25           So it is relevant to simply letting me understand

1     what he -- understand the platform from which he is functioning  
2     and reviewing. All right.

3             MR. RUSSO: That's fine, Your Honor. I just want to  
4     make sure my objection is on the record --

5             THE COURT: Your objection is noted. I'm just  
6     saying --

7             MR. RUSSO: -- since this is Pennsylvania he is  
8     talking about.

9             THE COURT: I get it. I mean, it is obvious is all  
10    I'm saying. Thank you.

11            And I don't mean to jump on you. I'm just trying  
12    to -- because, Mr. Russo, you are always very gentlemanly. I  
13    just am simply saying we've had a lot of -- you know, more  
14    objections here than one would think would be usually necessary  
15    in a -- in a bench trial right from the start. And I just want  
16    to move forward.

17            Thank you.

18            And you are welcome, if we get to something, to jump  
19    up and just say objection noted, in the same way. But I just  
20    think that we will move forward if we can just be a little bit  
21    more flexible.

22            Thank you.

23    BY MR. BROWN:

24    **Q.** Mr. Skoglund, the BMDs that you use in Pennsylvania have  
25    that accessibility package?

1     **A.**     That is correct.

2     **Q.**     And it is one per location?

3     **A.**     That's correct.   Per polling place.

4     **Q.**     As the judge of elections, from your personal knowledge,  
5     are you able to estimate what percentage of voters use the BMDs  
6     in your location?

7     **A.**     I think it would have to be less than one percent.

8     **Q.**     Let me ask you this to compare your experience in  
9     Pennsylvania to Georgia.

10           Does Pennsylvania allow early voting?

11     **A.**     It does not.

12     **Q.**     Do you have any experience or expertise with early voting  
13     in jurisdictions that use hand-marked paper ballots as the  
14     primary method of recording votes?

15     **A.**     I do.

16     **Q.**     And what is that?

17     **A.**     One of the things I do is I consult with jurisdictions  
18     about how they deploy and use voting technology.   And the New  
19     York City Council invited me to come and speak to talk about  
20     how they were going to manage the new requirement that the New  
21     York State had made that there would be early voting in vote  
22     centers across New York State.

23           New York City is primarily hand-marked paper ballots for  
24     most voters.   And so they wanted to figure out how they would  
25     manage a number of ballot styles in particular.   And so I came



1 and gave a presentation and recommended that they use a Ballot  
2 on Demand printer for the polling places that could print  
3 ballots for voters as they checked in.

4 **Q.** What is a Ballot on Demand printer?

5 **A.** So a Ballot on Demand printer is a printer that has been  
6 slightly customized so that when voters check in you can  
7 trigger the printing of a ballot in the correct ballot style  
8 for that voter.

9 **Q.** Do you know what New York City ended up using?

10 **A.** Yes. They took my recommendations, and they are using  
11 Ballot on Demand printers in their vote centers. The ones that  
12 they purchased was -- it is a Poll Pad -- I'm sorry, Poll Print  
13 is the name of the product. It is made by KNOWiNK. And it  
14 integrates with the pollbooks, which are the KNOWiNK pollbooks  
15 that Georgia uses as well.

16 MR. BROWN: Your Honor, we tender Mr. Skoglund as an  
17 expert in election security, cybersecurity, and election  
18 technology.

19 MR. RUSSO: Your Honor, I don't have an objection to  
20 Mr. Skoglund being tendered as an expert in cybersecurity with  
21 regards to election security. That is a fairly broad topic.

22 He has not discussed any expertise if we're  
23 discussing physical security around voting machines and the  
24 voting process. If he is referring --

25 THE COURT: Can you pull the --

1 MR. RUSSO: -- purely to election technology  
2 security, that may be different.

3 It does not sound like Mr. Brown is tendering the  
4 witness as an expert in election administration. Although he  
5 did testify just now about some of his experiences in other  
6 jurisdictions.

7 To the extent he is being offered as an expert about  
8 different types of voting systems and what may be able to be  
9 used in Georgia, I would object to that.

10 But again, to the extent he is in kind of a narrow  
11 lane here, that's -- we don't object.

12 MR. BROWN: I'm not sure I quite understand the  
13 objection, Your Honor. We are offering Mr. Sterling [sic], as  
14 I said, to testify on several topics relating -- that are  
15 germane to the case, including his -- and all of these topics,  
16 Your Honor, he has already submitted declarations in this case.  
17 And most of them have been cited by Your Honor in opinions that  
18 you have issued.

19 He is going to speak on Coffee County, logic and  
20 accuracy testing, the EMS and ICC replacement, and some  
21 discussion of Mr. Sterling's testimony on these topics. Those  
22 are the areas of his testimony.

23 THE COURT: So I think that the main one -- I mean --  
24 that would be flagged here by the comments made by Mr. Russo is  
25 election administration. Election administration, I guess, is

1 separate and apart from security, and there's no such bright  
2 line exactly because of like, for instance, logic and accuracy  
3 testing could be deemed security or administration.

4 Perhaps what he is most concerned about is the fact  
5 that the witness testified about the New York situation and  
6 their use of the Ballot on Demand software with the Poll Pad  
7 KNOWiNK technology and that that perhaps had nothing to do with  
8 security and had more to do with election administration.

9 I don't know -- I mean, if you want to -- I mean, it  
10 is -- I don't have his affidavit in front of me. I have his  
11 election experience in front of me instead. So -- and I can  
12 remember reading other affidavits.

13 So I don't know in particular with respect to the  
14 affidavits submitted most recently or in connection with the  
15 motions what in particular you're relating to. I can see more  
16 in terms of the -- what he's done with the working group, the  
17 election verification group, the other work that he has done,  
18 why he is -- you know, you are tendering him also as to  
19 administration. I realize there is not a neat separation,  
20 but ...

21 MR. BROWN: Your Honor, we are not tendering him as  
22 an election administration expert.

23 THE COURT: Okay.

24 MR. BROWN: However, the reason for going into his  
25 background in Northampton, as you noticed, is election

1 security. Cybersecurity bleeds into -- necessarily bleeds into  
2 how elections are actually conducted in real life. And that is  
3 why the preliminary examination of Mr. Skoglund based upon what  
4 he knows in Pennsylvania and how that compares to Georgia is  
5 directly relevant to his experience, as well as his personal  
6 knowledge on facts that's relevant to this case.

7 THE COURT: Well, with that explanation, I'll allow  
8 the testimony but note the objection, and I will not consider  
9 the testimony to the extent that it is sheerly about  
10 administrative matters to be deemed expert testimony.

11 And I consider that in the same vein for purposes of  
12 the same testimony as to New York. Though it is clearly  
13 relevant and helpful for the Court to know.

14 MR. BROWN: Thank you, Your Honor.

15 THE COURT: Because there has been testimony and  
16 there has been cross-examination that has elicited testimony  
17 about the -- from officials in the Secretary of State's office  
18 about, well, why they couldn't do particular things, which  
19 included having a variety of ballot styles at local -- at  
20 voting precincts and their concern about that over the course  
21 of the history of this case, so ...

22 MR. RUSSO: Your Honor, I would simply note it is not  
23 necessarily a qualification issue, but it would go to  
24 admissibility of an expert opinion if he's simply applying it  
25 to some other jurisdiction that is not Georgia.

1 THE COURT: Right. Right. Well, just so I can get  
2 clarity, the Ballot on Demand in -- that are -- I realize they  
3 are done with similar KNOWiNK technology.

4 THE WITNESS: Correct.

5 THE COURT: But just so I can understand the  
6 comparability, do they -- and what is the -- and that's  
7 separate and apart? I mean, is it solely the programming on  
8 the KNOWiNK that produces the election -- the different  
9 ballots, or is it some other technology that they are  
10 interfacing with that they use to print the ballots?

11 I'm now asking you not as an -- based on your  
12 expertise in New York but based on your familiarity with it as  
13 a -- having consulted with them.

14 THE WITNESS: Right. I'm not an expert on election  
15 administration or on New York's even. But I am very much  
16 concerned with how technology gets used, right, whether it is  
17 appropriate use of it. So that is the basis for talking to  
18 them.

19 To your question about how the technology works, the  
20 Poll Pad triggers behavior in the printer. So they work  
21 together. It is not a separate device. It's the two of them  
22 communicating.

23 THE COURT: Okay. Thank you.

24 BY MR. BROWN:

25 Q. Mr. Skoglund, I would like to focus on the first

1 substantive topic on some very specific questions relating to  
2 Coffee County. We've had a lot of testimony on this already.  
3 So I'm going to address several discrete topics.

4 First, before we discuss any of them, if you could tell  
5 the Court what documents or data or other evidence you have  
6 reviewed for your testimony on Coffee County.

7 **A.** It was a lot. I reviewed all of the data that  
8 SullivanStrickler captured in Coffee County on January 7, at  
9 least what they provided, and everything that Paul Maggio  
10 discussed.

11 I looked at three months' worth of security video from the  
12 Coffee County office from four different cameras. I looked at  
13 documents and emails and text messages between -- supplied by  
14 the State defense and also by witnesses who had been deposed.  
15 I attended all of those depositions.

16 And then I looked at a couple of forensic copies of the  
17 EMS and ICC that had been made subsequently.

18 **Q.** Mr. Skoglund, have you reviewed the testimony of  
19 Mr. Maggio?

20 **A.** Yes.

21 **Q.** Based upon your review of the evidence, including all of  
22 what you have described, was Mr. Maggio's testimony as to what  
23 SullivanStrickler copied from Coffee County accurate and  
24 complete?

25 **MR. RUSSO:** Your Honor, I'm going to object on -- he

1 is not a computer forensics expert. He may be a computer  
2 cybersecurity expert. But Mr. Skoglund testified at his  
3 deposition he is not a computer forensics expert, and he has  
4 not stated today that he is a computer forensics expert. That  
5 is what Mr. Brown is getting at in this line of questioning.

6 MR. BROWN: Two responses to this. First, the  
7 question has nothing to do with forensics.

8 Second, it is puzzling the State would object to  
9 testimony relating to disclosures of Coffee County conduct.  
10 The State should be interested in exposing that, not shielding  
11 it.

12 All of this evidence is in the record already. It is  
13 not in dispute. And therefore, the question was proper and  
14 should be allowed.

15 MR. RUSSO: We're not looking to shield --

16 THE COURT: All right. The witness barely has been  
17 given an opportunity, at this point, to explain what his  
18 expertise in looking at it and what he found. I can strike  
19 this afterwards. You can examine it.

20 I'm not going to, at this juncture, preclude his  
21 testifying in explaining what is the experience that he brought  
22 to it or the knowledge. I don't know whether it is forensic or  
23 not. I don't know anything about it at this point. So it is  
24 premature.

25 Thank you.

1 BY MR. BROWN:

2 Q. Mr. Skoglund, did comparing the data that you reviewed to  
3 Mr. Maggio's testimony involve any forensics?

4 A. No, not forensics in the way that I think it is typically  
5 used in normal language and in court.

6 Q. And I'm not sure if the record got your answer to my  
7 question before the objection. But -- so let me just ask it  
8 again. Based upon your review --

9 MR. BROWN: And your objection is noted.

10 BY MR. BROWN:

11 Q. Based upon your review of the evidence, including your  
12 review of the data that SullivanStrickler captured, was  
13 Mr. Maggio's testimony as to what SullivanStrickler copied from  
14 Coffee County accurate and complete?

15 A. The information that he testified that they had collected  
16 matched the evidence that I reviewed.

17 Q. Thank you.

18 Next topic is, do you recall testimony about a virtual  
19 machine being created from data captured by SullivanStrickler?

20 A. I do.

21 Q. What is a virtual machine?

22 A. A virtual machine is a virtual computer. So it is  
23 essentially a large file that has an operating system in it  
24 that can be booted.

25 But unlike a normal computer that you would turn on and



1 then use, instead you would go to a computer that was already  
2 running and you would open that file and it would launch an  
3 application, similar to launching Microsoft Word or something  
4 like that, and a window would open. And inside that window  
5 would be another operating system.

6 So it is like having a software computer running inside a  
7 hardware-based computer. A computer within a computer.

8 **Q.** Have you used virtual machines before in your own work?

9 **A.** Yes, I have.

10 **Q.** In what context?

11 **A.** I have used them in a variety of contexts. They are  
12 useful, for example, if you have a Mac operating system and you  
13 want to work on a Windows operating system for some purpose, or  
14 if you have a Windows machine and you want to work on Linux.

15 In those kinds of cases, you can have those other  
16 operating systems running in that software-based computer and  
17 run them on a different operating system. That is a very  
18 common use.

19 **Q.** In our situation, what is a virtual machine useful for or  
20 what might it have been useful for?

21 **A.** Well, if you -- if you have a virtual machine, it is  
22 like -- especially one that is made from a forensic image that  
23 has been copied from somewhere else, it is like using that  
24 computer. It is like being at the keyboard of that computer  
25 regardless of wherever it is. The forensic image is a snapshot

1 of the computer, and so you're using the computer sort of in  
2 that state that that snapshot was captured.

3 So it is -- in the case of like an election management  
4 system from a county, it is like being in that county sitting  
5 in front of the keyboard for the election management system and  
6 using the software that is on it.

7 **Q.** Is it useful for experimenting with the software and  
8 looking at its vulnerabilities?

9 **A.** Absolutely. You would be able to see how it works. In  
10 the case of election management system, you know, you could  
11 program elections. You can, you know, experiment with the  
12 features, see what the menu options are, see what the settings  
13 are.

14 And then you can also do investigations on how to overcome  
15 defenses that the machine has or ways that you might manipulate  
16 the machine. It becomes sort of like a little laboratory.

17 And it is one that you can repeat -- you know, it is  
18 repeatable. You can sort of reset things back to the initial  
19 state and then do a new set of experiments.

20 **Q.** Did you find any evidence that someone had created a  
21 virtual machine from the data captured by SullivanStrickler in  
22 Coffee County?

23 **A.** Yes, I did.

24 **Q.** What evidence did you see?

25 **A.** In the ShareFile logs that SullivanStrickler presented and

1     that were discussed with Paul Maggio, you see that the Coffee  
2     County data is downloaded by a number of people, including Doug  
3     Logan. And then at some point in those ShareFile logs, you see  
4     that new files -- new large files are uploaded back to the file  
5     system -- back to the ShareFile site.

6             And when Doug Logan was deposed and asked about this, he  
7     said that, yes, these were virtual machines that he had created  
8     from the Coffee County images and that he was re-uploading them  
9     to share with other collaborators.

10    **Q.**    Are you familiar with a piece of software called Immunity  
11    Debugger?

12    **A.**    I am.

13    **Q.**    What is it?

14    **A.**    Immunity Debugger is a tool that lets you analyze software  
15    to watch it while it is operating and to look for specific  
16    things that you want to find.

17             It is useful for what we call reverse engineering  
18    software. That is when you don't have the actual source code,  
19    and so you can kind of work backwards from the working copy to  
20    figure out some of the details about the source code.

21             And then it is also used for constructing malware and  
22    exploits.

23    **Q.**    Did you see any evidence that Doug Logan was or is using  
24    Immunity Debugger with the virtual machine that he created from  
25    the Coffee County data?

1     **A.**    I'm not sure about is but was.  He produced a document  
2     during the -- his subpoena or discovery -- I'm not sure what  
3     the right word is for that.  He produced a document that is a  
4     screenshot where he shows himself using the Coffee County  
5     software inside of a virtual machine.

6           And at the same time in the screenshot, you see that the  
7     Immunity Debugger program is running and watching those  
8     operations that he is doing.

9           And he testified in his deposition that he was using it  
10    and he was trying to explore the software looking for sensitive  
11    code and data specifically for the cryptographic keys that are  
12    used to secure a lot of the data in the machine.

13   **Q.**    Mr. Skoglund, I want to shift -- still in Coffee County,  
14    but I want to shift --

15           THE COURT:  I'm just -- Mr. Logan was -- who was he  
16    affiliated with?

17           THE WITNESS:  You would probably know him from Cyber  
18    Ninjas most notably.  But he had a number of affiliations.

19           THE COURT:  I just wanted to make sure we had the  
20    same person in mind.  Okay.

21   BY MR. BROWN:

22   **Q.**    Same topic of Coffee County, but a subtopic.

23           Mr. Skoglund, there has been testimony about the January 7  
24    incident with SullivanStrickler.

25           Did you run across evidence of any later access to Coffee

1 County data?

2 **A.** Yes. Evidence of two additional breaches of the Coffee  
3 County election office.

4 **Q.** Okay. What was the next one after SullivanStrickler?

5 **A.** The next one was a little more than a week later on  
6 January 18 and 19, I believe. I remember the 18th was Martin  
7 Luther King Day or the day I'm referencing as the 18th was  
8 Martin Luther King Day, and the Coffee County office election  
9 office was closed.

10 But the security video shows that Doug Logan and another  
11 individual, Jeffrey Lenberg, came to Coffee County election  
12 office. And Misty Hampton met them and let them inside for  
13 those two days, Monday and Tuesday.

14 **Q.** And how long about did they have access to the election  
15 office? A two-day period?

16 **A.** It was a two-day period. And I think it's -- it's -- the  
17 security video -- and you're looking at the time that they came  
18 and left -- I think it is around 13 hours altogether.

19 **Q.** And were you able to detect what they did while they were  
20 in the elections office?

21 **A.** Yes. I was able to look at the activity on the -- on  
22 subsequent images from the Coffee County computers. And then  
23 they were also -- you know, testified about it in their  
24 depositions as well.

25 They were doing experiments on the equipment. They had

1 various theories about ways that votes might have been  
2 manipulated. And they wanted to do a set of experiments to  
3 determine if any of those were viable theories.

4 **Q.** Did Mr. Doug Logan or Jeffrey Lenberg change the dates or  
5 any other settings on the server or the ICC in this first visit  
6 on January 18 and 19?

7 **A.** Yes, they did. A number of times they changed the dates,  
8 and a number of times they changed the settings. And they  
9 would -- the process was essentially to scan a set of ballots,  
10 then change something, the date or the settings for the  
11 scanner, and then rescan those ballots again and see if there  
12 were any differences. And then repeat the process over and  
13 over.

14 **Q.** Did they change the dates back after they did what they  
15 were doing?

16 **A.** They did not. The dates and also the scanner settings.  
17 In the subsequent captures of the server, after it was in the  
18 State's possession, those still have the incorrect dates and  
19 the incorrect scanner settings.

20 And if it had been used in an election, it would have, you  
21 know, materially impacted the election.

22 **Q.** What do you mean materially impacted?

23 **A.** I mean, this -- when they were doing the scanner tests,  
24 they were testing to see if they could get different results.  
25 And they were sometimes getting different results. They would

1 set the contrast to a different value, for example, on the  
2 scanner, or the resolution, and then run a set of tests.

3 Those were yielding different results than the scanner  
4 would yield under its normal configuration. They were getting  
5 odd results. I'll call them odd. They were not -- the scanner  
6 was not operating as it normally would for an election.

7 **Q.** And they didn't -- and had that equipment not been picked  
8 up, it would have -- would it have performed adequately in an  
9 upcoming election?

10 **A.** No. I think especially -- the ICC, the ImageCast central  
11 scanner that is -- typically is mostly to scan mail-in ballots,  
12 I think that is the one that would be most impacted by the  
13 setting changes they made.

14 **Q.** Mr. Skoglund, you have been describing the January 18 and  
15 19, 2021, breach by those two.

16 Were there any subsequent breaches?

17 THE COURT: Before you go on to the subsequent ones,  
18 let me just roll back to the 7th because there was something  
19 you were describing on the 7th, and I'm just trying --

20 Who did that one? Did you have evidence of who was  
21 involved in the alterations that you saw dating back to the 7th  
22 or not?

23 THE WITNESS: Yes. The 7th was the date that  
24 SullivanStrickler was there --

25 THE COURT: SullivanStrickler, I see.

1 THE WITNESS: -- that Paul Maggio testified about.

2 THE COURT: All right.

3 THE WITNESS: So it was all of the people that he  
4 described being there with him that day.

5 THE COURT: All right. That is fine.

6 Thank you. I just got a little confused in my notes.

7 BY MR. BROWN:

8 Q. Okay. So after January 18, 19, was there another visit?

9 A. Yes. The following week -- so the following Monday,  
10 Jeffrey Lenberg returned to Coffee County and was there for  
11 that week in varying degrees. He appears on the security video  
12 on all five days.

13 Q. Were you able to determine what he was doing there?

14 A. He was continuing the work that -- from the previous week.  
15 I think he felt like he wasn't done with his experiments. I  
16 think he -- I believe he testified to that in his deposition,  
17 that he wanted to continue working and had the ability to go  
18 back. So he made arrangements and went back to do scans.

19 He primarily, out of those five days, spent the most time  
20 at the beginning of the week. It was discussed in testimony  
21 that Inspector Blanchard came to Coffee County and they had a  
22 close encounter. After that, he appeared less frequently in  
23 the Coffee County office.

24 Q. Mr. Skoglund, stepping back and in summary looking at  
25 these three breaches, SullivanStrickler, and then the two by



1 Logan and Lenberg, how would you describe the impact of these  
2 breaches upon the security of Georgia's elections?

3 **A.** All three of them?

4 **Q.** Together.

5 **A.** I mean, as far as I'm aware, this was the largest election  
6 security breach in United States history. I mean, I don't know  
7 how far you would have to go back to know that was certainly  
8 true. But it is -- it is the biggest in recent history.

9 And I think by any measure this was a consequential breach  
10 of Georgia's election security.

11 **Q.** How so?

12 **A.** I mean, SullivanStrickler went to Coffee County and  
13 captured software and data from almost every single component  
14 of the election system. Not just a couple but really  
15 everything, including the software for the ImageCast X  
16 ballot-marking device.

17 That is -- it is a lot of data that had previously not  
18 been available outside of an election office.

19 And then they distributed that and distributed it to a  
20 dozen people -- close to a dozen people at least. And those  
21 people are -- they have a lot of different affiliations. They  
22 are spread out around the country. They may have different  
23 agendas.

24 And once that software is -- they call it uncontrolled  
25 distribution. Once that software is in uncontrolled

1 distribution like that, you can't regulate where it goes or who  
2 has it or who might obtain it in the future.

3 And you can't regain control over it. It is not possible  
4 to know that you have gone and gotten every copy the way that  
5 you might go and reclaim something physical from someone. Like  
6 a car that you need to repossess or something, you go bring the  
7 car back. You can't do that with digital data.

8 And that data is -- it helps our adversaries. It helps  
9 increase the number of adversaries potentially or empower some  
10 adversaries who may not have had power before.

11 A nation-state has resources to have this software  
12 already. If they want it, they have the ability to do it.  
13 They can spend millions and millions on it and millions and  
14 millions of dollars to research and to exploit it.

15 But there is a whole range of threat actors that are in  
16 the threat model that do not necessarily have those same  
17 resources. And this is just a gift to them. This is just an  
18 easy way for them to get access to what should be, you know,  
19 well-protected data.

20 And once they have it, then they have the ability to, you  
21 know, sit in their basement and, you know, work on crafting --  
22 crafting exploits or ways to lower defenses or even just to  
23 understand how it works or to create misinformation about it,  
24 right, just to be able to say, you know, I have seen the  
25 software and here is how it works.

1           And the public doesn't have that ability to see it or  
2   to -- and even experts don't have the ability to see that  
3   software or to know how it works.

4           MR. RUSSO: Your Honor, I hate to interrupt. But I  
5   have to object on some of this. This is just -- there are no  
6   facts or data in the case that he could be relying on for some  
7   of these opinions. I mean, that the information was disclosed  
8   to other people is one thing.

9           But some of the statements about what nation-states  
10   may be doing or not doing and people in their basements doing  
11   or not doing, I just -- I don't know that this is expert  
12   testimony.

13          MR. BROWN: Your Honor --

14          THE COURT: I'm just going to ask the witness a  
15   question.

16          So in your description of all of the vulnerabilities  
17   that it creates by being -- once the data was distributed to at  
18   least 12 separate individuals across the nation by the  
19   Ninjas -- and then you described the -- what that unleashes.

20          What is the -- what is the basis for your testimony  
21   about that and how do you -- what is the -- in your -- you may  
22   be describing this as based on your having read the New York  
23   Times or you could be doing it based on your knowledge as an  
24   expert.

25          And so if you could be more specific as to the basis

1 upon which you are drawing those -- making those remarks and  
2 concerns that are elicited by what happened.

3 THE WITNESS: Sure.

4 These are basic cybersecurity concerns.  
5 Cybersecurity and any security is about protecting things that  
6 we believe are valuable. And in order to protect those things  
7 and to think about what the risks to those are you first have  
8 to stop and think about what kinds of things could go wrong.

9 THE COURT: This is in the field?

10 THE WITNESS: In the field. Just generally in  
11 cybersecurity.

12 THE COURT: As a general principle in the field?

13 THE WITNESS: General principle.

14 You have to -- your job is to manage risks. That is  
15 the North Star of cybersecurity is managing risks.

16 And to do that, you have to consider what could  
17 happen. And just to take it out of elections for a moment. I  
18 mean, when you think about security of your house, you think  
19 about what are the things that could go wrong. Right. What  
20 are the things that threaten my security in my house? It is a  
21 basic fundamental principle.

22 And so in elections, we have to think about those  
23 things. And part of that analysis has to be who could do us  
24 harm, what are their capabilities to do harm, what are their  
25 motivations to do harm, so that you can then consider what is

1 the likelihood that they could actually cause harm.

2 And that really is a fundamental sort of risk  
3 assessment that is done all the time in cybersecurity. It is  
4 not unique to election security.

5 So in the election context, this is the kind of thing  
6 that an expert looks at is, you know, who is out there that  
7 wants to affect the elections? What ability do they have to do  
8 that. What is the likelihood that they could actually do it?

9 And when events like this happen that raise the  
10 likelihood, that is of concern to me.

11 THE COURT: Okay. All right. Well, I think I've  
12 satisfied myself as to the intellectual foundation and  
13 expertise that was the basis of Mr. Skoglund's testimony in  
14 this connection.

15 Go ahead.

16 MR. BROWN: Thank you, Your Honor.

17 BY MR. BROWN:

18 **Q.** Mr. Skoglund, I want to shift attention to another topic,  
19 and that is logic and accuracy testing.

20 You have testified before about logic and accuracy  
21 testing; correct?

22 **A.** Yes.

23 **Q.** I don't want your legal opinion. But we're going to put  
24 something up on the board here.

25 Can you see that?

1     **A.**    I have it here on my screen.

2     **Q.**    Mr. Skoglund, we have put on the board a passage from the  
3     Court's order dated October 11, 2020.  It is Document 964,  
4     Page 51.

5           And the purpose of putting that on the board is to just to  
6     help guide us.  And it quotes -- you see where the Court has a  
7     block quote of the Georgia statute relating to logic and  
8     accuracy testing.

9           Now, you're familiar with the legal requirements in  
10    Georgia.  I don't want your legal opinion.  But what I would  
11    like is just your working knowledge of what Georgia law  
12    requires in terms of logic and accuracy testing.

13           MR. RUSSO:  Your Honor, I think that is calling for a  
14    legal conclusion based on the question itself.

15           MR. BROWN:  Your Honor, logic and accuracy testing is  
16    a function that cannot be conducted unless it is within some  
17    sort of regulatory environment.  So -- and it should be  
18    following the regulatory environment.

19           So you can't do logic and accuracy testing unless  
20    there is some guiding guidepost in relation to the law.  And he  
21    is clearly qualified to testify about it.

22           THE COURT:  All right.  Just be sure that your  
23    testimony is your understanding of what the requirement is.

24    BY MR. BROWN:

25    **Q.**    Do you understand that, Mr. Skoglund?  We're just looking

1 at your understanding of what the requirement is for logic and  
2 accuracy testing.

3 **A.** I do.

4 **Q.** And what is it in Georgia?

5 **A.** So I'm reading this. And the first thing that it says is  
6 each electronic ballot marker. The electronic ballot marker is  
7 the ballot-marking device.

8 And it is each one needs to be tested to ascertain that it  
9 will correctly record the votes cast for all offices and all  
10 questions and produce a ballot reflecting such choices.

11 That I think is sort of the core part. And it is  
12 basically saying every ballot-marking device needs to be tested  
13 for all the offices and all of the questions to ensure that  
14 they cast correct votes.

15 **Q.** And have you reviewed the testimony last week or the week  
16 before from Michael Barnes' testimony in this case?

17 **A.** Yes.

18 **Q.** And is the way that he described the logic and accuracy  
19 testing that he conducted -- does that test each BMD for all  
20 offices and all questions?

21 **A.** No, it does not.

22 **Q.** Can you explain that to the Court?

23 MR. RUSSO: Your Honor, this is calling for a legal  
24 conclusion. If he wants to ask him about his understanding,  
25 that may be one thing. But that is not what the question is

1 asking.

2 MR. BROWN: Your Honor, I very deliberately did not  
3 ask him about the law in that question. I asked him if  
4 Mr. Barnes' description of logic and accuracy testing tested  
5 each BMD for all offices and all questions. I didn't mention  
6 the law. He's not making an opinion on the law.

7 MR. RUSSO: I'm looking back at his question, and he  
8 is pointing to the statute saying -- and you heard him describe  
9 logic and accuracy testing that he conducted and does that test  
10 each BMD for offices in all -- well, it is down now -- but in  
11 all --

12 THE COURT: And all questions.

13 MR. RUSSO: Pointing to the screen.

14 THE COURT: I'm going to let him answer the question.  
15 Just --

16 Go ahead.

17 BY MR. BROWN:

18 **Q.** And, Mr. Skoglund, can you just tell -- describe to the  
19 Court how what Michael Barnes was describing does not test each  
20 ballot for each office and each question?

21 **A.** The process that Michael Barnes described was familiar to  
22 me because it was something that we had discussed back in 2020.  
23 And it also --

24 THE COURT: In the course of your testimony before  
25 you are saying?



1           THE WITNESS: In the course of my prior testimony  
2 when it was before this Court and we talked about this issue.

3           The -- it also matches the procedures manual for  
4 logic and accuracy testing. And that is that you program a set  
5 of ballot-marking devices from a polling place with the ballot  
6 definition file that they need to conduct the election. All  
7 the election data is essentially in place that you'll need for  
8 election day.

9           And you line up the ballot-marking devices or put  
10 them in a round robin or something like that. And then you  
11 proceed down the line. And the first ballot-marking device,  
12 you would mark the first candidate in the first contest.

13           And then you would move to the second ballot-marking  
14 device and you would test the second candidate in the same  
15 contest.

16           And then move to the third ballot-marking device and  
17 mark the third candidate and so on down the line.

18           And if you were to run out of candidates before you  
19 had run out of ballot-marking devices, if you still had  
20 ballot-marking devices that weren't touched, then you would  
21 start that process over again.

22           And then you would cast those votes -- those ballots  
23 from each -- you would proceed until you were done -- you had  
24 sort of exhausted all of the contests and candidates. And then  
25 you would print the ballots and use that for verification that

1 the logic and accuracy testing was working as expected.

2 BY MR. BROWN:

3 **Q.** Mr. Skoglund, is this -- what offices or BMDs or questions  
4 would be missed in the way that Mr. Barnes described it?

5 **A.** So I think the easiest way to give an example is that that  
6 first ballot-marking device where you cast that first vote for  
7 that candidate, if there -- I mean, that may be the only  
8 ballot-marking device in the whole line that tests for that  
9 candidate and to ensure that that candidate -- you know, a  
10 touch on the screen results in a vote for that candidate.

11 The other ballot-marking devices on the line  
12 potentially -- unless you start the pattern over again, they  
13 won't test that. They sort of make the assumption that my  
14 sibling or neighbor ballot-marking device has checked this and  
15 I don't need to check it for myself.

16 **Q.** Is one of the things you're testing the sensitivity or  
17 correctness of the calibration of the touch screen itself?

18 **A.** I mean, that is one of the things that you should be  
19 testing for, certainly. I mean, screen calibration issues are  
20 a common problem with touch screens. And we've seen them  
21 affect live elections.

22 Historically it affected them more. But even now in  
23 recent elections with recent technology, screen calibration  
24 issues impact the election.

25 **Q.** And so the way that Mr. Barnes described it, you could

1 have some or many particular vote or vote combinations that the  
2 screen would not be tested at all on a particular BMD; right?

3 **A.** That is right. You would -- you would not be able -- I  
4 mean, you would not be able to say anything definitive about  
5 whether those other candidates were working, whether touching  
6 the screen in those places was working properly.

7 I like to say, you know, you only get answers for what you  
8 test. And you can't know that they are working properly  
9 because you didn't test its functionality.

10 **Q.** Have you -- are you aware of any recent and maybe nearby  
11 instances in which failures in logic and accuracy testing have  
12 had an impact upon an actual election?

13 **A.** Yes. It happens -- it happens pretty regularly. Logic  
14 and accuracy testing will miss things. And often those end up  
15 in the headlines when that happens.

16 One that comes to mind, because we were just talking about  
17 screen calibration, is -- and I think we talked about this even  
18 back in 2020 -- was that in Northampton County, Pennsylvania,  
19 in 2019 they had screen calibration issues that affected  
20 30 percent of the ballot-marking devices there.

21 And there were two judge candidates where voters could not  
22 cast a vote for them. They could not actually, you know,  
23 support their candidacy. And those two judge candidates went  
24 to court to try and get a remedy for that because the screens  
25 on a large number of machines, 30 percent, were not working.

1     **Q.**   Mr. Skoglund, the Court issued an order in 2020 that  
2     addressed logic and accuracy testing.

3           Are you aware, from your perspective and looking at the  
4     evidence, of any material changes that Georgia has made since  
5     the Court issued that order to logic and accuracy testing on  
6     the BMDs?

7     **A.**   No.   The process, as I understand it, now is exactly what  
8     it was when we discussed it in 2020.

9     **Q.**   Okay.   Still on logic and accuracy testing but I want to  
10    shift gears a little bit.

11           You have described how BMDs are not tested properly in  
12    Georgia.   But let me ask you this:   If BMDs were subjected to  
13    rigorous and proper logic and accuracy testing, would such  
14    testing protect the BMDs from malware or misprogramming?

15    **A.**   You're asking if you did it perfectly?   If you really did  
16    just like a superb job of logic and accuracy testing?

17    **Q.**   Exactly.

18    **A.**   No.

19    **Q.**   Why not?

20    **A.**   Logic and accuracy testing is a -- what we call a  
21    functional test.   You're testing the functionality.   You're  
22    testing to see whether or not the machine functions the way  
23    that you expect.

24           It is not a security test directly.   It is only a security  
25    test in the sense that if the functionality has been changed

1 and becomes apparent during your testing, that it might alert  
2 you that there's some underlying issue. But if it doesn't  
3 alter the functionality during the test, then no, you would not  
4 detect it.

5 **Q.** You were here for Mr. -- Dr. Halderman's demonstration --

6 **A.** Yes.

7 **Q.** -- the other day?

8 **A.** Yes.

9 **Q.** Would the kind of malware that he was demonstrating on the  
10 machine here be caught in logic and accuracy testing?

11 **A.** He demonstrated a lot. The ones that come to mind  
12 though -- you know, some of -- I think maybe all, if not many  
13 of the things that he showed, would all take place after logic  
14 and accuracy testing was done.

15 The demonstration with the pen, the poll worker card, the  
16 technician card, those kind of things are all things that are  
17 introduced to the system long after logic and accuracy testing  
18 is complete.

19 **Q.** In your experience and in learning, are there other  
20 examples of malware that could evade logic and accuracy  
21 testing?

22 **A.** Yes. Malware that we see outside of elections frequently  
23 tries to evade detection to detect when it is under test.  
24 There's malware that, you know, looks -- tries to determine  
25 whether a security researcher is looking at it or not.

1           A very famous example is Volkswagen. It is called  
2   Dieselgate. It is where the software in some of the Volkswagen  
3   cars behaved one way in normal use but was able to detect when  
4   it was being tested for emissions tests and would behave  
5   differently when it detected that.

6           So it is -- software and malware, you know, can be  
7   sensitive to its context and its conditions at the time and  
8   modify its operation accordingly.

9           So it could detect that it was logic and accuracy testing  
10   perhaps by the date on the clock to know that it wasn't  
11   election day.

12   **Q.**   Mr. Skoglund, we've been talking about logic and accuracy  
13   testing, which is done on the BMDs right before election day.

14           Are you with me?

15   **A.**   Yes.

16   **Q.**   We've also heard the term "parallel testing."

17           What is parallel testing?

18   **A.**   Parallel testing in general is testing the systems at the  
19   same time that they are being used. So in this case while the  
20   election is going on. So voting is actually in progress and in  
21   parallel to that you're conducting tests.

22   **Q.**   And is parallel testing one way or the other materially  
23   effective in catching malware or reducing the risk of a  
24   cybersecurity attack or catching misprogramming?

25   **A.**   No, I would say not very effective at all. It is nothing

1 I would ever recommend.

2 **Q.** From a cybersecurity perspective, why is that the case?

3 **A.** Again, it is functional testing. Right. So -- and it is  
4 similar to logic and accuracy testing just on a -- perhaps a  
5 single device or on a smaller scale.

6 So you have those same concerns that malware could detect  
7 that it was under test. You also can have, you know, malware  
8 that only starts working at a certain time of day. Right. So  
9 it doesn't -- you know, it doesn't actually sort of kick into  
10 action until 2:00 in the afternoon.

11 And then as Dr. Halderman testified, malware can easily be  
12 programmed to be intermittent. Something as simple as every  
13 ten votes. Right. So then, you know, you have -- if you have  
14 a test where you're just going to go and during the day vote a  
15 ballot and check it to see if it functions as you expected, you  
16 know, there is a great chance that you would miss it.

17 Like I said about logic and accuracy testing, it is not a  
18 security test. It is only effective if you happen to catch  
19 that change in the functionality. And malwares can be quite  
20 good at evading that.

21 **Q.** Have you heard the term "hash validation"?

22 Did I get that right?

23 **A.** Yes.

24 **Q.** And what is hash validation?

25 **A.** I'll start with a general explanation and then move to

1 elections.

2       So with any kind of data, you can create a hash of that  
3 data. And the way I typically explain it is if you took a copy  
4 of War and Peace and you took all the words in the War and  
5 Peace and you alphabetized them and then you counted the  
6 instance of each word, you would have a unique set of data  
7 about what War and Peace looks like. It is not the text any  
8 more. It is a derived text from it.

9       Any copy of War and Peace that you get anywhere in the  
10 world you can do that same operation and you will get the same  
11 results and you can then say this has not been changed. It is  
12 the same.

13       Hashes work the same way. We run any kind of data through  
14 an algorithm, and we come up with a fairly succinct bit of  
15 letters and numbers that provide like a signature for it.

16       So that is the principle.

17       In elections, we can take some part of the election system  
18 and we can do that process on it to get that string of letters  
19 and numbers that represent what it is. And a point that I  
20 missed in the theory of it is any change that you were to make  
21 to it would result in something different. Right. If you  
22 remove a word from War and Peace or you add another sentence or  
23 something like that, it materially changes what that final  
24 outlook looks like.

25       And it is the same with digital data. If you add a space



1 or take away a letter or add a semicolon or something, the hash  
2 will then change. And so you can tell not what was changed but  
3 you can tell something changed.

4 **Q.** How can you use that technology in election security and  
5 is it useful?

6 **A.** So with election technology, you can have the voting  
7 system -- a lot of the voting systems have the ability to run  
8 that algorithm and to give you the results that they come up  
9 with.

10 So they will say, hey, this is what my software -- this is  
11 the hash that belongs to my software right now at this moment.  
12 So if it were to change later, you could compare those two  
13 outputs and know that something changed. That it is not what  
14 you expected it to be at the start.

15 So it is a way to check and see whether the software has  
16 changed. But that is just a change to the part that you're  
17 looking at. And you are asking the machine to self-attest.  
18 You're asking the machine to run the algorithm for you.

19 You know, the -- a more reliable way to do the hash  
20 testing would be to take that same data on a different system  
21 that was trusted and ask it to run that algorithm. But you  
22 don't really know whether the machine has given you back the  
23 correct value or if malware has, you know, kept track of what  
24 the old value used to be and is just presenting that to you  
25 again rather than actually running the algorithm.

1 Q. So malware that can hurt the election can also booby trap  
2 the hash validation?

3 A. That's right because of the self-attestation. You're  
4 trusting the machine to tell that it is not a liar.

5 Q. Now, let me change topics to the replacement of the EMS  
6 and the ICC units in Coffee County in June of 2021 by the  
7 Secretary of State.

8 Are you with me?

9 A. I am.

10 Q. And just for context, this is just a few weeks after James  
11 Barnes had sent the Cyber Ninjas business card to Chris Harvey.

12 Are you with me?

13 A. I am.

14 Q. Have you reviewed the testimony in this case this last  
15 week or the week before of Michael Barnes about the replacement  
16 of these Coffee County computers in June of 2021?

17 A. Yes, I have.

18 Q. Do you recall the reason that he gave for replacing the  
19 EMS and the ICC units?

20 A. The reason he gave was that the password was unknown to  
21 them, that it didn't match what the Secretary of State's office  
22 had on file and that there was an imminent election.

23 Q. Okay. So two things, imminent election and password  
24 didn't work; right?

25 A. Correct.

1 Q. Okay. Did you examine a copy of the EMS and ICC units  
2 that were picked up from Coffee County?

3 A. Yes. Those are the subsequent images that I referred to  
4 earlier after they had been removed from Coffee County and were  
5 in the possession of the State. At some point in the future,  
6 another forensic image was made and provided to me.

7 Q. Okay. So just as a little bit of a detour to make sure  
8 the foundation for this is set, we have the January 7 snapshot  
9 that was taken by SullivanStrickler; correct?

10 A. Correct.

11 Q. And you reviewed that?

12 A. Yes.

13 Q. And then you had a subsequent snapshot of the EMS and ICC.  
14 And who made that?

15 A. There were actually two subsequent images. One that was  
16 made by the -- a person retained by the State. And then the  
17 State provided access to a plaintiffs' expert to make another  
18 copy. So there were two copies.

19 Q. On the two -- so the two later copies were a snapshot from  
20 a different time; right?

21 A. Correct.

22 Q. Okay. So were you able to detect on the later snapshot of  
23 the EMS and the ICC anything about the pass codes that would  
24 allow access to the ICC and the EMS server?

25 A. Yes. Quite a bit. Because when you -- when you boot up a

1 Windows computer or when you log into a Windows computer, those  
2 things are recorded in the Windows logs.

3 **Q.** Now, Mr. Barnes said that they couldn't boot up the EMS  
4 server.

5 Could you?

6 **A.** For the -- we're talking about the EMS?

7 **Q.** The EMS first.

8 **A.** The EMS I was able to, yes.

9 **Q.** How did you do that, just briefly?

10 **A.** I converted it into a virtual machine, as we discussed  
11 before, so that I would have an operational copy and could boot  
12 it up and see the log-in screen.

13 I first tried a password that I thought might work, which  
14 was the password that was on the bottom of Misty Hampton's  
15 monitor in the YouTube video that was posted online in December  
16 of 2020. That seemed like a good candidate. That did not  
17 work.

18 But then I was -- the next thing I tried was that in  
19 the -- in the data that SullivanStrickler produced there was a  
20 photograph of another Post-it note which had that password, the  
21 one on the bottom of the monitor, as well as another one that  
22 looked like a password to me. It was very memorable and easy.  
23 It was elect#2020. And so I tried that. And that password  
24 worked.

25 **Q.** Okay. So just to be fair, James Barnes and the Secretary

1 of State might not have had access to the SullivanStrickler  
2 video and photographs in June of 2021.

3 Fair enough?

4 **A.** Yes. I don't know what they had access to or didn't.  
5 Yes.

6 **Q.** But could they have nevertheless worked around the  
7 password issue still on the EMS server?

8 **A.** Yes. Easily.

9 **Q.** How so?

10 MR. RUSSO: Your Honor, I'm going to object to down  
11 this line. He's testified he is not a computer forensics  
12 expert. If he's a cybersecurity expert, you know, he can talk  
13 about that. I think -- but this is drifting off into a  
14 forensics issue that we have had discussions about separately.

15 MR. BROWN: Let me just ask a foundational question.  
16 BY MR. BROWN:

17 **Q.** Mr. Skoglund, does it take any high-level expertise to get  
18 into a Windows system that is running an EMS server?

19 **A.** To log into it?

20 **Q.** Yes.

21 **A.** No, it does not.

22 **Q.** And if you're not an expert, if you're not qualified, as  
23 Mr. Russo is complaining about, to do that, what would you do?  
24 Just an ordinary person, what could they do to get into that  
25 system?

1     **A.**    I mean, one easy thing is you can call Microsoft. But,  
2     you know, if you were really sort of on your own and  
3     determined, there are videos that are posted online that are --  
4     you know, in plain language walk you through the steps of  
5     resetting a Windows password.

6            I mean, it is a common occurrence that people forget their  
7     password and get locked out of their accounts. So ...

8     **Q.**    Okay. That is with the EMS server.

9            They also picked up the ICC unit.

10           Are you with me?

11     **A.**    Yes.

12     **Q.**    And I believe Mr. Michael Barnes said that they couldn't  
13     get into that one either; right?

14     **A.**    Correct.

15     **Q.**    Were you able to log into the ICC unit?

16     **A.**    Yes, I was.

17     **Q.**    How did you do that?

18     **A.**    For the ICC, the password that was on the bottom of Misty  
19     Hampton's computer monitor did work. That was the password.

20     **Q.**    So the password on the ICC had never even been changed?

21     **A.**    Correct. I -- you can look at the Windows logs and tell  
22     when passwords are changed. And it had not been changed in --  
23     any time in recent history.

24     **Q.**    Did you detect any evidence that the ICC had been booted  
25     up and actually used?

1     **A.**    I'm sorry.  During what time period are we referring to?

2     **Q.**    Just prior to the Secretary of State picking it up because  
3     allegedly it couldn't be turned on or booted up in June of  
4     2021.

5     **A.**    Yes.  It was logged into on that day.  The logs recorded  
6     the fact that someone logged into it on the same day that the  
7     CES took the hardware.

8     **Q.**    Now -- okay.  So based upon your review of the evidence,  
9     does the evidence support or does it not support Mr. Barnes'  
10    explanation that the ICC and the EMS were picked up from Coffee  
11    County because they could not get into the computer or because  
12    of a password issue?

13                 MR. RUSSO:  Same objection, Your Honor.

14                 THE COURT:  Overruled.

15                 THE WITNESS:  It does not support it for the  
16    ImageCast Central, the ICC computer.  They were able to log in  
17    on that day.  So clearly they knew the password and were able  
18    to use it.

19                 For the election management system, or EMS computer,  
20    I don't know whether they knew the password or not.  There were  
21    no log-ins on that day like there were with the ICC.  So there  
22    is no indication that they did know the password.

23                 But it would have been a trivial matter to reset the  
24    password.  IT departments, corporate IT departments routinely  
25    deal with this kind of thing.  You can purchase software that

1 will allow you to reset passwords.

2 And, in fact, that is what eventually happened when  
3 the -- when the State asked -- someone they hired that had more  
4 IT expertise, he used one of these software packages that  
5 just -- you run a program and it resets the password for you.

6 BY MR. BROWN:

7 **Q.** Okay. Now, Mr. Barnes also said something about an  
8 imminent election was the reason for picking up the ICC and the  
9 EMS from Coffee County.

10 Was there an imminent election?

11 **A.** So I've reviewed all of the minutes for the Coffee County  
12 Board of Elections for 2021. And the only reference subsequent  
13 to June was to the November 2021 election.

14 **Q.** In the course of your review of documents in this case,  
15 did you run across any other evidence that related to whether  
16 the Secretary of State picked up the ICC and the EMS server  
17 because of the password issue?

18 **A.** Yes, I did.

19 **Q.** And what did you uncover? And first, for foundational  
20 purposes, what data set are you referring to?

21 **A.** I reviewed documents, including emails, that were on a  
22 forensic image that I was told were provided by the State  
23 defendants to the plaintiffs and that the State defendants had  
24 obtained from the GBI, the Georgia Bureau of Investigation.

25 And the Georgia Bureau of Investigation had made the



1 forensic image of a computer that was in Coffee County -- I'd  
2 call a desktop computer.

3 **Q.** And are the documents that you are referring to emails?

4 **A.** Yes, they are.

5 **Q.** And who were the emails from and to?

6 **A.** The emails are from James Barnes, the election director in  
7 Coffee County, to someone named Deb Cox, who I understand to be  
8 the election director of Lowndes County.

9 MR. BROWN: Your Honor, may I approach?

10 THE COURT: Yes.

11 BY MR. BROWN:

12 **Q.** Mr. Skoglund, are Coalition Plaintiffs' Exhibit 41 and 42  
13 the documents that you discovered in the disc drive that was  
14 given to us by the State defendants, which they had received  
15 from the GBI, which the GBI had received from Coffee County?

16 **A.** Yes, they are.

17 **Q.** And do you see where Deb Cox is commenting on a draft memo  
18 and suggests that Mr. James Barnes make a correction, and she  
19 says CES also brought a new server, not correct, delete this  
20 line. They took it but not because the password had changed?

21 Do you see that?

22 MR. RUSSO: Your Honor, I'm going to object to all of  
23 this as inadmissible hearsay. I realize experts, at times, can  
24 rely on inadmissible hearsay. But there has to be some  
25 guardrails around it regarding its trustworthiness and

1 accuracy.

2           These two emails, they were not produced by the  
3 State. I think what Mr. Brown is saying is they were produced  
4 in a server image that was produced by the State.

5           Is that what you are saying?

6           MR. BROWN: Well, physically we got them from you.

7           MR. RUSSO: They are not Bates stamped with a  
8 State -- I just don't know -- when we got them recently, this  
9 was the first we had seen them.

10           MR. BROWN: Your Honor, the State and -- the GBI and  
11 the Secretary of State and State defendants may not have even  
12 looked at the disc that Misty -- that was made from Misty  
13 Hampton's computer. A lack of interest. Don't know.

14           THE COURT: Well, were they Bates stamped or not?

15           MR. BROWN: No. These are documents that we  
16 pulled --

17           THE COURT: Off of the server?

18           MR. BROWN: -- off the server, yes, Your Honor.

19           These are not -- the Bates stamped documents are ones  
20 that were officially produced in discovery. This we got  
21 indirectly from the GBI through the Robbins Firm.

22           And that's where we got this document. And it has no  
23 indicia that it is not authentic. We didn't create it. It  
24 matches up with Exhibit 45, which is already in evidence.

25           THE COURT: Did I get 45?

1 Harry, do you have Exhibit 45 there?

2 MR. BROWN: CGG 45, I think.

3 COURTROOM DEPUTY CLERK: I don't. Is it admitted?

4 MR. BROWN: Yes. CGG 45, which is Mr. Barnes' edited  
5 memo to Blanchard.

6 And the only other thing I would add, Your Honor, is  
7 that --

8 THE COURT: So when she -- when this was sent,  
9 Exhibit 45, was the attachment the document on the right-hand  
10 side of my screen or is it a different one?

11 MR. BROWN: What you are looking at is the actual  
12 memo that was sent by James Barnes to Mr. Blanchard. And that  
13 is the actual memo.

14 The memo that is on Exhibit 41 is the draft memo that  
15 James Barnes sent to Deb Cox for her review. And that draft  
16 memo says CES also brought a new server because Ms. Hampton had  
17 changed the server password. And it is that sentence that Deb  
18 Cox recommends to Mr. Barnes to delete saying they took it but  
19 not because the password had changed.

20 THE COURT: Okay. Well, why don't we take a few  
21 minutes of a break, and I will take a look at these documents.

22 So I want to make sure I have the totality of the  
23 relevant ones to look at though.

24 MR. CROSS: Could I add one quick thing on this? It  
25 is also worth noting that this email is from Deb Cox, the

1 superintendent of the county. We have heard from numerous  
2 State witnesses that they rely on the counties for important  
3 things like security. So I don't think they can --

4 THE COURT: That's fine. But I want to read them.

5 MR. CROSS: Right.

6 MR. RUSSO: I would simply note that Deb Cox -- even  
7 if you look at her email here, it says Lowndes County on it.

8 THE COURT: I understand that it was Lowndes County.  
9 That wasn't a question. They were communicating between  
10 themselves.

11 But I'm looking at it. And is there -- I just want  
12 to make sure I have everything that is relevant to this so I'm  
13 not taking three minutes for no purpose.

14 Is there anything else that is relevant to this other  
15 than what you've handed me? I have 41, 42, and --

16 MR. BROWN: CGG 45.

17 THE COURT: Okay. That is what I was looking for.

18 MR. BROWN: Your Honor, that is the end of this  
19 topic. We're going to move on to one more topic.

20 THE COURT: I want to know what 45 is.

21 MR. BROWN: 45 is --

22 THE COURT: Does anyone have a copy they can provide  
23 me?

24 MR. BROWN: I do right here, Your Honor.

25 May I approach?

1 THE COURT: Yes.

2 I mean, do you want to ask your last question and  
3 I'll take a break? Or do you want me to go ahead and do this  
4 right this moment? This is not going to be a long break.  
5 Whichever way you want.

6 BY MR. BROWN:

7 Q. Mr. Skoglund, are Coalition Exhibits 41 and 42 the  
8 evidence that you were referring to with respect to additional  
9 evidence that Mr. Barnes' statement about the reasons for  
10 replacing the ICC and the EMS might be -- not be accurate?

11 A. Yes. That's correct.

12 MR. BROWN: That is it on that topic, Your Honor.

13 THE COURT: All right. And 45 has been -- has or has  
14 not been tendered before?

15 MR. BROWN: Your Honor --

16 MR. CROSS: It is in evidence, Your Honor.

17 THE COURT: That's what I'm trying to find out.

18 MR. BROWN: It is in evidence.

19 Caution, Mr. Martin, it may have been admitted with a  
20 duplicate number. I'm not sure if it is the same number, but  
21 the identical document I know has been admitted.

22 THE COURT: All right. Well, I'll get you to admit  
23 it again then -- seek its submission again so we make sure that  
24 we have it since we're referring to it now as 45.

25 I'll just be a few minutes. I just want to read it.

1 MR. BROWN: Thank you, Your Honor.

2 COURTROOM SECURITY OFFICER: Court stands in recess  
3 for a brief moment.

4 THE COURT: If anyone needs a restroom break, take it  
5 now.

6 **(A brief break was taken at 11:09 AM.)**

7 THE COURT: Have a seat.

8 Well, Ms. Cox's email is hearsay. But hearsay under  
9 703 is permissible for an expert to review and consider in his  
10 opinion of facts. But if the facts would otherwise be  
11 inadmissible, the proponent of the opinion may disclose them to  
12 the jury only if their probative value in helping the jury  
13 evaluate the opinions substantially outweighs their prejudicial  
14 effect.

15 Well, of course, we don't have a jury here. And the  
16 concerns about prejudice are not exactly the same.

17 In any event, I mean, I think that there is a --  
18 without respect to whether the information contained in Cox's  
19 email back to Mr. Barnes is accurate or not, it is clearly part  
20 of a chain of communications between him and -- between James  
21 Barnes and Ms. Cox. And you can see that in part by  
22 Mr. Barnes' -- the sequence of time in these emails.

23 So that he wrote her -- Ms. Cox a note. I don't have  
24 the email time. Though I think it is probably accessible to  
25 plaintiffs from printing off properly the documents. But it

1 says, Investigator Blanchard had asked me for a statement  
2 concerning the improper storage of election equipment files and  
3 other things I observed when I took office. Is this  
4 sufficient?

5 And then he gives -- writes a one-paragraph -- he  
6 sends her a one-paragraph statement, which is not, in fact, the  
7 one that he ultimately sent to -- that he sent later on.

8 So she then writes at 9:50 A.M. on August 24th that  
9 is clearly in response to his email, which -- and it is easier  
10 to see on Exhibit 42 the date of his original letter to her.

11 And that says August 24th, 9:14 A.M. And then she  
12 responds to him less than an hour later, really 20 minutes or  
13 so at 9:50 A.M. on August 24th with a letter we have that is in  
14 Exhibit 24.

15 And I think that sequence is sufficient. And we know  
16 that his letter was sent. Not Exhibit 41. The letter he sent  
17 to Mr. Barnes is -- I think has all the indicia of reliability  
18 and -- regarding the conditions of the equipment he found. And  
19 he has taken into account also the comments from his colleague  
20 running another -- the elections office in another county. I  
21 think that is all -- those are good indicia of reliability.

22 And so even if it is hearsay, it is admissible for  
23 Mr. Skoglund's consideration.

24 MR. BROWN: Thank you, Your Honor.

25 I will --

1           THE COURT: I don't think you admitted Exhibit 45  
2 before. But -- however -- and I don't know all the documents  
3 that were in 45. But in any event, it looks like the documents  
4 are there in 42. But you would have to -- you need to check  
5 it. I don't want to say that this replaces your tender of 45  
6 that was -- that you said later on you were going to hook up to  
7 it. But maybe 41 gives you -- gives the original -- what he  
8 originally wrote and sent to Ms. -- to Deb Cox.

9           MR. BROWN: Yes, Your Honor. We would move to admit  
10 41, which is James Barnes' email to Deb Cox, which encloses a  
11 draft of the memo to whom it may concern.

12           We would move to admit 42, which does two things.  
13 First, it puts a date on 41 and a time. And it also shows  
14 Ms. Cox's return email. So we would move those into admission.

15           And then Exhibit 45 may be a duplicate exhibit. But  
16 we believe it is admissible. And to be careful, we would like  
17 to go ahead and move that that also be admitted into evidence.

18           THE COURT: Because you think you used the word --  
19 the Number 45 in preceding examination so you just want to make  
20 sure that --

21           MR. BROWN: Yes. It is 45, but it is Coalition  
22 Plaintiffs' Exhibit 45.

23           THE COURT: All right.

24           MR. BROWN: Thank you, Your Honor.

25           THE COURT: Yes.



1 MR. RUSSO: Your Honor, we appreciate your decision  
2 on this. And we agree that hearsay can be used in certain  
3 circumstances under 703 in forming an opinion.

4 I think at the end of the day he has to still form an  
5 opinion. He can't just parrot the hearsay as his opinion. He  
6 has to use it to form an opinion.

7 THE COURT: I don't know that he is. He had so many  
8 objections before he actually said anything that I can't even  
9 get to the point of what his testimony was, other than the fact  
10 that he was mentioning what was in -- what he saw in -- he  
11 had -- the document is actually -- of course, the -- I guess  
12 the server that was given to -- a copy of the server that was  
13 given to you.

14 THE WITNESS: Correct.

15 THE COURT: And then -- or of that -- and that this  
16 is what he saw and he produced. And, of course, he -- he  
17 received the server via the counsel for the State.

18 MR. BROWN: Thank you, Your Honor.

19 We would --

20 THE COURT: But if you want to more specifically hook  
21 up his opinion to anything, then now you -- because of the time  
22 frame and the fact that we've been fussing over the testimony,  
23 I think we ought to get clear about what the testimony is that  
24 is linked -- that he's considered all of this in connection  
25 with.

1 BY MR. BROWN:

2 Q. Mr. Skoglund, over the course of your testimony, you were  
3 discussing your opinions on whether Mr. Barnes' rationale for  
4 picking up the ICC server and the EMS server was consistent  
5 with the evidence that you had reviewed.

6 You with me?

7 THE COURT: All right.

8 MR. RUSSO: Your Honor, if he's giving an opinion on  
9 whether the State's rationale was consistent, I don't -- that  
10 is -- he is not -- he is the cybersecurity expert. That has  
11 got nothing to do with being a cybersecurity expert. It is not  
12 expert testimony.

13 MR. BROWN: I'm not asking for any public policy  
14 position or any sort of social science rationale about the  
15 State. I'm asking the witness whether the reason -- if  
16 rationale is the wrong word, the reason given for picking up  
17 those two units from Coffee County three weeks after the Cyber  
18 Ninja incident can be explained, because as Mr. Barnes said the  
19 password is changed. I'm getting his opinion on that.

20 THE COURT: I think that that is a little bit -- that  
21 is stretching things. If you want to use -- I think there are  
22 things you can ask him about this that are helpful to the Court  
23 without asking that question, which is -- sort of asks for him  
24 to assess the credibility.

25 But, I mean, you can obviously elicit anything that

1 may be contradictory to him personally as he is looking at the  
2 sequence of things. He has already testified that anyone -- it  
3 is standard to be able to change passwords. He explained all  
4 of that. And so -- and that that is a common feature of any IT  
5 department or any -- anyone who is working with software or  
6 hardware, in fact.

7 But that is -- that is something different. So, I  
8 mean, I've let it in. But I think that you need to hook up --  
9 you need to think about how -- which you have already obviously  
10 plenty of time to do. But think about what is it you want him  
11 to testify about.

12 I mean, he had -- he receives this disc. And you're  
13 looking through it. And then go from there. I mean, what  
14 strikes him, but without making a credibility assessment about  
15 the State. I can draw that.

16 MR. BROWN: Sure.

17 BY MR. BROWN:

18 **Q.** Mr. Skoglund, when you received the disc from defense  
19 counsel, which they had received from the GBI, did you  
20 undertake to search that disc drive for information that was  
21 relevant to Coffee County?

22 **A.** So the -- when you say the drive, you are referring to the  
23 subsequent images of EMS and ICC?

24 **Q.** No. I'm talking about from the GBI.

25 **A.** Oh, sorry. The desktop computer is how I refer to it.

1 The desktop computer. GBI took that image. Then yes, I was  
2 interested to find out -- that was not a computer that was  
3 copied by SullivanStrickler. That was not data that I had seen  
4 before.

5 So it was the computer, as I understood it, from the  
6 Coffee County elections office that was used by Misty Hampton,  
7 James Barnes, and his successor in their daily activities. And  
8 so I was keenly interested to see how that linked up with the  
9 other evidence that was on the other drives and data that I did  
10 have.

11 **Q.** And it was in the context of that that you found the Deb  
12 Cox exchange with James Barnes?

13 **A.** Yes. By searching through the emails and looking for  
14 relevant material.

15 **Q.** Okay.

16 MR. BROWN: Your Honor, I think we've -- I think  
17 we've covered this in terms of how we believe the evidence  
18 lines up on this issue.

19 THE COURT: All right. Fine. Thank you.

20 MR. BROWN: I'll move on.

21 BY MR. BROWN:

22 **Q.** Mr. Skoglund, have you reviewed Gabriel Sterling's  
23 testimony from this case from last week?

24 **A.** Yes, I have.

25 **Q.** Do you recall his testimony about an incident in

1 Northampton this past November election?

2 **A.** Yes, I do.

3 **Q.** And I believe Northampton is the same county that you  
4 testified about in -- your testimony might have been in 2020.  
5 But there was another incident in Northampton in 2019.

6 Do you recall that testimony?

7 **A.** That's correct.

8 **Q.** Now, are you familiar with the incident this year or in  
9 November in Northampton?

10 **A.** Yes.

11 **Q.** And how did you become knowledgeable about that?

12 **A.** So as I testified earlier, I'm in Montgomery County,  
13 Pennsylvania. That is near Philadelphia. It is -- another  
14 county that is near Philadelphia is Northampton County. So it  
15 is not quite a neighbor, but it is in the region.

16 And I am the president of a group called Citizens for  
17 Better Elections, which is a nonpartisan nonprofit that is  
18 interested in elections primarily in Pennsylvania.

19 And several of our members of Citizens for Better  
20 Elections reside in Northampton. So it is very much a county  
21 that we focus on and pay attention to.

22 And then, you know, it also is a particular interest  
23 because when Northampton was deciding what voting system to  
24 purchase, I went and consulted with members of the Government  
25 there.

1           And then when the first incident happened in 2019, I, you  
2     know, paid a lot of attention to that and analyzed what was  
3     happening then. And then again when this incident happened, it  
4     seemed like, okay, this is once again happening.

5           And I am an election technology expert. I am interested  
6     in anytime technology, you know, behaves in a surprising way  
7     for elections.

8     **Q.**   Mr. Skoglund, have you written up anything on the incident  
9     in Northampton County in November 2023?

10    **A.**   Yes, I wrote up a report on what happened.

11    **Q.**   I'm going to show you what has been marked as Coalition  
12    Plaintiffs' Exhibit 40.

13           Mr. Skoglund, is Exhibit 40 a copy of your article on  
14    election problems in Northampton County, Pennsylvania?

15    **A.**   Yes.

16    **Q.**   And I don't -- it is a long article. And I have no  
17    intention of going through --

18           MR. BROWN: Well, first, I move to admit this as the  
19    witness' article on Northampton County.

20           MR. RUSSO: Your Honor, I guess -- I mean, this is a  
21    2020 -- November 2023 article. It was written well past the  
22    expert disclosure deadline. I don't know, you know, what the  
23    tie is here to expert testimony other than to try to bolster  
24    the expert's testimony.

25           But we don't think it is relevant to the issues in

1 this case.

2 MR. BROWN: Couple of things. One, it is not to  
3 bolster his credentials. He has a lot of other publications,  
4 and he's already been acknowledged as an expert.

5 In terms of the date, it is dated -- it is dated  
6 recently because it just happened in the most recent election.

7 In terms of whether this is within the scope of his  
8 expert testimony, the door to the Northampton issue was opened  
9 by Gabe Sterling in his direct testimony. He volunteered it as  
10 an example. We didn't even bring it up.

11 THE COURT: Remind me what he was saying as to  
12 Northampton.

13 MR. BROWN: I will get to that in the examination  
14 with Mr. -- I can do it also, but Mr. Skoglund --

15 THE COURT: I just want you to remind me so I can  
16 understand the significance or lack of significance of it.  
17 Just the basic facts, not --

18 MR. BROWN: In Northampton the vote was switched  
19 between judges on a retention ballot that way --

20 THE COURT: I remember. All right.

21 MR. BROWN: And -- so he opened the door. And then  
22 it was discussed at length by Mr. Sterling sua sponte. So  
23 we're responding to -- it is relevant generally. It just  
24 happened. So it is not in previous declarations.

25 However, as Mr. Skoglund testified, he has been

1 tracking Northampton. And his first -- the first incident in  
2 Northampton is in the record. It is one of his declarations,  
3 and it is a part of his expert testimony. This is just  
4 updating it.

5 MR. RUSSO: Your Honor, if this is a supplement to an  
6 expert report, then he needed to supplement his expert  
7 testimony.

8 THE COURT: Why doesn't he just testify about it and  
9 not use the article? I mean, you know, he has indicated he has  
10 written an article on it. And that is fine.

11 But what we want to know is what he thinks is  
12 significant about it in light of his evaluation -- this case,  
13 the testimony so far by him, as well as by Mr. Sterling.

14 MR. BROWN: Fair enough, Your Honor. We will put the  
15 article to the side and get the information from the witness.

16 THE COURT: All right.

17 BY MR. BROWN:

18 Q. Now, you heard Mr. Sterling's testimony. Did he get the  
19 facts right about what happened in Northampton, Pennsylvania,  
20 in November?

21 A. He may have got a couple of facts right, but he got many  
22 facts wrong.

23 Q. What did he get wrong?

24 A. For example, I recall being very surprised when he said  
25 that he -- his understanding was that Northampton knew about



1 this problem ahead of election day and proceeded anyway. That  
2 was very surprising to me. That is not true.

3 **Q.** And just in general, what -- he did describe generally  
4 what happened correctly; right?

5 And could you explain -- just remind the Court what the  
6 basic problem was that caused the incident in Northampton.

7 **A.** So the incident in Northampton was that ballot programming  
8 problems -- when the ballots were programmed to be suitable for  
9 the -- for the ballot-marking device, had a mistake in them.  
10 And that mistake -- the result of that mistake was that voters  
11 casting their ballots in the election would mark one thing on  
12 the screen and then the ballot that would be printed out by the  
13 ballot-marking device showed text that was not what they had  
14 selected on the screen. It was changed.

15 **Q.** As a judge of elections, did the judge of elections in  
16 Northampton County have any good options at that time?

17 **A.** No. And I would note not all judge of elections realized  
18 that there was a problem. You know, some polling places  
19 notified the county that they saw it. But other judges of  
20 elections did not hear about it until the county told them  
21 about it. They didn't know about it until then.

22 **Q.** But if you are in the position of Northampton and you  
23 learn that a BMD is making that mistake, what should an  
24 election director do or what can they do?

25 **A.** Well, we saw what they did do. Some let voters continue

1 voting because they didn't know about the problem or because  
2 they didn't know what else to do. Some stopped voters from  
3 voting. Some closed their polling place and told voters to  
4 come back later.

5 Some of them told -- since they were voting one way and  
6 getting a different result on the paper and the judge of  
7 election had some sense that what was on the paper that the  
8 voter could read mattered, they would tell voters to vote the  
9 opposite way on the screen so that they could then get the  
10 paper to be right, to sort of try to work around the problem  
11 that way.

12 **Q.** And Mr. Sterling mentioned that he -- if presented in the  
13 same situation he would replace all the BMDs or not use the  
14 BMDs that were malfunctioning.

15 Is that a realistic solution, in your view?

16 **A.** I recall his testimony being that he would pull a  
17 ballot-marking device from service.

18 This was all the ballot-marking devices in the entire  
19 county. So if you pulled them all from service, then, you  
20 know, essentially you have shut down the election until you  
21 solve the problem.

22 **Q.** Mr. Sterling also testified that the same thing could  
23 happen with the hand-marked paper ballot and in terms of the  
24 chaos and the aftermath of discovering the problem.

25 Could this sort of problem happen with a voting system

1 that primarily uses hand-marked paper ballots?

2 MR. RUSSO: Your Honor, I think this is outside the  
3 scope of his expert testimony. He is a cybersecurity expert,  
4 not an election administration expert. You know, I've tried to  
5 kind of let it go --

6 THE COURT: All right. I'm going to say you should  
7 move on.

8 MR. BROWN: Okay.

9 BY MR. BROWN:

10 Q. One more topic, Mr. Skoglund, and it is about the EMS  
11 server.

12 You testified -- again, you testified that you had  
13 reviewed a copy of the EMS server that the Secretary of State  
14 had obtained from Coffee County.

15 Are you with me?

16 A. Yes. Two images, one that they obtained and one that the  
17 plaintiffs obtained.

18 Q. And I believe that Mr. Persinger -- did he make a copy?

19 A. That is the first one -- the State obtained, that was a  
20 forensic image made by Mr. Persinger.

21 Q. And did -- were you able to determine whether when he  
22 booted up the EMS any files were lost or destroyed?

23 A. Yes, I was.

24 Q. And what was your -- what was your -- what did you find?

25 A. So when you conduct a -- when you make a forensic image,

1 it has to be done carefully because the purpose of doing it is  
2 to preserve the hard drive exactly as it is. And if you take  
3 certain actions, like booting it up, then you change it.

4 Because booting it up, you know, runs through a set of  
5 processes on the machine. And if nothing else, it generates  
6 log files and erases old log files. But, you know, it can make  
7 other changes as well. So it has to be done carefully.

8 And both with Mr. Persinger and even with  
9 SullivanStrickler, we saw that they made mistakes in the way  
10 that they were doing that, which modified those drives in the  
11 process. They did not, you know -- sorry, SullivanStrickler,  
12 they did it for one computer. They made a mistake like that.  
13 For the other ones, they appeared to have done it without  
14 disturbing the evidence. So there is no evidence that they did  
15 disturb it.

16 But for Mr. Persinger, yes, it appears that his activity  
17 in trying to boot up the system and then to reset the password  
18 on the system made many changes.

19 **Q.** And do you know about how many changes or files were lost?

20 Do you know how many changes were made or how many files  
21 were lost?

22 **A.** I do not know as I sit here. I submitted a declaration on  
23 this point where I enumerated all of the changes that I  
24 observed.

25 MR. BROWN: Your Honor, let me speak --

1 THE COURT: Are you introducing that --

2 MR. BROWN: No, Your Honor.

3 THE COURT: -- declaration?

4 MR. BROWN: Not at this time, Your Honor, no.

5 THE COURT: All right. So what is the range? Are we  
6 talking about, just for the record, two, five, a thousand, two  
7 thousand? A hundred? What is the range?

8 THE WITNESS: As I sit here, I believe it was  
9 hundreds. I don't think it was thousands, but it also wasn't a  
10 small number.

11 MR. BROWN: Your Honor, I may have a couple more  
12 questions. But I'm about done. I just need to check with  
13 counsel.

14 THE COURT: Okay.

15 **(There was a brief pause in the proceedings.)**

16 MR. BROWN: That's all I have at this time, Your  
17 Honor.

18 Thank you.

19 THE COURT: I just want -- was the data changed in  
20 those hundreds of files or were you able to determine or were  
21 they just simply destroyed and lost, the change -- or were  
22 they -- what is the nature of the types of changes you  
23 observed?

24 THE WITNESS: The -- it is both. Files being added,  
25 files being removed, and files being changed. All three of

1 those categories.

2 THE COURT: Thank you.

3 CROSS-EXAMINATION

4 BY MR. RUSSO:

5 Q. Good afternoon, Mr. Skoglund. It is nice to see you.

6 A. Nice to see you.

7 Q. It's the first time we've had the pleasure of meeting.

8 And I'm sorry that you've had to be here for so many days. And  
9 I guess, unfortunately, the weather is not any warmer here  
10 probably than it is where you are from.

11 A. It is not. But the food is good here.

12 Q. I do want to ask you a couple of questions as we start  
13 about where you just left off regarding the imaging and your  
14 review of this.

15 Now, you previously testified that you were not an expert  
16 in computer forensics; is that correct?

17 A. I did not testify that -- I don't remember testifying to  
18 that.

19 Q. Now, do you recall the date that the Secretary of State's  
20 office took possession of the Coffee County --

21 THE COURT: Could you just move it -- thank you -- so  
22 we can hear you better.

23 BY MR. RUSSO:

24 Q. -- Coffee County servers.

25 MR. RUSSO: Sorry, I'll speak louder.

1 BY MR. RUSSO:

2 Q. Do you recall the date that the Secretary of State's  
3 office took possession of the Coffee County servers?

4 A. Yes, I do.

5 Q. And can you tell us, who is -- who is RDT? You mentioned  
6 a company called RDT earlier.

7 What is that company?

8 A. I don't believe I mentioned them by name. I think I  
9 described them as someone hired by the plaintiffs.

10 But that is the name of the company that the plaintiffs  
11 used to make a forensic image of the ICC and the EMS that were  
12 in the State's possession.

13 Q. Okay. And have you -- do you have any experience with  
14 that company from any other work?

15 A. I do not.

16 Q. Now, you stated -- and I'll go ahead and just show you  
17 your declaration to make this a little easier on us all.

18 **(There was a brief pause in the proceedings.)**

19 BY MR. RUSSO:

20 Q. I'm just going to show -- I'm just showing it to you. I'm  
21 not admitting it.

22 And if we can turn to Paragraph 5 on Page 2. You state  
23 that -- thank you.

24 You state that RDT was engaged to create forensic images  
25 of the EMS and ICC in PMI's possession.

1 At the bottom, second sentence.

2 **A.** Was there a question?

3 **Q.** That was your understanding that RDT was engaged to create  
4 forensic images?

5 **A.** Yes. That's correct.

6 **Q.** And to the best of your knowledge, did -- do you know who  
7 did that work for RDT?

8 **A.** I have no firsthand knowledge. But I have been told that  
9 it was Rob Draper, I believe that is the R and D in RDT.

10 **Q.** And do you have any understanding of what forensic  
11 software RDT used to create those images?

12 **A.** I do not.

13 MR. CROSS: Your Honor, could I ask the relevance?

14 MR. RUSSO: Well, I was kind of wondering the  
15 relevance of it myself when Mr. Brown was bringing it up  
16 because it seemed to me to be more of a discovery issue than an  
17 issue in this case.

18 But since Mr. Brown raised it and it appeared to be  
19 going to the credibility of the State, I felt like it was  
20 necessary to ask some questions about Mr. Skoglund's work and  
21 his testimony.

22 MR. CROSS: My understanding --

23 MR. RUSSO: I'm happy to move on if Your Honor is not  
24 going to consider that.

25 MR. CROSS: My understanding of what Mr. Brown was



1 asking about was just to establish that the original EMS server  
2 the State took from Coffee County -- that there were hundreds  
3 of files that were deleted or altered or added by their  
4 forensic consultant when he booted it up.

5 What Mr. Russo is getting into is something totally  
6 unrelated, which is an e-discovery vendor we hired to just come  
7 in and copy the two servers.

8 And again, I mean, we will address this later when we  
9 get to Mr. Persinger's issues. But there's actually no dispute  
10 in this case that that happened on the original server. There  
11 is a dispute about whether some of those files may be reflected  
12 on a copy. But no one disputes that that is what happened on  
13 the original server.

14 MR. RUSSO: Well, there is a dispute, Your Honor.  
15 And I think his declaration shows that the copy he got -- he  
16 received that was supposedly the Persinger copy, he couldn't  
17 open. And he got a separate copy from Dr. Halderman that was  
18 sent to him over a secure network.

19 So there is a question here as to what was he looking  
20 at.

21 THE COURT: Go ahead.

22 MR. RUSSO: And was he looking at what Dr. --

23 THE COURT: Go ahead.

24 But do you agree -- I mean, putting aside what he was  
25 looking at, objectively speaking, did -- did the copy created

1 by Mr. Persinger delete or change files?

2 MR. RUSSO: I think we will have to have  
3 Mr. Persinger testify to that. I am not a forensic expert. I  
4 will tell you that.

5 THE COURT: Is he on your witness list?

6 MR. RUSSO: He is on our witness list.

7 THE COURT: Okay.

8 BY MR. RUSSO:

9 Q. So just to confirm, you were not able to access,  
10 Mr. Skoglund, the image that you originally received of  
11 Mr. Persinger's copy?

12 A. I'm sorry?

13 Q. The forensic image that Mr. Persinger created, you had --  
14 I think you said there was BitLocker on it?

15 A. So -- sorry. You're asking if whether initially when I  
16 was given the image that Mr. Persinger had whether I was able  
17 to access it. And no, I was not. It had a password on the  
18 image -- on the drive, not on the image on the drive itself, so  
19 that no information could be accessed on it. And that is what  
20 we referred to as BitLocker. That is a technology that allows  
21 you to encrypt data at rest.

22 Q. What was your understanding of how many copies  
23 Mr. Persinger had transmitted to plaintiffs' consultant to  
24 begin with?

25 A. I don't know that I know that number.

1 Q. You know Dr. Halderman got one copy; correct?

2 A. Correct.

3 Q. And it was your understanding that his copy did not have a  
4 password protection on it?

5 A. Correct.

6 Q. And so then after you could not access the version you  
7 received, what did you do?

8 A. When I couldn't -- first, I reached out to the plaintiffs'  
9 counsel and let them know that I could not access it. My  
10 recollection is that then they reached back out to the  
11 State's counsel and said, there is a password on this drive.  
12 What is it?

13 I think they may have also reached out to RDT as well.

14 I then was told that the State reached out to  
15 Mr. Persinger who said that they -- he had not put any password  
16 on the drive. That was relayed back then through counsel to  
17 me.

18 I then sent screenshots showing that the drive was, in  
19 fact, encrypted with BitLocker software. And I was not able to  
20 access it.

21 I think then it went back through counsel and sort of hit  
22 an impasse. I reached out then through counsel to Alex  
23 Halderman -- Dr. Alex Halderman. And he said he told them that  
24 his copy did not have a password on the hard drive and he was  
25 able to get the image.

1           And so then we arranged for him to send me the forensic  
2 image that he had through a secure transmission over the  
3 internet.

4   **Q.**   Were you ever able to determine who created the copy you  
5 received?

6   **A.**   No, I could not do anything with the drive. When you plug  
7 it in, the first thing that pops up is a password screen and  
8 you can't proceed any further.

9           So I know nothing about it, except that it was locked with  
10 a password.

11   **Q.**   So you never reviewed the version that you received --  
12 that you believe you received from Mr. Persinger?

13   **A.**   For that -- for one specific one. For the other one --  
14 there were two images from Mr. Persinger. It is confusing  
15 because there's so many. But there were ICC and EMS. ICC and  
16 EMS from Persinger. ICC and EMS from the plaintiffs'  
17 contractor.

18           One of the two from Mr. Persinger I could not open.

19           THE COURT: Which --

20           MR. RUSSO: I think you were about to ask the  
21 question.

22   BY MR. RUSSO:

23   **Q.**   Which one was it?

24   **A.**   I don't recall now which one it was. That's --

25   **Q.**   The EMS --

1     **A.**    It is in my declaration.  But I don't recall which one it  
2     was.

3               THE COURT:  Have you been given a copy of your  
4     declaration?

5               MR. RUSSO:  I was just trying to show him to refresh  
6     his memory, Your Honor, on the screen.  We're not planning to  
7     submit that.

8               THE COURT:  I'm just wondering -- I would like to  
9     know which one it was.

10              MR. RUSSO:  I can direct --

11              THE COURT:  Which one was he actually able to access  
12     and which one was he not able to access that Mr. Persinger gave  
13     him?

14              MR. RUSSO:  I believe it was the EMS image.  But I'll  
15     let -- I will tell you this is not a topic we were planning to  
16     engage in today, so that's why we're a little disheveled.

17              THE COURT:  That's all right.

18              It is in the same one that is on the screen?

19              MR. RUSSO:  It is.  If you want to just scroll down  
20     to the next page.

21              THE COURT:  I'm sure you could find it if you --

22              MR. RUSSO:  It appears it says -- if you look at  
23     Paragraph 7.

24              May I approach, Your Honor?

25              THE COURT:  I'm reading it on the screen.

1 Can you go to Page 3?

2 THE WITNESS: This refreshes my memory if you would  
3 like to --

4 BY MR. RUSSO:

5 Q. Would you like to tell us which one it was now.

6 A. So I was incorrect. It was actually both images. They  
7 were on a single hard drive. It wasn't on separate hard  
8 drives. There was another hard drive. So I had one hard drive  
9 that worked, one hard drive that didn't.

10 And I was -- I misspoke when I said that they were  
11 separate for Mr. Persinger. So both of Mr. Persinger's  
12 weren't.

13 But I spoke about hash validation earlier. You can check  
14 the hashes to make sure they match what Mr. Persinger had to  
15 make sure that the data has not been altered.

16 Q. Just to be clear, when you say the one you received from  
17 Mr. Persinger, that is -- you are referring to the one you  
18 received from RDT?

19 A. The one that was given to me by plaintiffs' counsel that  
20 they represented had been made by RDT.

21 Q. Okay. You didn't -- you didn't receive it directly from  
22 Mr. Persinger?

23 A. No, I have never met him.

24 Q. Moving on.

25 It is your opinion that the idea of a perfectly secure --

1 a perfectly secure voting system that relies on computers is  
2 not one that from a cybersecurity perspective exists?

3 **A.** I think that fundamentally misunderstands the field of  
4 cybersecurity. That is -- that is not how we approach it at  
5 all.

6 **Q.** How do you -- tell us how you would approach that then.

7 **A.** Well, we don't think of things as being secure and  
8 insecure. I mean, just like you wouldn't think of your house  
9 of being secure or insecure. There is no perfectly secure bank  
10 vault. So it is not useful to talk about something being  
11 secure or being insecure.

12 Instead, the analysis that you do is a risk analysis where  
13 you look at the threats and the things that could do harm to  
14 whatever you are trying to protect.

15 In this case, parts of the voting system. And then you  
16 look at the potential that those threats would be realized.  
17 You look at what the impact of those threats would be if they  
18 are realized. And then you -- you have a whole bunch of  
19 threats at that point. You then have to weigh them against  
20 each other to decide the priority in which you want to focus on  
21 them.

22 So there may be some threats that you consider higher  
23 priority and you sort of put top of your list. There may be  
24 other threats that you view as improbable and not worth the  
25 time and resources on them. It is really -- it is a full

1 analysis rather than a yes-or-no binary question.

2 **Q.** And did you do -- did you do any of that type of analysis  
3 in forming your opinions in this case?

4 **A.** Yes. Constantly. Yes.

5 **Q.** And so tell us a little bit more about that. How did you  
6 determine the risk level -- I think Dr. Halderman referred to  
7 it as degrees of risk is what he said that he would look at.

8 How did you determine and measure the risk that -- you  
9 know, the likelihood of a threat occurring?

10 **A.** I mean, that is really broad. Do you -- do you have a  
11 specific threat in mind that you are --

12 **Q.** Well, I guess what I am trying to understand is --  
13 because -- since we didn't see any such risk analysis, is what  
14 analysis you actually did to assess whether the likelihood of a  
15 threat was to occur?

16 Can you just walk us through that process?

17 **A.** I mean, I wasn't -- I have never been asked to -- to  
18 evaluate Georgia's entire voting system and all the threats the  
19 way that Fortalice, you know, was hired to do.

20 That is not -- that is not something that I have been  
21 asked to do.

22 I do routinely -- I mean, that is -- daily I am making  
23 that evaluation. I think that the place that you see it  
24 probably most clearly, if you're saying you don't see it, is in  
25 the Coffee County declaration where I do perform an analysis



1 and do talk about whether this was unauthorized access, what  
2 are the potential harms that can come from that access, how  
3 this event increased the likelihood of all of those harms  
4 coming to life.

5 I talked about the -- what I viewed as the impact of those  
6 realized harms. And, you know, concluded that this is a  
7 significant concern with very high risks and that Georgia  
8 should move expeditiously to mitigate them.

9 **Q.** And since you mentioned your Coffee County declaration, I  
10 think we can -- that might be a good point to look at.

11 It is plaintiffs -- I believe it is Curling Plaintiffs'  
12 Exhibit 471.

13 **MR. RUSSO:** May I approach, Your Honor?

14 **THE COURT:** Yes. Thank you.

15 **THE WITNESS:** I have never seen it printed before.  
16 It is quite thick.

17 **BY MR. RUSSO:**

18 **Q.** Now, is -- this is the declaration you are referring to?

19 **A.** I mean, I haven't looked at all of the pages. But based  
20 on the first page, yes, this is my declaration related to  
21 Coffee County. And it was 79 pages long.

22 **Q.** A lot of ink went into it; right?

23 Now, I'm trying to -- remind me which -- what was the  
24 example you just gave of one of your assessments?

25 **MR. BROWN:** I'm sorry. I didn't hear or understand

1 the question.

2 MR. RUSSO: I'm sorry. I'm trying to find my copy.

3 THE COURT: He said what is the --

4 BY MR. RUSSO:

5 Q. Mr. Skoglund, let's walk -- walk us through your --

6 MR. RUSSO: I'm just going to use this one. This is  
7 fine.

8 BY MR. RUSSO:

9 Q. Page -- on Page 3 you go through a summary of your  
10 conclusions; is that right?

11 A. Yes. Page 3 is where the summary of conclusions begins.

12 Q. And you state that the system was breached; is that --  
13 that's right?

14 A. Correct. In A.

15 Q. And so your risk analysis that you conducted determined  
16 that -- well, you didn't determine anything there. But did you  
17 make a determination about future breaches?

18 A. I'm sorry?

19 Q. You assessed future breaches. So you determined that a  
20 breach occurred in Coffee County.

21 Did you do any assessment regarding potential future  
22 breaches similar to that in Coffee County?

23 A. Yes. I do talk about that in the implication section.

24 Q. Okay. And I guess that is a little different than what  
25 I'm asking.

1           What I'm asking is: Did you do any assessment of the  
2           likelihood that a future breach would occur? Not the impact  
3           from that breach.

4           MR. BROWN: Your Honor, I don't understand the  
5           question, the likelihood it is related to impact. He is asking  
6           either/or. And it just doesn't make sense.

7           MR. RUSSO: It was his testimony that when he  
8           conducts a risk analysis he looks at the likelihood of the  
9           threat occurring.

10          BY MR. RUSSO:

11          **Q.** So what I'm asking is: When you reviewed this, did you  
12          conduct an assessment of the likelihood of a future breach  
13          occurring similar to that in Coffee County?

14          **A.** Yes, I did. I determined that the likelihood had  
15          increased as a result of this.

16          **Q.** So what was -- I guess I'm still trying to understand.  
17                Was there a quantification that you applied to it? Did  
18          you quantify that? What was the -- what was the starting  
19          point?

20               That is really what I'm trying to understand is, what was  
21          your methodology behind walking -- behind coming up with these  
22          opinions.

23          **A.** Well, as Dr. Halderman testified, we don't -- we don't  
24          typically put a number on it, a percentage that you are now  
25          five percent more, you know, risk -- your risks have risen by

1 five percent.

2 In the same way if your house -- if you left the back door  
3 unlocked, how much have you increased the percentage of being  
4 robbed? You don't. It doesn't work that way.

5 So instead you can say, well, clearly you left your back  
6 door unlocked when you went on vacation, you have increased the  
7 risks.

8 So I think that's more useful than trying to put some kind  
9 of a numeric score on it.

10 **Q.** So do you have a -- well, did you look at what the risk  
11 level was prior to the Coffee County incident?

12 **A.** The risk level, as I understood it, prior to the Coffee  
13 County incident, was that Georgia's election software was not  
14 being distributed to a dozen or more individuals on the  
15 internet. So that was my understanding.

16 After my evaluation here, I determined that that is the  
17 case, and I think that the risk level increased significantly.

18 **Q.** Okay. So you did not have a baseline risk level? That is  
19 what I'm trying to understand.

20 **A.** I just described the baseline risk level.

21 **Q.** Well, you said it increased. I guess what I'm trying to  
22 understand is: Did you -- we're looking at the system, where  
23 was it prior to and where is it today?

24 **THE COURT:** Well, as I understand it, what you're  
25 answering is, relative to the -- linking the software available

1 to others, it went from -- you didn't know whether it had been  
2 distributed before necessarily, but you could see affirmatively  
3 now it had been distributed in a way that made it more --  
4 significantly more accessible. Is that your testimony? Am  
5 I --

6 THE WITNESS: That is my testimony.

7 THE COURT: -- understanding it?

8 BY MR. RUSSO:

9 Q. And --

10 THE COURT: And when you've mentioned the 12, that  
11 doesn't include, obviously, the Cyber Ninja individuals who  
12 were making it accessible to more people, or does it?

13 THE WITNESS: I can offer a longer answer on that.

14 So what I observed in the evidence is that  
15 approximately 12 people received it. I've since heard of other  
16 people who have received it. But I don't -- I'm not aware of  
17 other evidence that it has been spread to other people.

18 THE COURT: All right. That wasn't my question.

19 THE WITNESS: I'm sorry.

20 THE COURT: Did your 12 include Doug Logan and his  
21 partner or did the 12 --

22 THE WITNESS: Yes, it did. They are in that list,  
23 yes. Yes.

24 THE COURT: All right.

25 THE WITNESS: And my declaration enumerates the full

1 list of people in the summary. It is right there, I think, on  
2 Page 4.

3 THE COURT: Okay. Thank you.

4 THE WITNESS: 4 or 5.

5 BY MR. RUSSO:

6 Q. And let's see. Looking at Page, I guess, 9 --  
7 Subsection 9(h).

8 A. I'm sorry, 9(h)?

9 Q. 9(h).

10 A. Give me one moment.

11 Q. So it is your opinion that the access controls to protect  
12 election hardware and software were insufficient; is that  
13 right?

14 A. Yes. I said that they were obviously insufficient.  
15 This -- Coffee County shows that.

16 Q. And in terms of physical security, did you -- did you  
17 consider -- did you consider anything around physical security?

18 A. Yes. That's mentioned in my declaration as well.

19 Q. And you mentioned maybe that having two locks with -- or  
20 multiple keys; is that right?

21 A. To protect against insider threats. A common thing is to  
22 require two people to open a door that is meant to be kept  
23 secure.

24 Q. And you said you reviewed James Barnes' testimony;  
25 correct? You attended his deposition?

1     **A.**   Both.  I reviewed his testimony and attended his  
2     deposition.

3     **Q.**   And did you understand his testimony to be that when he  
4     came in as election superintendent there was such a two-key  
5     system with multiple locks?

6     **A.**   I don't recall that testimony.

7     **Q.**   Now, you're not giving an opinion on whether the laws in  
8     Georgia regarding physical security of voting equipment are  
9     sufficient; correct?

10    **A.**   No.  I haven't done that analysis for what the law --  
11    whether the law is -- has the right scope.

12    **Q.**   And you agree, though, that insider threats are a common  
13    security challenge; right?

14    **A.**   Yes.

15    **Q.**   And you agree that insiders facilitated the events in  
16    Coffee County; is that right?

17    **A.**   Yes.

18    **Q.**   And it is true that election insiders can facilitate  
19    unauthorized access to all kinds of equipment that they have,  
20    right, to whatever equipment --

21    **A.**   I'm sorry.  Can you repeat that question?

22    **Q.**   It is true that election insiders can facilitate  
23    unauthorized access to the election equipment?

24    **A.**   Is that different than the question I just answered?

25    **Q.**   I think it was a little bit different.

1           The -- but I'll move on.

2           So the insiders themselves can conduct the actions to  
3 allow this unauthorized access to occur; correct?

4     **A.**    Yes.

5           Is that different -- it sounds like the same question  
6 again.

7     **Q.**    It is a little bit different because one is where the  
8 insiders are actually doing it. The other is where they are  
9 allowing third parties to do it.

10    **A.**    Yes.

11    **Q.**    So regardless of whether -- well, strike that.

12           And you agree that the county election officials in Coffee  
13 County were responsible for their equipment?

14                   MR. BROWN: Object. That calls for a legal  
15 conclusion, Your Honor.

16    BY MR. RUSSO:

17    **Q.**    Well, you would agree that -- did you hear any testimony  
18 in all of the depositions or did you see any evidence of the  
19 Secretary of State's office authorizing the access in Coffee  
20 County?

21    **A.**    No. In my declaration, I talk about the authorization and  
22 walk through, and the conclusion is that I conclude there was  
23 no authorized access. And that includes the Secretary of  
24 State.

25    **Q.**    And you concluded also that the -- there is an illusion of



1 authorization; is that right?

2 **A.** I don't know if I would say it quite that way. But I do  
3 use that phrase. I think that the presence of Misty Hampton  
4 and Eric Chaney as, you know, legitimate employees or personnel  
5 in the election office, I think based on the different  
6 depositions and the reasons that people cited why they believed  
7 they had authorization -- I believe that created an illusion  
8 that there was authorization.

9 **Q.** And if you flip with me to Paragraph 141 -- 147.

10 **A.** I'm sorry?

11 **Q.** 147.

12 **A.** What page is this?

13 **Q.** Page 51. Well, the ECF is 52 of 80, if you're looking at  
14 the top of the page.

15 **A.** And what number?

16 **Q.** 47 [sic].

17 So you mentioned Eric Chaney and Misty Hampton and several  
18 attorneys.

19 Who were the others that you mentioned in Subpart 4 in the  
20 paragraph?

21 THE COURT: So it is 147, not 47, that you're  
22 referencing?

23 MR. RUSSO: 147. Yes, ma'am.

24 THE WITNESS: You're interested in only 147,  
25 Subpart 4?

1 BY MR. RUSSO:

2 Q. Well, I mean, I was interested in the whole thing, but I  
3 think you answered some of it already that -- I believe you  
4 testified that legitimate authorization, there was -- well,  
5 there was none. And that there was an illusion of  
6 authorization; correct?

7 And you stated who gave this illusion of authorization.  
8 And then you named Mr. Chaney and Ms. Hampton. And then are  
9 these -- these are their attorneys I think -- are these their  
10 attorneys you are referencing?

11 A. I don't know what their relationship is. These are  
12 attorneys who were involved and were in the evidence.

13 Q. Were in the what? I'm sorry.

14 A. In the evidence that I reviewed --

15 Q. Okay. And that was --

16 A. -- those were attorneys that were --

17 Q. -- depositions -- I'm sorry, go ahead. I didn't mean to  
18 cut you off.

19 That was in depositions that you reviewed?

20 A. In -- no. Emails, text messages, documents, and the  
21 depositions. All.

22 Q. So then in Paragraph 4, you mentioned other willing  
23 credulous participants.

24 Who are you -- do you recall who you are referring to  
25 there?

1     **A.**    I'm referring to pretty much all of the participants in  
2     those events who are not listed there already.

3            So SullivanStrickler would be an example of someone who  
4     was a willing and credulous participant.  They didn't ask  
5     questions.

6     **Q.**    Would it be your opinion that anybody who coordinated  
7     with, say, Mr. Chaney would fall into that group?

8     **A.**    I'm sorry.  I'm not sure of your question.  Anybody who  
9     coordinated with Mr. Chaney for what purpose?

10    **Q.**    For purposes of Coffee County, the Coffee County review.

11    **A.**    I'm sorry.  I'm still not understanding -- anyone who --

12    **Q.**    I'm trying to -- I guess what I'm trying to really do is  
13    get an idea of who all these other credulous participants and  
14    what the full scope of this lack of authorization ultimately --

15    **A.**    I can only speak to the words that I wrote.  And when I  
16    wrote them, I was intending to refer to the many other  
17    individuals that I had named that were involved in those three  
18    breaches in Coffee County and that they were the willing and  
19    credulous participants.

20            I don't know about hypotheticals for who might else be  
21    given that label.  I'm not trying to go beyond the bounds of  
22    the evidence.

23    **Q.**    Okay.  Looking at Paragraph 157 now, these are  
24    implications for Coffee County's hardware.

25            Do you see that?

1     **A.**    157 you said?

2     **Q.**    Yes.

3                 THE COURT:  I'm just going to remark.  I think as to  
4     Paragraph 147 it is very clear what it states.  I think it is  
5     more complex than what has been described by the testimony  
6     being elicited, and I don't think it is helpful.

7                 So I'm going to ask the witness to just -- I mean,  
8     I'm reading it, and I understand something more complex from it  
9     myself, I will just state.

10                If either -- either attorney wishes to elicit more,  
11    that is fine.  But I am looking at the actual words of it, and  
12    it is something that is different than what is being elicited  
13    and what is being -- and it concerns me that -- because I  
14    understand what it says.  And if it is something different --

15                And what it says right now, just for the record, is  
16    for this portion of my analysis I concluded legitimate  
17    authorization was not given for the irregular access to Coffee  
18    County's election office in 2021.  The evidence indicates an  
19    illusion of authorization was created, one, by Eric Chaney  
20    leveraging his membership on the board of elections; two, by  
21    Misty Hampton's willingness to collaborate; and, three, by  
22    several attorneys including Powell, Bundren, and Lambert  
23    lending their integrity as officers of the court and by  
24    involving many other willing and credulous participants.

25                I think that speaks for itself.

1 BY MR. RUSSO:

2 **Q.** Moving on to the implication section of your declaration,  
3 Mr. Skoglund, directing you to Paragraph 157.

4 Do you know whether any manipulation or damage occurred to  
5 the systems in Coffee County during the access in January 2021?

6 **A.** No, I have not examined the equipment directly.

7 **Q.** And you understand, of course, that the equipment was  
8 replaced; correct?

9 THE COURT: Which equipment?

10 MR. RUSSO: The equipment in Coffee County.

11 THE COURT: Right. But all the equipment in Coffee  
12 County?

13 MR. RUSSO: All.

14 THE COURT: Initially? I mean, what is -- let's be  
15 very precise here since you-all have thought a lot about this  
16 issue.

17 BY MR. RUSSO:

18 **Q.** You understand that -- well, you didn't review it to begin  
19 with is what you said; correct?

20 **A.** I did not review the Coffee County's hardware and software  
21 directly, correct.

22 **Q.** You would with agree me that failing to find a problem  
23 might mean there is no problem; correct?

24 **A.** Yes. I go on -- if you read the next two sentences of  
25 157, I state that. It is very difficult to know whether or not

1 this equipment has been negatively impacted and to prove a  
2 negative to say that it is not.

3 We saw that in a number of other states when their  
4 election equipment was breached, those machines were quickly  
5 pulled from service so that there was no opportunity and there  
6 was no thought of trying to remediate those computers and to  
7 rehabilitate them in some way. Instead, they were simply  
8 pulled from service.

9 **Q.** And are those the ones in Northampton you're referring to?

10 **A.** No, I'm not. Arizona is another example where the  
11 machines were not put back into service after they were  
12 provided to third parties.

13 **Q.** Just to clarify one point from earlier. Regarding the  
14 Northampton matter that you testified about, those machines --  
15 what type of machines were those?

16 **A.** Those are ES&S ExpressVote XLs.

17 **Q.** Now, you testified earlier about hash verifications on --  
18 and that they can determine whether -- well, tell us -- remind  
19 me about the hash verification.

20 They can determine if it is the same software. Is that  
21 what you said?

22 **A.** I'm sorry. What was the question? I didn't get a  
23 question out of that.

24 **Q.** Well, what I'm getting at is: If the State performed hash  
25 verifications on the equipment, would you agree that those hash

1 verifications would provide a level of security around  
2 confirming that the equipment has been unchanged?

3 **A.** Are you referring to the Coffee County equipment or to  
4 something different than that?

5 **Q.** The equipment -- just the equipment generally, BMDs in  
6 Georgia.

7 **A.** So this is a hypothetical ballot-marking device we're  
8 talking about?

9 **Q.** That's fine.

10 **A.** So if you took a hypothetical ballot-marking device and  
11 you -- you used the built-in Dominion hash validation software  
12 to look at a small set of files that are on that computer and  
13 tell you what the hash is, then I do not think that that offers  
14 you very much security protection.

15 **Q.** And why is that?

16 **A.** Because, one, it is only looking at a small set of files.  
17 It cannot look at the entire hard drive. For one thing it  
18 would take a very long time. But also the hard drive is  
19 constantly changing. It is constantly, you know, making edits  
20 to the log file, for example. So even a simple edit to a log  
21 file will change the hash to be something completely different.

22 But it also would not be effective because you're asking  
23 the system to self-attest. As I have said before, it is like  
24 asking someone, are you a liar?

25 **Q.** So you're saying that would provide zero security benefits

1 to the State? Is that -- that is your opinion?

2 **A.** I don't know that I would quantify it as zero. I don't  
3 think that it is effective and would not recommend it as any  
4 kind of -- it would not give me any assurance if you came to me  
5 with that as a fact.

6 **Q.** What is your understanding of whether the EAC performed --  
7 recommends hash verifications to be performed by the states?

8 **A.** What is my opinion?

9 **Q.** What is your understanding?

10 So I direct you to Paragraph 160 -- 162. You mentioned  
11 the Election Assistance Commission's best practices for  
12 election technology.

13 Do you know if the Election Assistance Commission --

14 **A.** Wait. I'm not quite caught up. You said 162?

15 **Q.** Yes. And it is at the bottom of 162 on that page and goes  
16 over to the next page.

17 **A.** Okay.

18 **Q.** The EAC you said recommends single use memory devices, and  
19 you cite to the EAC's best practices for election technology.

20 Do you see that?

21 **A.** Yes, I do.

22 **Q.** Do you have any understanding of whether the EAC  
23 recommends hash verification as a best practice?

24 **A.** I don't recall whether it does.

25 **Q.** Would you disagree with the EAC's belief that it is a best



1 practice if they did recommend it?

2 **A.** I don't -- I don't know that I would disagree that it is a  
3 good practice. But I don't think that it is an effective one,  
4 in my opinion. I don't know that I would -- I don't know  
5 that -- I have not read -- I don't have the EAC report in front  
6 of me, so I can't say what their opinion is to contrast it with  
7 mine.

8 **Q.** Now, in Paragraph 164 you mention Cybersecurity and  
9 Infrastructure Security Agency, CISA, and the incident  
10 eradication.

11 Do you agree with me that knowledge of an incident is a  
12 necessary precursor before election officials can take  
13 mitigation efforts?

14 Or do you have to know something happened before you can  
15 mitigate it?

16 **A.** Yeah. I think you may be using mitigation a different way  
17 than I would. I think that it is true that you need an  
18 indication that there may have been some kind of a security  
19 event that requires further investigation.

20 And I see evidence that the Cyber Ninjas card coming right  
21 after Dominion's warning and the missing password, I think all  
22 of the events that happened in 2020 in Coffee County -- I  
23 think, you know, the sum total of those is that further  
24 investigation was definitely required. This might have been  
25 something that needed incident response.

1 Q. And we talked about insiders earlier. You don't think  
2 that insiders would -- would disclose that they had done  
3 something wrong so that mitigation efforts could occur;  
4 correct?

5 A. I'm sorry?

6 Q. So the insider --

7 A. Do I think Misty Hampton would have told the Secretary of  
8 State? Is that --

9 Q. Sure.

10 A. I mean, no, I don't -- I don't think that they will tell  
11 on themselves. But, you know, once she told the Washington  
12 Post that, yes, she had let in insiders, I think that was the  
13 point at which it was super clear that something had happened.

14 Q. And are you aware of the phone call between Ms. Marks and  
15 Mr. Hall in this case?

16 A. Yes, I am.

17 Q. When did you become aware of that?

18 A. It was either -- the years all kind of run together. It  
19 was either in January or February of 2022.

20 Q. And what was your understanding of when that call was  
21 recorded?

22 A. I do not have an understanding of when it was recorded,  
23 not as I sit here.

24 Q. Okay. Is it -- is it your opinion that because of what  
25 happened in Coffee County that all of the equipment in Georgia

1 needs to be replaced statewide?

2 **A.** There's several answers to that. The first is that all of  
3 the equipment should have been immediately replaced in Coffee  
4 County, and it is troubling to me that it was not and that it  
5 was used in live elections before it was removed.

6 I have concerns about the removal of media that is used  
7 and reused against best practices. And I'm concerned that  
8 removable media is used to ferry information from the air  
9 gapped election management systems to internet connected  
10 systems and back again.

11 So it is difficult, without doing further analysis, to  
12 know whether the circumstances in Coffee County were contained  
13 or were not. And one of the first things, as I said in the  
14 earlier -- or right here, actually, in the incident  
15 eradication, is the first step is to remove the compromised  
16 machines, block known malicious infrastructure, reset account  
17 credentials, and implement additional controls.

18 And I strongly agree with that. That is what should have  
19 been done to lower the risk that this incident would spread  
20 beyond Coffee County.

21 **Q.** And you mentioned an election that the equipment was  
22 subsequently used in.

23 Do you recall which election that was?

24 **A.** Well, it would have been all elections between January 7,  
25 2021, and when the equipment was removed, which I seem to

1 recall was September of 2022. And I don't know whether  
2 everything was removed at that time.

3 I know the majority of equipment was replaced. But the  
4 ICC and the EMS from January 8th of 2021, was allowed to remain  
5 and to sort of bridge service with the other equipment.

6 **Q.** And when you say bridge service, you're not aware of any  
7 malfunctions or any bugs that due to that bridge service went  
8 from what was there previously and carried over to this new  
9 equipment; correct?

10 **A.** You're asking if I know how the equipment performed after  
11 September of 2022?

12 **Q.** Well, I'm asking if you -- well, let's just do it this  
13 way.

14 Are you aware of any malfunctioning equipment in Coffee  
15 County after the EMS was replaced?

16 **A.** No. I have had no visibility into any of the hardware or  
17 software directly or indirectly since the forensic images were  
18 provided.

19 **Q.** You're not aware of any complaints by voters saying their  
20 votes were --

21 THE COURT: He just said he had no visibility  
22 afterwards one way or the other. So let's move on.

23 Thank you.

24 BY MR. RUSSO:

25 **Q.** You talk about -- in Paragraph 174 you mention it is

1 highly likely -- highly likely -- a highly likely consequence,  
2 excuse me, of the distribution of the software is a  
3 disinformation campaign.

4 What do you mean by a disinformation campaign?

5 THE COURT: I'm sorry. What paragraph are you  
6 talking about?

7 MR. RUSSO: 174.

8 THE COURT: Okay.

9 THE WITNESS: Could you ask your question again.

10 BY MR. RUSSO:

11 Q. Sure.

12 Do you believe that disinformation campaigns have been  
13 realized as a result of the Coffee County incident?

14 A. Yes, I do.

15 Q. And what disinformation campaigns have been realized --  
16 that you think have been realized at least?

17 A. I have observed that the incident in Coffee County is used  
18 for other purposes to suggest that it is evidence of  
19 manipulated votes, vote totals, secret algorithms, a wide  
20 variety of claims.

21 Q. So it is -- disinformation is information that is being  
22 used to manipulate. I'm trying to understand what you mean by  
23 disinformation.

24 To manipulate someone else? Manipulate voters, in this  
25 case?

1     **A.**    Yes.  That is a rough definition of disinformation.

2     **Q.**    So there is some intent on -- by the speaker to affect  
3       some change by the listeners; is that correct?

4     **A.**    Yes.  Yes.

5     **Q.**    And do you believe that attempting to manipulate voters to  
6       not use voting machines would be disinformation?

7               MR. BROWN:  I'm sorry.  I just didn't hear you.

8     BY MR. RUSSO:

9     **Q.**    I said:  Do you believe that attempting to manipulate  
10       voters so they do not use voting machines -- would that be  
11       disinformation in your mind?

12              MR. BROWN:  I object, Your Honor.

13              THE WITNESS:  That is a big hypothetical.  I would  
14       need much more specifics.

15     BY MR. BROWN:

16     **Q.**    I think isn't it -- it is about the specific statement  
17       being made if a speaker says something about voting machines?  
18       There have been a lot of statements about voting machines in  
19       this -- since 2020.

20              You agree with me on that?

21              THE COURT:  I'm going to say that you are going off  
22       base at this point.  That is not relevant.  I think what his --  
23       what you asked about in 17 -- about his comments in 174 was his  
24       discussion of some of the consequences when you end up  
25       having -- of the distribution of election software, what some

1 of the adverse consequences and public understanding and  
2 misrepresentations. I think that is -- you can't go further  
3 than that. And you can -- so -- or else it is not really going  
4 to be relevant to this here.

5 MR. RUSSO: Okay.

6 THE COURT: But if there's something in particular --  
7 a paragraph here that you want to discuss, that is something  
8 else. But I think you were using your --

9 MR. RUSSO: I was just exploring what his -- if this  
10 was his opinion and -- he was given it as to disinformation. I  
11 was just trying to understand the scope of that and --

12 THE COURT: Well, he has given you lots of examples.  
13 So I think then to start going off to discussing is it  
14 disinformation to communicate with fellow citizens about the  
15 system as a whole -- I don't know that that is really dealing  
16 with disinformation. It is just dealing with somebody's  
17 assessment of it. But -- I don't know.

18 I mean, I just don't think it is going to be  
19 helpful -- let me just put it that way -- helpful to the Court  
20 in deciding the merits of this case.

21 If there is something in particular as to which he  
22 describes here in a particular paragraph, I'm happy to have you  
23 examine him about that, at least in a limited way. Because not  
24 everything that is in his affidavit is necessarily relevant to  
25 my decision either. But as with everything that all of you

1 write at some point, it won't be -- something won't be  
2 relevant.

3 MR. RUSSO: I hope so.

4 THE COURT: I know. It would be terrible to be told  
5 that something you said was not relevant.

6 MR. RUSSO: All right.

7 BY MR. RUSSO:

8 Q. Moving on to your next section here of your report,  
9 Mr. Skoglund, Paragraph 196.

10 A. Can you tell me what page? That would be faster.

11 Q. 72 of 80 on the ECF pages.

12 A. 196?

13 Q. Yes.

14 A. Okay. I'm there.

15 Q. Okay. So you agree that -- you state here that an  
16 adversary must gain access to election hardware with enough  
17 opportunity to put weaponized code into action.

18 You still believe that; correct?

19 A. Yes, I do.

20 Q. And did you conduct any assessment of the scope of that  
21 opportunity that is required, as it pertains to Georgia?

22 A. I think we may be skipping a few steps there.

23 As it says, after developing techniques or weaponized  
24 code. That is step one. Then you have to put that into use,  
25 right, in some way. And it depends greatly what you have



1 developed.

2 If your hack is a BIC pen, then you have got to figure out  
3 how to use that BIC pen in the polling place and have that  
4 opportunity.

5 If your attack is malware and it is a malware that is on a  
6 poll worker card, then once you have the opportunity to insert  
7 a poll worker card, you have the necessary access.

8 If the attack requires you to, you know, be in front of an  
9 election management system, well, then you have to be able to  
10 get in front of that election management system.

11 I mean, it really depends on the scope of what you are  
12 trying to accomplish. But yes, you must develop it and then  
13 effectuate it in the real world.

14 **Q.** And in Georgia with 159 counties, is it your opinion you  
15 would have to effectuate that opportunity in all 159 counties?

16 **A.** No, I do not think that is a prerequisite for --

17 **Q.** I apologize. Let me clarify.

18 For -- to affect the statewide -- to put that malware into  
19 effect statewide?

20 **A.** I mean, you are describing a very narrow thing. You're  
21 describing can I -- I think you are describing can I get  
22 malware installed on every single component of the election  
23 system in every single county. And that is contrary to what I  
24 just testified to, which is that an attack, an exploit, can be  
25 very targeted.

1           And it is not necessary to necessarily go there, depending  
2           on what you have in mind. If your goal is to sow chaos, well,  
3           then you really only need to go to one county and create chaos  
4           that then causes the rest of the election results to be called  
5           into question.

6           **Q.**    Okay. Moving on to -- you provide six mitigations, I  
7           believe, at the end of your report, Paragraph 204.

8           Now, if Georgia used an all hand-marked paper ballot  
9           system, would these risk mitigations, minus the reference to  
10          hand-marked paper ballots in Paragraph 204, be the same?

11          **A.**    I'm sorry. Could you repeat the question.

12          **Q.**    If Georgia had an all hand-marked paper ballot system,  
13          would these risk mitigations, minus the reference to  
14          hand-marked paper ballots in your risk mitigations, so the  
15          remaining five -- would those be the same? Would they still  
16          exist?

17          **A.**    Yes. I believe those are the risk mitigations recommended  
18          by cybersecurity experts and they are -- except for the one you  
19          mentioned about hand-marked paper ballots, they are consistent.

20          **Q.**    Mr. Skoglund, I've got just a few more questions and I'll  
21          try to wrap it up quickly here.

22          You're not offering an opinion on whether the Coffee  
23          County outside access has burdened any one -- any voter in that  
24          county; correct?

25          **A.**    I don't know what you mean by the word "burden." I think

1 that is a legal term, and I don't quite understand it. So ...

2 **Q.** Preventing anyone from voting. You're not offering an  
3 opinion --

4 **MR. BROWN:** I didn't hear or understand Mr. Russo's  
5 last comment. I'm sorry.

6 **MR. RUSSO:** Sure. I'll repeat that.

7 **BY MR. RUSSO:**

8 **Q.** You're not offering an opinion that the incident in Coffee  
9 County has prevented anyone from voting; correct?

10 **A.** I think I testified to that earlier that I haven't seen  
11 any evidence or information beyond what was given to me from  
12 those forensic images. That really is the limit of my Coffee  
13 County knowledge.

14 **Q.** And you're not offering an opinion that voting systems  
15 should not use technology at all; correct?

16 **A.** I am not offering that opinion.

17 **Q.** You believe there should be some technology that is used  
18 in voting systems?

19 **A.** Do I believe? I'm not sure --

20 **Q.** Is it your opinion that technology -- that -- well, I  
21 mean -- yeah, I guess that is what I'm asking. You're not  
22 offering any opinion that we shouldn't use technology in voting  
23 systems; correct?

24 **A.** Maybe I can get to your answer by stating it in my own  
25 words.

1 Q. Sure.

2 A. I believe that technology can be extremely useful in some  
3 cases. And the ballot-marking devices, when equipped with the  
4 ATI accessibility kit, are a terrific example of that. And it  
5 is why Congress mandated the Help America Vote Act that all  
6 polling places must have a ballot-marking device with full  
7 accessibility is because the technology allows voters who might  
8 have not been able to vote to be able to use technology to  
9 vote. And I think that is a terrific and appropriate use of  
10 technology.

11 I think that the tabulators that are used to count votes  
12 are a good piece of technology that count votes accurately and  
13 efficiently most of the time. And I think that as long as the  
14 technology has non-technological bookends on either side of  
15 that we can trust it. Because we can always check the  
16 technology.

17 So if you have a voter marking a ballot by hand, that is  
18 very low tech. There is no technology to get in the way of  
19 that. And then we can hand count those ballots, machine count  
20 those ballots. It doesn't matter. Because on the other side  
21 we have risk-limiting audits that we can use to go back to that  
22 original evidence that we know technology didn't interfere  
23 with. We can go back to those and know that the tabulation is  
24 correct or questionable and something we need to investigate.

25 Q. And what is the right balance? Do you have an opinion on

1 where the right balance is between how much technology is okay  
2 and how much isn't?

3 MR. BROWN: Your Honor, I object. He just answered  
4 the question and -- the same question, which was where is  
5 technology appropriate and when it isn't.

6 THE COURT: I think -- there is a sufficient answer.  
7 So let's move on.

8 MR. RUSSO: Let me check with co-counsel real quick.

9 THE COURT: Sure.

10 **(There was a brief pause in the proceedings.)**

11 MR. RUSSO: Thank you, Mr. Skoglund.

12 THE WITNESS: Thank you.

13 THE COURT: Mr. Brown, do you have many questions or  
14 just a few?

15 Do you have many questions or just a few?

16 MR. BROWN: One.

17 THE COURT: One.

18 REDIRECT EXAMINATION

19 BY MR. BROWN:

20 **Q.** One question, Mr. Skoglund, with a brief introduction.

21 You testified about the need to replace the machines in  
22 Coffee County as soon as possible after the incident.

23 Are you with me?

24 **A.** Yes.

25 **Q.** Given that the equipment software is in the wild, would

1 replacing the equipment itself be sufficient?

2 **A.** No. They address two different risks. The one is the  
3 risk that there is contamination in the Coffee County hardware  
4 and software.

5 The second is a separate risk, which is that now all of  
6 that software and data that is supposed to be kept, you know,  
7 safe and secure and only given to authorized individuals is now  
8 in uncontrolled distribution.

9 So it is two separate matters entirely.

10 MR. BROWN: Thank you.

11 MR. RUSSO: No further questions.

12 THE COURT: I have one question.

13 EXAMINATION

14 BY THE COURT:

15 **Q.** You were asked questions about what you wrote in  
16 Paragraph 162 as to your statement that reuse of removable  
17 media is a bad security practice because it provides a  
18 convenient vehicle for malware to move between devices in both  
19 directions from EMS to other devices and from devices back to  
20 EMS. It is analogous to intervenous drug users sharing  
21 needles.

22 And then you reference what you were asked about the U.S.  
23 Election Assistance Commission recommends using single use  
24 memory devices to transfer election results from the voting  
25 system tabulator to the EMS and write-once or read-only

1 removable media should be used where possible.

2 And I guess I -- I went back to look at the -- at the  
3 EAC's recommendation. I think it deals exactly with that  
4 issue.

5 It says if a USB -- for instance, if a USB drive or other  
6 piece of writable removable media is inserted into a device  
7 that is connected to the internet, another network or is  
8 outside of the voting system, it should not be used -- reused  
9 without ensuring that it is free of malware.

10 And then it gives similar ones about not using thumb  
11 drives or external drives more than one time. Never reusing  
12 them.

13 How did that pertain to what the EAC was saying to what  
14 you were looking at, if it pertained at all?

15 **A.** So from the Coffee County evidence, it was very clear that  
16 they were reusing media. And one of the best examples of that  
17 was that there were removable compact flash cards that had a  
18 label on the outside for one election but inside contained data  
19 for a subsequent election. So they clearly had been reused.

20 And those are the cards that are for the precinct  
21 scanners. So they go from the election management system out  
22 to one of the precinct scanners. At the end of the election,  
23 they come back. And then, you know, that process continues  
24 from election to election.

25 Another example was that there are -- there were USB

1 drives that were collected by SullivanStrickler that appeared  
2 to have been reused from multiple elections that contained some  
3 old election data on them.

4 And then most concerning I think to me is that those --  
5 there is removable media that is used to ferry information from  
6 the air-gapped system to an internet-connected system. And  
7 people just say, oh, our system is air gapped. But air gapped  
8 is not just not connecting it to the internet. It is also  
9 having a set of policies and procedures in place to ensure that  
10 you are keeping it quarantined, like you would a COVID patient.  
11 Right. You really want to make sure that you're not  
12 transmitting anything in and out the door.

13 So you can't just, you know, put someone in a room and  
14 say, okay, you can come and go as you please. We are going to  
15 call this quarantine. You have to have policies and procedures  
16 as well. So that was of great concern to me.

17 **Q.** In looking at the Coffee County?

18 **A.** In looking at the Coffee County, yes.

19 **Q.** And, I guess, is that from looking at the videos or  
20 looking at the data itself or looking at what in particular?

21 **A.** Looking at the data on the hard drives. Looking at the  
22 photographs that SullivanStrickler took, that is how I was able  
23 to see the labels that were on there and see that they were  
24 from an older election.

25 The GBI image of the desktop computer, that was an



1 internet computer that they were using to send email, but it  
2 was also being used to collect -- to send election night  
3 results that came from the election management system.

4 So from those, I was able to see this.

5 THE COURT: Any other questions in light of mine?

6 MR. BROWN: Your Honor, not just in light of your  
7 questions, but I would like to move to admit Mr. Skoglund's  
8 declaration, Number 471. That is Curling Plaintiffs'  
9 Exhibit 471.

10 MR. RUSSO: We don't have any objection to it, except  
11 to the extent that it has statements in there that we don't  
12 believe he is qualified to testify to.

13 THE COURT: All right. Thank you.

14 Well, it is admitted.

15 MR. BROWN: Thank you, Your Honor.

16 THE COURT: May this witness be excused?

17 MR. BROWN: Yes, Your Honor.

18 THE COURT: All right. Please don't discuss your  
19 testimony with anyone else. We never know who might be  
20 recalled.

21 So thank you very much. I know you have come a good  
22 number of times, and we've offered you as lousy weather as you  
23 have up in Pennsylvania.

24 THE WITNESS: Thank you, Ms. Welch.

25 THE COURT: I think you look different than you do on

1 the internet, when we had the other proceedings.

2 All right. We're going to take a lunch break. It is  
3 1:05, basically. We'll aim to see each other at -- 45 minutes  
4 roughly from now.

5 Anyway, I'll see you at five of.

6 COURTROOM SECURITY OFFICER: All rise.

7 THE COURT: If there are exhibits that you only gave  
8 to me but didn't give to -- to Mr. Martin, let me know and I'll  
9 just give him my copies. But -- anyway, I'm just concerned  
10 that he probably doesn't have a complete set of the copies.

11 **(A lunch break was taken.)**

12 THE COURT: Have a seat.

13 MR. TYSON: Your Honor, I have two additional  
14 administrative quick matters, if I could.

15 THE COURT: Yes.

16 MR. TYSON: One is, I spoke with Mr. Oles. He would  
17 like to have Dr. Johnston here. We have requested she arrive  
18 this afternoon and wanted to make the Court aware of that.

19 THE COURT: All right.

20 MR. TYSON: And then as well, wanted to make sure  
21 that at some point today we're able to address the email issues  
22 from yesterday as well.

23 THE COURT: Okay.

24 MR. TYSON: Thank you.

25 MR. McGUIRE: Your Honor, plaintiffs call Professor

1 Stark -- Professor Philip Stark.

2 COURTROOM DEPUTY CLERK: Please raise your right  
3 hand.

4 **(Witness sworn)**

5 COURTROOM DEPUTY CLERK: Thank you.

6 If you would, state your name and spell your full  
7 name for the record, please.

8 THE COURT: Philip Bradford Stark, P-H-I-L-I-P,  
9 B-R-A-D-F-O-R-D, S-T-A-R-K.

10 Whereupon,

11 PHILIP BRADFORD STARK PH.D.,

12 after having been first duly sworn, testified as follows:

13 DIRECT EXAMINATION

14 BY MR. MCGUIRE:

15 **Q.** Professor Stark, good afternoon.

16 Can you see me?

17 **A.** Yes. Thank you. Good afternoon.

18 **Q.** Hi. My name is Robert McGuire. I represent the Coalition  
19 for Good Governance, which is one of the plaintiffs in this  
20 lawsuit.

21 MR. MCGUIRE: Your Honor, I would like to thank the  
22 Court for allowing Professor Stark to testify by Zoom.

23 BY MR. MCGUIRE:

24 **Q.** And, Professor Stark, since you are on Zoom, I just wanted  
25 to remind you that because of audio, we want to be especially

1 careful to be very clear and -- so the court reporter can hear  
2 you.

3 **A.** I'll do my best.

4 **Q.** Thank you.

5 Professor Stark, by whom are you currently employed?

6 **A.** University of California at Berkeley.

7 **Q.** And do you teach there?

8 **A.** Yes, sir.

9 **Q.** What do you teach?

10 **A.** Statistics.

11 **Q.** You have provided a curriculum vitae in this case that is  
12 part of the record; correct?

13 **A.** Yes, sir.

14 MR. MCGUIRE: I would like to ask Tony to show you  
15 Curling Plaintiffs' Exhibit 449.

16 BY MR. MCGUIRE:

17 **Q.** And do you see that on your screen?

18 **A.** I do.

19 **Q.** And do you recognize that document?

20 **A.** First page of the CV. I don't know the date of that  
21 particular one on the screen.

22 **Q.** Can you flip to the second page? Does that help,  
23 Professor Stark?

24 **A.** Yes. It is a bit out of date, but it is one.

25 **Q.** And is this a document that you prepared?

1     **A.**    Yes, sir.

2                 MR. MCGUIRE:   Your Honor, I would move 449 into  
3     evidence.

4                 MR. RUSSO:    No objection.

5                 THE COURT:    It is admitted.

6     BY MR. MCGUIRE:

7     **Q.**    Professor Stark, can you tell us about your educational  
8     background?

9     **A.**    I have an undergraduate degree in philosophy from  
10    Princeton University. I have a Ph.D. in geophysics from the  
11    University of California San Diego, and post doctorate training  
12    from the University of California at Berkeley in between  
13    various things, including a month of law school.

14    **Q.**    A month of law school.

15               And your career in academia, could you tell us about that.

16    **A.**    I'm sorry. I couldn't quite hear you.

17    **Q.**    Could you also please tell us about your career in  
18    academia.

19    **A.**    In academia, I have spent my entire professorial career at  
20    the University of California Berkeley. I was originally  
21    appointed as an assistant professor in 1988, I believe. And I  
22    have gone through the professorial ranks and now at the top  
23    rank that the university offers.

24    **Q.**    And your CV, you said, was a little out of date.

25               Are there any noteworthy matters since the date on this CV

1 of September 4, 2018, that you would like to put into the  
2 record?

3 **A.** Well, relevant to this legal matter, I have about 28 more  
4 peer-reviewed publications relating to trustworthy elections  
5 and election audits. I have served -- I think when this  
6 document was created I was on the board of advisers at the U.S.  
7 Election Assistance Commission. I'm still on the board.

8 But since then, I have served on some subcommittees,  
9 including the cybersecurity subcommittee and the VVSG  
10 subcommittee.

11 I believe that at the time this document was prepared I  
12 was on the board of directors of Verified Voting Foundation.  
13 I'm no longer with them.

14 I am on the board of advisers of the Open Source Election  
15 Technology Institute. I spent about a year on the board of  
16 directors of the Election Integrity Foundation. I won an award  
17 from the IEEE for cybersecurity practice for my work on  
18 election integrity.

19 MR. McGUIRE: Yes, ma'am. Yes, Your Honor.

20 THE COURT: And I want this to all counsel. I would  
21 really prefer to have an updated resumè.

22 Do you have an updated resumè?

23 THE WITNESS: Yes, Your Honor.

24 THE COURT: Would you mind arranging for its  
25 provision to counsel to be -- and if --

1 THE WITNESS: Of course.

2 THE COURT: -- defense counsel wants to see anything  
3 that they will have an opportunity to do so.

4 So if we -- if there is anyone in your office now who  
5 could transmit one to -- it would be great so that they could  
6 have it right away.

7 THE WITNESS: It is available online. I can tell you  
8 what the URL is.

9 MR. MCGUIRE: Your Honor, we'll have it marked, and I  
10 can have it -- maybe I can have it marked even --

11 THE COURT: So it is already online?

12 THE WITNESS: Yes, Your Honor.

13 MR. MCGUIRE: We can pull it down --

14 THE COURT: You can pull it down.

15 MR. MCGUIRE: -- and we'll mark it.

16 THE COURT: Thank you very much. Sorry to interrupt  
17 y'all. Then you can provide it to me too.

18 MR. MCGUIRE: Thank you.

19 BY MR. MCGUIRE:

20 **Q.** The CV that we're looking at, Exhibit 449, Professor  
21 Stark, it lists elections as one of the applications of your  
22 research interests; is that right?

23 **A.** Yes, sir.

24 **Q.** And is election auditing a topic that falls within your  
25 research interests of elections?

1     **A.**    Yes, it is.

2     **Q.**    Now, in September 2020, you gave testimony in this case as  
3     an expert in the fields of election auditing and election  
4     security. I would like to focus just on election auditing for  
5     present purposes.

6             What kinds of things fall within the field of election  
7     auditing?

8     **A.**    It is a broad range of things that include everything from  
9     analyzing event logs in election technology to physical audits,  
10    looking at whether seal protocols are being followed. Auditing  
11    eligibility determinations, making sure that things like  
12    signature verification has been done correctly.

13            The pieces that I personally have focused on are something  
14    called compliance audits, which are involved in determining  
15    whether there is affirmative evidence that the record of the  
16    votes is complete and trustworthy, and risk-limiting audits,  
17    which are a way of providing affirmative evidence that reported  
18    election outcomes are correct or with high probability  
19    correcting them if they're not correct. They require a  
20    trustworthy paper trail. The trustworthiness is generally  
21    established by the compliance audit.

22            Another sort of audit I have been involved in is a  
23    forensic audit to examine the software running on voting  
24    machines. I personally was not the one to do that, but it was  
25    part of the audit that I conducted in New Hampshire in 2020 and



1 the root cause analysis audit to determine the cause of an  
2 observed failure of voting equipment to count those accurately.

3 **Q.** Thank you.

4 And you mentioned the idea of evidence in connection with  
5 elections.

6 Does that bear on the concept of evidence-based elections?

7 **A.** Yes. I introduced the idea of evidence-based elections in  
8 the 2012 paper with computer scientist David Wagner, then wrote  
9 another paper on the topic with Andrew Appel that appeared in,  
10 I believe, 2020. The idea of evidence-based election is that  
11 we shouldn't be satisfied with election results merely being  
12 correct. We should also require with affirmative evidence that  
13 the outcomes are, in fact, correct. Elections shouldn't really  
14 require voters to trust blindly that things are happening  
15 correctly; rather, we should be conducting elections in such a  
16 way that they provide evidence that the outcomes are right.

17 **Q.** And were those two papers that you referenced, the 2012  
18 Wagner paper and the 2020 Appel paper -- were those significant  
19 papers in the field of election auditing?

20 **A.** The term has become used pretty widely. It has been  
21 adopted by the Election Assistance Commission in some context,  
22 at least. Though I'm not sure how to judge the significance.  
23 I don't pay attention to things like citation counts, but they  
24 seem to have had an impact.

25 **Q.** And I believe you also mentioned that you invented a

1 process called a risk-limiting audit; is that right?

2 **A.** Yes.

3 **Q.** Tell us what a risk-limiting audit is meant to do and how  
4 it is meant to work.

5 **A.** So I preface my answer with the fact that I want to be  
6 careful how I use terminology, especially terms of art because  
7 there's a growing disagreement about what risk-limiting audit  
8 means. So I would rather talk about properties that audits  
9 have or that audits can have that are desirable, again, from  
10 the perspective of providing affirmative evidence that the  
11 reported outcomes are correct.

12 So the risk that a risk-limiting audit is designed to  
13 limit is the risk that an incorrect election outcome will be  
14 certified, will become final. So incorrect, it means that it  
15 is not the outcome that an accurate count of the expressed  
16 votes of the eligible voters would show. So it is about the  
17 political outcome, not the exact tally.

18 That is a pretty bright line for materiality. If things  
19 didn't happen well enough that the reported winner really one,  
20 there has clearly been some kind of a failure.

21 So a risk-limiting audit is a procedure that guarantees  
22 that the chance that you will fail to detect and correct wrong  
23 outcomes is, at most, some percentage of the risk limit.  
24 Typical risk limit might be five percent or ten percent.

25 That risk limit is computed on the assumption that the

1 outcome is wrong and is wrong in a way that is most difficult  
2 for the audit to detect.

3 **Q.** And just for some clarity on our end, when you say a  
4 five percent or ten percent risk limit, what does that actually  
5 refer to?

6 **A.** That is the maximum chance that the audit won't detect and  
7 correct a wrong outcome if the outcome is wrong.

8 **Q.** I think the court reporter wants you to speak a little  
9 slower and a little more -- enunciate just a bit more.

10 I'm sorry. Continue.

11 **A.** I apologize.

12 **Q.** Your last sentence about risk-limiting audits, could you  
13 repeat that.

14 **A.** Yes. So the risk limit of a risk-limiting audit is the  
15 largest chance that the audit will fail to detect that an  
16 outcome is wrong and correct that outcome regardless of why the  
17 outcome is wrong.

18 **Q.** So when you detect an error in a risk-limiting audit, you  
19 know that the reported outcome is not the correct outcome but  
20 you don't know the tally; is that right?

21 **A.** So the risk -- a risk-limiting audit, in general, is not  
22 checking whether the reported tally is accurate; it is only  
23 checking whether the reported winner really won.

24 In order for an audit to limit the risk that an incorrect  
25 reported outcome will become final, it needs to have a

1 trustworthy record of the expressed votes of the eligible  
2 voters and it needs to have the legal power to correct the  
3 outcome if it determines that the outcome is wrong.

4 **Q.** And have you studied the auditability of elections  
5 conducted using ballot-marking devices?

6 **A.** Yes.

7 **Q.** Have you done any noteworthy studies about that that come  
8 to mind?

9 **A.** I have several papers relating to ballot-marking devices  
10 and the ability to conduct elections in a way that generates  
11 evidence that the outcomes are correct if those elections are  
12 conducted using ballot-marking devices.

13 One peer-reviewed paper on that was joint with Professors  
14 Rich DeMillo and Andrew Appel. I have a paper on whether it is  
15 possible to test ballot-marking devices adequately to determine  
16 whether they changed enough votes to alter an election outcome.  
17 It is joint with a Stanford Ph.D. student in statistics. Came  
18 out couple of years ago.

19 I have letters that I have written to various government  
20 groups, I believe, including at least one in Georgia on why  
21 conducting elections using -- conducting elections where a  
22 substantial number of votes are cast using ballot-marking  
23 devices undermines the ability to provide affirmative evidence  
24 that outcomes are correct.

25 **MR. McGUIRE:** Your Honor, Professor Stark has

1 previously given testimony as an expert in election auditing,  
2 and I would tender him as an expert in that field at this time.

3 MR. RUSSO: Your Honor, we don't object to him being  
4 tendered and qualified as an expert in audits and election  
5 audits.

6 THE COURT: He is accepted as such.

7 BY MR. MCGUIRE:

8 Q. Now, Professor Stark, this case is about, in many ways,  
9 cybersecurity vulnerabilities.

10 How do audits relate to cybersecurity vulnerabilities when  
11 it comes to elections?

12 A. So pretty much all electronic technology is vulnerable  
13 and, as a result, one needs to be careful how it uses  
14 technology in elections. Audits can make an end run around  
15 some uses of technology in elections to ensure that even if  
16 that technology misbehaved, the reported outcomes are still  
17 correct. That can't be done for all technology that is  
18 currently being used in elections, but it can be done for some  
19 technology that is currently used in elections, and I believe  
20 that that should inform which technology election jurisdictions  
21 use and how they use it.

22 Q. Now, the plaintiffs in this case are challenging  
23 specifically the use of ballot-marking devices as the standard  
24 method of in-person voting.

25 Is that one of the technologies that you believe can be

1     safeguarded by audits?

2     **A.**     Unfortunately, it isn't. The paper I mentioned -- I guess  
3     more than one of the papers I mentioned before addresses  
4     exactly that. Auditing can't do anything to determine whether  
5     the votes that were expressed by the voter to the  
6     ballot-marking device matched the votes that the ballot-marking  
7     device printed in its output, so that becomes a piece of the  
8     providence of the paper trail that is vulnerable to technology  
9     failures, to cybersecurity problems, but that can't be  
10    addressed adequately by any audit.

11    **Q.**     And what makes a ballot as the record of what the voter  
12    did trustworthy or untrustworthy, in your opinion?

13    **A.**     So I'm going to interpret by ballot you mean that printed  
14    piece of paper with some selections on it?

15    **Q.**     Yes, that is what I mean.

16    **A.**     So the vote record can be untrustworthy for a variety of  
17    reasons. It can be born untrustworthy. That is, what is on  
18    the paper may not accurately reflect what the voter expressed.  
19    And ballot-marking devices suffer from that vulnerability. So  
20    a ballot-marking device printout is in some sense born  
21    untrustworthy.

22            But even the records that are born trustworthy. Like  
23    hand-marked paper ballots which necessarily reflect the voter's  
24    expressed preferences, don't necessarily remain trustworthy  
25    throughout the canvass and the audit unless adequate physical

1 security, chain of custody, physical inventories, and other  
2 things are conducted.

3 **Q.** Is an election -- is the outcome of an election that is  
4 conducted with widespread use of ballot-marking devices capable  
5 of being effectively audited at all, in your opinion?

6 **A.** There's no way to audit an election that is -- in which a  
7 substantial number of votes are cast using ballot-marking  
8 devices in such a way as to provide affirmative evidence that  
9 the reported outcomes are correct. Audits can detect some  
10 kinds of failures in some aspects of an election conducted that  
11 way, but they can never provide affirmative evidence that the  
12 reported winner is actually wrong.

13 **Q.** And to be clear, an audit checks outcomes, but it doesn't  
14 check whether individual votes count; correct?

15 **A.** Risk-limiting audits check outcomes. Sometimes that  
16 involves checking whether some individual ballots were  
17 interpreted correctly by the voting equipment and aggregated  
18 correctly to produce the winner, but they don't check any  
19 particular voter's ballots. And, in general, when things go  
20 well, they examine only a minute fraction of the ballots that  
21 were cast in -- at least in a large election.

22 **Q.** So you said just a second ago that BMD ballots were born  
23 untrustworthy.

24 Can you explain what it is about BMDs that makes the  
25 ballots they produce inherently untrustworthy?

1     **A.**   Well, I think the Court has already heard testimony about  
2     this from Kevin Skoglund and Alex Halderman and perhaps others.  
3     But when you introduce technology between the voter and the  
4     record of the vote, you kind of lose the guarantee that the  
5     record of the vote accurately reflects what the voter did.

6     **Q.**   And when you say what the voter did --

7     **A.**   Did I answer your question?

8     **Q.**   I think so.

9           When you say what the voter did, are you envisioning what  
10    the voter did with their fingers on a touch screen? Is that  
11    what you mean by what the voter did?

12    **A.**   With a BMD, it is what the voter did in their interaction  
13    with the touch screen voting machine, whether that is touching  
14    locations on the touch screen or using a Sip and Puff interface  
15    or something else.

16           What the voter did for a hand-marked paper ballot is make  
17    marks ideally with an indelible pen on a piece of paper. That  
18    mark is a direct reflection of what the voter did. Whereas,  
19    what is printed in a BMD printout is a reflection of what the  
20    machine did in response to what the voter did. And there's  
21    just an evidence gap between those two.

22           I believe the Court has heard testimony that what the BMD  
23    prints is not always what the voter did.

24           COURT REPORTER: I missed a word.

25



1 BY MR. MCGUIRE:

2 Q. So --

3 THE COURT: Why don't you say what you've got so we  
4 can --

5 (There was a brief pause in the proceedings.)

6 MR. MCGUIRE: One moment, Professor Stark.

7 THE COURT: If you would, slow down a little bit.

8 THE WITNESS: I'll try. I apologize.

9 THE COURT: I understand.

10 BY MR. MCGUIRE:

11 Q. So, Professor Stark, one of the things we've heard from  
12 the other side in this case is that the content of BMD-printed  
13 ballots can be trusted because it is checked by voters before  
14 they cast that ballot.

15 Do you have an opinion on whether that step is effective?

16 A. I'm aware of four studies of the -- of whether voters do  
17 check and how well they check when they check the BMD printout.  
18 One of the studies was, I believe, commissioned by the Georgia  
19 Secretary of State and conducted by two researchers from the  
20 University of Georgia. It found that relatively few voters  
21 looked at their ballots for long enough even -- this is my  
22 addition -- even for long enough to count how many contests  
23 were on the printout, much less to determine whether the  
24 selections on the printout matched their intended selections.  
25 That was a study of actual voters voting at the polls in the

1 state of Georgia.

2       There has been another study that involved observing  
3 voters, I believe, in Tennessee, if I recall correctly, which  
4 also found that voters did not look at all or did not look for  
5 very long when they were looking at their printout before  
6 casting it, and then there have been a couple of studies --  
7 academic studies with simulated elections -- actual voters but  
8 not in real elections -- that looked at voters' ability to  
9 detect changes to their selections that were made by the  
10 technology.

11       And again, the finding is that, by and large, relatively  
12 few voters check and that those who do don't check perfectly.

13       In order to get accurate checks requires a substantial  
14 intervention and tends to require that the voter bring in a  
15 written slate of candidates that they intended to vote for and  
16 check the BMD printout against their written intended  
17 selections. And my understanding, informally, is that very few  
18 voters do that.

19 **Q.** Does scholarship say anything about how much of a burden  
20 on individual voters it is to have to verify the machine  
21 printout?

22 **A.** I'm sorry.

23 Does who say?

24       MR. RUSSO: Objection, Your Honor, to the extent it  
25 calls for a legal conclusion as to what a burden is.

1           THE COURT: I don't think so. I mean, there is the  
2 legal term, but there is also the actual human term of burden.

3           MR. RUSSO: That is why I was couching it as to the  
4 extent it is.

5 BY MR. MCGUIRE:

6 **Q.** Professor Stark, let me reask my question.

7           Does the scholarship say anything about how much of a  
8 burden -- and I use that in the colloquial sense -- how much of  
9 a burden it is on voters to have to check BMD-printed ballots  
10 for accuracy?

11 **A.** The scholarship suggests that it is a cognitively  
12 non-trivial task that relatively few voters would be able to  
13 recall all of their selections or even the name of every  
14 contest that they voted in without some kind of written prompt.

15 **Q.** Can software improvements or upgrades increase the  
16 effectiveness of audits in BMD heavy elections?

17 **A.** I'm not sure I understand the question.

18           You mean improvements in ballot-marking device software,  
19 does that improve the trustworthiness?

20 **Q.** Let me ask it a different way.

21           You've testified that there are issues with the  
22 trustworthiness of BMD ballots -- BMD-printed ballots.

23           Are there software improvements or upgrades that you're  
24 aware of that could in any way mitigate that untrustworthiness?

25 **A.** No. There's always going to be a gap between what the

1 voter did and what the machine did -- evidence that what the  
2 machine did is identical to what the voter selected. You can  
3 certainly harden BMDs to make them more difficult to hack. You  
4 can test them more extensively to try to detect programming  
5 errors or malware.

6 But you are never going to get the same kind of guarantee  
7 that you get with a hand-marked paper ballot where the vote  
8 record is the voter's direct expression of their selections  
9 rather than the expression through a hackable pen, as it were.

10 **Q.** Yes. And that raises a point I wanted to ask you about.

11 We have heard testimony from State officials that they  
12 have called BMDs basically just a really big expensive pen.

13 Is that a good analogy, in your opinion?

14 **A.** If expensive pens can be hacked, then I guess so. But it  
15 is not -- it has CPU and software in it and so --

16 **Q.** So you mentioned that hand-marked paper ballots are more  
17 trustworthy -- or they are trustworthy.

18 Are they more trustworthy, or are they trustworthy? Which  
19 one?

20 **A.** They are born trustworthy in the sense that the marks on  
21 the ballot were put there by the voter themselves, and so they  
22 really are a record of the voter's expressed preferences. They  
23 don't necessarily -- they don't magically remain trustworthy.  
24 You need to keep track of them. You need physical inventories.  
25 You need seal protocols. You need chain of custody protocols.

1           So they are not automatically trustworthy forever. But at  
2 the moment in which they are created, they're unambiguously the  
3 voter's expression of their preferences.

4   **Q.**   And given the trustworthiness of hand-marked paper  
5 ballots, what would you say about the effectiveness of audits  
6 of the outcome of ballots conducted using hand-marked paper  
7 ballots?

8   **A.**   Again, if appropriate measures are taken to ensure that  
9 votes are cast by eligible voters, if there's proper chain of  
10 custody and that is verified, then -- to confirm that the paper  
11 trail remains trustworthy at the time of the audit, then a  
12 risk-limiting audit of that paper trail can provide affirmative  
13 evidence that the reported winners actually won or can correct  
14 the reported outcome by conducting a sufficiently accurate  
15 tally of that trustworthy paper trail if the reported winners,  
16 in fact, did not win.

17   **Q.**   And does it complicate hand-marked paper ballot elections  
18 that are tabulated by scanners to know that there may be issues  
19 with the scanners?

20   **A.**   That is exactly what risk-limiting audit protects against.  
21 Using optical scan tabulation is an example of the use of  
22 vulnerability technology in elections, but using it in a way  
23 that you can make an end run around that technology to confirm  
24 that whatever might have gone wrong didn't alter the reported  
25 outcome, that the reported winners, in fact, did win.

1           So that is an example of using statistical procedures,  
2 shoe leather, et cetera, to make an end run around the  
3 vulnerabilities in the technology so that those vulnerabilities  
4 can't undermine the trustworthiness of the election.

5           Of course, you actually have to do the audit. You  
6 actually have to keep the trustworthiness of the paper trail.

7   **Q.**   Is there a distinction in your mind between the  
8 auditability, let's say, of a hand-marked paper ballot election  
9 conducted where the tabulation is done by scanners backed by  
10 audits versus where the tabulation is done by hand counting the  
11 paper ballots?

12   **A.**   Regardless of whether -- I'm so sorry. There is someone  
13 scraping my roof right now. When this was scheduled, I thought  
14 that I was testifying on Thursday of last week, so I apologize.

15           Regardless of how you conduct the initial tabulation,  
16 whether that's by hand or using an optical scanner, you should  
17 check that it was done sufficiently accurate to determine who  
18 really won.

19           A better way to say that is you should check whether the  
20 tabulation -- whether an accurate tabulation would find the  
21 same winners. What a risk-limiting audit does is that. It  
22 checks whether an accurate tabulation would find the same  
23 winners, but it doesn't check whether the tabulation itself was  
24 accurate.

25           And I think I only answered part of your question. I

1 apologize.

2 **Q.** So is it -- is there a -- is there scholarship on whether  
3 tabulations tend to be more accurate if they are counted by  
4 scanners versus counted by humans, or is there no difference?

5 **A.** There is evidence that -- well, this depends on a lot of  
6 things. One thing that it depends on is what the rules are for  
7 determining voter intent from the paper ballots, and different  
8 states have different rules regarding the hand count.

9 Okay. We'll see how long this lasts. Again, I am very,  
10 very sorry.

11 It is generally the case that hand tabulation of  
12 hand-marked paper ballots finds more valid votes than machine  
13 tabulation of hand-marked paper ballots because voters  
14 sometimes mark ballots in a way that the machine isn't able to  
15 pick up but that humans looking at the marks can.

16 That can happen for a variety of reasons, ranging from  
17 voters not following instructions for how to mark ovals or how  
18 to mark their paper ballot to voters making a mark that is too  
19 light or too small or in the wrong color ink or something else  
20 that can cause scanners to fail to pick up that mark. There  
21 are examples where scanners have been misprogrammed and make  
22 errors that are relatively large compared to what a hand count  
23 would find.

24 In the other direction, there are a lot of different ways  
25 of conducting a hand count. These range from a kind of calling

1 tally where someone is looking at the face of a ballot and  
2 saying, I see a vote for Abraham Lincoln, while someone is  
3 looking over that person's shoulder saying, yes, it is a vote  
4 for Abraham Lincoln, and two people are making little picket  
5 fence tallies of the votes that are being seen and then  
6 comparing their answers every -- comparing their tallies every  
7 ten ballots or something like that. That is one title, a  
8 four-person counting team, that is a particularly accurate way  
9 of doing a hand count.

10 There are less accurate ways of doing a hand count. For  
11 example, trying to sort the ballots according to who a vote was  
12 for in a particular contest and then count the stacks after the  
13 ballots have been sorted. There are some scholarship that  
14 suggest that that is a relatively inaccurate way of conducting  
15 a hand count.

16 **Q.** Is it fair to say that scanners probably produce a faster  
17 tabulation?

18 **A.** Yes. I think my general belief and experience is that  
19 under ordinary circumstances, scanners are fast and do a good  
20 job with technical cases; people are slow and do a good job  
21 with the edge cases.

22 **Q.** I want to ask you about some specifics of Georgia's  
23 current audit law, and I'm not asking you about your -- about  
24 the law itself for a legal opinion. I'm asking you about how  
25 the audits that the law calls for -- I'm asking about those.



1           So first, Georgia law requires -- and I'm referring to  
2 OCGA 21-2-498(b). It requires local election superintendents  
3 to conduct either precertification tabulation or risk-limiting  
4 audits.

5           What is a tabulation audit?

6   **A.**   That could mean any number of things. From that word  
7 alone, I have no idea what is intended.

8   **Q.**   So there's no -- that is not a term of art that people  
9 charged with conducting these would understand?

10   **A.**   It is not a term of art that refers to any specific  
11 procedure. People do talk about tabulation audits by which  
12 they seem to mean some kind of check of whether the votes are  
13 being tabulated accurately, but there are many ways of doing  
14 that that have different likelihoods of detecting problems and  
15 different abilities to correct problems.

16   **Q.**   And do you happen to know whether the risk-limiting audits  
17 provided for under Georgia law correspond to the risk-limiting  
18 audit process that you invented?

19   **A.**   I think that the definition corresponds to my original  
20 definition, but there is evidence that -- well, first of all,  
21 because such a large fraction of those in Georgia are cast  
22 using ballot-marking devices, no procedure, regardless of what  
23 you call it, can provide affirmative evidence that the reported  
24 winners really win -- really won, or conversely, can limit the  
25 risk that an incorrect outcome or incorrect reported outcome

1 will become final.

2       So whether the Georgia law calls for using the procedure  
3 that I invented or one of the procedures that I came up with or  
4 not, it can't have the intended effect of limiting the risk  
5 that an incorrect outcome will become final because, among  
6 other things, the vote record that it is relying on isn't  
7 necessarily a complete and accurate record of the voter's  
8 expressed selections.

9 **Q.** And if Georgia law requires that precertification audits  
10 must be performed on one contest, is that enough -- is that  
11 enough of a safeguard to ensure an election -- election  
12 outcomes are accurate?

13 **A.** You can't borrow strength from an audit of one contest to  
14 determine anything about the correctness of another contest.  
15 So only the contest that is audited would have any evidence of  
16 correctness, again on the assumption that all of the other  
17 pieces were in place, including the trustworthiness of the  
18 paper trail.

19 **Q.** And I think you said early on in your testimony here today  
20 that audits needed to have a legal consequence in order to  
21 matter.

22       Can you explain that?

23 **A.** To limit the risk that an incorrect outcome will become  
24 final, the audit needs to be able to correct the outcome if it  
25 discovers that the reported outcome is wrong. My understanding

1 of the law in Georgia is that audits don't have the power to  
2 correct outcomes, that there is an original machine count that  
3 depending on -- I don't recall the details of the law, but  
4 under some circumstances there can be a re-count, but the  
5 re-count, by default, is a second machine count, not a hand  
6 count, and that the audit basically has no power to correct the  
7 outcome, even if the audit leads to a full hand count that  
8 reveals that the reported outcome was incorrect.

9 **Q.** During earlier testimony in this case, the defendants have  
10 suggested that ballot-marking devices are superior to  
11 hand-marked paper ballots because ballot-marking devices  
12 prevent voters from making errors.

13 Do you agree with that?

14 **A.** First of all, anything that a ballot-marking device is  
15 supposed to do, it will only do if it is performing correctly.  
16 And the whole idea here is that ballot-marking devices cannot  
17 be relied upon to perform correctly because they are  
18 susceptible to bugs, misconfiguration, and malware.

19 So under some circumstances, if they are performing  
20 correctly, a ballot-marking device might prevent certain kinds  
21 of error such as overvoting. But precinct-based optical  
22 scanning can provide the same protection for hand-marked paper  
23 ballots by spitting back out a ballot if it has an overvote.  
24 This sort of overvote protection, I believe, is mandated by  
25 HAVA.

1           Other kinds of errors, such as unintentionally making or  
2           selecting a candidate other than the intended candidate, a  
3           ballot-marking device can't protect against that, nor can  
4           hand-marked paper ballots.

5       **Q.**    So the printout on a ballot-marking device is not  
6           ambiguous; right? Assuming it reflects what the voter did when  
7           you look at the paper, it is unambiguous what the choices are;  
8           right?

9       **A.**    Well, it is unambiguously what the machine printed, but it  
10          is entirely ambiguously what that -- what the voter selected.

11       **Q.**    Now, we've heard some testimony from State officials  
12          suggesting that since all voting systems are vulnerable to  
13          insiders that they are all the same or equivalent from a  
14          security standpoint; is that true?

15       **A.**    I would disagree with that.

16       **Q.**    Why would you disagree?

17       **A.**    Well, several reasons. First, as I mentioned before,  
18          there are some uses of technology where even if that technology  
19          misbehaves, either through error or malfeasance, you can still  
20          check whether it got the right answer. Optical scan voting  
21          systems are an example of that. You can make an end run around  
22          the technology so that even if insiders altered the software on  
23          the optical scanner, you could use a properly designed audit to  
24          get affirmative evidence of whether the reported result is  
25          correct or have a high probability of correcting it if it

1 isn't.

2 Other kinds of vulnerabilities to insiders, for example,  
3 altering cast ballots after they are cast or substituting other  
4 ballots for the ballots that were cast by the eligible voters.  
5 You know, ballot box stuffing, removing ballots, things like  
6 that. That is going to be a vulnerability whether you are  
7 using hand-marked paper ballots or ballot-marking devices.

8 But to alter a substantial number of votes that way is  
9 generally going to require a large number of people on the  
10 ground. It is going to require accomplices. It is something  
11 that is sort of happening at a retail level rather than a  
12 wholesale level.

13 In contrast, other technology vulnerabilities, such as the  
14 vulnerabilities of the ballot-marking devices, are wholesale  
15 vulnerabilities. A single actor can implant malware that  
16 propagates through the system in such a way as to alter a large  
17 number of votes.

18 **Q.** And given the variety of voting systems that are out  
19 there, how does the concept of software independence bear on  
20 the auditability of them?

21 **A.** So software independence is a notion that was introduced  
22 by Ron Rivest and John Wack as a security property that some  
23 voting systems have. The idea of software independence is that  
24 an undetected change or flaw in the software of a voting system  
25 should not be able to produce an undetectable change in the

1 outcome of an election.

2 Strong software independence adds to that the requirement  
3 that if a problem is detected, you should be able to correct  
4 the outcome of the election without rerunning the election.

5 So ballot-marking devices, one can argue whether they are  
6 software-independent because, in principle, voters could detect  
7 malfunctions, although in practice, they are not very good at  
8 it. And even if a voter does detect malfunction, there is  
9 nothing the voter can do to prove to a poll worker or election  
10 official that they did detect a malfunction.

11 There is never -- the ballot-marking devices don't provide  
12 the voter with any evidence they can show someone else to prove  
13 that what was printed was not what they collected on the  
14 screen, and that is a fundamental gap in the security model for  
15 ballot-marking devices.

16 I think I have gone on a tangent. I can't -- can you  
17 remind me of what question I'm answering?

18 **Q.** Yes, just about how software independence applies to the  
19 various voting methods.

20 **A.** Software independence, yes.

21 So regardless of whether you believe the ballot-marking  
22 devices are software-independent, if you believe that voters  
23 detecting it is an adequate property or characteristic, they  
24 are definitely not strongly software-independent. Because if  
25 an election official becomes convinced if a voter does detect a

1 malfunction in a ballot-marking device, there is no way to  
2 determine who really won the election without rerunning the  
3 election, basically redoing the election.

4 In contrast, for hand-marked paper ballots counted using  
5 optical scan tabulators, it -- because -- if you have taken  
6 care of the paper trail adequately so there remains a  
7 trustworthy record of the vote, if the scanners are detected to  
8 have misbehaved, there is still a way to determine who really  
9 won the election, namely by doing an accurate count of the  
10 votes from the trustworthy paper trails either using a  
11 different set of standards or full manual hand count that is  
12 done carefully enough to ensure that it finds the correct  
13 winners from the paper.

14 **Q.** Thank you.

15 So I just want to wrap up by recapping your opinions on  
16 two issues.

17 The first issue is: When it comes to auditing the  
18 outcomes of elections, how does Georgia's current system with  
19 BMD voting compare to a system without BMD voting?

20 **A.** Because such a large fraction of the votes are cast using  
21 ballot-marking devices, there is no way to determine whether  
22 the reported winners are the winners that you would get from  
23 accurately tabulating the voter's expressed choices. So you  
24 can't conduct an audit that genuinely limits the risk that an  
25 incorrect outcome will become final and binding given the heavy

1     reliance on ballot-marking devices.

2     **Q.**     Now, if the plaintiffs in this case have their way and  
3     Georgia moved instead to a system of voting in person which  
4     involved, one, BMD for accessibility, hand-marked paper ballots  
5     for everyone else, and scanner tabulations, would conducting an  
6     election using that arrangement provide voters an accountable  
7     vote?

8     **A.**     The accountability of the vote depends in part on whether  
9     chain of custody is maintained. It depends on physical  
10    security of the voted ballots and having a complete canvass,  
11    including pollbook reconciliation, ballot accounting, and other  
12    measures.

13            But having the vast majority of votes cast using  
14    hand-marked paper ballots would make those votes accountable  
15    under those circumstances. There would still be an issue for  
16    those votes that are cast using ballot-marking devices.

17            MR. McGUIRE: Thank you. Thank you, Professor Stark.  
18    I have no further questions on direct.

19            And -- oh, actually, you know what? Just a moment.  
20    I was handed while I was examining you what has been marked as  
21    Coalition for Good Governance Plaintiffs' Exhibit 64.

22            Professor Stark --

23            I'm not quite sure how to authenticate this given  
24    that he is not here. I have --

25            THE COURT: Tell him what it is.



1 BY MR. MCGUIRE:

2 Q. It is a 176-page copy of what purports to be your CV dated  
3 January 17, 2024.

4 Is that the most recent version of your CV?

5 A. Yes. I found one error in it that I haven't yet posted to  
6 the web, but that is the most current version that I have out  
7 there.

8 Q. And I will represent that it was pulled down from a  
9 location online where it is publicly available.

10 A. Yes, sir.

11 MR. MCGUIRE: So, Your Honor, I would move this into  
12 evidence.

13 MR. RUSSO: No objection, Your Honor.

14 THE COURT: It is admitted.

15 MR. MCGUIRE: Thank you.

16 And with that, no further questions on direct.

17 Thank you, Professor Stark.

18 THE COURT: You had a few questions?

19 MR. OLES: I have a few questions, Judge, if I may.

20 THE COURT: All right. Would you share those with  
21 counsel before you proceed.

22 MR. MCGUIRE: We have not seen any questions and --

23 MR. BROWN: That's not true.

24 MR. MCGUIRE: Oh, we have? Must have happened while  
25 I was up there.

1 MR. BROWN: Your Honor, we have reviewed some of his  
2 questions, and I have tried to explain to Mr. Oles that --

3 THE COURT: Speak up a little more. You have tried  
4 to explain to Mr. Oles?

5 MR. BROWN: That they are not relevant and not  
6 helpful, and he was going to talk to Mr. Favorito, and I  
7 haven't been able to circle back with him.

8 I believe there's different ways we can do it. One  
9 is to approach the bench and discuss them to see if they are  
10 appropriate at this time.

11 THE COURT: That's fine. Why don't you approach the  
12 bench.

13 **(A bench conference ensued, as follows:)**

14 THE COURT: Let me just talk to the audience first.

15 Please be quiet while we are up here. It is hard  
16 enough to handle this. So if you need to talk, go outside.

17 **(A bench conference ensued, as follows:)**

18 MR. OLES: Thank you, Judge.

19 For the record, my client is not Mr. Favorito. My  
20 client is Mr. Davis, and he is out getting a copy of the report  
21 that we tried to put into evidence the other day, which I  
22 understand Ms. Johnston is coming back, so I'm getting a number  
23 of copies, and that is why he is not here in the courtroom.

24 THE COURT: All right.

25 MR. OLES: Judge, we understand Dr. Stark and

1 appreciate his testimony as an election audit expert.

2 Obviously, one of the key issues in this case is going to be  
3 whether or not he -- or is going -- for the Court to consider  
4 if it sees fit to rule upon the ballot-marking device is how  
5 effective Georgia's election audit procedures are.

6 The questions that I would like -- because the Court  
7 is going to be asked then to make some sort of ruling that  
8 involves what those election audit procedures may or may not  
9 have to look like after the Court's ruling.

10 The questions I would like to pose have to do with  
11 several situations that did actually come up, and I would like  
12 to pose these questions to Dr. Stark. They are addressed in  
13 his report, which is in the docket of the case at 1346-1. He  
14 has talked about a couple of situations. He has talked about  
15 some gaps in the mail-in ballot images. He has talked about  
16 some opposing in-person and mail-in.

17 I would like to pose some questions to him about  
18 whether or not the audit procedures that Georgia is currently  
19 using are sufficient to account for that or whether or not he  
20 would make recommendations to this Court for improvement in  
21 that practice, that that would then meet constitutional  
22 standards.

23 For the same reason, I would like to ask him about  
24 some observations that there were some SHA authentication files  
25 missing, whether or not the audits that he reviewed are

1 sufficient to account for that.

2 I would also ask to --

3 THE COURT: I'm sorry. I don't think he was -- are  
4 you talking about recent ones?

5 Because I don't know that he reviewed the recent  
6 audits.

7 MR. OLES: The most recent one I had was when he went  
8 back into '22, March 9th of '22. He did an update to his  
9 declaration, and these are the results that I'm talking about.

10 MR. MCGUIRE: So two issues. One issue is more of a  
11 meta issue, and that is that, obviously, Mr. Davis used to be  
12 part of our group, but he is no longer part of our group.  
13 Dr. Stark is a retained expert by our group, so we kind of feel  
14 like this is highjacking our expert to pursue an agenda  
15 separate from the agenda from which he was engaged. So that  
16 would be an objection.

17 Second of all, as far as the substance of what  
18 Mr. Oles hopes to get in, it is backward-looking. It is not  
19 looking forward. This is a case about threatened injury. It  
20 is not a case about what happened in the past.

21 And while that might be marginally relevant to the  
22 issue of future harm, it is, at best, marginal. And Professor  
23 Stark's testimony, I think, will be diluted if we allow that  
24 kind of questioning to go forward, and that will essentially  
25 prejudice our case.

1           THE COURT: How much time are you asking for to do  
2 this?

3           MR. OLES: Judge, I think 15 or 20 minutes. I don't  
4 even know that it is going to take that long, but I won't be  
5 long.

6           But I do think, looking forward, his opinion as to  
7 what an effective audit is going to be going forward is going  
8 to be very important to Your Honor's ruling in the case.

9           THE COURT: Have you advised Professor Stark that he  
10 might be subject to this examination by Mr. Oles?

11          MR. MCGUIRE: He has given, I think, nine-plus  
12 declarations in the case, so --

13          THE COURT: I understand that.

14          MR. MCGUIRE: -- it is possible it is within the zone  
15 of things he's aware of, but we haven't talked about it  
16 specifically.

17          THE COURT: No, I'm not asking that he would be  
18 asking -- he understands what the issues are between you and  
19 the State defendants, but I don't know if he understands who  
20 Mr. Oles is.

21          That is why -- have you advised him that there might  
22 be this possibility that Mr. Oles would ask questions?

23          MR. MCGUIRE: He is aware that one of the plaintiffs  
24 splintered off from our group. He is aware that we believe  
25 there's a difference in case strategy between us. So he is

1     aware of that. We haven't really discussed details about how  
2     he should approach it.

3             THE COURT: That's fine.

4             MR. CROSS: Your Honor, can I ask a quick question?  
5             Is this a direct exam or a cross-exam?

6             THE COURT: Well, it would have to be a direct exam.  
7     He is not an adverse party.

8             MR. CROSS: Exactly. That is what I thought. If it  
9     is a direct exam, then I guess the problem I have is we have a  
10    plaintiff that wants to do a direct exam of an expert that his  
11    client has no longer retained that is adverse to the other  
12    plaintiffs.

13            THE COURT: Well, I don't know that it is adverse.

14            MR. CROSS: Well, I mean, that is what I just heard.

15            MR. McGUIRE: I think it is tactically adverse.

16            MR. CROSS: Affirmatively unhelpful.

17            I guess the other question I would raise is, is the  
18    plaintiffs don't typically get to free-ride.

19            Is Mr. Davis going to pay?

20            THE COURT: Well, that has been a constant theme.

21            All right. Thank you, gentlemen. I will think about  
22    it.

23                    **(The bench conference was thereby concluded,**  
24                    **and there was a brief pause in the**  
25                    **proceedings.)**

1           THE COURT: I think you should look over your  
2 question and determine which two questions you think are most  
3 relevant, knowing what the testimony has been and the scope of  
4 what it is, because I think that there really is an unfairness  
5 that these folks who have called the witness and who is their  
6 expert for years and years who they have worked with and have  
7 developed a case about in which this expert knows about for you  
8 to come in and then introduce a whole potentially new set of  
9 issues is really not fair and not appropriate.

10           But I will let you ask two questions, so look at what  
11 you've got, and you can follow up on those with limited  
12 questioning, but -- and I don't know what those will be that  
13 you're going to choose. You can look over what you've got.

14                       **(There was a brief pause in the proceedings.)**

15           THE COURT: Ready?

16           MR. OLES: Thank you, Judge.

17           Before I get started, I do appreciate the Court's  
18 indulgence and the fact that the Court has been so fair-minded  
19 to my client this late in the case in a very difficult  
20 situation.

21           That being said, putting in an arbitrary limit of two  
22 questions is extremely limiting. I will do my best for my  
23 client within those two questions.

24           THE COURT: If there is an actual follow-up from what  
25 the witness says, I'll let you ask the question. I'll hear it,

1 and then we'll go from there.

2 MR. OLES: Thank you, Judge.

3 DIRECT EXAMINATION

4 BY MR. OLES:

5 **Q.** Good afternoon, Dr. Stark. My name is David Oles. I  
6 represent one of the plaintiffs, Ricardo Davis. It is nice to  
7 meet you.

8 Can you hear me all right?

9 **A.** Sorry. Yes. Good afternoon, Mr. Oles. Thank you.

10 **Q.** Thank you.

11 I have -- my two questions then stem out of a declaration  
12 that you prepared. You went back and revisited an earlier work  
13 that you had done, and you prepared an updated declaration in  
14 about March 9, 2022, it is dated.

15 And it discusses your examination or some thoughts  
16 regarding audits around some actual results that you  
17 investigated in Fulton County.

18 You are familiar with that?

19 **A.** It is my ninth declaration, approximately?

20 **Q.** I believe that.

21 It was updated March 9th, 2022.

22 **A.** Yes, I think that is the one -- yeah, I recall the one  
23 you're referring to. Yes.

24 **Q.** All right. Thank you, sir.

25 In that -- in that declaration you focused on a couple of



1 issues -- I will say issues -- that you perceived there may be  
2 problems in the process -- audit problems in the process.

3 The first had to do with -- had to do with missing ballot  
4 images, both mail-in and in-person ballot images, and you  
5 focused on -- and you had some numbers in your report which are  
6 in the declaration.

7 And I listened to you earlier. You were talking about  
8 problems of audits and how they are improved without the BMDs  
9 in the process. However, on this issue that you focused in on  
10 your report with the missing ballot images, Judge Totenberg is  
11 going to be asked -- assuming that she rules that the system is  
12 unconstitutional, she is going to be asked to also opine upon  
13 the sufficiency of the audit processes.

14 So my question to you is this: Given the missing ballot  
15 images that you found in your report, do you perceive there to  
16 be a problem with Georgia's current audit process? And if so,  
17 what would you recommend to improve that going forward?

18 **A.** The ballot images would not play a role in the  
19 risk-limiting audit of the results or the risk-limiting audit  
20 procedure, whether it has been applied to hand-marked paper  
21 ballots or a collection of vote records that included a lot of  
22 BMD printout.

23 So the missing images don't directly affect the audit, but  
24 they are a sign that election officials, at least in Fulton  
25 County, don't have very good control over their election

1 materials.

2 There was other evidence of that in that declaration as  
3 well.

4 **Q.** So are you saying that there is nothing that can be done  
5 in order -- in the manner of an audit requirement in order to  
6 catch that sort of an error?

7 **A.** I am not quite understanding the question. I'm sorry.

8 The -- my understanding is that there were cast vote  
9 records purportedly for every piece of paper that were cast,  
10 and there was paper which the plaintiffs were not granted  
11 access to, but in the course of scanning the paper, images were  
12 generated by the scanner, and some of those were evidently  
13 deleted before production.

14 **Q.** Okay.

15 **A.** Ordinarily, a risk-limiting audit would not involve  
16 examining those images. It would involve examining the  
17 underlying paper records.

18 **Q.** All right. And then if I understand what you were  
19 testifying to earlier today, if the -- if the BMD voting  
20 process is taken out of this and you move to hand-marked paper  
21 ballots, is this problem going to go away?

22 **A.** No. That is a problem of just the administration of  
23 elections in general. There are other issues that I point at  
24 in that declaration, including the fact that some ballots were  
25 included in the first machine count more than once, some were

1 included in the second machine count more than once, and there  
2 were differences even in the total number of ballots scanned  
3 between those two machine counts.

4 That has nothing to do with ballot-marking devices per se.  
5 It has to do with how well Fulton County in this particular  
6 instance keeps its materials organized and inventoried.

7 **Q.** Then, again, looking forward what we're going to be asking  
8 Judge Totenberg in the way of a remedy here, do you have any  
9 recommendations that you would -- I'm being redundant.

10 Do you have any recommendations in this regard?

11 **A.** For audits specifically?

12 **Q.** Yes.

13 **A.** Okay. So I'm not an authority on Georgia's election law  
14 or -- I have read the current audit law, but I'm not an  
15 attorney.

16 One of the most fundamental problems that I've come across  
17 in elections in Georgia --

18 **MR. CROSS:** Sorry to interrupt.

19 **THE COURT:** I'm sorry. Doctor, just one second.

20 **THE WITNESS:** Yes, ma'am.

21 **MR. CROSS:** Just to clarify, I guess I'm trying to  
22 understand the relevance of this.

23 Is Mr. Davis seeking audits as relief?

24 Because I don't believe that is the relief that any  
25 plaintiff is seeking, so I'm not understanding what the

1 question is for, and I don't want the Court to be confused  
2 about the relief that plaintiffs are seeking.

3 THE COURT: Could you read me his question again.

4 **(There was a brief pause in the proceedings.)**

5 THE COURT: What was the question you asked, sir?

6 MR. OLES: Judge, the question that I asked Dr. Stark  
7 is simply, in light of what he found in the investigation he  
8 conducted with the orders of this Court, is he making any  
9 recommendations -- would he make any recommendations here in  
10 the ways of an audit, assuming that, for example, if the BMD  
11 device is taken out of the process and the Court finds that to  
12 be unconstitutional, does he then have a recommendation for a  
13 robust audit process that will ensure that the kinds of things  
14 that he found are not going to reoccur?

15 MR. CROSS: Your Honor, with that clarification, it  
16 is fine.

17 THE COURT: All right. Did you hear the question  
18 again restated, Professor?

19 THE WITNESS: Yes, Your Honor.

20 THE COURT: Do you have any recommendations about  
21 what would be a robust audit process?

22 THE WITNESS: Yes, Your Honor.

23 First and foremost, additional steps need to be taken  
24 to ensure that the record of the votes is complete and  
25 trustworthy when the audit is conducted, and that requires more

1 thorough canvass than at least some Georgia counties evidently  
2 conduct. It requires physical inventories of ballots, physical  
3 accounting for ballots, pollbook reconciliation, what is called  
4 ballot accounting, comparing the number of ballots that were  
5 sent to a polling place to the number that came back from the  
6 polling place voted, blank, or spoiled.

7           It requires more attention to chain of custody,  
8 verifying that chain of custody wasn't broken. It requires  
9 proper attention to the physical seals on both voting equipment  
10 and voted ballots, checking the log-in seals when seals are  
11 broken, recording the number of the new seal, checking that on  
12 when materials are reopened, and this kind of shoe leather work  
13 of physical security to ensure that the paper trail is complete  
14 and trustworthy.

15           If that is done, then there is a variety of ways that  
16 probative audits could be conducted to establish whether  
17 reported outcomes are correct and to correct them if not. That  
18 will still require -- an audit should be expanded to include  
19 every contested race, not just one contested race. There  
20 should ideally be a risk-limiting audit.

21           The current law that allows different jurisdictions  
22 to pick whether they are doing a tabulation audit, which is an  
23 even unspecified thing, or a risk-limiting audit should be  
24 eliminated. There is no way to conduct a risk-limiting audit  
25 of any contest that crosses jurisdictional boundaries unless

1 all the jurisdictions in which ballots were cast in that  
2 contest participate.

3 So the current audit law that allows counties to do  
4 something other than a risk-limiting audit undermines the  
5 ability to conduct a risk-limiting audit of a statewide contest  
6 or a federal congressional contest or something like that.

7 Audits also need to be given the power or there needs  
8 to be some provision that if the audit determines that the  
9 outcome of one or more contests is wrong, there has to be a way  
10 to correct the outcome of this contest under the law.

11 And again, I'm not an attorney. My understanding of  
12 Georgia election law is that audits can't correct outcomes even  
13 if audits determine that the outcome were wrong.

14 THE COURT: Thank you, sir.

15 MR. OLES: Thank you, Doctor.

16 THE COURT: And this all dealt with us having an  
17 election that did not have a BMD or something, as I understand  
18 your recommendations with -- the assumption was made that there  
19 was only hand-marked ballots; is that right, sir?

20 THE WITNESS: Yes. Yes, Your Honor.

21 THE COURT: Okay.

22 MR. OLES: Thank you, Judge.

23 THE COURT: All right.

24 CROSS-EXAMINATION

25

1 BY MR. RUSSO:

2 Q. Good afternoon, Dr. Stark.

3 How are you doing today?

4 A. I'm well. Better than a few weeks ago. It is a little  
5 touch and go. Thank you.

6 Q. It is nice to meet you. Getting organized here.

7 A. Of course.

8 Q. Dr. Stark, you stated earlier that -- in the preferred  
9 system that you would recommend for the state of Georgia that  
10 if the plaintiffs had their way, there would be BMD ballots  
11 used for only disabled voters.

12 Did I hear that correctly?

13 A. I don't think I said that. I think there should be an  
14 accessible means for voters with disabilities to independently  
15 mark and verify the ballot. Currently, the best technology for  
16 that is some ballot-marking devices. Although some  
17 ballot-marking devices had failed usability to sustain in other  
18 states.

19 I don't know if there is or should be a means of  
20 restricting access to ballot-marking devices to only voters who  
21 have -- who identify as having disabilities, but I think that  
22 the default option for marking a ballot should be hand-marking  
23 for those voters who have the physical dexterity and eyesight  
24 to be able to do so.

25 Q. So just so I understand, it would be voters who are

1     able -- who are disabled and may be able to use a hand-marked  
2     paper ballot.

3             Is that who you are saying would use it?

4     **A.**     Well, some disabilities don't affect one's ability to use  
5     a hand-marked paper ballot. For example, many wheelchair users  
6     request a hand-marked paper ballot. The kinds of disabilities  
7     that a ballot-marking device is helpful for are generally  
8     visual disabilities and dexterity impairments that prevent you  
9     from actually holding a pen or physically handling a piece of  
10    paper.

11            But I don't think -- again, I'm not an attorney, but I'm  
12    not suggesting that there should be some test before a voter,  
13    you know, gets to use a ballot-marking device rather than  
14    marking a ballot by hand.

15     **Q.**     Thank you for that clarification.

16            THE COURT: Could I ask one follow-up question?

17            I also heard you to say you just didn't think there  
18    should be also a restriction on people using the BMDs if they  
19    so chose to use them. But maybe I misunderstood what you said.

20            THE WITNESS: Well, Your Honor, I am agnostic on that  
21    point. I just don't know if there is a basis for saying a  
22    legal way that one could say -- discourage voters from using  
23    ballot-marking devices unless they actually need that  
24    accommodation to privately and independently mark a ballot.

25            And that is not a -- I don't know what to say. From



1 a security standpoint, the fewer votes that are cast using  
2 ballot-marking devices the better.

3 BY MR. RUSSO:

4 **Q.** Dr. Stark, is it your opinion that if there was such a  
5 system where voters could -- who want to vote in person on a  
6 BMD are able to, is it your opinion that that type of system  
7 could produce an auditable result?

8 **A.** It has the same -- first of all, there are many states  
9 that do that, including the State of California. Whether an  
10 audit can produce affirmative evidence that outcomes are  
11 correct will depend on the margin and the number of voters who  
12 use ballot-marking devices to cast their votes. If there are  
13 few enough voters who use ballot-marking devices, that even if  
14 their votes were incorrectly recorded it couldn't alter a  
15 political outcome, then an audit can still generate affirmative  
16 evidence that the outcome is correct.

17 But if enough voters use BMDs, that changing their votes  
18 could alter the political outcome, could widen the margin, then  
19 no audit will be able to provide affirmative evidence that the  
20 reported outcome is correct.

21 **Q.** And would this -- this concept would be the same if there  
22 were hand-marked paper ballots for all in-person voters except  
23 certain disabled voters if the margin was within a certain  
24 range; correct?

25 **A.** If the margin is sufficiently small that alterations to

1 the BMD printout -- the inaccuracies in the BMD printout could  
2 change the outcome, then an audit is not going to be able to  
3 show that the outcome is correct.

4 **Q.** So, in essence, you're looking at how many ballots are  
5 cast on a BMD and are using a BMD and the margin to determine  
6 whether an outcome could be confirmed through a risk-limiting  
7 audit; is that correct?

8 **A.** Well, because there's a gap between the voter's expressed  
9 preferences and what the BMD prints, a conservative approach  
10 would be to treat the votes recorded on a BMD printout as  
11 intrinsically uncertain. Though an audit that pulls a BMD  
12 printout in the course of its investigation, the honest way to  
13 treat that would be to act as if the BMD printout recorded a  
14 vote for the loser in every contest, regardless of what it  
15 actually showed because it might, in fact, have been a vote for  
16 the loser that was misrecorded by the BMD.

17 **Q.** So there's not a maximum number of voters who could vote  
18 on a BMD is what you are saying?

19 **A.** No, I am not saying there is a maximum.

20 **Q.** There is --

21 **A.** I'm saying the BMD printout should be treated as  
22 intrinsically uncertain in the course of auditing.

23 **Q.** Thank you for that.

24 Is it your opinion that BMD systems have some of the same  
25 failure modes that hand-marked paper ballots have?

1     **A.**    Yes.

2     **Q.**    What are some of those failure modes?

3     **A.**    Well, a poorly designed ballot, whether it is a paper  
4     ballot or an on-screen ballot, can confuse voters and make it  
5     difficult for voters to record their intended selections  
6     accurately.

7           Once a ballot has been marked, the same physical security  
8     concerns apply to the hand-marked paper ballot as to  
9     ballot-marking device printout. Regardless, it needs to be  
10    kept accounted for and secure.

11           There's -- otherwise, there is a possibility that someone  
12    will substitute ballots that are inauthentic, remove ballots,  
13    alter marks, and so on.

14    **Q.**    Now, is it your opinion that Georgia should conduct a  
15    routine risk-limiting audit on every race on the ballot?

16    **A.**    It is my opinion that every jurisdiction should routinely  
17    audit every contest and every election -- every contested race  
18    and every election. The 2018 National Academies report on the  
19    Securing the Vote makes that recommendation as well. They  
20    advocate starting off with statewide contests and adding small  
21    contests down to local contests as states gain experience.

22    **Q.**    Now, did you -- did you consider the logistics of how that  
23    would work in a state like -- or in Georgia, I should say, with  
24    159 counties?

25    **A.**    Yes, sir.

1 Q. And is it your opinion that auditing every contest --  
2 every race that is contested is feasible?

3 A. Yes, by using the most current methods for risk-limiting  
4 audits. I have a recent paper with a couple of Ph.D. students  
5 showing that Orange County, California, which I believe is the  
6 nation's fifth largest jurisdiction and by itself is larger  
7 than many states, could have audited every contest in the 2020  
8 general election of which there were approximately 200 in  
9 Orange County to a risk limit of five percent by examining  
10 something like seven-tenths of one percent of the cast ballots.

11 In 2022, they had a comparable number of contests. And if  
12 I recall correctly, the sample size would have been between one  
13 and two percent of the ballots cast.

14 So in that -- in both cases, those numbers included either  
15 tied contests or contests with such a small margin, that a full  
16 hand count would have been required to confirm those contests.  
17 That is included in those work (Zoom interference) estimates.

18 Q. And remind me, what kind of voting system is used in  
19 Orange County?

20 A. Orange County uses Hart's voting system. I don't recall  
21 the -- in detail the model numbers and so on.

22 Q. It is a ballot-marking device, though?

23 A. They do have ballot-marking devices for accessibility in  
24 every precinct, every vote -- every polling place.

25 THE COURT: Do they have also hand-marked ballot

1 systems?

2 THE WITNESS: Yes, Your Honor.

3 THE COURT: So when you tell me -- tell us about the  
4 one or two percent. That includes both the BMD ballots and the  
5 hand-marked ballots?

6 THE WITNESS: Yes, Your Honor. That number is of the  
7 sheets of paper that were cast, regardless of how they were  
8 marked.

9 BY MR. RUSSO:

10 **Q.** And so none of the races in that election were within the  
11 margin that would have prevented an audit from occurring due to  
12 the voters voting -- the disabled voters?

13 **A.** Yes. At least one of those two elections included a tied  
14 contest. So if any ballots were cast using ballot-marking  
15 device or ballots using ballot-marked devices, the answer is  
16 intrinsically unknown.

17 **Q.** So just so I understand it, so if one disabled voter had  
18 used a ballot-marking device in that race, it would have been  
19 intrinsically unauditable?

20 **A.** Well, an audit couldn't show definitively who won.

21 **Q.** I guess they got lucky in that race.

22 **A.** Any inference about who won would require assuming that  
23 that ballot accurately reflected that voter's intended  
24 selections.

25 **Q.** Now, it is also your opinion that a risk-limiting audit

1 must be able to correct the reported outcome before the  
2 election is certified?

3 Is that what I understand?

4 **A.** Well, California briefly considered allowing risk-limiting  
5 audits to go back in time and change the outcome of an already  
6 certified election. That didn't seem like a great idea to me.

7 But the logical issue is simply if you want to limit the  
8 risk that an incorrect outcome will be certified, you need to  
9 correct the outcome before you certify it.

10 **Q.** And is that -- well, I guess my question is -- you know,  
11 what is -- do you have an opinion as to why that versus just  
12 allowing an election contest to determine the actual winner?

13 **A.** By election contest, do you mean a particular legal  
14 process?

15 **Q.** I'm sorry. I could not hear that last --

16 THE COURT: Did you mean a particular election  
17 contest? What did you mean?

18 BY MR. RUSSO:

19 **Q.** All I meant is an election contest that would determine  
20 whether the results -- the certified results were correct or  
21 not.

22 **A.** I'm sorry.

23 When you say election contest, are you referring to a  
24 particular legal proceeding?

25 **Q.** Okay. I understand now where we're missing each other.

1           Yes, I am. I am referring to where one candidate may  
2 challenge the results because they believe that candidate  
3 believes he or she won.

4   **A.** I don't know what the barriers are to that. I don't know  
5 what costs are involved. I don't know what a candidate needs  
6 to do to make that happen. But the idea of a risk-limiting  
7 audit is that it is a nonpartisan, non-adversarial quality  
8 control measure to ensure that there is strong evidence that  
9 the reported outcomes are right before you certify them.

10 **Q.** Would you agree with me that that is a policy decision  
11 then for policymakers to determine?

12 **A.** Well, it is wrapped up in the definition of risk-limiting  
13 audit. If the audit is going to limit the risk of certifying  
14 the wrong outcome, then there needs to be a mechanism for the  
15 audit to correct the outcome if it determines that the outcome  
16 is wrong.

17 **Q.** So in that -- so if policymakers choose to have election  
18 contests like we just discussed, then that would not be a  
19 risk-limiting audit in your definition?

20 **A.** If there were automatically election contests to correct  
21 the outcome before it is final, then that could be a somewhat  
22 (Zoom interference) risk-limiting audit. But if it isn't  
23 automatic, then the audit isn't doing what it claims to do,  
24 mainly to limit the risk of certifying wrong outcomes.

25 **Q.** In terms of being able to change the results through the

1     audit, do you have any concerns that the scanner could possibly  
2     be hacked and the results be altered?

3     **A.**     So the mechanism by which a risk-limiting audit corrects  
4     the outcome is by conducting a full hand count, accurate hand  
5     count of the underlying paper records. It doesn't involve the  
6     scanner.

7     **Q.**     So is there a -- did you -- have you ever considered  
8     whether the hand-marked paper ballots could be altered between  
9     the time they are scanned and the time the audit occurs?

10    **A.**     Yes. That is why secure chain of custody and the  
11    compliance audit are crucial. Because if the paper trail is no  
12    longer trustworthy by the time of the audit, then no audit can  
13    provide affirmative assurance that the outcome is right.

14    **Q.**     And this is so even if the optical scanner has taken the  
15    images of the hand-marked paper ballots; correct?

16    **A.**     Yes. Scanners are, first of all, not like cameras. They  
17    have CPUs and software and a bunch of things going on. So what  
18    comes out of a scanner may actually look different from what  
19    auditors would see if they looked at the underlying paper.

20           Moreover, a problem that results from relying on images is  
21    you need an assurance that every piece of paper, that every  
22    validly cast ballot was scanned exactly once, and its unaltered  
23    image is present in the collection.

24    **Q.**     You would agree that the images could be altered; right?

25    **A.**     Yes.



1   **Q.**   Now, a minute ago, we were talking about auditing every  
2   race on every ballot.

3           And did you -- I might have just missed you say this.

4           Are there any states in the country that presently audit  
5   every race and every election -- every contested race?

6   **A.**   The State of California does, but it doesn't do a  
7   risk-limiting audit of every race and every contest.

8   **Q.**   Okay.

9   **A.**   I think there are other states that do as well.

10   **Q.**   Now, there is some dispute amongst experts in the field  
11   about what is a risk-limiting audit?

12   **A.**   There's, yes, some dispute over the definition of the  
13   term, but I don't think that there's disagreement over whether  
14   applying a risk-limiting audit procedure to an untrustworthy  
15   record of the vote can provide affirmative evidence that  
16   outcomes are correct.

17   **Q.**   So what is -- you said there is some dispute over the  
18   term.

19           What is the dispute?

20   **A.**   Well, I don't want to put words in anyone's mouth, but I  
21   think it is an accurate paraphrase of the State's expert, Ben  
22   Adida, that a risk-limiting audit is just a procedure you can  
23   do to an arbitrary pile of vote records, whether that pile of  
24   vote records is a trustworthy record of the expressed  
25   preferences of the eligible voters.  Though he seems to

1 consider an RLA an algorithm. But I think he would concede  
2 that if the paper trail isn't a trustworthy record of the vote,  
3 then applying that procedure to those vote records can't  
4 guarantee a maximum chance that the wrong outcome will be  
5 certified rather than being caught and corrected.

6 **Q.** And the -- when you refer to the procedure, the  
7 trustworthiness, you're referring to the paper trail?

8 **A.** Yes, sir.

9 **Q.** And did you review any poll worker manuals in Georgia or  
10 other poll worker forms when making your -- excuse me. I had  
11 a -- cat caught my tongue there.

12 Did you review any poll worker manuals or poll worker  
13 forms when arriving at your -- to arrive at your opinion in  
14 this case?

15 And I'm talking about poll worker forms in Georgia -- in  
16 Georgia.

17 **A.** I have reviewed the audit board fact sheets or images of  
18 them from the 2020 election. I have reviewed instructions to  
19 the auditors of the 2022 audit, but I haven't reviewed basic  
20 poll worker instructions.

21 **Q.** So you didn't review instructions regarding opening and  
22 closing of polls?

23 **A.** I believe I read some regulations regarding ballot  
24 accounting, but not something that would look to me like a poll  
25 worker instruction manual.

1 Q. Okay. Did you review anything -- any of the required  
2 signage that is -- that poll workers are required to put in  
3 polling places about review your ballot?

4 A. No, sir.

5 Q. And so just to be clear, you didn't review any recap  
6 sheets for BMD touch screens that poll workers are required to  
7 write down the numbers at the opening and closing of the polls?

8 A. I don't recall.

9 Q. Maybe if we can show a few, and that would help see if it  
10 refreshes your memory.

11 A. I don't recall whether I have seen this one before.

12 Q. Okay. This is a voting equipment exception report, and I  
13 believe you testified earlier that a voter has no one to report  
14 if they have a problem with the machine; is that right?

15 They have no one to cry foul to, I think, is what you  
16 maybe said.

17 A. Yes, sir. I said that the voter can't prove to anyone  
18 that they observed a malfunction because they are given no  
19 evidence that they could present to someone else. There is  
20 always going to be uncertainty as to whether the voter made a  
21 mistake, the voter did observe a malfunction, or the voter is  
22 right.

23 Q. But it is not your opinion that a BMD cannot -- or that  
24 any voting equipment cannot be taken out of use in an election  
25 in Georgia; right?

1   **A.**   There certainly is.  You can take a BMD out of use.  If  
2   you have evidence that a BMD is malfunctioning, though, that's  
3   evidence that none of it can be relied upon.

4           So simply removing the one that was identified as an  
5   offender isn't really an adequate remedy.  Moreover, it doesn't  
6   do anything about the ballots that have already been printed  
7   using that ballot-marking device, presumably, which are also --

8   **Q.**   And just to make sure I heard you correctly, it is your  
9   opinion that if there is a malfunction with one BMD, then all  
10   BMDs -- then no BMD is good?

11   **A.**   I think the presumption should be that something is wrong  
12   with the software, and that absent affirmative evidence that  
13   the other BMDs don't suffer from the same fault, the only safe  
14   option is to assume that they have all been corrupted.  They  
15   are supposed to be receiving their programming from the same  
16   source.

17   **Q.**   Now, the next one is a Poll Pad recap sheet.  We can just  
18   kind of go through these quickly.  Well, take your time with  
19   it, of course.

20           But did you review any Poll Pad recap sheets?

21   **A.**   Not to the best of my recollection.

22   **Q.**   Do you understand what a Poll Pad recap sheet is?

23   **A.**   Well, just looking at it, it seems to be a record of voter  
24   check-ins according to the Poll Pad.

25   **Q.**   And that is -- that is so at the end of the day, you can

1 determine whether the number of checks-in match the number of  
2 ballots or ballots plus spoiled ballots; is that right?

3 **A.** It should make that possible. Whether these forms are  
4 routinely filled in, whether those checks are routinely  
5 performed, I don't know.

6 **Q.** It would all be part of --

7 **A.** But there is evidence from 2020 that there -- that there  
8 is considerable uncertainty about how many pieces of paper  
9 there were.

10 **Q.** Okay. And just flipping to the next one, now this is the  
11 ballot recap sheet.

12 Do you recall seeing any ballot recap sheets in arriving  
13 at your opinion?

14 **A.** I don't recall seeing that.

15 **Q.** Okay. Are you familiar with what a ballot recap sheet is?

16 **A.** Not prior -- I mean, I have heard of it before in Georgia.  
17 I think that term is specific to Georgia. I can see what is  
18 printed on this.

19 **Q.** You would agree that an accounting for all the ballots  
20 issued, printed, cast, and spoiled in a precinct -- that would  
21 be part of -- I think you call it a compliance audit maybe; is  
22 that right?

23 **A.** Yes. It would be part of a thorough canvass and also part  
24 of a compliance audit.

25 **Q.** The next one, this is the scanner ballot box recap form.

1 Did you see a recap form --

2 THE COURT: Excuse me. Please wait a second.

3 MR. RUSSO: Yes, ma'am.

4 THE COURT: I can't hear if I am also coughing.

5 MR. RUSSO: I'm going to take that opportunity to get  
6 a drink of water.

7 **(There was a brief pause in the proceedings.)**

8 MR. RUSSO: Are you all right, Your Honor?

9 THE COURT: Yes.

10 BY MR. RUSSO:

11 **Q.** Dr. Stark, take a sip of water if you need to.

12 **A.** Thank you.

13 **Q.** I hope your back is feeling better. For those of us that  
14 have back issues, we all understand.

15 Now, the scanner recap sheet -- and I don't know if you've  
16 responded or not, so I apologize.

17 But are you familiar with the scanner recap sheet? Did  
18 you see any of those in your review of the evidence?

19 **A.** I don't -- I don't recall.

20 **Q.** And this form also provides a summary of vote counts  
21 during the election; right?

22 **A.** It appears to, yes, sir.

23 **Q.** Okay. And moving on to the next one -- and this is the  
24 touch screen. I think we've talked about the touch screen, or  
25 have we not?

1 But you're familiar with the touch screen recap and  
2 understand what that is; correct?

3 **A.** The document looks self-explanatory. Again, I don't know  
4 how routinely they are filled out or whether they are checked  
5 or what they are checked against.

6 **Q.** It would be something that you agree should be done in a  
7 compliance audit?

8 **A.** Yes, sir. This kind of check reporting, this kind of  
9 data, and checking it against other records including physical  
10 inventories of the amount of paper would be part of a thorough  
11 canvass of the compliance audit.

12 **Q.** And that is the same whether -- where you are using touch  
13 screens or hand-marked paper ballots, you think this should --  
14 type of compliance audit should be done; right?

15 **A.** Yes, sir. Although this form says specifically touch  
16 screen.

17 **Q.** I realize it may be a little different if it was an all  
18 hand-marked.

19 Well, it may only apply to disabled voters; right?

20 **A.** Well, it applied to the devices, not voters.

21 **Q.** Good point.

22 Now, was that the last one?

23 Now, this is the chain of custody form.

24 Did you review any chain of custody forms in forming your  
25 opinion?

1     **A.**    No, sir.

2     **Q.**    Okay.  Now, this is for transporting ballots to the  
3     polling place; right?

4     **A.**    It says from the polling place.

5     **Q.**    Excuse me.  From the polling place.

6             Now, you have also mentioned earlier that part of a  
7     compliance audit or having a trustworthy audit trail requires  
8     that voters are verified to be eligible voters and that  
9     ineligible voters are not voting.

10            Is that what I heard?

11     **A.**    Yes, sir.  The word -- what we want is for the vote record  
12     to be a complete record of the expressed preferences of the  
13     eligible voters who voted.

14     **Q.**    And in terms of verifying eligibility, what do you -- I  
15     guess just explain that.  So the noncitizens aren't voting.

16            Is that what you are referring to?

17     **A.**    I don't know whether -- under Georgia law whether  
18     noncitizens are eligible to vote in some contests or not.  I  
19     think it is in states where they are able to vote on some tax  
20     measures.

21            Basically, the first cut is that the people who are voting  
22     are registered voters.  The second cut is that each registered  
23     voter receives a ballot that contains exactly those contests  
24     that that voter is eligible to vote in.

25            There are examples where voters have received the wrong



1 style ballot and therefore were either allowed to vote in a  
2 contest they were not eligible to vote in or were precluded  
3 from voting in a contest they were eligible to vote in.

4 **Q.** So those would be like provisional ballot voters; right?

5 **A.** No, sir. For example, by virtue of where I live, I am  
6 eligible to vote in certain contests for mayor, for school  
7 board, for tax measures, et cetera. If I received a ballot  
8 that corresponded to someone who lived a couple of ZIP codes  
9 over, I might not get different contests on that ballot,  
10 including some I'm not eligible to vote in and exclude some I  
11 am eligible to vote in.

12 **Q.** That is like the Nevada Sanitary District Board case that  
13 you were an expert in many years ago; right?

14 **A.** Yes, sir.

15 **Q.** And in that case, there was what, about 15-vote  
16 difference, if I recall, and there was --

17 **A.** I honestly don't remember. I'm sorry.

18 **Q.** I don't either.

19 You discussed earlier voter review of printed ballots.

20 Do you recall that?

21 **A.** I'm sorry. Say that once more.

22 **Q.** Voters reviewing their print ballots or just their ballot,  
23 period.

24 **A.** Yes, sir.

25 **Q.** You haven't done any studies regarding whether voters who

1 mark a hand-marked paper ballot review that ballot before  
2 casting it; right?

3 **A.** That's correct.

4 **Q.** Is it your opinion that when somebody completes a  
5 hand-marked paper ballot, they are reviewing it as they go?

6 **A.** I imagine some people do and some people don't. My habit  
7 is to mark a sample ballot and then mark the actual ballot when  
8 I have it from the sample ballot, checking the selections  
9 against my more researched sample ballot.

10 **Q.** So in that case, you agree with me that no matter what  
11 voting system voters are using, they may or may not review  
12 their ballots; right?

13 **A.** They may or may not make mistakes, and they may or may not  
14 review their ballots.

15 **Q.** Sure. And then you agree mistakes can occur on all voting  
16 systems, hand-marked or BMD?

17 **A.** Yes, sir. The fundamental difference is that with a  
18 hand-marked paper ballot, it is only the voters' mistakes that  
19 can cause the marks to be in the wrong place and mark the wrong  
20 selection; whereas with BMD printout, misconfiguration or  
21 malware or bugs can also cause that.

22 **Q.** Now, you talked a little bit about overvotes earlier.

23 And did you account for or have you seen any overvotes on  
24 BMDs in Georgia before?

25 **A.** No, sir.

1 Q. And did you ever review any ballots in Georgia that had  
2 overvotes that were hand-marked paper ballots?

3 A. I don't recall.

4 Q. And did you review any laws in Georgia regarding whether  
5 voting systems that allow for overvotes can be -- can be used?

6 A. I don't recall reading anything about that under Georgia  
7 law. My understanding is that HAVA requires either overvote  
8 protection of the kind I mentioned before where precinct  
9 scanners spits the ballot back out. Or for centrally tabulated  
10 optical scan, I think it just requires some written notice.

11 Q. Now, in the precinct scanned system you are referring to  
12 that spits the ballot back out with a hand-marked paper ballot  
13 that is -- I believe you said overvoted; that's right?

14 A. Yes, sir. There's -- my understanding is that that kind  
15 of protection is available on all EAC-certified systems  
16 starting with the VVSG 1, although I believe it can be disabled  
17 and that some jurisdictions do disable it.

18 Q. Now, do you know if there's a privacy concern with that  
19 function being enabled?

20 A. If someone is looking over the voter's shoulder when the  
21 voter puts the ballot into the scanner, they could see it on  
22 the way in. They could also see it on the way out if the  
23 ballot got spit back out. But I think that is a place where  
24 polling place procedures are the way to get privacy of the  
25 polling booth.

1 Q. So you agree that if a scanned ballot that had the  
2 overvote prevention enabled -- I'm calling it the overvote  
3 prevention. I'm sure there is a technical term for it, and I  
4 apologize for that -- you agree that it could reveal who the  
5 voter had voted for?

6 A. Honestly, I don't know whether it spits the ballot card  
7 back out face-up or face-down. I think the risks are the same  
8 as the risks when the voter first puts the ballot into the  
9 scanner. Although I guess it would be giving the shoulder  
10 surfer a second bite at the apple.

11 Q. Now, you've been engaged in promoting policy changes for  
12 years now around paper ballots; isn't that right?

13 A. Yes, I think that is fair.

14 Q. And after the 2016 election, you sent, in fact, a letter  
15 to Senator Lindsey Graham to try to promote more -- or fewer, I  
16 should say, touch screen ballot-marking devices; correct?

17 A. I vaguely recall that, but I'm not very specific. It has  
18 been eight years.

19 MR. RUSSO: Jim, could we put that letter --

20 BY MR. RUSSO:

21 Q. Maybe this will help remind you.

22 MR. RUSSO: May I approach?

23 THE COURT: Yes.

24 BY MR. RUSSO:

25 Q. Dr. Stark, this is a letter. Have you had --

1           MR. RUSSO: Well, we can scroll through it, Jim, so  
2 he can see if he recognizes it.

3 BY MR. RUSSO:

4 **Q.** Dr. Stark, is that the letter -- you recognize that  
5 letter?

6 **A.** Vaguely.

7 **Q.** Okay. This is one if we flip down, flip to the fifth  
8 page, you see you have signed on there?

9 **A.** Yes, sir.

10 **Q.** And, in fact, Ms. Marks is also signed on to the letter;  
11 right?

12 **A.** Yes.

13 **Q.** And this letter, you agree that there needed to be  
14 election systems that had some kind of a paper trail; correct?

15 **A.** Yes. The state of the art circa 2017 was that no one  
16 really anticipated that vendors or election officials would  
17 adopt universal use of ballot-marking devices. And my kind of  
18 research and understanding of the vulnerabilities about  
19 ballot-marking devices didn't really kick in until roughly  
20 2018, and that is when I started to understand the issues  
21 better.

22 **Q.** And -- okay. That is fair enough.

23           And you -- you and your cosigners made several suggestions  
24 for mitigating cybersecurity threats, and you direct yourself  
25 to the second to the last -- third-to-last page of your letter.

1 It is in the appendix.

2 All right. And so here, you believe it is the one, two --  
3 the second recommendation requiring paper ballots and  
4 prohibiting touch screen machines from federally funded  
5 equipment. And you cite to this -- you have an end note at End  
6 Note 10, which is the last page.

7 Here, you make clear that you're not -- you're talking  
8 about, like, the old DRE machines that have no paper trail;  
9 right?

10 **A.** Yes. I think given the fact that that was 2017 and given  
11 the context of that letter, we were probably referring to  
12 paperless DREs.

13 **Q.** And remind me, why was there the change to, at that time,  
14 only opposing paperless machines to now opposing machines that  
15 provide a paper trail such as the Dominion machine?

16 **A.** I think it was an advance of scientific knowledge,  
17 including the cyber vulnerabilities of ballot-marking devices  
18 and the human factors research demonstrating that voters, by  
19 and large, don't check the printout and aren't especially good  
20 at noticing errors that are there.

21 **Q.** So science moved pretty quickly, right? That's a couple  
22 of years.

23 **A.** It did in this instance, yes, sir.

24 **Q.** And do you have any indication whether science around  
25 scanners is going to move this -- as quickly as this?

1     **A.**   Once again, scanners are giving a fundamentally different  
2     function, and we know how to make an end run around the cyber  
3     vulnerabilities of scanners to ensure that even if the scanners  
4     misbehave, we still find the right winner of the election.

5             Here, you know, discovering the vulnerabilities is  
6     different from saying we're assuming there is a vulnerability  
7     and we have a workaround.

8     **Q.**   Now, you don't dispute the results of the 2020 election;  
9     right? I mean, that is clear?

10    **A.**   I don't. That's correct.

11    **Q.**   And I want to just show you what has already been marked  
12    as Defendants' Trial Exhibit 67.

13             Are you familiar with this document?

14    **A.**   It looks familiar.

15             Is that the letter I signed?

16             MR. RUSSO: Jim, if you could flip through the pages  
17     so he can see. And if you flip one more, Jim. Thank you.

18     BY MR. RUSSO:

19    **Q.**   And this looks like you signed it --

20    **A.**   Yes, sir.

21    **Q.**   -- along with some others.

22             And the third paragraph states, anyone asserting that the  
23     U.S. election was rigged is making an extraordinary claim, one  
24     that must be supported by persuasive and verifiable evidence.

25             Do you still agree with that?

1     **A.**    Yes, sir.

2     **Q.**    And you state that merely citing -- merely citing the  
3       existence of technical flaws does not establish that an attack  
4       occurred, much less that it altered an election outcome.  It is  
5       simply speculation.

6             You still agree with that statement?

7     **A.**    Yes, I do.

8     **Q.**    Now, just days before this letter, you gave an interview  
9       for -- I believe it is your University Berkeley research.

10            Is that an outlet you're familiar with?

11    **A.**    Yes, sir.

12    **Q.**    And do you recall giving an interview for an article  
13       called Is Trump Right About Georgia Vote?

14    **A.**    Yes, I do.

15             I don't recall the content, but I recall the interview.

16    **Q.**    Okay.

17             MR. RUSSO:  And, Jim, if you could put it up to  
18       refresh your memory.

19    BY MR. RUSSO:

20    **Q.**    Is this the article you remember?

21    **A.**    Yes, sir.  I don't remember the rest of the pages, though.

22             MR. RUSSO:  Jim, if you could just kind of scroll  
23       through it for him so he can --

24    BY MR. RUSSO:

25    **Q.**    On the second page you state, I give it a 20 or 25 percent



1 chance that Republicans will be able to show what is, in fact,  
2 true about Georgia.

3 Do you see that sentence?

4 **A.** Yes, sir.

5 **Q.** So you believe that there may be -- what were you trying  
6 to say there?

7 **A.** It was speculating about the outcome.

8 THE COURT: I don't really think that is a fair  
9 question. At least, you need to read the whole statement into  
10 the record.

11 MR. RUSSO: I was trying to cut off putting in the  
12 language into the record myself, which is why --

13 THE COURT: Well, that is the problem. It makes it  
14 more --

15 MR. RUSSO: That's fine.

16 THE COURT: Either you can or can't ask him the full  
17 question because now you have changed what -- the context.  
18 That is the thing.

19 MR. RUSSO: Well, I'll move on to the next one.

20 BY MR. RUSSO:

21 **Q.** Mr. Stark, you stated that -- this is a paraphrase --  
22 Georgia's disarray is the result of a long history of  
23 shenanigans that have suppressed the Peach State's minority  
24 Black vote, something that -- it appears to say Stark looked  
25 into statistically after the 2018 midterm elections.

1 Dr. Stark, you don't have any evidence that minority  
2 voters were suppressed in the 2018 election, do you?

3 THE COURT: I'm sorry. Just wait. There is an  
4 objection. Just a second.

5 MR. MCGUIRE: Your Honor, I think this is beyond the  
6 scope, and I am not sure what he is getting at here in terms of  
7 relevance.

8 MR. RUSSO: This gets to his credibility, Your Honor.  
9 He's talked about, you know, making -- that the 2020 election  
10 was fine. He has talked about -- I mean, look --

11 THE COURT: I think he has been very neutral,  
12 frankly, and been very credible, so I just think to go into  
13 what happened in the 2018 election -- midterm election and some  
14 of the statistics and a whole other inquiry is not an  
15 appropriate -- doesn't necessarily indicate he is biased or not  
16 biased.

17 I think he has given you very candid responses of his  
18 position. So I don't think that it is fair game, and it is, in  
19 fact, a waste of time.

20 If you had taken his deposition and he had advanced  
21 notice that you wanted to discuss with him his assessment of  
22 the 2018 midterm elections, that would be another thing. But  
23 to pop it with an article that's prepared by likely a student  
24 writer or somebody in media relations for the university is --  
25 just doesn't make sense.

1 MR. RUSSO: I think, Your Honor, this -- one last  
2 question.

3 BY MR. RUSSO:

4 Q. Dr. Stark, you've never actually reviewed any -- an audit  
5 that has taken place in Georgia; correct?

6 A. I have not, no. I have spoken with people who were  
7 present, but (Zoom interference).

8 MR. RUSSO: Thank you. No further questions.

9 Thank you, Dr. Stark.

10 THE COURT: Thank you.

11 REDIRECT EXAMINATION

12 BY MR. MCGUIRE:

13 Q. Dr. Stark, I just wanted to clarify a couple of points  
14 that came up on cross and on Mr. Oles' questioning.

15 I believe you told Mr. Russo that if one disabled voter  
16 used a BMD that would render the election intrinsically  
17 unauditable.

18 That seemed like a misstatement.

19 Is that what you meant?

20 A. No, sir. I think the hypothetical was that there was a  
21 tied contest and some votes were cast using BMDs.

22 Q. And so --

23 A. And it is not about auditability. It is about whether any  
24 audit can provide affirmative evidence that there really is a  
25 tie, or if it had been a win by one vote, that the reported

1 winner really did win.

2 **Q.** And is your answer there to that hypothetical a function  
3 of the fact that a risk-limiting audit is a hand count of a  
4 sample of the paper, and if the margin is close, you have to  
5 count more and more and more the closer the margin gets?

6 **A.** So I would almost flip it -- your statement on its head.

7 You can think of a risk-limiting audit as a full hand  
8 count that stops without -- if and only if the ballots you have  
9 looked at so far make it clear that it is pointless to continue  
10 because completing the full hand count will just find the same  
11 reported winners. So a full hand count of the paper trail that  
12 isn't sufficiently trustworthy won't show -- won't necessarily  
13 show who really won.

14 Or if you have a tiny margin and a bunch of the votes were  
15 cast using ballot-marking devices, then you can't assume that  
16 was printed on the BMD printout is what the voters expressed to  
17 the machine, then you have no reason to believe that a full  
18 hand count shows who really won as a moral issue.

19 As a legal issue, a state might define that full hand  
20 count to be the correct answer even though, morally, there is  
21 no certainty.

22 **Q.** And so in terms of the risk-limiting audit's ability to  
23 get you to an assessment of the correctness of the election's  
24 reported outcome, the more untrustworthy paper you have among  
25 what you're counting, the harder it is to get to that

1 certainty?

2 **A.** Yes, sir.

3 **Q.** And is that why you said that you would -- you would want  
4 to discourage people from voting by BMD if they had the option  
5 to do it because that would reduce the untrustworthy paper?

6 **A.** Yes. At least we would know that paper record was the  
7 selections of more of the voters.

8 **Q.** And you are not arguing that there is any problem with  
9 people who need BMDs for accessibility using BMDs?

10 **A.** I sincerely hope that someone comes up with a better  
11 solution than BMDs for voters with disabilities that preclude  
12 their ability to -- from hand-marking a paper ballot because  
13 BMDs have this intrinsic security gap. But for the moment, it  
14 seems a well-designed BMD is the best option.

15 **Q.** And we talked --

16 **A.** I do think -- may I say --

17 **Q.** Of course.

18 **A.** I do think one thing that is missing from many BMD-based  
19 system is an air-gapped independent way for voters to have  
20 their printed ballots open back to them or voters with visual  
21 disabilities, for example. Right now, voters have to rely on  
22 the machine telling them what it claims it is going to print on  
23 the paper rather than having technology read to them what  
24 actually was printed on the paper.

25 Something like that could be an improvement, especially

1 with voters with disability, to make it easier or possible for  
2 them to verify whether the printed selections reflect what they  
3 intended. There is still a problem that voters might not do  
4 that or might not do it perfectly.

5 **Q.** Thank you.

6 And then you talked a bit about the example of Orange  
7 County as a place where every contest on every ballot was  
8 audited and apparently was feasible.

9 **A.** No, this is not an audit that actually took place. These  
10 are work load calculations done to show feasibility.

11 **Q.** You assessed that every contest on every ballot could have  
12 been audited feasibly in a county like that?

13 **A.** Yes. So Orange County election staff provided us with  
14 cast vote records for all of the cast ballots for 2020 general  
15 election and the 2022 midterm election, so we were able to  
16 figure out how many of each ballot style there were, what the  
17 margins were in all of the contests that were reported, and  
18 those calculations for sample size are pro forma calculations  
19 on the assumption that the audit didn't uncover any  
20 discrepancies between the cast vote records and the underlying  
21 paper.

22 **Q.** Thank you.

23 And then just to wrap up, I just want to recap what audits  
24 do and what they don't do.

25 Is it fair to say that audits do, when you have a

1 trustworthy paper record, tell you whether or not the reported  
2 outcome of an election is correct?

3 **A.** If we have a trustworthy paper record, they can provide  
4 affirmative evidence that the outcome is correct, but if they  
5 stopped short of a full hand count, that is still just  
6 statistical evidence, not proof.

7 **Q.** And is it your testimony that when elections are conducted  
8 using a substantial number of BMDs that you cannot get a  
9 successful outcome audit?

10 **A.** Well, if the underlying paper trail isn't trustworthy,  
11 meaning that a full accurate tabulation wouldn't necessarily  
12 show who won as a moral matter, then no audit can provide  
13 affirmative evidence of the correctness of outcomes. The paper  
14 trail can be untrustworthy for a variety of reasons. One of  
15 them is substantial use of ballot-marking devices.

16 **Q.** And are we right to understand you as having testified  
17 that as far as what audits don't do, audits don't give  
18 individual voters any assurance that their votes were not  
19 stolen by a hack or a misprogramming error on a machine; is  
20 that right?

21 **A.** Risk-limiting audits do not. In fact, every single ballot  
22 could have been tabulated incorrectly, but still the reported  
23 winners really won.

24 I mean, I think I can give you a simple numerical example  
25 if you want.

1 Q. Sure. Please.

2 A. Suppose we have a two-candidate contest, Alice v. Bob, and  
3 let's just suppose that a thousand votes were cast in all  
4 reporting -- really 1,000 votes were cast in all. And let's  
5 suppose that according to the tabulator, according to the  
6 scanners, there were 400 votes for Bob, 500 votes for Alice,  
7 and 100 undervotes or overvotes or non-votes. So according to  
8 the scanners, Alice really won.

9 Well, suppose that in reality the 400 votes that the  
10 scanner said were for Bob were really for Alice and the 100  
11 undervotes were, in fact, really for Alice, and 400 of the  
12 votes that were recorded as being votes for Alice were really  
13 votes for Bob, and the other 100 reported were really  
14 undervotes. Then Alice really won, but every ballot was  
15 incorrectly tabulated.

16 MR. McGUIRE: Thank you.

17 Nothing further.

18 THE COURT: That sounds like a nightmare.

19 I had just one -- I think one question. It might  
20 have a follow-up.

21 EXAMINATION

22 BY THE COURT:

23 Q. This January 13, 2017, letter to Lindsey Graham in his  
24 capacity, I guess, as head of the Armed Services Committee by  
25 you and many other experts in the field, I wanted just to ask



1 you about this: On Page 2, the second-to-last paragraph, there  
2 is this quotation again from CIA director James Woolsey in  
3 connection with the Russian hacking of the election.

4 Quote, well, the degree to which they intervened in the  
5 process -- this is again from Mr. Woolsey -- is something we  
6 really need to get a handle on, but at this point, it doesn't  
7 look as if they were interfering with the voting, and insofar  
8 as that is the case, it is a very different thing than if they  
9 were hacking into the voting machines. And by the way, they  
10 shouldn't be involved, period. But we have to make sure that  
11 two years from now and four years from now, we are protecting  
12 our voting machines, and a lot of people and counties and so  
13 forth have added essentially touch screens, and you can't check  
14 up on hacking with that. You have got to have some kind of  
15 paper trail.

16 That is the end of his remarks that were quoted here, and  
17 since those remarks were made, then also CISA was created and  
18 given responsibilities also in this area.

19 But I wanted to ask you in particular about his statement  
20 that he says on one, that there have been a lot of  
21 jurisdictions that have added touch screens, and you can't  
22 check up on hacking with that. You've got to have some kind of  
23 paper trail.

24 So is the paper trail one that -- that he is thinking  
25 about. I know you have a different potential perspective. But

1 when we talk about a paper trail for a -- somebody who votes  
2 with a screen, what is -- is that -- what is that, typically,  
3 if anything?

4 **A.** Your Honor, I think that he might have been referring to  
5 was VVPAT with more paper rolls that have been either designed  
6 into or retrofitted to some touch screen DREs. There's a fair  
7 amount of evidence that voters don't check those either and  
8 aren't very good at checking them when they do. It is research  
9 out of Rice University going back quite a while.

10 I think that -- I can't read his mind, but I think the  
11 number of people who are worried about vulnerabilities of  
12 ballot-marking devices of putting technology between the voter  
13 and the paper record was very small at that time. And just,  
14 again, I don't think the election integrity community really  
15 anticipated that states would move to universal use of  
16 ballot-marking devices. In retrospect, it was a mistake not to  
17 call for hand-marked paper, primarily.

18 **(There was a brief pause in the proceedings.)**

19 THE COURT: Thank you very much, Doctor.

20 THE WITNESS: Thank you, Your Honor. Thank you again  
21 for letting me testify by video.

22 THE COURT: All right. Now I hate to say, we have  
23 one counsel who -- from the plaintiffs' side who is independent  
24 and has his own questions, so I think I need to know -- I'm  
25 going to follow the same rule I did before, if that is what

1     you're going to -- are you going to -- seeking to ask  
2     additional questions or not?

3             MR. OLES:  Oh, for Dr. Stark?

4             THE COURT:  Yes.

5             MR. OLES:  No.

6             THE COURT:  Very good.  Then we're through.  Thank  
7     you very much, sir.  And we're sorry for keeping you on hold,  
8     and good luck on your recovery as well.  You look --

9             THE WITNESS:  Thank you so much.

10            THE COURT:  You look very erect, so you may be  
11     holding yourself in the best way possible.

12            THE WITNESS:  I have my prosthesis cummerbund going  
13     on.  Thank you.

14            THE COURT:  Thank you.

15            All right.  Are there any other witnesses the  
16     plaintiffs intend to present?

17            MR. CROSS:  No further live witnesses.

18            MR. BROWN:  Right.

19            MR. CROSS:  No further live witnesses, Your Honor.  
20     We do have deposition designations in hard copy that we're  
21     going to tender.  I know there has been some discussion between  
22     the parties on that.  Our plan was to play some short video  
23     clips for the Court from some of those, just because we think  
24     it would help the Court to get a sense of credibility from some  
25     of these people.  I think they run anywhere from about five or

1 six minutes to the longest is maybe 15, so they will -- they  
2 won't take that long, I think.

3 THE COURT: How long collectively, just so I can --

4 MR. CROSS: A little over an hour.

5 MR. SCHEINMAN: About an hour, 20.

6 MR. CROSS: The last pieces of our case, I think,  
7 are -- Your Honor, with the deposition designations, there are  
8 some exhibits. It sounds like there may be only a few that  
9 there are objections on, so we'll have to resolve that.

10 I know that there are some exhibits Your Honor took  
11 in and was pending ruling on, so there is handful of those that  
12 are outstanding.

13 THE COURT: Would you mind identifying what those are  
14 so we can pull them up?

15 MR. CROSS: I don't have a list for that yet. We're  
16 going to pull that together for the Court. There is a motion  
17 that we filed today for Fifth Amendment inferences. We can  
18 address that whenever the Court wants.

19 THE COURT: Well, I haven't read it yet.

20 MR. CROSS: Obviously. Yeah, I was just flagging it  
21 for you because these are last pieces in our case.

22 And, of course, the last piece that also bears on the  
23 merits of the case is the issues percolating with  
24 Mr. Persinger, and we're prepared to address that today as  
25 well.

1 THE COURT: Okay. Did you have a witness who has  
2 come back to court?

3 MR. OLES: Ms. Johnston, apparently, wants to come  
4 back and clear up something.

5 THE COURT: Is she here?

6 MR. TYSON: She is, Your Honor.

7 THE COURT: Let's go ahead with Ms. Johnston since  
8 she is here in person.

9 MR. BELINFANTE: Your Honor, while that takes place,  
10 given what we've heard they're still to do, is it okay with the  
11 Court if we send Mr. Germany home today given that it is 4:30?

12 THE COURT: Was he your first witness?

13 MR. BELINFANTE: Yes.

14 THE COURT: It seems like that is so, yeah.

15 MR. BELINFANTE: Thank you.

16 THE COURT: You are still under oath. Thank you for  
17 coming back. Have a seat.

18 I understand from counsel that there was some -- from  
19 defense counsel that you were concerned about one of your  
20 responses.

21 THE WITNESS: Yes.

22 THE COURT: All right. I'm going to let Mr. Oles,  
23 who called you, come up so that --

24 MR. OLES: We had time to make copies.

25 Whereupon,

1 JANICE JOHNSTON M.D.,  
2 after having been previously duly sworn, testified as  
3 follows:

4 RECROSS-EXAMINATION

5 BY MR. OLES:

6 Q. Good afternoon, Ms. Johnston.

7 A. Good afternoon.

8 THE COURT: Sir, do you know what question she --  
9 have you been advised as to what matter the witness wishes to  
10 testify about again?

11 MR. OLES: I should have.

12 THE COURT: Yeah. Because we're not going to jump  
13 into a whole new wave of questions. I just want -- I don't  
14 know that we know what her concern is at all. So we'll find  
15 out.

16 THE WITNESS: Thank you.

17 BY MR. OLES:

18 Q. Ms. Johnston --

19 THE COURT: Doctor.

20 BY MR. OLES:

21 Q. -- I understand through counsel that since you were  
22 here -- you were here the other day testifying and we had  
23 questioned you about one or more matters before the State  
24 Election Board that you have had some additional recollection  
25 about those matters.

1     **A.**    Yes.

2     **Q.**    Okay.  And is there a specific case or matter that you're  
3     referring to?

4     **A.**    Correct.  There is.

5     **Q.**    Okay.  And would that be -- would that be the complaint  
6     filed by David Cross and Kevin Moncla?

7     **A.**    They have filed several complaints.  You'll need to be  
8     specific.

9     **Q.**    Okay.  This is numbered SEB 2022-348 and has to do with QR  
10    code signature mismatch.

11    **A.**    Correct.  That's the case.

12    **Q.**    All right.  Thank you.

13            MR. OLES:  May I approach, Judge?

14            THE COURT:  Yes.

15    BY MR. OLES:

16    **Q.**    What I have set before you as Davis Exhibit 10, which I  
17    will represent -- well, the other day I asked you if you could  
18    identify the document.

19            Would you go ahead and take another look at it, and I'll  
20    ask you the same question.

21    **A.**    Thank you.  All 196 pages.

22    **Q.**    Yes.

23            THE COURT:  But a lot of it is printouts.

24            MR. OLES:  Right.  I think it is only 30 pages of  
25    actual letter.

1           THE COURT: Is this the document you had a concern  
2 about?

3           THE WITNESS: Yes, it is.

4           THE COURT: And do you know what you were concerned  
5 about here?

6           THE WITNESS: My concern was I did not know I would  
7 be asked about this case. And although I had seen this  
8 document approximately 15 months ago as an attachment to an  
9 email, I did not -- from that point, I did not know this was  
10 actually filed as a complaint. It was sent to me as a  
11 complaint, but that does not equate to a formal complaint being  
12 submitted to the State Election Board. But it was. And  
13 apparently, a case number was assigned, the case number you  
14 just mentioned, Mr. Oles.

15           And the case was then scheduled to be presented to --  
16 for a hearing by the State Election Board last month.

17 BY MR. OLES:

18 **Q.** All right. Well, let me ask you, Ms. Johnston --

19           THE COURT: Was it heard last month?

20           THE WITNESS: Beg your pardon?

21           THE COURT: Was it heard last month?

22           THE WITNESS: No. It was continued because  
23 Mr. Barnes from the Secretary of State did not appear to answer  
24 technical questions.

25           THE COURT: Okay. Thank you.



1 BY MR. OLES:

2 **Q.** Ms. Johnston, now we're here before Judge Totenberg  
3 because questions have been raised by the plaintiffs concerning  
4 the ballot-marking device that produces a QR code and its  
5 process. And, of course, they are asking the judge to grant  
6 certain -- to find that the process is unconstitutional.

7 And I'm not trying to burden you with the legalisms, but  
8 this complaint that came before the State Election Board, this  
9 involves issues regarding the QR codes?

10 **A.** Yes, it does.

11 **Q.** Okay. And have you -- you have familiarized yourself with  
12 this complaint?

13 **A.** Yes, I have.

14 **Q.** Okay. Could you explain for the judge what your  
15 understanding is then of the claims that are being raised with  
16 the QR code process and the ballot-marking device.

17 **A.** So in the complaint, the allegation is there is an anomaly  
18 that complainants think they have -- have found between the  
19 scanning and tabulating of QR codes.

20 **Q.** Has the State Election Board taken an initial evaluation  
21 of this about whether to then go ahead and investigate it?

22 **A.** The case has not been presented yet, so --

23 **Q.** Okay. So am I correct then that no real investigation has  
24 yet been conducted on it?

25 **A.** The Secretary of State investigators are responsible for

1 the investigation, and they will report their findings at the  
2 State Election Board meeting.

3 **Q.** Okay. And do you know when you expect that to be?

4 **A.** Well, it was scheduled for last month, and it was  
5 continued, so I think it will be determined when Mr. Barnes  
6 could be present for the hearing.

7 **Q.** Okay. Now -- and you've been how long on the State  
8 Election Board?

9 **A.** Three months shy of two years.

10 **Q.** All right. And during that time, have you had occasion to  
11 review and participate in board deliberations on complaints  
12 similar to this; not necessarily the same subject matter, but  
13 complaints about election processes in general?

14 **A.** Yes, on many cases, but not concerning this particular  
15 complaint.

16 **Q.** Okay. In your -- and in your review of this particular  
17 complaint, do you have any reason to believe that this is not a  
18 serious complaint?

19 **A.** I don't think it would be appropriate for me to reason.

20 MR. CROSS: Could we get the relevance. We're  
21 burning a lot of time.

22 THE COURT: I'm going to allow him to ask the  
23 question.

24 MR. CROSS: Okay. Thank you.

25 THE WITNESS: So in my role as a State Election Board

1 member, I feel it is important to be impartial until the  
2 evidence is presented by the investigators and I have an -- and  
3 we all have an opportunity to ask questions.

4 BY MR. OLES:

5 **Q.** And as you understand this complaint, the allegations are  
6 that this QR code -- what I'll call mismatch, as it is  
7 described in here -- is responsible for rejecting many ballots?

8 **A.** It is unclear to me in the complaint exactly how many  
9 ballots, if any, are affected.

10 **Q.** Okay. In comparison to the complaints that the board may  
11 typically receive, is this particular complaint -- can you  
12 comment about whether or not this one is -- appears to be  
13 well-researched or what -- I don't know myself the character  
14 and the nature of the complaints that come before the board.

15 But does this one appear to be well-researched to you?

16 MR. MILLER: Your Honor, I just note an objection  
17 here. Dr. Johnston just testified earlier that she's not a  
18 typical recipient of complaints. She may receive an email, but  
19 that does not a complaint make.

20 Mr. Oles is now asking her to compare it to the  
21 incoming complaints she doesn't necessarily see and evaluate  
22 until the investigative report is presented.

23 THE COURT: Are you able to answer the question or  
24 not?

25 THE WITNESS: Ask that question again, please.

1           THE COURT: His question was simply, how does this  
2 compare to other complaints you see? Is it more  
3 well-researched and prepared or not, or are you not able to  
4 make a judgment like that?

5           THE WITNESS: I don't think I can make a fair  
6 judgment at this time. It is certainly a 196-page complaint.

7           But I don't think I can make that judgment.

8 BY MR. OLES:

9   **Q.** All right. And as we sit here today, you're not able to  
10 say whether or not the contentions that are made with regard to  
11 this QR code mismatch is present in Georgia's system?

12 **A.** It is only fair to say that I have questions that I would  
13 like to ask at the time of the State Election Board meeting,  
14 and I would prefer not to provide any opinion at this point  
15 because I haven't heard the full report of the investigators.

16 **Q.** Okay. Is it your understanding, Dr. Johnston, that this  
17 is a problem that has been reported in other states that also  
18 use the Dominion Democracy Suite 5.5 system?

19           THE COURT: I think that you're going beyond what --  
20 the witness had asked to return because she felt like she had  
21 mis-answered something, but the question you're now asking is  
22 something different, what she knew about other jurisdictions.

23 BY MR. OLES:

24 **Q.** Okay. Ms. Johnston, is there anything else that you would  
25 like to clarify for the Court about this particular complaint?

1     **A.**    No.  I appreciate being able to return and to confirm that  
2     this indeed is the report that you were asking me about.

3     **Q.**    Thank you.

4                 MR. OLES:  That is all I have, Judge.

5                 THE COURT:  Thank you very much, Doctor.

6                 MR. MILLER:  Your Honor, just for clarity, has the  
7     exhibit been admitted into the record?

8                 MR. OLES:  Yes.

9                 THE COURT:  Are you offering the exhibit into  
10    evidence?

11                MR. OLES:  We would move to admit Davis 10 into the  
12    record.

13                MR. MILLER:  Our only objection would be hearsay as  
14    to the truth of the substance.  If the -- I'm not really sure  
15    what other purpose there is.  But as to the substance of the  
16    allegations, it is still hearsay.

17                THE COURT:  Well, it is not being admitted for the  
18    truth.  I think he's basically -- what I understood was counsel  
19    wanted to introduce it for purposes of saying -- showing that  
20    there have been complaints dating back to this time, and this  
21    was, from his view or his client's view, a serious complaint.

22                MR. MILLER:  That's fine, Your Honor.

23                MR. CROSS:  Your Honor, could I just note for the  
24    record our relevance objection.  We defer to Your Honor as to  
25    what you do with it.

1           THE COURT: Yeah, well, I understand that. And, you  
2 know, I've tried to balance the fact that we have new counsel.  
3 And if he feels that this is relevant in some way -- I'm not  
4 sure it is, but it is at least closer than some other things  
5 offered, so --

6           MR. MILLER: Your Honor, if I may, I have just two  
7 brief questions.

8           THE COURT: But it clearly doesn't -- at this  
9 juncture, all of the information is -- are the complainants'  
10 perspective.

11           All right. Go ahead.

12                           REDIRECT EXAMINATION

13 BY MR. MILLER:

14 **Q.** Hi, Dr. Johnston. Good afternoon.

15 **A.** Good afternoon.

16 **Q.** You're the exception for a witness that asked to come  
17 back, but good to see you.

18 **A.** I really wanted to know if the baby was delivered.

19           THE COURT: Waiting for you to be available to them.  
20 They had to recall the doctor and then he --

21           MR. MILLER: You'll have to fly to Michigan now.

22           THE COURT: We've got an ideal doctor for you.

23 BY MR. MILLER:

24 **Q.** Dr. Johnston, just a brief -- do you still have the Davis  
25 exhibit there in front of you?

1     **A.**     Yes.

2     **Q.**     This may be somewhat difficult, but if you wouldn't mind  
3     flipping with me to Exhibit E that is attached in support of  
4     this complaint.

5             THE COURT:   How far back is that?

6             MR. MILLER:   The total document isn't numbered, but  
7     it is probably a little over three-quarters of the way through.  
8     There are actually two pages back-to-back.  It says Exhibit E,  
9     and then it says Exhibit B.  At the top, it says  
10    Document 1071-2.

11            THE COURT:   So it is Ms. Marks' affidavit that you're  
12    asking about?

13            MR. MILLER:   Yes, Your Honor.

14            If you'll just turn maybe one or two more pages.

15            THE COURT:   Are you able to find it?

16            THE WITNESS:   Yes.

17    BY MR. MILLER:

18     **Q.**     And just for clarity of the record here with this exhibit,  
19     this is the supplemental declaration of Marilyn Marks attached  
20     to this document; right?

21     **A.**     Yes, it is.

22     **Q.**     Okay.  And at the top, you see this is a document that was  
23     originally submitted in the case Curling v. Raffensperger,  
24     Civil Action Number 1:17-CV-2989; correct?

25     **A.**     Correct.

1 Q. Okay.

2 MR. MILLER: Thank you, Your Honor. No further  
3 questions.

4 THE COURT: May I excuse this witness?

5 MR. BROWN: No questions, Your Honor.

6 THE COURT: All right. I just will clarify for the  
7 record, I'm not introducing this for the truth of the  
8 information contained, but the fact that it was written in the  
9 nature of the complaint written and sent to the board.

10 Okay. Well, you are excused. You can give -- just  
11 leave it and we'll take it. Thank you so much for coming  
12 back --

13 THE WITNESS: Thank you.

14 THE COURT: -- and your great good humor and patience  
15 with us too. Thank you.

16 All right. So we have movie time now or something  
17 else?

18 MR. CROSS: I was going to give Mr. Tyson a moment.

19 THE COURT: Okay. If it is movie time, have you  
20 arranged for the popcorn?

21 MR. CROSS: Sadly, no.

22 I guess -- so I'll raise it as a question for Your  
23 Honor as to how you want to proceed. The Persinger issue is  
24 one that we would think is important to get to. It sounds like  
25 Mr. Tyson would like to do the same. I think we could probably



1 get that done before the end of the day if we want to do that  
2 now. Then we can start the day tomorrow with the videos and  
3 then they pick up their case, or we can start the videos.

4 MR. TYSON: Your Honor, I think the only hesitancy  
5 would be my understanding is that issue needs to be part of the  
6 sealed proceeding, not in open court, which I know would  
7 require additional logistics.

8 MR. CROSS: We actually don't -- oh, I'm sorry.

9 MR. TYSON: Given that -- I mean, if it is an hour  
10 and 20 minutes of video, it just seems like starting that now  
11 takes us to past 6:00.

12 MR. CROSS: I was just going to say, Your Honor, I  
13 don't think we need to seal the courtroom, and our strong  
14 preference would be that we don't. Given the nature of the  
15 issue, given that it bears very heavily on the merits, we're  
16 prepared to address it in a way that doesn't require sealing.

17 The only thing that is not public is the source code  
18 itself. There is no need to discuss the source code itself,  
19 and so we would prefer that this be on the record -- I'm sorry.  
20 Not be sealed. Obviously, it will be on the record.

21 MR. TYSON: Your Honor, I just -- given how  
22 restrictive the conversation has been on this, only -- I mean,  
23 none of the rest of our team is even aware of the allegations  
24 that Mr. Cross made yesterday morning besides me and Mr. Russo.

25 So at this point, I think either we need permission

1 to share that with our entire team if we're going to conduct in  
2 this open court and let everybody be part of this, or we need  
3 to continue with the process we have been following. But we  
4 can't have a situation where we're limited to two members of  
5 our team who know this and all of a sudden now we're going to  
6 have a debate in open court.

7 THE COURT: Well, I understand, Mr. Cross, your  
8 concerns for getting it taken care of. But frankly, it is ten  
9 of 5:00, and you might have a brain-dead judge if you have --  
10 this is complicated stuff.

11 MR. CROSS: Sure.

12 THE COURT: Very intense. I was already bombarded  
13 all weekend by the intensity of the communications. I think I  
14 will do a better job if I do it tomorrow morning --

15 MR. CROSS: That's totally fine, Your Honor.

16 THE COURT: -- and I get prepared with my group  
17 tonight so that I make sure that I'm at my best.

18 MR. CROSS: That's totally fine, Your Honor.

19 And I apologize if there was some confusion. My  
20 recollection was that there were a lot of folks on the email  
21 that went to the Court, not just Mr. Russo and --

22 MR. TYSON: No. It was just the two individuals who  
23 were permitted to have access to all the sealed proceedings.  
24 And we haven't shared it because that was the responsibility we  
25 had.

1 MR. CROSS: Then that is my apology. I didn't  
2 realize it was the only two of them on it. We didn't mean for  
3 that to be limited. Sorry about that.

4 THE COURT: So I would like to do it tomorrow morning  
5 then, or, you know, if you --

6 MR. CROSS: That's totally fine. It sounded like  
7 they have a preference. We're happy to do it whenever it works  
8 for the Court.

9 MR. TYSON: We'll do it whenever it works for the  
10 Court, Your Honor. I would request permission, though, if I  
11 could share the email with the rest of the team in anticipation  
12 of tomorrow.

13 MR. CROSS: Absolutely. Yeah.

14 We did not consider that email to be sensitive, and  
15 again, I apologize that --

16 THE COURT: The only question is, is are you thinking  
17 that it is beyond -- the concerns are beyond the letter? I  
18 mean, it is just like if you -- you-all need to talk about it.  
19 I'll go along with anything you want to do that you agree on.  
20 It is such a pleasure whenever there is agreement.

21 So I think you should talk about it so that there is  
22 no misunderstanding and no fury about it so that we understand,  
23 are some people there for the whole hearing, are they there for  
24 part of the hearing, what is going on?

25 It is something you should discuss.

1 MR. CROSS: We'll do that.

2 MR. TYSON: Thank you, Your Honor.

3 MR. CROSS: If we want to do the videos, Your Honor,  
4 one upside to that is I understand it -- and Shannon will tell  
5 me if I'm wrong -- I don't think she has to transcribe that  
6 because you have the transcripts.

7 THE COURT: Right. Doesn't transcribe.

8 MR. CROSS: So at least she won't have to --

9 THE COURT: Only Judge Duffey's court reporter  
10 transcribes them.

11 MR. CROSS: Fortunately, no one is calling  
12 Judge Duffey, so I think we'll be all right.

13 THE COURT: No one likes working for me either  
14 because I work too late.

15 MR. MILLER: Judge, could I raise one minor thing?  
16 And I will be simpler than the other issue, and I won't take an  
17 hour and 20 minutes either.

18 But yesterday, the national -- or not yesterday.  
19 Friday, the National Academies report, excerpts of it were  
20 admitted. We had moved under completeness -- you asked us to  
21 just provide the full copy. This is one full copy of it. It  
22 is quite long. It is already on the docket. But we can email  
23 that to your staff as well.

24 THE COURT: Okay. Have you-all looked at it?

25 MR. MILLER: And I should note this is Defendants'

1 Exhibit 728. It is just the full report of the excerpts that  
2 y'all had provided.

3 THE COURT: Okay. Thank you.

4 MR. CROSS: Yeah, I think we -- there may be some  
5 hearsay aspects or whatever, Your Honor. We don't have an  
6 objection to it. We defer to Your Honor to give it whatever  
7 weight you think it warrants.

8 THE COURT: All right. Well, Shannon, can you -- can  
9 I release you without there being any trouble?

10 MR. CROSS: The only reason you might want her to  
11 stay is because we will introduce each video, and so that  
12 probably should be on the record.

13 THE COURT: I tell you what. We're going to go at  
14 least until 5:30. I am not promising anything else beyond that  
15 as a matter of taking care of everybody here because it doesn't  
16 look very hopeful for us finishing this week anyway.

17 So I'm going to have a restroom break in  
18 five minutes. We'll start at 5:00.

19 All right. And you have something?

20 MR. BELINFANTE: I had a housekeeping thing that was  
21 just going to go on the record pretty quickly, but I can do it  
22 after.

23 THE COURT: That's fine. Do you have a broom also?  
24 What is the housekeeping matter?

25 MR. BELINFANTE: For one of our witnesses perhaps

1 tomorrow, hopefully tomorrow, Blake Evans, we were going to try  
2 to produce official election results from 2020's general  
3 election and 2022's general election. I have the documents  
4 here. Most cases, we have done it by official notice. I just  
5 wanted to -- because I know that you need to provide notice to  
6 the other side of doing so, so I wanted to do that in open  
7 court now.

8 They are -- I have the documents, which I will share.  
9 They are from the Secretary of State's website.

10 THE COURT: Okay. You-all need to see them?

11 MR. CROSS: Yeah, I think we want to look at them.  
12 Sure.

13 THE COURT: Okay. Great. Okay. We'll come back in  
14 five minutes.

15 **(A brief break was taken at 4:58 PM.)**

16 MR. TYSON: So, Your Honor, before we start back, I  
17 just wanted to report a rare moment of agreement in the case.

18 THE COURT: Oh, my gosh.

19 MR. TYSON: Mr. Cross and I have agreed that we can  
20 share his email from yesterday morning with our team, and  
21 further, that he is also okay with me and Mr. Russo sharing  
22 with our team the things Mr. Persinger talked about on the  
23 stand here as part of preparing a response to that, so I just  
24 wanted to put that on the record.

25 We're having a discussion about a need for continued

1 sealing of those transcripts as well and whether we can reach  
2 an agreement on that. We'll report back soon.

3 THE COURT: Okay. Does that extend to the -- his  
4 translation of his notes?

5 MR. TYSON: And, Your Honor, the notes themselves and  
6 the translation of the notes would not be shared with the  
7 remainder of the team.

8 THE COURT: All right. Well, what would be useful  
9 for me is -- in the end, is if you identify what items you  
10 don't think are public or shouldn't be -- I don't want to have  
11 any disagreement later on and getting 9:00 emails about, we  
12 didn't mean that.

13 MR. CROSS: What we had talked about, Your Honor,  
14 we're going back through the sealed transcripts. Our team and  
15 Dr. Halderman -- I think there is very little and maybe nothing  
16 that actually needs to be sealed once we go through that. But  
17 I told Bryan we would -- if there is anything, we would suggest  
18 some modest redactions, they can look at it, and hopefully  
19 everybody just agrees this small portion gets sealed and  
20 everything else becomes unsealed.

21 THE COURT: Would it still be an ex parte hearing in  
22 terms of the public or not?

23 MR. CROSS: You mean what is coming up or what is  
24 already done?

25 THE COURT: No, what you are about to -- the hearing

1     you want about this matter.

2                 MR. CROSS: Our expectation from what we're going to  
3 discuss is it does not need to be sealed. If for some reason  
4 we veer there, we can pause and get to it. We're not going to  
5 discuss the contents of source code, and that is the only thing  
6 that we think needs to be sealed.

7                 MR. TYSON: And for us, Your Honor, the only concern  
8 is that since we've had kind of extensive sealed proceedings,  
9 proceeding in open court before all that is open, I think,  
10 would be a problem.

11                In addition, I don't yet know -- I need to talk with  
12 our team about -- I mean, if there is anything else we need to  
13 discuss about what was said in those proceedings. I don't  
14 think we're going to need to reveal -- we won't reveal source  
15 code, which is the main issue, but just the fact that -- I  
16 don't want us to have a half-sealed/half-unsealed proceeding.

17                THE COURT: Well, you-all can talk about it further,  
18 it sounds like. Please do.

19                MR. TYSON: Thank you, Your Honor.

20                THE COURT: So that there is some clarity and we're  
21 not worrying about that. Whatever you do, do not write me  
22 letters tonight.

23                MR. TYSON: Absolutely. Thank you, Your Honor.

24                THE COURT: Thank you.

25                MR. CROSS: Your Honor, would it help if you have a



1 courtesy copy of our Fifth Amendment filing?

2 THE COURT: Sure.

3 MR. SCHEINMAN: Would Your Honor also like a copy of  
4 the clips that we're about to play? We have excerpts if  
5 anybody would like to follow along.

6 THE COURT: Sure. Why not.

7 MR. MILLER: And, Your Honor, if I may, on the Fifth  
8 Amendment filing, we saw it come in while we were in here with  
9 you.

10 I think at this juncture, we don't necessarily intend  
11 to respond in writing rather than rest on what we have already  
12 briefed in the motion in limine. We would like to have the  
13 opportunity to present short argument to you tomorrow. But  
14 regarding substantively, I think you've got a lot of paper up  
15 there on the desk.

16 THE COURT: Really? Okay. Thank you.

17 MR. SCHEINMAN: Thank you, Your Honor. At this time,  
18 plaintiffs would like to introduce an excerpt from the  
19 deposition of Misty Hampton. This was taken on the 11th of  
20 November, 2022.

21 And for those following along in the clip book, this  
22 is Tab Number 5.

23 MR. BEDARD: And, Your Honor, for agreement with the  
24 plaintiffs' side for these deposition designations --

25 **(There was a brief pause in the proceedings.)**

1 MR. BEDARD: Thank you.

2 I was just saying, Your Honor, that per agreement  
3 with the plaintiffs' side for these deposition designations, we  
4 do have objections to some of these -- to some of the  
5 questions. They are included in a list, I believe, that has  
6 maybe already been provided to Your Honor. We are fine with  
7 Your Honor making rulings on those at her convenience rather  
8 than now in open court.

9 THE COURT: All right. Thank you.

10 **(The videotaped deposition clip of MISTY**  
11 **HAMPTON was played.)**

12 THE COURT: What was the date of the deposition?

13 MR. SCHEINMAN: Your Honor, I have that marked as  
14 November 11, 2022.

15 For our next clip, we would like to introduce the  
16 deposition of --

17 THE COURT: I'm sorry. Who were the counsel present?

18 MR. SCHEINMAN: We can --

19 MR. CROSS: Bruce Brown was doing most of the  
20 questioning. The woman at the end was Hannah Elson, a lawyer  
21 at MoFo.

22 Then I'm not sure who else, Bruce.

23 But that is who was questioning.

24 THE COURT: Okay. Thank you.

25 MR. SCHEINMAN: For our next clip, we would like to

1 present the deposition of Eric Chaney. This was taken on  
2 August 16, 2022, and that is Tab 2 in your binder.

3 MR. CROSS: I took this one, Your Honor. So it will  
4 be me.

5 MR. BEDARD: I'm not sure if I was clear on this  
6 first one. But for all of these deposition designations, our  
7 objections have been submitted to you and they are there for  
8 you to rule on at your convenience.

9 **(The videotaped deposition clip of ERIC CHANEY**  
10 **was played.)**

11 THE COURT: You have one other short one? Because  
12 I'm going to end after that.

13 MR. SCHEINMAN: Your Honor, we would next to like to  
14 introduce the excerpt from the deposition of Ben Cotton. This  
15 was taken on August 25th, 2022.

16 THE COURT: What number is it?

17 MR. SCHEINMAN: It would be Tab Number 3 in your  
18 binder, Your Honor.

19 THE COURT: Okay.

20 MR. SCHEINMAN: I'll look up the counsel.

21 MS. KAISER: Your Honor, it was me, Mary Kaiser,  
22 asking questions.

23 **(The videotaped deposition clip of BEN COTTON**  
24 **was played.)**

25 THE COURT: Is there any other one that is really

1 short?

2 MR. SCHEINMAN: Your Honor, our next shortest is over  
3 five minutes long.

4 THE COURT: Let's end now.

5 While you were talking before about what you would  
6 agree to make -- not claim to be -- or that you thought was  
7 proper to be in the public record or not, I'm basically --  
8 given all that has happened, anything that was previously  
9 sealed, until I say so, it is going to still be treated as  
10 sealed and then -- so that I can properly look at it all  
11 together.

12 So don't treat anything that you have suddenly  
13 incidentally have said, oh, it is really okay to unseal it.

14 I would like at this juncture, after all I have seen,  
15 to be cautious as we proceed.

16 MR. CROSS: Again, Your Honor, the idea was to get  
17 you a proposal on what we would redact. Certainly, we were not  
18 intending to make our own decision.

19 THE COURT: That's fine, and I would be very happy to  
20 see the proposal. But since I don't have it at this point, I'm  
21 not prepared to act precipitously.

22 All right. So you are going to finish reading these  
23 tomorrow morning -- having these played?

24 MR. CROSS: Yes, Your Honor.

25 THE COURT: Then you want to have a hearing -- the

1 hearing that you're talking about?

2 MR. CROSS: I think that probably makes sense on  
3 timing.

4 THE COURT: I mean, the only thing about it that I  
5 would say is there is a public that is interested in hearing  
6 these tapes, and so it sort of jacks them around.

7 MR. CROSS: Why don't we start with Persinger and  
8 then --

9 THE COURT: That's what would make more sense to me,  
10 so that they can come at whatever hour they deem fit.

11 But you said the rest of -- do you have any estimate  
12 at all about -- collectively about how long the hearing would  
13 take?

14 MR. TYSON: I don't, Your Honor. We do want to  
15 respond in detail to the allegations from the emails, and I'm  
16 thinking that's going to take a little while, 30, 45 minutes  
17 probably, to walk through each allegation. It may take less  
18 than that. But just probably budgeting that is reasonable.

19 THE COURT: And you want to do it in the morning  
20 rather than the evening, I gather -- rather than late in the  
21 evening, I gather?

22 MR. CROSS: We have no preference.

23 MR. TYSON: And we will do whatever would work for  
24 the Court, Your Honor.

25 One thing, I guess, just trying to think about

1 sequencing tomorrow, we obviously had witnesses here per the  
2 Court's email from yesterday to us to make sure we are ready to  
3 go. But it sounds like we have maybe close to an hour of  
4 videos, we have the issues of Mr. Persinger, we have exhibits  
5 to go through, we have argument on the adverse inference  
6 motion. And I think all that has to happen before the  
7 plaintiffs -- I mean, not the Persinger piece, but the rest of  
8 it has to happen before the plaintiffs can rest, I believe.

9           So just in terms -- and then as soon as they rest,  
10 not a secret, we're planning to move under Rule 52(c). I  
11 figure we'll have a brief argument on that.

12           Just in terms of sequencing, I'm just trying to think  
13 when we should have people here tomorrow, I guess, is what I'm  
14 trying --

15           THE COURT: That's what I'm thinking about. Let me  
16 just say, in terms of brief argument, I'm not going to allow  
17 more than 10 to 15 minutes on either side. I think ten really  
18 would be sufficient, given my understanding of the case.

19           But if you bleed over toward a little bit, I'll live  
20 with it, but -- let me talk to my crew and see what they --  
21 since we have to prepare for it too. If you can just hold a  
22 moment.

23           **(There was a brief pause in the proceedings.)**

24           THE COURT: My view is we should do this at like  
25 4:00 if you think an hour, hour and a half is enough tomorrow.

1 That way, anyone who -- we get all the -- I get to look at  
2 everything. I'm going to talk to you tonight after I excuse  
3 them -- public about making sure I understand which items you  
4 want to be discussed.

5 But it seemed like there were enough that it would be  
6 better to do it at the end of the day with people who are here  
7 to get to hear most of the hearing up until that point.

8 So in other words, is there about an hour left of the  
9 show-and-tell with the depositions or an hour and --

10 MR. SCHEINMAN: I did the math. It's a little --  
11 around 53 minutes.

12 THE COURT: Okay. And then after that, the  
13 plaintiffs closing their case except for reference to anything  
14 that might come up during the hearing at 4:00?

15 MR. CROSS: Yeah. I think the only thing left would  
16 be exhibits with the deposition designations. So those will go  
17 in, and then the Fifth Amendment piece.

18 THE COURT: All right. Is the Fifth Amendment  
19 piece -- because I haven't looked at it -- is that in the -- is  
20 that something that you wanted to deal with at 4:00 or  
21 beforehand?

22 Because I don't know what is in it, so I'm sorry.

23 MR. CROSS: We're happy to deal with that whenever it  
24 works for the Court. There is no urgency on that.

25 THE COURT: Is that something you're trying to deal

1 with, though, before you close your case?

2 MR. CROSS: Yes. It will certainly bear on the  
3 closing of the case.

4 THE COURT: All right. We'll deal with it in --  
5 then, and then I don't know how long that will take, but I  
6 think you can -- seems like if we start at 9:30, you should be  
7 able to have a witness -- at least one or two witnesses. It  
8 depends on who you call as your first witness.

9 MR. TYSON: Certainly, Your Honor.

10 THE COURT: If Ryan Germany was the first witness, he  
11 will probably take up all the time.

12 MR. TYSON: That helps, Your Honor.

13 So we'll plan, I guess, lunchtime probably to have  
14 folks arrive, if that works.

15 THE COURT: You don't think you're going to get to  
16 Ryan Germany beforehand? I mean, if we have 9:30 to 10:30,  
17 roughly, we're going to have the rest of the video show. And  
18 10:30 to -- then you want to deal with your motion?

19 MR. TYSON: Well, I guess, Your Honor, I was thinking  
20 then, you know, 10:30 --

21 THE COURT: We'll deal with your proffer on the -- on  
22 the Fifth Amendment, whatever it is. And then --

23 MR. TYSON: The exhibits as well. Then our -- then  
24 plaintiffs rest, our 52(c) motion, which is why I was thinking  
25 that would get us to noon, just logistically.



1           But we can have Mr. Germany here or whoever else here  
2 earlier if that is -- if we want to just be ready just in case.

3           THE COURT: If you think the exhibits -- do I need to  
4 be here or are you working this out with your -- you have all  
5 worked this out? I mean, I guess that is the question.

6           MR. CROSS: Sure. We can work it out. Like we said  
7 before, as long as somebody can get here in half an hour or to  
8 an hour, there is no reason for anybody to sit here.

9           THE COURT: Well, Ryan Germany, is he working from  
10 home or working from --

11          MR. TYSON: I believe he is working nearby, Your  
12 Honor, but he does have other employment, obviously, now as a  
13 practicing lawyer, so --

14          THE COURT: Why don't you just have him on call and  
15 let him know at 11:00 where you are at?

16          MR. TYSON: Thank you, Your Honor. We'll do that.

17          THE COURT: A little bit before 11:00, we'll see  
18 where we're at, because if you worked out the -- I mean,  
19 normally people work out the documents with Harry beforehand,  
20 frankly.

21                So have you-all not sorted all of this out?

22                Because he is here at 9:00.

23          MR. MILLER: To be clear, there are two layers of  
24 documents here. The first layer is what they are submitting  
25 with the deposition excerpts where there were some objections.

1 THE COURT: I see.

2 MR. MILLER: It will probably be dealt with pretty  
3 quickly.

4 THE COURT: All right.

5 MR. MILLER: I think our respective paralegals were  
6 actually just comparing notes on the exhibits with Mr. Martin  
7 just a moment ago.

8 THE COURT: All right.

9 MR. MILLER: Hopefully, that will go quickly.

10 THE COURT: We'll see. And then you'll just have  
11 your witness on call.

12 All right. All right. Ladies and gentlemen, thank  
13 you very much for your patience, and we'll see everyone who  
14 desires to be here at 9:30. Maybe I'll stay home.

15 (The proceedings were thereby adjourned at 5:46  
16 P.M.)

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## C E R T I F I C A T E

UNITED STATES OF AMERICA  
NORTHERN DISTRICT OF GEORGIA

I, SHANNON R. WELCH, RMR, CRR, Official Court Reporter of the United States District Court, for the Northern District of Georgia, Atlanta Division, do hereby certify that the foregoing 233 pages constitute a true transcript of proceedings had before the said Court, held in the City of Atlanta, Georgia, in the matter therein stated.

In testimony whereof, I hereunto set my hand on this, the 22nd day of January, 2024.

*Shannon R. Welch*

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SHANNON R. WELCH, RMR, CRR  
OFFICIAL COURT REPORTER  
UNITED STATES DISTRICT COURT

UNITED STATES DISTRICT COURT  
OFFICIAL CERTIFIED TRANSCRIPT

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BELINFANTE: [5]</b> 204/9 204/13 204/15 220/20 220/25</p> <p><b>MR. BROWN: [71]</b> 5/5 6/4 10/12 10/22 12/24 16/16 17/12 18/21 18/24 19/14 22/6 23/9 34/13 36/16 37/15 39/2 52/15 56/9 57/6 57/10 57/15 57/18 58/2 58/4 58/11 59/16 59/18 59/21 59/24 60/12 60/15 60/18 61/1 62/24 63/9 63/21 63/24 64/18 65/13 66/16 67/16 67/20 69/18 70/2 70/13 70/18 70/21 71/14 74/8 75/25 76/2 76/4 76/11 76/16 88/25 90/4 95/14 109/7 109/12 114/4 116/3 116/16 117/10 120/6 120/15 120/17 152/23 153/1 153/5 202/18 215/5</p> <p><b>MR. CROSS: [54]</b> 58/24 59/5 60/16 79/13 79/22 79/25 157/4 157/8 157/14 157/16 162/18 162/21 163/15 202/17 202/19 203/4 203/6 203/15 203/20 209/20 209/24 212/23 215/18 215/21 216/8 216/12 217/11 217/15 217/18 218/1 218/6 218/13 219/1 219/3 219/8 219/11 220/4 220/10 221/11 222/13 222/23 223/2 223/25 225/19 226/3 227/16 227/24 228/2 228/7 228/22 230/15 230/23 231/2 232/6</p> <p><b>MR. 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SCHEINMAN: [11]</b> 203/5 224/3 224/17 225/13 225/18 225/25 226/13 226/17 226/20 227/2 230/10</p> <p><b>MR. TYSON: [26]</b> 5/8 121/13 121/16 121/20 121/24 204/6 216/4 216/9 216/21 217/22 218/9 219/2 221/16 221/19 222/5 223/7 223/19 223/23 228/14 228/23 231/9 231/12 231/19 231/23 232/11 232/16</p> <p><b>MS. KAISER: [1]</b> 226/21</p> <p><b>THE COURT: [279]</b></p> <p><b>THE WITNESS: [54]</b> 6/12 20/4 20/14 27/17 30/23 31/1 31/3 35/3 35/10 35/13 40/1 54/15 64/14 76/8 76/24 85/2 88/15 92/6 92/13 92/19 92/22 92/25 93/4 96/24 108/9 109/13 116/12 120/24 125/23 126/1 126/7 126/12 136/8 162/20 163/19 163/22 165/20 167/20 172/2 172/6 201/20 202/9 202/12 204/21 205/16 207/3 207/6 207/20 207/22 209/25 210/25 211/5 214/16 215/13</p> <p>'</p> <p><b>'22 [2]</b> 155/8 155/8</p> <p>-</p> <p>-- and [1] 215/14</p> <p>-- that [1] 31/1</p> <p>.</p> <p><b>...CONT'D [2]</b> 2/25 3/1</p> <p><b>1</b></p> <p><b>1,000 [1]</b> 199/4</p> <p><b>10 [4]</b> 189/6 206/16 212/11 229/17</p> <p><b>100 [3]</b> 199/7 199/10 199/13</p> <p><b>10:30 [3]</b> 231/16 231/18 231/20</p> <p><b>11 [2]</b> 37/3 225/14</p> <p><b>11:00 [2]</b> 232/15 232/17</p> <p><b>11:09 [1]</b> 61/6</p> <p><b>11th [1]</b> 224/19</p> <p><b>12 [5]</b> 34/18 92/10 92/15 92/20 92/21</p> <p><b>13 [1]</b> 199/23</p> <p><b>13 hours [1]</b> 28/18</p> <p><b>1346-1 [1]</b> 154/13</p> <p><b>1383 [1]</b> 1/25</p> <p><b>141 [1]</b> 96/9</p> <p><b>147 [6]</b> 96/9 96/11 96/21 96/23 96/24 99/4</p> <p><b>15 [2]</b> 156/3 203/1</p> <p><b>15 minutes [1]</b> 229/17</p> <p><b>15 months [1]</b> 207/8</p>	<p><b>15-vote [1]</b> 184/15</p> <p><b>157 [4]</b> 98/23 99/1 100/3 100/25</p> <p><b>159 [3]</b> 112/14 112/15 170/24</p> <p><b>16 [1]</b> 226/2</p> <p><b>160 [1]</b> 103/10</p> <p><b>162 [4]</b> 103/10 103/14 103/15 117/16</p> <p><b>164 [1]</b> 104/8</p> <p><b>17 [2]</b> 109/23 152/3</p> <p><b>174 [3]</b> 107/25 108/7 109/23</p> <p><b>176-page [1]</b> 152/2</p> <p><b>18 [4]</b> 28/6 29/6 30/14 31/8</p> <p><b>18th [2]</b> 28/6 28/7</p> <p><b>19 [4]</b> 28/6 29/6 30/15 31/8</p> <p><b>196 [3]</b> 111/9 111/12 206/21</p> <p><b>196-page [1]</b> 211/6</p> <p><b>1988 [1]</b> 124/21</p> <p><b>1994 [1]</b> 7/10</p> <p><b>1:05 [1]</b> 121/3</p> <p><b>1:17-CV-2989 [1]</b> 214/24</p> <p><b>1:17-CV-2989-AT [1]</b> 1/6</p> <p><b>2</b></p> <p><b>20 [2]</b> 191/25 203/5</p> <p><b>20 minutes [4]</b> 62/12 156/3 216/10 219/17</p> <p><b>20 years [1]</b> 7/14</p> <p><b>200 [1]</b> 171/8</p> <p><b>2012 [2]</b> 128/8 128/17</p> <p><b>2016 [1]</b> 187/14</p> <p><b>2017 [3]</b> 188/15 189/10 199/23</p> <p><b>2018 [8]</b> 9/21 125/1 170/18 188/20 192/25 193/2 193/13 193/22</p> <p><b>2019 [3]</b> 42/19 68/5 69/1</p> <p><b>2020 [21]</b> 37/3 39/22 42/18 43/1 43/8 51/16 51/23 68/4 69/21 104/22 109/19 127/2 127/25 128/10 128/18 171/7 177/18 180/7 190/8 193/9 197/14</p> <p><b>2020's [1]</b> 221/2</p> <p><b>2021 [11]</b> 30/15 49/6 49/16 52/2 54/4 55/12 55/13 99/18 100/5 106/25 107/4</p> <p><b>2022 [12]</b> 105/19 107/1 107/11 159/14 159/21 171/11 177/19 197/15 224/20 225/14 226/2 226/15</p> <p><b>2022's [1]</b> 221/3</p> <p><b>2022-348 [1]</b> 206/9</p> <p><b>2023 [2]</b> 69/9 69/21</p> <p><b>2024 [4]</b> 1/13 5/2 152/3 234/13</p> <p><b>204 [2]</b> 113/7 113/10</p> <p><b>21-2-498 [1]</b> 144/2</p> <p><b>215-1383 [1]</b> 1/25</p> <p><b>22 [2]</b> 1/13 5/2</p> <p><b>22nd [1]</b> 234/13</p> <p><b>233 [1]</b> 234/9</p> <p><b>2394 [1]</b> 1/24</p> <p><b>24 [1]</b> 62/14</p> <p><b>24th [3]</b> 62/8 62/11 62/13</p> <p><b>25 percent [1]</b> 191/25</p> <p><b>25th [1]</b> 226/15</p> <p><b>28 [1]</b> 125/3</p> <p><b>2989 [1]</b> 214/24</p> <p><b>2:00 in [1]</b> 46/10</p> <p><b>3</b></p> <p><b>30 [2]</b> 206/24 228/16</p> <p><b>30 percent [2]</b> 42/20 42/25</p> <p><b>30303 [1]</b> 1/25</p> <p><b>348 [1]</b> 206/9</p>
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<p><b>4</b></p> <p><b>400 [3]</b> 199/6 199/9 199/11</p> <p><b>404 [1]</b> 1/25</p> <p><b>41 [8]</b> 56/12 58/14 59/15 60/7 62/16 63/7 63/10 63/13</p> <p><b>42 [6]</b> 56/12 59/15 60/7 62/10 63/4 63/12</p> <p><b>449 [3]</b> 123/15 124/2 126/20</p> <p><b>45 [18]</b> 57/24 57/25 58/1 58/2 58/4 58/9 59/16 59/20 59/21 60/13 60/24 63/1 63/3 63/5 63/15 63/19 63/21 63/22</p> <p><b>45 minutes [2]</b> 121/3 228/16</p> <p><b>47 [2]</b> 96/16 96/21</p> <p><b>471 [3]</b> 88/12 120/8 120/9</p> <p><b>498 [1]</b> 144/2</p> <p><b>4:00 [1]</b> 230/14</p> <p><b>4:00 if [1]</b> 229/25</p> <p><b>4:00 or [1]</b> 230/20</p> <p><b>4:30 [1]</b> 204/11</p> <p><b>4:58 [1]</b> 221/15</p>	<p>28/21 31/13 33/24 42/3 42/4 45/3 50/22 51/8 53/15 54/16 54/17 66/3 74/21 76/20 81/9 81/16 82/19 82/25 83/4 84/11 84/12 112/9 115/8 115/8 119/22 120/4 121/21 138/12 142/14 145/24 148/25 149/3 153/7 166/24 167/1 167/1 168/6 168/19 169/2 173/1 174/25 183/19 192/1 197/15 210/23 211/3 211/9 212/1 214/15 231/7</p> <p><b>about [227]</b> 5/12 5/21 9/18 9/19 10/3 10/3 13/6 14/8 15/18 15/19 17/5 17/7 18/4 18/5 19/9 19/17 19/18 19/20 20/19 22/23 23/18 26/6 26/20 27/1 27/23 28/14 28/23 29/1 31/1 33/23 34/9 34/21 35/5 35/7 35/8 35/18 35/19 35/22 36/20 37/21 38/24 39/3 40/2 42/4 42/16 42/17 45/12 46/17 47/7 49/15 50/23 51/6 52/13 52/14 52/23 55/7 60/9 61/16 64/23 65/14 65/22 66/9 66/10 66/11 66/14 66/24 67/25 68/4 68/11 71/8 71/12 71/19 71/25 72/20 72/21 72/21 73/1 74/10 75/19 76/6 76/12 77/13 79/20 80/1 80/11 83/9 83/20 85/13 86/10 87/5 88/1 88/5 89/17 89/23 95/21 98/20 100/15 101/14 101/17 101/19 102/8 105/1 106/6 107/25 108/6 109/16 109/17 109/18 109/23 109/23 110/14 110/23 113/19 116/21 117/15 117/22 118/10 124/7 124/15 124/17 125/3 125/15 129/7 129/8 129/16 130/12 131/7 132/8 134/24 135/1 137/19 138/7 139/10 140/5 143/22 143/23 143/23 143/24 143/25 144/11 145/14 149/18 154/14 154/14 154/15 154/17 154/23 155/4 155/9 155/19 155/20 156/15 157/1 157/21 158/7 158/7 159/14 160/7 163/2 163/20 172/3 172/22 176/1 176/11 177/15 178/3 179/6 180/8 181/24 184/15 185/22 186/6 188/18 189/8 191/13 192/2 192/7 193/9 193/10 194/23 194/23 197/6 200/1 200/19 200/25 201/1 201/11 202/25 203/5 204/19 205/10 205/23 205/25 207/2 207/5 207/7 208/21 209/13 210/12 211/22 211/25 212/2 214/12 218/3 218/18 218/21 218/22 221/22 221/25 222/11 222/13 222/25 223/1 223/12 223/13 223/17 223/21 224/4 227/5 228/1 228/4 228/12 228/12 228/25 229/15 230/3 230/8</p> <p><b>Abraham [2]</b> 143/2 143/4</p> <p><b>absent [1]</b> 179/12</p> <p><b>Absolutely [3]</b> 25/9 218/13 223/23</p> <p><b>academia [3]</b> 124/15 124/18 124/19</p> <p><b>academic [1]</b> 137/7</p> <p><b>Academies [2]</b> 170/18 219/19</p> <p><b>accepted [1]</b> 132/6</p> <p><b>access [30]</b> 27/25 28/14 33/18 50/17 50/24 52/1 52/4 81/9 81/17 82/6 82/9 82/20 84/11 84/12 88/1 88/2 93/11 94/19 94/23 95/3 95/19 95/23 99/17 100/5 111/16 112/7 113/23 161/11 166/20 217/23</p> <p><b>accessed [1]</b> 81/19</p> <p><b>accessibility [8]</b> 13/7 13/9 14/25 115/4 115/7 151/4 171/23 196/9</p> <p><b>accessible [4]</b> 61/24 92/4 92/12 166/14</p> <p><b>accommodation [1]</b> 167/24</p>	<p><b>accomplices [1]</b> 148/10</p> <p><b>accomplish [1]</b> 112/12</p> <p><b>according [5]</b> 143/11 179/24 199/5 199/5 199/7</p> <p><b>accordingly [1]</b> 45/8</p> <p><b>account [5]</b> 62/19 106/16 154/19 155/1 185/23</p> <p><b>accountability [1]</b> 151/8</p> <p><b>accountable [2]</b> 151/6 151/14</p> <p><b>accounted [1]</b> 170/10</p> <p><b>accounting [5]</b> 151/11 164/3 164/4 177/24 180/19</p> <p><b>accounts [1]</b> 53/7</p> <p><b>accuracy [32]</b> 17/20 18/2 36/19 36/20 37/8 37/12 37/15 37/19 38/2 38/18 39/4 39/9 40/4 41/1 42/11 42/14 43/2 43/5 43/9 43/13 43/16 43/20 44/10 44/14 44/17 44/20 45/9 45/12 46/4 46/17 57/1 138/10</p> <p><b>accurate [21]</b> 21/23 23/14 60/10 61/19 129/15 130/22 137/13 140/14 141/17 141/20 141/22 141/24 142/3 143/8 143/10 145/7 145/12 150/9 175/4 176/21 198/11</p> <p><b>accurately [8]</b> 115/12 128/2 133/18 135/5 144/13 150/23 170/6 172/23</p> <p><b>acknowledged [1]</b> 70/4</p> <p><b>across [5]</b> 15/22 27/25 34/18 55/15 162/16</p> <p><b>act [3]</b> 115/5 169/13 227/21</p> <p><b>action [3]</b> 46/10 111/17 214/24</p> <p><b>actions [2]</b> 75/3 95/2</p> <p><b>activities [1]</b> 67/7</p> <p><b>activity [2]</b> 28/21 75/16</p> <p><b>actor [1]</b> 148/15</p> <p><b>actors [1]</b> 33/15</p> <p><b>actual [13]</b> 26/18 42/12 58/11 58/13 99/11 136/25 137/7 138/2 158/24 159/16 173/12 185/7 206/25</p> <p><b>actually [36]</b> 19/2 36/1 36/8 42/22 45/20 46/9 48/25 50/15 53/25 64/8 64/11 80/9 84/11 85/6 87/14 95/8 106/14 130/4 134/12 140/13 141/5 141/6 151/19 154/11 167/9 167/23 169/15 175/18 194/4 196/24 197/9 207/10 214/8 216/8 222/16 233/6</p> <p><b>ADAM [1]</b> 2/9</p> <p><b>add [5]</b> 47/22 47/25 48/1 58/6 58/24</p> <p><b>added [5]</b> 13/10 76/24 80/3 200/13 200/21</p> <p><b>adding [1]</b> 170/20</p> <p><b>addition [2]</b> 136/22 223/11</p> <p><b>additional [8]</b> 28/2 60/8 106/17 121/13 163/23 202/2 205/24 216/7</p> <p><b>address [7]</b> 21/3 80/8 117/2 121/21 203/18 203/24 216/16</p> <p><b>addressed [3]</b> 43/2 133/10 154/12</p> <p><b>addresses [1]</b> 133/3</p> <p><b>adds [1]</b> 149/2</p> <p><b>adequate [3]</b> 133/25 149/23 179/5</p> <p><b>adequately [4]</b> 30/8 131/15 133/10 150/6</p> <p><b>Adida [1]</b> 176/22</p> <p><b>adjourned [1]</b> 233/15</p> <p><b>administration [11]</b> 12/23 17/4 17/25 17/25 18/3 18/8 18/19 18/22 20/15 74/4 161/22</p> <p><b>administrative [3]</b> 5/9 19/10 121/14</p>
<p><b>5</b></p> <p><b>5.5 [1]</b> 211/18</p> <p><b>5.5-A [1]</b> 11/23</p> <p><b>500 [1]</b> 199/6</p> <p><b>51 [2]</b> 37/4 96/13</p> <p><b>52 [3]</b> 96/13 229/10 231/24</p> <p><b>53 minutes [1]</b> 230/11</p> <p><b>5:00 [2]</b> 217/9 220/18</p> <p><b>5:30 [1]</b> 220/14</p> <p><b>5:46 [1]</b> 233/15</p>		
<p><b>6</b></p> <p><b>63 [2]</b> 10/16 10/22</p> <p><b>64 [1]</b> 151/21</p> <p><b>67 [1]</b> 190/12</p> <p><b>6:00 [1]</b> 216/11</p>		
<p><b>7</b></p> <p><b>703 [2]</b> 61/9 64/3</p> <p><b>72 [1]</b> 111/11</p> <p><b>728 [1]</b> 220/1</p> <p><b>75 [1]</b> 1/24</p> <p><b>79 [1]</b> 88/21</p> <p><b>7th [4]</b> 30/18 30/19 30/21 30/23</p>		
<p><b>8</b></p> <p><b>80 [2]</b> 96/13 111/11</p> <p><b>8th [1]</b> 107/4</p>		
<p><b>9</b></p> <p><b>90 [1]</b> 1/4</p> <p><b>964 [1]</b> 37/3</p> <p><b>9:00 [2]</b> 222/11 232/22</p> <p><b>9:14 A.M [1]</b> 62/11</p> <p><b>9:30 [3]</b> 231/6 231/16 233/14</p> <p><b>9:50 A.M [2]</b> 62/8 62/13</p> <p><b>9th [2]</b> 155/8 159/21</p>		
<p><b>A</b></p> <p><b>A.M [3]</b> 62/8 62/11 62/13</p> <p><b>AARON [1]</b> 2/7</p> <p><b>abbreviation [1]</b> 9/24</p> <p><b>abilities [1]</b> 144/15</p> <p><b>ability [14]</b> 31/17 33/12 33/20 34/1 34/2 36/7 48/7 131/10 131/23 137/8 165/5 167/4 195/22 196/12</p> <p><b>able [55]</b> 13/21 15/5 17/8 25/9 28/19</p>		

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