

LEAGUE OF WOMEN VOTERS OF UTAH

VS

UTAH STATE LEGISLATURE

EVIDENTIARY HEARING DAY 1

October 23, 2025



IN THE THIRD JUDICIAL DISTRICT COURT
IN AND FOR SALT LAKE COUNTY, STATE OF UTAH

LEAGUE OF WOMEN VOTERS OF
UTAH; MORMON WOMEN FOR
ETHICAL GOVERNMENT;
STEFANIE CONDIE; MALCOLM
REID; VICTORIA REID; WENDY
MARTIN; ELEANOR SUNDWALL;
and JACK MARKMAN,

Plaintiffs,

vs.

UTAH STATE LEGISLATURE;
UTAH LEGISLATIVE
REDISTRICTING COMMITTEE;
SENATOR SCOTT SANDALL, in
his official capacity;
REPRESENTATIVE BRAD
WILSON, in his official
capacity; SENATOR J.
STUART ADAMS, in his
official capacity; and
LIEUTENANT GOVERNOR DEIDRE
HENDERSON, in her official
capacity,

Defendants.

EVIDENTIARY HEARING
DAY 1

Case No. 220901712

Judge Dianna Gibson

COPY

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OFFICIAL TRANSCRIPT OF ELECTRONIC RECORDING

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

2

3 THE COURT: All right. Good morning.

4 Let me know when we're on.

5 THE CLERK: We're on.

6 THE COURT: League of Women Voters of
7 Utah, et al., versus Utah State Legislature, et al.,
8 case 220901712.

9 Counsel, starting with plaintiffs, please
10 make your appearances.

11 MR. REYMANN: Good morning, Your Honor.
12 David Reymann and Cheylynn Hayman from Parr Brown.
13 And from the Campaign Legal Center, we have Mark
14 Gaber, Aseem Mulji, Ben Phillips, and Isaac DeSanto.

15 THE COURT: Great.

16 MR. REYMANN: I also want to thank the
17 Court for setting up a Webex link. We're not having
18 anyone appear remotely, but there may be some people
19 online that are just observing.

20 THE COURT: Great.

21 All right. Good morning.

22 MR. GREEN: Good morning, Your Honor.

23 Tyler Green on behalf of the defendants --
24 legislative defendants.

25 MR. GEIGER: Soren Geiger on behalf of the

1 legislative defendants.

2 MS. ROGERS: Olivia Rogers on behalf of
3 the legislative defendants.

4 THE COURT: All right.

5 All right. Good morning. So we are set
6 for a two-day evidentiary hearing considering the
7 maps that have been submitted by the parties.

8 Before we get started, are there any
9 preliminary issues or any scheduling issues we need
10 to address?

11 MR. REYMANN: So we did have the
12 opportunity, Your Honor, to confer on a couple
13 things ahead of time, and Mr. Green can correct me
14 if I'm wrong.

15 Sorry, give me one sec.

16 I think that with respect to at least the
17 exhibits that the plaintiffs are going to be using
18 today, we've stipulated to the admission of all of
19 those.

20 THE COURT: Okay.

21 MR. GREEN: That's right, including, I
22 guess, specifically the reports, is where we're --

23 MR. REYMANN: Right.

24 MR. GREEN: Yeah.

25 MR. REYMANN: And that includes a specific

1 stipulation that we would admit all of the expert
2 reports for both sides into evidence --

3 THE COURT: Okay.

4 MR. REYMANN: -- and that we've stipulated
5 as well that the experts -- they may go into their
6 qualifications a little bit, but we stipulated that
7 they can be qualified as experts to the extent that
8 that required any separate examination.

9 THE COURT: Okay.

10 MR. REYMANN: I'm trying to think if there
11 was something else.

12 With respect just to the physical
13 exhibits, we -- with our exhibits, we put a binder
14 up there for the witness, if that's okay. We also
15 have a copy for the clerk and for you in both
16 electronic and paper form, if you -- if you would
17 like, and I'm happy to bring those up.

18 THE COURT: That would be perfect.

19 MR. REYMANN: Okay.

20 THE COURT: Thank you.

21 MR. REYMANN: And then I think the only
22 other issue that was on my list was the scheduling
23 issue that had not been resolved for the hearings --
24 or the hearing on the pending -- one of the pending
25 PI motions that we had had some back and forth

1 about, and I'll let these guys address that.

2 THE COURT: Okay.

3 MR. GREEN: Sure. Yes, a couple on the
4 scheduling front.

5 Before we get to the PI question, Your
6 Honor, for today and tomorrow, as the Court knows,
7 it's seen a lot of paper, we've got a lot of things
8 to get through, and our experts, we had anticipated,
9 would be testifying tomorrow, and some of them have
10 afternoon flights. So in the course of what's
11 happening today, I just wanted to note that we've
12 got a few scheduling concerns with, you know,
13 afternoon stuff tomorrow, so the mid-afternoon
14 flights that our experts are intending to make.

15 THE COURT: Okay.

16 MR. GREEN: So just as a -- as a -- I
17 guess, a piece of groundwork.

18 And then for the -- for the PI hearing
19 scheduling issue, the Court -- I think the order
20 scheduled it for November 3rd, and I've got -- I'm
21 counsel of record in a U.S. Supreme Court case
22 that's being argued that day, so I can't do it that
23 day.

24 THE COURT: Okay.

25 MR. GREEN: I talked to Mr. Gaber, and we

1 had suggested, or at least talked about, two
2 possibilities. I don't know what the Court's
3 schedule is like a week from Friday. We could do it
4 in person on -- so that would be Halloween, the 31st
5 of October.

6 THE COURT: Okay.

7 MR. GREEN: Or if the Court was open to a
8 remote argument, I'll still be in Washington, D.C.
9 the day after, but I could appear remotely and
10 argue, you know, remotely on the 4th of November on
11 Tuesday.

12 THE COURT: Okay. Let me --

13 MR. GREEN: So I don't know if we want to
14 take the time to do that now or if we should address
15 that later, because I know we have witnesses
16 waiting, but...

17 THE COURT: Do you -- could we address it
18 either at the end of the day today or tomorrow?

19 MR. GREEN: Sure.

20 THE COURT: And then -- I'll tell you,
21 the 31st, I'm booked the entire day. It's my
22 regular law and motion calendar --

23 MR. GREEN: Okay.

24 THE COURT: -- so I can't do it that day.

25 MR. GREEN: Okay.

1 THE COURT: The 4th would be fine, I just
2 need to look and see what time I'm available. I'm
3 pretty sure I have some hearings that day, so I'm
4 happy to move stuff around to accommodate, but I
5 just need to take a peek at that.

6 MR. GREEN: Thank you. That's fine. That
7 can wait till the end. That's fine.

8 THE COURT: Perfect. Okay.

9 And then with regard to your witnesses,
10 what time do we need to be done by tomorrow?

11 MR. GREEN: So our last witness tomorrow
12 will be a local witness. So the two before that,
13 our first and second one, are the ones that have
14 flights, and the flights are at two --

15 What time's your flight?

16 UNIDENTIFIED MALE: Four.

17 MR. GREEN: 4:00 o'clock?

18 And?

19 UNIDENTIFIED MALE: 5:15.

20 MR. GREEN: So 4:00 and 5:00, so they'd
21 need --

22 THE COURT: Okay.

23 MR. GREEN: -- you know, enough time to
24 get to the airport and --

25 THE COURT: Okay.

1 MR. GREEN: -- security, et cetera, before
2 that.

3 I guess you'd need to be there -- you'll
4 probably board at like 3:00 or 4:00.

5 So they probably need to be done by
6 2:00-ish.

7 THE COURT: Okay. All right. Any other
8 scheduling issues?

9 (No audible response.)

10 THE COURT: Okay. Well, then are
11 plaintiffs ready to proceed?

12 MR. GABER: Yes, Your Honor. Plaintiffs
13 call Dr. Jowei Chen to the stand.

14 THE COURT: All right. Dr. Chen, if you
15 wouldn't mind, if you'd just come forward and stand
16 here right in front of my clerk, we're going to --
17 right here, just in this well area. We're going to
18 ask you to provide some -- that's great.

19 We're going to ask you to provide some
20 testimony under oath. If you wouldn't mind, please
21 raise your right hand. The clerk of the Court will
22 administer the oath.

23 (Witness sworn.)

24 THE COURT: All right. Come take a seat.
25 Just two requests for you. Everything we

1 do is recorded, but it's audio only, so when you
2 respond, make sure you're speaking into the
3 microphone. And then the second thing, respond with
4 words, "yes" and "no." "Uh-huh" and "huh-uh" don't
5 really translate accurately on the record. Okay?

6 THE WITNESS: Thank you, Your Honor.

7 THE COURT: All right. Thank you.

8 MR. GABER: And if we could switch to --
9 the screen to plaintiffs'.
10

11 JOWEI CHEN, Ph.D.,
12 called as a witness, being first duly sworn,
13 was examined and testified as follows:
14

15 DIRECT EXAMINATION

16 BY MR. GABER:

17 Q. Good morning, Dr. Chen. Could you please
18 state your name for the record?

19 A. Dr. Jowei Chen.

20 Q. And where are you employed, Dr. Chen?

21 A. At the University of Michigan in Ann
22 Arbor.

23 Q. And what's your area of study?

24 A. I study -- well, I'm an associate
25 professor of political science. I study

1 redistricting and gerrymandering.

2 Q. And how long have you been a professor at
3 the University of Michigan?

4 A. Since 2009.

5 Q. And in your academic field, what is your
6 methodology that you generally use to study the
7 partisan effects of redistricting?

8 A. I use computer simulations of
9 redistricting.

10 Q. And would you say that you're one of the
11 sort of preeminent or first scholars in that field
12 of using computer simulations in redistricting?

13 A. Yes.

14 Q. And did you write a seminal article on the
15 topic?

16 A. Yes.

17 Q. And could you tell the Court just a little
18 bit about that?

19 A. Yeah. So this was back in the early
20 2010s -- I believe in 2013 -- that I published one
21 of the first articles that used computer simulations
22 to study redistricting in various states.

23 Q. And have you published peer-reviewed
24 academic papers on simulation methodology as applied
25 in this case?

1 A. Yes.

2 Q. And does your work also involve analyzing
3 statistical measures of whether maps have the effect
4 of favoring or disfavoring a political party?

5 A. Yes.

6 Q. And have you presented expert reports and
7 testimony in other cases where you used the same or
8 similar methodology applied in this case?

9 A. Yes.

10 Q. Roughly how many cases?

11 A. Well, they're listed in my report. It's
12 probably 15 or so. I don't remember.

13 Q. And generally, all of your qualifications
14 and background and education, that's in your -- in
15 your CV and in your report?

16 A. Yes.

17 Q. Have Courts credited your testimony and
18 your analysis in the cases in which you've
19 testified?

20 A. Yes.

21 Q. And have you been retained on behalf of
22 clients who were challenging both alleged
23 gerrymanders by Democratic interests and also
24 gerrymanders by Republican interests?

25 A. Yes.

1 Q. And with respect to maps that were alleged
2 to be gerrymandered by Democrats, what's an example
3 of work you've done in that regard?

4 A. Well, for example, a challenge in Illinois
5 was a challenge to -- was a partisan gerrymandering
6 challenge to a plan drawn by Democratic legislature
7 in Illinois, and so I was retained on behalf of the
8 Republican plaintiffs.

9 MR. GABER: As Your Honor notes, we
10 stipulated to the qualifications of the expert. I
11 would offer Dr. Chen as an expert in the fields of
12 redistricting political geography, statistical
13 measures of partisan favoritism, and redistricting
14 simulation analysis.

15 THE COURT: All right. And there's no
16 objection?

17 MR. GREEN: No objection.

18 THE COURT: All right.

19 Q. (By Mr. Gaber) Dr. Chen, could you
20 briefly explain to the Court how computer
21 simulations for redistricting work?

22 A. Sure. So what a computer simulation does,
23 you know, when it produces redistricting plans is it
24 follows a given set of criteria.

25 Now, the criteria have to be programmed in

1 by whoever is programming the simulations, and so
2 you specify particular criteria that you want the
3 computer simulation process to follow. And so the
4 computer algorithm will know what sort of criteria
5 are being pursued.

6 And the -- generally, algorithms will
7 produce random districting lines, but will accept or
8 reject random lines in accordance with the criteria
9 that the programmer has specified. So it all
10 depends on what criteria you program into the
11 simulation algorithm.

12 Q. Now, you're familiar with Senate Bill 1011
13 that was enacted by the Utah legislature?

14 A. Yes.

15 Q. And it refers to a "computer ensemble."
16 "Ensemble" means the same thing as simulations in
17 this sense; is that right?

18 A. Right. So I'll use those terms
19 interchangeably. I'll generally just call it a set
20 of simulations, but the term "ensemble" just refers
21 to a set of simulations.

22 Q. And SB 1011 refers to ensembles that use
23 sequential -- the Sequential Monte Carlo method of
24 simulations; is that right?

25 A. Yes.

1 Q. And does your algorithm use the Sequential
2 Monte Carlo method of simulations?

3 A. Yes.

4 Q. And how does your algorithm account for
5 the Proposition 4's priority order redistricting
6 criteria?

7 A. Well, my algorithm was programmed to very
8 strictly follow the criteria laid out in
9 Proposition 4, the neutral redistricting criteria,
10 and to follow it in the specific hierarchy in which
11 those criteria are listed.

12 So most importantly, that means drawing
13 equally populated districts. And because this is a
14 Utah congressional plan, you divide the -- Utah's
15 population into four districts. That means that
16 every single district has to be exactly 817,904
17 people with no deviations. And so that's the most
18 important requirement.

19 Next, in Proposition 4, the list of
20 redistricting criteria is minimizing the division of
21 municipalities and then the division -- minimizing
22 the division of counties. Then there's geographic
23 compactness and then others underneath that. But
24 that is a hierarchy of criteria.

25 And so I specifically programmed that list

1 with that specific hierarchy of criteria into my
2 simulation algorithm so that all the maps that my
3 computer program, that my algorithm, is generating
4 are built with those specific criteria and that
5 specific hierarchy.

6 Q. Now, there's a number of items on the
7 list. You mentioned some contiguity and others.
8 One of them is -- a little further down the list is
9 "Respecting communities of interest." Does that --
10 do you recall that?

11 A. Yes.

12 Q. And how, if at all, did your algorithm
13 account for communities of interest?

14 A. Yes. So I used the Shapefile map of the
15 roughly 590 communities of interest that the UIRC,
16 the Independent Redistricting Commission, received
17 through public comments and turned them into digital
18 maps, and I instructed my algorithm to consider the
19 geographic boundaries of those 590 maps, those 590
20 communities. And so the algorithm was instructed to
21 try to avoid splitting as many as possible of those
22 590 communities of interest into multiple districts.

23 Q. Now, given the rank of that factor on the
24 list, can you talk a little bit about the extent to
25 which it's likely that a map would change depending

1 upon a particular community of interest?

2 A. In the Proposition 4 redistricting
3 criteria list, it's pretty far down the list. It's
4 below, for example, municipal and county divisions.
5 It's below geographic compactness. So it's pretty
6 far down the list. So it has virtually no effect,
7 very little to no effect, on the actual lines that
8 are being drawn. But it is in the criteria, and so
9 I found it very important to make sure that I built
10 the consideration into my redistricting algorithm.

11 Q. Did -- you said you brought in the
12 Shapefile. Did you consider or assess any of the
13 actual comments that underlayed any of those
14 communities of interest?

15 A. No.

16 Q. And -- now, after the UIRC -- any time
17 after the UIRC communities of interest were
18 released, did you also pretty recently come to see
19 that the legislature had announced some of its own
20 communities of interest that it was considering?

21 A. I did.

22 Q. And those were military bases and Native
23 American reservations, educational institutions, and
24 the like?

25 A. Yes.

1 Q. And did you then assess your algorithm to
2 see how it fared against those communities of
3 interest?

4 A. I did.

5 Q. And what did you generally find?

6 A. I generally found that the simulated plans
7 that I had produced, 10,000 simulated plans, were
8 pretty comparable to all of the proposed remedial
9 plans in this case with respect to the number of
10 those communities, the legislature-proposed
11 communities, that were protected and kept together
12 in a single district.

13 Q. Does your algorithm consider partisan
14 election results or partisan voter registration or
15 racial data in any way?

16 A. No.

17 Q. I am going to show you Figure 3.1. It's
18 on page 17 of your October 17th report.

19 MR. GABER: And this, for the Court's
20 record, is Plaintiffs' Exhibit 3.

21 Q. (By Mr. Gaber) And it's on the screen in
22 front of you. You have your binder there as well.

23 Dr. Chen, could you tell the Court what's
24 being reported in Figure 3.1?

25 A. Yes. And if you could just scroll up a

1 little bit to get the bottom -- the bottom axis.

2 Q. What I will do is make it a little
3 smaller.

4 A. Yeah. Or just maybe shrink it a little
5 bit.

6 Q. Yeah. There we go.

7 A. Perfect. Thank you.

8 So we're going to look at here the
9 partisanship of the computer-simulated plans that I
10 just talked about. My computer produced 10,000
11 simulated redistricting plans for Utah. Of course,
12 each plan has four districts, and so there are four
13 rows here.

14 What's shown on the horizontal axis is the
15 partisanship of each of these four districts. The
16 bottom row focuses on the least Republican district
17 in every computer-simulated plan. And so what I'm
18 reporting here is the Republican vote share of each
19 of these least Republican districts in every
20 simulated plan in gray circles. So there are 10,000
21 gray circles here.

22 And what this -- what the gray circles are
23 telling us is that typically the normal range for
24 the least Republican district, in terms of its
25 Republican vote share, is about 42 to 46 percent.

1 That's that gray blob on the bottom row in the lower
2 left. And then I've also plotted here the least
3 Republican district for each of the three remedial
4 plans that have been proposed.

5 The Plan C, Map C, is shown with a red
6 star. And so you see CD3 in the red star on the
7 bottom row. And so what that's telling us, that CD3
8 in the red star is telling us, is that the Map C has
9 a least Republican district with roughly a 56
10 percent Republican vote share.

11 You can see that that is way outside of
12 the normal range of the distribution of the
13 simulations. It is an extreme partisan outlier. It
14 is more heavily Republican than almost all of the
15 computer-simulated plans district in that row.

16 We can also see Plaintiffs' Map 1 in
17 purple, in a purple triangle, and we can also see
18 Plaintiffs' Map 2 with a green square, and we can
19 see that Plaintiffs' Map 1, the purple triangle, is
20 right inside of the distribution on that bottom row,
21 CD1. And with respect to Plaintiffs' Map 2, you can
22 see it's a little bit to the right of the normal
23 range of the distribution, but not anywhere as
24 extreme as Map C, the SB 1012 map.

25 Q. And is the same conclusion true with

1 respect to the second-least or the third-most
2 Republican district in the chart CD2 for Map C?

3 A. Yeah. If we look at the third-most
4 Republican district row, the third row on this
5 figure, you can see where all of those extra
6 Republican voters had to come from that went into
7 CD3 in Map C.

8 Well, we see that CD2, the third-most
9 Republican district, is far less Republican than
10 almost all of the computer-simulated maps.
11 So it's very much two sides of the same coin in
12 terms of CD2 and CD3. Republican voters were
13 shifted from one -- from the third row into the
14 fourth row.

15 Q. And statistically speaking, then, what is
16 your opinion with respect to where CD3 and CD2 fall
17 in terms of the range of maps?

18 A. Yeah. Looking at the simulation maps here
19 and comparing them to Map C, it's pretty clear that
20 the districts in Map C are an extreme partisan
21 outlier.

22 Q. Now, the partisan data that you're using
23 to analyze here, what elections are those from?

24 A. Here, we're using all of the statewide --
25 the competitive statewide elections from 2016 to

1 2024, including the 2018 and the 2022 elections.
2 And so I just took all of those elections,
3 aggregated them up across all the 17 statewide
4 contests, and then I'm calculating on the horizontal
5 axis here the Republican share of the two-party
6 vote. So Republican share of Republican plus
7 Democratic votes across the 17 elections.

8 Q. Now, SB 1011 has a partisan index of its
9 own defined set of elections. Are you familiar with
10 that?

11 A. Yes.

12 Q. And did you also conduct this same
13 analysis using SB 1011's partisan index?

14 A. I did.

15 Q. And that's, for the Court's record,
16 reported in Exhibit -- Appendix A to your report; is
17 that right?

18 A. Yes.

19 Q. And what did you find using the --
20 generally, what did you find using the partisan
21 index of SB 1011?

22 A. I found largely the same -- I reached
23 largely the same conclusions: Map C is a partisan
24 outlier.

25 Q. So I'm going to direct your attention to

1 Figure 3.3. This is on page 25 of your report and
2 is on the screen in front of you as well.

3 And could you tell the Court what
4 Figure 3.3 is reporting?

5 A. So this is a partisan characteristic of
6 each entire plan. And specifically, this is the
7 standard deviation measure. So what I'm showing
8 here is the distribution of standard deviations
9 across all 10,000 of these simulated plans and then
10 the three proposed remedial plans.

11 So the standard deviation measure, this is
12 just a measure that has been used by scholars of
13 Utah's political geography, and what it captures is
14 the extent -- well, what the measure does is it
15 takes the standard deviation of the Republican vote
16 share of the four districts in any congressional
17 plan in Utah, any simulated plan or any proposed
18 remedial plan or any enacted plan, and it calculates
19 the standard deviation.

20 And so what these scholars explain is that
21 the standard deviation measure captures the extent
22 to which the minority party's voters -- in this
23 case, the Democratic Party's voters -- have been
24 cracked or split across the four districts in any
25 given plan. The lower the standard deviation, the

1 more that they have been split or cracked across the
2 four districts versus, say, a higher standard
3 deviation. So that's the theoretical intuition of
4 what the measure is getting at.

5 So now let's look at this figure, and what
6 you can see is that the vast majority of the
7 computer simulations have a standard deviation of
8 about .14 or .15. Those are those two gray bars --
9 I'm sorry, the two bars that are tallest in this
10 histogram.

11 Okay, so what about Map C, the red star
12 that's labeled SB 1012? That has a much, much lower
13 standard deviation than almost all of the
14 computer-simulated plans. It is a partisan outlier.

15 And then, of course, we have a purple
16 triangle for Plaintiffs' Map 1, and that is well
17 within the normal range of the distribution.
18 And Plaintiffs' Map 2 is also inside of the
19 distribution -- inside the normal distribution of
20 the simulated plans in terms of the standard
21 deviation.

22 Q. And just from a percentage standpoint,
23 where does Map C fall in terms of how many -- what
24 percentage of plans are -- have a higher standard
25 deviation?

1 A. It is lower than over 99 percent of the
2 computer-simulated plans. That's what makes it an
3 extreme partisan outlier.

4 Q. Now, in your report, in section 4, which
5 is pages 27 to 40, you compare the partisanship of
6 the remedial proposals and your simulations using SB
7 1011's metrics. Does that -- are you familiar with
8 that?

9 A. Yes.

10 Q. And two of -- I want to talk about two of
11 those metrics. The first is the ranked marginal
12 deviation, and I'm going to show you Figure 4.1.
13 It's on page 29 of your report.

14 And before we delve into this figure,
15 could you just tell the Court in layman's terms what
16 ranked marginal deviation is generally and what it's
17 measuring?

18 A. Yeah. SB 1011 calls for the use of the
19 ranked marginal deviation. I'm just going to start
20 calling it the RMD test. And so the RMD test is
21 essentially asking: How much does any given, say,
22 proposed plan, or any computer-simulated plan -- how
23 much does any given plan, congressional plan in
24 Utah, deviate from a range of computer-simulated
25 plans, from the typical computer-simulated plan?

1 So SB 1011 calls for the use of a
2 computer-simulation ensemble, and the RMD test, in
3 layman's terms, is saying: How different is it in
4 district-level partisanship from a typical
5 computer-simulated plan or a computer-simulated
6 ensemble plan in its district level partisanship?
7 That's what RMD is measuring.

8 Now, the SB 1011 test says that a plan
9 passes the RMD test if it is within the bottom 95
10 percent of deviations, meaning it is within the
11 bottom 95 percent in terms of being most similar to
12 a typical computer-simulated plan. So if you're
13 below bottom 95 -- below 95 percent -- percentile,
14 then the plan passes the test. If it's above 95
15 percent, then it is deemed as extreme and fails the
16 test, the RMD test.

17 Q. And what is Figure 4.1 on page 29 showing
18 with respect to the maps under consideration?

19 A. So in Figure 4.1 here, we're going to
20 apply the RMD test using my 10,000
21 computer-simulated maps, and you can see on the left
22 side of the figure, there is a dashed line, 95
23 percent. That is the 1011 -- the SB 1011 threshold.
24 Everything on the left -- to the left of that line
25 passes the test, and everything to the right of that

1 95 percent line would fail the test. So the gray
2 circles report the RMD of all the computer-simulated
3 plans.

4 And so what this map is showing -- sorry,
5 what this figure is showing is -- so starting with
6 the left, Plaintiffs' Map 1 passes the test. It is
7 within the bottom 95 percent. That's the -- that's
8 the purple square there on the left.

9 Map C, labeled with the red star, the SB
10 1012 plan, it fails the test. It is more extreme
11 than 95 percent. In fact, it's way up at 99.99
12 percent. So it fails the RMD test using my
13 computer-simulated plans. And we can see the green
14 triangle labeled Plaintiffs' Map 2, and we can see
15 that Plaintiffs' Map 2 also fails the RMD test.

16 Q. Now, the next metric I want to have you
17 talk about is the partisan bias test. And could you
18 just explain, again, in terms for those of us who
19 aren't political scientists, what the partisan bias
20 test is and what it's -- what it's measuring?

21 A. The partisan bias test is a test that asks
22 you to assess the partisanship -- the district-level
23 partisanship of any given Utah congressional plan by
24 first taking us into a hypothetical world in which
25 Utah is a tied 50/00 state. And so to do that, we

1 start with Utah's statewide Republican vote share,
2 which is about 66 percent.

3 Now, to get us into this hypothetical
4 world where Utah is a tied 50/50 competitive state,
5 you have to go from 66 down to 50. So you subtract
6 16 percentage points from every district's
7 Republican vote share, and that is how we pretend
8 like we're in a hypothetical world where Utah is a
9 50/50 competitive state.

10 And then, now that we are -- we've
11 subtracted 16 percent from each district's
12 Republican vote share, the partisan bias test simply
13 asks: Are there two districts above 50 percent and
14 two districts below 50 percent? If there are, then
15 the plan passes the test. If not, then it fails.

16 Q. Do you have an opinion as to whether the
17 partisan bias test is inappropriate or one of the
18 best-available metrics for assessing partisan
19 gerrymandering in Utah?

20 A. It's inappropriate in Utah. It's
21 inappropriate because, as I just explained, it
22 requires us to go into this hypothetical world in
23 which Utah is not a two-thirds Republican state, but
24 instead is a 50/50 state, and that's simply not
25 realistic in Utah. So that by itself is why it

1 doesn't make any sense specifically in Utah. But in
2 general, the partisan bias test just doesn't account
3 for a state's political geography, and the unique
4 political geography of Utah in particular.

5 Q. Now, on page 32 of your report -- and it's
6 on the screen here -- Tables 1 and 2, can you tell
7 the Court what Table 1 is showing?

8 A. Yeah. So we're going to look at those
9 10,000 computer-simulated maps that I just talked
10 about, and we're going to look at how many maps are
11 accepted and rejected by the partisan bias test, and
12 this figure -- sorry, this table is also going to
13 tell us about the partisanship of those 10,000 maps,
14 whether or not they have a Democratic-favoring
15 district in them.

16 So first of all, what this figure is
17 telling us is that almost all 10,000 of the
18 computer-simulated maps are rejected by the partisan
19 bias test. There are only 11 out of 10,000 maps
20 that were not rejected by the partisan bias test.

21 Second, what's the partisanship of those
22 few maps that were accepted? Well, a little over
23 half of them were four-zero maps with four
24 Republican districts and zero Democratic districts.
25 Contrast that with the vast majority of the

1 simulations, which, of course, do have a Democratic
2 district.

3 So what this is showing us is that
4 essentially if a plan has -- has a Democratic
5 district, it's almost certainly going to fail the
6 partisan bias test.

7 Q. And what is -- what, if anything, does
8 that say about the partisan bias test in relation to
9 how it interacts with Proposition 4's neutral
10 redistricting criteria?

11 A. Well, they're clearly at odds. They're
12 clearly at odds with the neutral Proposition 4
13 redistricting criteria.

14 What we're seeing here is that I produced
15 10,000 computer-simulated maps that are all strictly
16 adhering to the neutral Prop 4 redistricting
17 criteria, and over 99 point -- or about 99.9 percent
18 of them were rejected by the partisan bias test. So
19 it's simply rejecting plans that are complying with
20 the neutral Prop 4 redistricting criteria.

21 Q. Now, as part of your analysis in this
22 case, you also looked at simulations that were
23 conducted by Dr. Trende and Dr. Barber for the
24 defendants; is that right?

25 A. Yes.

1 Q. And we'll talk a little bit more about
2 that in a minute, but I want you to explain for the
3 Court what Table 2 is. This is in paragraph 64 of
4 your report.

5 A. Yeah. Table 2 is looking at
6 Dr. Trende's -- what he calls the base set of
7 simulated plans. And Dr. Trende produced 100,000
8 such computer-simulated plans. We're going to see
9 in this table -- it's laid out exactly the same way
10 as the last one, and we're going to see exactly the
11 same thing.

12 So most of Dr. Trende's maps are, in fact,
13 rejected by the partisan bias test, but what's
14 really interesting here is the partisan asymmetry in
15 which maps get accepted and which maps get rejected
16 by the partisan bias test. The maps that were
17 rejected by the partisan bias test were
18 overwhelmingly maps that had a Democratic district,
19 and the maps that were accepted by the partisan bias
20 test were overwhelmingly maps that did not, that
21 contained four Republican and zero Democratic
22 districts. So there's a partisan asymmetry, a
23 partisan filter when the partisan bias test is
24 applied.

25 Q. And then on the next page of your report,

1 page 33, Table 3, could you tell the Court what
2 that's showing?

3 A. We're seeing -- we're seeing exactly the
4 same thing with Dr. Trende's other set of simulated
5 plans, what he calls the restricted simulated plans.
6 And, again, we're going to see the same thing here.

7 Most of the plans are rejected by the
8 partisan bias test, but the ones that are rejected
9 are almost entirely maps that have a Democratic
10 district. And the maps that are accepted by the
11 partisan bias test are almost entirely maps that are
12 four-zero, have four Republican districts and zero
13 Democratic districts.

14 Q. And then Table 4 just below that, what
15 does that show?

16 A. We're seeing exactly the same thing with
17 respect to the so-called ALARM-simulated plans that
18 Dr. Trende brought in and used, and we see exactly
19 the same thing. There were 6,000 such simulated
20 plans, and the maps that were rejected by the
21 partisan bias test were ones that contained a
22 Democratic district, and almost all of the maps that
23 were accepted by the legislature's partisan bias
24 test were four-zero maps with no Democratic
25 districts.

1 Q. Now I'm showing you Figure 4.2. This is
2 on page 35 of your report. And could you tell the
3 Court what this figure shows?

4 A. What we're seeing plotted on this
5 histogram here is the Republican vote share of the
6 least Republican/the most Democratic district in
7 each simulated plan. And so that's Republican vote
8 share of that most Democratic district that's
9 plotted in this histogram. And the Trende-simulated
10 plans in this base simulation set that were rejected
11 by the partisan bias test are in the gray histogram,
12 and then the ones that were accepted are in the red
13 histogram.

14 So what this is telling you is that as the
15 Republican vote share of that most Democratic
16 district goes up, it becomes more Republican
17 favorable, those plans become more likely to be
18 accepted by the legislature's partisan bias test,
19 and as the district becomes more Democratic
20 favorable, it is more likely to be rejected by the
21 legislature's partisan bias test.

22 Q. And then similarly, Figure 4.3 on page 36,
23 does this tell a similar story?

24 A. It shows exactly the same thing, except
25 now we're looking at Dr. Trende's restricted

1 simulated plans. But it shows exactly the same
2 thing.

3 Q. And then on page 37 of your report,
4 Figure 4.4, what is this showing?

5 A. That shows exactly the same thing with
6 respect to the ALARM-simulated plans that Dr. Trende
7 used.

8 Q. Now I want to talk for a bit about
9 Dr. Trende's simulations and show you some figures.
10 But just to start, could you tell the Court how
11 Dr. Trende's methodology of computer simulations
12 differs from yours?

13 A. Dr. Trende used a software called Redist
14 (phonetic), and he instructed the Redist package to
15 produce some simulated plans, and I -- well, I
16 looked at Dr. Trende's code.

17 Q. And is the Redist program the same program
18 that Dr. Barber used to generate his simulated
19 plans?

20 A. It is.

21 Q. Do you have an opinion as to whether using
22 Redist for Utah in particular is appropriate?

23 A. Yeah, it's not appropriate because the
24 Redist software package is not built with the
25 proposition for neutral redistricting criteria. And

1 so plans that are generated from Redist are not
2 automatically just magically knowing or following
3 the Prop 4 neutral redistricting criteria, which are
4 unique to Utah. The Redist software was not built
5 specifically for Utah's proposition for
6 redistricting criteria.

7 Q. And then I have on the screen here still
8 Figure 4.4, and these are the ALARM-simulated plans.
9 Do you have an opinion as to whether using the
10 ALARM-simulated plans is appropriate for comparing
11 the proposed remedial maps in this case against a
12 simulated set?

13 A. It's not appropriate because the
14 ALARM-simulated plans were explicitly produced with
15 the consideration -- with the redistricting
16 consideration of preserving the course of prior
17 districts -- the prior decades' districts. And so
18 that's obviously at odds with or not consistent with
19 the criteria in Prop 4.

20 Q. And on the ALARM website, does it indicate
21 that it's following the SB 200 commission criteria
22 when it generates the maps?

23 A. Yeah, the ALARM website is pretty explicit
24 that that is what the ALARM simulations were
25 programmed to do, was to follow SB two -- follow

1 SB 200 and to preserve the course of prior
2 districts.

3 Q. And to the extent that there's a
4 requirement to -- under SB 1011 to follow the legal
5 and geometric criteria in sampling and reweighing
6 simulated plans, is it your view that -- or what is
7 your view with respect to Redist and whether it can
8 do that?

9 A. Well, Redist is not programmed to follow
10 the Prop 4 neutral redistricting criteria.

11 Q. So I want to direct your attention to
12 Figure 5.1. It's on page 46 of your report. And if
13 you could tell the Court what Figure 5.1 shows.

14 A. Sure. So this is a very -- this is the
15 very first example of the ways in which Redist is
16 not following the neutral Prop 4 criteria.

17 As we talked about earlier, the very
18 first -- or probably the most important criterion in
19 Prop 4 is that districts have to be equally
20 populated. They have to have zero population
21 deviations, every district has to be exactly 817,904
22 people.

23 So I looked at Dr. Trende's base simulated
24 plans, his 100,000 maps, and I found that none of
25 them, not a single one of the 100,000 plans, is

1 equally populated. They all have population
2 deviations.

3 And so on this figure, I'm reporting the
4 magnitude of those population deviations.

5 Specifically, I'm reporting the sum of the
6 population deviations across all four districts in
7 every congressional plan in Dr. Trende's base set.

8 And so what we can see here is that the
9 typical range of the sum of his population
10 deviations for an entire plan ranges from about
11 5,500 to about 25,000 people. So that's the sum of
12 the population deviations in his simulated plans,
13 and there are no plans that have zero population
14 deviations.

15 Now compare that in the lower half of this
16 figure to my computer-simulated plans, which were
17 programmed to follow the Prop 4 neutral
18 redistricting criteria. All 10,000 of those
19 computer-simulated plans have zero population
20 deviations. All four districts in every plan have
21 exactly 817,904 people.

22 Q. Could population deviations of the extent
23 that you see in the top of -- from Dr. Trende's base
24 simulated plans, could that impact the partisan
25 characteristics of the simulated set?

1 A. Yeah, absolutely. If you were going to
2 try to manually go in or if Dr. Trende wanted to
3 manually go in and redraw his plans so as to achieve
4 equal population, you can see on this figure the
5 magnitude of the number of people that he would have
6 to be shifting around. It's ranging from about
7 5,000 to 25,000 people, typically. So that's a lot
8 of people to have to move around just to get
9 Dr. Trende's plans to equal population.

10 Q. Now I want to show you Figure 5.2. This
11 is on page 51 of your report -- or 49 of your
12 report. And could you tell the Court what
13 Figure 5.2 says?

14 A. So what we're going to look at in this
15 figure is the number of county divisions in
16 Dr. Trende's simulated plans, and then we're going
17 to look at the number of county divisions in my
18 computer-simulated plans. Obviously Prop 4 tells us
19 to minimize municipal divisions and then county
20 divisions. So we're going to look at county
21 divisions here, and what this figure is telling us
22 in the upper half is that Dr. Trende's base
23 simulated plans are splitting a lot more counties
24 than is necessary.

25 So the most common outcome in a simulated

1 plan is seven or eight county divisions in each
2 plan. So that's a lot more than necessary. We know
3 that when you draw four congressional districts in
4 Utah, you only need to split three counties.
5 You only need to have three county splits or three
6 county divisions. That is the amount that you need
7 in order to create an equally populated plan. Any
8 more than that is more than necessary.

9 And so look at the bottom half of this
10 figure. Those are my computer-simulated plans, and
11 you can see that every single one has exactly three
12 divisions of counties.

13 Q. Now, turning to Figure 5.3 on page 52,
14 what is this figure showing?

15 A. This map is an example of one of
16 Dr. Trende's simulated maps in his base simulation
17 set. And so this is just an example of one of
18 Dr. Trende's maps.

19 And what we can see here in this figure is
20 that, first of all, the districts are pretty oddly
21 shaped. There is District 4 that kind of circles
22 the entire state and then a couple of other kind of
23 very abnormally shaped districts that cover the
24 remaining counties in between District 4 inside of
25 that donut hole.

1 So these are really oddly shaped
2 districts, of course, but look at the number of
3 county splits, the number of county divisions.
4 This map has a total of 11 county divisions spread
5 out across six different counties that are
6 divided 11 different ways. And so that's obviously
7 a really large number of county splits, and it's
8 pretty obvious that this is not a map that complies
9 with the redistricting criteria, the neutral
10 criteria, in Prop 4.

11 Q. And how many times is Salt Lake County
12 split in this map?

13 A. Salt Lake County is divided into all four
14 congressional districts. So it's divided three
15 times. It's divided into four total congressional
16 districts.

17 Q. And is the same true for Utah County?

18 A. Yes, Utah County is also divided into all
19 four congressional districts in this map.

20 Q. Do you have an opinion as to whether it is
21 methodologically appropriate to have a map like this
22 be among the set that you compare against to
23 determine compare -- compliance with Prop 4's
24 criteria?

25 A. Well, it's not appropriate to use a map

1 like this or to use other simulated maps like this
2 because maps like these clearly are not complying
3 with the Prop 4 neutral redistricting criteria, and
4 so they are not an appropriate comparison set to use
5 to compare against, say, any remedial proposed plan.

6 Q. I want to direct your attention to
7 Figure 5.5. This is on page 56 of your report. And
8 if you could please tell the Court what you are
9 showing here.

10 A. So we're going to look at subsets of
11 Dr. Trende's computer-simulated plans now. And
12 specifically, every row on this figure is going to
13 look at a subset of his plans with respect to how
14 many county divisions it has. The very bottom row
15 looks at the Trende simulations that have only three
16 county divisions, and the top row looks at the
17 Trende simulations that have 12 or more county
18 divisions. And, of course, all the other values in
19 between are in the rows in between.

20 So with each row, I'm going to look at, on
21 this figure, the average and the median Republican
22 vote share of the most Democratic district in each
23 of these simulated plans. So that goes from left to
24 right, and it ranges from 45 to about 51 percent.

25 What's really interesting here is the

1 relationship between the number of county divisions
2 in Dr. Trende's simulated plans and the partisanship
3 of those plans. What the top of this figure -- what
4 the top couple of rows in this figure are telling us
5 is that when Dr. Trende has all those excessive
6 county divisions -- 10, 11, 12 county divisions in
7 his simulated maps -- those end up being really
8 Republican-favorable maps where all four districts
9 are typically Republican-leaning or
10 Republican-favoring with Republican vote shares
11 above 50 percent. So those are Republican-favorable
12 maps.

13 Now, what happens when Dr. Trende's
14 simulations get the number of county divisions lower
15 and closer down to three, which is -- which is all
16 that's ever necessary? Well, then all of a sudden,
17 that district, the most Democratic district, becomes
18 more favorable to the Democrats. And when you get
19 all the way down to three county divisions in
20 Dr. Trende's simulated maps, the Republican vote
21 share of the most Democratic district goes all the
22 way down to 45 or 46 percent.

23 Q. Now, why is it, considering Utah's
24 political geography, that having an excessive number
25 of county splits would lead to a result like this?

1 A. Well, think about the previous map that we
2 just looked at where districts were sprawling all
3 across the state. You had four districts in Utah
4 County, four districts in Salt Lake County, just --
5 six counties being split, 11 county divisions in
6 total, just excessive number of county splits. What
7 is such a map doing? It's basically picking voters
8 randomly from across the state, from random
9 counties, and putting them randomly into random
10 districts.

11 Now, what's the partisan effect of that
12 sort of completely geographically random districting
13 process in Dr. Trende's simulated maps? Well, if
14 you just draw voters at randomly [sic] and put them
15 into random districts, then you're essentially going
16 to end up having four districts that basically
17 mirror Utah's statewide Republican vote share,
18 meaning that all four districts will basically be
19 closer to uniformly Republican-favorable.

20 So that is what violations of Prop 4
21 redistricting criteria do to the partisanship of
22 your maps. They make for four safer Republican
23 districts that mirror the state's statewide
24 Republican vote share.

25 Q. Now I want to show you Figure 5.6. This

1 is on page 60 of your report. And if you could
2 explain what this figure shows to the Court.

3 A. This figure is telling us the same
4 information that we saw in the previous figure,
5 except now, this time, I'm plotting out the
6 Republican vote share of the most Democratic
7 district with a histogram on each row. And so you
8 can see in the top row, I'm looking at all 100,000
9 of Dr. Trende's simulated plans.

10 Now, when Dr. Trende looks at his
11 simulated plans, as he testified to the legislature
12 on September the 22nd, he applied what he called a
13 quantile test. This is a pretty simple test. It
14 just says, look at the Republican vote share of the
15 most Democratic district in Dr. Trende's simulated
16 plans.

17 And Dr. Trende said, "Here's my quantile
18 test." He said he was going to line up the
19 districts from least to most Republican and then
20 look at the middle 95 percent range. In other
21 words, the 2.5 percent to the 97.5 percent
22 percentile in terms of Republican vote share of the
23 most Democratic district.

24 So he sets up that 95 percent range, that
25 middle 95 percent range, and then Dr. Trende said

1 his test was -- pretty straightforward -- that he
2 asks for any proposed plan that he -- and he, of
3 course, looked at five different proposals that day,
4 and he said: Is the district in the proposed
5 plan -- the most Democratic district, is it within
6 that middle 95 percent range, or is it outside of
7 the 95 percent range?

8 And Dr. Trende's test was straightforward.
9 If it is outside, then Dr. Trende would call it a
10 partisan outlier and say it fails his quantile test.
11 And if it's inside of the 95 percent range, which
12 I've shown in a blue bar -- a blue line on each row,
13 if it's within that 95 percent range, then
14 Dr. Trende would say it passes his test, and he
15 would deem it to not be an extreme partisan outlier.
16 So pretty straightforward test.

17 Now, of course, we know now that the
18 problem with his test is that Dr. Trende is using
19 all of these computer-simulated plans that have an
20 excessive number of county splits.

21 So what happens if we look at different
22 plans depending on their number of county divisions?
23 Well, as you can see in the top row, Dr. Trende
24 concluded on September 22nd that if you look at all
25 100,000 of the simulated plans, including the ones

1 with excessive county splits, then, of course,
2 Dr. Trende's plan C, the Map C, which later became
3 SB 1012, it passes the test. It is within the 95
4 percent middle range.

5 But what happens when we go down on this
6 figure and look at plans that have fewer and fewer
7 county divisions? Dr. Trende would start to fail
8 the Map C on his quantile test if he had just looked
9 at plans that have fewer county splits.

10 So look at the bottom two rows. If
11 Dr. Trende had just looked at his own simulated
12 plans that have four or fewer county divisions, he
13 would have concluded that Map C fails his own
14 quantile test. But, of course, he didn't do that.
15 He looked at all of his plans, all 100,000,
16 including the ones with excessive county divisions.

17 Q. Now, one of the things that Dr. Trende and
18 SB 1011 called for are culling of the simulated set
19 based on the results of the partisan bias test. Do
20 you recall that?

21 A. Yes.

22 Q. And do you have an opinion as to whether
23 it's appropriate to cull a set of neutrally created
24 simulations based on the partisan bias test?

25 A. It's not appropriate. As we just saw

1 earlier, a couple minutes ago, that partisan bias
2 test is essentially a filter. It is effectively
3 just a filter for whether or not a plan has a
4 Democratic district or not. And we saw in those
5 four tables that we looked at a couple minutes ago
6 that if a plan has a Democratic district, it's
7 almost certainly going to be culled or rejected by
8 the partisan bias test. And if it doesn't, then
9 it's much more likely to be accepted by the partisan
10 bias test.

11 Q. Now I want to show you Figure 5.7. This
12 is on page 63 of your report, and I believe this is
13 showing the ones that are not culled. Could you
14 tell the Court about what Figure 5.7 is showing?

15 A. This figure is telling us what percent of
16 Dr. Trende's plans are accepted or not culled by the
17 partisan bias test.

18 And so, again, we're going to sort the
19 plans across these different rows based on how many
20 county divisions they have, and this is going to
21 show us something really interesting.

22 When Dr. Trende's plans have, in the top
23 row, a very large number of county divisions, 12 or
24 more, 11 county divisions, 10 county divisions, the
25 partisan bias test usually accepts those plans.

1 With 12 or more county divisions, the partisan bias
2 test accepts about two-thirds of those plans. It's
3 a pretty high acceptance rate.

4 But what happens in Dr. Trende's simulated
5 plans that minimize -- or that get closer to
6 minimizing the number of county divisions, say, when
7 he gets down to the row with four county divisions
8 and even three county divisions? Well, on those two
9 bottom rows, almost all of the plans are not
10 accepted. They're rejected by the partisan bias
11 test.

12 So what does that tell us about the
13 partisan bias test? In Dr. Trende's simulated
14 plans, the partisan bias test is accepting plans
15 that have a wildly excessive number of county
16 divisions -- 10, 11, 12 county divisions -- and it
17 is rejecting almost all of the plans that have
18 relatively fewer county divisions, three or four
19 county divisions.

20 So that's kind of perverse, isn't it?
21 It's basically accepting plans -- accepting at the
22 highest rates plans that deviate from the Prop 4
23 neutral redistricting criteria, and it is rejecting
24 almost all of the plans that have relatively fewer
25 county divisions that are getting closer to

1 complying with Prop 4.

2 Q. Now, Figure 5.10, this is on page 68 of
3 your report. Could you explain what this figure is
4 showing, please?

5 A. So this figure is applying the RMD test to
6 different subsets of Dr. Trende's simulated plans.
7 And so on every row here, we're going to look at a
8 different subset, once again, subsetted by the
9 number of county divisions. And remember the RMD
10 test that SB 1011 laid out.

11 The RMD test is saying you need to look at
12 a set of simulations and then look at the bottom 95
13 percent of their RMDs. And a proposed map -- a
14 proposed remedial map passes the RMD test if it is
15 within the bottom 95 percent, which on each row on
16 this figure is depicted with a gray rectangle. And
17 so each rectangle is that bottom 95 percent. The
18 RMD test is essentially: Is the enacted -- or are
19 the proposed plan within or outside of the gray
20 rectangle.

21 So when Dr. Trende applies the RMD test
22 using all 100,000 of his base simulated plans, he,
23 of course, concludes that Map C passes because he
24 was looking at all 100,000 of his maps. But what
25 happens if we only look at a subset of his maps, of

1 Dr. Trende's maps, with relatively fewer county
2 divisions? That's what we see on the bottom four
3 rows of this figure.

4 If you look at Dr. Trende's simulated
5 plans with only six or fewer or five or fewer or
6 four or fewer county divisions, if Dr. Trende had
7 just looked at his plans that have relatively fewer
8 county divisions, he would have concluded that Map C
9 fails his -- fails the RMD test. That's what the
10 bottom four rows are showing.

11 Q. And the RMD test, that -- in SB 1011,
12 that's the test -- is that part of the test for
13 partisan intent in the drawing plan?

14 A. In SB 1011, yes.

15 Q. Now I want to direct your attention to
16 Figure 5.11. This is on page 71 of your report.
17 And if you could tell the Court what 5.11 is
18 showing.

19 A. So now we're done with -- talking about
20 county divisions. Let's look at another one of the
21 neutral Prop 4 criteria, geographic compactness.

22 The way that we measure geographic
23 compactness is with quantitative metrics like the
24 Polsby-Popper score, where higher Polsby-Popper
25 scores indicate greater geographic compactness. In

1 other words, a more normal-looking shape. So higher
2 scores are better; lower scores are more noncompact.

3 Now, the top half of this figure is
4 looking at the Polsby-Popper scores, the compactness
5 scores, of Dr. Trende's 100,000 simulations. And as
6 you can see from the top half of this figure, the
7 normal range of Dr. Trende's simulations goes from
8 about 0.198 to about 0.397.

9 So did these plans -- are these plans as
10 geographically compact to the greatest extent
11 practicable? Well, we can answer that by looking at
12 my computer-simulated plans, which were drawn with
13 strict adherence to the Prop 4 neutral criteria, and
14 we see that distribution on the bottom half of this
15 figure.

16 So what the bottom half of this figure
17 shows is that in my 10,000 computer-simulated plans,
18 the Polsby-Popper scores -- the normal range of
19 Polsby-Popper scores is significantly higher. It
20 goes from about 0.418 to 0.479.

21 So compare the bottom to the upper half of
22 these distributions -- the bottom distribution to
23 the upper distribution in this figure. The upper
24 half is Trende's simulations, and the bottom half is
25 my own simulations.

1 This is telling us that the normal
2 95 percent range of Dr. Trende's simulated plans are
3 all completely less compact, lower geographic
4 compactness scores, lower Polsby-Popper scores, than
5 the entire middle 95 percent range of my
6 computer-simulated plans. So clearly Dr. Trende's
7 simulated plans are not geographically compact to
8 the greatest extent practicable.

9 Q. Now I want to show you from Appendix E of
10 your initial report, Figure E-1. And could you tell
11 the Court what this is?

12 A. Right. So we just talked about the
13 Polsby-Popper measure, which is just a quantitative
14 measure. But how does that look in terms of a real
15 map from Dr. Trende's simulated plans?

16 This is an example of one of Dr. Trende's
17 simulated plans, and you can just look at the
18 district shapes on here, and they're pretty clearly
19 visually kind of abnormal, they're kind of sprawling
20 all over the place. Of course, this plan creates a
21 very large number of county divisions. But in terms
22 of the compactness scores, you can see what low
23 compactness scores mean in terms of an actual map.
24 The districts are just geographically kind of
25 abnormal or oddly shaped.

1 Q. And do you have an opinion as to whether
2 it would be appropriate to have maps like this in a
3 set of simulations to assess a Proposition 4
4 compliance?

5 A. It's clearly not appropriate. Maps like
6 these clearly are not complying with neutral Prop 4
7 redistricting criteria, and so they are not a valid
8 basis for comparison to a proposed remedial map.

9 Q. Turning back to your report, Figure 5.13
10 on page 76, could you tell the Court what this is
11 reporting?

12 A. So what we're going to look at in this
13 figure is the relationship between Dr. Trende's
14 noncompact plans, the compactness scores in these
15 plans, and the partisanship of Dr. Trende's maps.

16 So in this figure, I'm looking at
17 different subsets of Dr. Trende's simulated maps
18 depending on their Polsby-Popper compactness scores.
19 Remember, higher Polsby-Popper means more
20 geographically compact. So the upper rows are the
21 relatively more compact of Dr. Trende's maps, and
22 the bottom rows are the relatively less compact
23 among his plans.

24 Now, along the horizontal axis here, we're
25 going to look at the percent of Dr. Trende's maps

1 that contain a Democratic district. So what are we
2 seeing here? If you look at Dr. Trende's maps that
3 have relatively better compactness scores, say .36
4 or higher, .35, .34, they all have -- about
5 two-thirds of the maps will contain a
6 Democratic-favoring district. About two-thirds.

7 Now, what happens when we go to the other
8 end, the bottom of this figure, and look at
9 Dr. Trende's plans that have the worst compactness
10 scores, .2 or lower, .21? Well, they get down to 35
11 percent to 40 percent containing a
12 Democratic-favoring district. So that's a massive
13 partisan difference.

14 And what does that tell us? When
15 Dr. Trende is drawing these weird, odd shapes,
16 having very low geographic compactness scores, that
17 is favoring the Republicans. That is creating more
18 plans that are four-zero and don't contain a
19 Democratic district.

20 In other words, this is the partisan
21 consequence of failing to adhere to the Prop 4
22 criteria. You deviate from Prop 4 criteria, you're
23 drawing wild districts that just sprawl across the
24 state, you're, therefore, creating more safe
25 Republican districts because every district is just

1 a random selection of voters from across the state,
2 and you're more likely to create four-zero plans
3 with four Republican districts and no Democratic
4 district. That's what Dr. Trende's maps are
5 showing.

6 Q. And then what does that mean, then, when
7 the simulated set has that characteristic? What
8 does it do to the reliability of the set, comparing
9 it to the proposed plans?

10 A. It's just not a reliable basis for
11 comparison because these maps are just clearly not
12 adhering to the Prop 4 neutral redistricting
13 criteria. And in deviating from those Prop 4
14 criteria, in not minimizing county divisions, in
15 drawing really geographically noncompact districts,
16 you can see the partisan impact. It is really
17 putting the thumb on the scale of drawing more and
18 more four-zero maps with no Democratic districts.

19 Q. And I have on the screen Figure 5.14.
20 This is from page 79 of your report. Could you
21 explain what this figure shows?

22 A. We're going to see the very same pattern
23 here, it's just measured a slightly different way.
24 We're going to see the same rows here in terms of
25 subset of Dr. Trende's simulated plans, except here,

1 we're just going to look at the Republican vote
2 share of the most Democratic district of the Trende
3 simulated plans in each row.

4 And so that's what I've plotted along the
5 horizontal axis here. The blue circles, those are
6 the medians of the simulated plans, and the red
7 stars are the averages, the means.

8 But what is broadly this figure showing?
9 It's showing us exactly the same thing that we saw
10 in the last figure. When Dr. Trende has relatively
11 higher Polsby-Popper scores of .36 or higher, then
12 you can see that the median Republican vote share in
13 the most Democratic district is about 47 percent,
14 average of about 48.5 percent. So those are
15 Democratic-leaning districts.

16 In other words, the typical map with a
17 relatively higher Polsby-Popper score, compactness
18 score, will have, typically, a Democratic-leaning
19 district.

20 Now let's go to the bottom of the figure.
21 What do the bottom rows tell us? When Dr. Trende is
22 producing these wildly noncompact plans with really
23 low Polsby-Popper scores, do we still see these
24 Republi- -- see these Democratic-leaning districts?
25 No, they flipped. They flipped into becoming

1 Republican-leaning districts. That's what you see
2 on the bottom two rows. They have Republican vote
3 shares of around 52 percent. So that is the
4 consequence of deviating from the Prop 4 neutral
5 redistricting criteria.

6 Q. Now, on page 83 of your report,
7 Figure 5.16, what are you showing here?

8 A. So this is now looking at the partisan
9 bias test and how many plans are going to -- or what
10 percent of plans are going to be accepted rather
11 than rejected or culled by the legislature's
12 partisan bias test that Dr. Trende applied. And so
13 this is what happens when you have this partisan
14 effect that we've seen in the previous two figures.
15 So the horizontal axis is reporting the percent of
16 Trende's simulated plans that are accepted by the
17 partisan bias test. And so it's interesting what
18 kinds of plans are being accepted rather than
19 rejected.

20 Let's start at the very bottom of this
21 figure. The simulated plans in Trende's set with a
22 really low Polsby-Popper score of .2 or lower. How
23 many of those are accepted by the partisan bias
24 test? About two-thirds, over 65 percent, in that
25 bottom row. So two-thirds of the plans are accepted

1 even though they've got really bad Polsby-Popper
2 scores.

3 Now let's roll up to the top of this
4 figure and go to the very top of, say, five -- or
5 four or five rows. These are the plans in
6 Dr. Trende's set with the relatively higher
7 Polsby-Popper scores. In other words, more
8 geographically compact.

9 So what percent of those are accepted by
10 the partisan bias test? Well, now that number goes
11 all the way down to about 35 percent or even a
12 little bit lower.

13 Okay, so what is that telling us? The
14 partisan bias test is accepting plans that are
15 really bad on geographic compactness, but then it is
16 rejecting plans in Trende's set that are relatively
17 better on geographic compactness.

18 That's perverse. It is promoting
19 Dr. Trende to focus on, to cull, to get rid of the
20 good -- the relatively better plans on compactness
21 and to instead focus on the worst of his plans on
22 geographic compactness.

23 Q. Now, on page 87 of your report,
24 Figure 5.19, could you tell the Court what you are
25 finding here?

1 A. So we're going to do what we did earlier
2 with respect to county divisions, but now we're
3 going to do it on the compactness scores. We're
4 going to apply the RMD test.

5 And remember, Dr. Trende applied the RMD
6 test that was prescribed by the legislature in SB
7 1011, but he looked at all 100,000 of his simulated
8 plans. He applied the RMD test, and he concluded
9 that Map C passes the RMD test, looking at all
10 100,000 plans. Now we're going to do the same thing
11 here, except we're going to look at subsets of his
12 maps, depending on their geographic compactness.

13 So the bottom row is just what Dr. Trende
14 did. He looked at all 100,000 of his maps, he
15 concluded that Map C passes the RMD test. And if
16 you look at the bottom couple of rows and you look
17 at the Trende maps with the worst lowest compactness
18 scores, you come to the same conclusion.

19 Map C passes the RMD test when you look at
20 Dr. Trende's most noncompact plans.

21 But now go up to the top four rows. Here
22 in the top four rows, we're looking at Dr. Trende's
23 maps with the relatively higher Polsby-Popper
24 compactness scores, at least .33, at least .34, .35,
25 .36.

1 What happens when we look at the subset of
2 Dr. Trende's plans that don't have the worst
3 compactness scores, are a little bit better on
4 compactness? Well, all of a sudden we see that Map
5 C fails the RMD test.

6 If Dr. Trende had just looked at the
7 subset of his maps that come relatively closer to
8 complying with the Prop 4 redistricting criteria of
9 being geographically compact to the greatest extent
10 practical -- practicable, he would have concluded
11 that Map C fails the RMD test.

12 Q. Now, all of these figures we've gone
13 through with Dr. Trende's simulations, these were
14 the base simulations; is that right?

15 A. Yes.

16 Q. And did you produce all of these same
17 figures for the restricted set of simulations that
18 Dr. Trende produced?

19 A. I did.

20 Q. And now generally, just for the Court's
21 reference, what is the restricted set versus the
22 base set?

23 A. Dr. Trende produced a second set of
24 100,000 simulated maps using the same software as
25 the base set. He made some modifications in terms

1 of introducing certain restrictions having to do
2 with things like mountains and other geographic
3 features.

4 Q. And in Appendix F to your report, you show
5 these figures for the restricted set. Generally
6 speaking, do you come to the same conclusions based
7 on those figures as you do with respect to the base
8 set?

9 A. Yes, I came to the same conclusions that
10 we've just covered.

11 Q. Now, I want to talk a bit about contiguity
12 and Appendix G of your report. And is that where
13 you report the results of Dr. Trende's simulations
14 with respect to contiguity?

15 A. Yes.

16 Q. And starting with Table G1 in Appendix G,
17 what are you showing here?

18 A. So, of course, districts should be
19 contiguous. Districts should be geographically
20 contiguous. They can't jump across state -- the
21 state. They should be contiguous within the
22 boundaries of each particular district.

23 And I looked at Dr. Trende's -- I looked
24 at all 100,000 of Dr. Trende's base simulated maps,
25 and I found that about one-half of them have

1 contiguity violations. They're just not
2 geographically contiguous. So there are only 50.9
3 percent of the maps that don't have contiguity
4 violations. So almost one-half do have contiguity
5 violations. And, in fact, some have contiguity
6 violations in three and even four -- all four
7 districts. But about half of them have a contiguity
8 violation.

9 Q. Now, Table G2, what is this showing?

10 A. So here, we're going to look at the
11 partisan consequences of Dr. Trende's contiguity
12 violations. And so in the top row, let's just look
13 at Dr. Trende's simulated plans that have no
14 contiguity violations at all, the ones that are
15 actually contiguous.

16 And what we're reporting here -- what I'm
17 reporting here is, first, the average and then the
18 median Republican vote share of the least Republican
19 district, and then looking at, in the third column,
20 the percent of Dr. Trende's simulated plans that are
21 four-zero rather -- and don't have a Democratic
22 district. And you can see here, 34.5 percent of the
23 plans in the top row have no Democratic districts.

24 Okay, so what happens, then, if we look at
25 the half of Dr. Trende's plans that do have

1 geographic contiguity violations? Well, in the
2 second row, you can look at the plans that have just
3 one contiguity -- one district with contiguity
4 violations, and in the next row, the plans with two,
5 and then three, and then four districts with
6 contiguity violations.

7 As you go down the rows in this table,
8 you'll see that the plans become more and more
9 favorable to the Republicans. In other words, the
10 plans that are most egregious in their contiguity
11 violations are the most favorable to the Republicans
12 in Dr. Trende's set of simulations.

13 Go to the very bottom row, just -- in the
14 previous figure, the very bottom row. When we look
15 at the plans that have four noncontiguous districts,
16 75 percent of them are four-zero plans: Four
17 Republican and zero Democratic districts.

18 Q. Now, in Table G3 on the next page, what is
19 being shown here?

20 A. So now we're going to look at what happens
21 when Dr. Trende applies his partisan bias test. And
22 what this figure is showing is the percent of
23 Trende's simulations that are rejected by the
24 partisan bias test.

25 Now we're going to look at how that

1 affects the contiguity violations. The top row just
2 looks at the plans with no contiguity violations.
3 Dr. Trende rejects 62 percent of them with the
4 partisan bias test.

5 Go to the bottom row, and Dr. Trende is
6 only rejecting 25 percent of the simulations that
7 have four noncontiguous districts.

8 So what is this telling us? Dr. Trende's
9 partisan bias test is accepting -- is accepting the
10 plans that have the most contiguity violations, and
11 he's rejecting the plans that have the least or zero
12 contiguity violations. So he's actually throwing
13 away the plans that don't have contiguity violations
14 through the partisan bias test, and he's keeping and
15 focusing on the ones that do have the most
16 contiguity violations.

17 Q. Now, there's a couple more tables in
18 Appendix G, and these deal with the restricted
19 simulation plans; is that right?

20 A. Yes.

21 Q. And did you find similar conclusions with
22 respect to the set that was designed to have better
23 adherence to geographic constraints?

24 A. Yes, I found the same patterns in the
25 restricted set.

1 Q. And I want to show you from Appendix E of
2 your report and Figure E26. What is this showing?

3 A. This is an example of one of Dr. Trende's
4 simulated maps. It has pretty clear contiguity
5 violations. You can see the contiguity violations
6 in the southern half -- the southern portion of Utah
7 County.

8 You can see that gray district, District
9 1, as well as District 4, they just jump across each
10 other. There's clearly -- one of the districts is
11 just jumping across the other. There's a pretty
12 obvious contiguity problem here, and you can see how
13 that very much goes along with just the general
14 noncompact shape of Dr. Trende's districts in this
15 area.

16 Q. And, again, with respect to maps like
17 these that violate the contiguity provision, do you
18 consider these to be an appropriate set of maps to
19 include in an assessment of compliance with
20 Proposition 4's criteria?

21 A. It's clearly not appropriate to use them
22 as a basis for comparison. These maps clearly don't
23 comply with the Prop 4 neutral redistricting
24 criteria.

25 Q. Now, is it your understanding that

1 Dr. Trende was the expert for the legislature during
2 the legislative process?

3 A. Yes.

4 Q. And so Dr. Trende's analysis was the
5 analysis that the legislature would have used in
6 assessing Map C?

7 A. Yes.

8 Q. Now, you -- also in this case are an
9 expert, Dr. Barber, for the defendants. Are you
10 familiar with him?

11 A. Yes.

12 Q. And did you read his reports in this case?

13 A. I did.

14 Q. And that included the report from
15 October 17th and then a supplemental report filed
16 yesterday; is that right?

17 A. Yes.

18 Q. Now, focusing on Dr. Barber's initial
19 report -- and you as well had a supplemental report
20 that responded to that; is that right?

21 A. Yes.

22 Q. And do you see that on the screen here?

23 A. Yes.

24 Q. With respect to Dr. Barber's use of
25 Redist, generally speaking, did you identify any

1 problems with the way that he ran his simulations?

2 MR. GEIGER: Objection. Leading.

3 THE COURT: Sustained.

4 Q. (By Mr. Gaber) What, if any, problems did
5 you find with respect to Dr. Barber's use of Redist?

6 A. Yeah, a couple different problems. So,
7 first of all, much like Dr. Trende, Dr. Barber
8 produced plans that had population deviation
9 problems.

10 Dr. Barber reported that his maps -- in
11 the text of his report, he stated that his maps
12 adhered to strict population equality. But I
13 analyzed the maps, I looked at his -- the maps that
14 Dr. Barber turned over, and they clearly all had
15 population deviation problems --

16 Q. And I'm showing --

17 A. -- on them.

18 Q. -- figure 1 -- sorry -- on page 3 of your
19 supplemental report. Does this relate to what you
20 were just discussing?

21 A. Right. So same figure as I showed earlier
22 for Dr. Trende's simulated plans, and what we can
23 see here is that Dr. Barber produced 50,000 plans.
24 Every single one had population deviation problems.
25 Not a single one adhered to the Prop 4 neutral

1 redistricting criteria with respect to population
2 equality.

3 And so here, we're just showing the sum of
4 the population deviations across all four districts
5 in each of Dr. Barber's simulated plans, and in the
6 bottom half of this figure, I'm again showing my own
7 simulations, just showing that all 10,000 of them
8 are equally populated. And so it's clearly pretty
9 practicable to draw equally populated districts in
10 Utah.

11 Q. Now, I'm showing you Figure 2 on page 6 of
12 your supplemental report. And could you tell the
13 Court what this is showing?

14 A. So we're going to look at Dr. Barber's
15 plans with respect to the very unusual way that it
16 treats Salt Lake County. And Dr. Barber, in his
17 computer code, I found, put a very special variable
18 when it came time to identifying Utah's counties for
19 the redistricting software, for the Redist software
20 that he used.

21 He did not instruct the computer to
22 actually adhere to all 29 of Utah's counties.
23 He instead identified 28 of the 29 counties. But he
24 did not identify, in his code, Salt Lake County, the
25 geographic boundaries of Salt Lake County, which

1 precincts are in Salt Lake County. He just didn't
2 identify it. So he identified 28 counties, all
3 except for Salt Lake County.

4 This is the consequence of doing that.
5 When we look at Dr. Barber's simulated plans, we can
6 see that the algorithm, because it wasn't instructed
7 on the proper boundaries of Salt Lake County, it
8 just split Salt Lake County excessively. Among
9 Dr. Barber's 50,000 computer-simulated plans, 98
10 percent of them split Salt Lake County into three or
11 four districts, more than is necessary to produce an
12 equally populated plan. In fact, almost two-thirds
13 of them, 63.6 percent, split Salt Lake County into
14 four districts.

15 Q. So when Dr. Barber's algorithm was aiming
16 to reduce county splits, would it have seen Salt
17 Lake County and its residents as people who are in a
18 county?

19 A. It did not.

20 MR. GEIGER: Objection. Leading.

21 THE COURT: Sustained.

22 Q. (By Mr. Gaber) On page 10 of your report,
23 Figure 4, could you tell the Court what this is
24 showing?

25 A. We just saw a minute ago -- we just saw a

1 second ago that almost all of Dr. Barber's simulated
2 plans split Salt Lake County into three or four
3 districts, more than is necessary. Now we're going
4 to compare that to all the other counties. And
5 remember, what I explained was that Dr. Barber told
6 his simulation algorithm about all the other 28
7 counties, all except for Salt Lake County. And what
8 does that result in? Well, his simulation algorithm
9 treats Salt Lake very differently than it treats the
10 other counties.

11 So this figure is telling us about the
12 percent of Dr. Barber's simulated plans in which
13 each county is split multiple times; not once, but
14 more than once. How often does it happen to Salt
15 Lake? Well, I said it a minute ago, 98 percent.
16 Over 98 percent of the time.

17 What about for all the other counties?
18 Almost never. Almost never. Almost never for Utah
19 County, Davis County, Summit County. It almost
20 never happens. It's well under 1 percent of the
21 time.

22 So Dr. Barber's simulated map algorithm is
23 clearly treating all the other 28 counties one way,
24 and then Salt Lake County a very different way.

25 And if we go to Figure 5, we'll see the

1 same thing. We're just looking at the number of
2 plans in which any county is split into four
3 districts, and this happens in Salt Lake County 63.6
4 percent of the time in Dr. Barber's simulations.
5 All other counties, it never happens. Not a single
6 time. Not a single time.

7 So clearly Dr. Barber's simulated plans
8 are treating Salt Lake County very differently,
9 splitting it into three or four districts in almost
10 every simulation, never -- almost never doing that
11 for any other county.

12 Q. Now I want to show you Figure 9. I'm
13 sorry. Figure 6 -- sorry -- which is on page 13 of
14 your supplemental report. And what is this showing?

15 A. This is an example of Dr. Barber's
16 simulated maps, and we can see what it does to Salt
17 Lake County. So this is just an example of one of
18 Dr. Barber's simulated maps here, and you can see
19 that, as happens 63.6 percent of the time, Salt Lake
20 County is divided into four districts.

21 Q. And in your view, is it appropriate to
22 consider a map like this that divides Salt Lake
23 County four times, or into four districts, for
24 assessing compliance with Proposition 4?

25 A. It's clearly not because this is clearly a

1 map produced by a simulation algorithm that's not
2 complying with Proposition 4's neutral redistricting
3 criteria.

4 Q. Now, Figure 8 on page 17, what are you
5 showing with respect to municipality divisions in
6 Dr. Barber's simulated plans?

7 A. So first of all, I found a coding mistake
8 in Dr. Barber's calculation of municipal divisions,
9 and so I recalculated using the stipulated municipal
10 maps, the stipulated data regarding municipal
11 boundaries, which Dr. Barber didn't use.

12 So I recalculated the number of municipal
13 divisions, and this figure just reports the number
14 of municipal divisions in Dr. Barber's maps. And
15 you can see that some of them go up to 13, some of
16 them go down to two -- I'm sorry, some of them go
17 down to zero or one, but you can see the entire
18 range here.

19 Q. And was this an increase in the number of
20 municipal divisions from what he had reported in his
21 report?

22 A. It was.

23 Q. And what, if any, effect does the failure
24 to achieve population -- perfect population equality
25 have on reporting municipal divisions?

1 A. Yeah, recall where we started.

2 Dr. Barber, just like Dr. Trende, did not produce
3 equally populated maps. None of his maps achieve
4 equal population.

5 So if Dr. Barber wanted to go back and fix
6 that problem, what would he have to do? Well,
7 Dr. Barber would have to go and manually move some
8 people around in every district in every one of his
9 maps in order to shift towards equal population.
10 When you do that, you may have to create even more
11 municipal splits, as well as even more county
12 splits.

13 Q. Did you find any errors with respect to
14 the calculation of compactness in Dr. Barber's
15 report?

16 A. I did.

17 Q. And Figure 9 on page 19 here, could you
18 tell the Court what that's showing?

19 A. Yeah. I found errors in how Dr. Barber
20 used a faulty noncensus Shapefile that had altered
21 geographic boundaries for each of Utah's precincts,
22 and he used that faulty or altered Shapefile, which
23 was not census data -- well, not -- not a census
24 map -- to calculate his compactness scores, and I
25 found that it influenced his compactness scores.

1 So I went and used census data, census
2 maps, census precinct maps, to go and recalculate
3 the compactness scores. I found that they were a
4 little bit different. They were a little bit lower
5 than what Dr. Barber had reported, but I've reported
6 the correct numbers on this figure. So that's in
7 the upper half of this figure.

8 Now, just like with Dr. Trende, we're
9 going to compare Dr. Barber's Polsby-Popper
10 compactness scores to the Polsby-Popper compactness
11 scores in my own computer-simulated plans. And
12 that's what this figure does.

13 The upper half is Dr. Barber's simulated
14 plans. What does it tell us? The middle 95 percent
15 range of Polsby-Popper scores in Dr. Barber's plans
16 is .26 to about .396. That's the middle 95 percent
17 range. That is entirely lower than the 95 percent
18 range for my simulated maps, which go from .418 to
19 .479 in the bottom half of this figure.

20 So what does that tell us? Well, it tells
21 us that Dr. Barber's computer simulations are not
22 producing geographically compact districts to the
23 greatest extent practical.

24 Q. Now, in Appendix A to your supplemental
25 report, did you provide a set -- you know, a series

1 of map images from Dr. Barber's simulated set?

2 A. I did.

3 Q. And on the screen there, do you see
4 Appendix A, Dr. Barber's simulated map, number
5 14,928?

6 A. Yes.

7 Q. And what is this map showing with respect
8 to the discussion of compactness we were just
9 having?

10 A. This is just an example of one of
11 Dr. Barber's noncompact maps, and you see the
12 consequence in terms of an actual map of having low
13 compactness scores.

14 You look at especially the green district,
15 District 3 here, it just sprawls across the state,
16 kind of snakes through a bunch of different
17 counties, and has a bunch of oddly shaped districts.
18 District 2 is like that as well. But you just see
19 the general consequence -- District 4 as well -- you
20 see the general consequence of a low compactness
21 score. You can definitely see it in terms of visual
22 compactness.

23 Q. And then how many -- how many districts is
24 Salt Lake County split into here?

25 A. Like the majority of Dr. Barber's maps,

1 this map splits Salt Lake County into four
2 districts -- into all four districts.

3 Q. And then overall, how many counties are
4 split in the map?

5 A. Overall, there are three different
6 counties that are divided, and there are a total of
7 five county divisions, so certainly that's more than
8 is necessary.

9 Q. And do you have an opinion as to whether
10 it's appropriate to have maps like this among the
11 set to which you are assessing for Proposition 4
12 compliance?

13 A. It's clearly not appropriate. Maps like
14 these clearly don't adhere to the neutral Prop 4
15 redistricting criteria.

16 Q. Now, did you also review Dr. Barber's
17 rebuttal report that was issued yesterday?

18 A. I did.

19 Q. And did you provide a response to that
20 report?

21 A. I did.

22 Q. And I want to talk through some of the
23 criticisms in that report with you -- in
24 Dr. Barber's report.

25 So one of the first ones was that -- sort

1 of about your algorithm and your code and its
2 transparency. Was your code for your algorithm
3 produced to the defendants in this case?

4 A. It was.

5 Q. And in the litigation in which you've
6 testified as an expert, have you generally produced
7 your code to all the parties in the case?

8 A. Yes.

9 Q. And have Dr. Barber and Dr. Trende been
10 experts for the other side in cases in which you've
11 testified?

12 A. Yes.

13 Q. Have you published about your algorithm
14 and your code process?

15 A. Yes.

16 Q. And have you testified about it?

17 A. Yes.

18 Q. And has it been accepted by Courts in that
19 testimony?

20 A. Yes.

21 Q. Now, another of the criticisms was about
22 your maps and some of the similar configurations
23 that appear, and I want to -- Plaintiffs'
24 Exhibit 6 is -- or what -- tell me, what do you --
25 what do you -- do you recognize the exhibit on the

1 screen?

2 A. Yeah. These are just examples of my
3 computer-simulated plans among the 10,000 that we've
4 talked about earlier.

5 Q. And generally speaking, what was your
6 understanding of Dr. Barber's criticism with respect
7 to the differences or similarities of some of the
8 maps?

9 A. Well, Dr. Barber asserts that there is a
10 lack of diversity, that -- he claims that my maps
11 are strikingly similar, and that they are failing to
12 meaningfully explore alternative geographic
13 configurations. Those were Dr. Barber's words.

14 Q. And I have on the screen here a -- this is
15 "Chen simulated map number 3." It's the second page
16 of the -- of Plaintiffs' Exhibit 6. And can you
17 talk a little bit about this particular
18 configuration and why it might arise frequently in
19 the simulated set?

20 A. Yeah.

21 MR. GEIGER: Objection. Leading.

22 THE COURT: Sustained.

23 Q. (By Mr. Gaber) Why, if at all, would a
24 map like Figure 3 that I'm showing you on the screen
25 arise from -- in the simulated set with some

1 frequency?

2 A. Yeah, so this map has a northern Salt Lake
3 County district, and this is a pattern that
4 Dr. Barber objects to and noted in his -- in his
5 report -- or his response report. And so this is --
6 this is -- this sort of configuration is similar to
7 others that arise in my computer-simulated maps.
8 And so this is the sort of configuration that we see
9 other similar maps do.

10 Now, no two maps are completely identical
11 in my set of 10,000. They're all different from one
12 another. But certainly some are similar, and you
13 will certainly notice that there is often a northern
14 Salt Lake County-based district like we see in this
15 map. And, of course, there are good reasons for
16 that. That sort of thing naturally arises from
17 adherence to the Prop 4 criteria.

18 Q. Now, nevertheless, are there other
19 configurations of maps that arise in your simulated
20 set?

21 A. Yeah. They are very different maps.

22 Q. And showing on the screen here "Chen
23 simulated map number 3954." This is the fourth page
24 of the PDF. Is this an example of one that would be
25 different?

1 A. That's an example of a very different sort
2 of configuration than what we just previously saw.

3 Q. Now, another of Dr. Barber's criticisms
4 was -- or I suppose, similar to his criticism with
5 respect to similarity, did you find -- or did you
6 analyze Dr. Barber's simulated set with respect to
7 the similarity of his simulated maps?

8 A. Yeah. So that's what we're going to look
9 at in the top half of Table 1 here. So --

10 Q. And this -- for the Court's record, this
11 is Table 1 in the October 22nd rebuttal report that
12 was filed with the Court, Exhibit 5.

13 A. So first we're going to look at the number
14 of different plans in Dr. Barber's set of
15 simulations, and then we're going to look at the
16 same numbers from my set of simulations and count
17 how many different maps there are.

18 Dr. Barber, of course, starts with 50,000
19 maps. The number of maps in Dr. Barber's set that
20 are completely identical to another map in his set
21 is 83.3 percent. So 83 percent of them are
22 completely identical, no differences at all, to
23 another map in his set of simulations. So that
24 means the number of that -- the number of maps that
25 Dr. Barber has that are not completely identical is

1 16.7 percent.

2 And if you take all those duplicates and
3 you count the first instance of them and count that
4 as a unique map but then exclude all the other
5 duplicates of that first instance, then you end up
6 with 14,668 different maps. But overall, the number
7 of maps in Dr. Barber's set that are an exact copy
8 of other maps in his set is 70.7 percent.

9 So that's what we see with respect to
10 Dr. Barber's simulations. Clearly there are a lot
11 of repeated maps when 70.7 percent of them are exact
12 copies of another map. And so overall, 83 percent
13 are completely identical to another map.

14 So then we can look at the same numbers
15 for my simulation set, and that's what the bottom
16 half of Table 1 shows. I produced 10,000 different
17 maps, and every one of them is different. There are
18 no two maps that are completely identical to another
19 map. So there are 10,000 different maps.

20 Q. Now, similarly, Table 2 on page 3 of your
21 rebuttal report, what do you report here?

22 A. There's a way in which Dr. Barber is
23 producing these duplicate maps. They're consecutive
24 maps. In other words, Dr. Barber is producing
25 50,000 maps in order. Number 1, number 2, number 3,

1 so on to 50,000. So they're ordered. There's an
2 order to them. And if you look at these individual
3 maps in order, you'll see that they're just
4 consecutively repeating the same map over and over
5 again.

6 So there are 50,000 total maps, so 49,999
7 after the first map. I just compared Map 1 to
8 Map 2, Map 2 to Map 3, Map 3 to Map 4, and counted
9 up how -- what percentage of each map is simply an
10 exact copy of the previous map, and the answer is
11 68.6 percent. So over two-thirds of his maps are
12 just exact copies of the previous map.

13 And sometimes these streaks of identical
14 maps can go on for quite a while, and the most
15 extreme instance I found was 114 maps in a row in
16 Dr. Barber's simulations that were identical. Map
17 number two thousand five hun- -- sorry -- 25,377
18 onward for 114 maps was just the same map over and
19 over again. They were completely identical, and it
20 was a long streak of 114 identical maps.

21 I, of course, did the same calculations
22 with my own maps, and as I, of course, already said,
23 there are no duplicated maps, so, of course, there
24 are no repeated maps.

25 Q. Now, in paragraph 7 of your report -- your

1 rebuttal report, you talk about northern Salt Lake
2 County districts and the Chen-simulated plans. Can
3 you talk to the Court about this criticism from
4 Dr. Barber and what your response to that is?

5 A. Yeah. As I mentioned earlier, Dr. Barber
6 noticed that there were a lot of my simulated plans
7 that had a northern Salt Lake -- Salt Lake
8 County-based district in them. And certainly that's
9 the case. Dr. Barber seems to think that this was
10 suspicious, but, really, as I mentioned earlier,
11 this is the natural consequence of adhering to
12 Prop 4's redistricting criteria.

13 And so let me explain that a little bit
14 here. Salt Lake County has two municipalities in
15 the south part of the county that are unique:
16 Bluffdale and Draper. These two municipalities are
17 unique because they span across the county border
18 and go from Salt Lake County into Utah.

19 Now, remember the Prop 4 redistricting
20 criteria: First minimize municipal splits, then
21 county splits.

22 So you've got Draper and Bluffdale that
23 span across -- that go across - that cross that
24 county border across Utah and Salt Lake counties.
25 So you want to achieve minimization of both

1 municipal and county divisions, and so what the
2 algorithm is naturally just going to do is to
3 combine Utah County with the southern portion of
4 Salt Lake County containing Draper and Bluffdale so
5 as to minimize municipal and county divisions. That
6 then leaves the rest of Salt Lake County to be
7 assigned to a different district.

8 And what do we have along the
9 northern-northwest sort of border of Salt Lake
10 County? We have a natural geographic feature, the
11 Great Salt Lake, that provides a natural barrier
12 that you don't want to have a district jump across.
13 So I explicitly told my algorithm to not have
14 districts that just kind of jump across or traverse
15 the water rather than through land. So don't jump
16 across the Great Salt Lake.

17 And so these considerations, you put them
18 all together, combined with just generally telling
19 the algorithm to try to draw districts that are as
20 geographically compact as is practicable, and
21 obviously minimizing county and municipal splits,
22 combined with that Draper and Bluffdale situation
23 that I talked about in the southern part of Salt
24 Lake, that leads naturally to having a northern Salt
25 Lake County-based district. So it makes complete

1 sense that adherence to Prop 4's neutral
2 redistricting criteria is going to lead a map-drawer
3 to have a northern Salt Lake County-based district.

4 Q. And looking at Dr. Barber's maps and his
5 code, did you determine whether or not he restrained
6 his set not to jump over the Great Salt Lake?

7 A. He did not. So he didn't have any rule
8 about not jumping across the Great Salt Lake.

9 Q. Now, due to our limited time, I don't want
10 to ask too many questions about it, but did you
11 assess the simulated set of plans and the proposed
12 maps against their performance on Proposition 4's
13 neutral criteria?

14 A. I did.

15 Q. And that's in section 6 of your initial
16 report?

17 A. Yes.

18 Q. And finally, in section 7 of your report,
19 did you discuss the -- whether or not Utah's
20 political geography necessarily results in a
21 partisan impact on a map?

22 A. Yes.

23 Q. And what is your overall conclusion with
24 respect to whether or not Utah's political geography
25 causes partisan favoritism in a map?

1 A. Well, I found that it is possible and very
2 common, when you apply Utah's natural political
3 geography, combined with strict adherence to the
4 Prop 4 redistricting criteria, to end up with, as I
5 found in over 99 percent of my simulated plans, a
6 three-one plan.

7 Q. Thank you, Dr. Chen.

8 MR. GABER: I pass the witness.

9 THE COURT: All right. Mr. Geiger? Is
10 that correct?

11 MR. GEIGER: Yes, Your Honor.

12 THE COURT: All right. Cross.

13 MR. GEIGER: May I --

14 THE COURT: Yes.

15 MR. GEIGER: I know we're only an hour and
16 a half in or so. May I please ask for a five-minute
17 restroom break?

18 THE COURT: Of course. That's not a
19 problem.

20 So, Dr. Chen, you're under oath. I'm
21 instructing you not to talk to anyone about your
22 testimony until you've been excused. All right?

23 THE WITNESS: Thank you, Your Honor.

24 THE COURT: We'll take a five- to
25 ten-minute break.

1 Court is in recess.

2 Oh, and you may be seated. Just remain as
3 you are. Thank you.

4 (Recess taken.)

5 MR. REYMANN: -- one is just for our
6 purposes, for scheduling, we were wondering what
7 your practice was for lunch breaks and how long.

8 THE COURT: I will follow the parties'
9 lead, whatever you need. When would you like to
10 break and how long would you like to take?

11 MR. REYMANN: Yeah, I mean, half an hour
12 is probably fine.

13 THE COURT: Does that work?

14 MR. REYMANN: And -- yeah, and the timing
15 is -- we're flexible on the timing. We just -- I
16 just didn't know if you had a preference on that.

17 THE COURT: I don't. We can just go until
18 there's a natural break around the lunch hour.

19 MR. REYMANN: And then the second question
20 was end time for the day.

21 THE COURT: Typically we'd like to end by
22 5:00. If we need to go later, we can talk to
23 security and go a little longer tonight if we need
24 to.

25 MR. REYMANN: Okay.

1 THE COURT: Okay?

2 MR. REYMANN: And then the second thing
3 was I -- even though I said earlier we had
4 stipulated to admission of our exhibits, I neglected
5 to actually move for their admission. So we would
6 move for admission of our exhibits. They're 1A, 1B,
7 1C, and 2 through 7.

8 THE COURT: Okay. 1A, B, C, and then 2
9 through 7.

10 Any objection?

11 MR. GREEN: No objection, Your Honor.

12 THE COURT: All right. So --

13 MR. REYMANN: Thank you.

14 THE COURT: -- plaintiffs' exhibits are
15 admitted.

16 (Plaintiffs' Exhibits 1A, 1B, 1C, 2, 3, 4,
17 5, 6, and 7 received.)

18 THE COURT: Question. Do you anticipate
19 that we'll need to go beyond 5:00? And if you do,
20 how much later do you think?

21 MR. REYMANN: I -- that's not why I was
22 asking. I just --

23 THE COURT: Okay.

24 MR. REYMANN: -- wanted to know so that we
25 can try and time it. I didn't anticipate needing

1 to, but --

2 THE COURT: Okay. Okay.

3 MR. GREEN: Just to clarify, does that
4 mean you think we'll get through all of your
5 witnesses by 5:00 today, including the cross?

6 MR. REYMANN: No, I just don't -- I don't
7 think we know yet. I -- but I was just saying,
8 that's not why I was asking, I just wanted to know
9 if the Court -- usually staff leaves around then.
10 That's -- so I figured that was what it was. But I
11 don't -- I don't have any idea how long you guys are
12 going to take, and so I don't know.

13 MR. GREEN: Okay.

14 THE COURT: Well, we can reevaluate as we
15 get closer.

16 All right. Back on the record, League of
17 Women Voters versus Utah State Legislature, case
18 ending 1712.

19 Mr. Geiger, Cross.

20

21 CROSS-EXAMINATION

22 BY MR. GEIGER:

23 Q. Good morning, Dr. Chen.

24 A. Good morning, Mr. Geiger.

25 Q. My name is Soren Geiger. I'm counsel for

1 the legislature. Just a few questions for you
2 today. I'd like to begin with some questions about
3 your algorithm that you discussed.

4 You programmed your algorithm to create
5 10,000 example redistricting plans for this case; is
6 that correct?

7 A. Yes.

8 Q. You're aware that this redistricting
9 cycle, other experts in your field are also using
10 redistricting algorithms for creating simulations,
11 right?

12 A. Yes.

13 Q. They're not using your algorithmic
14 process, correct?

15 A. Not that I know of.

16 Q. You're familiar with the various Monte
17 Carlo simulation models?

18 A. Yes.

19 Q. There's the constructive Monte Carlo? Is
20 that one?

21 A. I've heard of that term.

22 Q. There's the Markov Chain Monte Carlo as
23 well? Have you heard of --

24 A. Yes.

25 Q. You've heard of that.

1 And the Sequential Monte Carlo?

2 A. Yes.

3 Q. I think I heard you say on direct that
4 your algorithm that you're using in this case is a
5 Sequential Monte Carlo?

6 A. I use Sequential Monte Carlo.

7 Q. You use Sequential Monte Carlo.

8 Is the algorithm that you've used to
9 generate your 10,000 plans in this case a Sequential
10 Monte Carlo?

11 A. Yes.

12 Q. Okay. Could you, in layman's terms,
13 explain the difference to me between those three, to
14 the extent you can?

15 A. Sure. These are really getting into how
16 maps are changed in different iterations throughout
17 the algorithms.

18 And so to start with, I think MCMC, Markov
19 Chain Monte Carlo, is probably one that's been
20 widely talked about in the literature. And so that
21 is -- it comes in a bunch of different forms, but a
22 classic example is making a change to a districting
23 plan by essentially making one precinct reassigned
24 from one district to another and then doing that
25 sort of change a large number of times. And so

1 that's basically one class of methods, and it refers
2 to a bunch of different things, but that's the
3 general description of what -- what a MCMC does.

4 A Sequential Monte Carlo is a different
5 class of methods that's pretty related but proceeds
6 a little bit differently. So an SMC, a Sequential
7 Monte Carlo, is -- as an example of how it's
8 implemented in the literature, is to start with the
9 entire state of Utah, divide Utah into two halves,
10 two districts, and then take each of those halves
11 and then further subdivide them into two districts,
12 and then you end up with four total districts after
13 three different splits.

14 And so that's a little bit different
15 because the scholars that implement SMC will do that
16 sort of -- will do that and take one of those plans,
17 use it as an ancestor, and then produce more -- more
18 plans based on these previous splits. So using the
19 same split over and over again and trying it a bunch
20 of different ways to change it subsequently. So
21 that's just how it proceeds a little bit
22 differently. So that's an example of SMC.

23 With respect to the constructive, I
24 understand that term and I've seen it described in
25 the literature, and what I've seen the literature

1 describe it as is, starting with a seed, kind of a
2 randomly chosen district, and then building around
3 that randomly chosen seed and proceeding outward.
4 So that's a bit different, but that's an overview of
5 the different sort of tools that are used in these
6 three categories that you've outlined.

7 Q. Thank you.

8 Your algorithm that you used in this case
9 is neither a constructive Monte Carlo nor a Markov
10 Chain Monte Carlo; is that accurate?

11 A. That's not accurate.

12 Q. Is it a constructive Monte Carlo?

13 A. It's not.

14 Q. Is it a Markov Chain Monte Carlo?

15 A. It does use MCMC steps inside of it, yeah.

16 Q. Okay. It is a Sequential Monte Carlo that
17 uses Markov Chain Monte Carlo steps?

18 A. Yeah. Basically when I produce a
19 redistricting algorithm, I'm using the best tools
20 that I can -- that I can come up with to pursue the
21 Prop 4 redistricting criteria. So basically, based
22 on my experience, I use what tools make the most
23 amount of sense to pursue different parts, different
24 criteria within Prop 4.

25 And so I draw from multiple tools. SMC is

1 certainly one of them, and MCMC is one that I've
2 used frequently as well, and I do have parts of my
3 algorithm that uses part of -- that uses both.

4 Q. At the beginning of your testimony today,
5 you mentioned the 2013 article that you coauthored
6 with Professor Jonathan Rodden; is that correct?

7 A. Yes.

8 Q. And you described an algorithm applying
9 computer simulation technology to redistricting in
10 that article; is that correct?

11 A. Yes.

12 Q. Was that -- and I believe you mentioned
13 earlier today that that was a same or similar
14 methodology algorithm as you were using today; is
15 that accurate?

16 A. Yeah.

17 Q. So in 2013, you produced an algorithm that
18 was a Sequential Monte Carlo that used elements of
19 Markov Chain Monte; is that accurate?

20 A. No, that article, that was over a decade
21 ago, and back then the methods were -- that scholars
22 were using were different. Back then, I don't think
23 anybody had come up with the term "Sequential Monte
24 Carlo" yet.

25 Q. Sequential Monte Carlo simulations,

1 outside of the redistricting context, not much older
2 than 2013?

3 A. Oh, I don't know the answer to that. I'm
4 talking just about redistricting.

5 Q. Is it correct that Professor Kosuke Imai
6 and Cory McCartan with the ALARM Project have been
7 credited in 2020 or 2023 with first applying
8 Sequential Monte Carlo methods to redistricting?

9 A. I believe so. I'm not entirely sure that
10 they are the first, but I believe -- I believe that
11 may be right.

12 Q. Would you consider yourself the first?

13 A. No.

14 Q. How long have you used this mod- -- the
15 simulation model that you're using today, or a same
16 or similar model? How many years?

17 A. Well, the precise algorithm I wrote
18 specifically to follow the Prop 4 criteria, and so
19 only for this case. I've done similar models for
20 basically my entire career as an expert witness.

21 Q. Did you testify in a Pennsylvania
22 redistricting challenge to their congressional
23 districts in 2017 or so? Does that ring a bell?

24 A. Yes.

25 Q. Okay. Did you run simulations for the

1 plaintiffs in that case?

2 A. I did.

3 Q. Okay. Could I refresh your recollection
4 as to what -- or, actually, first I should ask, do
5 you recall what algorithm you used in that case or
6 what methodology you used to run those simulations?

7 A. It's 2017. I can't remember.

8 Q. Could I refresh your recollection?

9 A. Sure.

10 Q. Thank you.

11 Dr. Chen, does this appear to be a trial
12 transcript from that case we were just discussing?

13 A. Yes.

14 Q. Will you turn a good ways in to pages 376
15 to 377? Just let me know when you get there. That
16 would be transcript pages 376.

17 At the very bottom of page 376, do you see
18 the bold "Question: Okay. Okay. So it's fair to
19 say...?"

20 A. Yes.

21 Q. I'll read that real quick, and I'll ask
22 to -- I'll ask you to read the answer that you gave
23 in that case.

24 "Okay. Okay. So it's fair to say, then,
25 that your simulation model is a form of what's

1 called a Monte Carlo simulation model?"

2 And what did you -- how did you answer?

3 A. "No, absolutely not."

4 Q. "Okay. And what are the differences
5 between your model and a Monte Carlo simulation?"

6 A. "Okay. So, you know, Monte Carlo, I'm
7 just going to ask you if you can clarify to me what
8 you -- what you're trying to mean by that term,
9 because it's a very broad term that means a lot of
10 different things in a lot of different contexts, so
11 I'm just going to ask you to clarify your question."

12 Q. "Sure. Absolutely. So in other words, is
13 your algorithm iteratively traversing the space and
14 making" -- "and making choices between different
15 moves as it's drawing its" -- "as it's drawing the
16 metrics" -- "the districts?" Excuse me.

17 A. "Okay, I got you. What you're describing
18 there is what's known in the statistical world, and
19 in the redistricting simulation world, as a Monte
20 Carlo Markov Chain, what you've just described
21 there, so that is a very different sort of class of
22 models that other scholars have used, and that is
23 absolutely not what I'm doing here. And let me just
24 make this point clear because it is important
25 that -- that I want to make sure you understand

1 this."

2 Q. Thank you.

3 MR. GABER: Can I just clarify for the
4 record that what that was was counsel reading
5 questions from a trial transcript and Dr. Chen
6 reading the answers, not questions about this case?

7 THE COURT: Yes.

8 MR. GABER: Thank you.

9 Q. (By Mr. Geiger) You spoke just a minute
10 ago very briefly, and I believe you mentioned on
11 direct the ALARM Project's simulation model?

12 A. Yes.

13 Q. Are you aware of whether it uses Markov
14 Chain and/or Sequential Monte Carlo simulation
15 models?

16 A. I don't know.

17 Q. You note in your report that the
18 simulation software developed by the ALARM Project
19 group is publicly available; is that right?

20 A. Yes.

21 Q. It's an open-source simulation software,
22 in other words?

23 A. Yes.

24 Q. You know from your redistricting work that
25 many experts have used that open-source simulation

1 software, correct?

2 A. Yes.

3 Q. Could you name some of those experts?

4 A. Sure. Dr. Trende, Dr. Barber.

5 Q. Are there any others?

6 A. That's what comes to my top -- comes to
7 the top of my head. I'm sure there are others.

8 Q. Professor Imai and Dr. McCartan as well
9 use those in redistricting?

10 A. You're asking about redistricting papers?
11 Sure.

12 Q. Is it your opinion that the ALARM Project
13 simulation model is unreliable?

14 A. With respect to the proposition for a
15 neutral redistricting criteria, the criteria in this
16 case, that's -- that's the opinion I expressed
17 earlier today.

18 Q. Is it your opinion that it's unreliable as
19 applied to Utah congressional districts?

20 A. In this case, yes.

21 Q. Is it your opinion that the Redist R
22 package cannot be programmed to comply with
23 Proposition 4 and other criteria?

24 A. I have no opinion on that specific
25 question.

1 Q. Your algorithm is not publicly available;
2 is that correct?

3 A. Which algorithm?

4 Q. The one that you -- first, the one that
5 you have used in this case.

6 A. Yes, you're correct.

7 Q. That it is not publicly available?

8 A. Yes.

9 Q. Only you can use this algorithm; would
10 that be accurate?

11 A. I have no opinion on that.

12 Q. If others would like to use your
13 algorithm, would they need your permission to do so?

14 A. No, they would need to have received a
15 copy of my code.

16 Q. And not subsequent permission to use it to
17 simulate redistricting models?

18 A. No permission from me other than having my
19 code.

20 Q. Is your algorithm open source like the
21 ALARM Project's algorithm?

22 A. No.

23 Q. A researcher can't go to a website and
24 install your algorithm, could they?

25 A. That's right.

1 Q. Your algorithm is not proprietary, is it?
2 Or is it?

3 A. I'm not sure what the term "proprietary"
4 means.

5 Q. If the Utah legislature wanted to use your
6 algorithm to generate a simulation ensemble, how
7 would it go about doing so?

8 A. I don't really have an opinion about that.

9 Q. Would the only way be to hire you?

10 A. I have no opinion on that.

11 Q. You've been operating in this field for
12 quite some time, so I'm sure you're aware of some of
13 the discussion that your simulation work has
14 generated.

15 MR. GEIGER: I'd like to mark an article,
16 and we'll move it in to the record, Your Honor, at
17 the appropriate time, but -- and I'll show it to you
18 in just a second.

19 THE COURT: Thank you.

20 Q. (By Mr. Geiger) Dr. Chen, are you
21 familiar with the authors of that article?

22 A. Yes.

23 Q. Could you read the title of it?

24 A. "Models, Race, and the Law."

25 Q. And could you read the year in which it

1 was published?

2 A. 2021.

3 Q. Could you please turn to page 769? The
4 very last sentence of that page, beginning "And even
5 in the last ten years," could you begin there
6 reading and read on into the next page?

7 A. "And even in the last ten years, quite a
8 few political science publications and expert
9 reports have been based on a very different style of
10 district generation that we will name a 'Petri dish'
11 method. The small units of a state are given
12 initial labels, and these proto-districts then merge
13 and grow until they fill out the state with the
14 right number of districts, like bacteria cultures
15 growing on a plate."

16 Q. Could you look at footnote 89? And do you
17 recognize that Petri dish methods that the authors
18 are describing here are -- they are applying that to
19 your methodology?

20 A. I see that footnote.

21 Q. Did I describe it accurately?

22 A. The footnote. I -- I see the footnote.

23 Q. Did I describe the contents of the
24 footnote accurately?

25 A. Yeah, they're talking about me.

1 Q. Okay. Would you mind reading the rest of
2 the paragraph from where you left off, starting, "To
3 create desired properties"?

4 A. "To create desired properties in the
5 output plans, ad hoc adjustments are made to the
6 merging rules. The resulting plans come with no
7 theory describing their distribution, and their
8 authors present no account of the extent to which
9 one kind of plan might tend to appear more often
10 than another. For instance, a merging instruction
11 meant to promote compactness could easily cause a
12 certain two" -- "a certain two counties to be kept
13 together in nearly every plan generated by the
14 process, though their association has nothing to do
15 with compactness per se."

16 Q. Let's talk about the simulations you
17 created with your proprietary -- or I should say
18 with your algorithm specifically designed for this
19 case. You stopped at 10,000 plans. Why not
20 generate more?

21 A. 10,000 is more than enough in order to
22 draw broad statistical conclusions about the
23 distribution of a set of simulated plans.

24 Q. You stopped at 10,000 because those were
25 sufficiently representative, in your opinion, of

1 different possibilities for Utah congressional
2 districts --

3 A. No, what I just said is --

4 Q. -- under legal constraints?

5 A. Sorry. I didn't mean to interrupt you.

6 No, I'm going to repeat my previous
7 answer. I stopped at 10,000 because that is more
8 than enough to draw broad statistical conclusions
9 about the simulated plans.

10 Q. And the resulting 10,000 map ensemble, in
11 your opinion, is a representative ensemble of the
12 varieties of ways that Utah's congressional
13 districts can be drawn and compliant with the law?

14 A. They are plans -- my opinion is simply
15 that they are plans that emerge -- they're the sort
16 of plans that emerge when you have a map drawing
17 process that follows Prop 4 criteria.

18 Q. How long did it take you to generate those
19 10,000 plans?

20 A. I didn't time it.

21 Q. Any ballpark guess?

22 A. It would have been a matter of days.

23 Q. Matter of days?

24 Were the 10,000 simulated plans that you
25 provided the only simulations that you tried to run

1 for your work in this case?

2 A. No.

3 Q. Were there earlier simulation runs that
4 you tried to produce but did not present in this
5 case?

6 A. Yes.

7 Q. Would those have been less than ten in
8 number? Total runs, I mean.

9 A. Yeah, probably.

10 Q. Probably less than ten? More than five?

11 A. I really couldn't say.

12 Q. I believe last night, in your rebuttal
13 report, you stated that every single one of the
14 10,000 congressional maps in your simulation set is
15 unique --

16 A. Yes.

17 Q. -- is that accurate?

18 Does your algorithm ever generate
19 duplicate maps?

20 A. I went back and checked. I looked at all
21 10,000 maps. I found that all 10,000 were different
22 from one another. They were all unique.

23 Q. I'd like to mark and show you another
24 article, this one from a little bit more recently.
25 Just give me a second.

1 Are you familiar with the authors of this
2 article, Dr. Chen?

3 A. Some of them.

4 Q. Who would they be?

5 A. I'm familiar with DeFord and Duchin.

6 Q. Could you read the title of this article?

7 A. "Repetition Effects in a Sequential Monte
8 Carlo Sampler."

9 Q. And do you see on the left-hand margin
10 when this article was published?

11 A. 2024, September.

12 Q. Could you just flip the page to page 2,
13 please, and read the first sentence at the very top.

14 A. "SMC samples face a certain amount of
15 characteristic redundancy. As the authors note,
16 because the SMC algorithm involves repeating" --
17 "repeated resampling with replacement, for a finite
18 number of samples, it can suffer from particle
19 system collapse, where many of the sampled plans
20 share a small number of common districts, which
21 originate as common ancestor particles in the SMC
22 scheme."

23 Q. Thank you.

24 A. "And" --

25 Q. That's fine. Thank you.

1 Could you skip down to the middle
2 paragraph -- the very middle of that middle
3 paragraph, right after the footnote 1 marker, with
4 the sentence beginning "In New Mexico"? Could you
5 read that sentence?

6 A. "In New Mexico state Senate litigation, a
7 defense brief described the SMC method as being
8 'plagued with duplicate simulations.' As a
9 prophylactic measure to protect against this
10 criticism, a defense expert cosmetically altered his
11 SMC sample by perturbing the boundaries of districts
12 so that he could claim no" -- "that no districts
13 were duplicated."

14 Q. Thank you.

15 Is it -- are the authors of this article
16 referring to you when they say "the defense expert"?

17 A. Yes.

18 Q. I'd like to pull up just a few pairs of
19 maps from Dr. Barber's supplemental Appendix A
20 submitted yesterday. We'll hand out hard copies in
21 just a second.

22 Thanks for your patience with that. Let's
23 look at the first two maps. These are Maps 3 and 4.
24 Aside from the colors, could you tell me where --
25 the differences between Maps 3 and 4?

1 A. Look, I can see that they're similar. If
2 you wanted me to point out the precise differences,
3 I know that there are differences, but I couldn't do
4 that without actually looking -- looking at it on a
5 computer.

6 Q. Okay, could we go to the next pair? This
7 would be 21 and 22. Are you able to point me to the
8 differences between these two maps' district lines?

9 A. Same answer.

10 Q. Not without getting on your computer?

11 A. Yeah, without actually analyzing the
12 digital maps.

13 Q. Could we go to pair 45 and 46? Can you
14 visually see any differences between these district
15 lines?

16 A. I can, but generally the same answer.

17 Q. In the final pair, for now, do you see any
18 differences between these district lines?

19 A. Which number are you asking me to look at?

20 Q. Thank you. Seventy-two and 73.

21 A. Okay. I can see some differences, but
22 generally the same answer as before. They're
23 clearly similar.

24 Q. And just to be complete -- I think I might
25 have skipped 49 and 50. Do you see any differences

1 between 49 and 50?

2 A. I can see some differences, but same
3 answer as before.

4 Q. Do you still have your report in front of
5 you, your initial report? Looking at page 8 -- that
6 would be part 1 of your initial report -- you write:
7 "Drawing a complete plan of four congressional
8 districts requires the division of only three
9 counties"; is that accurate?

10 A. Yes.

11 Q. And, again, we've covered this, but how
12 many counties in Utah?

13 A. Twenty-nine.

14 Q. And you've written here that a plan
15 requires splitting three counties; is that right?

16 A. Division of three counties, yes.

17 Q. So that would be 26 counties kept whole in
18 districts while three will be split between
19 different districts. Is that a different way of
20 saying it?

21 A. That's right.

22 Q. In the same passage from your report, you
23 write: "In addition, no county in Utah has a
24 population large enough to require being divided
25 more than once."

1 Do you see that?

2 A. Yes.

3 Q. So you agree that a congressional
4 districting plan could achieve population equality
5 by keeping 27 out of 29 counties whole and then
6 splitting the remaining two counties?

7 A. Yes.

8 Q. But you programmed your algorithm to avoid
9 splitting any county into more than two districts,
10 correct?

11 A. Yes.

12 Q. You could have programmed it to keep the
13 maximum number of counties whole, couldn't you have?

14 A. I'm not sure I understand.

15 Q. Going back to the discussion of numbers of
16 counties kept whole and numbers of counties split,
17 if a congressional districting plan could achieve
18 population equality by keeping 27 out of 29 counties
19 whole and splitting the remaining two, you could
20 have programmed your algorithm to include those
21 results?

22 A. Yes.

23 Q. But you did not?

24 A. Yeah.

25 Q. You could have even programmed it to

1 ensure that 28 of Utah's 29 counties remained whole
2 in districts and that final county was split?

3 A. Yes.

4 Q. And you report that all 10,000 maps in
5 your ensemble split three counties once each,
6 correct?

7 A. Yes.

8 Q. The simulations you've produced in this
9 case do not include maps that split only two
10 counties, one county twice and one county once,
11 correct?

12 A. Correct.

13 Q. Your simulations do not include maps that
14 split just one county three times to achieve
15 population equality; is that correct?

16 A. Correct.

17 Q. And Salt Lake County is split in every
18 plan, correct?

19 A. Yes.

20 Q. Just as a matter of mathematics, Salt Lake
21 County must be split in any Utah congressional
22 districting plan, must it?

23 A. Yes.

24 Q. It's the only county that must be split
25 because of its population size?

1 A. Yes.

2 Q. In that respect, it is unique?

3 A. Yes.

4 Q. And in looking at Salt Lake County, you
5 report in paragraph 35 of your initial report that
6 9,994 --

7 A. Could you just let me get there first?

8 MR. GABER: What page was this,
9 Mr. Geiger?

10 MR. GEIGER: It's paragraph 35.

11 MR. GABER: Thank you.

12 THE WITNESS: I gotcha.

13 Q. (By Mr. Geiger) Okay. You report that
14 9,994 of your 10,000 plans include a
15 Democrat-leaning district anchored in northern Salt
16 Lake County; is that accurate?

17 A. Democratic-favoring, yes.

18 Q. And last night in your rebuttal report --
19 and this was discussed a little earlier today -- you
20 wrote that: "Keeping the municipalities of Draper
21 and Bluffdale whole naturally leads to a district
22 that combines Utah County with the southern portion
23 of Salt Lake County"; is that accurate?

24 A. Yes.

25 Q. Is it your position that an east-west

1 split of Salt Lake County as opposed to a
2 northern-southern split could not keep Draper and
3 Bluffdale whole without creating another county
4 split?

5 A. I didn't say that, no.

6 Q. Is it your position today that that is the
7 case?

8 A. I don't have an opinion.

9 Q. But none of your maps produced such a
10 configuration; is that accurate?

11 A. That -- I'm almost certain that's not
12 accurate.

13 Q. On a percentage basis, 99.9 percent of the
14 maps your algorithm created have a Democrat-favoring
15 district with most of its population coming from
16 northern Salt Lake County; is that accurate?

17 A. If I could ask you to repeat that.

18 Q. Sure thing.

19 On a percentage basis, 99.9 percent of the
20 maps your algorithm created have a Democrat-favoring
21 district with most of its population coming from
22 northern Salt Lake County; is that accurate?

23 A. I can't confirm that precise number. I'm
24 happy to take your word for it.

25 Q. Do you know how many of your maps keep

1 that Democrat-favoring district wholly within Salt
2 Lake County?

3 A. I don't have that number in front of me.

4 Q. You have reviewed Dr. Barber's
5 supplemental report filed yesterday?

6 A. Yes.

7 Q. Do you still have that in front of you, by
8 chance?

9 MR. GABER: I don't know that he ever did.

10 MR. GEIGER: He never did? Okay.

11 MR. GABER: It's not in our exhibit
12 binder.

13 Q. (By Mr. Geiger) Would you accept my
14 representation that Dr. Barber calculates that you
15 keep that Democrat-favoring district wholly within
16 Salt Lake County in 894 out of 10,000 maps?

17 A. I'm happy to take your word for it. I
18 have not checked that specific number.

19 Q. Okay. So accepting that number, out of
20 your 10,000 plans, your algorithm created 9,100
21 plans by taking Democrats in northern Salt Lake
22 County and joining them with voters in another
23 county; is that accurate?

24 A. If I could just ask you to say that again.

25 Q. Sure. I can --

1 A. Sure.

2 Q. -- rearrange if we need to.

3 Out of your 10,000 plans, your algorithm
4 created about 9,100 plans by taking -- or, actually,
5 exactly 9,100 plans by taking Democrats in northern
6 Salt Lake County and joining them with voters from
7 another county.

8 A. Yeah, I'm just going to have the same
9 answer. I'm happy to take your word for it. I'm
10 not able to pull that number up right in front of me
11 here. I'm happy to take your word for it that
12 that's what Dr. Barber said.

13 Q. Do you recall what counties border
14 northern Salt Lake County?

15 A. All the counties that border Salt Lake
16 County, is what you're asking me?

17 Q. Yes, sir.

18 A. Okay. Sure. I mean, there's Davis, there
19 is Utah County, there's Summit, there's -- there's
20 Tooele. I'm -- if I just looked at a map --

21 Q. No, that's fine.

22 A. -- I could give you the complete answer.

23 Q. Morgan to the northeast?

24 A. I'll take your word for it.

25 Q. Yeah.

1 A. I'm happy to just look at a map if you'd
2 like me to just read them off.

3 Q. Now, for the 9,100 times that your
4 northern Salt Lake County anchor district is
5 crossing county lines, it could cross into any of
6 those counties that are bordering the northern part
7 of Salt Lake County; is that accurate?

8 A. No. I talked about this earlier today,
9 that the Great Salt Lake is a natural barrier, so
10 I'm not going to allow districts to jump across the
11 water. So there is a natural barrier there.

12 And then I talked about earlier how Draper
13 and -- Draper and Bluffdale create a configuration
14 that's just naturally going to occur, where you have
15 Utah combined with the southern portion of Salt Lake
16 County that -- that contains Draper and Bluffdale
17 because those two municipalities span Utah and Salt
18 Lake County, and then that's going to leave the
19 remainder of Salt Lake County.

20 So there are geographic constraints once
21 you start applying the Prop 4 neutral criteria that
22 just make certain configurations more likely.

23 Q. Is it your position that the Great Salt
24 Lake is a natural barrier between Salt Lake County
25 and Tooele County?

1 A. No. I'm happy to -- no. My answer is no.

2 Q. Or between Salt Lake County and Summit
3 County to the east?

4 A. No.

5 Q. Do you know how often your northern Salt
6 Lake County district keeps at least 95 percent of
7 its population in Salt Lake County while then
8 picking up the remaining population from Tooele
9 County?

10 A. Yeah, I do.

11 Q. Could you provide that number to me?

12 A. It's a little over 5 percent.

13 Q. A little over 5 percent.

14 A. Yeah.

15 Q. Do you dispute Dr. Barber's calculation
16 that when those percentages align, that 95 percent
17 of the Democrat-favoring district's population is
18 kept in Salt Lake County, that your districts --
19 your maps cross over into Tooele County only once?

20 A. I remember that line. I went back and
21 checked, and when I -- I found, like I said, over 5
22 percent. I think Dr. Barber's calculation, I think
23 he reported something like zero or one, and that's
24 just wrong.

25 Q. Did you look back and calculate the same

1 for Summit County, for crossing from northern Salt
2 Lake County into Summit County?

3 A. I did.

4 Q. And what was that percentage?

5 A. I can't remember the precise number. It
6 was in -- it was over a hundred, I believe. I can't
7 remember the precise number off the top of my head.

8 Q. A hundred maps?

9 A. Over a hundred.

10 Q. Right.

11 A. I can't remember the precise number.

12 Q. Do you recall how many times that northern
13 Salt Lake district that has the vast majority, 95
14 percent of its population drawn from Salt Lake
15 County, crosses north into Davis County?

16 A. I don't know.

17 Q. Did you not go back and calculate those
18 percentages?

19 A. I didn't.

20 Q. Would you accept Dr. Barber's
21 representation that it is 7,000 times?

22 A. No opinion.

23 Q. You spoke on direct at length about county
24 divisions in Dr. Trende's simulations. Do you
25 recall?

1 A. Yes.

2 Q. When you were examining Dr. Trende's data
3 to determine how many county divisions his
4 simulations contained on average, do you remember
5 the name of the file you pulled containing county
6 lines?

7 A. I did not pull any file containing county
8 lines.

9 Q. Does the file name "County N" ring a bell?

10 A. I -- that -- that's not a file. That --
11 that may be a file, but I wouldn't have examined
12 that file. So -- it does ring a bell.

13 Q. Did you use County N to determine how many
14 county splits are in Dr. Trende's ensembles?

15 A. No, absolutely not. That's an inaccurate
16 representation of the county boundaries.

17 Q. You report that your algorithm did not use
18 any partisan data, correct?

19 A. That's correct.

20 Q. And that Proposition 4 prohibits such use?

21 A. Yes.

22 Q. Your algorithm used other data like county
23 lines, municipal lines, Great Salt Lake.

24 Could you give me some other data inputs?

25 A. There was other census data, but I used

1 census geography.

2 Q. You also programmed your algorithm to
3 preserve traditional neighborhoods and communities
4 of interest; is that right?

5 A. That's right.

6 Q. Those included the four that the
7 legislature identified more recently, as well as
8 the 590 that the Independent Redistricting
9 Commission identified earlier?

10 A. If I could ask you to clarify when you
11 said "four that the legislature identified."

12 Q. The ones containing military bases and
13 reservations and those of that nature that were
14 separate and distinct from the 590.

15 A. Okay, the answer to that part, just that
16 part, is no. The rest, I think you got it.

17 Q. Okay. "The rest" being you did --

18 A. The 590.

19 Q. -- program --

20 A. Sorry, I -- I'm sorry --

21 Q. That's fine.

22 A. -- I interrupted you.

23 Q. You did program the 590 into your
24 algorithm to --

25 A. I inputted the -- sorry. I'm sorry. I'll

1 be careful to stop interrupting you. I'll let you
2 finish.

3 Q. Almost done.

4 -- to preserve, to the greatest extent
5 practicable, those 590 traditional neighborhoods and
6 communities of interest identified by the
7 Independent Redistricting Commission?

8 A. Exactly.

9 Q. Okay. You also testified earlier today
10 that doing so had virtually no effect on the lines
11 that you drew?

12 A. Yes.

13 Q. And how do you know that?

14 A. Because I can see that when you put --
15 when you have this hierarchy of criteria and you
16 have all of these redistricting criteria above
17 communities of interest -- so most importantly,
18 that's equal population, municipal divisions, county
19 divisions, compactness -- you go down the list, and
20 then communities of interest are down below all of
21 those things.

22 By the time the algorithm is getting to
23 that consideration -- right? -- that is just a
24 tiebreaker in case a -- there's, say, two different
25 lines are tied along all of these other

1 considerations. Well, I just know from my
2 experience that that so rarely happens that,
3 effectively, when you get that far down the list,
4 all the way to where communities of interest is,
5 down on the hierarchy, it's having very close to
6 zero effect --

7 Q. Okay.

8 A. -- because there's so many other
9 considerations that are above it in the hierarchy.

10 Q. Compared to your ensemble, Plaintiffs'
11 Plan 1 better respected those 590 communities of
12 interest than either Plaintiffs' Plan 2 or the 2025
13 plan; is that accurate?

14 A. I can't remember off the top of my head,
15 but it was certainly in my --

16 Q. Could you go to --

17 A. -- report. I'm happy to just look through
18 it or I'll take your word for it.

19 Q. I believe if you go to part 4 of your
20 report --

21 A. Maybe if you could give me a --

22 Q. Yeah, I will do that in just a second.
23 Yeah, page 95. That Figure 6.5 is showing --

24 A. Okay, I gotcha.

25 Q. -- the respect for the -- by the various

1 maps for these 590 communities of interest compared
2 to your ensemble; is that accurate?

3 A. Yes.

4 Q. And you see that Plaintiffs' Map 1 better
5 respects the 590 communities of interest than the
6 other two plans considered?

7 A. Yes.

8 Q. Did you review Dr. Barber's Appendix B
9 filed yesterday?

10 A. You'll have to refresh my memory. I doubt
11 it, but I'm happy to take a look and tell you.

12 Q. It's a short PDF pulling the descriptions
13 from the Shapefiles that you input into the
14 algorithm, descriptions of the communities of
15 interest -- of these 590 communities of interest.

16 A. Okay. I don't think I looked at it real
17 closely. I may have flipped through it, but --

18 Q. I'll show it to you now, if you don't
19 mind.

20 A. Sure.

21 Q. Dr. Chen, could you read community of
22 interest 15's description?

23 A. "Democrats need representation. Carving
24 up SLC to silence that voice is dishonest."

25 Q. Could we flip a few pages and go to 133?

1 And could you read it when you get there?

2 A. You said 133, right?

3 Q. Yes.

4 A. Okay. You want me to read it?

5 Q. Yes, please.

6 A. "The Avenues are one of the oldest
7 neighborhoods in Utah. The Salt Lake City Cemetery
8 has markers from pioneers to veterans and old ghost
9 stories. Culturally, The Avenues are liberal but
10 also have some of the oldest LDS wards and stakes in
11 Utah."

12 Q. Flipping the page, could you please
13 read 144?

14 A. "East Central Salt Lake City, mostly
15 liberal, ethnically diverse community with
16 concentrated LGBTQ community."

17 Q. And flipping several pages, could you
18 please go to 224? Could you read that, please?

19 A. "My community is very diverse and liberal.
20 In conservative Utah, my community needs to be
21 grouped together so we have a chance for
22 representatives that are willing to listen to our
23 needs and support legislation that supports our
24 needs instead of limits O-U" -- I think it may have
25 been cut off.

1 Q. It seems there may have been a character
2 limit for these comments.

3 Could you please go to 226 on the next
4 page?

5 A. "Parents of adult children. My community
6 is made up of people who send their children to
7 Judge Memorial Catholic High School. My community
8 is upper middle class and fairly liberal."

9 Q. And could you now jump to community of
10 interest number 406? It's a decent chunk farther
11 down.

12 A. "Holladay community. My community is
13 liberal, cares about the environment, believes in
14 providing social services that are equitable."

15 Q. And two pages later, 426, please.

16 A. "Salt Lake City. My community is made up
17 of a diverse group of people from many different
18 backgrounds. They tend to lean Democratic. They
19 tend to meet at schools, libraries, parks, and out
20 on hiking trails. They care a great deal about each
21 other and the" -- I guess that was cut off.

22 Q. And the next page, 441.

23 A. "Downtown Salt Lake City. I feel that
24 inhabitants of Salt Lake City lean more liberal, as
25 evidenced, for example, by the election of female

1 mayors. Talking with my neighbors about current
2 events, we seem to be largely in agreement about
3 policies and direct" -- maybe that word was cut off.

4 Q. And the next page, 453.

5 A. "University faculty and alumni. My
6 community is middle to upper middle class,
7 well-educated, and progressive in outlook. We need
8 congressional representation. The current map is
9 gerrymandered, and our voice is drowned out by rural
10 interests and our represent" -- that word was cut
11 off.

12 Q. A few pages later, could you please go to
13 495?

14 A. Okay. "I live in an area of Salt Lake
15 made up of doctors, professors, entrepreneurs,
16 stay-at-home moms, and retirees. While occupations
17 are diverse, the common thread in our neighborhood
18 is largely one of progressive thinking,
19 inclusiveness, and conservation. Man" -- that one's
20 cut off.

21 Q. Thank you.

22 Could you flip the page to -- or two pages
23 to 514?

24 A. "Just west of" -- oh, sorry.

25 "Just west of Foothill Village, my

1 community should be in the same district. I believe
2 that my community has views that would be more in
3 line with the Democratic Party, and yet we have a
4 super conservative representative."

5 Q. Two pages later, could you go to 541?

6 A. "My community is diverse and mixed-age.
7 It has access to bus service with declining service.
8 Close to a county library and a walking path, access
9 to banks and stores. Representatives are diverse
10 with liberal leanings. It is diverse, and
11 representation" -- then it's cut off.

12 Q. And the next page, 543.

13 A. "We want representation that does not
14 ignore our community's values and interests. SLC is
15 progressive, caring, supportive, and the capital
16 city."

17 Q. And the next page, 554, at the top.

18 A. "We live in what is largely considered a
19 liberal part of the Salt Lake City, but since the
20 gerrymandering of our district several years ago, we
21 have had zero opportunity for representation on the
22 federal level. I don't take issue with the
23 conservative" -- and it's cut off.

24 Q. And then two pages later, the last page,
25 could you read 588?

1 A. "I feel I am part of the community of Salt
2 Lake City, which is more liberal and less LDS, 34
3 percent, than the rest of the state, 66 percent. I
4 wish that my community was more consistently
5 represented in Washington. One-third of state has
6 zero of four representatives usually."

7 Q. Thank you.

8 MR. GEIGER: May I have about a minute to
9 confer with my colleagues, Your Honor?

10 THE COURT: Of course.

11 Q. (By Mr. Geiger) And just to clarify one
12 point from the beginning of our discussion about
13 communities of interest, you corrected me and said
14 that you did not consider the legislature's
15 communities of interest specifically in your
16 algorithm; is that right?

17 A. Yes.

18 Q. Okay. Thank you.

19 MR. GEIGER: No further questions for me
20 this time, Your Honor.

21 THE COURT: Mr. Geiger?

22 MR. GEIGER: Yes.

23 THE COURT: With regard to the exhibits
24 that we discussed, are those also stipulated and are
25 they being admitted?

1 MR. GEIGER: We would -- we would like to
2 mark them, but we'll move to admit them during our
3 case in chief if you prefer, or we can do it now.

4 THE COURT: I'll leave it to counsel.
5 What makes the most sense for the record?

6 MR. GABER: With respect to the -- I guess
7 I would -- maybe would need to address them one by
8 one.

9 THE COURT: Okay.

10 MR. GABER: The journal -- the journal
11 articles, I think I would object to hearsay, and --
12 but I'd have to know which ones we're talking about.
13 So maybe we should confer about it and --

14 THE COURT: Okay.

15 MR. GEIGER: I think we'll do that.

16 THE COURT: Perfect.

17 MR. GEIGER: Is that fine with you, Your
18 Honor?

19 THE COURT: Okay. All right. Thank you,
20 Mr. Geiger.

21 Redirect.

22 MR. GABER: Thank you.

23 ***

24 ***

25 ***

1 REDIRECT EXAMINATION

2 BY MR. GABER:

3 Q. Just a few questions for you, Dr. Chen.

4 Do you have the article -- the Cannon,
5 DeFord, and Moon Duchin article "Repetition Effects
6 in a Sequential Monte Carlo Sampler" in front of
7 you?

8 A. Yes.

9 Q. And counsel for the legislative defendants
10 referred you to, I guess, the third paragraph on
11 page 2 and then footnote 2 about work in a New
12 Mexico redistricting litigation. Does that -- do
13 you recall that?

14 A. Yes.

15 Q. Did you see that there?

16 A. Yes.

17 Q. Could you please respond to the assertion
18 in this article?

19 A. Yeah, let's start with the assertion.
20 Read it, and I'll respond to it.

21 So it says: "A defense expert" --
22 referring to me -- quote, "cosmetically altered his
23 SMC sample by perturbing the boundaries of districts
24 so that he could claim that no districts
25 were duplicated."

1 That's just absolutely a complete lie.
2 Absolutely a complete lie. And the idea that
3 somehow I took, say, a thousand simulated maps and
4 sat there by hand, thousands of districts, and just
5 jiggered around lines just to make them different,
6 that's just preposterous. It's just absolutely a
7 lie.

8 Q. And who -- what was the source of this
9 assertion?

10 A. Well, the authors of this article. So
11 it's Sarah Cannon, Daryl DeFord, and Moon Duchin.

12 Q. And that's not something you did?

13 A. Absolutely not.

14 Q. Now, you also were asked about a
15 Pennsylvania case that you had testified in and were
16 shown your trial transcript testimony in that case.
17 Is the simulations that -- the algorithm that you
18 applied in this case, is it different than the
19 algorithm in the Pennsylvania case?

20 A. Yes.

21 Q. And have your methods adopted -- or
22 adapted over time since that testimony?

23 A. Absolutely. That was eight years ago.

24 Q. If I could, I would like to show on the
25 screen the text of SB 1011.

1 First of all, do you recognize this as
2 Senate Bill 1011, the redistricting standards?

3 A. I do.

4 Q. And you've reviewed this?

5 A. Yes.

6 Q. And I want to draw your attention to the
7 definition, so subpart F of section 1 -- or
8 subsection 1. And could you just read the
9 definition of Sequential Monte Carlo simulation?

10 A. "Sequential Monte Carlo simulation means a
11 probabilistic algorithm that simultaneously
12 generates a representative ensemble of districting
13 plans for comparison in an ensemble analysis by
14 building redistricting plans through a step-by-step
15 random sampling method, weighting and resampling the
16 plans to reflect legal and geometric criteria."

17 Q. Did your algorithm use the approach
18 described in this definition of Sequential Monte
19 Carlo simulation?

20 A. Yes.

21 Q. What about Dr. Trende and Dr. Barber's
22 algorithms? Did it comply, in your view, with the
23 definition that you just read aloud?

24 A. No, it didn't.

25 Q. And why not?

1 A. The definition clearly says "reflect legal
2 and geometric criteria."

3 Presumably, that's referring to the
4 neutral proposition for redistricting criteria. And
5 obviously, we spent quite a bit of time earlier
6 today talking about both Dr. Trende and Dr. Barber
7 did not follow the Prop 4 criteria. Not a single
8 one of their maps followed the Prop 4 criteria.
9 Every single one of their maps deviated from the
10 Prop 4 criteria, along -- multiple criteria in
11 Prop 4, but just as an example, none of their maps
12 are equally populated.

13 Q. Now, I want to ask you just about the --
14 you read aloud some of the descriptions that were
15 submitted by members of the public defining their
16 preferred communities of interest; is that right?

17 A. Yes.

18 Q. And there was a handful of them that you
19 read, and I gather that the point of that was that
20 they contained descriptions that referenced
21 Democrats or liberal or conservative; is that right?

22 A. Yes.

23 Q. Now, some of those were -- and when I was
24 listening, some of those were referencing Salt Lake
25 City, the city of Holladay. Do you recall that?

1 A. Yes.

2 Q. How, if at all, would defining a community
3 of interest in that manner affect the algorithm's
4 treatment of Salt Lake City or Holladay?

5 A. Well, if you're testifying to the
6 commission and saying that that municipality is your
7 community, and then, of course, we have these 590
8 maps that I incorporated into my simulation
9 algorithm, well, then respecting communities of
10 interest would tend to keep, say, Salt Lake City or
11 whatever municipality the testimony is referring to
12 together.

13 Q. And would the algorithm have already
14 addressed the city boundaries of Salt Lake City or
15 Holladay or any other city through one of the other
16 criteria in the list?

17 A. Yes, because it's pretty high up on the
18 Prop 4 criteria -- neutral redistricting criteria.

19 Q. And what if one of the communities of
20 interest that was identified or that was referenced
21 in Mr. Geiger's examination, what if that community
22 of interest crossed over municipal lines? How would
23 the algorithm treat whether or not it was going to
24 make a decision based on that community of interest
25 definition?

1 A. Well, communities of interest are falling
2 further down on the list of criteria. So if it's
3 just a community that spans across multiple
4 counties, the algorithm is not going to say
5 sacrifice community boundaries or split more and
6 more communities just -- sorry, the algorithm is not
7 going to split more and more counties just because
8 somebody said they have a community of interest that
9 spans across multiple counties.

10 So it's pretty clear on the Prop 4 list of
11 criteria, communities of interest is subordinated to
12 county boundaries, to municipal boundaries. It's
13 less important, it's of lower priority than those
14 other things. You're not going to split more
15 counties or split more municipalities just so you
16 can do better in terms of keeping one of the 590
17 communities of interest together.

18 Q. And in your view, did any of the comments
19 that you read report partisan election results,
20 voting records, or voter registration data?

21 A. I don't recall seeing that.

22 Q. Thank you.

23 MR. GABER: No further questions.

24 MR. GEIGER: Your Honor, may I have one or
25 two recross?

1 THE COURT: Of course.

2

3 RECROSS-EXAMINATION

4 BY MR. GEIGER:

5 Q. Dr. Chen, did I hear you correctly just
6 now say that you changed your algorithm about eight
7 years ago, right after the Pennsylvania case?

8 A. No, I -- what I just said is that I do
9 different things now than I did then. It's not as
10 if I changed it and adapted it, I just do different
11 things now than I was working on eight years ago.
12 I'm always -- I've always been producing
13 redistricting simulations using different tools.

14 Q. Have you published a paper since the
15 Pennsylvania litigation on your updates and
16 adaptations to your algorithm?

17 A. I have published a paper using
18 redistricting algorithms since then.

19 Q. Have you published one since 2021 on
20 redistricting algorithms?

21 A. In 2021.

22 Q. In 2021.

23 Have you made your most recent version of
24 your algorithm available for download online?

25 A. Yeah, I believe one of those 2021 papers

1 is -- the code's online.

2 Q. And one final point about the communities
3 of interest that we've been discussing. With each
4 of those 590, there is a Shapefile that your
5 algorithm uses to -- as it is deciding whether to
6 break ties as it's going down the criteria of
7 Proposition 4 that you programmed in; is that
8 accurate?

9 A. You got the right idea. The basic idea is
10 that there's a single Shapefile that has all 590. I
11 didn't literally input that Shapefile in, but I used
12 the geographic boundaries of that Shapefile to input
13 information into the algorithm.

14 Q. Okay. Thank you.

15 THE COURT: Any requests -- or, sorry,
16 redirect?

17 MR. GABER: Nothing further. Nothing
18 further.

19 May Dr. Chen be permanently excused?

20 THE COURT: Yes.

21 Thank you for your testimony today,
22 Dr. Chen. You're excused.

23 THE WITNESS: Thank you, Your Honor.

24 MR. GABER: Your Honor, I would suggest
25 maybe we could take our lunch break.

1 THE COURT: We can do that.

2 THE WITNESS: Okay. Do I -- can I sit
3 down?

4 THE COURT: Go ahead. Yeah, you can step
5 down off the stand.

6 All right. How long did you want to take
7 for lunch?

8 MR. GABER: Is half an hour --

9 MR. GREEN: Thirty minutes sounds good.

10 THE COURT: Thirty minutes?

11 MR. GREEN: Yeah.

12 THE COURT: All right. Why don't we
13 resume at 12:30. So Court is in recess. We'll see
14 you all around 12:30.

15 Do you need us to leave the doors open for
16 you?

17 MR. GABER: I don't -- I don't think so.
18 We can take what we need.

19 THE COURT: Okay. Great.

20 All right. Court is in recess.

21 (Recess taken.)

22 THE COURT: Back on the record, League of
23 Women Voters of Utah versus Utah State Legislature,
24 case 220901712.

25 All right. Are you ready to call your

1 next witness?

2 MR. DESANTO: Yes. Isaac DeSanto for the
3 plaintiffs.

4 THE COURT: Okay. Mr. DeSanto.

5 All right, go ahead. Call your next
6 witness.

7 MR. DESANTO: Plaintiffs call Victoria
8 Reid to the stand.

9 THE COURT: All right, Ms. Reid. If you
10 wouldn't mind, please come forward, come stand right
11 here in front of the clerk. We're going to ask you
12 to provide some testimony under oath.

13 If you don't mind, please raise your right
14 hand.

15 (Witness sworn.)

16 THE COURT: All right. Come, please, take
17 a seat.

18 All right, before we get started, with
19 regard to your responses, everything we do is
20 recorded, audio only. Make sure you speak into the
21 microphone, and when you respond, use words.

22 "Uh-huh" and "huh-uh" don't really translate on the
23 record. Okay?

24 THE WITNESS: Okay.

25 THE COURT: All right. Mr. DeSanto.

1 MR. DESANTO: Thank you.

2

3

4 VICTORIA REID,
5 called as a witness, being first duly sworn,
6 was examined and testified as follows:

7

8 DIRECT EXAMINATION

9 BY MR. DESANTO:

10 Q. Ms. Reid, can you introduce yourself to
11 the Court, please?

12 A. Yes, my name is Victoria Reid, and I'm a
13 resident of Millcreek.

14 Q. And how long have you lived in Utah?

15 A. Seven years.

16 Q. Where did you live before that?

17 A. I lived in Minnesota.

18 Q. What inspired you to move to Utah?

19 A. My husband and I both retired, and our
20 kids were not staying in Minnesota. And we were
21 looking -- we're tired of the long, cold winters,
22 and we both have family connections and roots here,
23 And we're looking for an adventure, and it's a great
24 place to live.

25 Q. You mentioned you retired. What did you
do before you retired?

1 A. I worked in public affairs, and I also
2 taught at the University of Minnesota.

3 Q. And you mentioned your husband. Is he
4 involved in this litigation as well?

5 A. Yes, he is, and you will be hearing from
6 him later today.

7 Q. Great. Thank you.

8 Can you tell me just briefly, what do you
9 like about living here in Utah?

10 A. Well, it's great. I love the national
11 parks, I love the outdoors, I love my community, I
12 love the diversity, and I love that the winters are
13 not very cold. And I know you think they are, but
14 they are not.

15 Q. Thank you.

16 I'm going to switch gears here a little
17 bit. What is your political affiliation?

18 A. I'm a registered Republican.

19 Q. And have you ever been involved in
20 Republican politics?

21 A. I have. I worked in Washington at the
22 U.S. Capitol for the House Republican Conference, I
23 worked for a Republican governor of Minnesota,
24 and I worked on the re-election campaign of a U.S.
25 Republican senator in Minnesota.

1 Q. Have you ever been involved in Republican
2 politics here in Utah?

3 A. I attended the precinct caucuses this last
4 year.

5 Q. Are you involved in any other civic
6 organizations here in Utah?

7 A. Well, I am a member of Mormon Women for
8 Ethical Government, which, as we all know, is a
9 plaintiff in this case. I do serve on my city's
10 planning commission. Yeah, it's been a great place
11 to get involved.

12 Q. That's great.
13 Why did you decide to get involved in this
14 litigation?

15 A. Well, I was very excited to vote for
16 Proposition 4. I believe fair maps are really
17 important. And then I was really disappointed with
18 the legislature that they didn't take the provisions
19 of Prop 4 seriously. And I feel like the process
20 that they used as well as the maps they came up with
21 were unfair.

22 Q. And you mentioned the maps, the 2021
23 congressional map. Can you tell us, what -- were
24 there specific things about it that you disliked?

25 A. Well, it carved up my city into four --

1 all four congressional districts. And, you know, I
2 feel like it was making me lose my sense of
3 community.

4 Q. Did the fact that you're a registered
5 Republican impact your decision to get involved in
6 this case?

7 A. It did. I am a moderate Republican, but I
8 had expectations for my party. I always think of
9 our party as one that's rule-followers. And I felt
10 like what the legislature was doing was being a
11 rule-breaker.

12 Q. You're aware that there have been three
13 remedial maps proposed in this case?

14 A. I have.

15 Q. Have you seen those three maps?

16 A. I have.

17 Q. Okay. I would like to bring up, for the
18 record, Plaintiffs' Demonstrative 2.

19 MR. DESANTO: If we can switch to this
20 screen.

21 THE CLERK: You might have to unplug and
22 re-plug it in.

23 MR. DESANTO: Oh, unplug it and plug it
24 in?

25 Great. Thank you.

1 Q. (By Mr. DeSanto) So, Ms. Reid, this is a
2 zoomed-in shot of Defendants' Map C, focused here on
3 Millcreek, because you mentioned that's your
4 community, that's where you live, it's where you
5 have the most at stake, personally.

6 Can you just tell me, do -- how do you
7 feel this map addresses the concerns that you've
8 expressed here today?

9 A. It's an improvement over the first map
10 that the legislature came up with. However, I'm now
11 in a peninsula. My city is carved up into two
12 congressional districts, and where I live, I can
13 walk north to a different district, I can walk east
14 to a different district, and I can walk south to a
15 different district. They're all just a few blocks.
16 So, you know, it's better, but I don't really feel
17 like it -- the map respects our community.

18 I guess the other thing I should just add
19 is, Millcreek, as a lot of you know, is a, you know,
20 fairly new city, and it's worked really hard to
21 create a sense of place, and I feel like this map
22 really undercuts that effort.

23 Q. Thank you.

24 Okay. I'd like to show you two more
25 images. These are the same zoomed-in portions on

1 Millcreek. The top one is Plaintiffs' Map 1, and
2 the bottom one is Plaintiffs' Map 2.

3 So same question as the map above, how do
4 you feel that these maps address the concerns you've
5 expressed here today?

6 A. Well, I think they're both excellent.
7 They, you know, keep Millcreek intact, which, again,
8 I feel is really important, but I think it's
9 important also that these -- that we have fair maps
10 for everyone in the state of Utah.

11 Q. Thank you.

12 MR. DESANTO: No further questions.

13 THE COURT: All right. Cross, Ms. Rogers?

14 MS. ROGERS: Thank you, Your Honor.

15
16 CROSS-EXAMINATION

17 BY MS. ROGERS:

18 Q. Hello, Ms. Reid. My name is Olivia
19 Rogers. I'm counsel for legislative defendants.
20 Just a couple of questions for you.

21 First, you mentioned that you worked for a
22 few Republicans back in Minnesota. Just out of
23 curiosity, which ones were those?

24 A. Governor Albert Quie -- he was up a long
25 time ago -- and Senator Dave Durenberger.

1 Q. Great. Thank you.

2 And you also mentioned that you taught at,
3 I believe, the University of Minnesota. What did
4 you teach while you were there?

5 A. I taught in the communications department.

6 Q. Communications. Great.

7 So not a statistician?

8 A. No.

9 Q. Me either.

10 Had you heard of the partisan bias test
11 before this litigation?

12 A. Before this litigation? No.

13 Q. Do you know how to calculate the partisan
14 bias?

15 A. Not at any deep level, and I am not here
16 as an expert witness.

17 Q. Sure.

18 A. I'm here to -- talking about why I am
19 personally offended by the maps that have been
20 selected by the legislature.

21 Q. Sure. What about the mean-median test?
22 Have you heard about it before this litigation?

23 A. No.

24 Q. And what about simulations ensembles?

25 A. Nope.

1 Q. Great.

2 And you don't know how to calculate any of
3 those either?

4 A. No.

5 Q. Great.

6 Does SB 1011 prevent you from casting a
7 vote?

8 A. No.

9 Q. And you'll still get your ballot in the
10 mail, still fill it out, mail it back in, that whole
11 process?

12 A. Correct.

13 Q. Still can donate to the candidates of your
14 choice?

15 A. Yep.

16 Q. And attend fundraisers, rallies,
17 gatherings, anything of that nature?

18 A. Right, I can still do that.

19 Q. And isn't it true that you can still speak
20 on political matters of importance within the state?

21 A. You mean as a result of that? Yes, I can.

22 Q. Would you be happy if there was one
23 competitive district drawn?

24 A. I don't really feel like I am the person
25 to ask that question of.

1 Q. Okay. If a competitive district could be
2 drawn, do you think that it should be or must be?

3 A. Yeah, I think competitive districts are
4 always a good idea.

5 Q. Great. Thank you.

6 MS. ROGERS: No further questions.

7 THE COURT: Any redirect?

8 MR. DESANTO: No, Your Honor.

9 THE COURT: All right. Anything else for
10 this witness?

11 MR. DESANTO: Oh, they should be excused.

12 THE COURT: All right. Ms. Reid, thank
13 you very much for your time and testimony. You're
14 excused.

15 And, Counsel, what's your last name?

16 MR. MULJI: Aseem Mulji, Your Honor.

17 THE COURT: Mulji. All right. Mr. Mulji,
18 go ahead and call your next witness.

19 MR. MULJI: Plaintiffs call
20 Dr. Christopher Warshaw.

21 THE COURT: All right. Dr. Warshaw, if
22 you would come forward. If you would stand here in
23 front of the clerk, we're going to ask you to
24 provide some testimony under oath.

25 Please raise your right hand.

1 (Witness sworn.)

2 THE COURT: All right. Doctor, I assume
3 that you heard what I said before. Speak into the
4 microphone and use words with your -- for your
5 responses.

6 THE WITNESS: Thank you. Yes, Your Honor.

7 THE COURT: Okay.

8

9 CHRISTOPHER WARSHAW, Ph.D.,
10 called as a witness, being first duly sworn,
11 was examined and testified as follows:

12

13 DIRECT EXAMINATION

14 BY MR. MULJI:

15 Q. Welcome, Dr. Warshaw.

16 MR. MULJI: For the Court's benefit too,
17 I'll just note that the exhibits relevant to this
18 examination will be 1A, 1B, and 1C.

19 THE COURT: Okay.

20 MR. MULJI: And those are Dr. Warshaw's
21 October 7th, October 13th, and October 17th reports.

22 THE COURT: Thank you.

23 Q. (By Mr. Mulji) And, Dr. Warshaw, you have
24 those available to you in your binder there.

25 A. Oh, great. I'm sorry, what letters are

1 they?

2 Q. 1A, 1B, and 1C over at the beginning of
3 the binder.

4 Good afternoon. Would you please start by
5 stating your name for the record?

6 A. Christopher Warshaw.

7 Q. Where are you employed?

8 A. At the McCourt School of Public Policy at
9 Georgetown University.

10 Q. And what department do you teach in there?

11 A. It's a public policy school. My classes
12 all focus on the effect of the political process on
13 policy.

14 Q. Okay. And what are your --

15 A. So political science, broadly speaking.

16 Q. Political science.

17 What are your fields of expertise within
18 political science?

19 A. I focus on American politics, and within
20 American politics, I focus on political
21 representation, elections, public opinion, and
22 redistricting.

23 Q. And does that include gerrymandering and
24 that sort of thing?

25 A. Yes.

1 Q. Have you published peer-reviewed
2 scholarship on redistricting and gerrymandering?

3 A. Yes.

4 Q. In the recent past?

5 A. I'm sorry, can you repeat it.

6 Q. In the recent past?

7 A. Yes.

8 Q. And do you have experience, as an expert
9 witness, applying scientific and statistical methods
10 of assessing partisan favoritism in redistricting
11 plans?

12 A. Yes, I've testified in about a dozen cases
13 or written reports for about a dozen cases.

14 Q. And are those cases listed in your CV
15 attached to -- attached to your reports?

16 A. Yes.

17 Q. To your knowledge, has any Court ever
18 declined to accept or credit your testimony?

19 A. No.

20 MR. MULJI: Your Honor, Dr. Warshaw's
21 qualifications have been stipulated, as with the
22 other experts, and we'd call for him as an expert in
23 American politics with specialties in political
24 representation, elections, redistricting, and
25 gerrymandering.

1 THE COURT: Any objection?

2 MS. ROGERS: No objection.

3 THE COURT: All right. You may proceed.

4 Q. (By Mr. Mulji) Dr. Warshaw, can you start
5 by summarizing the opinions you offer in this case?

6 A. Well, the opinion that I offer in this
7 case is that in order to assess whether a particular
8 state's redistricting plan unduly favors a
9 particular party, it's important to look to metrics
10 that have been proposed in the academic literature
11 that fit the conditions of that state. And where we
12 can, we should employ multiple metrics in order to
13 evaluate the potential favoritism in a districting
14 plan, being careful to only use metrics that are
15 applicable in that state.

16 And when I looked at the applicability of
17 the potential metrics for Utah, what I found is
18 there's a couple metrics that work -- that work
19 well, such as the efficiency gap, the least
20 Republican vote share metrics, and the standard
21 deviation of vote shares.

22 And there's a couple metrics that don't
23 work well for the congressional plan, at least. The
24 declination doesn't work well for the congressional
25 plan but could work for the state legislative plans.

1 And partisan bias and the mean-median difference
2 don't work well in Utah at all for a number of
3 reasons.

4 Q. And before we turn to each of those
5 metrics in turn, which metrics did you ultimately
6 apply to the congressional remedial maps at issue in
7 this hearing?

8 A. I applied the efficiency gap. And it's my
9 understanding that another expert in the case,
10 Professor Chen that testified earlier, as we heard
11 earlier, he testified about the least Republican
12 vote share metric and the standard deviation of vote
13 shares in his analysis.

14 Q. Do all of the measures that you've
15 considered in this case -- whether you find them
16 applicable or not, in your view, do they qualify as
17 scientific or statistical methods?

18 A. Yes.

19 Q. Okay. Let's -- let's turn to the measures
20 that you've determined are inapplicable, starting
21 with the partisan bias metric.

22 You've heard Dr. Chen's testimony earlier
23 today describing what that metric is. I won't have
24 you do that here for the sake of time. But let me
25 ask you this: Have you applied the partisan bias

1 test in past expert engagements in other states?

2 A. I have. I've used it in a number of other
3 states where I believed it was applicable based on
4 the assumptions of the metric.

5 Q. Okay. And what led you to conclude, as
6 you stated earlier, that it's not applicable in
7 Utah?

8 A. Well, the authors of the partisan bias
9 metric, both in their original article as well as in
10 subsequent work, were very clear that it's only
11 applicable in states with competitive statewide
12 elections. In their original papers, they
13 explicitly excluded states from their analysis that
14 didn't have competitive statewide elections, And
15 they advised taking the same approach in most of
16 their later work. And when I looked at the
17 elections in Utah, based on a variety of different
18 indicators, state -- Utah's statewide elections are
19 not competitive.

20 Q. On that point, I want to direct your
21 attention -- and hopefully it will pull up on the
22 screen -- to Figure 4 in Exhibit 1A. It's on
23 page 15. We'll just wait for it to be displayed.

24 Now, you just told me that you looked at
25 whether elections in Utah are competitive.

1 A. I did.

2 Q. Can you tell us what Figure 4 is showing?

3 A. Well, these are looking -- so as I said
4 earlier, it's important for the partisan bias metric
5 for elections to be competitive. And that's because
6 imagining a tied statewide election really makes no
7 sense if the statewide elections are not
8 competitive. If we can never actually observe a
9 tied statewide election, then that's not a relevant
10 hypothetical for evaluating a districting plan.

11 And so one of the things that Andrew
12 Gelman and Gary King said in their original article
13 that explicated this metric was that an important
14 indicator of statewide competitiveness in order to
15 determine whether the metric is applicable in a
16 state is whether a party wins the majority of the
17 votes or seats in congressional elections in that
18 state.

19 And it didn't have to be -- obviously, you
20 know, elections will go back and forth a little bit.
21 So they looked over a 20-year time period in their
22 article, and they said, like, you know, "Has a party
23 won a majority of the votes or seats in the last 20
24 years?"

25 So what I did is I put together an index

1 of Utah's elections in the same -- in the same
2 manner that the SB 1011 recommends, using the same
3 races that are in SB 1011, and -- or, sorry, here --
4 I'm getting ahead of myself. Here, focusing on
5 congressional races.

6 So here, just focusing on congressional
7 races, what we find is that the -- in most years --
8 congressional races in recent years, Republicans get
9 about two-thirds of the vote, and Democrats get
10 about a third of the statewide vote. So based on
11 the -- and it's many years since -- you know,
12 Democrats have not won a majority of the statewide
13 vote in Utah's congressional elections in decades.

14 So based on the 20-year time horizon that
15 Gelman and King laid out in their original article,
16 Utah wouldn't qualify as a competitive election
17 based on the two parties' vote shares in
18 congressional elections.

19 In the right panel, we could instead look
20 at seat shares. You might argue that maybe we
21 should focus on the number of seats the two parties
22 win rather than votes. But here, too, since the --
23 since the beginning of "one person, one vote" in
24 1972, Democrats have never won a majority of the
25 seats in Utah's congressional districts. And, in

1 fact, in most years, Republicans win the majority.
2 And in recent years, Republicans have won all of the
3 seats on the Utah congressional plan.

4 Q. Now, just a clarifying question. You've
5 mentioned an article by Gelman and King. Can you
6 explain the significance of that -- of that article
7 again?

8 A. Oh, I'm sorry. This is the article that
9 originally explained, sort of laid out, established
10 the partisan bias metric that we've talked about.
11 So the boundary conditions they established for
12 their metric I think are important to consider.

13 Q. And what were those boundary conditions,
14 if you don't mind reiterating?

15 A. So, again, what they -- what they
16 discussed in their article was that in order to use
17 the partisan bias metric, the statewide elections
18 have to be competitive. In states that don't have
19 competitive elections, they advise not to use the
20 partisan bias metric. And, indeed, they dropped it
21 from their own analysis in that article on
22 competitive states.

23 Q. And here in Figure 4, you've looked at the
24 competitiveness in congressional elections.

25 I want to turn your attention to the next

1 figure in this Exhibit 1A on page 16, Figure 5.

2 What elections did you examine here? What is this
3 figure showing us?

4 A. So this is what I was -- when I was
5 getting ahead of myself earlier, what I started to
6 describe. So here I'm using the same index of
7 statewide elections that is used in the SB 1011, so
8 looking at an index based on presidential elections,
9 governor, attorney general, treasurer, and auditor.

10 And what we see is, again, it's been many,
11 many years since the average of these elections was
12 even somewhat competitive. And I established bands
13 here because my view is that -- and I think the
14 consensus view in the literature is that you have to
15 be between 45 percent and 50 percent of the
16 statewide vote to be solidly competitive.

17 But I also wanted to have -- you know, to
18 be a little bit more relaxed than that, to say,
19 okay, we could be somewhat competitive if you're
20 between 40 percent and 60 percent on average of the
21 statewide vote.

22 But in Utah, you know, it's been decades
23 since Democrats have gotten 40 percent of the
24 statewide vote in this index of statewide elections.
25 And, in fact, it's been a long time since Democrats

1 have won any of these statewide elections, as I show
2 in the right-hand panel, that -- looking at the best
3 Democrats have done in this index.

4 And again, this is a lagged index from the
5 past ten years. This isn't showing -- this one
6 isn't showing the particular year's elections. It's
7 showing the elections over the previous ten years,
8 as you -- as we do in SB 1011, essentially.

9 And so here, what we're saying is that
10 it's been since the early 2000s that this lagged
11 index would have shown Utah as being competitive
12 based on the best Democratic showing in the
13 statewide index, and it's been since at least the
14 1990s, and probably even before that, since it's
15 been competitive in the average of the index.

16 Q. Having looked at the results -- election
17 results over decades on average, what is your
18 ultimate conclusion about the competitiveness of
19 statewide elections in Utah?

20 A. Well, I think if we look at multiple
21 indicators of the competitiveness of Utah's
22 elections, the statewide -- at the statewide level,
23 Utah is not a competitive state. And, therefore, it
24 doesn't make a lot of sense to imagine a tied
25 statewide election as our benchmark for partisan

1 favoritism in congressional elections on a
2 districting plan.

3 Q. You've described one boundary condition of
4 applying partisan bias, competitiveness of statewide
5 elections. Can you explain what happens if you,
6 nevertheless, apply the partisan bias test to
7 congressional maps in Utah? What occurs when you do
8 it?

9 A. Well, what I observed and what -- what I
10 observed in my own analysis of the plans that have
11 been proposed in the course of this year and in
12 2021, but also looking at the academic literature,
13 what you see is that the plans where Democrats could
14 plausibly win a seat, and conversely, Republicans
15 might lose a seat, show, paradoxically, a
16 pro-Republican bias on the partisan bias metric,
17 which doesn't make a lot of sense, and -- whereas
18 plans where Republicans in real-world elections
19 would win all of the seats show as -- or indicated
20 as fair under the partisan bias metric.

21 So you actually apply the metric in Utah,
22 which you shouldn't, based on the boundary
23 conditions established by the original papers of the
24 metric that yields, you know, very strange results.

25 Q. And did you -- you heard the testimony of

1 Dr. Chen this morning?

2 A. I did.

3 Q. Okay. And did that -- did his testimony
4 have any bearing on your opinion here regarding the
5 results of applying this test in Utah?

6 A. Well, for me, they merely reinforced what
7 we've already seen from previous literature, from an
8 article that focused on districting in Utah that was
9 published, I think, in 2022. They found largely the
10 same things that Professor Chen did.

11 Q. And do these -- I think you said
12 paradoxical results, do they affect one party more
13 than another in Utah? Did you -- did you have an
14 opinion about that?

15 A. Yeah. So when you apply the partisan bias
16 test in Utah, what it -- it basically -- according
17 to both my own analysis and the academic literature,
18 and then reinforced this morning by Professor Chen's
19 testimony, it eliminates most of the plans where
20 Democrats could plausibly win a seat.

21 Which is odd, because, you know, the goal
22 of, you know, a fair districting plan should give
23 both parties, you know, if it's warranted based on
24 political geography and other indicators, the
25 opportunity to win a seat. And so it's odd that

1 plans where Republicans in real-world elections
2 would win all the seats are indicated as fair under
3 this metric.

4 And I also wanted to say that as part of
5 this analysis, I also look at the state legislative
6 plans. And the state legislative plans are
7 indicated as being -- having a pro-Republican tilt
8 under the -- these metrics. So one thing I noticed
9 or that -- I thought it was strange that SB 1011
10 excluded the state legislative elections from
11 consideration and only focused on the congressional
12 plan.

13 Q. Is what you're saying that the SB 1011
14 only applied the partisan bias test to congressional
15 elections?

16 A. Right, where it would uniquely, I think,
17 eliminate plans where Democrats could win a seat.
18 If you applied it to other plans in the state, which
19 are explicitly excluded from SB 1011, then it would
20 indicate that all of the plans that have been passed
21 have a pro-Republican bias.

22 Q. And has this partisan effect of applying
23 partisan bias in a state like Utah, has that been
24 recognized as -- in this academic literature as
25 you've seen it?

1 A. I'm sorry, can you repeat the question?

2 Q. Is this partisan effect that you've
3 described of applying partisan bias in Utah, has
4 this been recognized in the academic scholarship?

5 A. It has. There's two recent articles that
6 have discussed this at length. One by DeFord,
7 et al., that was in political analysis, and then a
8 more recent article, as I mentioned earlier, by
9 King -- not Gary King, a different King -- that
10 focuses on Utah specifically. And both of those
11 articles discuss what they call this Utah paradox at
12 length.

13 And I think one of the points that the
14 recent article -- the more recent article that -- by
15 Katz, et al., talks about in response to one of
16 those is that they raise the concern that the
17 partisan bias metric is -- well, the DeFord article
18 raised the concern that it's gameable. And then
19 this more recent article raised the concern that, at
20 least implicitly, because it's gameable in the state
21 of Utah, this is the test that partisan actors might
22 want to have as their metric.

23 And, in fact, that -- I think you can
24 observe that in SB 1011 because they excluded the
25 state legislative plans and only wanted to supply to

1 the congressional plan.

2 Q. Now, have you read or reviewed the reports
3 of Drs. Katz, Trende, and Barber filed last Friday
4 on October 17th?

5 A. I have.

6 Q. Okay. I want to discuss at least one of
7 the claims -- or a couple of the claims that they've
8 made about your critique of partisan bias and get
9 your response.

10 One of the claims I believe made by
11 Drs. Trende and Katz is that partisan symmetry can
12 only be measured by the partisan bias test. What is
13 your reaction to that?

14 A. My view is that, broadly speaking,
15 asymmetries in the distribution of vote shares
16 across districts are the target of interest of many,
17 if not most, of the metrics for detecting partisan
18 gerrymandering. And this is a particular form of
19 symmetry that the partisan bias test focuses on.
20 But broadly speaking, many of these metrics are
21 focused on detecting asymmetries.

22 Q. And is the partisan bias test itself
23 sometimes referred to as partisan symmetry?

24 A. Yes. It's sometimes colloquially referred
25 to as symmetry, although a slightly different

1 version of it where you look at a larger range of
2 the vote seat curve.

3 Q. Have you done that before as well?

4 A. Yes.

5 Q. In what context?

6 A. In some of -- many of my expert reports,
7 I've -- I've used it. Again, and in certain
8 circumstances that I would have believed was
9 applicable, where states were competitive, then I
10 think it's useful to evaluate the potential partisan
11 favoritism in a plan. I think you would want to use
12 all of the available metrics that fit the political
13 context of that state.

14 Q. Now, Dr. Barber says that you critique
15 partisan bias because, quote, "it relies on
16 hypothetical election outcomes." And he notes that
17 all partisan symmetry measures use past elections to
18 project how a map might perform in future elections.
19 Do you object to all counterfactual reasoning in
20 measuring partisan favoritism? Is that your
21 position?

22 A. No, in fact, I agree with -- I think,
23 broadly speaking, the consensus in the field that's
24 reflected in the, you know, varying degrees, I
25 think, in these reports is that you want to -- in

1 order to evaluate a new districting plan, what we
2 want to do is forecast what would happen under that
3 plan. In order to forecast what's going to happen
4 under that plan, implicitly, we're trying to
5 estimate how the two parties will perform under that
6 plan in each district. And there's different
7 approaches for doing that.

8 But I think that one principled approach
9 to do it, which is the approach that I take here,
10 Professor Chen takes, and then, to varying degrees,
11 Professors Barber and Trendle, is to construct an
12 index of statewide elections, average them together
13 in some -- in some way, and then use that as an
14 estimate for the normal vote in each district over
15 time.

16 Q. And how does that contrast with the way
17 that counterfactuals figure into the partisan bias
18 test?

19 A. So there, it's a different type of
20 counterfactual reasoning. It's not just
21 imagining -- trying to estimate how the two parties
22 will do in each district. It's trying to imagine a
23 totally different world, where instead of the two
24 parties -- you know, instead of Republicans getting
25 about two-thirds of the vote in Utah, they only get

1 half the vote.

2 And we've never observed that world. So
3 we don't know -- you know, I think one of the points
4 that Professor Katz makes in his various recent
5 articles is the uniform shift I think can make sense
6 for relatively small vote share shifts.

7 But to imagine that, you know, we can know what kind
8 of changes in the electoral coalitions which would
9 be required for Democrats to win half the statewide
10 vote in Utah I think is very challenging.

11 Q. You mentioned the words "uniform shift."
12 For those of us who aren't political scientists, can
13 you explain what that means?

14 A. Yeah, so the idea is that the uniform
15 shift, which is how most people use the partisan
16 bias metric and how I've used it in my own
17 previous -- you know, some of my own previous expert
18 reports where I've used it, or all of the ones where
19 I've used this metric, is you just imagine that if
20 Democrats get 30 percent of the vote in, say, a
21 particular precinct or district, we're just going to
22 increase that by 20 percentage points, and that's
23 how we get to 50 percent.

24 Well, it's a little bit more complicated
25 than that because you have to figure out what shift

1 statewide would get you to 50 percent. So let's
2 imagine it's -- let's imagine it's 15 percent. So
3 then you would take this district where Democrats
4 got 30 percent and you'd increase that to 45 percent
5 because that gets you to a tied statewide election
6 across all of the districts.

7 And, you know, I think what we observed in
8 recent years, it's just very hard to predict changes
9 in electoral coalitions when you have such large
10 shifts.

11 Q. Okay. And just so I clarify my own
12 understanding, uniform shift is part of the way that
13 the partisan bias test is applied; is that right?

14 A. Exactly. It's how political scientists
15 apply the partisan bias test in practice, is you
16 just assume that every precinct, whether it's a very
17 rural Republican district precinct or maybe a more
18 urban precinct, you know, they all change in exactly
19 the same way.

20 Q. In order to get to this
21 50/50 counterfactual; is that right?

22 A. Exactly.

23 Q. Okay. What is your ultimate opinion as to
24 whether the partisan bias test is among the best
25 available measures in Utah to assess congressional

1 redistricting plans?

2 A. I think this is not one of the best
3 metrics in Utah. In fact, it's inapplicable in Utah
4 because Utah is not a electorally competitive state.

5 Q. Let's turn to the mean-median difference
6 test. Have you reviewed the mean-median difference
7 test that's set out in SB 1011?

8 A. Yes.

9 Q. Okay. Can you explain for the Court, how
10 does SB 1011's mean-median difference test work?

11 A. In SB 1011, the way it works is you take
12 the statewide average vote share as an estimate for,
13 you know, how well the two parties do statewide, and
14 then you look at their performance in the median
15 district and you take the difference between the
16 two, and that's an indicator of sort of skews in the
17 vote seeker or, put differently, asymmetries in the
18 distribution of vote shares across parties.

19 Q. Okay. And in SB 1011, how do you
20 determine whether a map passes or fails the
21 mean-median difference test?

22 A. It has a bright line of a 2 percent
23 threshold. So if it's above 2 percent, then it
24 fails, and if it's below 2 percent, then it passes.

25 Q. Do you have an opinion about whether

1 that's wise as a policy matter?

2 A. I think any bright line test is gameable,
3 particularly one that's so knife-edged like that and
4 deterministic, I think is -- and I think that would
5 be -- you know, I mentioned before one of the points
6 that the DeFord article -- DeFord, et al., article
7 that was in Political Analysis made is indeed both
8 partisan bias and the mean-median test are gameable
9 in Utah. But that's particularly true when you have
10 such a bright line.

11 Q. And have you applied the mean-median test
12 in past cases?

13 A. I do. I think it's an indicator of the
14 overall partisan favoritism of a plan when the
15 conditions of a state meet the assumptions of the --
16 of the test.

17 Q. And what are the assumptions that need to
18 be met in order to validly apply the mean-median
19 difference test in a state?

20 A. Well, here too, it's going to be most --
21 it tends to work best in competitive states. And
22 there's been a number of academic articles now that
23 have used different methodologies to show that, that
24 when you use the mean-median difference in a state
25 that is not electorally competitive, it tends to

1 give, you know, very strange results that don't
2 match other sort of theoretical definitions of
3 gerrymandering. And when you apply them in
4 particular states where it doesn't meet these
5 conditions, it can yield strange and paradoxical
6 results.

7 Q. You mentioned the paradoxical results come
8 out of applying the partisan bias test?

9 A. Yes.

10 Q. Are the results that come out of applying
11 the mean-median difference test similar or
12 different? What are -- what happens when you apply
13 the mean-median test here in Utah?

14 A. Well, similarly to the partisan bias
15 test -- and here, I don't know if we want to turn to
16 Table 5.

17 Q. We can do that. Yeah.

18 MR. MULJI: If we could pull up Exhibit --

19 THE WITNESS: Or, sorry, not -- sorry,
20 Table 6.

21 MR. MULJI: Table 6 in Exhibit 1A, and
22 that's at page 21.

23 THE WITNESS: So in Table 6, I constructed
24 two hypothetical plans in Utah. On the first
25 plan -- and both of these have a statewide

1 Democratic vote share of about 36 percent, which is,
2 depending on your -- how you construct your index, I
3 think reasonably close to what we would get.

4 So in the map on the left, Democrats --
5 the first district, Republicans would always win.
6 The second district, Republicans would always win.
7 And the third district too has an average Democratic
8 vote share of 34 percent, so Republicans would
9 always win. The fourth district has a Democratic
10 vote share of 53 percent, so Democrats, you know,
11 would probably win this district most of the time.

12 So in this plan, Democrats have a
13 reasonably good chance of winning a district. But
14 the mean-median difference indicates that the median
15 vote share across the four districts is 32 percent.
16 So here, what we see is there's a four-percentage-point
17 pro-Republican mean-median difference. So
18 mean-median difference shows -- suggests that this
19 plan is biased in favor of Republicans, despite the
20 fact that this is the plan where Democrats could
21 plausibly win a seat.

22 On the right-hand side, I show another
23 hypothetical map where the four vote shares are all
24 pretty similar to each other. The average across
25 them is still 36 percent. But here, Republicans are

1 going to win all of the -- all four of these seats
2 almost all the time. But the mean-median difference
3 suggests -- says there's no difference between the
4 median district and the mean.

5 Therefore, here, the mean-median
6 difference suggests that this plan is neutral, which
7 seems strange, given on this plan, Republicans would
8 basically always win all four seats, whereas on the
9 first map, Democrats had a good chance of winning a
10 seat.

11 Q. (By Mr. Mulji) Do you have an opinion as
12 to why the mean-median test produces these
13 paradoxical results?

14 A. Well, in the case of, we know looking
15 at -- as I said earlier, at congressional plans
16 around the country, is that it often doesn't work
17 well and it yields weird results in uncompetitive
18 states. But in the case of Utah, it's because we
19 know from Utah's political geography and previous
20 academic work shows is that the best chance,
21 Democrats couldn't win more than one district in
22 Utah.

23 So the most important, you know, for
24 determining favoritism in a plan, you'd want to
25 focus on the least Republican district and say, is

1 this a district Republicans would always win, or is
2 it a seat the Democrats could plausibly win? But
3 the mean-median difference doesn't do that. It
4 focuses on the median between the second and third
5 districts, which makes no sense because neither of
6 those districts are relevant for determining whether
7 Republicans might actually lose a seat on this plan.

8 Q. And these two districts, the second-most
9 and third-most Republican districts, are they most
10 likely to be Republican districts anyhow? Is that
11 relevant?

12 A. Yes, so basically -- so you could change
13 the median here by just moving voters between the
14 second and third districts, which has no bearing on
15 whether Democrats could plausibly win a district on
16 the plan, but it does affect the mean-median
17 difference.

18 Q. Now, Dr. Barber, in his report, suggests
19 that any difference greater than 2 percent, the
20 cutoff set out in SB 1011, means that Republicans
21 have been packed. And he notes that Republicans can
22 be just as readily packed as Democrats can be
23 cracked. Is this correct in your view?

24 A. No. I think -- and I think what -- I'm
25 trying to find the quote. Earlier in my report, I

1 noted that -- that -- sorry, can you read me the
2 quote again?

3 Q. Well, it's not a quote, so I could be
4 wrong about it, but my takeaway -- and you can tell
5 me if you disagree -- is that Dr. Barber suggested
6 that any high mean-median score, which he defined as
7 above 2 percent, I think, means that Republicans
8 have been packed somehow into districts rather than,
9 you know, Democrats having been cracked. Is that --
10 is that an accurate way to think about packing and
11 cracking in Utah?

12 A. No, I think based on my read of both the
13 definition of the mean-median difference as
14 described by its authors and Utah's political
15 geography, there's no basis for that assertion.

16 Q. And we've been speaking about packing and
17 cracking without having defined those terms. So
18 perhaps, could you tell us about what "packing" and
19 "cracking" are and what they mean?

20 A. Well, usually as they're defined in the
21 redistricting literature, packing is the idea that a
22 dominant party that's trying to skew a map to their
23 advantage would put all of the disadvantaged party's
24 supporters into a small number of districts, sort of
25 pack them in so they'd win by enormous margins in

1 those districts, but they do so very inefficiently.
2 So that's packing.

3 Or if you're the advantaged party and
4 you're trying to draw a map in your favor, you could
5 take the disadvantaged party and divide them across
6 multiple districts to crack them, in other words.
7 And that's typically the approach -- so that would
8 be the approach with Utah's political geography that
9 you would take to draw a map that benefited
10 Republicans. You would divide the Democrats in Salt
11 Lake County across multiple districts.

12 Q. Is the mean-median difference test equally
13 suitable to detect packing versus cracking
14 gerrymanders?

15 A. Well, the authors -- one of the authors --
16 or one of the original articles that develop the
17 mean-median difference says -- unlike other --
18 unlike other approaches, they say, quote, "by
19 itself, this metric detects packing only, or what
20 McDonald and Best refer to as differential packing."

21 So to detect cracking, which is the thing
22 we have to worry about in Utah, for the advantaged
23 party here cracking Democratic voters, they say that
24 other measures, like the efficiency gap or other
25 metrics, should be used.

1 Q. What is your ultimate opinion regarding
2 whether the mean-median difference test is among the
3 best available measures in Utah?

4 A. I think it is not among the best available
5 measures. And, in fact, it's among the worst
6 measures and should not be applicable -- it is not
7 applicable in Utah.

8 Q. Before we turn to the efficiency gap, I
9 want to ask you about one other measure or metric
10 that's been introduced in SB 1011, and that's the
11 ranked -- the ranked marginal deviation test. Are
12 you familiar with that?

13 A. Yes.

14 Q. Okay. Now, you issued a supplemental
15 report correcting your understanding of the ARMD as
16 it was laid out in SB 1011; is that right?

17 A. Yes.

18 Q. Did your further review of the RMD metric
19 change any of -- any of your other conclusions set
20 out in any of your reports?

21 A. No.

22 Q. All right. Let's turn to the efficiency
23 gap.

24 Well, actually, before we do that, let's
25 talk about the other two metrics that you said are

1 applicable in Utah. I think you mentioned the least
2 Republican vote share and the standard deviation of
3 vote share; is that right?

4 A. Yes.

5 Q. Can you explain for the Court what the
6 least Republican vote share metric is?

7 A. The least Republican vote share metric,
8 again, because of Utah's political geography, that
9 there's really only one -- in a congressional plan,
10 there's only one district that Democrats could
11 plausibly win. And so what the least Republican
12 vote share says is we should focus on the Republican
13 vote share in that district. And I think at a high
14 level, it's saying that a gerrymandered map would
15 construct the map such that even the least
16 Republican district is one that Republicans would
17 basically always win.

18 Q. And what is the standard deviation of vote
19 share metric?

20 A. Well, one way that you could gerrymander a
21 map in Utah would be to try to make all of the
22 districts look like the state -- the statewide sort
23 of electoral context because we know that statewide
24 Republicans get about two-thirds of the vote. And
25 so if Republicans got two-thirds of the vote in

1 every district, then they would win every district.

2 And so the standard deviation of the vote
3 share is just capturing the variation or the
4 variance across the district vote shares. And if
5 you have a small standard deviation, that suggests
6 that it looks like the statewide -- like the state
7 as a whole. And it's constructed so that
8 Republicans would win all four.

9 And if it has a higher standard deviation,
10 then that suggests there's some variation across the
11 district vote shares, meaning that there's probably
12 a district that Democrats could plausibly win.

13 Q. And you did not apply either of these
14 metrics -- correct? -- as you said earlier?

15 A. No. It's my understanding that -- or my
16 understanding going into today that another expert
17 in the case was doing so. And then this morning, I
18 saw that Professor Chen had done so.

19 Q. And why is it that you didn't apply these
20 metrics here?

21 A. Because they're both best used in
22 conjunction with an ensemble of simulations, and I
23 wasn't asked to do an ensemble of simulations in
24 this case.

25 Q. All right. Thank you.

1 Let's turn to the efficiency gap. Now,
2 you discussed the efficiency gap for the first time
3 in your October 7th report that's Exhibit 1A,
4 starting on page 7; is that correct?

5 A. I believe that's right. I'm getting there
6 now. Sorry.

7 Yes, that's right.

8 Q. Well, let's start with a basic question:
9 Can you explain what the efficiency gap is and what
10 it measures?

11 A. It's capturing asymmetries in the
12 efficiency that each party is able to convert votes
13 into seats.

14 Q. And can you say more? What does that
15 mean?

16 A. Well, basically, what a party wants to do,
17 particularly when they're -- when they're
18 gerrymandering a plan, is to construct -- is to
19 convert their party's votes into seats as
20 efficiently as possible in order to maximize their
21 seat share. And so that's what the efficiency gap
22 is trying to capture. It's trying to tally how many
23 inefficient votes each party has and see which party
24 has more inefficient votes in a particular state as
25 a -- as a metric that we might use as part of our

1 holistic evaluation of a state to determine whether
2 it has partisan favoritism.

3 Q. And when was the efficiency gap first
4 proposed?

5 A. It was proposed by a political scientist
6 named Eric McGhee in a peer-reviewed article in
7 2014.

8 Q. And has it since been the subject of
9 social scientific study in academia?

10 A. It has. It was expanded -- or it was
11 applied to legal questions and refined a little bit
12 in the 2015 Law Review article by McGhee and a law
13 professor named Nick Stephanopoulos. And it has
14 since been -- Eric McGhee wrote a subsequent article
15 in 2017 that refined it a little bit, and it's
16 certainly been the subject of a very large
17 literature that's both used it to evaluate
18 districting plans, to look at the causes and
19 consequences of redistricting, as well as, you know,
20 pushing on various of its assumptions.

21 Q. Have you published peer-reviewed
22 scholarship on the efficiency gap?

23 A. I've used -- I've published a
24 peer-reviewed article that uses the efficiency gap,
25 sometimes on its own, sometimes as part of a suite

1 of other metrics.

2 Q. And you mentioned that it's been adjusted
3 through the process of sort of scholarly
4 examination.

5 A. Yeah, one of the things that was
6 explicitly discussed in its original formulation but
7 then, you know, flagged more in subsequent work was
8 that it had an assumption embedded in it of equal --
9 originally it was framed as equal population across
10 districts, which is true, but also equal turnout
11 across districts. And, of course, we know that's
12 not an empirically tractable assumption. So in a
13 2017 article, Eric McGhee developed a refined
14 version of it that adjusts for differences in
15 turnout across districts.

16 Q. And do you use the old version of the
17 efficiency gap in your analysis, or this
18 turnout-adjusted efficiency gap?

19 A. I use the turnout-adjusted version, and
20 I've done so, I believe, in all of my expert
21 reports, but certainly since it was peer published
22 in -- yeah.

23 Q. And did you use that turnout-adjusted
24 efficiency gap in this case as well?

25 A. Yes.

1 Q. Is the efficiency gap a measure of
2 partisan symmetry?

3 A. It's a measure that captures -- yes,
4 broadly speaking, it's a measure that captures
5 asymmetries in the efficiency that the two parties
6 are able to convert votes into seats.

7 Q. Now, reading the reports of some of the
8 other experts in this case, one might get the
9 impression that you're, you know, the world's most
10 ardent efficiency gap evangelist. Do you accept
11 that title?

12 A. Of course -- no, of course not. I
13 certainly didn't develop the metric. In my academic
14 work, I've used -- as I said, I've used the
15 efficiency gap in some papers, but I've also used
16 partisan bias in papers. You know, where it's
17 appropriate, I use different metrics.

18 And in my expert reports, I also use the
19 efficiency gap, typically alongside other metrics
20 that are applicable in a state. And my general
21 theoretical view -- and this is true of social -- my
22 view of social science -- is that there's no one
23 right metric. And that's true whether I'm studying
24 redistricting, whether I'm studying partisanship or
25 ideology in the electorate, where multiple metrics

1 often are complementary to each other, or whether
2 I'm studying roll-call voting in Congress, where
3 there's many different metrics that indicate -- try
4 to capture sort of how, say, liberal and
5 conservative members of Congress are.

6 And in each case, there's different
7 metrics that are complementary. And I think where
8 it's appropriate, we should use multiple metrics to
9 push on the robustness of our conclusions and sort
10 of try to get a sense of how strong of a conclusion
11 we can draw from the data that we have.

12 Q. What can the efficiency gap tell you about
13 a congressional map in Utah?

14 A. Well, what the efficiency gap can tell us
15 about a plan in Utah is how -- is there a difference
16 in the efficiency that the two parties are
17 converting votes into seats? And in -- Utah is
18 not -- so there are states that are so uncompetitive
19 that the efficiency gap might not be applicable.
20 But Utah doesn't fall into that category. So unlike
21 the mean-median difference in partisan bias, Utah is
22 not outside of the boundary conditions that -- of
23 the efficiency gap.

24 Q. I'll ask you a little bit more about that,
25 but I want to talk about how you applied the

1 efficiency gap in this case to the remedial maps.

2 A. Sure.

3 Q. And first, I should confirm, did you apply
4 the efficiency gap to the remedial maps in this
5 case?

6 A. I did. I applied them -- in my first
7 report, I applied them sort of in an illustrative
8 way to the commissions -- to the independent
9 commissions maps and to the 2021 enacted plan. And
10 then in my later report that we submitted a few days
11 ago, I applied it to the three remedial -- proposed
12 remedial plans in this case.

13 Q. Okay. I want to turn to that later report
14 now, specifically Figure 10 in Exhibit --

15 A. Is this Exhibit C?

16 Q. -- 1C. That's right.

17 All right. We have Figure 10 up on the
18 screen. Dr. Warshaw, can you explain what Figure 10
19 is showing with respect to your application of the
20 efficiency gap here?

21 A. So in this case, I calculated the
22 efficiency gap for the enacted plan, the other four
23 plans that were proposed by the legislature, because
24 as we know, there were five plans the legislature
25 considered, as well as the plaintiffs' two plans.

1 And what this graph is showing is the efficiency gap
2 for those seven plans. It's a little hard to see
3 because some of the efficiency gaps are essentially
4 identical to each other, so it's on those purple
5 lines on the right.

6 And then I also compare them. As part of
7 my academic work, I've calculated both the
8 efficiency gap, but also the other metrics of
9 partisan favoritism, such as partisan bias,
10 declination, mean-median difference that, again, I
11 do use broadly in my academic work, as well as in
12 legal cases, for all of the congressional plans
13 around the country, going back to 1972.

14 So what we can see here is that the
15 enacted plans are more extreme than the plaintiffs'
16 plans, in -- both in terms of sort of the absolute
17 sense, in the sense that they both treat more
18 inefficient Democratic votes than Republican votes,
19 but also relative to the other plans around the
20 country over the last 50 years.

21 Moreover, they have a larger efficiency
22 gap -- the enacted plan has a larger efficiency gap
23 than three of the other plans considered by the
24 legislature. It is the second highest efficiency
25 gap of any of the plans the legislature considered.

1 And I should note, this efficiency gap is calculated
2 using my partisan index that includes Senate
3 elections.

4 And so the numbers I get here are a little
5 bit different than what the -- the defense's --
6 Professor Barber and Professor Trende's reports.
7 But in this case, my efficiency gap estimates are
8 actually a little bit less pro-Republican than
9 theirs, because of the index I developed, which I
10 think averages across races in a little bit more of
11 a holistic way.

12 Q. And just to be clear, for clarity of the
13 chart, the enacted map's efficiency gap is indicated
14 in red, correct?

15 A. Yes, I'm sorry. It's in red. The other
16 plans proposed by the legislature are in purple, and
17 the plaintiffs' plans are in yellow.

18 Q. And what efficiency gap did you find for
19 Map C?

20 A. I think I found 11.7 percent.

21 Q. Okay. And you said that was what -- how
22 did that compare to the plaintiffs' maps?

23 A. The plaintiffs' plan maps efficiency gaps.
24 I don't recall the exact numbers, but they're very
25 close to zero.

1 Q. And how did that --

2 A. So almost perfectly fair.

3 Q. How did the enacted map's efficiency gap
4 compare to the other maps that the legislature had
5 before it, Maps A, B, C -- A, B, D, and E?

6 A. The enacted plan or the plaintiffs' plan?

7 Q. The enacted plan.

8 A. The enacted plan? The enacted plan, as I
9 just said, was more extreme than three of the other
10 maps proposed by the legislature.

11 Q. Okay. And you said that what's shown in
12 gray in this figure is the -- sort of the historical
13 congressional maps --

14 A. Exactly.

15 Q. -- in all states? Is there --

16 A. In all states -- in this graph, in all
17 states.

18 Q. Okay. And how did the map compare to the
19 congressional plans in all states?

20 A. It was more biased than about 80 percent
21 of the other plans around the country over the
22 last 50 years.

23 Q. And in your opinion, as an expert who's
24 looked at this a number of times, is that high?
25 Low? Where does that fall?

1 A. That's pretty high. It's not -- you know,
2 it's not historically extreme. I wouldn't say it's
3 the most -- it's the largest bias of any plan that
4 I've ever seen, but it's certainly, you know,
5 historically large.

6 Q. And so what does the efficiency gap then
7 indicate about Map C?

8 A. That Map C does seem to exhibit some
9 degree of favoritism toward Republicans as compared
10 to the plaintiffs' plans that have -- do not have
11 favoritism toward the -- toward either party.

12 Q. Let's turn to the next figure, Figure 11.
13 This is a similar chart that you've made. Can you
14 explain how this is different from the last one?

15 A. Yeah, one of the critiques of the
16 efficiency gap is that maybe we should only compare
17 states that have a similar number of congressional
18 seats to one another. So here what I did is -- I
19 don't have a strong position on that, but I think
20 it's -- you know, my general view as a social
21 scientist is we should conduct robustness checks for
22 our analyses to make sure they hold up under
23 different assumptions and different sorts of
24 scrutiny. So here I constructed a graph where I
25 only compare the plans in Utah to other

1 similarly-sized states with four or five
2 congressional seats.

3 And here, again, we see that the enacted
4 plan has a pro-Republican bias compared to the
5 plaintiffs' plans that are very close to zero and
6 right in the middle of the distribution of
7 historical plans.

8 Q. Shifting gears a little bit, I want to
9 turn to some of the criticisms of the efficiency gap
10 that have come up in some of the experts' reports.

11 A. Sure.

12 Q. Fair to say they've leveled some
13 criticisms of your use of the efficiency gap,
14 correct?

15 A. Yes.

16 Q. One of them, from Dr. Barber and
17 Dr. Trende, is that the efficiency gap is either too
18 volatile or just can't be used in jurisdictions like
19 Utah with a small number of districts. What's your
20 response to that?

21 A. Well, I -- I think that the efficiency gap
22 is certainly a little bit more volatile in smaller
23 states. But I also think that's true of all of the
24 partisan fairness metrics. Like, all of the metrics
25 of partisan needs, it's most often discussed in the

1 context of the efficiency gap.

2 But when -- for instance, when we're
3 looking at partisan bias, we have to know how many
4 seats each party is going to win when the state vote
5 share is tied. And in a state with only four
6 districts, that too is going to be sensitive to
7 knife-edge results in individual districts. So I
8 think all of the metrics have this, you know,
9 complication, and one should exercise care when
10 you're using them.

11 But the way I mitigate that here is, I
12 think, using the partisan index and averaging across
13 the 17 races that I use in my partisan index gives
14 me 60 data points to construct this average. It's
15 not just four districts. Now we have 17 elections
16 times four districts. And that gives us a lot of
17 information to sort of say, what's the -- you know,
18 what's the likelihood that each party is going to
19 win in a particular potential future election.

20 And so, you know, what we find is that,
21 you know, for instance, on the plaintiffs' plans,
22 you know, they usually, but not always, win --
23 sorry, Democrats usually, but not always, win one of
24 the districts on this plan. And it gives us, you
25 know, that kind of probabilistic sense across these

1 different plans of how many votes -- how many seats
2 each party is likely to win.

3 Q. And what about Utah led you to the
4 conclusion that you could apply the efficiency gap
5 in a state with four congressional districts but not
6 the partisan bias or mean-median test?

7 A. Well, I think if this was a state that was
8 more electorally competitive, I probably -- despite
9 the fact they said that all of these metrics are a
10 little noisier with four districts, I probably would
11 have used the partisan bias and mean-median tests,
12 you know, using the same care that I use here with
13 averaging across a large partisan index.

14 What I wouldn't recommend doing and where
15 I think that one really should exercise caution with
16 all of these metrics -- you know, especially the
17 efficiency gap perhaps -- is to use one
18 congressional election as your benchmark, because
19 then I think it is very sensitive to knife-edge
20 results that if one party wins that election by six
21 votes or something, sure, that could change the
22 metric in a -- in a state with only a couple
23 districts.

24 Q. Okay.

25 A. And so that's why I think it's really

1 important to average across many different elections
2 to try to get -- to try to forecast what's going to
3 happen on this plan.

4 Q. And that's what you've done with your
5 composite index of past elections?

6 A. Exactly. What I actually do is I estimate
7 these -- for here the efficiency gap, for instance,
8 in all of those previous elections. And then I
9 average -- and then I construct a weighted average
10 where I average across them.

11 Q. Okay. One of the other criticisms that's
12 been leveled against the efficiency gap is that it's
13 incredibly sensitive to slight changes in the
14 partisanship of districts near the 50 percent mark.
15 That's from Dr. Trende's report. I think you've
16 just discussed this a bit, but would you respond to
17 that criticism?

18 A. Yeah, I think that's related to this point
19 about the small number of seats. Because of course,
20 if we had 1,000 seats, then that wouldn't matter
21 very much. But because we have four seats, it can
22 be sensitive to that.

23 And I think that's just an important --
24 when you're using these metrics, you know, what I've
25 always said is that you should use care when you're

1 using these metrics. And that's particularly true
2 in a state with only a small number of districts.

3 But the way that I address that in my
4 report -- and this is what I would recommend that
5 others applying these metrics do as well -- is to
6 have a -- you know, develop your forecast of future
7 elections based on more than just one or two
8 congressional elections, but to have more of a
9 holistic index of what could happen in the future
10 based on a broader set of recent elections.

11 So again, here I use 17 different
12 statewide elections, which I think does make the
13 index a lot more stable against sort of small,
14 knife-edge results.

15 Q. A third criticism that's been leveled, I
16 think, in these reports is that it's just -- the
17 efficiency gap is not applicable in uncompetitive
18 states at all. What is your response to that?

19 A. Well, I think one of the things the
20 authors -- the original authors of the efficiency
21 gap noted, and it's certainly true, is that it
22 doesn't work if you have a state where one party
23 gets more than 75 percent of the vote.

24 And -- but again, Utah is not in that
25 category, and in fact, there's essentially no --

1 maybe Washington, D.C. would be in that category, I
2 don't know, but there's essentially no places in
3 modern United States that would fit that condition.
4 You'd have to go back to the one-party South or
5 something in the 1950s, '60s, or '70s, really, to
6 find places where one party consistently got more
7 than 75 percent of the vote.

8 Q. Now, Dr. Trende also takes issue with your
9 method for forecasting how the map will perform in
10 future elections. He notes that Utah elections are
11 difficult to forecast because Democrats have a
12 history of over-performing expectations. What is
13 your response to that criticism?

14 A. Well, I thought that was an interesting
15 point, and so I looked at it, and what I found is at
16 the statewide level, it's not true.

17 So at the statewide level, Republicans
18 typically get about the same share of the vote in
19 congressional elections they get in other statewide
20 elections. They get about two-thirds of the vote.
21 You know, election to election, that'll vacillate a
22 little bit, but around two-thirds of the vote. And
23 that's just like we see in other statewide
24 elections.

25 And, in fact, in congressional elections,

1 Republicans do a lot better than they've done in
2 recent presidential elections. So if one wanted to
3 use -- you know, which I wouldn't recommend, but if
4 you wanted to use like the Biden, Trump -- or Trump
5 versus Harris as your benchmark for the partisanship
6 of a district, then that will surely overestimate
7 Democrats' chances because in recent congressional
8 elections, Republicans have done much better in
9 congressional elections in Utah than the top of the
10 ticket did in presidential elections.

11 But I think the other more nuanced point,
12 perhaps, that Professor -- that Dr. Trende was
13 making was that -- is that, you know, in the past,
14 it was possible for a really stellar candidate to
15 outrun the partisanship of their district. And we
16 saw that in Utah, you know, many years ago with
17 Matheson. And we've seen that in other places.

18 But in recent years, its elections have
19 become far more nationalized. It just doesn't
20 happen very often. That in recent years, the
21 correlation between the presidential vote and
22 congressional results is just very, very high, you
23 know, perhaps with a statewide intercept shift, like
24 I mentioned in Utah.

25 But at the district level, the

1 partisanship -- the overall partisanship of a
2 district is really predictive of congressional
3 elections. It's really hard for a congressional
4 candidate to outrun the overall partisanship of the
5 district as elections have gotten more nationalized
6 and sort of more partisan in nature.

7 Q. Now, all three of the experts in this case
8 have emphasized a difference between partisan
9 symmetry and proportionality. What, if at all, is
10 the role, in your view, of proportionality in
11 assessing partisan favoritism?

12 A. Well, in my view, it would be unrealistic.
13 In any system of democracy with single-member
14 districts, we should never expect perfect
15 proportionality.

16 And we know, from looking at historical
17 elections, both in the United States but in other
18 democracies around the world, is that there's always
19 a winner's bonus, such that the party that wins the
20 majority of the vote gets more seats than that. And
21 typically, there is around a two-to-one winner's
22 bonus. And so what that means is we should never
23 expect that the -- a party to get the same share of
24 the vote and the same share of the seats.

25 However, when we observe an extreme amount

1 of disproportionality, such that, you know, with
2 60 percent of the vote or 65 percent of the vote,
3 you win 100 percent of the seats, then I think that
4 that sort of massive level of disproportionality
5 could be at least -- you know, at least for the
6 ocular test -- ocular test, kind of, it could be an
7 indicator of favoritism.

8 Q. Would you -- would you recommend that an
9 extreme disproportionate result be factored into
10 whether a map exhibits partisan favoritism?

11 A. Yes.

12 Q. And of the three remedial proposals here,
13 if you've looked at it, would you -- is there one
14 remedial proposal here that exhibits this sort of
15 extreme disproportional result?

16 A. Well, the enacted map, I wouldn't say it's
17 an extreme disproportionate result, but it is a
18 disproportionate result that I think what we saw
19 this morning is larger than you would expect based
20 on Utah's political geography. And it's larger than
21 most of the other maps the legislature considered,
22 and it's larger than the plans proposed by the
23 plaintiffs.

24 Q. Great. Those are all the questions I have
25 for you, Dr. Warshaw.

1 MR. MULJI: I pass the witness.

2 THE WITNESS: Thank you.

3 THE COURT: All right. Ms. Rogers, cross?

4 MS. ROGERS: Thank you, Your Honor.

5

6 CROSS-EXAMINATION

7 BY MS. ROGERS:

8 Q. Good afternoon, Dr. Warshaw. My name's
9 Olivia Rogers. I'm counsel for the legislature. I
10 just have a couple of questions for you.

11 First of all, you mentioned that you're
12 familiar with Professors McGhee and Stephanopoulos,
13 who created or at least applied the efficiency gap
14 in their 2015 article; is that right?

15 A. Yes.

16 Q. And in their article, you know, discussing
17 the efficiency gap, they considered only states with
18 eight or more districts; is that correct?

19 A. That's correct.

20 Q. And you agree that the efficiency gap can
21 be substantially -- is substantially less reliable
22 in states with a small number of congressional
23 districts; is that right?

24 A. I think it's less reliable. I would --
25 I'm not sure I agree with the "substantially" part.

1 But I think it's -- I mean, all of the partisan bias
2 metrics are less reliable in a small state, the
3 efficiency gap among them.

4 Q. All right. I'd like to mark an exhibit
5 and show it to you. It's the New Mexico expert
6 report for the proposed intervenor in the Republican
7 Party of New Mexico versus Oliver.

8 MS. ROGERS: Thank you.

9 May I approach, Your Honor?

10 THE COURT: Yes. Thank you.

11 Q. (By Ms. Rogers) Dr. Warshaw, can you turn
12 to the last page of this report, I believe, and
13 confirm -- or the signature page and confirm that
14 this is your signature?

15 A. Yes.

16 Q. And this is your expert report in this
17 case?

18 A. It looks like it, yes.

19 Q. Great.

20 Could you turn to page 5?

21 A. Page 5. Okay.

22 Q. And at the very --

23 THE COURT: On the -- sorry. Are we going
24 to mark this? It might make it easier for us to
25 track which documents we're talking about even if we

1 don't admit them.

2 MS. ROGERS: Sure, Your Honor, yes, we can
3 mark this.

4 Do we have a number?

5 This is Plaintiff Exhibit 6 -- or, excuse
6 me, Defense Exhibit 6.

7 THE COURT: Okay. Thank you.

8 Q. (By Ms. Rogers) All right, Dr. Warshaw,
9 back to the bottom of the efficiency gap section,
10 the very last sentence that begins: "As a result,"
11 could you read that, please?

12 A. I said: "As a result, the efficiency gap
13 in New Mexico is likely to be substantially less
14 reliable than in states with larger numbers of
15 districts."

16 Q. And that's what you wrote in your expert
17 report, right?

18 A. Yes.

19 Q. And New Mexico has only three
20 congressional districts; is that correct?

21 A. Correct.

22 Q. So you also agree that in states with
23 smaller number of seats, a change in the winner of
24 1C could cause a huge shift in the efficiency gap,
25 correct?

1 A. Yes.

2 Q. I'd like to mark one more exhibit and show
3 it to you. It's the testimony in the League of
4 Women Voters vs. Commonwealth.

5 MS. ROGERS: This is Defense Exhibit 7.

6 Q. (By Ms. Rogers) Dr. Warshaw, you
7 testified on December 13, 2017, in this case. Do
8 you remember that?

9 A. That was a long time ago, but I do have --
10 I have at least a vague memory of it, yes.

11 Q. Great. Great.

12 And you were under oath at the time?

13 A. Of course, yes.

14 Q. Could you flip to page 891 of the
15 transcript? I've broken it up into four. It'll be
16 on the right-hand side. On the bottom of that page,
17 do you see a question that starts "Dr. Warshaw, you
18 mentioned earlier"?

19 A. Yes.

20 Q. Great.

21 I'll read that question. Then if you
22 could just read the first part of your answer there.

23 So the question begins: "Dr. Warshaw, you
24 mentioned earlier that you focused your analysis on
25 comparing Pennsylvania's efficiency gap to states

1 with more than six congressional seats. Why did you
2 do that?"

3 A. "I did it primarily because the efficiency
4 gap in states with a smaller number of seats were
5 more volatile year to year."

6 Q. Keep going.

7 A. Oh, sorry.

8 "So I didn't want to focus on the small
9 states with more volatile efficiency gap. And
10 they're volatile for the very simple reason that in
11 a place with only, say, three or four congressional
12 elections, a close result in one election, where the
13 Democrat or the Republican narrowly wins, could
14 obviously substantially change the efficiency gap."

15 Q. Thank you.

16 So isn't it true that given this
17 volatility, the efficiency gap in smaller states
18 tends to be less informative about partisan bias?

19 A. Yes.

20 Q. Would you agree that a fair district can
21 mean a competitive district?

22 A. No.

23 Q. Have you said before that plans of more
24 competitive elections are likely to be more
25 responsive to changes in voter preferences?

1 A. So what I've said in my previous reports,
2 which is based on the academic literature, is that
3 the concept of competitiveness and responsiveness
4 are a different concept than partisan fairness or
5 partisan advantage. And you could have a plan that
6 has some competitive districts, but still has a
7 large -- an undue amount of favoritism toward a
8 particular party.

9 Q. Sure. But in general, do we want
10 districts to have some measure of responsiveness?

11 A. Yes.

12 Q. Isn't it true that the efficiency gap
13 measure actually penalizes toss-up districts?

14 A. No.

15 Q. I'd like to mark another article to show
16 to you. Bernstein and Duchin, "A Formula Goes to
17 Court."

18 MS. ROGERS: This will be Defense
19 Exhibit 8.

20 May I approach, Your Honor?

21 THE COURT: Yes.

22 THE WITNESS: Thank you.

23 THE COURT: Thank you.

24 Q. (By Ms. Rogers) Dr. Warshaw, do you
25 recognize the authors of this article?

1 A. I don't recognize Mira Bernstein as much,
2 but certainly Moon Duchin, I recognize.

3 Q. Sure. Could you turn to page 1022? On
4 that page, over on the right-hand side, there is a
5 bullet point that begins, "Fetishizes three-to-one
6 landslide districts."

7 Could you read -- it's a little bit long,
8 but could you read that paragraph for me?

9 A. I'm sorry, can you tell me again which
10 paragraph?

11 Q. It begins "Fetishizes three-to-one
12 landslide districts."

13 A. "We've seen that EG is not sensitive to
14 any changes in packing or cracking that preserve the
15 overall seat outcome. But if anything, EG rewards a
16 certain level of district-by-district packing.

17 "Recall that every district has a total of
18 50 percent vote wastage. It immediately follows the
19 only way to share that fairly in a single district
20 is to have 25 percent on each side, which is a 75/25
21 vote split. So the only districts viewed by EG to
22 be perfectly neutral are highly non-competitive
23 districts, and any plan made up entirely of these
24 landslide districts will be judged perfectly fair."

25 Q. Thank you.

1 Is it true that the goal of the efficiency
2 gap is to measure wasted or inefficient votes?

3 A. Yes.

4 Q. And just so I understand, the idea is that
5 the more wasted or inefficient votes the losing
6 party has, the more a system is gerrymandered in the
7 winning party's favor, or favors the winning party.

8 A. Yes. Although, you're comparing the two
9 parties, so it's always relative to each other.

10 Q. Sure, sure. I'd like to mark one more
11 article and show it to you, if that's okay. This is
12 from Robin Best, et al., Defense Exhibit 9.

13 Are you familiar with these authors?

14 A. Yes.

15 Q. If you turn to page 2, on the top of the
16 second -- the right-hand column, could you read that
17 first sentence beginning "while arguably
18 manageable"?

19 A. "While arguably manageable, we find that
20 counting wasted votes, a.k.a. the efficiency gap
21 test, relies on a dubious definition of wasted votes
22 and is decidedly ineffective because wasted votes
23 occurred for reasons other than gerrymandering."

24 Do you want to keep reading?

25 Q. That's it. Thank you. Thank you very

1 much.

2 You're aware that Proposition 4 requires
3 some measure of partisan symmetry, correct?

4 A. I think what it says is the best -- best
5 available measures, including measures of partisan
6 symmetry.

7 Q. So some of those measures need to be of
8 partisan symmetry, right?

9 A. Yes.

10 Q. All right. And would you agree that the
11 efficiency gap is not a measure of partisan
12 symmetry?

13 A. No.

14 MS. ROGERS: Your Honor, I'd like to mark
15 one more article and show it to you. Katz, King,
16 and Rosenblatt.

17 May I approach, Your Honor?

18 THE COURT: Yes.

19 THE WITNESS: Thank you.

20 Q. (By Ms. Rogers) Are you familiar with
21 these authors?

22 A. Yes, of course.

23 Q. And are you familiar with this article?

24 A. Yes.

25 Q. Could you turn to page 13? Could you

1 read -- excuse me, let me find this page on my own
2 here.

3 Could you read the first sentence of the
4 paragraph beginning "this result," which is near the
5 top left?

6 A. I'm sorry, "This result?" Oh.

7 "This result means that the claims for the
8 efficiency gap are mistaken. It is not a measure of
9 partisan symmetry."

10 Q. Continue, please.

11 A. "The slope of the implied seats vote curve
12 is not 2 because it did not imply a coherent seats
13 votes curve. The claim of the efficiency gap and
14 partisan bias are mathematically identical in the
15 special case in which both parties receive exactly
16 50 percent of the vote is incorrect."

17 Q. So you would agree that this article
18 claiming that by these mathematical measures, this
19 is not a measure of partisan symmetry, correct?

20 A. I think based on the definition of
21 partisan symmetry provided by this article, I
22 think -- I agree that it doesn't fit the definition
23 of partisan symmetry in this article. But I think
24 as we think more broadly about asymmetries and the
25 distribution of votes across parties, that it meets

1 a broader definition of asymmetries.

2 Q. So you're operating under the assumption
3 that this broad definition of symmetry is just
4 looking at -- could you just define that briefly for
5 us?

6 A. Sure. It's looking at asymmetries either
7 in the ability of the two parties to translate -- to
8 efficiently translate their votes into seats or in
9 the distribution of vote shares between the two
10 parties.

11 Q. You compared the 2025 plan, the enacted
12 map, against all states with at least four
13 districts -- four congressional districts; is that
14 correct?

15 A. I believe so.

16 Q. And you compared the 2025 plan's
17 efficiency gap to other states' efficiency gaps; is
18 that right?

19 A. Yes.

20 Q. So that would include in this
21 comparison -- going all the way back -- I guess one
22 more question to clarify, this comparison includes
23 all states within a certain time frame; is that
24 right?

25 A. Correct.

1 Q. And what was that time frame?

2 A. 1972 to the present.

3 Q. So within this comparison, that would
4 include comparing Utah -- present-day Utah with four
5 congressional districts to 1975 Pennsylvania; is
6 that right?

7 A. Yes.

8 Q. And Pennsylvania at that time had 25
9 congressional districts; is that right?

10 A. I don't know, but I'll take your
11 stipulation.

12 Q. Sure, sure.

13 When comparing the 2025 plan against these
14 other states, did you exclude states whose
15 districting plans would fail Utah's partisan bias
16 test?

17 A. No.

18 Q. So in your comparison of the 2025 plan
19 against these other states, there might have been
20 plans that failed the partisan bias test; is that
21 right?

22 A. I don't know. Probably.

23 Q. And you didn't compare your results
24 against computer-created redistricting plans at all,
25 did you?

1 A. No, I did not do that in this case.

2 Q. So you also did not compare them against
3 redistricting plans -- computer-created
4 redistricting plans that would fail -- excluding
5 those that would fail Utah's partisan bias test; is
6 that right?

7 A. No. I mean, yes, that's correct. I'm
8 sorry.

9 Q. Sure. So you mentioned that you
10 forecasted future elections to stabilize for turnout
11 rates over time; is that right?

12 A. Well, that wasn't really the purpose. I
13 forecasted future elections because we really want
14 to know -- when we're evaluating a plan, is we want
15 to know how the two parties are going to perform on
16 that plan. And there's multiple different
17 approaches you could use to do that. But what's
18 commonly done is -- and what I think is a reasonable
19 approach is to use a large index of recent statewide
20 elections to try to estimate the normal vote in
21 every district.

22 Q. Sure.

23 And is there some margin of error that the
24 efficiency gap measure itself has?

25 A. Probably.

1 Q. Did you apply a margin of error here?

2 A. I did not try to estimate a margin of
3 error here.

4 Q. Is there -- could you just give an
5 example, just in general, of why a margin of error
6 is important?

7 A. The -- well, in general, if you're -- if
8 you're performing a statistical test, you'd want to
9 know, you know, what is the -- does whatever your
10 estimate of the quantity overlap with zero, does it
11 overlap with some other quantity? In order to know
12 that, we might want to know a confidence interval
13 around it.

14 Q. Sure. You mentioned that you had reviewed
15 Dr. Trende's report; is that right?

16 A. Yes.

17 Q. So you're -- are you familiar with the
18 plan score project or data set?

19 A. Yes.

20 Q. And familiar with its unified district
21 model?

22 A. Yes.

23 Q. In their forecasted results for
24 congressional elections, there's -- there are charts
25 that indicate what those would look like. They have

1 an R -- little "r" and a little "e" written on those
2 charts. Are you familiar if the "e" on those charts
3 refers to the error rate?

4 A. It sounds to me -- I didn't construct this
5 chart, so one of my -- one of my -- I'm -- as you
6 know, I'm a collaborator in the plan score project,
7 but I wasn't the principal author of those charts.
8 Like, I'd have to have them in front of me to be
9 able to --

10 Q. Would you like to look at them?

11 A. Sure.

12 MS. ROGERS: Your Honor, I'd like to mark
13 Defense Exhibit 11.

14 May I approach?

15 THE COURT: Yes.

16 THE WITNESS: Sure.

17 THE COURT: Thank you.

18 Q. (By Ms. Rogers) So if you can see Utah in
19 the bottom row --

20 A. Yes.

21 Q. -- and that the "e" indicates a 0.13,
22 presumably, error rate; is that right?

23 A. I believe so. To be honest, I can't
24 remember exactly. It's probably an -- some sort of
25 absolute error here, but I can't remember exactly.

1 Q. Okay. And just to be clear, your reported
2 efficiency gap here was 11.7 percent -- right? --
3 for -- for -- I'm sorry, in your report for the
4 enacted map?

5 A. Yes.

6 MS. ROGERS: Your Honor, that's all the
7 questions I have. Thank you.

8 THE COURT: Thank you.

9 Any redirect?

10 MR. MULJI: Yes, Your Honor.

11

12 REDIRECT EXAMINATION

13 BY MR. MULJI:

14 Q. Dr. Warshaw, I want to ask for your
15 response to a couple of the articles that defense
16 counsel showed you.

17 A. Sure.

18 Q. And I want to start with the article by
19 Mira Bernstein and Moon Duchin marked as Defense
20 Exhibit 8.

21 A. Sure. Sorry, it might take me a second to
22 find it. Okay. Here we go.

23 Q. Now, you were asked to read from a
24 paragraph that starts "fetishes three-to-one
25 landslide districts in particular."

1 And that's on page 1022 of this -- of this
2 exhibit.

3 Do you have a response to the criticism
4 leveled here in this -- in this paragraph?

5 A. Yes, that I don't agree with it, but I
6 think -- I recognize this is a critique that's been
7 made, but the -- the efficiency gap is indifferent
8 between what type -- how competitive a plan is, and
9 the authors of the efficiency gap -- Professors
10 McGhee and -- or Dr. McGhee and Professor
11 Stephanopoulos performed an exhaustive analysis of
12 the relationship between the competitiveness of a
13 plan and the efficiency gap. They essentially found
14 almost no relationship between the competitiveness
15 of a plan and the efficiency gap. And I've
16 constructed my own analyses and found similar
17 things.

18 So what this implies is that somehow the
19 efficiency gap will be more neutral if you have a
20 less competitive plan, but there's just no basis in
21 empirical reality for that.

22 Q. I'd like to ask for your response next to
23 the claim that you read in the article by Robin
24 Best. That's Defense Exhibit 9.

25 A. Yeah. Okay.

1 Q. Now, you were asked to read, on the second
2 page of that exhibit, on the top right column, a
3 claim about counting wasted votes being based on a
4 dubious definition of "wasted votes" and being
5 ineffective.

6 What is -- what is your response to that
7 claim against the efficiency gap?

8 A. I think that the -- you know, there's
9 different ways we could think about wasted votes.
10 But I think the efficiency gap, in my view, is a
11 well theoretically grounded formulation of wasted
12 votes.

13 Q. What do wasted votes tell you about how
14 gerrymandering occurred on the map?

15 A. Well, it tells you that a party is not
16 able to convert their votes into seats. And at the
17 end of the day, what a -- what a gerrymanderer is
18 trying to do is to prevent the other party from
19 converting their votes into seats. And that's
20 exactly what the -- what the concept of wasted or
21 inefficient votes in the efficiency gap tells us.

22 Q. And so you find this criticism unfounded?

23 A. Yes.

24 Q. Now, you were -- you were asked to
25 admit -- and you did, and we talked about this in

1 your direct examination -- that, you know, any of
2 these partisan symmetry metrics that you've
3 discussed aren't perfect and particularly not
4 perfect in states with a small number of districts.
5 Is that a correct characterization of your
6 testimony?

7 A. Absolutely.

8 Q. And I think you were asked to admit that
9 the efficiency gap is less informative of fairness
10 of favoritism in states with small numbers of
11 districts compared to states with more districts; is
12 that right?

13 A. Absolutely, yes. That's right.

14 Q. But I guess the question that I have is:
15 Is the efficiency gap more informative than the
16 other measures of partisan symmetry in states with a
17 small number of districts?

18 A. Well, I think that, again, that would
19 depend on the conditions. To me, the number of
20 districts is far less important than the
21 competitiveness of the state. And the mean-median
22 difference in partisan bias just don't tell us
23 anything about real-world elections if you have to
24 imagine a counterfactual that would never actually
25 occur, whereas the efficiency gap for all of -- you

1 know, is less probative in a smaller state.

2 But I think it still tells us something
3 much, much more so than the other metrics where Utah
4 is, you know, well outside of their boundary
5 conditions.

6 Q. And is the informative value derived from
7 the efficiency gap something you think a Court
8 should consider in determining whether a map unduly
9 favors or disfavors a political party?

10 A. Absolutely. I think especially in
11 conjunction with the type of analysis that we heard
12 this morning, where you're using the least
13 Republican vote share and standard deviation of vote
14 shares in conjunction with an ensemble of
15 simulations.

16 Q. Based on the testimony you heard this
17 morning and your analysis of the efficiency gap,
18 which way do these measures point with respect to
19 the enacted map or Map C?

20 A. What they suggest is the enacted map
21 unduly favors the Republican Party, and the other
22 proposed maps here from the plaintiffs are
23 politically neutral and do not favor either party.

24 Q. Thank you.

25 MR. MULJI: That's all the questions I

1 have, Your Honor.

2 THE COURT: Thank you.

3 Anything else for this witness?

4 MS. ROGERS: Your Honor, can I do a few
5 recross?

6 THE COURT: Of course.

7 MS. ROGERS: Thank you.

8

9 RECROSS-EXAMINATION

10 BY MS. ROGERS:

11 Q. Dr. Warshaw, isn't it true that the
12 original creators of the efficiency gap had claimed
13 a responsiveness of 2?

14 A. Yes, I believe that's right.

15 Q. And isn't that a very competitive
16 situation?

17 A. I don't know. I haven't thought about it
18 quite that way.

19 Q. All right. If you don't mind, I'd like to
20 just go through a very brief math problem.

21 MS. ROGERS: Apologies to the judge for
22 inflicting math upon you.

23 Q. (By Ms. Rogers) But first, just to
24 clarify, I just want to make sure I have the
25 efficiency gap, you know, equation that you used

1 within your report correct.

2 A. Yes.

3 Q. So is it -- could you just describe it to
4 me briefly?

5 A. Yeah. So The turnout-adjusted efficiency
6 gap equation that I use in my report is that a party
7 should get the -- twice the -- there's a winner's
8 bonus, a two-to-one winner's bonus, as you just
9 suggested, where if you get 55 percent of the votes,
10 for instance, you should get 60 percent of the
11 seats, and if you get 70 percent of the seats, that
12 would be a 10 percent efficiency gap in favor -- in
13 favor of the party that won 70 percent of the seats.

14 Q. Sure. So another way to put that, as you
15 have it in your report, is the efficiency gap equals
16 the wasted votes of the, let's say, winning party
17 minus the wasted votes of the losing party divided
18 by the total number of votes; is that right?

19 A. In a situation of equal turnout, they're
20 mathematically equivalent, but not if it's not equal
21 turnout.

22 Q. Okay. So let's -- but that is the
23 equation that you have in your report; is that
24 right?

25 A. Yes. Meaning My computer code that we

1 produced, we had the turnout-adjusted efficiency gap
2 that I used.

3 Q. Sure, sure.

4 A. But I simplified it for the report a
5 little bit.

6 Q. Sure. So using this simplified method, if
7 we had a situation where one district had, you know,
8 let's say, simplified 100 votes, so there's 51 votes
9 for the winning party, and 49 votes for the losing
10 party, so would that be at that point the winning
11 votes -- wasted vote would be one vote because they
12 had one over 50, the wasted or inefficient votes for
13 the losing party is 49; is that correct?

14 A. Yes.

15 MR. MULJI: Objection, Your Honor.
16 Compound.

17 THE COURT: Overruled.

18 Q. (By Ms. Rogers) So continuing with the
19 equation then, we would subtract 49, the losing
20 amount of inefficient votes, from 1; is that
21 correct?

22 A. Well, they'd both be over the total number
23 of votes, but yes, roughly -- if --

24 Q. So 1 minus 49 divided by 100. So -- and
25 then that would be -- if my math is correct, that

1 would be negative .48; is that right?

2 A. Yes.

3 Q. So 48 percent is the efficiency gap in
4 that situation; is that right?

5 A. I believe so.

6 Q. So in another example, we -- the same
7 100 -- hundred-person district, if there's 70 votes
8 for the winning party, 30 votes for the losing
9 party, we do the same math again, we find that
10 there's 19 inefficient votes for the winning party,
11 because they have 19 above 51, 30 votes for the
12 losing party, because all of their votes are
13 inefficient. So we subtract 30 from 19 to give us
14 negative 11; is that right?

15 MR. MULJI: Your Honor, objection. The
16 math that's happening here maybe needs to take place
17 a little more stepwise so that it can be followed.

18 THE COURT: All right. I'll sustain that.

19 MS. ROGERS: Thanks, Your Honor.

20 Q. (By Ms. Rogers) So we'll take it one step
21 at a time. So if we have 19 minus 30, is that
22 negative 11?

23 A. Yes.

24 Q. And then if we divide negative 11 by 100,
25 is that $-.11$?

1 A. Yes.

2 Q. And another way to say that would be
3 11 percent?

4 A. Yes.

5 Q. So if we compare, this efficiency gap then
6 would be negative 11 percent; is that right?

7 A. Yes.

8 Q. So the vote -- the situation where there's
9 a 70-to-30 vote has a lower efficiency gap than the
10 situation where there's a very close race; is that
11 correct?

12 A. Well, in the situation with the close
13 race, the support for the losing party was much
14 higher, so it's more of an indication -- if they
15 were to lose -- I mean, it's hard to say with one
16 district here, but if they were to lose all the
17 districts on a plan, if you had 49 percent of the
18 vote across the state, for instance, like in every
19 district, then, yes, that would be a severe
20 disadvantage for your party.

21 Q. Sure. But in this example, there's -- the
22 district that has a less competitive situation has a
23 lower efficiency gap; is that right?

24 A. Yes. Again, that's because the support
25 for the disadvantaged party went down, so they're

1 less -- they're less disfavored.

2 Q. Sure.

3 MS. ROGERS: May I confer with my
4 colleagues for one moment?

5 THE COURT: Yes.

6 MS. ROGERS: All right. No further
7 questions, Your Honor.

8 THE COURT: All right. Any redirect?

9 MR. MULJI: No further, Your Honor.

10 Can the witness be excused?

11 THE COURT: Yes.

12 Dr. Warshaw, thank you very much for your
13 time and testimony. You are excused.

14 THE WITNESS: Thank you, Your Honor.

15 THE COURT: Thank you.

16 MR. GREEN: Your Honor, could we take a
17 brief break?

18 THE COURT: We can. Five or ten minutes?
19 Does that work?

20 MR. GREEN: That's good.

21 THE COURT: All right. Court is in
22 recess.

23 (Recess taken.)

24 THE COURT: And you may be seated.

25 All right. Back on the record.

1 All right, Counsel --

2 MR. PHILLIPS: Yeah.

3 THE COURT: -- Mr. DeSanto, correct?

4 MR. PHILLIPS: No, Ben Phillips, on behalf
5 of the plaintiffs.

6 THE COURT: Oh, you're Mr. Phillips.
7 Okay.

8 MR. PHILLIPS: Yeah.

9 THE COURT: All right, Mr. Phillips, go
10 ahead and call your next witness.

11 MR. PHILLIPS: Plaintiffs call Dr. Kassra
12 Oskooii.

13 THE COURT: All right, Doctor, if you
14 would come forward, stand here in front of the
15 clerk. We're going to ask you to provide some
16 testimony under oath.

17 (Witness sworn.)

18 THE COURT: And did you hear the
19 admonition that I've given before? Make sure you
20 speak into the microphone, use words when you give
21 your responses.

22 THE WITNESS: Yes.

23 THE COURT: Okay. Thank you.

24 Mr. Phillips.

25 ***

1 KASSRA A.R. OSKOOII, Ph.D.,
2 called as a witness, being first duly sworn,
3 was examined and testified as follows:
4

5 DIRECT EXAMINATION

6 BY MR. PHILLIPS:

7 Q. Good afternoon, Dr. Oskooii. Could you
8 please say and spell your name for the record?

9 A. Yes. Good afternoon.

10 My name is Kassra A.R. Oskooii. Last name
11 is spelled O-S-K, double O, double I.

12 Q. Thank you, Dr. Oskooii.

13 Could you introduce yourself briefly for
14 the Court?

15 A. Sure. I'm an associate professor of
16 political science at the University of Delaware.

17 Q. And are you tenured?

18 A. Yes.

19 Q. Where did you earn your degrees?

20 A. So I earned my bachelor's, master's, and
21 Ph.D. from the University of Washington in Seattle.

22 Q. In what area?

23 A. So my major was in political science, and
24 same goes for master's and Ph.D., political science.

25 Q. What are your areas of focus as a

1 professor?

2 A. So as a professor, my areas of focus is in
3 American politics, race and ethnic politics, and
4 political methodology.

5 Q. What are some of the courses that you have
6 taught?

7 A. Yeah, some of the courses that I've taught
8 relates to obviously American politics, within that,
9 political behavior, elections, public opinion,
10 redistricting principles, general map-drawing, and
11 courses related to the Voting Rights Act.

12 Q. You said you've taught some classes
13 related to redistricting. Can you say a little bit
14 about those?

15 A. Yeah. For example, I have an advanced
16 undergraduate course that I offer that -- where
17 students learn about traditional redistricting
18 principles. They learn about the Voting Rights Act,
19 and they actually learn how to draw redistricting
20 plans, either from scratch from at-large districts
21 and turn them into a districted plan or
22 redistricting an existing plan. And typically, they
23 do it with, you know, city council or school boards
24 or county-type areas.

25 Q. Have you been retained as an expert

1 before?

2 A. Yes.

3 Q. In about how many cases have you been an
4 expert?

5 A. I think about a dozen or so cases.

6 Q. And are those all listed in your CV that
7 was attached to your report that you submitted in
8 this case?

9 A. Yes.

10 Q. As part of your work in any of those
11 cases, did you draw or produce maps?

12 A. Yes.

13 Q. And were any of the maps that you've
14 drawn, have they been implemented by a Court?

15 A. Yes.

16 Q. Have any districts or maps that you've
17 drawn ever been struck down by a Court?

18 A. No.

19 Q. Are you aware of any Court that has not
20 qualified you as an expert or found your testimony
21 unreliable?

22 A. No.

23 MR. PHILLIPS: Your Honor, the parties, as
24 you know, have stipulated to the qualifications. I
25 present Dr. Oskooii as an expert in redistricting

1 and mapping.

2 THE COURT: Any objections?

3 MR. GREEN: No objection.

4 THE COURT: All right. You may proceed.

5 Q. (By Mr. Phillips) Dr. Oskooii, do you
6 have any specialized expertise in the geography,
7 politics, or history of Utah in particular?

8 A. No.

9 Q. Do you need that kind of expertise to do
10 the work that you did in this case?

11 A. No, I don't believe so.

12 Q. Why is that?

13 A. Well, because I have expertise in drawing
14 plans and understanding redistricting principles,
15 and based on the scope of work that I had here, I
16 don't think you need specific area expertise to
17 conduct that work.

18 Q. So let's turn to this case. At a high
19 level, what were you asked to do with regard to the
20 two maps that have been submitted from plaintiffs in
21 this case?

22 A. So at the high level, I was presented with
23 two plans that I was asked to adjust for different
24 reasons.

25 Q. We'll get into what those adjustments were

1 in a moment, but when you made those adjustments,
2 did you use partisan or political data at all?

3 A. No.

4 Q. And what platform or software did you use
5 to do the mapping adjustments?

6 A. So I used Esri for -- redistricting
7 platform.

8 Q. And can you say a little bit about what
9 Esri is?

10 A. Yeah, it's a famous redistricting platform
11 for drawing districting plans. There are other
12 platforms that one could also use, like Maptitude or
13 Dave's Redistricting Application, also known as DRA.

14 Q. And why did you use Esri in this case?

15 A. Yeah, I was specifically instructed by
16 counsel for the plaintiffs to rely on a mapping
17 software that does not have any electoral, partisan,
18 or voter data already built into the software. And
19 so --

20 Q. And does Esri have that built in at all?

21 A. No, Esri does not have that built in at
22 all.

23 MR. PHILLIPS: Would it be possible to
24 have my screen come up on the monitor?

25 Hold on a minute.

1 Q. (By Mr. Phillips) Okay. Dr. Oskooii, you
2 submitted a report in this case; is that right?

3 A. Yes, I have.

4 Q. So I'm going to turn to page 13 of your
5 report, which shows what's been called Plaintiff
6 Map 1. Could you explain what were you asked to do
7 as it relates to producing this map?

8 A. Yes. So as it relates to producing this
9 map, I was presented with a map which I believe
10 comes from a computer simulation, which I refer to
11 as a simulation map. And I was asked whether I
12 could resolve a potential road connectivity or
13 contiguity issue in Rich County, and that's what I
14 was asked to do.

15 Q. So how did you go about doing that?

16 A. Yes. So it was actually pretty simple.
17 So this road connectivity issue, as I mentioned,
18 Rich County deals with District 2. The five
19 northern counties that are grouped in District 2
20 have almost the same population as the ideal
21 population of a congressional district, but they're
22 over that by 328 people.

23 So the way things are configured in
24 District 2 is that Rich County is split. To carve
25 out 328 people to get to that zero population

1 deviation, I made Rich County whole and instead
2 decided to go into Weber County, which borders
3 Morgan County, in an unincorporated area below the
4 town of Huntsville to carve out those 328 people to
5 get to that zero population deviation.

6 Q. And on page 6 of your report, which I'll
7 put up on the screen, can you explain what this
8 shows?

9 A. Yeah. So on page 6, the first one, the
10 Figure 1, shows the plaintiff map on boundaries
11 without displaying the checkered pattern in Figure
12 2, which shows the changes, essentially. So the
13 zoomed-in version in Figure 2 shows where the
14 changes were made between Districts 2 and, in this
15 case, 3.

16 Q. So other than this change, did you make
17 any other adjustments to this map?

18 A. No, I did not.

19 Q. And Map 1, what is the population
20 deviation of the map?

21 A. It's exactly zero between the districts.

22 Q. And are the districts contiguous?

23 A. Yes.

24 Q. And are the districts reasonably compact?

25 A. Yes.

1 Q. And did you look at political data at all
2 while you made these adjustments?

3 A. Not at all.

4 Q. Okay. Let's turn now to what's been
5 called Plaintiff Map 2, which appears on page 15 of
6 your report. What were you asked to do as it
7 relates to creating this map?

8 A. Sure. So the second plan that I was given
9 is called the Legislative Plan C, and -- maybe short
10 for Plan C, we can call it. And I was asked whether
11 it's possible to improve municipal and county
12 divisions within Plan C while making the least
13 practical, disruptive changes to the existing
14 boundaries of Plan C.

15 Q. And how did you go about seeing if you
16 could do that?

17 A. Yeah, sure. So the first thing I did is I
18 examined to see if -- which municipalities, if any,
19 are split. And so I identified that North Salt Lake
20 and Davis County is split under Plan C, and then --
21 as well as Millcreek, and then Pleasant Grove.
22 There are three municipal splits.

23 And then I looked at county divisions.
24 There are three counties that are divided in Plan C.
25 This would be Davis County, Salt Lake County, and

1 Utah County. And then I noticed that Utah County is
2 split across three districts. So that's the first
3 thing I identified before doing anything.

4 Q. So you said that North Salt Lake was
5 split. How did you go about trying to resolve that
6 split?

7 A. Yeah, so North Salt Lake was really easy
8 to resolve that split because, as I mentioned, just
9 like the simulation map, those five -- there are
10 those five counties that are grouped in District 1
11 that have an excess population of 328.

12 So what appears to me is that, under the
13 Legislative Plan C, the map drawer went into
14 North Salt Lake and split that municipality in
15 Davis County to carve out those 328 people to get
16 District 1 to zero population deviation. And I
17 don't think that's necessary because you could go in
18 an unincorporated area in Weber County, the same way
19 I did with the previous plan I discussed, and go
20 below Huntsville -- the town of Huntsville, and
21 carve out 328 people out of Weber County; that way,
22 you achieve equal population, you still split the
23 same number of counties. You just traded, you know,
24 Davis with Weber, but you resolved a municipal split
25 in North Salt Lake.

1 Q. What did you do next?

2 A. Yeah, so as I mentioned, I noticed also
3 that Millcreek is split between two districts and
4 also split into six pieces. At the same time, when
5 I was observing the map, I noticed that the city of
6 Bluffdale -- which most of it is in Salt Lake
7 County, but part of it goes into Utah County, just
8 like Draper -- by keeping Bluffdale in District 2,
9 as has been the case or is the case under
10 Legislative Plan C, that introduces an additional
11 county-district split in Utah County that is not
12 necessary.

13 The reason I say that is because one thing
14 that you can do is you can just simply move
15 Bluffdale into District 3. Then you only split Utah
16 County between two districts, and then you can take
17 Millcreek and make it whole and put it into
18 District 2.

19 But then the next thing that you have to
20 do is, you know, population deviation. You have to
21 get equal population deviation, and the
22 configuration that I identified to get to equal
23 population deviation without splitting any other
24 municipalities in that region is basically group
25 Salt Lake, Millcreek, Holladay, put that in

1 District 2, and then get West Jordan, South Jordan,
2 and Midvale along with Bluffdale and shift those as
3 a whole into District 3; that way, you're not
4 introducing any municipal splits because that would
5 defeat the whole purpose of what I was trying to do
6 here with Millcreek. That gets you almost to equal
7 population deviation.

8 Q. And what did you do to get to zero
9 population deviation?

10 A. Yeah. So then the task was I had to
11 identify an unincorporated area where I could get
12 these two districts exactly zero population
13 deviation. And I noticed that in the northwest
14 region of West Jordan, below West Valley City,
15 there's an unincorporated area where District 3 can
16 gain about 700 or so people and vice versa,
17 District 2 can lose those people to get Districts 2
18 and 3 to exactly zero population deviation.

19 Q. On page 8 of your report, can you explain
20 what these charts show?

21 A. Yeah, essentially the best way to
22 illustrate the changes between these plans is to
23 look at Figure 4. So as you can see in the top and
24 in Weber County, that's an area which District 3
25 gains, and that's different from Legislative Plan C.

1 And then the slightly more yellowish checkered marks
2 shows that essentially Salt Lake City, Millcreek,
3 and Holladay were shifted to District 2, and then
4 Bluffdale, West Jordan, South Jordan, Midvale, which
5 is a little bit darker below it, that's shifted into
6 District 3.

7 Q. Why did you choose these municipalities to
8 balance the population?

9 A. Yeah, because recall that, you know, I was
10 asked to make the least disruptive changes while at
11 the same time improving municipal and county splits
12 to the extent practical, and that's the way I was
13 able to identify to do that, to make it least
14 disruptive and not reorganize all these districts
15 and achieve equal population and not split
16 municipalities.

17 Q. You mentioned that in Map C, Pleasant
18 Grove was split as well. Were you able to resolve
19 that split?

20 A. Yes, Pleasant Grove was split, but I was
21 not able to resolve that split without introducing,
22 you know, which, you know, major changes. So I left
23 that one be. That's the one municipal split.

24 However, Pleasant Grove, what I did notice
25 is that it split between two counties -- three

1 pieces into -- sorry, it split into three pieces
2 between two districts. And when I looked at it
3 closely, I realized, well, that's unnecessary. One
4 can clean that up, the number of times that
5 Pleasant Grove is split, and I was able to reduce
6 that by two. So it kind of improved it, but
7 obviously I could not resolve that municipal split.

8 Q. So you were talking about it was split
9 three times -- I think in your report you say into
10 different pieces. Can you explain a little bit what
11 you mean when you say that a municipality is split
12 into different pieces?

13 A. Yeah, basically if you overlay the
14 municipal boundaries over the district boundaries,
15 you can see, like -- you know, and Millcreek is,
16 like, really obvious. They're like six separate
17 islands in pieces. It's still contiguous, but, you
18 know, that's the way it was chosen by the mapmaker
19 to split, like, Millcreek. A similar kind of thing
20 has been done in Pleasant Grove, although not as bad
21 as Millcreek.

22 Q. And why might it matter if a municipality
23 is split into multiple pieces?

24 A. Yeah, if it's practical to avoid it, if
25 one can avoid it, I think it's a good practice to do

1 so because when you split a municipality into
2 multiple pieces, it could make it really confusing
3 for the residents to recognize, like, what
4 congressional districts they're part of.

5 In addition to that, one of the things
6 that it could do, it could make it more difficult,
7 although not impossible at all, for the State to
8 come up with precinct boundaries. When you have
9 these separate pieces, the State may have to create
10 more precinct boundaries than necessary, which it
11 doesn't have to be that way if you can avoid it.

12 And finally, you know, if we're looking at
13 the redistricting criteria -- state-specific
14 redistricting criteria here, it's possible that, you
15 know, breaking a municipality between two districts
16 into multiple pieces, that might not be desirable
17 based on the criteria.

18 Q. So as you look at Plaintiffs' Map 2 --
19 there we go -- what's the population deviation for
20 this map?

21 A. It's a perfect population deviation:
22 Zero.

23 Q. And are the districts contiguous?

24 A. Yes.

25 Q. And are they reasonably compact?

1 A. Yes.

2 Q. And as you made the adjustments that you
3 described, did you look at partisan or political
4 data at all?

5 A. Not at all.

6 Q. So in addition to the adjustments that
7 you've described in creating these two maps, were
8 you asked to do anything else?

9 A. Yeah. I was asked to calculate plan-wide
10 average core population retention rates between
11 different plans, and specifically looking at
12 Legislative Plan C, Plaintiff Map 1, and Plaintiff
13 Map 2 and comparing that to what I understand to be
14 three plans from the Independent Redistricting
15 Commission. I believe they were labeled "Orange,"
16 "Purple," and "Public SH2."

17 Q. And is that comparison listed in, I think,
18 Table 2 on page 11 of your report there at the
19 bottom?

20 A. Yes, Table 2, "Average Population Core
21 Retention Rate Between Plans."

22 Q. And to clarify, did you look at any of
23 those commission plans before or while you were
24 creating the adjustments that you made to these two
25 maps?

1 A. No. In fact, counsel for the plaintiffs
2 only shared those Orange, Purple, and SH2 plans
3 after I had completed finalizing and drawing
4 Plaintiff Map 1 and 2.

5 Q. And when you say "core retention," can you
6 explain what that means?

7 A. Yeah. Core retention is basically you're
8 trying to see, you know, how many people are moved
9 between different districts, you know, how many
10 people -- or another way to put it, how many people
11 are you keeping together in a district relative to
12 another district in another map.

13 Q. Were you asked to do anything else,
14 Dr. Oskooii?

15 A. Yeah, I was also given Shapefile
16 boundaries for what I understand to be communities
17 of interest identified by the Legislative
18 Redistricting Committee. There were three
19 Shapefiles. I think one was tribal areas and lands,
20 institutions of higher education was the second one,
21 and military installations was the third one. And I
22 was asked to overlay those boundaries on top of
23 Plan C, Plaintiff Map 1, and Plaintiff Map 2, and
24 visually share those results, the overlays.

25 Q. And those maps that you're describing are

1 on pages 17 to 22 of your report, for the Court's
2 reference.

3 So this would be -- this is an example.
4 Can you describe what this picture is showing?

5 A. Yeah. So this is an overlay of those
6 three boundaries on top of Plaintiff Map 1. So the
7 green lines represent tribal areas, the military
8 installations are represented in red lines, and
9 institutions of higher education are represented in
10 blue. They're obviously much smaller areas --
11 geographic areas. That's why they're tiny here.

12 Q. And if we go to the next page, Figure 5A
13 on page 18, this is a zoomed-in cropped part of the
14 previous image; is that right?

15 A. That's right.

16 Q. And there -- you said that there were
17 three communities of interest that the Legislative
18 Redistricting Committee identified that you
19 compared. There was a fourth one. Did you
20 investigate that at all? What was the fourth one,
21 if you know?

22 A. Yeah, the fourth one, I didn't need to
23 overlay any boundaries because the fourth one is in
24 Duchesne and Uintah. And in every -- in Plan C,
25 Map 1, Plaintiff Map 1, and Map 2, those two

1 counties are kept together. So you're not breaking
2 those communities.

3 Q. And so as you look at these community of
4 interest boundaries overlaid on the three different
5 maps, what did you observe?

6 A. So I basically -- when I compared
7 Legislative Plan C to Plaintiff Map 2, because
8 Plaintiff Map 2 is a version -- adjusted version of
9 Plan C, I didn't notice any real substantive
10 differences in terms of how these districts break
11 any communities of interest or how many communities
12 of interest they have in the district. They're
13 substantively very similar, if not identical.

14 Q. Also in your report on page 16, there's a
15 comparison chart here of the compactness scores.
16 Can you explain a little bit what we're looking at
17 here in Table 1A?

18 A. Yeah. So Table 1A represents the
19 compactness scores between the districts and
20 Legislative Map C, Plaintiff Map 1, and Map 2.
21 And there are two compactness scores that were
22 calculated with Esri for redistricting software and
23 reported here. So we have Reock and Polsby-Popper
24 scores by district, and also the average plan-wide
25 compactness.

1 Q. And what was your conclusion about the
2 compactness based on this chart?

3 A. So I thought that the compactness, you
4 know, looking at it, are substantively similar.
5 They're on par with one another. There are some
6 variations just because of the configuration of maps
7 are a little bit different between Plaintiff Map 1
8 and 2. But if you compare Plaintiff Map 2 and
9 Legislative Map C, you can see that substantively
10 they're on par with each other. They're as compact.

11 In fact, if you look at average plan-wide
12 Reock compactness score across all these plans, what
13 I reported here is 0.49. And there's a little bit
14 variation in the Polsby-Popper score, but I think
15 substantively they are fairly similar.

16 Q. And then the table just below this 2A
17 relates to the topic we discussed earlier, but can
18 you just summarize very briefly what Table 2A shows?

19 A. Yeah. Table 2A is a comparison of county
20 and municipal splits across the three different
21 plans that I've been discussing. So here, you know,
22 if we look at -- so the first column is criteria,
23 the second one is Legislative Map C, and then
24 Plaintiff Map 1 and 2.

25 So in terms of total county splits, what

1 we can see here is that all three plans split three
2 counties, but they're -- they split different
3 counties. And that Legislative Map C, for example,
4 splits Davis County, but Plaintiff Map 1 and 2
5 splits Weber County for the reasons that I stated.

6 And then we can look at how many times
7 those counties that are split in those plans are
8 split across districts. And here, the main
9 difference you see here is that in Utah County, Utah
10 County in Plan C split across three districts, but
11 it's only split across two districts in Plaintiff
12 Map 1 and 2. So the total county district split for
13 Plan C is higher by one relative to Plaintiff Map 1
14 and 2.

15 Q. In Dr. Barber's report, he had a comment
16 about the population of the part of Utah County that
17 was split. Do you recall reading that?

18 A. I remember him mentioning something about
19 Bluffdale being split between the two counties,
20 Salt Lake and Utah County.

21 Q. And I think he commented that the
22 population of the part of Bluffdale in Utah County
23 had a zero population.

24 MR. GREEN: Objection. Leading.

25 THE COURT: Sustained.

1 Q. (By Mr. Phillips) Can you talk about what
2 the second half of this chart shows?

3 A. Yeah. So the second half of the chart
4 focuses on the municipal split and, if they're
5 split, into how many pieces. So, you know, starting
6 off with Legislative Map C, you can see that, you
7 know, Millcreek is split. That's why the check mark
8 inside the box. And then it's split into six pieces
9 across two districts. North Salt Lake is split, but
10 split across two districts, only two pieces. And
11 then Pleasant Grove is split.

12 And then you can just look at the summary
13 at the end, you know, like total municipal splits,
14 and Legislative Map C has three total municipal
15 splits, Plaintiff Map 1 and 2 each have one.
16 And then the total municipal pieces in Legislative
17 Map C are 11, if you add up, you know, the 6, 2,
18 and 3. And then in Plaintiff Map 1, there are two,
19 and Plaintiff Map 2, also two.

20 Q. Thank you, Dr. Oskooii.

21 MR. PHILLIPS: No further questions.

22 THE COURT: All right. Cross, Mr. Green?

23 ***

24 ***

25 ***

CROSS-EXAMINATION

BY MR. GREEN:

Q. Good afternoon, Dr. Oskooii. Am I pronouncing that right?

A. Yes. Good afternoon. Yes.

Q. Okay, thank you.

It sounds like, sir, you've spent a fair amount of time up in Seattle, the University of Washington.

A. That's right.

Q. You must be a big Huskies fan.

A. Huskies fan, but not Seahawks.

Q. But not Seahawks.

So you have Michael Panix on your fantasy team; is that --

A. No, I couldn't draft him, unfortunately.

Q. High on the board.

A. Yeah.

Q. Yeah, I understand that. Good enough.

A couple of questions about your testimony in this case. I believe you testified that Map 1 started as a simulation map; is that right?

A. That's my understanding.

Q. Whose simulations?

A. I was not actually told whose simulation

1 this map is.

2 Q. So even sitting here today, you don't know
3 who was the original author, I guess, of that
4 simulation, or who coded the simulation?

5 A. Sitting here today, I could have a guess,
6 but I'm not a hundred percent sure.

7 Q. If you had to guess, who would that be?

8 A. I think Dr. Chen.

9 Q. Okay. Plaintiffs' counsel gave you that
10 simulation; is that right?

11 A. That's right.

12 Q. And plaintiffs' counsel asked you to
13 revise that simulation; is that also right?

14 A. That's right.

15 Q. At the time you were revising that
16 simulation, what else did you know about the
17 ensemble set from which that simulation came?

18 A. Nothing.

19 Q. You hadn't seen the code behind it?

20 A. No.

21 Q. Even still today, you haven't seen the
22 code behind it?

23 A. Not at all.

24 Q. So you don't -- you didn't examine any
25 other simulations in that ensemble set; is that

1 correct?

2 A. That's correct. No other simulations
3 besides the one that was given to me.

4 Q. Great.

5 So did you give any advice to plaintiffs'
6 counsel about which simulation they should pick to
7 give to you to revise?

8 A. No. Like I said, I didn't see any other
9 simulation besides the one that was given to me.

10 Q. All right. I guess that means you also
11 didn't write the code to produce them, someone else
12 did that; that's right?

13 A. That's correct. I did not.

14 Q. All right. For Map 1, I believe you
15 testified your lawyers asked you to fix a road
16 contiguity problem in Rich County; is that right?

17 A. A potential road connectivity or
18 contiguity issue in Rich County, correct.

19 Q. That was only a potential issue?

20 A. Yeah, that's my understanding.

21 Q. In your opinion, was it a real contiguity
22 issue?

23 A. I mean, I tried to look at -- look at it.
24 It is awkwardly shaped. There are two pieces that
25 come up, and, you know, it's not a populated area,

1 so it could be an issue. But ultimately, it's up
2 for the Court to decide.

3 Q. Well, in your -- in your opinion, does
4 road contiguity matter in a redistricting plan?

5 A. Yes, I think road connectivity or ease of
6 travel is a redistricting criteria based on Utah's
7 ranked order criteria.

8 Q. Separate from Utah's ranked order
9 criteria -- we'll talk about that in a second, but
10 just in your opinion, is that important, even if it
11 didn't show up in Utah's criteria?

12 A. Are you talking about general
13 redistricting principles?

14 Q. Yes.

15 A. Yeah, I think so. I think generally if
16 you can improve road connectivity, you should do it.

17 Q. Why is that?

18 A. Well, just ease of travel between
19 different parts of the state to the extent that's
20 practicable.

21 Q. Okay. And --

22 A. I apologize. I said, "state." I think I
23 should have said, "district." It's --

24 Q. District. Fair enough. Yeah. Fair
25 enough. Yeah. Thank you.

1 A. Yeah. Sorry. Yeah.

2 Q. You've described in your report Map 1's
3 districts as traversable; is that right?

4 A. Yes.

5 Q. That's also, I think you just testified,
6 an important feature of a good redistricting plan.

7 A. Yes, and part of also Utah's redistricting
8 criteria.

9 Q. Great.

10 Dr. Oskooii, have you -- have you been to
11 Utah before today?

12 A. No, I have not had the pleasure.

13 Q. Oh, great. Well, welcome.

14 You flew in, I assume, from Delaware?

15 A. From Philadelphia, actually.

16 Q. Philadelphia.

17 A. The airport is in Philadelphia.

18 Q. Got it.

19 But did you have a chance to see the
20 mountains on the way in?

21 A. Yes, I did.

22 Q. What do you think of them?

23 A. Beautiful.

24 Q. That's -- every time we get visitors here,
25 that's the first thing they say, is, "Wow, you're

1 right on top of the mountains." People love them.
2 Hopefully you'll have a chance to come out and go
3 skiing maybe sometime.

4 A. That would be awesome.

5 Q. It's a big hit here.

6 Have you ever been -- so I guess you've
7 never been to Utah County.

8 A. Correct, I have not been to Utah at all.

9 Q. Okay. Are you aware that the city of
10 Alpine is in Utah County?

11 A. I believe that's correct --

12 Q. You believe that's right? Okay. Let's --

13 A. -- although I'm not a hundred percent
14 sure.

15 Q. Let's take a look here on -- so this is
16 just Google Maps. We'll show you some overview of
17 the geography of Utah here. So here's Salt Lake
18 City. Here's our county right here.

19 Can you see my cursor okay?

20 A. Looking at it here -- no, I don't see the
21 cursor.

22 Q. Oh, is it not -- oh, it's not moving.
23 Shoot. Let's see.

24 Okay. Oh, there it is. You see it now?
25 Slow movement?

1 A. I see the cursor moving, yes.

2 Q. Okay. Great.

3 So we're here in Salt Lake City --
4 right? -- northern part of Salt Lake County, and if
5 we move down south, we've got southern Salt Lake
6 County down here, and then we hit the Utah County,
7 Salt Lake County line, and you see the city of
8 Alpine right here --

9 A. Okay.

10 Q. -- in Utah County. What city is to the
11 south of Alpine?

12 A. Highland.

13 Q. Highland. Uh-huh.

14 A. Cedar Hills.

15 Q. Cedar Hills. Yep.

16 Now, what city is to the west of Alpine?
17 Can you see?

18 A. If you zoom out. Sorry.

19 So we have, I guess, northwest, if you're
20 referring to, Bluffdale is one.

21 Q. Bluffdale is one. And then just to the
22 east of Bluffdale, we have Draper?

23 A. That's right. Draper.

24 Q. And immediately to the east of Alpine, we
25 have some of our big beautiful mountains right here.

1 So Alpine is right here and then mountains right
2 here --

3 A. Okay.

4 Q. -- and also mountains up here to the east
5 of the city of Alpine; is that right?

6 A. Yes.

7 Q. Let's take a look at Map 1, Plaintiffs'
8 Map 1.

9 MR. GREEN: And, Your Honor, we've --
10 we're looking at the website here, Dave's
11 Redistricting.

12 Q. (By Mr. Green) Dr. Oskooii, are you
13 familiar with Dave's Redistricting website?

14 A. Yes, I am.

15 Q. Okay. Great.

16 Does this accurately look like a
17 representation of Map 1?

18 A. It appears to be the case. I'm not sure
19 what the revision for share is.

20 Q. Okay.

21 MR. GREEN: Your Honor, I represent to the
22 Court we shared these links with plaintiffs' counsel
23 this morning, and I believe we have a stipulation
24 that these accurately represent the maps.

25 MR. REYMANN: That's correct.

1 MR. GREEN: Great.

2 THE COURT: And is there a copy of this --

3 MR. GREEN: We can --

4 THE COURT: -- that's been provided.

5 MR. GREEN: It's -- I'm sure we could get
6 you it. It's just a map. I want to try to zoom in
7 and show the Court --

8 THE COURT: That's fine.

9 MR. GREEN: -- It's kind of a
10 demonstrative to show what's happening here with
11 this map.

12 THE COURT: No problem. Sure.

13 Q. (By Mr. Green) So a map -- and this is
14 your map, Dr. Oskooii, that you revised here. We've
15 got District 1 up here in Salt Lake County, by and
16 large, and let's -- nope, we don't want that one.
17 Sorry. We'll change a couple of the other overlays
18 here. We've got district lines, precinct lines,
19 county lines, and city lines. That may be too many,
20 so we'll do that.

21 Okay. All right. We're back.

22 A. Okay.

23 Q. Okay. So District 1 here in Salt Lake
24 County, and then if we come down a little bit south,
25 we get to Utah County.

1 A. Okay.

2 Q. And right here, we zoom in and take a
3 look. What city -- excuse me, what district is the
4 city of Highland in?

5 A. What district is the city --

6 Q. Yes.

7 A. -- of Highland in?

8 Q. The City of Highland. This city right
9 here.

10 A. Oh, Highland, sorry.

11 Q. Yeah.

12 A. Thanks for clarifying.

13 Q. Yeah.

14 A. It's the blue district, which is here,
15 District 4.

16 Q. District 4, right? Okay. Great.

17 And Draper, right up here, which crosses
18 over the mountain, also in District 4?

19 A. Yes.

20 Q. But the city of Alpine is not in
21 District 4, is it?

22 A. It's in District 3.

23 Q. It's in District 3. That's right.

24 So the only way to get from Alpine
25 directly to anywhere else in District 3 is to drive

1 up over these mountains to get over to the rest of
2 District 3 on this side; isn't that right?

3 A. Sorry, could you --

4 Q. Oh, sure. Yep.

5 A. -- please zoom in slowly --

6 Q. Let me zoom back out. Yep.

7 A. -- because it gets really blurry.

8 Q. It's a little jerky on the screen? Sorry
9 about that. Yeah.

10 A. Yeah.

11 Q. So here's Alpine, and here's Highland, and
12 here's Draper.

13 Maybe if we remove the -- let's see. No,
14 we need the city lines.

15 How about that? Is that any easier to see
16 Alpine right there?

17 A. Yeah, I see Alpine.

18 Q. You see Alpine?

19 So is it right that the only way to get
20 directly from Alpine to any place else in District 3
21 is to climb up over these mountains we just saw over
22 here, right there?

23 A. I would need a little bit more details to
24 see exactly what roads are available there or not.

25 Q. Sure. Let me see if I can get rid of

1 the --

2 A. Yeah, because it's a --

3 Q. -- get rid of the terrain right there.

4 A. -- little blurry here.

5 Q. Yeah. Here's the city of Alpine right
6 here.

7 A. Okay.

8 Q. Did you look, when you were looking at the
9 district and drawing these maps, to see if there
10 were any roads from Alpine up over the mountain
11 range?

12 A. Yeah, I mean, I didn't look at
13 specifically in detail every single area, but I
14 looked at the borders of the districts. And here,
15 what I see, if you zoom in --

16 Q. Yeah.

17 A. -- a little bit further down, Alpine --

18 Q. Sure.

19 A. -- I think 92 --

20 Q. Which way -- do you want me to move the
21 map -- sorry -- or zoom in? What would --

22 A. Zoom in.

23 Q. Zoom in?

24 A. Zoom in so we could see the roads.

25 Q. Great. Okay.

1 A. So I see -- is it 92 here?

2 Q. This one right here?

3 A. Yeah.

4 Q. Ninety-two, yeah.

5 A. Right.

6 Q. Yeah. But you've never driven on that
7 road?

8 A. I've never been to Utah.

9 Q. You had never been to Utah.

10 A. Yeah.

11 Q. So you don't know if that's a paved road?

12 A. I would assume it's a paved road, but I
13 don't know a hundred percent.

14 Q. But you don't know for sure.

15 A. No, I don't know.

16 Q. Okay. And if it was a paved road, would
17 you know if they would clear it in the winter when
18 the snow comes? Would you know that?

19 A. I don't know that.

20 Q. You don't know that. Okay. All right.
21 Great.

22 Let's talk about a little bit more of
23 Utah's geography here. The city of Kanab, have you
24 heard of the city of Kanab, Utah?

25 A. Not very specifically.

1 Q. Great. Let me show you where the city of
2 Kanab is. Kanab, Utah. Kanab, Utah, down here on
3 our southern border with Arizona. It's in Kane
4 County, Utah. Right here.

5 A. Kane County. Okay.

6 Q. Kane County, yep. And Map 1 -- let's go
7 back to Plaintiffs' Map 1. Kane County, what
8 county -- excuse me. What congressional district is
9 Kane County in?

10 A. In Map 1, correct?

11 Q. Map 1, yes, sir.

12 A. Yeah, yeah. It's District 3.

13 Q. District 3. Great.

14 And Garfield County, which -- where is
15 Garfield County in Utah?

16 A. Garfield and Wayne, both in District 3.

17 Q. Was that Wayne or Kane?

18 A. Oh, sorry. Kane you were saying.

19 Q. Kane, yeah.

20 A. Yeah. Yeah. Yeah. Sorry. My bad.

21 Q. Yeah, Kane. Both in District 3, right?

22 A. Yeah.

23 Q. Yep, correct. So if this map were to be
24 the law and the member of Congress who represented
25 District 3 were visiting her constituents in Kanab

1 and wanted to drive to the city of Blanding, which
2 is in San Juan County --

3 A. Okay.

4 Q. -- do you know the fastest way that the
5 member of Congress could make that drive?

6 A. I remember something that Dr. Barber
7 mentioned about traveling to San Juan population
8 centers.

9 Q. Do you remember what he said about that?

10 A. That it was -- there were -- I think there
11 were three ways to do it. One would necessitate
12 going into Arizona, but the other two ways not. And
13 I don't recall exactly how long the travel is, but
14 it may have been like five hours or so.

15 Q. That's a pretty good memory.

16 A. Okay.

17 Q. Let's just see what Google Maps has to
18 say.

19 A. Yeah.

20 Q. If we start in Kanab and we want to make
21 our way over to Blanding, Google Maps tells us the
22 fastest route is to head east, leave Utah, go down
23 into Arizona, through a tribal reservation, make
24 your way back up and over to Blanding. And that's
25 about a -- looks like that's about a four-hour and

1 18-minute drive right now. I guess maybe conditions
2 could change, depending on road travel.

3 A. That's correct.

4 Q. Does that sound about right?

5 A. Yeah. I don't dispute that.

6 Q. Okay. Great.

7 After you revised the simulation that
8 became Map 1 here, did you perform any statistical
9 tests on that map to assess its partisan fairness?

10 A. No, not at all.

11 Q. So all the tests you've heard about --
12 you've been in the courtroom today listening to the
13 testimony?

14 A. Yes.

15 Q. And so the tests you've heard about,
16 marginal -- ranked marginal deviations and
17 mean-median, whatever test I were to spit out at
18 you, your answer would say -- be the same: "I
19 haven't done those tests."

20 A. Exactly.

21 Q. Okay.

22 A. I have not.

23 Q. Okay. Great. But I guess you were -- if
24 you were here earlier -- let me double-check. You
25 were here earlier for Dr. Chen's testimony?

1 A. Yes, I was.

2 Q. Yeah? Did you hear him testify that 99
3 percent of his simulations produced a 3-to-1
4 Republican-to-Democrat map?

5 A. I think that's what I heard.

6 Q. Okay. All right. Let's talk for a few
7 minutes about Map 2, Plaintiffs' Map 2, which I
8 believe you testified earlier is -- the starting
9 point for Map 2 was Map C; is that right?

10 A. Yes.

11 Q. And Map C was created by the legislature
12 in this case?

13 A. That's my understanding.

14 Q. Great. And you tried to reduce -- you
15 tried to change Map C, rather, to reduce the number
16 of municipal and county splits?

17 A. Yeah, to adjust it, to reduce, to the
18 extent practicable, while making the least
19 disruptive changes possible.

20 Q. And most of the changes that you made to
21 Map C in your Map 2, most of those are in Salt Lake
22 County; is that right?

23 A. Yes. There are two splits in that region.

24 Q. And so most of those changes are in
25 Districts 2 and 3; is that also right?

1 A. That sounds correct, yes.

2 Q. Okay. And as part of your testimony
3 earlier, I think you said you resolved some of the
4 municipal splits by instead moving people or moving
5 the district lines through unincorporated areas of
6 the state; is that right?

7 A. To achieve equal zero population, I did
8 have to go into unincorporated area as to not to
9 introduce any new or additional municipal splits.

10 Q. Right. And I think in paragraph 40 of
11 your report, you said that you had to make some --
12 make some trade-offs so that you could make those --
13 reduce those municipal splits; is that right?

14 A. That's correct.

15 Q. Do you agree that there are always
16 trade-offs in redistricting?

17 A. Yes, that's generally the case.

18 Q. As like one simple example -- I think you
19 just talked about this -- the federal constitution
20 requires population equality, and so that's going to
21 trump the desire to keep every municipality whole.
22 That could be one example of a trade-off.

23 A. Yeah, especially if it's rank ordered,
24 that could be, yes.

25 Q. Even if it wasn't ranked order in the

1 statute, I guess by virtue of the supremacy clause
2 of the federal constitution, you'd have to respect
3 that over some other criteria, right?

4 A. I would say that that seems accurate to
5 me, yeah.

6 Q. All right. Let's talk about some of the
7 changes you made to Districts 2 and 3 of
8 Plaintiffs' -- in Plaintiffs' Map 2. Paragraph 41
9 of your report says the core retention rate for
10 those districts is only about 69 percent, right?

11 A. For Districts 2 and 3?

12 Q. 2 and 3, yes, sir.

13 A. And that's Plaintiff 2?

14 Q. Plaintiffs' Map 2, yes, sir.

15 A. Relative to Plaintiff Map C, correct?

16 Q. Yes, sir. Correct.

17 A. That sounds right. From what memory
18 recalls, that sounds right.

19 Q. Would you like to look at -- if you'd like
20 to look at your report, it's paragraph 50 -- or
21 excuse me, paragraph 41.

22 A. Sure. Why not?

23 Q. Sure. Do you have it in front of you?

24 Did you -- in the --

25 A. Oh, I don't know what tab --

1 MR. PHILLIPS: It's Plaintiffs' Exhibit --
2 Plaintiffs' Exhibit 2.

3 MR. GREEN: Exhibit 2.

4 THE WITNESS: Two. Okay. It's right up
5 front. Okay. Okay. You said paragraph --

6 Q. (By Mr. Green) Paragraph 41, sir, please.

7 A. 41.

8 Q. Yes, sir.

9 A. Yes, I see that.

10 Q. About 69 percent is the core retention
11 rate?

12 A. Yeah.

13 Q. Mathematically, how many people in Utah
14 need to be in a district to have equal population?

15 A. How many people to achieve equal
16 population?

17 Q. Yes, sir, per district.

18 A. Per district, I believe it's eight hundred
19 seventeen thousand --

20 Q. Some change?

21 A. -- and nine hundred --

22 Q. And nine hundred and some change?

23 A. -- four -- yeah, I think --

24 Q. Yeah, something like that?

25 A. Yeah.

1 Q. Yeah. All right. Great. So,
2 mathematically, if you have a 69 percent core
3 retention rate, that means you're moving about
4 250,000 people per district, right?

5 A. That's correct.

6 Q. So between those two districts, that's a
7 half a million people that you moved in Map 2; is
8 that right?

9 A. That sounds correct, yes.

10 Q. Okay. And almost all of those were in
11 Salt Lake County; is that right?

12 A. Yes.

13 Q. What's the population of Salt Lake County?

14 A. I think it's over a million.

15 Q. It's about one -- just a little under 1.2
16 million. Does that sound right?

17 A. Yeah, that sounds right.

18 Q. So half a million people of 1.2 million is
19 about 40 percent of Salt Lake County that you moved
20 when you redrew the Legislature's Map C. Does that
21 sound right?

22 A. That sounds right.

23 Q. Great. So let's compare these maps, Map 2
24 and Map C. Let's start with Map C, which is the
25 legislature's map. Can you see that okay, sir, on

1 your screen?

2 A. Yes.

3 Q. Okay. Great. Let's look at the Salt
4 Lake -- focus on the Salt Lake County piece of this,
5 where we have a half a million people moving. Would
6 you agree that in Map C, the legislature's Map C
7 keeps Salt Lake City whole?

8 A. Yes.

9 Q. And then that's assigned to District 3,
10 right?

11 A. That's correct.

12 Q. And then District 3 moves east in the
13 county up towards Millcreek, takes in part of
14 Millcreek, which is split with District 2?

15 A. Yes, it's split.

16 Q. And then it continues here, District 3,
17 along the east and south -- moving south and through
18 Holladay, Cottonwood Heights, down into Sandy,
19 Draper, and up over the point of the mountain that
20 we talked about earlier. Is that an accurate
21 description of District 3 in Salt Lake County?

22 A. Yes.

23 Q. Great. So effectively, District 3 is --
24 in the legislature's map, is Salt Lake County, parts
25 of Millcreek, and then the eastern half of Salt Lake

1 County. Is that a fair characterization?

2 A. That's a fair characterization.

3 Q. All right. Now let's compare that to
4 Map 2, which was your revision to Map C that moved
5 40 percent of Salt Lake County to different
6 districts.

7 So Map 2 also keeps Salt Lake City whole.
8 That's right?

9 A. That's right.

10 Q. And then you moved up to Millcreek and
11 took in all of Millcreek, kept Millcreek whole.

12 A. Correct.

13 Q. And then you moved to the west, you took
14 in West Valley City, took in Magna, and skipped part
15 of the west half of Salt Lake County before
16 re-establishing the district in Herriman and
17 Riverton; is that right?

18 A. I disagree a little bit with the way you
19 phrased it. If you could go up --

20 Q. Sure.

21 A. I didn't touch some of those cities that
22 you mentioned. They were already in District 2.

23 Q. Okay. So, yeah, that's -- let me ask the
24 question a different way, then.

25 A. Yeah.

1 Q. So the way District 2 exists now after you
2 drew it was to combine Salt Lake City, Millcreek,
3 West Valley, Magna, with the non-adjacent cities of
4 Herriman and Riverton; is that right?

5 A. That -- yes, the way it's drawn, yes.

6 Q. That's the way it's drawn? Great.

7 And then in contrast, the District 3 in
8 Map 2, the green district on the screen, is mostly
9 the eastern half of the county -- excuse me, mostly
10 the southern half of the county. So all of
11 District 2 here, the purple, is all of the northern
12 half of Salt Lake County.

13 District 3 starts here in West Jordan and
14 in Midvale and Sandy and Cottonwood Heights and
15 Draper, taking in Bluffdale and then back around the
16 point of the mountain this way --

17 A. Correct.

18 Q. -- into northern Utah County. Is that
19 accurate?

20 A. That's accurate.

21 Q. Great.

22 Dr. Oskooii, can county council districts
23 be community of interests?

24 A. They can be.

25 Q. They can be? Did you look at the Salt

1 Lake County Council districts before you moved half
2 a million people in your Map 2 in Salt Lake County?

3 A. No, I did not look at county council
4 districts.

5 Q. Okay. Let me take a quick look at those
6 here, Salt Lake County Council districts. This here
7 is a website, the Salt Lake County Council
8 Interactive Map, for people interested in finding
9 out who their council member is.

10 A. Yeah. Well, it looks beautiful, yeah.

11 Q. Like most of Utah, sir, it is, indeed.

12 A. Yeah, absolutely.

13 Q. And it's being a little touchy here, but
14 let me just try to zoom in. Oh, that's way too
15 touchy.

16 A. Oh, man.

17 Q. All right. We'll get back out here.

18 A. Yeah, send you a bill for new glasses that
19 I might need.

20 Q. Yeah, I would need to pay that, for sure.
21 Yeah.

22 A. Yeah.

23 Q. Okay. If you could look at your screen,
24 can you see the districts -- excuse me -- can you
25 see the cities that make up District 5 in the Salt

1 Lake County Council Map?

2 A. This is Salt Lake County, you said?

3 Q. Yep, Salt Lake County Council.

4 A. Okay.

5 Q. And here's -- here's District 5. Can you
6 see those cities that make up that --

7 A. So, yeah --

8 Q. -- district?

9 A. -- I see part of Herriman; Bluffdale, part
10 of it because the other part goes into Utah County;
11 Riverton; and then part of Draper -- right? -- part
12 of South Jordan, and part of West Jordan.

13 Q. Part of West Jordan? And those same
14 cities are all -- in the legislature's Map C, those
15 same cities are all grouped together here in
16 District 2, right? This is Map C on your screen
17 now?

18 A. Not Draper.

19 Q. Is Draper in -- let's go back and look at
20 the council. All right. So part of Draper is in
21 there. Other than Draper. Bluffdale, Herriman,
22 Riverton, South Jordan, and West Jordan are all in
23 District 5, right?

24 A. Well, and also part of Bluffdale is not in
25 there, but yeah.

1 Q. Yeah. Okay. Let's talk about that part
2 of Bluffdale for just a few minutes. Let's go back
3 to the legislature's Map C here. So I think you
4 said you had to resolve what you called a -- one of
5 the splits in Utah County because Bluffdale -- the
6 city of Bluffdale crosses the county line from Salt
7 Lake County to Utah County; is that right?

8 A. That's correct.

9 Q. Did you look at the population of the
10 precinct in Bluffdale that is in the Utah County
11 side of that line?

12 A. I have looked at it, yes.

13 Q. What is that population?

14 A. It's zero.

15 Q. Zero. So is there any way mathematically
16 that that part of Bluffdale could affect the
17 partisan fairness of the legislature's Map C?

18 A. I have no opinion on that because I didn't
19 examine partisan fairness in any way.

20 Q. Okay. But so even though you didn't
21 examine it, just sitting here today, what you know
22 about maps, if the population is zero, you're
23 telling me that it -- there's -- you don't have an
24 opinion on whether it could affect the partisan
25 fairness?

1 A. Oh, I see what you're saying.

2 Q. Yeah.

3 A. Just the zero population.

4 Q. The zero population.

5 A. Well, yeah, there's no voters there, yeah.

6 Yeah.

7 Q. So there's no chance it could affect the
8 partisan outcome of any of those tests, right?

9 A. Well, that exact area.

10 Q. Right.

11 A. But the key is, though, that Bluffdale is
12 in a different district, in C, as it is in Plaintiff
13 Map 1 and 2, and as a -- you know, maybe that could
14 have some sort of impact. I have no idea.

15 Q. I -- so maybe -- let me try to re-ask my
16 question, then. If we're looking at Map C -- the
17 legislature's Map C here, and we're talking about --
18 let's see. Got to make sure I get the overlays
19 right here. District and precinct, city and county,
20 okay.

21 Is this showing up on the screen okay
22 right here? This -- I believe it's this section?

23 A. Yeah, I think that's the section, yeah.

24 Q. Yep. That section right there, right?

25 A. Uh-huh.

1 Q. Make sure we're zooming in on the right
2 thing here.

3 The population -- if the population is
4 zero and an expert in these sort of partisan
5 gerrymandering statistics were -- was asked to do
6 any sort of mathematical calculation, the kind we
7 talked about earlier, if the population was zero,
8 could that affect the outcome of that mathematical
9 equation?

10 A. No.

11 Q. No. Okay. Let's see. The legislature's
12 Map C, this is the city of Millcreek, the border of
13 District 2 and 3, and part of your goal in Map 2 is
14 to resolve that split; is that right?

15 A. Yes.

16 Q. And part of the way you did that was to
17 come over here and draw a boundary in Oquirrh that
18 looks like that; is that right?

19 A. To achieve zero population deviation.

20 Q. Is that -- and that's the voting -- those
21 are the voting tabulation districts that you put
22 into District 2 for that purpose?

23 A. Well, no. I think you got it reversed.
24 District 3 is grabbing that area from District 2.

25 Q. District 3 is grabbing it from District 2?

1 A. Yes.

2 Q. Okay. Great. So this -- the result of
3 this line right here, where we're taking some
4 streets and some neighborhoods right there, is a
5 result of the population equality requirement; is
6 that right?

7 A. That's correct.

8 Q. Right. Same thing that happened in
9 Millcreek in the legislature's Map C.

10 A. No.

11 Q. No. Why is that different?

12 A. Well, you don't split a municipality here.
13 This is an unincorporated area. Millcreek is a
14 municipality that's split.

15 Q. Right. I'm talking -- did you -- let me
16 ask it this way: Did you read Dr. Trende's report
17 in this case?

18 A. Sorry. Could you say again?

19 Q. Yeah. Sorry. Did you read Dr. Trende's
20 report -- expert report in this case?

21 A. There was only one expert report that I
22 recall that -- I read only a portion of it, where
23 Dr. Trende was talking about district lines and so
24 forth.

25 Q. Okay. So you do have some memory of

1 reading that --

2 A. Yeah.

3 Q. Was it Dr. Trende's? Or was it someone
4 else?

5 A. No, it was Dr. Trende.

6 Q. Okay.

7 A. And then a portion of Dr. Barber's report,
8 as it was relevant to the different plans.

9 Q. Okay.

10 A. Like Plan -- Plaintiff Map 1, 2, and so
11 forth.

12 Q. Got it. So do you remember reading the
13 part of Dr. Trende's report where he talked about
14 why he split Millcreek?

15 A. No. But if you --

16 Q. No.

17 A. -- refresh my memory, yeah.

18 Q. That's okay. All right. Okay.

19 Dr. Oskooii, could public school districts
20 be communities of interest?

21 A. Yes.

22 Q. They could? Did you look at the
23 boundaries of the public school districts in Salt
24 Lake County before you moved half a million people
25 from one district to another?

1 A. No.

2 Q. No? Let's take a quick look at those
3 right now, another demonstrative here, Utah school
4 district boundaries. These are all of our public
5 school district boundaries in the state. We're very
6 proud of our public schools here.

7 A. That's awesome.

8 Q. They do a great job.

9 Let's zoom in and talk here again about
10 Salt Lake County?

11 A. Okay.

12 Q. So here's Salt Lake City. You can see up
13 north, and so if -- as we move south through the
14 county, we have two public school districts in the
15 south of Salt Lake County. Can you see that?

16 A. Yeah, I assume those are the lines of the
17 public school boundaries.

18 Q. Correct.

19 A. And it's called -- and those are the names
20 of the schools district?

21 Q. Yes, sir. That's correct. Yeah.

22 A. Okay. Yes.

23 Q. So you see on the -- on the east half of
24 the county, we have the Canyon School District, and
25 on the west half of the county, we have the Jordan

1 School District.

2 A. I see that, yes.

3 Q. You see that?

4 A. Yes.

5 Q. And you see the Jordan School District
6 cities are -- include Bluffdale, Riverton, South
7 Jordan, West Jordan, Copperton, and Herriman on the
8 west side?

9 A. I see that.

10 Q. All those cities are lumped together in
11 the same way that the legislature's Map C puts them
12 together? Is that right?

13 A. Yeah, I'm trying to -- I can't see the
14 city boundaries to see if there's like -- they're
15 crossing city boundaries or breaking --

16 Q. Sure.

17 A. -- city boundaries. That's what I was --
18 trying to look at that.

19 Q. Trying to see? Yeah. You can see --
20 yeah, maybe that -- I don't know if that will help
21 you at all.

22 A. No, because we don't have the city
23 boundaries --

24 Q. No city boundaries?

25 A. -- but generally speaking, though, they

1 all group together. I mean, that's a fact.

2 Q. Okay. Great.

3 Let's talk for just another minute here
4 about --

5 A. Sure.

6 Q. -- Map 2. I just want to ask a couple of
7 questions. So Map 2 here separates Riverton and
8 Herriman from Bluffdale, South Jordan, most of West
9 Jordan; is that right?

10 A. Yes.

11 Q. So you can't get -- a member of Congress
12 who is representing District 2 in this, if this were
13 to be the map, could not get from Riverton and
14 Herriman over to the rest of District 2 without
15 crossing District 3; is that right?

16 A. Oh, you're not talking about school board
17 anymore, right?

18 Q. Sorry. No, we're back to --

19 A. The boundary? You changed the topic.

20 Q. -- your congressional map, yes.

21 A. Okay. Okay.

22 Q. Thank you. Sorry. Thanks for --

23 A. Sorry. I was like --

24 Q. Thanks for clarifying. Yeah. Yeah. Good
25 question.

1 A. Okay. So, yeah, that's the trade-off that
2 I mentioned. There's about, I think, a four-mile or
3 five-minute ride to get across.

4 Q. Okay. And District 2 also, again -- I
5 guess just to double-check, District 2 includes
6 Riverton and Herriman, but does not include the city
7 of Bluffdale; is that right?

8 A. That's right.

9 Q. Bluffdale is in District 3?

10 A. With Draper, yes.

11 Q. With Draper.

12 Dr. Oskooii, Herriman was the 15th fastest
13 growing in the country -- fastest growing city in
14 the country between 2014 and 2013; was that right?
15 Do you know?

16 A. I don't know that, but I think Dr. Barber
17 mentioned some information about Herriman, Riverton,
18 and Bluffdale being some of the fastest growing
19 cities or areas in this region, or maybe in the
20 entire state, and he cited like a few news articles
21 that --

22 Q. Some articles?

23 A. -- may have suggested that, yeah.

24 Q. Yeah. Did you -- did you happen to read
25 those articles by chance? Or just his report?

1 A. Yeah, I looked at them and --

2 Q. You looked at them?

3 A. -- it was a little bit strange. But,
4 yeah.

5 Q. What was strange about it?

6 A. Oh, well, because when I looked at them,
7 you know -- whenever I see like a few articles just
8 being put in a report, I wonder if they were
9 systematically selected, it was a good search, or
10 was it maybe cherry-picked.

11 So I did my own search, and I put, you
12 know, those cities' names in there. And then as I
13 was looking at different news articles, I noticed --
14 I kept noticing Draper coming up. And then so I
15 would -- I dug deeper, and I'm like, why is Draper
16 constantly coming up, especially with respect to
17 Bluffdale, but also with respect to Riverton.

18 And then I learned that, well, you know,
19 Draper is going to have the biggest economic and
20 housing development in Utah history, apparently, at
21 The Point -- it's called The Point, where the old
22 prison site was -- the State prison site.

23 And it's right by the border of Bluffdale,
24 and this is apparently a massive development to
25 address housing needs, also to address traffic

1 congestion. Apparently, there's going to be a rail
2 investment of about 1 billion.

3 So I thought it was odd that, you know,
4 Draper arguably should also be mentioned with those
5 three cities, but it was not. And I did wonder why
6 that was left out, given the major news and economic
7 development that's happening right there.

8 Q. And some of that, of course, is in
9 response to the prison site that's moving, right?

10 A. Well, the prison --

11 Q. You just mentioned the prison is --

12 A. Yeah, the prison site moved --

13 Q. The prison has moved.

14 A. -- and they're developing --

15 Q. Yeah. Right.

16 A. -- what's called The Point --

17 Q. Right.

18 A. -- at the point of the mountain --

19 Q. Correct.

20 A. -- right next to Bluffdale. And
21 apparently, you know, more -- 6,000 acres of land is
22 being developed, parks, you know, housing --
23 different types of housing, and that area with
24 Bluffdale, from what I read -- and you correct me if
25 I'm wrong, since I'm not from Utah, but it seems to

1 me that that's the area where you could have a lot
2 of housing, where maybe other areas, it's a little
3 bit congested already. So that's a good area for
4 development, from what I read.

5 Q. And that would -- those sort of housing
6 choices would have to be made probably on a local
7 zoning level, right?

8 A. County or local. Or looks like the State
9 is also involved.

10 Q. Yeah.

11 A. I'm not sure about that.

12 Q. So County or local. And we read
13 earlier -- we saw the map earlier that the county
14 district here that includes Bluffdale also includes
15 Riverton and Herriman and South Jordan and West
16 Jordan; isn't that right?

17 A. The City council one?

18 Q. County council. If it's at county
19 level --

20 A. County Council.

21 Q. -- County council.

22 A. Yes, yes, yes, yes, yes.

23 Q. Yeah. Yeah. Great. Thanks.

24 So just to confirm on the statistical
25 questions we talked about earlier with respect to

1 Map 1, you did no statistical analysis of anything
2 in Map 1, the tests we talked about, mean-median,
3 partisan bias, rank marginal deviations, those kind
4 of questions?

5 A. Nothing --

6 Q. Nothing there.

7 A. -- related to elections, partisanship,
8 voters, you name it.

9 Q. Same answer for Map 2?

10 A. Yes, same answer for Map 2.

11 Q. Okay.

12 MR. GREEN: Your Honor, could I have just
13 a moment?

14 THE COURT: Of course.

15 MR. GREEN: Just one point of
16 clarification or -- or for the Court. You asked
17 about the Dave's links that we've been using here --

18 THE COURT: Yes.

19 MR. GREEN: -- these ones we've been
20 looking at. It turns out they're actually in
21 Dr. Barber's report.

22 THE COURT: Okay.

23 MR. GREEN: Page 45, section 12 of
24 Dr. Barber's report.

25 THE COURT: Great. Thank you.

1 MR. GREEN: Thank you. With that, Your
2 Honor, no further questions.

3 THE COURT: Okay.

4 And redirect.
5

6 REDIRECT EXAMINATION

7 BY MR. PHILLIPS:

8 Q. Just a couple of brief questions,
9 Dr. Oskooii. Have you reviewed the redistricting
10 criteria in Prop 4?

11 A. Yes. I believe I cited the neutral
12 redistricting criteria in a footnote in my report.

13 Q. And is that on page 4 of your report,
14 footnote 5, I think?

15 A. I have to check the page numbers. Page 4,
16 and it's footnote 5.

17 Q. And included in the neutral redistricting
18 criteria are some of the things that Mr. Green asked
19 you about, maximizing a boundary agreement between
20 different types of districts. Do you recall being
21 asked about that?

22 A. Yeah, absolutely, for -- with respect to
23 City Council and School Board boundaries.

24 Q. Also, there's a criteria of following
25 natural and geographic features, boundaries, and

1 barriers. Do you recall being asked some questions
2 that relate to that?

3 A. Yes.

4 Q. And also preserving traditional
5 neighborhoods and local communities of interest. Do
6 you recall asking some -- Mr. Green asking you some
7 questions related to that?

8 A. Some questions, yes.

9 Q. And where do those criteria rank in
10 relation to municipal and county splits?

11 A. They're ranked lower since it's ranked
12 ordered and based on this law.

13 MR. PHILLIPS: No further questions, Your
14 Honor.

15 THE COURT: All right. Anything else for
16 this witness?

17 All right. Dr. -- and is it Oskooii?

18 THE WITNESS: Oskooii, yes.

19 THE COURT: Oskooii.

20 THE WITNESS: Yes.

21 THE COURT: All right. Dr. Oskooii, thank
22 you very much for your time and your testimony. You
23 are excused.

24 THE WITNESS: Thank you very much.

25 THE COURT: Thank you.

1 All right. Mr. Reymann, go ahead and call
2 your next witness.

3 MR. REYMANN: Thank you, Your Honor.
4 The plaintiffs call Malcolm Reid.

5 THE COURT: All right, Mr. Reid. If
6 you'll come forward. Come stand right in front of
7 the clerk. We're going to ask you to provide some
8 testimony under oath. Please raise your right hand.

9 (Witness sworn.)

10 THE CLERK: You may be seated.

11 THE COURT: All right, Mr. Reid. Make
12 sure you speak into the microphone. Use words when
13 you respond.

14 THE WITNESS: Yes and no.

15 THE COURT: All right. Thank you.

16 Mr. Reymann?

17

18 MALCOLM REID,
19 called as a witness, being first duly sworn,
20 was examined and testified as follows:

21

22 DIRECT EXAMINATION

23 BY MR. REYMANN:

24 Q. Good afternoon, Mr. Reid. Can you state
25 your name for the record?

1 A. Uh-huh. Malcolm Reid.

2 Q. And where do you live, Mr. Reid?

3 A. I live in Millcreek.

4 Q. How long have you lived there?

5 A. I've lived there for seven years, my wife
6 and I.

7 Q. And you're married to Vicki Reid?

8 A. Yeah, Victoria Reid, who spoke earlier.
9 Uh-huh.

10 Q. And she testified earlier today.

11 A. Yes.

12 Q. And you were here for that and heard her
13 testimony?

14 A. I was, yeah.

15 Q. Okay. I understand you're also retired?

16 A. Yes, I've been retired for seven years as
17 well.

18 Q. Okay. What did you do before you retired?

19 A. I worked in information technology in
20 Minnesota for two large corporations, in information
21 technology management and database.

22 Q. Okay. And you're a named plaintiff in
23 this case?

24 A. I am.

25 Q. Can you tell the Court a little bit about

1 why you decided to get involved in this case?

2 A. Yes. So we moved here in 2018 and
3 registered to vote and got a ballot in the mail. It
4 had citizen -- three citizen initiatives on the
5 ballot, as I recall, and I was pleased to see that
6 an Independent Redistricting Commission, under
7 what's known as Prop 4, was one of those. I was
8 happy to vote for it. It gave me some encouragement
9 that Utah would be a state that would listen to its
10 citizens.

11 Q. And what do you mean by that? What about
12 the Independent Redistricting Commission appealed to
13 you?

14 A. I like the idea of direct democracy, that
15 citizens have a voice in how their government is
16 formed.

17 Q. Was there something about the
18 redistricting standards that the initiative was
19 proposing that appealed to you?

20 A. The fact that they were non-partisan,
21 neutral, and that the Commission would be composed
22 of people who didn't have a vested interest in -- in
23 drawing the boundaries.

24 Q. And were you also drawn to vote for
25 Proposition 4 because of the standards that it

1 imposed on maps that would be enacted?

2 A. Yes, I was also.

3 Q. And tell us more about that.

4 A. I thought that the standards, as far as
5 respecting county and city boundaries, was
6 important. I thought that the idea of communities
7 of interest was also an important consideration, and
8 it was good to see those written as part of the
9 proposition.

10 Q. Is there anything else about Proposition 4
11 that appealed to you?

12 A. Those were the major elements.

13 Q. Okay. Tell us briefly what kind of
14 involvement you've had in this process, the --
15 starting with, you know, when Proposition 4 was
16 proposed to the voters, and since then, up to the
17 point where the lawsuit began.

18 A. So, yeah, Proposition 4 passed, and then
19 the -- the Independent Commission was formed, I
20 believe, in 2021, and they set forward to have a
21 series of meetings across the state, taking public
22 input, and I participated in a couple of those input
23 sessions when the Independent Commission convened.

24 Q. What kind of participation did you have?

25 A. I gave statements to the Commission.

1 Q. Okay. Can you tell us a little bit about
2 your city, Millcreek?

3 A. Millcreek. Yeah, Millcreek actually was
4 incorporated just a couple of years before we moved
5 to Utah. And, you know, it's a collection of
6 neighborhoods, and I think over the time that we've
7 been there, it's been creating an identity all of
8 its own as a city. And I think that it
9 definitely -- definitely is a community of interest
10 now as the city is trying to do things like build a
11 city center and encourage people to come and move
12 into the city.

13 Q. Now, tell me -- tell the Court a little
14 bit about how those beliefs and what you just
15 articulated, how they were affected by the map that
16 the legislature put into place in 2021.

17 A. Well, the legislature -- the maps that
18 were recently put aside divided Millcreek, as a lot
19 of people know, into four congressional districts.
20 And in that way, I think it really diluted the voice
21 of Millcreek residents in each one of those four
22 districts. And I thought, as my wife was
23 indicating, you can take a walking tour in 45
24 minutes, go through all four congressional
25 districts.

1 Also, I've seen that, just in talking with
2 neighbors and friends, they often don't know what
3 congressional district they live in. It's
4 confusing.

5 Q. And how does that affect you as a voter,
6 if you've experienced this yourself, not knowing
7 exactly who to go to for issues in your community?

8 A. Yeah. Well, I just -- I just think that
9 our -- my voice has been diluted by the whole -- by
10 the whole redistricting effort.

11 Q. Okay. You understand that there have been
12 three maps that have been presented to the Court to
13 choose between to replace the map that has been
14 struck down. You understand that?

15 A. Yes.

16 Q. You've seen those maps?

17 A. Yes, I've seen them.

18 Q. Let me just -- if we could pull up -- same
19 thing that your wife looked at, but just very
20 briefly.

21 So this -- I think you've seen this
22 before, but this is a zoomed-in portion of Millcreek
23 of what we've been calling Map C. Is that
24 consistent with your understanding of what the
25 legislature has proposed to do this time to your

1 city?

2 A. Yes.

3 Q. Tell us your impressions of whether this
4 fixes the concerns that you had with what they did
5 to your city in 2021.

6 A. Well, yeah, it hurts half as much. We're
7 down to two congressional districts now rather than
8 four. And so as I look at that and I look at where
9 I live -- and I think Vicki pointed this out as
10 well -- we can still walk to the east, we can walk
11 to the south, we can walk to the north and be in a
12 different congressional district than we're in right
13 now. And so I think it's -- it effectively keeps
14 Millcreek divided.

15 Q. And if you -- if we could just scroll down
16 to the other two that your wife also looked at
17 earlier today, and I'll just tell you the one that's
18 in red is what we've been calling Plaintiffs' Map 1,
19 and the one below that is Plaintiffs' Map 2. And is
20 it consistent with your understanding that both of
21 these maps would keep your city whole?

22 A. Yes.

23 Q. And that from -- as a voter, that would be
24 your preference; is that right?

25 A. That would be my preference, is to keep

1 the city intact.

2 Q. Okay.

3 A. Yes.

4 Q. So tell us more -- as a voter, not as a
5 statistician, but tell us as a voter who actually
6 lives in the community that everyone's been talking
7 about today, how having your community affects you
8 as a voter.

9 A. As a voter, I'd like to feel like we can
10 have our voice heard consistently, not only at the
11 local, but at the federal level. The interests of
12 people who live in Salt Lake County -- we're, of
13 course, close to Salt Lake City. We border Salt
14 Lake City. And so a lot of what we identify with
15 are the concerns of the city that -- the large city
16 that borders us as well.

17 Q. And in terms of having someone that is in
18 Congress that is responsive to your city's needs,
19 does having your community be divided in the way the
20 legislature has asked the Court to do -- how does
21 that impact that interest?

22 A. Oh, it -- we've been neglected by our
23 representatives over the last four years. So I
24 think -- when I think -- Millcreek, a city of 60,000
25 in a congressional district of 800,000, I think it

1 would have a much stronger voice.

2 Q. Now, you heard counsel for the legislature
3 earlier today suggest to your wife that, even if the
4 legislature's tools carve up your city, she can
5 still get her ballot. Did you hear that?

6 A. Yes.

7 Q. And you can still vote, I take it?

8 A. Yes.

9 Q. Even if they carve up your city?

10 A. Yes.

11 Q. You can still get your ballot.

12 A. Yes.

13 Q. You can still donate money to politicians.

14 A. Yes. I remain a U.S. citizen, and the
15 First Amendment still applies to me.

16 Q. Yeah.

17 A. Yes, uh-huh.

18 Q. So I guess the implication that your wife
19 wasn't asked a question to answer, but I'll ask you,
20 is what is the big deal, then? What's the problem?
21 Why do you still oppose the legislature carving up
22 your city?

23 A. Because my voice will be diluted. Yes, I
24 can vote, but my vote is less effective when -- when
25 people who are in my community of interest have been

1 carved up and put in another district.

2 Q. Okay. Just one last -- couple questions
3 on one last topic. There's been a suggestion in one
4 of the reports that's been filed in this case -- and
5 I don't think you've reviewed it, but I'll just tell
6 you that one of the suggestions that's been made is
7 that Plaintiffs' Map 2 -- so the second one that is
8 close to the Map C that the legislature proposed,
9 but keeps Millcreek whole -- shouldn't be adopted
10 because it separates Millcreek from people who live
11 up the canyon and separates other communities that
12 live at the so-called mouth of the canyon from
13 people who live up the canyons.

14 And I just wanted to ask you, as someone
15 who actually lives in one of those so-called
16 mouth-of-the-canyon communities, what your view of
17 that argument is.

18 A. Well, yes, occasionally we do actually go
19 up Millcreek Canyon or Emigration or the
20 Cottonwoods, but we identify really as a part of
21 Salt Lake County and that the -- that we're close to
22 Sugar House, we're close to Holladay. And so those
23 are the communities that we really identify with.

24 Q. Okay.

25 MR. REYMANN: I don't have any further

1 questions.

2 THE COURT: Any cross?

3

4 CROSS-EXAMINATION

5 BY MR. GREEN:

6 Q. All right. Good afternoon, Mr. Reid.

7 A. Hello.

8 Q. How are you, sir?

9 A. It's good to see you.

10 Q. Yeah, likewise. Just a couple of quick
11 questions.

12 You're not here offering any testimony
13 today as a statistician?

14 A. I'm a citizen.

15 Q. You're a citizen.

16 A. Yeah.

17 Q. So you don't have any opinion about any of
18 the particular partisan fairness tests that have
19 been adopted by the legislature?

20 A. I have not delved deeply into those tests.

21 Q. Okay.

22 A. I leave those to competent experts.

23 Q. Okay. There's been a lot of talk today
24 about fair maps in this case.

25 A. Uh-huh.

1 Q. Is a fair district one that is
2 competitive? One that's kind of up for grabs for
3 either party?

4 A. A fair map is one that's been drawn fairly
5 is what I'll say. It doesn't necessarily mean it's
6 competitive.

7 Q. So you could have a non-competitive map be
8 a fair map?

9 A. I would imagine that Southern Utah would
10 be a non-competitive fair map, yes.

11 Q. Does that mean you could have a fair map
12 where a district was a lock for a party?

13 A. If you follow the redistricting principles
14 laid out in Proposition 4, respecting county
15 boundaries and city boundaries, that could -- that
16 could be a result.

17 Q. Okay. Just a couple of quick questions
18 for you about the maps themselves. This is -- let's
19 see if I can get it to the right place here -- Map
20 C. This is the legislature's map adopted in this
21 case. And this we've talked about a couple of times
22 today, and I think your counsel asked you about
23 this. This is the way Millcreek looks under Map C.

24 A. Yeah, pretty ugly.

25 Q. And I think you were -- you mentioned that

1 you were unhappy with it because, if you walked to
2 the east or to the north or to the south, you could
3 be -- find yourself in a different congressional
4 district.

5 A. Yeah. It's just how the city has been
6 carved up, really. I mean, I know there's always
7 going to be boundaries. I realize that, but I think
8 the boundaries here are arbitrary.

9 Q. So let me just ask maybe a quick follow-up
10 about that. This is -- well, before I do that, in
11 your view, is either of Plaintiffs' maps -- is Map 1
12 a better map than Map C in your view?

13 A. I think from an eyeball test it is, yes.

14 Q. But -- so that's your opinion, it's a
15 better map?

16 A. It's an opinion. Yeah, it's my opinion.

17 Q. And it's the same answer for Map 2? Is
18 Map 2 a better opinion than Map C?

19 A. Yes.

20 Q. Either of Plaintiffs' maps is better.

21 A. Either of the Plaintiffs' maps is better
22 than Map C, yes.

23 Q. Okay. Great. Let me just ask you -- this
24 is Plaintiffs' Map 2, and this is on the border
25 between District 2 and District 3.

1 Now, if this map is adopted, someone who
2 lives, let's say, in this neighborhood --

3 A. Okay. So we're at, what, 70th South?
4 Where are we now?

5 Q. This is -- yep, this is 70th South. This
6 is Oquirrh. This is the district of -- the border
7 of the district between Map -- excuse me, the border
8 of the Districts 2 and District 3 in --

9 A. Okay.

10 Q. -- in Plaintiffs' Map 2.

11 A. So we're over on the west side of the
12 valley, then?

13 Q. West side of the valley.

14 A. Okay.

15 Q. Yeah. So someone who lives in this street
16 right here, if they walk to the north or to the east
17 or to the -- or excuse me, to the west, they'll be
18 in a different district too, right?

19 A. Yeah, I would -- I'd love to know how many
20 people are in each one of those districts -- or in
21 each one of those precincts.

22 Q. Let me show you Plaintiffs' Map 1.

23 A. But don't let me see the partisan leaning
24 on these maps, please.

25 Q. I think these are just the lines.

1 Map 1 -- Mr. Reid, have you ever been up to
2 Huntsville?

3 A. Pardon me?

4 Q. Have you ever been up to Huntsville?

5 A. Yeah.

6 Q. Yeah? Been up to the reservoir up there,
7 up to Pineview?

8 A. Yeah.

9 Q. Beautiful, right? Yeah, it's --

10 A. It's a great --

11 Q. It's terrific.

12 A. -- a great part of the state, sure is.

13 Q. Yeah. So the precinct lines and county
14 lines. So this -- Dr. Oskooii testified earlier
15 that, to fix the split in North Salt Lake, he took
16 some population from Weber County instead that was
17 just south of Huntsville.

18 A. Yeah.

19 Q. So that's this part of the map right here.

20 MR. REYMANN: Your Honor, I'm trying to
21 stay out of the way, but this is really beyond the
22 scope of what he was asked about about Millcreek.

23 MR. GREEN: Well, it's a response to the
24 question about walking north or south and being in a
25 different district, Your Honor.

1 MR. REYMANN: He's being asked about --

2 MR. GREEN: If I could ask one more
3 question?

4 MR. REYMANN: -- parts of the state he
5 wasn't -- he doesn't live in, he didn't testify
6 about. I mean, I -- like I said, I'll stay out of
7 the way. I just -- if this is going to go on and on
8 like we did the last time with the last expert, it's
9 way beyond the scope.

10 MR. GREEN: One more question.

11 THE COURT: Overruled.

12 Please proceed.

13 Q. (By Mr. Green) So just one more question
14 for you, Mr. Reid.

15 A. Uh-huh. Sure.

16 Q. Someone who lives up here in Weber County,
17 right here in this part of the map, if Map 1 were to
18 be adopted, same result, right? If they walked to
19 the east or walked to the south, they're going to be
20 in a different congressional district the same way
21 that you and your wife are now.

22 A. No, it's different because -- I'm assuming
23 that these are unincorporated areas, and so it's not
24 violating city boundaries.

25 Q. But it's -- but the people who live there

1 will have the same experience that you and your wife
2 do of walking --

3 A. Yeah, I'm --

4 Q. -- east or south --

5 A. I'm just trying to go by the highest
6 priorities given by the Independent Redistrict --

7 Q. Sure. Sure. I understand that. But if
8 you -- if -- people who live there, if they walked
9 to the east or the south, will be in a different
10 district, the same way you and your wife will.

11 A. They would, yeah.

12 Q. Right. Okay. Thank you.

13 MR. GREEN: No further questions, Your
14 Honor.

15 THE COURT: Okay.

16 MR. REYMANN: Nothing further.

17 THE COURT: Any redirect?

18 MR. REYMANN: Can he be excused?

19 THE COURT: Yes.

20 Mr. Reid, thank you very much for your
21 time and testimony.

22 THE WITNESS: Okay. You're welcome.

23 THE COURT: You are excused.

24 THE WITNESS: Thank you.

25 MR. REYMANN: That's all the witnesses we

1 have. So we'll turn it over to the defense.

2 THE COURT: All right. So plaintiffs
3 rest?

4 MR. REYMANN: We do.

5 THE COURT: How would you like to proceed?

6 MR. GREEN: I -- well, I mean, are we --
7 maybe we could take a minute and discuss timing.

8 THE COURT: Of course.

9 MR. GREEN: If we could get a --

10 THE COURT: Do you want to take a brief
11 recess?

12 MR. GREEN: If that would be all right.
13 If you -- maybe we'll take five minutes?

14 THE COURT: That's fine.

15 MR. GREEN: Or come back at 4:00 o'clock
16 and --

17 THE COURT: Perfect.

18 MR. GREEN: -- pause the Court --

19 THE COURT: Ten-minute recess. All right.
20 Court's in recess.

21 (Recess taken.)

22 THE CLERK: You're on.

23 THE COURT: We're on record? Okay.

24 We are now officially back on the record.

25 Let's talk about the November 3rd hearing.

1 So we could do -- like I said, the 31st is possible.
2 I just have to find someone to cover my calendar,
3 and those calendars are kind of hard, because it's
4 like 150 cases.

5 UNIDENTIFIED MALE: Yeah, I saw it.

6 THE COURT: So I doubt that I'm going to
7 get anyone to cover it on Halloween. So I -- I'm
8 happy to do the 4th if you want to do it remotely.
9 If you want to find another day so you could be in
10 person, I'm happy to be flexible that way too.

11 MR. REYMANN: I -- if -- it's really a
12 question about what the Court prefers. If you're
13 okay with doing it remote, then we can do the 4th.
14 That's fine.

15 MR. GREEN: I think -- I think that's
16 fine.

17 THE COURT: Okay. And does that mean
18 everyone will be remote, then, for that hearing?

19 MR. GREEN: We could be in person, but we
20 could also attend remotely, whatever.

21 THE COURT: Yeah, I'll leave it up to you.
22 If anyone wants to appear in person, we don't have
23 to make the whole thing remote. We could do some in
24 person, some remote.

25 If there's another day, I'm happy to --

1 just that day is hard to cover. Other things I can
2 try and cover if you want to do -- try and get it in
3 before the 31st. Or if you want to even do the 5th,
4 I've got the 5th open. I know that kind of puts a
5 crunch on my decision-making, but that's fine if you
6 want to do that.

7 MR. GREEN: I think we do the 4th and give
8 you the extra day.

9 MR. REYMANN: That's great.

10 THE COURT: Okay. What -- so I have -- I
11 have something from 1:00 to 5:00. Could we do it in
12 the morning?

13 MR. GREEN: Yes.

14 THE COURT: And do you want to just --
15 I'll block out the entire morning on the 4th, then?
16 Does that work?

17 MR. REYMANN: Yeah, I'm sorry if I missed
18 this. Is this on both motions? Or just the one
19 that deals with --

20 THE COURT: Let's --

21 MR. REYMANN: -- SB 1011 or --

22 THE COURT: Yeah, let's talk about the
23 second motion. I -- we hadn't really talked about
24 expediting that or -- and so my initial question to
25 you is: Does that one need to be expedited? Or can

1 that one be decided after my deadline on the 10th?

2 MR. GREEN: I -- so we -- I think we
3 requested on the header of an expedited hearing. We
4 didn't seek to expedite the response deadline, which
5 I think -- this all happened very quickly. I think
6 the response from the lieutenant governor is maybe
7 due next week, and the -- my understanding is that,
8 as of right now -- and I can be corrected. I don't
9 believe that the signature sheets have been issued
10 yet from the lieutenant governor.

11 THE COURT: Okay.

12 MR. GREEN: The relief we're seeking is
13 either to enjoin the issuance of those and/or to
14 enjoin its submission to the legislature if they're
15 collected. I think, for equity reasons, probably
16 the sooner it could be decided, the better in terms
17 of the folks who are -- would be collecting
18 signatures. But maybe --

19 MR. WOLF: Yeah, David Wolf on behalf of
20 the lieutenant governor, Your Honor. We intended to
21 take the full 14 days --

22 THE COURT: Okay.

23 MR. WOLF: -- to respond to the
24 preliminary injunction motion. I believe our
25 response is due on Tuesday, the 29th.

1 THE COURT: Okay.

2 MR. WOLF: And if you wanted to schedule a
3 hearing at this time, we could do that.

4 THE COURT: Let me ask, do you want to try
5 and -- when would you want to file a reply? I'm
6 assuming that you'd like to do that.

7 MR. GREEN: Yes. And I think we can -- as
8 you can tell from how fast we filed the motion, I
9 think we can do it pretty quickly.

10 THE COURT: Okay.

11 MR. GREEN: So maybe -- if the Court had a
12 date available shortly thereafter, then -- perhaps
13 we could combine it with the hearing on the 4th.

14 THE COURT: We could do that. I do have
15 the 5th open as well if you want your own time. I'm
16 assuming that we'll need a chunk of time on --

17 MR. GREEN: Yeah.

18 THE COURT: -- the 4th in the morning
19 anyway. So we can schedule --

20 MR. GREEN: The 5th?

21 THE COURT: Yeah.

22 MR. GREEN: That would be perfect.

23 THE COURT: Sometime on the 5th?

24 MR. GREEN: We'll be here, and that'll
25 work.

1 THE COURT: Okay. Let's see. If the
2 opposition is due on the 29th, when do you want to
3 file a reply?

4 MR. GREEN: What day of the week is the
5 29th?

6 MR. REYMANN: It's a Wednesday.

7 MR. GREEN: If we could file it on that
8 Monday, would that -- would that work?

9 THE COURT: The 3rd?

10 MR. GREEN: The 3rd?

11 THE COURT: Yeah. And then we could do
12 oral argument on the 5th. How about we do it later
13 in the day? So it will give me some time to read.

14 MR. GREEN: Perfect.

15 THE COURT: How much time would you like?

16 MR. GREEN: I don't know what your
17 position is going to be. I mean, there could be
18 some agreement --

19 THE COURT: Right.

20 MR. GREEN: -- for once. Maybe like an
21 hour and a half? Does that --

22 THE COURT: You want to do that?

23 MR. REYMANN: I think that's more than
24 enough time.

25 MR. GREEN: Yeah.

1 THE COURT: Okay. How about we schedule
2 it at 3:00 on the 5th?

3 MR. GREEN: Sure.

4 THE COURT: Does that work?

5 MR. GREEN: That's perfect.

6 THE COURT: Okay. And we can make a Webex
7 link available. I'm sure there are a lot of people
8 who will want to observe. And, otherwise, I think
9 it'll be in person; is that right?

10 MR. GREEN: That's right.

11 THE COURT: Okay. Okay. Then that is
12 scheduled on November 5th.

13 Are there any other scheduling things?

14 MR. GREEN: One more.

15 THE COURT: Okay.

16 MR. GREEN: So we had filed a motion for
17 summary judgment on count 8.

18 THE COURT: Yes.

19 MR. GREEN: And we had asked let's just
20 have it be part of this hearing. I don't know if
21 that argument is really necessary for it, but...

22 THE COURT: Is there actually a -- and
23 this is just a question. Is there actually a
24 controversy with regard to count 8?

25 MR. GREEN: I don't think there's any

1 dispute that the 2011 congressional district lines
2 are malapportioned. My understanding of the papers
3 was that the dispute was whether or not the
4 injunction against HB 2004 had the effect of
5 reviving the previous decade's map.

6 THE COURT: Does it -- does it matter, I
7 guess, is my question. If both parties agree that
8 that plan is malapportioned, then legally, does it
9 matter?

10 MR. GREEN: So the --

11 THE COURT: Does the Court have to decide
12 it? Or is it moot?

13 MR. GREEN: It's -- it wouldn't be moot.
14 To the extent the Court enjoins Map C as not abiding
15 by Proposition 4, then the issue is that the legally
16 operative map is a malapportioned -- you know,
17 unconstitutionally malapportioned map, and the
18 Court's authority and obligation to remedy that
19 violation is sort of -- you know, could be seen as
20 different than the Proposition 4 issue.

21 And so the Court has broad, equitable
22 power to remedy a violation of a malapportionment, a
23 violation that's been recognized by the U.S. Supreme
24 Court and courts across the country. And so it's
25 relevant to that issue. But like I said, I don't

1 think there's any dispute factually that that map is
2 unconstitutionally malapportioned.

3 MR. REYMANN: And I would just say I would
4 like to go re-read our papers again.

5 THE COURT: Okay. We can --

6 MR. REYMANN: Since we've been in expert
7 land.

8 THE COURT: That's fine. No, I
9 understand. If we can -- why don't we do this?
10 At the end of the hearing tomorrow, if we've got
11 some time, let's revisit this issue on count 8.

12 MR. REYMANN: Okay.

13 THE COURT: And then you can look at your
14 papers.

15 MR. REYMANN: Great. Thanks.

16 THE COURT: Okay. All right. Anything
17 else we need to address?

18 MR. GREEN: No.

19 THE COURT: Okay. All right.

20 Court is adjourned. I'll see you all
21 tomorrow, 8:30. I'll ask -- I'll see if we can have
22 the doors open at 8:15 so you can come in and get
23 ready.

24 MR. REYMANN: Great.

25 MR. GREEN: Thank you.

1 THE COURT: Okay? All right. Court is
2 adjourned.

3 (Court adjourned at 4:12 p.m.)
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REPORTER'S CERTIFICATE

STATE OF UTAH)
) ss.
COUNTY OF SALT LAKE)

I, Lindsay Payeur, Registered Professional
Reporter, do hereby certify:

That on October 23, 2025, I transcribed an
electronic recording at the request of
David Reymann;

That the testimony of all speakers was
reported by me in stenotype and thereafter
transcribed, and that a full, true, and correct
transcription of said testimony is set forth in the
preceding pages, according to my ability to hear and
understand the tape provided;

I further certify that I am not kin or
otherwise associated with any of the parties to said
cause of action, and that I am not interested in the
outcome thereof.

WITNESS MY HAND AND OFFICIAL SEAL
this 23rd day of October 2025.



Lindsay Payeur, RPR, CSR, CCR

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LEAGUE OF WOMEN VOTERS OF UTAH vs UTAH STATE LEGISLATURE

October 23, 2025

Evidentiary Hearing Day 1

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LEAGUE OF WOMEN VOTERS OF UTAH vs UTAH STATE LEGISLATURE

October 23, 2025

Evidentiary Hearing Day 1

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LEAGUE OF WOMEN VOTERS OF UTAH vs UTAH STATE LEGISLATURE

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