

IN THE CIRCUIT COURT OF JACKSON COUNTY, MISSOURI
SIXTEENTH JUDICIAL CIRCUIT, DIVISION 11
Honorable Adam Caine, Judge

TERRENCE WISE, *et al.*,

Plaintiffs,

vs.

) Case No. 2516-CV29597

STATE OF MISSOURI, *et al.*,

Defendants.

ELIZABETH HEALEY, *et al.*,

Plaintiffs,

vs.

) Case No. 2516-CV31273

STATE OF MISSOURI, *et al.*,

Defendants.

TRANSCRIPT OF BENCH TRIAL PROCEEDINGS
VOLUME I (Of IV)

On February 17 of 2026 the above cause came on for hearing before the Honorable Adam Caine, Judge of Division 11 of the Circuit Court of Jackson County.

APPEARANCES

For the Wise Plaintiffs:

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Campaign Legal Center

Washington, D.C.

Also from the Campaign Legal Center- Annabelle Harless, Simone
Leeper, Isaac DeSanto, Benjamin Phillips, and Nithin Venkatraman

From ACLU Foundation - Dayton Campbell-Harris and Ming Cheung

Gillian Wilcox, ACLU of Missouri

For the Healey Plaintiffs:

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Elias Law Group, Seattle, WA

Also from Elias Law Group- Harleen Gambhir, Jullianna Astarita,
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Principal Deputy Solicitor General

Patrick Sullivan,

Deputy Solicitor General

Joseph Kiernan,

Assistant Solicitor General

Madeline S. Lansdell,

Assistant Solicitor General

Office of the Attorney General

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For the Intervenor:

Marc Ellinger

Missouri State Republican Committee

Jefferson City, Missouri

Also, John Gore and Daniel Sutton

APPEARANCES CONTINUED

Board of Elections:

David Raymond

Kansas City Board

Brad Constance

Jackson County Board

INDEX

VOLUME I (February 17, 2026)

	Page
Opening Statements	
By Mr. Mulji (<i>Wise Plaintiff</i>)	17
By Ms. Khanna (<i>Healey Plaintiff</i>)	21
By Mr. Sullivan (<i>State Defendant</i>)	25
By Mr. Gore (<i>Intervenor</i>)	30
<i>Plaintiff's Evidence</i>	
TERRENCE WISE (<i>Wise Plaintiff</i>)	
Direct Examination by Mr. Campbell Harris	35
Cross-Examination by Mr. Sullivan	53
DR. JONATHAN CERVAS (<i>Wise Plaintiff</i>)	
Direct Examination by Mr. Mulji	55
Cross-Examination by Mr. Sullivan	95
Cross-Examination by Mr. Gore	117
Redirect Examination by Mr. Mulji	137
Recross Examination by Mr. Sullivan	141
MARQUES BUSSEY (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Astarita	142
Cross-Examination by Mr. Sutton	147
DR. ARI STERN (<i>Wise Plaintiff</i>)	
Direct Examination by Mr. Cheung	151
Direct Examination(continued) by Mr. Cheung	164
Cross-Examination by Ms. Hunker	206
Cross-Examination(continued) by Ms. Hunker	235
Cross-Examination by Mr. Ellinger	253
Redirect Examination by Mr. Cheung	264
REV. MINDY FUGARINO (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Meng Morrison	270

<u>INDEX (continued)</u>	Page
Cross-Examination by Mr. Gore	289
VOLUME II (February 18, 2026)	
DR. JONATHAN RODDEN (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Gambhir	301
Cross-Examination by Mr. Gore	346
Redirect Examination by Ms. Gambhir	382
DR. GISELLE ANATOL (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Astarita	385
Cross-Examination by Mr. Sutton	393
LOUIE WRIGHT (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Astarita	396
Cross-Examination by Mr. Sullivan	411
Cross-Examination by Mr. Ellinger	411
DR. JOHN CROMARTIE (<i>Wise Plaintiff</i>)	
Direct Examination by Ms. Leeper	418
Direct Examination (continued) by Ms. Leeper	446
Cross-Examination by Mr. Ellinger	451
Redirect Examination by Ms. Leeper	484
QUINTON LUCAS (<i>Wise Plaintiff</i>)	
Direct Examination by Mr. Phillips	491
Cross-Examination by Mr. Ellinger	522
Redirect Examination by Mr. Phillips	547
DR. MARY ESSELMAN (<i>Healey Plaintiff</i>)	
Direct Examination by Ms. Astarita	553
Cross-Examination by Ms. Hunker	563
Redirect by Ms. Astarita	572
VOLUME III (February 19, 2026)	
<i>Defendant's Evidence</i>	
DR. SEAN TRENDE	
Direct Examination by Ms. Hunker	582
Cross-Examination by Mr. Gore	619
Cross-Examination by Ms. Meng Morrison	623
Cross-Examination by Mr. Cheung	653
Redirect Examination by Ms. Hunker	681
SHAWN KIEFFER	
Direct Examination by Ms. Lansdell	684

<u>INDEX (continued)</u>	Page
Cross-Examination by Mr. Campbell-Harris	696
Redirect Examination by Ms. Lansdell	703
<i>Intervenor's Evidence</i>	
DR. M.V. HOOD	
Direct Examination by Mr. Gore	730
Cross-Examination by Ms. Harless	755
Cross-Examination by Ms. Gambhir	782
Redirect Examination by Mr. Gore	792
Intervenor rests	796
State Defendant rests	796
Plaintiff rests	797
JUDGE JOSEPH DANDURAND	
(Offer of Proof)	
Examination by Ms. Khanna	814
Cross-Examination by Mr. Ellinger	823
Redirect Examination by Ms. Khanna	835
VOLUME IV (February 20, 2026)	
Closing Arguments	
By Ms. Khanna & Mr. Mulji (<i>Joint Plaintiffs</i>)	845
By Ms. Hunker (<i>State Defendant</i>)	894
By Mr. Ellinger (<i>Intervenor</i>)	920
Rebuttal Arguments	
By Ms. Khanna (<i>Healey Plaintiff</i>)	937
By Mr. Mulji (<i>Wise Plaintiff</i>)	942
Reporters' Certificate	951

EXHIBIT LIST

<u>Description</u>	<u>Off'd</u>	<u>Recv'd</u>
<i>Plaintiff's Exhibits:</i>		
1 T. Wise Affidavit	15	15
2 A. Gromowski Affidavit	15	15
3 C. Wrehe Affidavit	15	15
4 C. Kay Lakin Affidavit	15	15
5 E. Healey Affidavit	15	15
6 G. Anatol Affidavit	15	15
7 M. Bussey Affidavit	15	15
8 M. Sapp Affidavit	15	15
9 L. Wright Affidavit	15	15
10 S. Beagle Affidavit	15	15
11 K. Heard Affidavit	15	15
12 T. Self Affidavit	15	15
13 J. Sorrells Affidavit	15	15
14 M. Freivogel Affidavit	15	15
15 S. Nastasia Affidavit	15	15
16 M. Todd Affidavit	15	15
17 C. Coble Affidavit	15	15
18 B. Rollings Affidavit	15	15
19 L. Nichols-Elliott Affidavit	15	15
20 R. McCallian Affidavit	15	15
21 Dr. Stern Dec. 30 Rep. (Amended)	15	15
22 Dr. Stern Jan 14 Reb. Rep	15	15
23 Dr. Cervas Dec. 30 Rep. (Amended)	15	15
24 Dr. Cervas Jan 14 Reb. Rep.	15	15
25 Dr. Cromartie Dec. 22 Rep.	15	15
26 Dr. Cromartie Jan. 14 Reb. Rep.	15	15
27 Dr. Rodden Dec. 22 Rep.	15	15
28 Dr. Rodden Jan. 14 Reb. Rep.	15	15
30 Gov. Kehoe Aug 29 Procl.	16	16
31 Gov. Kehoe Aug 29 X Map Post	16	16
32 Gov. Kehoe Aug 29 X Video	16	16
33 Gov. Kehoe Aug 30 MO First Map PR	16	16
34 SOS Elections and Voting Page	16	16
35 SOS May 2022 Email (EalomDep.1)	16	16
36 SOS May 2022 Email (ZorichProd.)	16	16
37 May 2022 Email att. (KiefferDep.2)	16	16
38 SOS Dec. 2025 Email (ZorichDep.6)	16	16
39 SOS Jan. 2026 Email (KiefferDep.3)	16	16
40 HB 1 Bill Text	16	16
41 HB 1 Map Image	16	16
42 HB 1 Landscape Maps (District)	16	16
43 HB 2909 Bill Text	16	16
44 HB 2909 Map Image	16	16

EXHIBIT LIST (continued)

<u>Description</u>	<u>Off'd</u>	<u>Recv'd</u>
45 HB 2117 Joint Press Release	16	16
46 HB 2117 House Comm. Passage PR	16	16
47 HB 2117 House Passage PR	16	16
48 House Sp. Comm. On Red. Mtng	16	16
49 HB 2909 House Floor Debate	16	16
50 Gov. Parson HB 2902 PR	16	16
51 State Answers to Wise Pet.	16	16
52 State Answer to Healey Pet.	16	16
53 KCEB Answer to Wise Pet.	16	16
54 KCEB Answer to Healey Pet.	16	16
55 Intervenor Ans. To Wise Pet.	16	16
56 Intervenor Ans. To Healey Pet.	16	16
57 State Response to ROGS	16	16
58 Intervenor Responses to RFAs	16	16
59 State Responses to RFAs	16	16
60 Cervas Map 1 Block Eq. File	16	16
61 Cervas Map 2 Block Eq. File	16	16
62 Cervas Map 3 Block Eq. File	16	16
63 Cervas Map 4 Block Eq. File	16	16
64 Cervas Map 5 Block Eq. File	16	16
65 Cervas Map 6 Block Eq. File	16	16
66 Cervas Map 7 Block Eq. File	16	16
67 Cervas Map 8 Block Eq. File	16	16
68 Map 11029 Adj. Block Eq. File	16	16
69 Map 11163 Adj. Block Eq. File	16	16
70 Map 71871 Adj. Block Eq. File	16	16
71 2025 Cong. Map GBF	16	16
72 2025 Cong. Map Block Eq. File	16	16
73 2022 Cong. Map GBF	16	16
74 2022 Cong. Map. Block Eq. File	16	16
75 2022 State Senate Map GBF	16	16
76 2020 Census Redistricting Data	16	16
77 2020 Census - MO Counties	16	16
78 2020 Census MO Places	16	16
79 2020 Census - MO Blocks	16	16
80 2020 Census - MO VTDs	16	16
81 2020 Census - MO UACs	16	16
82 2022 & 2025 Statewide Compilation	16	16
83 2022 & 2025 JACO Compilation	16	16
84 Maps w/ Density Compilation	16	16
85 Maps w/ Urban Compilation	16	16
86 Cervas Maps Compilation	16	16
87 Joint Stipulation	34	34

EXHIBIT LIST (continued)

<u>Description</u>	<u>Off'd</u>	<u>Recv'd</u>
<i>Defendant's Exhibits</i>		
101 Amended Ex. Report Dr. Trende	15	15
102 Expert Report of Dr. M.V. (Trey) Hood	16	16
103 Governor Kehoe Proclamation, Aug. 29, 2025	16	16
104 Truly Agreed House Bill 1 (2025)	16	16
105 MO House Color Map 2025 CDs	16	16
106 MO House Color Map 2022 CDs	16	16
107 Office of G.I. Map of HB1 w/ counties & hwys	16	16
108 Office of G.I. Map of HB1 w/ city boundaries	16	16
109 Governor Kehoe Press Release, 8/29/25	16	16
110 Governor Kehoe Press Release, 9/28/25	16	16
111 Gov. Office Email Re: HB1 Lawsuit, 9/17/25	707	713
112 Gov. Kehoe Missouri First Map Packet	16	16
113 Memo Kincaid to Rep. Deaton	707	--
114 2026 Missouri Election Calendar	16	16
115 Visual of '22 House CD and Split Counties	16	16
116 Visual of '25 House CD and Split Counties	16	16
117 Visual of '22 and '25 House CD - Central (HD)	16	16
118 Visual of '22 and '25 House CD - Central (LD)	16	16
119 Visual of '22 and '25 House CD - Eastern (HD)	16	16
120 Visual of '22 and '25 House CD - Eastern (LD)	16	16
121 Visual of '22 and '25 House CD - KC Met. (HD)	16	16
122 Visual of '22 and '25 House CD - KC Met. (LD)	16	16
123 Visual Overlay of '22 and '25 CD and 2022 State Senate Districts (HD)	16	16
124 Visual Overlay of '22 and '25 CD and 2022 State Senate Districts (HD)	16	16
125 Visual of '22 House CD, Municipalities (HD)	16	16
126 Visual of '22 House CD, Municipalities (LD)	16	16
127 Visual of '25 House CD, Municipalities (HD)	16	16
128 Visual of '25 House CD, Municipalities (LD)	16	16
129 Visual of '25 House CD, Municipalities- Central Missouri Region (HD)	16	16
130 Visual of '25 House CD, Municipalities- Central Missouri Region (LD)	16	16
131 Visual of '25 House CD, Municipalities- Lake of the Ozarks Region (HD)	16	16
132 Visual of '25 House CD, Municipalities- Lake of the Ozarks Region (HD)	16	16
133 Signed Affidavit of Off. of Admin., 2/11/26	16	16
134 Wise Plaintiffs Responses and Object. to State Defendants 1st Requests for Admission 1/13/26	16	16
135 Wise Plaintiffs Responses and Object. to State Defendants 2nd Requests for Admission, 1/13/26	16	16

EXHIBIT LIST (continued)

<u>Description</u>	<u>Off'd</u>	<u>Recv'd</u>
136 Wise Plaintiffs Responses and Object. to Intervenor's Requests for Admission, 1/16/26	16	16
137 Healey Plaintiffs Responses and Object. to State Defendants First Requests for Admission, dated January 16, 2026	16	16
138 Healey Plaintiffs Responses and Objections to Intervenor's Requests for Admission, dated January 16, 2026	16	16
<i>Intervenor's Exhibits</i>		
201 Governor's Proclamation calling S.S.	15	15
202 Media release, Governor issued /w Proclamation	16	16
203 Affidavit of C.K. re: above documents	16	16
204 Press release from Governor upon signing of HB1	16	16
205 Affidavit of C.K. re: above document	16	16
206 Memo Kincaid to Rep. Deaton	795	--
207 2002 Congressional Map	16	16
208 2012 Congressional Map	16	16
209 2022 Congressional Map	16	16
210 2022 State Senate Map	16	16
211 2025 Congressional Map	16	16
212 Populations of all counties in Missouri	16	16
213 Populations of all cities in Missouri	16	16
214 Certification of Papers on File in Secretary of State's Office	16	16
215 Report of Dr. M.V. Hood III	16	16
216 Missouri State Senate District Map	796	796
District Number 7	796	796
217 KCMO Council Districts Map	796	796
218 Ordinance 211074	796	796
219 KCMO Council Districts Map (blow up)	796	796
220 KCMO Council Districts Map (blow up)	796	796

PROCEEDINGS

(FEBRUARY 17, 2026)

THE COURT: These are Case Nos. 2516-CV29597 and 31273. It's Wise, et al. versus State of Missouri, and Healey, et al. versus State of Missouri. Can I have entry of appearance for the Wise Plaintiffs, please?

MR. MULJI: Yes, Your Honor.

Good morning, Your Honor. My name is Aseem Mulji.

I'm representing the Wise Plaintiffs at Campaign Legal Center. I'll be -- remain counsel here at the counsel table, but I'll pass it to my co-counsel here to introduce themselves, first.

MR. CHEUNG: Good morning, Your Honor. Ming Cheung, from the ACLU.

MS. WILCOX: Gillian Wilcox, ACLU, Missouri.

THE COURT: All right.

MR. MULJI: And, Your Honor, we'll have Dayton Campbell-Harris here, in just a moment.

THE COURT: Wonderful. Okay. And for the Healey Plaintiffs?

MS. KHANNA: Good morning, Your Honor. Abha Khanna, on behalf of the Healey Plaintiffs. With me are Andy Hirth, Harleen Gambhir, Jullianna Astarita, and Tina Meng Morrison.

THE COURT: All right. Thank you.

1 MS. KHANNA: Thank you, Your Honor.

2 THE COURT: All right. Next, we can go with the
3 State -- the State of Missouri Defendants.

4 MS. HUNKER: Thank you, Your Honor. My name's
5 Kathleen Hunker from the Office of Attorney General's
6 Office representing the Missouri State Defendants. I have
7 here with me, Patrick Sullivan --

8 MR. SULLIVAN: Thank you.

9 MS. HUNKER: -- as well, as Madeline Lansdell.
10 My other colleague, Joseph Kiernan, will be coming later
11 this morning.

12 THE COURT: Thank you. For our Intervenors?

13 MR. ELLINGER: Good morning, Judge. Marc
14 Ellinger, along with John Gore and Daniel Sutton on behalf
15 of the intervenor.

16 THE COURT: All right. Thank you.

17 MR. MULJI: And, Your Honor, I'm sorry. For the
18 Wise Plaintiffs we have a couple of other folks on our
19 legal team who are here and may -- will be making
20 appearances before the Court, so I figured I might as well
21 introduce them for the record, as well.

22 THE COURT: Sure. Go ahead.

23 MR. MULJI: So I'm joined by Annabelle Harless,
24 Simone Leeper, Isaac DeSanto, Benjamin Phillips, and Nithin
25 Venkatraman, all from Campaign Legal Center.

1 THE COURT: All right. Thank you. All right.

2 And our Election Board Defendants?

3 MR. RAYMOND: David Raymond on behalf of the

4 Kansas City Election Board. And, Your Honor, we're gonna

5 not take any position and haven't taken a position. We're

6 not gonna participate. And we will, likely, will listen to

7 opening arguments and then we will, probably, not

8 participate again and not be here, so.

9 MR. CONSTANCE: Brad Constance for the Jackson County

10 Board of Election Commissioners and its directors. And,

11 likewise, we're not going to be participating in the trial.

12 THE COURT: Okay. All right. Have I missed

13 anybody? All right.

14 MS. HUNKER: Your Honor?

15 THE COURT: Yes.

16 MS. HUNKER: I would like to request findings of

17 fact. I know it has to be done before the start of

18 evidence and, then, if I could, also, invoke the rule.

19 THE COURT: Okay. All right. Anybody else have

20 a preliminary record you want to make?

21 MS. KHANNA: Yes, Your Honor. Abha Khanna on

22 behalf of the Healey Plaintiffs. We would agree with the

23 request for findings of fact; particularly, on the disputed

24 issues of fact here.

25 With respect to the rule, I think that's -- I think,

1 that's fine with us. I assume, that that means that
2 parties and experts are permitted in the courtroom?

3 MS. HUNKER: Yes, Your Honor. However, we do
4 think there's a distinction for experts listening to
5 opposing counsel's experts versus each other's. Where one
6 is, you're taking ability to be able to respond and the
7 other is getting your story straight.

8 MS. KHANNA: I -- I've never worked out a
9 distinction like that before, Your Honor. I have no
10 objection, in principal. I don't know. I may have to
11 defer to my colleagues, as well, if there's any concern
12 about that.

13 MR. MULJI: Yeah. This is, I mean, this is
14 unusual for us, Your Honor. I think, the -- the experts, I
15 think, what I've read in the case law, is that experts can,
16 typically, rely on testimony they've heard at trial from --
17 from all of the experts. And so we would prefer to do
18 what's, I think, typical, at least, in our experience.

19 THE COURT: So it's -- I don't know how
20 duplicative they're all going to be, right? If they are
21 listening to somebody else from the same party, that's not
22 necessarily something they need to sit in here to respond
23 to, right? And so I don't know that this is a decision I
24 have to make immediately, because are these folks
25 testifying today?

1 MR. MULJI: We will have two experts testifying
2 today but, actually, I think we only have our first expert
3 in the room anyway, for this part, so.

4 THE COURT: Okay. We can address it when
5 somebody comes up to testify. My gut reaction is,
6 probably, wait until -- have them sit in for the opposing
7 parties' experts, but if somebody wants to give me
8 something that says they can do that, I haven't had that
9 come up, because, usually, there's not a ton of overlap.
10 But, that's my initial reaction, but if somebody wants to
11 convince me otherwise, I'll keep an open mind.

12 MR. MULJI: That's fine with us, Your Honor.

13 THE COURT: Okay. Any other preliminary matters?

14 MS. KHANNA: The last thing, Your Honor, before
15 we move to openings, we have a number of stipulated
16 exhibits --

17 THE COURT: Yes.

18 MS. KHANNA: -- and I don't know that if the --
19 if, Your Honor, would prefer that we move those in now --

20 THE COURT: That's fine.

21 MS. KHANNA: -- to get them off the table?

22 THE COURT: And so I did receive a joint
23 stipulation of facts and exhibits filed jointly by the
24 parties. By my count, the admitted exhibits were 1-20 and
25 21-28 for the plaintiff; Defense, 101; and Intervenors,

1 201; is that correct?

2 MS. KHANNA: Yes.

3 MS. HUNKER: That is largely correct, Your Honor,
4 with the plaintiff's exhibits. There is a small exception
5 for Exhibits 1 through 4 and Paragraph 8. That was not
6 agreed to, but the rest of the affidavit, we do agree to
7 admission.

8 MR. MULJI: And with respect to those exhibits,
9 Your Honor, Plaintiff's 1 through 4, we're happy to
10 stipulate that Paragraph 8 is excluded from the record.
11 And however you want us to deal with that, with respect to
12 the exhibits, whether stating it here on the record is
13 sufficient, we're happy to -- to stipulate to that.

14 THE COURT: The benefit of a bench trial, is I --
15 in my opinion -- I think your stipulation here on the
16 record is sufficient. So with those clarifications, those
17 exhibits will be admitted.

18 MS. HUNKER: Thank you, Your Honor.

19 MS. KHANNA: Thank you, Your Honor. And I
20 believe, just, you mentioned Plaintiff's Exhibits 1 through
21 20, 21 through 28, I believe are -- there's no objection to
22 those admission. I believe there's also no objection to
23 Plaintiff's Exhibits 30 through 86. I'm not sure if that
24 was made clear in the filings, but my understanding is the
25 only objection is Plaintiff's Exhibit 29, and that -- and

1 Plaintiffs are actually withdrawing that exhibit. We've
 2 actually removed it from the Court's binders. So I think
 3 that gets us 1 through 28 and 30 through 86 from
 4 plaintiff's side.

5 MS. HUNKER: I believe that's correct, Your
 6 Honor.

7 THE COURT: Okay.

8 MS. KHANNA: And I apologize if I didn't notate
 9 it, Your Honor. I believe, my understanding is, we
 10 stipulated to the admission of the defendant's exhibits
 11 except for 111, 113, and Intervenor's exhibits 2 -- Exhibit
 12 206.

13 MS. HUNKER: I can only speak to the State
 14 Defendant's exhibits, but that corresponds with what I have
 15 in my records, as well.

16 MR. ELLINGER: And that corresponds with
 17 Intervenor's, also.

18 THE COURT: Okay.

19 MS. KHANNA: Thank you, Your Honor.

20 THE COURT: All right. With the exception of 29,
 21 111, 113, and 206, the remaining exhibits are admitted,
 22 correct? For the plaintiffs?

23 MS. KHANNA: Yes, Your Honor. Thank you.

24 THE COURT: State Defendants?

25 MS. HUNKER: Yes, Your Honor.

1 THE COURT: Intervenors?

2 MR. ELLINGER: Yes, Judge.

3 THE COURT: All right. Okay. Any other
4 preliminary matters? All right. Do you all wish to give
5 an opening statement?

6 MR. MULJI: Yes, Your Honor. The plaintiffs will
7 give a brief opening statement. It will be brief, because
8 we do want to proceed straight to the evidence, but we'll
9 have brief statements.

10 THE COURT: Okay.

11 MR. MULJI: Yeah. If it's all right, Your Honor,
12 I'll just move the podium.

13 THE COURT: Wherever you want.

14 **WISE PLAINTIFF'S OPENING STATEMENT BY MR. MULJI**

15 MR. MULJI: We're here, Your Honor, today because
16 the State of Missouri has taken the extraordinary and
17 unprecedented step of redrawing its congressional districts
18 in the middle of a decade.

19 Now, Plaintiffs have, in Count I, asserted that that
20 effort was barred from the start, because Article III,

21 Section 45 of the Constitution prohibits mid-decade
22 redistricting at all. Now, we understand that that claim
23 is a stay, but it provides, I think, an essential backdrop
24 for the claims that the Court's gonna hear this week. And
25 it also highlights the fact that there is no dispute that

1 the map enacted by Missouri this past year needs to comply
2 with the other mandatory requirements of Article III,
3 Section 45.

4 Including, principally at issue in this case, the
5 requirement that districts be compact as may be. Now, the
6 plaintiffs have filed, I think, extensive briefing on -- on
7 what the legal standard is and how the courts have
8 interpreted it, in cases, principally, in the *Pearson v.*
9 *Koster* case but also the *Johnson and Faatz* case. I won't
10 belabor the standard here, but I will just note for the
11 Court a few, sort of, key aspects of that standard that I
12 think defendants have overlooked that I think will be
13 helpful for the Court to keep in mind as the evidence is
14 presented.

15 So the first -- the first one I want to make is that
16 compactness in Missouri does not mean just the district
17 size or shape; that may be the case in some other states,
18 but the Court has made very clear that in Missouri, it
19 means that districts must comprise closely united
20 territory. Now, the Court has provided some guidance about
21 what that means. In essence, it's that, you know, keeping
22 similar adjacent communities together is really the goal
23 here. And in a way that -- and this is cited in the
24 treatise in the *Pearson* case, that's conducive to
25 communication and interaction among constituents and their

1 representatives.

2 So what that means is that mathematical measures of
3 compactness, which are, I think, one of the principal
4 focuses of Defendant's and Intervenor's briefing, those are
5 relevant, but they're not central to the inquiry here.

6 Second, this is a requirement that applies district-by-
7 district. The Court has said several times in the *Pearson*
8 case that this applies -- this requirement applies to each
9 district. Each district needs to be compact and comprised
10 of closely united territory. So any hyper focus on the
11 compactness of the map overall or as a whole, that's a lot
12 less relevant here.

13 And then, third, the phrase "as may be", used in the
14 Missouri Constitution, that does allow some deviation from
15 compactness, but the Court has made quite clear that that's
16 minimal. It needs to be a minimal deviation and only where
17 those deviations can be explained by compliance with some
18 other constitutional requirement or a factor recognized in
19 Missouri law, will that be permitted under Article III,
20 Section 45.

21 And then, fourth, the Court has identified -- the
22 Missouri Supreme Court has identified alternative map
23 evidence is really a key piece of evidence in these cases
24 that Plaintiffs can use to prove a violation. And that's
25 because alternative maps can show that whether a departure

1 of compactness in the enacted plan was actually necessary
2 or can actually be explained by one of these recognized
3 factors.

4 And, finally, I just want to note, that the Court has
5 said very clearly that although the legislature has
6 discretion to enact any number of compact plans, the
7 compactness requirement itself is mandatory. It can't just
8 be disregarded in the name of making some of these non-
9 mandatory factors or improvements in those regards. So
10 applying that standard here, Plaintiffs will submit that
11 the totality of evidence the Court's gonna hear this week
12 will show that -- that HB1 is clearly and undoubtedly in
13 violation of that compactness requirement.

14 The Court will hear from four qualified experts in
15 this case, whose analyses will show that the challenged
16 districts disregard closely united territory that the
17 previous map, in fact, respected. And the Court will hear
18 from two experts today, who will present alternative map
19 evidence; including, for the plaintiff simulation expert,
20 you know, tens of thousands of maps that can be drawn from
21 the computer that will show that his departure from
22 compactness just cannot be explained by any of the
23 recognized factors in Missouri law.

24 The Court will also hear from a number of Missouri
25 residents and community leaders, including a number of

1 plaintiffs, as well, as the Mayor of Kansas City, whose, I
2 think, lived experiences will -- will confirm what the data
3 demonstrate. And that's that HBI divides communities that,
4 here in this region of the State, are closely united.

5 Finally, with respect to the Wise Plaintiffs
6 additional claims, the undisputed facts in that -- in those
7 claims, show that, sort of, the rushed, opaque legislative
8 process that the legislature used to get HBI enacted; it,
9 actually, ultimately, resulted in a bill that was
10 defective. By its terms, it assigns geographic areas that
11 have the same name to two differing correctional districts,
12 and that creates other independent violations of the
13 Missouri Constitution; mainly the equal population
14 requirement and contiguity requirements.

15 So to close, Your Honor, Plaintiff's understand that
16 our burden here under the law is to prove to you that there
17 are clear and undoubted violations of the Missouri
18 Constitution and the evidence will more than satisfy that
19 burden this week.

20 THE COURT: All right. Thank you.

21 **HEALEY PLAINTIFF'S OPENING STATEMENT BY MS. KHANNA**

22 MS. KHANNA: Good morning, Your Honor. Abha
23 Khanna on behalf of the Healey Plaintiffs. My colleague,
24 Mr. Mulji, just laid out the legal standard that will
25 govern Plaintiff's arguments and evidence over the next

1 several days. I just want to touch, briefly, on some of
2 the arguments and evidence that the defendants will offer
3 in response. Which, at best, ignore that standard and, at
4 worst, contradict it entirely.

5 Now, *Pearson* makes clear that the constitutional
6 compactness inquiry is a holistic analysis that considers
7 the totality of the evidence. Defendants will try to
8 reduce that totality to a single factor, the number of
9 political sub-division splits, including in locals and
10 districts that have no bearing on the configuration of the
11 Kansas City Metro area.

12 *Pearson* expressly rejects the proposition that compact
13 refers solely to physical shape or size. Defendants will
14 proffer expert testimony that examines solely physical
15 shape and size, converting the Missouri Constitution's
16 functional analysis of closely united territory into an
17 arithmetic exercise, down to the hundredth of a decimal
18 point. And, indeed, Your Honor need look no further than
19 the State Defendant's pre-trial brief, to see just how
20 studiously they avoid the closely united territory standard
21 that governs this claim-- this case, referring to it only
22 once in 54 pages of text.

23 Now, Defendant's strategy of avoidance is
24 understandable. Because, after all, the term closely
25 united territory is the antithesis of a district that

1 slices through the heart of Kansas City, that stretches
2 through rural counties, and then, winds its way across 150
3 miles to Jefferson City and beyond. So instead of
4 defending the map under the actual legal standard,
5 Defendants will ask this Court, Well, maybe, just, don't
6 look too closely, Your Honor. Take comfort in principles,
7 of deference, and presumptions of validity. Focus on parts
8 of the state that are far removed from the challenged
9 districts here.

10 And then, if you just squint, maybe, you too can blur
11 out what is otherwise plain on the face of the map. And
12 that is the blatant and unprecedented destruction of a
13 century's worth of history and tradition of respecting the
14 compact and closely united territory of the Kansas City
15 metropolitan area. Now, Defendants will offer a few
16 additional arguments to convince this Court to advert its
17 eyes from the constitutional violation here.

18 They contend that the question of compactness, how to
19 define it, how to prioritize it, how to consider various
20 trade-offs, is, ultimately, a matter for the legislature to
21 decide for itself and not for the Court to second-guess.

22 But, as my colleague made clear, the case law makes clear
23 that compactness is a mandatory and justiciable standard
24 and it imposes meaningful limitations on legislative
25 authority. And, Your Honor, Plaintiffs submit that if this

1 compactness standard in the Missouri Constitution tolerates
2 this level of extraordinary deviation from that principal,
3 then there is nothing mandatory or meaningful about it.

4 Defendants also contend, Well, okay. Well, maybe,
5 some court can examine the map, but this is the wrong court
6 to consider Plaintiff's claims. Well, this Court has
7 already rejected this argument, that's why we're here
8 today, and it's for good reason. Plaintiffs properly seek
9 relief from Defendants who reside here, who play an
10 integral role in implementing Missouri's congressional
11 districts and who, therefore, can redress Plaintiff's
12 injury.

13 And finally, Your Honor, Defendants will contend that
14 even if we're in the right court, it's really too late for
15 this Court to do anything at all. And, hereto, there is
16 neither the law nor the facts are on their side. As a
17 legal matter, the equitable doctrine that they invoke
18 relates to federal courts staying federal injunctions of
19 state election laws. Defendants cannot cite a single
20 Missouri case in Missouri court that has ever adopted that
21 principal and they offer no reason why this Court should be
22 the first.

23 Even more importantly, as a practical matter, the
24 status quo in Missouri remains the 2022 congressional map.
25 And indeed, the very Board Defendants that they claim are

1 inconsequential to this lawsuit, have made clear that they
2 can take no action to even begin implementing the 2025 map,
3 for another two months. In other words, Your Honor, the
4 election machinery in Missouri is steadily operating
5 consistent with the district lines that have been in place
6 for the last four years and the last two election cycles.

7 Now, contrary to Defendant's claims, the only threat
8 of chaos and disruption to Missouri voters, to Missouri
9 communities, and to Missouri elections, lies at the hands
10 of the 2025 map. And with that, Your Honor, on behalf of
11 the Healey Plaintiffs, I just want to thank the Court for
12 making the time to hear our presentation, to hear this case
13 on an expedited basis and to consider Plaintiff's claims.

14 Thank you, Your Honor.

15 THE COURT: Thank you.

16 **STATE DEFENDANT'S OPENING STATEMENT BY MR. SULLIVAN**

17 MR. SULLIVAN: Good morning, Your Honor.

18 Patrick Sullivan with the Attorney General's Office,
19 here on behalf of the State Defendants.

20 In this trial, the Court's going to hear arcane
21 terminology and technical information about things like
22 Reock scores and Convex Hull scores, but the essence of the
23 dispute is a simple one. Can the legislature draw
24 congressional maps that take into account the interest of
25 Missourians statewide? Or does it have to favor Kansas

1 City in a way that benefits some politically connected
2 people, but harms the interest of Missourians around the
3 State? And that's what it boils down to. Missouri first
4 or Kansas City first.

5 As Your Honor heard, the main challenge to the map is
6 the compactness requirement in Article III, Section 45. In
7 deciding that issue, the Court should presume that the
8 Missouri First Map is constitutional. Plaintiffs have a
9 very heavy burden here. They have to show that the map
10 clearly and undoubtedly violates the Constitution; that it
11 palpably affronts the Constitution. Any doubts are to be
12 resolved in favor of the Missouri First Map.

13 If they can't meet that burden, their claims fail, and
14 they can't meet that burden. So they're flailing. They're
15 throwing out everything they can, hoping something will
16 stick. They're gonna bring in fact witnesses that say how
17 important it is to keep Kansas City together the way it is,
18 and that's all well and good, but that kind of evidence
19 isn't recognized as relevant by the Missouri Supreme Court.
20 In fact, the Supreme Court has expressly recognized that
21 that kind of evidence is not relevant and Plaintiffs are
22 bringing in four experts -- four -- and they don't always
23 agree with each other.

24 One expert, Dr. Rodden, is a political science
25 professor. He's not a lawyer, but Counsel asked him to

1 read a Missouri Supreme Court case and, in discovery, he
2 appeared to fancy himself as a lawyer. His opinions were
3 mostly unsupported legal conclusions. We'll see how much
4 of that the Court wants to listen to. But, the important
5 thing to note, his aim is to keep Kansas City together and
6 to heck with the rest of the State.
7 Now, two other experts, Dr. Stern, Mr. Cervas,
8 essentially, do the same thing. They use computer programs
9 to draw alternate maps that they say are better, but, not
10 only is that testimony cumulative, it doesn't help
11 Plaintiffs meet their heavy burden. When they used --
12 created these computer maps, looking only at Kansas City
13 and ignoring the rest of the State, they put their thumbs
14 on the scale and in some cases, that led to absurd results.
15 They'll have you believe that a map that lumps
16 Chilhowee, population 325, in with Downtown Kansas City is
17 better than what the legislature did in the Missouri First
18 Map. Or that splitting Boone County twice makes more sense
19 than splitting Jackson County twice, even though Jackson
20 County's three times bigger. Despite some of the jargon
21 and technical information, Your Honor will see that these
22 comparator maps either lack sense or are doing apples to
23 oranges comparisons.
24 Their final expert, Dr. Cromartie, is similar to Dr.
25 Rodden in that you'll hear he's got a problem with

1 combining urban and rural districts, but that goes against
2 what Dr. Cervas and Stern did in their alternate maps.

3 And, again, Dr. Cromartie might be in here trying to offer
4 legal opinions on the stand here. On the other hand, the
5 state defendants and the intervenors will present evidence
6 that this Court should find helpful. State Defendants and
7 Intervenors each have one expert and they aren't coming in
8 here to try to present legal opinions.

9 They have done a number of mathematical tests on the
10 Missouri First Map, on the 2022 map, on the 2012 map, and
11 in some cases, they've considered data going back decades.
12 The State's expert, Dr. Trende, served as an expert in the
13 case challenging the 2022 maps, *Faatz v. Ashcroft*, F-A-A-T-
14 Z. That case went to the Missouri Supreme Court and the
15 Supreme Court affirmed the trial Court's finding that Dr.
16 Trende was, quote, Well-qualified based on his education
17 and experience to provide opinions on legislative map
18 drawing, end quote.

19 And it just doesn't -- it didn't just find him
20 qualified, it affirmed the trial court expressly based on
21 Mr. Trende's opinions, and you're gonna hear the same kind
22 of data from Dr. Trende in this case. You'll hear that the
23 Missouri First Map performs better under a variety of
24 measures than the 2022 map. You'll hear evidence on the
25 factors that the Missouri Supreme Court has held are

1 relevant in determining compactness.

2 You'll hear that the number of counties split in the

3 Missouri First Map has decreased, significantly, from the

4 2022 map and the same thing from municipalities. Your

5 Honor will hear evidence that the number of municipalities

6 split into different districts has been dramatically

7 reduced in the Missouri First Map, compared to the 2022

8 map. Under the 2022 map, Independence and Blue Springs,

9 for example, were both split. Independence was split three

10 ways. The Missouri First Map keeps these cities together,

11 as well as other important Eastern Jackson County cities.

12 Under the 2022 map, Boone County used to be split

13 right down the middle. In the Missouri First Map, just a

14 small slice of the northern section is split, and something

15 similar is done in the lake region 2022 map split Osage

16 Beach down the middle; that's fixed in the Missouri First

17 Map. Before I got up, I was unclear if certain claims of

18 the Wise Plaintiffs were still in the case. They have an

19 equal population claim and a contiguity claim, also

20 requirements in Article III, and these have to do with

21 Voting Tabulation District No. 811.

22 There is a voting tabulation district or VTD 811 in

23 District 4 and there's a VTD 811 in District 5. During

24 discovery, all of the evidence showed that they are --

25 these are separate VTDs, they're just misnumbered. They

1 had the same number. They represent separate regions.

2 They each have separate GEOID numbers, so to the extent the

3 Wise Plaintiffs are still pursuing these claims, Your Honor

4 would well hear evidence that slams the door on it.

5 At the close of the evidence, the state defendants and

6 Intervenors will ask Your Honor to enter judgment against

7 Plaintiffs on all of their claims and to uphold the

8 Missouri First Map.

9 MR. GORE: Good morning, Your Honor.

10 THE COURT: Good morning.

11 **INTERVENOR OPENING STATEMENT BY MR. GORE**

12 MR. GORE: John Gore, for the intervenor,

13 Missouri Republican State Committee. We thank the Court

14 for allowing us to appear today.

15 For all the reasons the State has explained,

16 Plaintiffs cannot carry their heavy burden in this case.

17 The plaintiff's bare a burden. The defendants do not bare

18 a burden in this case. And the plaintiff -- the burden on

19 the plaintiffs is a heavy one. They must show that the

20 Missouri First Map clearly and undoubtedly can be --

21 contravenes the Constitution. They cannot carry that

22 burden.

23 Their own evidence will show that the Missouri First

24 plan is more compact statewide than the 2022 plan it

25 replaced. It will also show that the Missouri First plan

1 performs better than the 2022 plan on a variety of
2 traditional districting criteria, including fewer county,
3 municipal, and VTD splits. And in fact, the evidence will
4 also show that the three districts that the plaintiff's
5 variously challenge, Districts 4, 5, and 6, are more
6 compact than the versions of those districts in the 2012
7 plan that the Missouri Supreme Court upheld against a
8 compactness challenge in *Pearson v. Koster*.

9 Now, Plaintiffs are largely asking the Court to ignore
10 all the statewide evidence. They want the Court to ignore
11 Missouri first and focus on Kansas City first and Jackson
12 County first, but they don't even tell the whole story
13 about Kansas City and Jackson County. Kansas City and
14 Jackson County have routinely been split into three
15 different districts in prior congressional redistricting
16 plans. They are split into three different districts in
17 the Missouri First plan. So the debate here, is whether
18 the Constitution requires their preferred three-way split
19 of Kansas City and Jackson County or whether the
20 legislature has authority to make that determination on its
21 own as part of its plenary power over congressional
22 redistricting. Moreover, they don't mention anything about
23 Clay County.

24 In both 2012, and 2022, Clay County was split by the
25 congressional districting map, including the Kansas City

1 portion of Clay County. The 2025 plan reunites the Kansas
2 City portion of Clay County and all of Clay County into a
3 single district. They also don't mention that the 2022
4 plan split eight municipalities in Jackson County. The
5 2025 plan heals almost all of those splits, including the
6 three-way split of Independence, by placing Independence
7 now into a single district.

8 The Constitution's as compact as may be requirement
9 has governed congressional redistricting since 1950. No
10 Missouri court has ever held that a congressional district
11 or congressional plan violates that requirement. No
12 Missouri court has ever held that a plaintiff has carried
13 the heavy burden to prove a violation of the as compact as
14 may be requirement in the Constitution. The evidence will
15 show that this court should not be the first. Thank you.

16 THE COURT: All right. Thank you. Just a couple
17 brief logistics questions before we jump into the evidence.
18 I think, it wasn't visible yet on the case when we spoke at
19 our scheduling conference, but there were some -- I would
20 just classify them as, kind of, discovery related filings,
21 I think, maybe, right before, about some subpoenas or
22 something like that. Nobody asked us to do anything about
23 it, and so I assume we can just disregard anything that was
24 filed on those matters?

25 MS. KHANNA: Your Honor, I don't believe

1 Plaintiffs have any outstanding discovery matters.

2 THE COURT: Okay.

3 MS. HUNKER: Your Honor, are you talking about
4 the motions to quash?

5 THE COURT: Yes.

6 MS. HUNKER: Yes, Your Honor. There was no
7 response from Plaintiffs within the timeframe that would be
8 required. And so to the extent that the Court was going to
9 consider it, we would ask you to consider them granted, but
10 it doesn't seem like they're pursuing the discovery fight
11 going forward.

12 THE COURT: Nobody's brought anything to my
13 attention about it, so I was planning to just mark it as no
14 longer at issue, because you all aren't trying to move
15 forward on the subpoenas, right?

16 MS. KHANNA: We're not going to move forward on
17 the subpoenas. No, Your Honor.

18 THE COURT: I --

19 MS. HUNKER: If that's the case, Your Honor, then
20 we're happy to stand on it.

21 THE COURT: I was assuming that, but I -- before
22 we marked it off, I wanted to talk to you all about it.
23 Okay. We'll do that. And then, my only other, just, kind
24 of, hyper technical question, the joint stipulation that
25 you all filed, is that marked as an exhibit?

1 MS. KHANNA: I don't believe it is, Your Honor.
2 We can, if that would make it easier.

3 THE COURT: I assume everybody wants to rely on
4 that, admit it, just for best practice, if we can just mark
5 that as somebody's exhibit and consider it admitted, that's
6 fine with me.

7 MS. KHANNA: We can. We can mark that
8 Plaintiff's Exhibit --

9 MR. MULJI: Eighty-seven.

10 MS. GAMBHIR: Eighty-seven.

11 MS. KHANNA: -- 87.

12 MS. HUNKER: And the State Defendants are fine
13 with that, as well, as admitting it into evidence.

14 MR. ELLINGER: Intervenors are fine with that,
15 Judge.

16 THE COURT: All right. Everybody okay with me
17 considering 87 admitted and part of our evidentiary record?

18 MS. HUNKER: Yes, Your Honor.

19 MR. ELLINGER: Yes, Judge.

20 MS. KHANNA: Yes, Your Honor.

21 THE COURT: Okay. All right. That's everything
22 I was gonna ask. Are we ready to proceed?

23 MR. CAMPBELL-HARRIS: We are, Your Honor.

24 THE COURT: Okay.

25 MR. CAMPBELL-HARRIS: Plaintiffs are gonna call

1 Mr. Terrence Wise to the stand.

2 THE COURT: Okay.

3 Sir, if you can please raise your right hand.

4 **TERRENCE WISE,**

5 having been sworn by the Court testifies as follows:

6 THE COURT: Thank you. Have a seat, please.

7 **DIRECT EXAMINATION BY MR. CAMPBELL-HARRIS**

8 Q. Good morning, Mr. Wise. How are you this morning?

9 A. Doin' all right.

10 Q. Excellent. You're a named plaintiff in this case,
11 correct?

12 A. Yes.

13 Q. Oh, I guess, first, can you please spell out your name
14 for the record?

15 A. It's Terrence Wise; T-E-R-R-E-N-C-E, W-I-S-E.

16 Q. And where do you live, Mr. Wise?

17 A. I live on 44 -- 44st and Monroe, in the inner city,
18 Kansas City.

19 Q. Okay. And have you always lived in that neighborhood?

20 A. No. I've lived in various neighborhoods around Kansas
21 City, you know, east, north, west, all around the city.

22 Q. Okay. And how long have you lived in Kansas City?

23 A. Over 20 years.

24 Q. And do you have family in Kansas City?

25 A. Yep. I have a wife and three girls.

1 Q. And how old are your girls?

2 A. Twenty-four, 22, and 20.

3 Q. Okay. And did they go to school in the city?

4 A. Yes.

5 Q. Whereabouts did they go to school in the city?

6 A. Various locations; Paseo, Raytown, Martin Luther King,
7 so they've been to school all around the city.

8 Q. Okay. And are you currently registered to vote in
9 Kansas City?

10 A. Yes.

11 Q. Okay. And since when have you been registered to
12 vote?

13 A. Since the -- I didn't vote until the second time Obama
14 ran for office, so that was the first time I was registered to
15 vote.

16 Q. Was that, about, 2012, fair to say?

17 A. Yep.

18 Q. And what congressional district do you currently
19 reside in?

20 A. The Fifth District.

21 Q. Okay. Do you know who your congressional
22 representative is?

23 A. Congressmen Emanuel Cleaver.

24 Q. Okay. And has Emanuel Cleaver always been your
25 representative?

1 A. Yes.

2 Q. Okay. What do you do for work, Mr. Wise?

3 A. Well, I drive full-time for Uber, Instacart, and
4 DoorDash.

5 Q. Okay. And where does Uber, Instacart, and DoorDash
6 regularly have you drive when you're driving in Missouri?

7 A. Well, the majority is in the inner city metropolitan
8 area, but I go as far north as the airport, as far south as
9 Raymore, Belton. Go to Independence, Lee's Summit, and even on
10 the Kansas side, Olathe, Overland Park, so all around.

11 Q. And when you say the "metropolitan area", do you mean
12 the Kansas City metropolitan area?

13 A. Yes.

14 Q. Okay. And are you involved in any civic
15 organizations?

16 A. Well, yes; Stand Up KC and the Missouri Workers
17 Center.

18 Q. And what is your role at Stand Up KC?

19 A. Well, I'm a worker leader. Yeah.

20 Q. What do you do as a worker leader?

21 A. Well, organize my coworkers and folks I work with and
22 live with in my community, to not only, you know, come together
23 to win racial and economic equality, but to come together with a
24 plan on how we do it, as well.

25 Q. Okay. And does Stand Up KC engage in Get Out the Vote

1 work, as well?

2 A. Yes.

3 Q. What kind of Get Out the Vote work does Stand Up KC
4 do?

5 A. Voter registration, getting people registered to vote,
6 and then getting folks on the same page of what we want to see
7 changed in our community.

8 Q. Okay. What is Stand Up KC?

9 A. Stand Up KC is the Kansas City arm of the national
10 Fight for 15 and a Union movement.

11 Q. Okay. And what is the Fight for 15 movement?

12 A. It was started over a decade ago with fast food
13 workers organizing to win \$15 an hour and win a union. Stand Up
14 KC is the Kansas City arm of that movement, the Fight for 15 and
15 a Union.

16 Q. Okay. What is Stand Up KC's mission?

17 A. Well, not only to win \$15 an hour and a union,
18 originally, but to, like I said, win racial and economic
19 equality and come together to combat all the social ills that
20 harm workers in our communities.

21 Q. And does Stand Up KC overwhelmingly work within Kansas
22 City?

23 A. Yeah, we do.

24 Q. Okay. How, if at all, has your work with Stand Up KC
25 informed your knowledge about the issues voters in the

1 metropolitan Kansas City area care about?

2 A. Well, like I said, I didn't even vote until I joined
3 Stand Up KC and began organizing, but it -- it helped me to see,
4 not only that our employers dictate our every day living
5 conditions and play a role in that, but our elected officials,
6 as well, folks we put into office, play a part in that, as well.

7 Q. What are some of the issues or policies that you and
8 Stand Up KC work to address?

9 A. Well, not only lifting the minimum wage here in Kansas
10 City and across the state, but when it comes to healthcare and
11 LGBTQ rights and Medicaid expansion, not only affordable
12 housing, but safe housing, those type of things that impact the
13 community.

14 Q. Okay. And how do you work to address those issues
15 that Stand Up KC cares about?

16 A. Well, first, you got to organize the folks. Organize
17 the people and bring people together and then develop plans;
18 whether we go on strike, hold rallies, hold town halls, things
19 of that nature.

20 Q. And when you've attended these rallies, who, in your
21 experience, who else attends them?

22 A. Well, everyone around the community; black, white,
23 brown, Hispanic, native born, foreign born, gay, straight, so
24 it's a melted pot of the community that attend.

25 Q. When you say "the community", do you mean the Kansas

1 City metropolitan area?

2 A. Kansas City metropolitan area and surrounding areas,
3 as well.

4 Q. Okay. And are there faith leaders at these rallies,
5 too?

6 A. Yes.

7 Q. Okay. And in your experience with civic engagement
8 work, if there's an issue facing minimum wage working people in
9 Kansas City, who -- which congressional representative have you
10 reached out to?

11 A. Emanuel Cleaver.

12 Q. And why do you reach out to Emanuel Cleaver?

13 A. Well, he's a, first and foremost, the congressmen in
14 my district, but he's been present, you know. Even from the
15 very first strike that I went on in front of my store here in
16 Kansas City, Emanuel Cleaver was there and present. And over
17 the last decade, he's been present at a lot of rallies; whether
18 it's a Labor Day rally, our Selma 50-year anniversary march here
19 in Kansas City, workers going on strike and holding a protest.
20 He's been present.

21 Q. Okay. And do you think when you reach out to
22 Congressman Cleaver, he's been responsive to your requests?

23 A. Yes.

24 Q. Why do you think he's been so responsive?

25 A. I think because he's not only been at rallies, but

1 he's been present in the community, as well. Like, I see him
 2 while I'm shopping at Hy-Vee and at the grocery store. I see
 3 him at community shops and have conversations with him, and I
 4 also see him at community events.

5 Q. Do you know where Representative Cleaver lives?

6 A. I don't know his home address, no.

7 Q. Do you know, generally, the area?

8 A. Yes.

9 Q. And what area does he, generally, live in?

10 A. In Kansas City.

11 Q. Okay.

12 A. Yeah.

13 Q. And when you've tried contacting Congressman Cleaver,
 14 you've been successfully able to reach him?

15 A. Yes.

16 Q. In your experience, does Congressman Cleaver conduct
 17 constituent outreach?

18 A. Yes.

19 Q. Okay. And have you seen him at community events, as
 20 well?

21 A. Yes.

22 Q. Okay.

23 A. Most recently, at a Martin Luther King Day celebration
 24 here in Kansas City, St. James Church, ran into him there.

25 Q. Where is St. James Church?

1 A. Fifty-fifth and Wayne here in Kansas City, the inner
2 city.

3 Q. Okay. And have you seen any members of Missouri's
4 congressional delegation representing rural parts of Missouri at
5 any of these community events in Kansas City?

6 A. No.

7 Q. Have you -- scratch that.

8 Have you ever tried contacting any representatives
9 representing Missouri's rural parts from their congressional
10 delegation before?

11 A. Yes. Stand Up KC has.

12 Q. Okay.

13 A. Yes.

14 Q. And how successful were you in reaching out to those
15 representatives?

16 A. Not -- not very successful. Like, we've invited them
17 to town halls and rallies and even to join workers who have been
18 protesting and exercising their right to go on strike, but I
19 haven't had the opportunity to have them present. Yeah.

20 Q. Okay. Are you familiar with the name Mark Alford?

21 A. Yes.

22 Q. Did you and Stand Up KC try reaching out to Mark
23 Alford to attend any of these Stand Up KC events?

24 A. Yes and town halls. Yeah.

25 Q. And town halls. Did he attend any of those town halls

1 or events?

2 A. No.

3 Q. Are you familiar with the name Sam Graves?

4 A. Yes.

5 Q. Did you and Stand Up KC try reaching out to him to
6 attend rallies and town halls?

7 A. Yes.

8 Q. And how was -- what was his response?

9 A. He wasn't present, either.

10 Q. What are some of the bills that Congressman Cleaver
11 supported that you felt addressed the needs of working people in
12 Kansas City?

13 A. Well, he's supported not only liftin' the minimum wage
14 here in Kansas City and across the state, but when it came to
15 Medicaid expansion and the women's right to the choice of their
16 body and -- and healthcare, you know, things of that nature,
17 he's been very supportive.

18 Q. Do you know whether any Missouri congressman
19 representing rural parts of the states also supported any of
20 these bills?

21 A. No.

22 Q. And in recent years, have you seen the Missouri
23 legislature pass bills that are unresponsive to the needs of
24 Kansas City residents?

25 A. Yes.

1 Q. What were those bills?

2 A. Well, when we most recently passed Prop A here in
3 Missouri to lift the minimum wage statewide, not only was it to
4 lift the minimum wage statewide to \$15 an hour, but it gave
5 workers access to paid time off and it had a built in living
6 wage adjuster that adjusted the -- the cost of living every year
7 on the minimum wage, but even though Missourian's statewide
8 passed it, folks in Jefferson City gutted it. They took away
9 the paid sick time and the living wage adjustment calculator
10 that was supposed to go along with Prop A.

11 Q. Okay. And what was Prop A?

12 A. It was a statewide initiative to, you know, lift the
13 minimum wage to \$15 an hour and give the paid sick time off.

14 Q. Why did there need to be a statewide initiative to
15 pass Prop A?

16 A. Well, we had in the past, Stand Up KC, we passed a
17 City Ordinance to lift the minimum wage here in Kansas City to
18 \$15 an hour, but folks in Jefferson City preempted it and took
19 it away and said we had to do it on a statewide level; hence,
20 Prop A coming along. Yep.

21 Q. And when you say Stand Up KC passed that statewide
22 ordinance, do you mean they supported the passing of the
23 ordinance?

24 A. They supported it and City Council passed it, yes.

25 Q. Let's talk a little bit more about Kansas City. Do

1 you take public transportation, Mr. Wise?

2 A. I did for the majority of my working life. I did.

3 Q. And can you speak to whether, in your experience,
4 Kansas City residents take public transportation?

5 A. Yes.

6 Q. And in your experience, do Kansas City residents
7 broadly support the expansion of public transportation?

8 A. Yes.

9 Q. And what is your experience of public transportation
10 in western Missouri outside of Kansas City?

11 A. Well, it's inadequate, to say the least, you know.
12 Folks who have to get up really early, like, before 6:00, 5:00,
13 4:00 AM, it doesn't run early enough. And when, late at night,
14 folks who work restaurant and other jobs they got off 1:00 and
15 2:00 in the morning, it's not available at those hours so, it's
16 definitely a need for improvement.

17 Q. Okay. I'm gonna hand you a document in a moment. Mr.
18 Wise, have you seen this document before?

19 A. Yes.

20 Q. What is it?

21 A. It's a map of Kansas City and the surrounding areas.

22 Q. Okay. In your experience -- well, what do the numbers
23 reflect on this document?

24 A. Different congressional districts.

25 Q. Okay. In your experience, as a community organizer,

1 how did the shapes of these districts serve the needs of voters?

2 In both rural and urban areas.

3 A. Well, I don't think they do.

4 Q. And why not?

5 A. Well, I think that we can all agree or that I can even
6 see --

7 THE COURT: I'm sorry to interrupt you. Just,
8 kind of, a technical point for our record.

9 MR. CAMPBELL-HARRIS: Oh.

10 THE COURT: So the -- what he's looking at right
11 now, it appears, they say, Demonstrative 1 and 2, but
12 Demonstrative 1 would be the, I guess, we'll call it the
13 2025 map, correct?

14 MR. CAMPBELL-HARRIS: Correct.

15 THE COURT: And then, Demonstrative 2 is --

16 MR. CAMPBELL-HARRIS: The same map but zoomed in.
17 And I can clarify that for the record.

18 THE COURT: Okay.

19 MR. CAMPBELL-HARRIS: So --

20 THE COURT: Hold on. Just one other thing. My
21 only other request would be that we call it something --
22 mark it as something else.

23 MR. CAMPBELL-HARRIS: Okay.

24 THE COURT: So whenever the fine folks that are
25 gonna review this look at it, they don't have multiple

1 number ones. So do we -- can we come up with a new number
2 so it's, just, a sequential with the other stuff that we
3 have?

4 MR. SULLIVAN: Your Honor, we're not clear where
5 this came from.

6 MR. CAMPBELL-HARRIS: We're not entering this in
7 as an exhibit. It's just a demonstrative to guide the
8 witness for his testimony.

9 THE COURT: No. I get that. I just, purely,
10 want to have them as separate numbers and then --

11 MR. CAMPBELL-HARRIS: Okay.

12 THE COURT: -- we can deal with the other parts
13 of it in a moment. I just want to make sure there's a
14 separate number for it and that's marked; does that make
15 sense?

16 MR. CAMPBELL-HARRIS: It -- it does.

17 MR. MULJI: We could do 88.

18 MR. CAMPBELL-HARRIS: Eighty-eight? Okay. We'll
19 mark it as Demonstrative 88.

20 THE COURT: Okay. We will call it Exhibit 88 --

21 MR. CAMPBELL-HARRIS: Okay.

22 THE COURT: -- and then, you're showing it as a
23 demonstrative.

24 MR. CAMPBELL-HARRIS: Correct. Okay.

25 THE COURT: All right. I apologize for

1 interrupting.

2 MR. CAMPBELL-HARRIS: No.

3 THE COURT: I just wanted to keep things as clear
4 as we can.

5 MR. CAMPBELL-HARRIS: No. That make sense.

6 Q. (MR. CAMPBELL-HARRIS) Do you need me to repeat the
7 question, Mr. Wise?

8 A. Please.

9 Q. Okay. I asked you: How do the shapes of these
10 districts serve the needs of voters in rural and urban areas?
11 And I believe you respond, that they don't; is that right?

12 A. Correct.

13 Q. And why is that?

14 A. Well, I think it's -- it's known that we all,
15 regardless of where you are on this map, deserve, you know, good
16 wages, safe housing, affordable housing, healthcare; we should
17 all have access to those things. But, there's different needs
18 for our communities and the communities on this map.

19 Folks in the, you know, rural parts of the state, they have
20 a different landscape, you know? Like, they've got a lot of
21 farmland and a lot of farm work, and in the inner city where I
22 live, it's lot of restaurants, hotels, service-based jobs. And
23 in the rural parts of the state, for instance, it's a lot of
24 heavy machinery that travels those roadways, so they probably
25 need extra focus and representation that addresses their

1 infrastructure, their roads, farmland, and things of that
2 nature.

3 And then, the inner city there's quite a few pot holes, you
4 know, and we need representation that fights and reflects that.

5 So I can see the -- and I know that we all have a lot in common,
6 but it's different needs when you talk about Kansas City, the
7 metropolitan area, and the rural parts of the State, as well.

8 Q. Thank you, Mr. Wise. I also gave you a document that
9 I'm marking as Exhibit 89. Have you seen this document before?

10 A. Yes.

11 Q. What is it?

12 A. It's showing Kansas City Metropolitan area. I see
13 Westport. I see east and west of Troost. I see where I live,
14 and I even see the airport up top.

15 Q. And what do you understand the shading on this map to
16 be?

17 A. Well, I see the division, right here, along Troost
18 Avenue, where you've got the, just, the inner city divided.

19 Q. Do you understand that dividing line to be the
20 dividing line between the two congressional districts under the
21 2025 plan?

22 A. Yes.

23 Q. What stands out to you about this map?

24 A. Well, how it -- how it divides -- divides my community
25 right down the Troost corridor where -- where it, literally,

1 splits us, splits the community, into two different parts here,
2 you know.

3 Q. You mentioned Troost, what's significant about Troost?

4 A. Well, Troost is, you know, what they call the dividing
5 line in the city, you know. I stay on the east side of Troost
6 and I've stayed on the west side of Troost as well. But, over
7 the last 10 years, I've been organizing, you know, with folks
8 and coming together on both sides of Troost to use our strength
9 in numbers to, you know, win in our places of employment but,
10 also, to take that power to the ballot box. And win things like
11 Prop A and Amendment 3 and elect folks who we know are gonna
12 serve Kansas Citians and the workers in our city the best.

13 Yeah.

14 Q. You mentioned earlier that you had lived north, west,
15 east in Kansas City. Did you live west of Troost?

16 A. Yes.

17 Q. Or have you?

18 And you mentioned your children went to school all over
19 Kansas City, as well; is all right?

20 A. (Nonverbal response.)

21 Q. Do you have any children who go to school west of
22 Troost?

23 A. Yes.

24 Q. Okay. And you mentioned that Stand Up KC holds
25 rallies, correct?

1 A. Yes.

2 Q. Do the people who attend those rallies come from both
3 sides of Troost?

4 A. Yes.

5 Q. Where do these rallies, generally, start for Stand Up
6 KC?

7 A. Well, right -- right on Troost Avenue was the birth of
8 our first office in Stand up KC, here in Kansas City, St. Mark's
9 Church on Troost Avenue. Yep. That's where most rallies and
10 strike lines start at.

11 Q. Okay. In your experience, Mr. Wise, how has a
12 congressional district that unites Kansas City residents on both
13 sides of Troost impacted you and your community?

14 A. Well, it's given us a voice and power at the ballot
15 box to come together on -- on many different issues, not just
16 when we talk about minimum wage and lifting wages. But, when we
17 come and talk about building power in our city, when we talk
18 about sitting together whether it was Me Too or LGBTQ rights or
19 Black Lives Matter rallies. We've been able to unite on both
20 sides of the -- of Troost to, you know, make those things
21 happen.

22 Q. You can put the exhibit down.

23 A. Oh, sorry.

24 Q. No. You're okay. Did you attend any town halls about
25 Missouri redistricting in 2025?

1 A. Yes.

2 Q. And were there other people from Kansas City in
3 attendance at those town halls?

4 A. Yes.

5 Q. What is your understanding about where the people from
6 Kansas City stood on HB1 at those town halls?

7 A. They weren't feelin' it. Yeah.

8 Q. How do you feel about HB1?

9 A. I feel like it -- it weakened our voice as a community
10 and divided us, you know.

11 Q. Why did you decide to get involved in this litigation,
12 Mr. Wise?

13 A. Well, you know, the same reasons I've decided to join
14 Stand Up KC and fight for better wages and better working
15 conditions. I joined this fight to fight for my family and my
16 community, and to stand up for my family as a father and my
17 community as a member, you know. I saw this map as an attack on
18 my own personal voice and a way to try to diminish the power I
19 had to come together with others and be -- be effective at the
20 ballot box. Yeah.

21 Q. And in your experience, what do you do when people try
22 to diminish your power? Either, in the workplace or in the
23 legislature.

24 A. What I've always done, I fight back, you know.

25 Q. Thank you.

1 MR. CAMPBELL-HARRIS: Moment to confer with
2 counsel?

3 THE COURT: Sure.

4 MR. CAMPBELL-HARRIS: We pass the witness.

5 **CROSS-EXAMINATION BY MR. SULLIVAN**

6 Q. Good morning, Mr. Wise.

7 A. Morning.

8 Q. When you voted in the 2024 election, you're aware that
9 the congressional map in effect split Kansas City into three
10 districts?

11 A. I was not aware.

12 Q. You were talking a little bit about Proposition A.

13 Congress wasn't involved in that, were they?

14 A. I'm sure they weren't.

15 Q. Congress doesn't fix holes in Kansas City, does it?

16 A. No.

17 Q. And you're aware that the boundary for the state
18 senate districts in Kansas City, the boundary runs down Troost;
19 did you know that?

20 A. Yes.

21 Q. Okay.

22 MR. SULLIVAN: I don't have any further
23 questions. Thank you.

24 MR. ELLINGER: No questions from the intervenor,
25 Judge.

1 THE COURT: Any additional questions?

2 MR. CAMPBELL-HARRIS: No more questions from the
3 plaintiffs, Your Honor.

4 THE COURT: All right. You can step down. Thank
5 you.

6 MR. MULJI: Your Honor, the plaintiffs will next
7 call our first expert, Dr. Jonathan Cervas, but before I
8 do, I was wondering if it would be okay if we took, about,
9 a two minute break to get set up tech wise for this part.

10 THE COURT: No. That's fine. Let's -- we can
11 take, just, a 10 minute break and I do try to -- 10 minutes
12 is 10 minutes. Just so you all know, if you haven't picked
13 up on it yet, that clock is fast back there. So you may
14 want to check your watch or computer for the time, but we
15 can take -- let's take 10, and then that way, we'll stretch
16 closer to, probably, about 11:00 or so, if we can, before
17 we take another short break. Okay. All right. Thank you.

18 (COURT WAS IN RECESS.)

19 THE COURT: Okay. If -- I don't remember if you
20 introduced or called, technically, your witness, if you
21 want to --

22 MR. MULJI: I'll do it, again.

23 THE COURT: Go ahead.

24 MR. MULJI: Just, right, quickly before I do
25 though, Your Honor. I -- we do have binders prepared of

1 the exhibits, minus the ones that we withdrew, and the
2 additional one that we added.

3 THE COURT: Okay.

4 MR. MULJI: And so we have this here for the
5 Judge and we've also provided one for the witness and we'll
6 have one for the defense, as well. The defense's
7 binders --

8 MR. GAMBHIR: We'll update it over the course.

9 MR. MULJI: Okay. These are the two we've been
10 able to update, but we've provided the defendants and
11 intervenors all of the exhibits, if that's okay with you
12 all.

13 THE COURT: Okay.

14 MR. MULJI: All right. Plaintiffs call Dr.
15 Jonathan Cervas to the stand, Your Honor.

16 THE COURT: All right. If you can please raise
17 your right hand.

18 **DOCTOR JONATHAN CERVAS,**
19 having been sworn by the Court testifies as follows:

20 THE COURT: Thank you. Have a seat, please.

21 **DIRECT EXAMINATION BY MR. MULJI**

22 Q. Good morning, Dr. Cervas.

23 A. Good morning.

24 Q. Would you please state your name for the record?

25 A. Jonathan Cervas.

1 Q. What do you do for work, Dr. Cervas?

2 A. I am a assistant teaching professor at Carnegie Mellon
3 University in Pittsburgh, Pennsylvania.

4 Q. How long have you been at Carnegie Mellon?

5 A. About five years.

6 Q. And what are your primary areas of expertise?

7 A. I'm a political scientist. I study American politics.
8 I study representation, voting rights, and redistricting.

9 Q. Okay. And have you published any peer-reviewed
10 articles on redistricting?

11 A. Yeah. About -- about ten.

12 Q. Okay. Any writings on the issue of compactness?

13 A. Nothing explicitly about compactness. Many of the
14 writings talk about compactness. I do have a working paper
15 about compactness that I've been working on for, maybe, five or
16 six years; it's been pretty stagnant. And recently within the
17 last year, I've added a co-author and picked it back up, but
18 it's not published.

19 Q. Okay. What, if any, work have you done on
20 redistricting outside of academia?

21 A. So I have served as an expert witness in a couple of
22 cases before this one. And I've served as -- appointed by
23 either federal courts or state courts to -- as special master or
24 consultant.

25 Q. Let's start with your experience as a -- as an expert

1 witness. Did your engagements as an expert witness ever involve
2 evaluating maps for compliance with redistricting criteria like
3 compactness?

4 A. Yes. In both my previous cases.

5 Q. And have your engagements involved drawing alternative
6 redistricting plans?

7 A. Yes. Both times, yes.

8 Q. To your knowledge, has a court ever declined to accept
9 your testimony?

10 A. No.

11 Q. Okay. Now, you mentioned you've also served as a
12 special master or a court consultant. For our benefit, what
13 does that mean? What's that job?

14 A. It's -- basically, my role with the Court was to
15 evaluate, like, court, like, party proposed maps or citizen
16 proposed maps to evaluate them for their constitutionality, and
17 in some cases, to provide a remedy map for the Court to use in
18 elections.

19 Q. And have any of the maps that you've drawn for courts,
20 that courts have ordered, been used in elections?

21 A. Yeah. When I served as special master for the state
22 of New York, I drew the congressional map that was -- and the
23 state senate map that were used in subsequent elections.

24 Q. Okay. Now, in this case you prepared a -- two written
25 expert reports; one dated December 30, 2025, and a rebuttal

1 report dated January 14, 2026. I'm not trying to quiz you on
2 the dates, but does that sound about right to you?

3 A. Yeah. It sounds right.

4 MR. MULJI: Okay. I'll just note for the record,
5 that those expert reports have been -- have been admitted
6 into the record as Plaintiff's Exhibit 23 and 24.

7 Q. Are the remainder of your qualifications listed in
8 your report and your attached CV?

9 A. Yes.

10 Q. Are the opinions that you're offering today, do they
11 correspond to the opinions that you set out in those reporter?

12 A. Yeah. They're the same.

13 Q. Okay.

14 MR. MULJI: Your Honor, I'll note that the
15 parties, as we've mentioned, our joint stipulation has
16 stipulated to Dr. Cervas' qualifications in the areas of
17 political science, redistricting, and census data. And
18 Plaintiffs would offer him as an expert in those areas at
19 this time.

20 MR. SULLIVAN: No objection to his being an
21 expert in those areas.

22 THE COURT: Okay. I don't usually sign off on
23 somebody as an expert, but if you all agree that he can
24 just jump right into opinion testimony, that's fine. And
25 then, if they feel like he's going outside of it, I'm sure

1 they will object.

2 MR. MULJI: We'll jump right in, then.

3 THE COURT: Okay.

4 Q. (MR. MULJI) Okay. Doctor Cervas, I want to start
5 with your assignment in this case. What were you asked to
6 analyze here?

7 A. I was asked to analyze the compactness of
8 Congressional Districts 4 and 5 in the 2025 congressional map.

9 Q. And what specific questions were you asked about the
10 -- to answer about the compactness of those two districts?

11 A. So the first question is: Are the districts in CDs --
12 the CDs 4 and 5 Districts -- in the 2025 map, compact? And
13 then, if not, whether Federal Constitution, State Constitution,
14 or relevant factors of Missouri law can explain the reduction in
15 compactness.

16 Q. And what is your understanding of what compactness
17 generally means in Missouri?

18 A. Yeah. It means that it's a -- it's been understood to
19 mean not just the size and shape of districts, but these other
20 relevant considerations.

21 Q. And how did you come to that understanding?

22 A. I learned it through you. Through the plaintiff's
23 counsel.

24 Q. Okay. But speaking from your own experience, why is
25 district compactness a relevant consideration in redistricting?

1 A. Because, generally speaking, compacted districts lead
2 to better representation. It facilitates a constituent
3 representative link.

4 Q. Let's turn to your methodology. At a high level, how
5 did you approach your analysis of compactness in this case?

6 A. Well, it's a comparative method.

7 Q. What does that mean? What did you compare?

8 A. So I'm gonna compare the 2025 map, the CDs 4 and 5 in
9 the 2025 map, to the CDs 4 and 5 in the 2022 map, and also to a
10 set of alternative maps that I created.

11 Q. Okay. And what features of these maps are you
12 comparing?

13 A. So I'm gonna first compare them on what might be
14 referred to as quantitative measures. So these are things like
15 the Reock and Polsby-Popper scores that were talked about
16 earlier. So they're social science approaches to compactness,
17 but, also, I'm going to compare the maps on the relevant factors
18 found in Missouri law.

19 Q. Now, is this comparative method -- is it common in
20 redistricting?

21 A. Yeah. It's very common in these types of cases for
22 redistricting. It's also common in science, more generally, to
23 make comparisons and look at things relatively.

24 Q. Now, we're going to pull up on the screen and I'm
25 going to refer you to Plaintiff's Exhibit -- what has been

1 admitted as Plaintiff's Exhibit 82. Oh, it's there. Great.

2 And it's also in the binder in front of you and, for the Court,
3 it's also in the binder there for the Court.

4 But, now, Dr. Cervas, would you explain what Plaintiff's
5 Exhibit 82 shows?

6 A. Yeah. My pleasure. So these are, obviously,
7 statewide maps of Missouri and the map on the left is the
8 district lines for the 2022 congressional map. And the map on
9 the right is the district lines for the 2025 map. I've
10 highlighted in orange District 4 in each of these maps and I've
11 highlighted in blue District 5.

12 Q. And looking at this, this is in a statewide view, I
13 guess, what did you observe about how these Congressional
14 Districts 4 and 5 changed from 2022 to 2025?

15 A. Well, in the map on the left, the 2022 map, District 4
16 is a rural district centered on rural western Missouri counties.
17 It is reasonably configured and it takes in that -- that rural
18 population. District 5 in the 2022 map is a district centered
19 on the Kansas City metropolitan area, the urban population in
20 western Missouri.

21 The map on the right, the changed map, the map resulted
22 after the 2025 lines were drawn, divides the rural counties in
23 half and takes those rural counties and mixes them in with the
24 suburban and urban areas of Jackson County and thereby changing
25 the character of these rural districts.

1 Q. I would like to next pull up Plaintiff's Exhibit 83.

2 Dr. Cervas, what does Plaintiff's Exhibit 83 show?

3 A. So this is the same map that I just had up on the
4 screen. You can see the orange and blue colors corresponding to
5 the districts, but now we're zoomed in on the, sort of, greater
6 Kansas City metropolitan area and the surrounding rural counties
7 around it.

8 Q. And why -- why zoom in on Jackson County? This area
9 in particular.

10 A. So this is -- there's only one county that's split
11 between Districts 4 and 5 in either these two maps and it's
12 Jackson County, and so this demonstrates the counties that is
13 split in both of these maps.

14 Q. What, if anything, did you observe in -- from these
15 maps about how Congressional Districts 4 and 5 split Jackson
16 County?

17 A. Well, as you can see on the 2022 map on the left, the
18 division of Jackson County is a vertical split and the part that
19 is in District 4 is the more rural part of Jackson County, and
20 the part that's in District 5 is the much more urban, suburban
21 character of -- of Jackson County.

22 Q. How did things change in 2025?

23 A. So the -- it's no longer a vertical dividing line.
24 It's now a horizontal dividing line. And urban parts of Jackson
25 -- urban and suburban and rural parts of Jackson County are now

1 placed in the District 4, as are urban, rural, and suburban
2 parts of Jackson County put in the District 5.

3 Q. Let's pull up Plaintiff's Exhibit 84. Okay. Doctor
4 Cervas, what does Plaintiff's Exhibit 84 show?

5 A. So this is what is called a population density dot
6 plot map. So these are actually, physically, dots on the map.
7 Each dot represents 10 persons, who -- so every dot is 10
8 people. And the idea of these maps are to describe visually
9 where people live.

10 Q. And what, if anything, did you take away about how
11 Districts 4 and 5 were -- were configured in 2022 and 2025?

12 A. Well, now, you can see what I described from the
13 previous map. The eastern part of Jackson County is much less
14 densely populated than the western part of Jackson County. And
15 the map on the left shows how the dividing lines separate out
16 rural Jackson County between Districts 4 and 6 and urban Jackson
17 County is paired with urban Clay County in District 5. And
18 then, in the 2025 map, those patterns are disrupted and urban
19 parts are placed into each of those three different districts.

20 Q. And, now, let's turn to Plaintiff's Exhibit 85. What
21 does Plaintiff's Exhibit 85 show?

22 A. So very similar to the previous map, this is another
23 way to describe density. This is data that a map file that I
24 downloaded from the US Census Bureau from their Urban-Rural
25 Program. The yellow areas describe the urban areas and the

1 white area describes the rural parts of the state.

2 Q. And what did you glean from this data?

3 A. It's almost exactly the same, right? The more urban
4 areas are kept in the District 5 in the 2025 map and the more
5 rural parts are kept in District 4 or District 6 and those areas
6 are all, sort of, mixed together between those three districts
7 in the 2025 map.

8 Q. What relevance, if any, does the Census' Urban-Rural
9 designation data have to your assessment of closely united
10 territory?

11 A. Well, I mean, it's a way to describe how people live.
12 It is, sort of, a objective way that the Census determines
13 whether an area is rural or not and they use this data for
14 policy purposes. The needs of rural America are different than
15 the needs of urban America and this data helps facilitate that
16 through our government.

17 Q. In light of the data we've just seen and the other
18 data you considered, how does the 2025 map compare to the 2022
19 map in its treatment of closely united territory, in your view?

20 A. Well, it doesn't treat these areas as closely united
21 and they are far less compact than they were in the 2022 map in
22 Districts 4 and 5.

23 Q. I want to now direct your attention -- and we'll pull
24 it up on the screen -- to Figure 1 on page 6 of your opening
25 report; that's plaintiff's Exhibit 23, for the record.

1 Now, you said earlier that you created a set of alternative
2 illustrative maps. What was the purpose of that exercise?

3 A. That's a comparative purpose. It's to compare -- to
4 compare the 2025 map to a set of alternative counterfactual
5 examples.

6 Q. Why is a counterfactual helpful here?

7 A. Right. A counterfactual's helpful because it allows
8 me or the Court to understand what, potentially, could have
9 happened had different choices of the legislature been made.

10 Q. And you created -- I think, we have eight maps up here
11 on the screen; is that right?

12 A. Yes.

13 Q. And just for the record, those top two maps are
14 showing the 2022 map on the left and the '25 map on the right;
15 is that correct?

16 A. Correct.

17 Q. Now, you said that you'd set out to create these
18 alternative maps; where you aiming to do anything with the
19 compactness of CDs 4 and 5?

20 A. Well, I wasn't, necessarily, aiming to do anything. I
21 drew the maps as I would if I were appointed by a court to draw
22 a remedial map. I draw -- you draw maps based on traditional
23 redistricting criteria, which includes, you know, compact shapes
24 built on political subdivisions, but the kinds of things that
25 are recognized in the Missouri Constitution.

1 Q. Did you find that the maps that you drew -- were you
2 aiming to make the Districts 4 and 5 more compact? Or did you
3 have any goal with that regard?

4 A. Well, they naturally come out more compact, right? If
5 you don't try to draw the districts ill-compact, they're gonna
6 naturally come out compact, because the population density
7 dictates this outcome.

8 Q. Now, there's been some suggestion in this case that
9 you were setting out to draw the perfect map, the perfectly
10 compact, universally compact map; is that what you were setting
11 out to do?

12 A. Well, no. I'm on the record in many places publicly
13 saying that there's no such thing as a perfect map. There are
14 many possible maps available for a legislature to choose from.
15 They have discretion over where some of the lines can go.
16 There's no perfect map. And I think that the Missouri law
17 contemplates that, actually.

18 Q. You drew eight versions of compact configurations of
19 CDs 4 and 5; why did you just draw eight?

20 A. Time -- time constraints. Given more time, I would've
21 drawn more maps. I could've drawn maps every day until the day
22 -- until today and had, you know, thousands of maps, or hundreds
23 of thousands of maps. There's lots of potential maps out there.

24 Q. Okay. And would you just, please, walk us through
25 your eight alternative maps?

1 A. Yeah. Gladly. So the -- the primary goal of my maps
2 here was to evaluate Districts 4 and 5 for compactness. And so
3 my starting point is to start from the 2025 map, the choices of
4 the legislature in the districts that are not challenged, and
5 freeze them in place; so to make absolutely no changes at all to
6 the non-challenged districts where possible. A consistent
7 approach I take in -- in court remedial proceedings.

8 And so in maps Cervas 1, 2, 3, and 4, I make changes only
9 -- only to District 4 and 5. So that means Districts 1, 2, 3,
10 6, 7, and 8 are exactly as they are in the 2025 map. Absolutely
11 no changes made; 100 percent of the legislature's choices are
12 reflected in that map in those six districts. In Cervas 5, 6,
13 and 7, I make some changes to CDs 6, in addition to CDs 4 and 5.
14 And then, in map 8, I make additional small changes to CD3 in
15 order to increase its compactness.

16 Q. What software did you use to create these maps?

17 A. I used a software called Dave's Redistricting App.
18 I'll sometimes refer to it as DRA, for shorthand.

19 Q. And have you used DRA in your work for courts?

20 A. Yeah. I've used it in both of those, New York and
21 Wisconsin, consultant or special master.

22 Q. Maps you've drawn in Dave's Redistricting App have
23 been used in elections?

24 A. That's right, yes.

25 Q. Okay. Did you reference any partisan or political

1 data in constructing your alternative maps?

2 A. No, not at all.

3 Q. And you mentioned earlier that you evaluated
4 compactness using these numerical measures, and you mentioned a
5 couple. Would you remind us which ones you evaluated?

6 A. Yeah. I used these -- they're social science measures
7 of compactness. They're mathematical, basically, measures.
8 They go by the names of Reock and Polsby-Popper.

9 Q. And why those two?

10 A. These are ones that I found that courts have relied on
11 for you, you know, decades, actually. And in my experience,
12 courts have really have relied on these measures in my own work.
13 I also use them in my independent research publications.

14 Q. Let's go ahead and, just, take them one at a time.

15 A. Sure.

16 Q. We'll start with the Reock measure. What does -- what
17 does the Reock score measure?

18 A. So Reock is a measure of dispersion and so, basically,
19 it wants to know how elongated a district is. So the way it's
20 measured is you take the area of a district and divide it by the
21 area of that district, a circle -- I'm sorry -- a circle with --
22 of the smallest circumscribing circle of that district. Which
23 is, basically to say, like, you fit a district inside a circle
24 where it barely touches on however many ends to fully fit inside
25 of it. So it's a fraction. (Coughs.) Excuse me. And the

1 fraction ranges from 0 to 1; where zero is the least compact and
2 one is the most compact.

3 Q. Okay. And I would like to pull Table 2 on page 10 of
4 your opening report, that is Plaintiff's Exhibit 23. You can
5 zoom into that first table. Thank you. Now, you reported the
6 Reock scores for the various maps that you compared. Those are
7 -- those are the scores displayed on this table; is that right?

8 A. Yes.

9 Q. What, if any, conclusions did you draw from these
10 scores?

11 A. Well, the first conclusion is that the 2025 map shares
12 a reduction in compactness overall compared to the 2022 map.

13 It's less compact than the 2022 map overall.

14 Q. And what about your -- what about Districts 4 and 5?

15 A. Right. So Districts 4 and 5 are both less compact
16 than their -- than the same districts in the 2022 map, at the
17 individual district level.

18 Q. And how do they compare to your alternatives?

19 A. So in my alternatives, I'm able to show that you can
20 increase the Reock scores in Districts 4 -- in both
21 simultaneously, 4 and 5 -- in every one of my maps.

22 Q. Let's scroll down to the text table within Table 2,
23 that's still on page 10 of Plaintiff's Exhibit 23. We're now
24 looking at your -- your reporting of the Polsby-Popper scores;
25 is that right?

1 A. Yes.

2 Q. What does the Polsby-Popper score measure?

3 A. So Polsby-Popper, sort of, at a high level is, like,
4 how irregular the district boundary is. And so the way we
5 measure Polsby-Popper -- and just to be clear, these scores are
6 named after people, so Polsby and Popper are two different
7 people -- but it's a perimeter based score. So the numerator is
8 the same; it's the area of the district, but the denominator
9 changes and now the circle that we're comparing it to has a
10 circumference that's the same as the district perimeter.

11 Q. What, if any, conclusions did you draw from the
12 Polsby-Popper scores that you reported?

13 A. So here, the 2025 map slightly increases the
14 compactness compared to the 2025.

15 Q. And what about in Districts 4 and 5?

16 A. In District 4 there is also a very slight increase
17 from .3 to .33 in the Polsby-Popper score for District 4 in the
18 2025 map. However, the District 5 has, you know, pretty marked
19 decrease in compactness from .4 to .2; so half in the 2025 map.

20 Q. Now, to be clear -- I don't know if I asked you this
21 -- but how did you calculate the Reock and Polsby-Popper scores
22 in these tables?

23 A. So I'm just reporting data from DRA.

24 Q. Okay.

25 A. Who calculates it.

1 Q. If we could scroll back up to Table 1 on page 7 of
2 your opening report, that's Plaintiff's Exhibit 23, for the
3 record. Now, you also, in this table, report some average Reock
4 and Polsby-Popper scores for both the map as a whole and also
5 the challenged districts, it seems. What, if anything, did you
6 take away from those scores?

7 A. So averaging the two districts, the two challenged
8 districts, together what we see is that there is a reduction in
9 both the Reock score and the Polsby-Popper score in Districts 4
10 and 5 in the 2025 map -- a reduction in both.

11 Q. And reduction compared to the 2022 map?

12 A. Exactly right.

13 Q. Okay. Now, based on the data that you've considered
14 -- that you've accounted for here and also that you considered
15 in general, what is your opinion on the compactness of the
16 challenged districts in the 2025 map?

17 A. That there's been a reduction in compactness compared
18 to the 2022 map.

19 Q. Would you characterize that reduction as being
20 minimal?

21 A. It's not minimal, and it's not even close. There is a
22 very -- it's a very marked reduction in compactness.

23 Q. I'd like to turn, now, to whether that reduction can
24 be explained by any of the recognized factors you mentioned at
25 the top of this testimony. We'll stay on Table 1, here on page

1 7 of Plaintiff's Exhibit 23.

2 And when I -- at the outset, when I say "recognized
3 factors", do you understand that I mean the factors Missouri
4 courts have said can justify, sort of, small deviations from
5 compactness; is that your understanding?

6 A. Yes.

7 Q. Okay. Now, the first factor that you look at on page
8 12 of your report is the equal population requirement. Could
9 you, just, start by explaining what the equal population
10 requirement is?

11 A. Yeah. So in congressional redistricting, the US
12 Constitution demands that the districts have what has the Court
13 -- the US Supreme Court has determined to be, like, precisely
14 equal population. So in Missouri, what that means is that each
15 district has to have exactly the same number of persons in it.
16 So seven of the districts have exactly the same and one
17 district, because of the remainder, has exactly one more person
18 than those seven.

19 Q. Now, did you -- do have an opinion as to whether the
20 equal population requirement could explain drawing Districts 4
21 and 5 less compactly, as you observed in 2025?

22 A. Yeah. The equal population requirement does not
23 explain the reduction in compactness in 4 and 5.

24 Q. Why is that?

25 A. Well, because the 2022 map also has equally populated

1 districts and it is more compact, as are each of my eight
2 alternative maps.

3 Q. Now, the second factor that you considered in your
4 report is the contiguity requirement with the Missouri
5 Constitution. Would you start by telling us what contiguity is?

6 A. Yeah. Contiguity is the idea that you can get from
7 any part of any district to any other part of that same district
8 without having to travel through another district.

9 Q. Now, do you have an opinion as to whether contiguity
10 could explain drawing CD4 or 5 less compactly in the 2025 map?

11 A. I do have an opinion. It's the same as I just
12 expressed for equal population, in the sense that the 2022 map
13 is also contiguous, as are my eight alternative maps, and, yet,
14 all those show an increase in compactness compared to the 2025
15 map.

16 Q. In the next section of your report you consider, I
17 think, the interrelationship between the compactness of these
18 districts and other districts. But, just to be clear, did you
19 do a full compactness analysis of any district other than
20 Districts 4 and 5?

21 A. No.

22 Q. Okay. But, if the legislature were, you know, seeking
23 to make the other districts in the plan, other than 4 and 5,
24 more compact, could that explain reducing the compactness of CD4
25 and 5 that you observed?

1 A. No. It doesn't. And that's exactly how I designed my
2 illustrative maps, that they freeze the other districts. So
3 that I -- it, basically, says the choices of the legislature, in
4 order to improve compactness in those districts, could that have
5 affected 4 and 5? And the answer is no. I can simultaneously
6 increase both Districts 4 and 5 compactness, while also holding
7 constant the other five or six districts in plan.

8 Q. And, maybe, you've answered this already, but what
9 about the relationship between Districts 4 and 5?

10 Could -- does an improvement in the compactness of one of
11 those districts have to come at the expense of compactness in
12 the other district?

13 A. No. Very clearly, although you can't see it from
14 Table 1 -- well, you kinda can see by looking at the average --
15 but, you can increase, simultaneously, the compactness of
16 Districts 4 and 5 at the same time. So it cannot explain the --
17 the increased compactness in District 4 cannot explain the
18 decrease in compactness in District 5.

19 Q. And you're referring to the Polsby-Popper score for
20 CD4? Is that --

21 A. Well, in any case, right? On any measure, right, you
22 cannot explain any reduction in either of those districts from
23 the increased compactness in the other.

24 Q. Now, the next factor you considered in your report was
25 the Federal Voting Rights Act -- and I'll, just, note that I'm

1 -- I'm on page 13 of your report.

2 A. Can you help me identify where that is in the binder?

3 Q. Yes. That is Plaintiff's Exhibit 23 --

4 A. And --

5 Q. -- page 13.

6 I'll just note for you that you wrote in your report, and
7 tell me if this is right, that you looked at the proclamation,
8 the governor's proclamation, calling a special session; is that
9 right?

10 A. I was -- you provided me that proclamation.

11 Q. Okay. And that proclamation identified that there
12 could be a -- the 2022 map could be vulnerable to a legal
13 challenge under the Equal Protection Clause or the Federal
14 Voting Rights Act; is that what you recall?

15 A. Yes.

16 Q. Do you know which district the governor was referring
17 to in that proclamation?

18 A. You informed me that it was District 1.

19 Q. Okay. And could the -- could the legislature's
20 changes to District 1, to deal with any potential violations of
21 federal law in the 2025 -- in the 2022 map, could that explain
22 reducing the compactness of CDs 4 and 5 in the 2025 map?

23 A. In none of my alternative maps, in my illustrative
24 maps, did I change District 1 from the 2022 configuration. So
25 any changes that they thought necessary to comply with the

1 Voting Rights Act or with the U.S. Constitution were taken into
2 account in all my illustrative maps. So it could not have
3 affected the compactness of Districts 4 and 5.

4 Q. Okay. I think, we've covered, now, all of the, sort
5 of, mandatory requirements of -- for correctional redistricting.
6 Let's turn to the, sort of, optional or permissive factors, the
7 recognized factors in Missouri.

8 The first one you considered is on page 14 of your report
9 and its respect for political subdivision boundaries; first,
10 counties. Is that -- is that right?

11 A. Yes.

12 Q. Let's start with counties. How do you measure respect
13 for county boundaries in -- or how did you respect for county
14 boundaries in your report?

15 A. Yeah. The way that I've seen it done in other places
16 and the way I've done in my own work, is that we count, in two
17 ways, the number of counties that are split. And so the first
18 way of doing this is to count, literally, the number of counties
19 that are in two or more districts. The second way is to count
20 the number of counties that are split, but also the number of
21 times in which it's split; which I think is the more informative
22 number because it allows us to more fully understand whether a
23 legislature were to have divide up a particular county many
24 times.

25 Q. Did you calculate both those metrics for all of the

1 maps you prepared?

2 A. Yes. They're both in my report.

3 Q. How did the 2025 map compare to between 2022 map on
4 county splits?

5 A. It actually -- it reduced the number of county splits,
6 and reduction is what we're looking, like, is kind of seen as
7 the positive thing here.

8 Q. But could the reduction in county splits explain the
9 2025 maps reduction in compactness of CDs 4 and 5?

10 A. No. It cannot. Again, looking at Table 1 here, there
11 are five total -- there are five county splits in the 2025 map,
12 which I match in one, two, three -- four of my maps also have
13 five county splits; that, in those maps, Districts 4 and 5 have
14 increased compactness. Likewise, there are seven total county
15 splits in the 2025 map, it's -- and I do the same thing in seven
16 or my eight maps -- and in each of those, the compactness of
17 Districts 4 and 5 are increased in those maps; so it cannot
18 explain.

19 Q. Now, next you looked at municipal splits. How do you
20 measure respect for municipal subdivision boundaries?

21 A. We do it, kinda, exactly the same way.

22 Q. And did you calculate those scores for the -- for your
23 map?

24 A. Yes.

25 Q. How did the 2025 map compare to 2022 in municipal

1 splits?

2 A. The 2025 map, actually, does -- it does significantly
3 less dividing of municipalities compared to -- between the 2022
4 map.

5 Q. And did you find that that reduction could explain
6 reducing the compactness of CDs 4 and 5, as well?

7 A. No. For the same -- for a very similar reason. I can
8 match or improve on the number of municipality splits including
9 improved on, by at least five additional municipalities not
10 being divided, all while increasing the compactness of Districts
11 4 and 5.

12 Q. Next, you looked at respect for precinct, or VTD, VTD
13 boundaries. What are VTDs?

14 A. VTD is a census acronym for voting tabulation
15 district. In Missouri, they're synonymous with precinct.

16 Q. How does respect for VTD boundaries matter?

17 A. In the same way; we're gonna count the number VTDs
18 that are in more than one district.

19 Q. And did you count that up for all of the maps you
20 looked at?

21 A. I did.

22 Q. How did the 2025 map compare to 2022?

23 A. A very, very, very slight improvement by 1 in the 2025
24 map.

25 Q. Did you find that was necessary to make, or at least

1 explain making, CDs 4 or 5 less compact?

2 A. No. As you can see in Table 1, I can further reduce
3 the number of VTD splits and -- while making the district lines
4 more compact.

5 Q. All right. Let's turn to the next recognized factor
6 that you looked at: population density. And for this one, I
7 want to pull up on the screen one additional demonstrative that
8 you've prepared.

9 MR. MULJI: I'll note that the printed copy that
10 I just passed around is in black and white but we have the
11 color version of the screen here, and the color version's
12 been provided to defendants.

13 For purposes of the record, Your Honor.

14 THE COURT: Yep.

15 MR. MULJI: I know that the last demonstrative we
16 numbered as Plaintiff's Exhibit 88, but we anticipate
17 having --

18 MS. KHANNA: Eighty-nine.

19 MR. MULJI: Oh, 89. I'm so sorry.

20 We anticipate having more than -- I think 11 remaining
21 demonstratives throughout this case. So we thought we'd
22 jump in, numbering to -- to 301. Which is -- so we'll call
23 this -- if we could, actually, renumber the last exhibit to
24 301 we can call this 302 or whatever Your Honor prefers.

25 THE COURT: Let's, just, call this 301.

1 MR. MULJI: Okay. All right.

2 Q. (MR. MULJI) Doctor Cervas, you have before you the
3 demonstrative I just passed out, that has been numbered
4 Plaintiff Exhibit 301 as a demonstrative. I'll note for you
5 that this is, just, a side-by-side image of Figures 4 and 5 in
6 your opening report that are on pages 17 and 18 of Plaintiff's
7 Exhibit 23.

8 What do these figures show?

9 A. So this is the density dot plot map that I described
10 earlier. I'll note that there's one difference that in that --
11 in the previous one, there was 10 persons per dot; here, there's
12 100 persons per dot. It -- you need -- because it's a different
13 scale, you had -- I had to change the number of persons per dot
14 -- but that -- it's demonstrating exactly the same thing,
15 population density.

16 Q. What, if anything, did you learn from this data about
17 whether population density patterns could explain the lack of
18 compactness that you observed in CDs 4 and 5?

19 A. Well, as is plainly seen, the 2022 map accounts for
20 population density by placing the highly dense Kansas City
21 metropolitan area in District 5 and more rural populations in
22 District 4 -- into its own district. But that pattern is
23 disrupted in the 2025 map, placing urban, rural, and suburban
24 voters into both Districts 4 and Districts 5.

25 Q. In your opinion, could following population density

1 patterns explain what happened to the compactness of these
2 districts?

3 A. No.

4 Q. Let's pull up Table 3 from your report, that's
5 Plaintiff's Exhibit 23 at page 19. All right.

6 Doctor Cervas, what does Table 3 of your opening report
7 show?

8 A. So this is taking the data that was from the other
9 yellow map, not the one we just showed, but the one that
10 described the census urban-rural population geography. And I
11 measured the percentage of each district population that lived
12 in -- in urban area. And this is, by the way, just for clarity,
13 that data set is you either are in an urban area or you're in an
14 urban -- or you're in a rural area. So the inverse of these
15 numbers is the percentage of rural people.

16 Q. And what conclusions, if any, did you draw about
17 whether population density could explain the lack of compactness
18 that you observed in CDs 4 and 5?

19 A. Well, just to understand this data, District 4 in the
20 2012 map -- the map that existed prior to this census data that
21 required redistricting -- District 4 was less than 50 percent
22 urban. So it was a majority rural district. The legislature
23 chose to continue that pattern in 2022, but then disrupted that
24 in the 2025 redraw and made it a majority urban district.
25 District 5 was a vast majority urban district in the 2012 map.

1 The legislature chose to continue that in the 2022 map, but in
2 the 2025 map disrupted that -- that configuration and made it a
3 district that is much less urban.

4 Q. The next recognized factor that you consider is
5 natural boundaries; is that right?

6 A. Yes.

7 Q. Let's pull up page 22 of your opening report in
8 Plaintiff's Exhibit 23. What natural boundaries did you
9 identify in Missouri?

10 A. Well, it seemed pretty clear to me that the
11 legislature's 2025 map considered the Missouri River as a
12 natural boundary.

13 Q. Do you have an opinion as to whether natural boundary
14 lines, including the Missouri River, can explain the level of
15 departure in compactness you observed in CDs 4 and 5?

16 A. I do have an opinion on that. It cannot explain it.
17 One such example is Cervas 6, where not only do I continue the
18 boundary with the Missouri River where they -- where the
19 legislature did, I actually increase the amount of river that is
20 used as a boundary. And, yet, Districts 4 and 5 are
21 considerably more compact in Cervas 6.

22 Q. The last recognized factor you considered is
23 historical boundary lines of prior maps. And before I -- well,
24 actually, let's turn to Table 5 of your opening report, that's
25 Plaintiff's Exhibit 23 at page 23.

1 How did you measure continuity or regard for historical
2 boundary lines?

3 A. Yeah. So, basically, the way that social science --
4 the way I understand social scientists to measure this, and the
5 way I've done it in other places, is to measure the percentage
6 of people who are in a district in one map and then compare that
7 to what percentage of that population continues to be in the
8 same district in the new map or in a different map.

9 Q. Is that -- and you might've just said this -- but is
10 that the measure you referred to as the core retention in this
11 table?

12 A. That's right. And it's measured at the district
13 level, but it can, also, be measured at the map level.

14 Q. Okay. And you did both for all of the maps that you
15 compared?

16 A. That's right.

17 Q. What value, generally, does regard for historical
18 boundary lines serve in redistricting?

19 A. It's -- the idea is that it's a continuity of
20 representation. Voters get used to voting for particular
21 candidates or -- or members of Congress and they get comfortable
22 with them. But also reverse -- the reverse of that is that
23 members of Congress provide constituent services for voters and
24 non-voters and that continuity allows them to continue those
25 relationships over time.

1 Q. Now, could you tell us a little bit about what you
2 found with respect to core retention comparing those across your
3 maps?

4 A. Right. So this table is showing retention from the
5 2012 map. Again, that's the -- that was the mandatory
6 redistricting after the 2020 census, so this is the map that
7 happened before it. So it was the -- the, sort of, pre-existing
8 map, what representation we base from, and what we can see is
9 that -- and, it should also be noted that because of population
10 changes, redistricting is required after the census.

11 And so the first column of the 2022 map reflects the fact
12 that there have been changes in the distribution of populations
13 and the total number of people in Missouri after the 2020
14 census. And so districts are not going to be 100 percent the
15 same -- they can't be. But what we see is that there's a fairly
16 significant overlap between the district lines from the 2012 map
17 through the 2022 map in nearly all the districts. However, in
18 the 2025 map, what we see is that Districts 4 and 5 are
19 significant redistricted, you know, reconfigured; particularly,
20 District 4 is now the most reconfigured district in the entire
21 state.

22 Q. And what did you conclude about -- about the level of
23 fidelity the 2022 and 2025 maps played -- paid to the last
24 decades map?

25 A. So the overall map, the 2022 map, kept 80.7 percent of

1 all persons in their same district from the previous decade;
2 that has been reduced to 72.6 percent in the 2025 map.

3 Q. Now, having considered all of the recognized factors
4 under Missouri law, in the end, did you identify any
5 redistricting factor in Missouri that could explain what you
6 observed to be a departure from compactness in CDs 4 and 5?

7 A. I did not.

8 Q. Let's turn to page 24 of your opening report. Thank
9 you. In this next section of your report, you discuss -- it's
10 called equalizing population of simulated maps. Could you
11 explain your analysis in this section of your report?

12 A. Yeah. So you, Plaintiff's Counsel, asked me to take
13 the data files from another expert, Ari Stern. You provided me
14 his files, his block equivalency files, which I re-created in my
15 software and you asked me to equalize the populations of the
16 Districts 4 and 5 because he used a computer to create his; so
17 -- not just a computer, he used a computer algorithm to create
18 his alternative plans and those don't create exactly equal
19 population districts.

20 They're very close, but they're not exact. And you asked
21 me to equalize those and then report out the various measures
22 that I reported for my other maps, here in Table 6.

23 Q. Were you able to achieve that task?

24 A. Yeah. So it was very trivial to equalize the
25 population; sometimes took just a couple of minutes at most.

1 And then, I report out these data and what you see from the data
2 is that no -- there's no material difference between the -- a
3 map that was produced by the computer algorithm and the map that
4 I adjusted; sometimes even improving on some of these measures.

5 Q. I want to turn to your responses to the defense-side
6 experts in this case. And for that, I'm primarily looking at
7 Plaintiff's Exhibit 24, which is your rebuttal report in this
8 case.

9 Now, have you -- have you reviewed the reports of Dr.
10 Trende and Dr. Trey Hood, the experts proffered by the State and
11 the intervenors, respectively?

12 A. Yeah. I did.

13 Q. You responded to their reports in your own rebuttal
14 report, correct?

15 A. Yes.

16 Q. I want to start with your responses to -- to some of
17 Dr. Hood's analysis.

18 Now, am I right that you and Dr. Hood reported slightly
19 different Reock scores for the same districts in the 2025 map?

20 A. Well, Dr. Hood reported the Reock scores twice. Once,
21 he reported out the scores from a different redistricting
22 program, Maptitude for Redistricting, and, then, also, the same
23 -- the same data for Reock as I did from DRA.

24 Q. Okay. And do you recall there being some differences
25 in the numbers?

1 A. Yeah. There's some small differences between the
2 Maptitude scores and the Dave's Redistricting scores.

3 Q. What accounts for differences between -- you have
4 different programs reporting these scores?

5 A. So I described the, sort of, mathematical formula that
6 you used to calculate these; those are going to be the same.
7 What's different is, basically, the area of the district is
8 going to change or the perimeter of the district might change
9 because you're taking, you know, the round Earth and have to put
10 it flat on a map. And so the choice of what they call -- what
11 geographers call projection can -- can, in the margins, affect
12 these numbers, but, usually, very minor.

13 Q. Does the difference in this case have any impact on
14 your conclusions?

15 A. No, none not all.

16 Q. Doctor Hood also reported a third measure of
17 compactness beyond the Reock and Polsby-Popper that you looked
18 at, called the Schwartzberg Alternative score. What is -- what
19 is that?

20 A. So Schwartzberg is another person; as described, these
21 measures are generally named after people. Schwartzberg is,
22 essentially, the exact same thing as Polsby-Popper. It's
23 reported differently; instead of being the -- a low means less
24 compact and a high number means more compacted, it's the
25 inverse, but the data are nearly 100 percent correlated with

1 Polsby-Popper.

2 Q. Did you, nevertheless, calculate Schwartzberg
3 alternative scores for the 2025, 2022, and your alternative
4 maps?

5 A. Yeah. So that's not reported on in DRA. So to
6 calculate that, I actually used the code that you provided me
7 from Dr. Trende, had -- had -- to calculate Schwartzberg in his
8 code, and so I used his program to calculate it for all these
9 districts.

10 Q. In your review of the Schwartzberg scores, did those
11 affect your conclusions at all in this case?

12 A. Only in the sense that they solidified my previous
13 conclusions.

14 Q. Now, on page 3, Paragraph 16, of your rebuttal report
15 you, said that you had some disagreement with Dr. Hood about --
16 and I'm just quoting from your report -- what should be compared
17 to what; is that right?

18 A. That's right.

19 Q. What comparisons does Dr. Hood make that you disagree
20 with?

21 A. Well, there's, at least, two comparisons that I find
22 to be less useful in this case. One, is comparing the
23 challenged districts to the non-challenged districts; so the
24 compactness scores in the challenged districts to the compacting
25 scores in the non-challenged districts. The other is to look at

1 the -- the scores for districts across different -- over time,
2 right? So from previous, like, censuses.

3 Q. What's less useful about those comparisons than the
4 comparisons you did in your report?

5 A. Right. So the -- comparing challenged districts to
6 non-challenged districts makes very little sense because they're
7 different parts of the State. And so these scores are somewhat
8 sensitive to like, you know, say, the outer boundary of the
9 State. So if the state is on a river or not on a river, that
10 can affect what the scores are. And so comparing areas of the
11 state that are not part of the challenged districts with the
12 challenged districts, it's just very limited on what you can
13 take away from those measures.

14 And comparing across time has more limited value here
15 because, sort of, the relevant factors that is contemplated by
16 the Missouri Constitution are -- are, basically, different
17 because the populations have changed over time. So whether or
18 not you can keep a county completely contained into a single
19 district or whether it must be divided, changes over time based
20 on where the population is and how it's changed. And so these
21 are, just, they're less useful for determining whether Districts
22 4 and 5 are compact, than actually measuring, say, a
23 counterfactual district in the same area and how they're
24 configured.

25 Q. Now, I believe, Dr. Hood also suggested, sort of, a

1 minimum numerical threshold for determining compactness or -- or
2 included one in his report.

3 And that was based on an article by Professors Pildes and
4 Yemi; does that ring a bell?

5 A. Yes.

6 Q. Do you have an opinion on the use of, you know, strict
7 numerical thresholds for determining compactness?

8 A. Yeah. I don't -- I don't, personally, believe that
9 there are any thresholds from when a district goes from, you
10 know, compact enough to not compact enough. This is a -- it's a
11 legal interpretation. It's a -- a Court needs to determine that
12 threshold. There's not a threshold in social science.

13 Q. Does that mean that numerical scores are useless?

14 A. No, not at all. Numerical scores are very useful when
15 used in relative -- relative to something else. Which is,
16 again, is the whole point of drawing illustrative comparative
17 maps, to see what was possible.

18 Q. Let's turn to your response to Dr. Trende. Now, Dr.
19 Trende, like Dr. Hood, reported, I think, two other measures
20 beyond Reock and Polsby-Popper. The first one was Convex Hull.
21 Can you explain what Convex Hull measures?

22 A. Yeah. So my understanding of Convex Hull is, again,
23 it keeps the numerator the same, the area of the district, but
24 the denominator now is going to be, not a circle, but the, like,
25 the smallest fitting polygon. So, basically, you snap lines to

1 the district borders.

2 Q. And did you calculate the Convex score for districts
3 in 2025, 2022, and your alternative maps?

4 A. I did, yeah.

5 Q. How did those scores affect your conclusions on this
6 case?

7 A. Just likes Schwartzberg, it fortified my opinion. It
8 didn't have any effect on my otherwise opinion that Districts 4
9 and 5 are less compact.

10 Q. Next, Dr. Trende looked at a score called, I Know It
11 When I See it. I don't know that I can say the acronym
12 verbally, but it's connoted by an acronym, IKIWISI. That's a
13 little awkward.

14 Are you familiar with that score?

15 A. I am. Yeah.

16 Q. What is it?

17 A. Well, it's I Know It When I See it. The name of it is
18 supposed to describe what it's doing. And the intention of it
19 is, when you look at a district -- when a person in the public
20 looks at a district, right, what are their -- what are their
21 impressions of the district, right? Does it look compact? You
22 know, the -- I think, the, sort of, general idea is, is that
23 courts have a hard time understanding what obscenity is, so
24 Courts have said, I know it when I see it, obscenity; so same
25 thing here, right? We know that something is not compact when

1 we look at it.

2 Q. And how does that score work?

3 A. So the authors of a paper who invented this measure,
4 basically, asked retired federal judges, members of the public,
5 and other people, like, to compare districts. Like, they
6 actually show them the shapes of districts without any other
7 context and said, you know, Give it a number.

8 And then, they create, like, a machine learning algorithm
9 to create a statistical measure and then -- then, they can apply
10 that statistical measure to any district shape and then score
11 it.

12 Q. Okay. And did you -- did you report this, the I Know
13 It When I See It scores for, districts in the census maps you
14 compared?

15 A. Yeah. This is reported in DRA; so I reported the
16 scores from DRA for all these maps.

17 Q. And how did those scores affect your conclusions in
18 this case?

19 A. Again, it further fortified my opinion in the case.

20 Q. Okay. Let's turn to Table 5 on page 12 of your

21 rebuttal report. You noted in your rebuttal report that Dr.

22 Trende, sort of, identified the boundary that -- the boundary
23 between --

24 A. (Coughing.) Sorry.

25 Q. If you need water, you should feel free.

1 A. I just did.

2 Q. Okay. That Dr. Trende noted, I think -- and you said
3 this in your report -- that the boundaries between CD4 and 5 in
4 Jackson County were drawn, apparently, to respect senate
5 district boundaries in that area. Did you find that that goal
6 could explain the ill compactness that you observed in CDs 4 and
7 5?

8 A. No. It can't. As Table 5 here shows, one could
9 easily -- or maybe not easily -- one does reduce the number of
10 senate districts that are divided between two or more districts
11 and simultaneously increases both the compactness of Districts 4
12 and 5 while doing so.

13 Q. And, just for clarity, how did you measure respect for
14 senate district boundaries in this table?

15 A. Yeah. Thank you. And, also I want to note that I --
16 when reviewing my rebuttal report, I noticed that I actually
17 inverted the row -- the row names, so the top row is actually
18 the number of senate district splits and the bottom row is the
19 number of total senate district splits. So the data itself is
20 not wrong, the data is fine, it's just that rows are -- need to
21 be reversed in their labeling.

22 And so the top row is the number of senate districts that
23 are in two or more districts and then the bottom row is the
24 number of times these districts are divided into multiple
25 districts.

1 Q. Last set of questions for you, Dr. Cervas. It's been
2 noted, I think, by -- by Dr. Hood and, perhaps, Dr. Trende, that
3 -- that you didn't interview legislator's, you didn't review the
4 legislative history.

5 Let me, just -- did you interview legislator's?

6 A. No.

7 Q. Did you review the legislative history?

8 A. I did not.

9 Q. Why didn't you do those things?

10 A. It wasn't necessary for me to do those things in order
11 to assess the compactness of districts.

12 Q. How did you consider the legislature's preferences in
13 redistricting in your -- in your comparative analysis here?

14 A. As I described earlier, when we looked at the, sort
15 of, the maps of all my districts and I described each of these
16 plans, I account for 100 percent of the legislature's

17 discretion. One hundred percent, everything. In six of the
18 eight districts, 100 percent, everything, 100 percent. And in
19 the other districts, you know, however many, you know, 100
20 percent in each of the districts that is unchanged. Because,

21 that's -- that was their discretion in those districts. You
22 know, I take it as, you know, control for it, right? Those are
23 their discretions and they're represented in my maps.

24 Q. What is your overall opinion on the compactness of
25 Districts 4 and 5 in the 2025 map?

1 A. Well, it's less compact than the 2022 map.

2 Q. And can that reduction in compactness be explained by
3 any recognized factor or goal that you observed?

4 A. No. It cannot.

5 Q. Those are all the questions, I think, I have for you,
6 for now, Dr. Cervas.

7 MR. MULJI: I'll pass the witness.

8 THE COURT: Okay.

9 **CROSS-EXAMINATION BY MR. SULLIVAN**

10 Q. Good morning, Dr. Cervas.

11 A. Hi.

12 Q. We're gonna be talking about a number of maps today.

13 We're gonna talk about the 2022 map, alternate maps you've
14 created, and the new map. If we call your maps the "Cervas
15 maps", is that okay with you?

16 A. Yeah. Thank you.

17 Q. You'll know what I'm referring to?

18 A. Sure.

19 Q. And in announcing HB1, Governor Parson called the new
20 map the Missouri First Map; so if I call it that, will you know
21 what I'm talking about?

22 A. Sure.

23 Q. Okay. When you prepared your report containing your
24 opinions, your charge from Counsel was to analyze Districts 4
25 and 5, right?

1 A. That's right.

2 Q. And so the bulk of your opinions relate to Districts 4
3 and 5?

4 A. Yes.

5 Q. Your report contains compactness data for the 2022
6 map, doesn't it?

7 A. Yes.

8 Q. And we'll look at your report in a minute.

9 But what I wanted to ask you -- your report doesn't have
10 similar data for the 2012 -- 2012 map, does it?

11 A. No.

12 Q. Okay. And you didn't review any of the information
13 packets provided to legislators for them to consider in deciding
14 whether to vote on the Missouri First Map, right?

15 A. No.

16 Q. Let's take a look at Exhibit 113. Can you pull that
17 up? And let's turn to the second page.

18 MR. MULJI: Your Honor, Plaintiffs would object
19 to -- to this exhibit being shown.

20 MR. SULLIVAN: I haven't offered it. I'm just
21 gonna ask the witness questions about it.

22 MR. MULJI: Well, I -- this is one of the
23 exhibits that, Your Honor, we would object to, but it
24 certainly cannot be offered for the truth of the matter
25 asserted. It's hearsay.

1 THE COURT: Okay. Well, right now, he hasn't
2 offered it. To the extent it's being shown to the witness,
3 I don't know that that's impermissible yet, but I think we
4 can wait and have some objections when they start asking
5 about it.

6 MR. MULJI: Certainly.

7 THE COURT: I don't know what it is, so.

8 MR. MULJI: Okay. Fair -- fair enough.

9 THE COURT: I don't -- I have a disadvantage to
10 it.

11 MR. SULLIVAN: I'm just asking questions at this
12 point, Your Honor.

13 MR. MULJI: We've been looking at all of these.

14 MR. SULLIVAN: I'm not offering it yet.

15 THE COURT: I won't look at it. How's that?

16 MR. SULLIVAN: Okay.

17 Q. (MR. SULLIVAN) If we could pull up Exhibit 113.

18 Let's go to the second page. No. The back -- after the cover
19 page. Yes.

20 And I showed you this in your deposition right, Dr. Cervas?

21 A. Yes.

22 Q. In fact, it was in the files that your counsel
23 produced to us, wasn't it?

24 A. Yes.

25 Q. Counsel sent it to you and you didn't review it,

1 though, right?

2 A. That's right.

3 Q. Okay. This, on the second page when we look at it,
4 it's a memo from Adam Kincaid, whom, I believe, you told me was
5 a redistricting expert?

6 A. Yeah. That's my understanding.

7 Q. And it's to Representative Dirk Deaton, right?

8 A. I see that, yeah.

9 Q. Okay. Let's go to page 7. If I would turn to the
10 right page.

11 If we go to the first sentence on page 7 of this exhibit,
12 it says: Boone County continues to be split under the Missouri
13 First Map, but the new division does a better job of keeping the
14 bulk of Columbia whole in a single congressional district; do
15 you see that?

16 MR. MULJI: Your Honor, objection. I know we
17 said that -- that this exhibit hasn't yet been offered, but
18 Counsel is reading from this document, essentially
19 testifying as to the hearsay contained within it.

20 MR. SULLIVAN: I'm gonna ask the witness if
21 that's accurate or not, Your Honor.

22 THE COURT: Well, it's a sentence for an exhibit
23 that's not in evidence, right? And so, I guess, what's the
24 purpose of asking a witness about an exhibit that's not in
25 evidence that he says he hasn't reviewed?

1 MR. SULLIVAN: Well, but he -- he knows about the
2 Boone County split. He's been testifying about that he did
3 -- looked at Districts 4 and 5 and the rest of the state
4 and did various splits himself and so I'm gonna ask him
5 about the -- the Boone County split.

6 THE COURT: Sure. I think that's a fair topic.
7 I, just, don't know why it needs to be tied to an exhibit
8 that's not admitted.

9 MR. SULLIVAN: Okay.

10 THE COURT: Right? Like, there's plenty of maps
11 that we have seen and will see that show the difference in
12 what happened in Boone County between the versions of maps,
13 if that's the topic, I think that's perfectly fair. I,
14 just, don't understand why it needs to come from this
15 exhibit; does that make sense?

16 MR. SULLIVAN: Okay. Let me try this.

17 THE COURT: Okay.

18 Q. (MR. SULLIVAN) You don't have an opinion, do you, on
19 whether the Missouri First Map does a better job of keeping
20 Columbia in a single district, do you?

21 A. In so far as it -- that it's in District 3; many of my
22 maps do not change District 3 at all.

23 Q. Okay. And under the 2022 map, Independence was split
24 three ways, right?

25 A. I recall that, yeah.

1 Q. And the Missouri First Map keeps Independence in a
2 single district, right?

3 A. I believe so, yeah.

4 Q. Under the Missouri First Map, Kansas City's the only
5 split city or village in Jackson County, isn't it?

6 A. I don't know that as I sit here, but I believe you.

7 Q. Okay. Okay. We're gonna go to your report now, and
8 that's Exhibit 23, Plaintiff's 23. And let's go to Table 1,
9 which is on page 7 of the report, and I want to ask you some
10 questions about Table 1.

11 So under the 2022 map, nine counties were split a total of
12 ten times, correct?

13 A. Yes. (Coughing.) Sorry. Sorry.

14 Q. Okay. Go ahead and take a drink.

15 Under the Missouri First Map, five counties were split a
16 total of seven times, right?

17 A. Yes.

18 Q. So there's fewer county splits under the Missouri
19 First Map than under the 2022 map?

20 A. Yeah. That's correct.

21 Q. Okay. And the 2022 map split 31 municipalities a
22 total of 33 times, correct?

23 A. Yes.

24 Q. The Missouri First Map, splits 13 municipalities a
25 total of 14 times, right?

1 A. Yes.

2 Q. So the Missouri First Map has fewer municipal splits
3 than the 2022 map?

4 A. Yeah. That's correct.

5 Q. And other than Kansas City, you don't know what
6 specific cities were split under the 2022 map, do you?

7 A. No, I don't have a list.

8 Q. Still on this table, statewide, we talked about two
9 measures in your -- or you talked about two measures of
10 compactness in your -- actually, more -- but one of 'em was
11 Polsby-Popper was the measure; you remember that?

12 A. Yeah.

13 Q. Now, in the -- under the Polsby-Popper measure,
14 compactness improved in the Missouri First Map compared to the
15 2022 map, right?

16 A. Overall, yes.

17 Q. And as measured by Polsby-Popper, District 4 is more
18 compact under the Missouri First Map than under the 2022 map,
19 right?

20 A. Yeah. A very slight increase, yes.

21 Q. And you also mentioned Reock scores, so I'll ask you a
22 few on that.

23 The Reock scores for Districts 2, 3, and 6 all increase
24 from the 2022 map to the Missouri First Map, right?

25 A. I'm sorry. I don't have that data in front of me.

1 Q. Let's see, is that -- that's a different table in your
2 report here.

3 THE COURT: Page 10, I think.

4 Q. Yeah. That's Table 2 on page 10.

5 And I'll ask you the question again, so you have it.

6 Talkin' about Reock scores, the -- for District 2, 3, and
7 6, the Reock scores increased from the 2022 map to the Missouri
8 First Map, right?

9 A. Yeah. That's correct.

10 Q. And similarly, the Reock scores for Districts 1, 7,
11 and 8 didn't change from the 2022 map to the Missouri First Map,
12 right?

13 A. That's -- that's correct.

14 Q. Now, under the 2022 map, the lowest Reock score for
15 every district is District 6, with a 2.5, right?

16 A. (Nonverbal response.)

17 Q. And under the Missouri First Map --

18 THE COURT: I'm sorry. You nodded, but did
19 you --

20 MR. SULLIVAN: Oh, I'm sorry.

21 THE COURT: -- have a verbal answer?

22 A. Yes.

23 THE COURT: Okay.

24 Q. And under the Missouri First Map, District 4 also has
25 the lowest Reock score, but it's improved at .28, hasn't it?

1 A. You said, District 6, right?

2 Q. District 6, yes.

3 A. Yeah. Yes.

4 Q. Okay. And in the 2022 map, the lowest Polsby-Popper
5 score is District 3 with .15, right?

6 A. Correct.

7 Q. And, now, in the Missouri First Map, the lowest
8 Polsby-Popper score is District 5 with .20?

9 A. Correct.

10 Q. So it'd be fair to say that in the Missouri First Map,
11 the lowest overall Polsby-Popper score increased from .15 to
12 .20?

13 A. I don't think the numbers are quite right. From .15
14 to .20; is that what you said?

15 Q. Yeah, .15 and .20.

16 A. Then, yes. Thank you. Yes.

17 Q. Is that right? Okay.

18 A. A lot of numbers. A lot of numbers.

19 Q. Gotcha. I could have very well said it wrong, so.

20 And we might need to go back to Table 1 for this next one. The
21 Missouri First Map has one fewer precinct split than the 2022
22 map, right?

23 A. Yes.

24 Q. Okay. I want to ask you about voting tabulations here
25 at the start.

1 What's a voting tabulation district?

2 A. As I said on direct, it's -- it's a -- the Census
3 collects this data, like, the Census produces a voting
4 tabulation district. They're synonymous with precinct, so it's
5 where people go vote.

6 Q. And if I call it a VTD, will you know what I'm
7 referring to?

8 A. Yes, I would.

9 Q. In the Missouri First Map, there's a VTD 811 assigned
10 to District 4, right?

11 A. Under the shapefile that I used, that I downloaded
12 from, I think, Secretary of State Office or something like that,
13 but, yes.

14 Q. Okay. And there's, also, a VTD numbered 811 in
15 District 5, right?

16 A. Yeah. There's two VTD labeled KC 811.

17 Q. And you downloaded the shapefiles from Office of
18 Administration?

19 A. I think, that's right, yes.

20 Q. And those shapefiles indicated those are, actually,
21 two separate VTDs, didn't they?

22 A. Yes.

23 Q. Did they have separate GEOID numbers?

24 A. Yes.

25 Q. Okay. Let's pull up -- well, okay.

1 Tell me if you agree with this, there are two separate and
 2 distinct VTD 811s in Kansas City. It is likely that the same
 3 name was assigned to two different VTDs by the US Census Bureau.

4 A. That sounds correct, yeah.

5 Q. Okay. And your review of the shapefiles is consistent
 6 with that, right?

7 A. Yes, exactly.

8 Q. Okay. Okay. I'm going to ask you some questions
 9 about the -- the Cervas maps --

10 A. Sure.

11 Q. -- that are on page 6 of your report and the
 12 discussion is on page 8 and there's bigger versions of the
 13 Cervas maps on page 30 through 37. Now, I think, you said, in
 14 preparing the Cervas maps, you were asked to make Districts 4
 15 and 5 more compact, right?

16 A. Well, to determine whether you could make it more.

17 Q. Okay. And you tried to make sure the other districts
 18 didn't change, right?

19 A. To the extent possible, yes. I didn't want to change
 20 the other legislator -- legislative prerogatives.

21 Q. A couple of them had small changes in Districts 3 and
 22 6, right?

23 A. That's right.

24 Q. Okay. But, 1, 2, 7, and 8 all stayed the same in the
 25 Cervas maps?

1 A. Yes.

2 Q. Okay. And when you created the Cervas maps, you
3 didn't make value judgments on which counties or municipalities
4 to split, did you?

5 A. Not value judgments, I would say.

6 Q. Okay.

7 A. Data judgments.

8 Q. Okay. Would you agree it's for the legislature to
9 decide which counties or municipalities should be split?

10 A. Certainly, the legislature has some discretion on --
11 as long as they comply with the law.

12 Q. Okay. You're aware that the Wise Plaintiffs aren't
13 asking the Court to adopt any of the Cervas maps as a remedy,
14 aren't you?

15 A. Yeah. I'm aware.

16 MR. MULJI: Objection; calls for legal
17 conclusion.

18 THE COURT: I'm sorry?

19 MR. MULJI: Calls for legal conclusion.

20 THE COURT: I don't know that it's legal. I
21 think it's more of what the remedy is, instead of what the
22 law is. So if he knows, I think he can answer, and it
23 sounds like he knows, so I'm gonna overrule the objection.

24 MR. SULLIVAN: And I'll move on, too.

25 THE COURT: Okay.

1 Q. (MR. SULLIVAN) Let's look at -- I want to ask you
2 about your -- your alternate maps, now. Cervas 1, in your
3 commentaries on page 8 if you need to review, but, I believe,
4 what you said here is Cervas 1 keeps nearly all of Jackson
5 County together?

6 A. Yes.

7 Q. Okay. So Cervas 1 keeps Kansas City in one district?

8 A. I'm sorry. No.

9 Q. I'm sorry. Does -- I'm sorry.
10 Cervas 1 keeps nearly all of Jackson County together in the
11 same district, right?

12 A. Yeah. Just to clarify, District 6 is unchanged in
13 Cervas 1 and there's a portion of District 6 that's in Jackson
14 County, so that's the part that is -- that contemplates the
15 nearly all.

16 Q. Okay. Western Jackson County's classified as urban by
17 the US Census Bureau, isn't it?

18 A. Western Jackson County?

19 Q. Yes.

20 A. Most of it, yeah.

21 Q. And eastern Jackson County is classified as rural by
22 the US Census Bureau, right?

23 A. Most of it, yeah.

24 Q. So in Cervas 1, if you keep Jackson County or nearly
25 all of Jackson County in the same district, you're putting Blue

1 Springs in the same district as Downtown Kansas City, right?

2 A. Correct.

3 Q. And you're putting Grain Valley in the same district
4 as Downtown Kansas City?

5 A. I believe so, yes.

6 Q. And you're putting Lake Lotawana in the same district
7 as Downtown Kansas City?

8 A. I believe so, yeah.

9 Q. In terms of population density, Blue Springs is
10 different from Downtown Kansas City, isn't it?

11 A. I don't have the data, but I believe you're correct.

12 Q. And same question for Grain Valley. In terms of
13 population density, Grain Valley is different from Downtown
14 Kansas City, isn't it?

15 A. Yeah. Again, I don't have the data, but it's almost
16 certainly different. It's a continuum when it comes to

17 population density.

18 Q. Okay.

19 A. So, again, it almost definitely would not be exactly
20 the same.

21 Q. Would you agree with me that in terms of land usage,
22 Blue Springs, Great -- Grain Valley, and Lake Lotawana are
23 significantly different from Downtown Kansas City?

24 A. I don't have the data in front of me to make an
25 opinion on that.

1 Q. Okay. Okay. Now, it looks like Cervas 2 is similar
2 to Cervas 1, in that it keeps nearly all of Jackson County
3 together, right?

4 A. Yes. That's correct.

5 Q. So Cervas 2 would include Blue Springs with Downtown
6 Kansas City?

7 A. I think the only part that's different on this is the
8 Cass County part.

9 Q. Okay. So Grain Valley, Lake Lotawana, would also be
10 included with Downtown Kansas City in the same district?

11 A. Correct.

12 Q. Okay. Now, if we go to Cervas 3, I believe you
13 indicated this is western Jackson County and all of Cass County,
14 right?

15 A. Correct.

16 Q. So Cervas 3 would put Harrisonville and Downtown
17 Kansas City in the same congressional district?

18 A. I believe that's right.

19 Q. And Cervas 3 would put Belton in the same
20 congressional district as Downtown Kansas City?

21 A. I believe you're right.

22 Q. And Cervas 3 would put Raymore in the same
23 congressional district as Downtown Kansas City?

24 A. As -- assuming it's in Cass County, yes.

25 Q. Okay. Do you have an opinion on whether Harrison,

1 Belton, and Raymore are similar to Kansas City in terms of
2 population density?

3 A. I -- as we sit here today, I do not have an opinion on
4 that.

5 Q. Okay. So I'm turning, now, to Cervas 4. And Cervas 4
6 you keep nearly all of Jackson County, all of Lafayette County,
7 and all of Johnson County in the same district, right?

8 A. In District 5?

9 Q. In District -- yes. I believe that's what you said.

10 A. Lafayette and Johnson County is correct, on page 8.

11 Q. Okay. So Cervas 4 would put Lexington, Missouri in
12 the same congressional district as Downtown Kansas City, right?

13 A. Assuming it's in one of those surrounding counties,
14 yes.

15 Q. And same question for Concordia, Missouri. Cervas 4
16 would put Concordia, Missouri in the same district as Downtown
17 Kansas City, right?

18 A. Again, same answer.

19 Q. Same question for Odessa, Missouri. Cervas 4 puts
20 Odessa, Missouri in the same district as Downtown Kansas City,
21 right?

22 A. Yeah.

23 Q. And same question for Wellington, Missouri. Cervas 4
24 would put Wellington in the same district as Downtown Kansas
25 City, right?

1 A. Yes.

2 Q. Have you ever heard of Napoleon or Bates City,
3 Missouri?

4 A. I have not, no.

5 Q. If I told you they're Lexington County cities, would
6 you agree that they would be in the same congressional district
7 as Downtown Kansas City under Cervas 4?

8 A. Yeah. I'd believe you.

9 Q. Okay. And Cervas 4 also has all of Johnson County,
10 right?

11 A. Yes. I'm sorry. There's no labels on the maps so
12 it's -- you have to look for it.

13 Q. Well, and the commentary's on a different page from
14 the maps and the report. So, just, take your time if you need
15 to flip back and forth.

16 So since Johnson County's included all of it in Cervas 4,
17 Cervas 4 would put Warrensburg in the same district as Downtown
18 Kansas City, right?

19 A. Correct.

20 Q. And it would put, Cervas 4, would put Knob Noster in
21 the same district as Downtown Kansas City, right?

22 A. I believe you.

23 Q. Cervas 4 would put Holden, Missouri in the same
24 congressional district as Downtown Kansas City, right?

25 A. I believe you.

1 Q. Cervas 4 would put Centerview, Missouri in the same
2 district as Downtown Kansas City, right?

3 A. I believe you, yes.

4 Q. And if Chilhowie and Kingsville, Missouri are Johnson
5 County cities, they'd be in the same district as Downtown Kansas
6 City, right?

7 A. I believe you, yes.

8 Q. When I took your deposition a little while ago -- I
9 guess, it wasn't that long ago -- you told me you hadn't read
10 the dep -- the reports by the other plaintiff's experts, right?

11 A. I had.

12 Q. You had read them?

13 A. Yes.

14 Q. Oh, okay.

15 A. I would think so, by that time.

16 Q. Okay. You hadn't had any discussions with him though;
17 is that right?

18 A. Oh, I'm sorry. You're talkin' about the
19 plaintiff's --

20 Q. The plaintiff's experts.

21 A. No. I didn't. Yeah. The plaintiff's expert, I did
22 not read their reports.

23 Q. Okay.

24 A. And I still have not.

25 Q. And did you have any discussions with those experts?

1 A. No.

2 Q. Okay.

3 A. I met Dr. Ari Stern last night at the hotel for,
4 about, 30 seconds.

5 Q. Gotcha. So you don't know what Doctors Rodden and
6 Cromartie say about combining urban and rural areas in the same
7 congressional districts?

8 A. I don't have any idea, other than what I may have read
9 in the defendant pre-trial brief.

10 Q. Okay. Let's go to Cervas 5. It looks like Cervas 5
11 keep District 5 mostly the same as a 2022 configuration, and
12 then does some redrawing in Districts 4 and 5; is that right?

13 A. District 5 is identical to the 2022 map.

14 Q. Okay. So Cervas 5 would split the city of Blue
15 Springs, right? Into two different districts.

16 A. I believe that's correct.

17 Q. And Cervas 5 would split Claycomo, Missouri into two
18 different congressional districts?

19 A. I believe that's correct. Yes.

20 Q. Cervas 5 would split Greenwood, Missouri into two
21 separate congressional districts?

22 A. I don't know that one as clearly, but I think it's --
23 yes.

24 Q. Okay. How about Independence? Independence would be
25 split under Cervas 5, right?

1 A. That's correct.

2 Q. And it'd be split twice, wouldn't it?

3 A. I think it's split into 4 and 6.

4 Q. Okay. Lake Lotawana would be split under Cervas 5,
5 right?

6 A. I believe that's correct.

7 Q. Lee's Summit would be split under Cervas 5?

8 A. I believe you, yes.

9 Q. Pleasant Valley, Missouri would be split under Cervas
10 5, right?

11 A. I believe you, yes.

12 Q. Okay. Last one. Sugar Creek, Missouri would be split
13 under Cervas 5, right?

14 A. I believe that's correct.

15 Q. Since Cervas 5 is the same as the 2022 map, there
16 would be a total of 17 municipal splits, right?

17 If we need to look back at the table, you're more than
18 welcome to.

19 A. I have -- can you repeat that question?

20 Q. Yeah. Under Cervas 5, there'd be a total of 17
21 municipal splits, right?

22 A. No, there's 15.

23 Q. Fifteen. Okay. Okay. Let's go to --

24 A. Oh, I'm sorry. Yes. I'm sorry.

25 Q. Cervas 5, there would be 17 splits?

1 A. Fifteen municipal splits, 17 times.

2 Q. Seventeen times. Gotcha. It can get, kind of,
3 confusing, isn't it?

4 A. A lot of numbers.

5 Q. I -- I'm feelin' the same thing. Let's move to Cervas
6 6. Cervas 6 splits Cooper County, Missouri, right?

7 A. You know, I don't, actually, have -- oh --

8 Q. It's on page 8.

9 A. Yeah. A small portion of Cooper County, instead of
10 splitting Jackson County twice, yes.

11 Q. So Cervas 6 splits Cooper County, instead of splitting
12 Jackson County twice, right?

13 A. That's right.

14 Q. If I told you Cooper County has a population of around
15 17,000, would you disagree?

16 A. I have no reason to disagree.

17 Q. If I told you it contained cities like Pilot Grove,
18 Missouri and Blackwater, Missouri; do you disagree with that?

19 A. I have no reason to disagree.

20 Q. Jackson County's quite a bit larger than Cooper
21 County, isn't it?

22 A. Almost certainly true.

23 Q. More than 40 times larger?

24 A. Well, if your numbers are to be believed, then, yes.

25 Q. But Cervas 6 chooses to split Cooper County rather

1 than Jackson County twice?

2 A. That's correct.

3 Q. Okay. Now, let's move to Cervas 7.

4 Cervas 7 splits Boone County twice rather than splitting
5 Jackson County twice, right?

6 A. That's correct.

7 Q. Boone County has a population of around 187,000.

8 A. Sounds about right.

9 Q. Does that sound -- about a third of the size of
10 Jackson County?

11 A. I think Jackson County's about 700,000.

12 Q. So under Cervas 7, though, if a county has to be split
13 twice, your computer choose to split Boone County rather than
14 Jackson County twice?

15 A. My computer didn't make any choices.

16 Q. You made the choice?

17 A. Well, it's a different configuration.

18 Q. Okay. And Cervas 7 splits Boone County twice rather
19 than Jackson County twice?

20 A. That's correct.

21 Q. Okay. And same thing with Cervas 8. Cervas 8 splits
22 Boone County twice rather than Jackson County twice, right?

23 A. Correct.

24 Q. Using the Dave's Redistricting Application that you
25 testified to, you could have created even more compact districts

1 than Cervas one through -- 1 through 8, right?

2 A. Well, I don't know about that.

3 Q. Okay. You did -- you have reviewed the reports of
4 Doctors Trende and Hood, right?

5 A. Yes.

6 Q. And they report a variety in numbers on metrics, the
7 Convex Hull, Reock, Polsby-Popper; you don't disagree with any
8 of those numbers, do you?

9 A. No.

10 Q. Okay. Pardon me. I'm just flippin' through, I might
11 be about done.

12 I don't have any more questions at this time. Thank you.

13 THE COURT: Okay. Let's take the second brief
14 morning break that I advertised earlier. Just so you all
15 know what to expect, I think we'll take a short break now
16 and then try to go up to 12:15 and then break for lunch.

17 And so let's take 10 minutes now, and then we'll start and
18 go up to right, about, 12:15.

19 (COURT WAS IN RECESS.)

20 THE COURT: All right. You're already in
21 position. Go ahead.

22 MR. GORE: Thank you, Your Honor.

23 **CROSS-EXAMINATION BY MR. GORE**

24 Q. Doctor Cervas, good morning. How are you?

25 A. Good. How are you?

1 Q. Good. I'm John Gore. I represent the intervenor,
2 Missouri Republican State Committee. It's nice to meet you in
3 person for the first time today.

4 A. Likewise.

5 Q. Let's go ahead and start with your expert report,
6 which is Plaintiff's Exhibit 23.

7 You're not a legal expert, right?

8 A. I'm not a lawyer, no.

9 Q. And you relied on Counsel to inform you as to what
10 Missouri law requires regarding compactness, correct?

11 A. Correct.

12 Q. And it was your understanding, Dr. Cervas, that
13 Missouri law requires that any deviations from compactness must
14 be necessary to comply with the Missouri Constitution, to comply
15 with Federal law, or to abide by traditional district criteria,
16 correct?

17 A. I don't know that that's exactly what I wrote, but I
18 think, it -- the concept seems -- I'd want to review those words
19 more closely, but.

20 Q. Sure. Well, let's get ahead and do that. Let's go to
21 page 2 of your report. The first full paragraph starts, N
22 "Counsel informed," if you'll go to the third sentence of that
23 paragraph, you're welcomed to read that into the record if you'd
24 like.

25 Go ahead.

1 A. Oh. I was informed that the Missouri Supreme Court
2 has understood the compactness requirement to allow minimal and
3 practical deviation from compactness necessary to comply with
4 the constitutional requirements for congressional redistricting
5 in Article III, Section 45 of the Missouri Constitution, to
6 comply with or resolve potential violations of the Federal
7 Voting Rights Act in 1965 or U.S. Constitution or to abide by a
8 set of redistricting factors recognized by Missouri courts;
9 political subdivisions, boundaries, including counties, cities,
10 and precincts; population density; natural boundary lines; and
11 historical boundary lines of prior redistricting maps.

12 Q. Thank you, Dr. Cervas. So what you were informed that
13 Missouri law requires informed your inquiry in this case, right?

14 A. Yes.

15 Q. And so the question you asked is whether what you
16 viewed as deviations from compactness of the 2025 plan were
17 necessary to comply with these other requirements or
18 considerations, correct?

19 A. Essentially. Whether -- whether those things could
20 explain the ill-compact shapes.

21 Q. Well, was it "could explain" or was it necessary?
22 Because you said "necessary" in your report.

23 A. Well, the way that I laid out my testimony in my
24 report is by using the comparison.

25 Q. Right. But you were asking, ultimately, whether the

1 2025 plan's minimal or practical deviations from compactness
2 that you observed were necessary to comply with these other
3 factors, correct?

4 A. I think -- I don't know if we're parsing words, but,
5 yes.

6 Q. Okay. And if you'd had a different understanding of
7 Missouri law, you would've analyzed the question differently,
8 right?

9 A. I may have asked different questions, but I'm not so
10 sure that that's true.

11 Q. And you might have reached a different conclusion if
12 you'd had a different understanding of Missouri law, correct?

13 A. Maybe or maybe not.

14 Q. Doctor Cervas, let's go to page 7 of your report,
15 Table 1. I believe you discussed this briefly before, but you
16 mentioned that you downloaded a shapefile from the 2025 plan
17 from Missouri Office of Administration, correct?

18 A. Yes.

19 Q. And a shapefile is a software program that transmits
20 the map into some kind of file that it then can be used in
21 computer programs; is that right?

22 A. I would describe a shapefile as a file. It's a
23 digital file. Digital map file.

24 Q. Okay. And in the digital map file that you
25 downloaded, Districts 4 and 5 were both contiguous and equally

1 populated, correct?

2 A. That's correct.

3 Q. So if Missouri election officials used that shapefile
4 to implement the 2025 plan, elections will be held in contiguous
5 and equally populated districts, correct?

6 A. That would be my conjecture, yeah.

7 Q. Okay. Now, we're looking at Table 1 here. When you
8 drew your eight plans, you did not consider all of the factors
9 that the General Assembly considered in drawing the 2025 plan,
10 correct?

11 A. Well, I considered all the factors that they would've
12 considered -- the population, right, but they may have had other
13 goals.

14 Q. And you didn't, necessarily, pursue all the same goals
15 that the General Assembly pursued, correct?

16 A. My goals were to draw districts compliant with the
17 Constitution.

18 Q. If we can, let's pull up your rebuttal report which is
19 Plaintiff's Exhibit 24, and go to page 6. And in Paragraph 26,
20 there is -- the third sentence begins, "But, I did incorporate".

21 It says -- it comes after that Id. cite. It says: But I
22 did incorporate most of the legislature's considered criteria --
23 and then, will you go ahead and read that next sentence into the
24 record?

25 A. As I show in my opening report, my plans retain, at

1 at least, 82 percent of the legislature's choices in the 2025 map.

2 Q. And then, it cites to Cervas 7, Table 1; is that
3 right?

4 A. (Nonverbal response.)

5 Q. Is that a citation to your opening report?

6 A. Yes.

7 Q. Okay. So it's your statement here that you retained,
8 at least, 82.4 percent of the legislature's choices in 2025; is
9 that right?

10 A. Yes.

11 Q. Okay. Let's go back to your opening report to page 7,
12 which is Table 1, which you've just cited here in your rebuttal
13 report; is that correct?

14 A. Correct.

15 Q. Can you show me where -- can you point us to where
16 this 82.4 percent number is on this table?

17 A. It's under Cervas 4 -- yeah, exactly what's
18 highlighted. Cervas 4, under core preservation with 2022 map.

19 Q. That's the core preservation of the 2022 plan,
20 correct?

21 A. Correct.

22 Q. That's not core preservation of the 2025 plan, is it?

23 A. That's correct. Yeah.

24 Q. So this number, you didn't actually retain 82.4
25 percent of the General Assembly's choices from 2025, correct?

1 A. That's -- that's true, yes.

2 Q. You retained -- here, you claimed to have retained
3 82.4 percent of the choices for 2022, correct?

4 A. That's correct.

5 Q. Okay. And so in the 2025 map, the General Assembly,
6 itself, only retained 76.9 percent of the choices that it made
7 in 2022; is that correct?

8 A. Correct.

9 Q. So it was some other number than 82.4 percent that you
10 retained in your maps; is that correct?

11 A. That'll be correct, yeah.

12 Q. Okay. But even on your map, you didn't retain 17.6
13 percent of the General Assembly's choice; is that right?

14 A. From the 2022 -- you mean the 82.4?

15 Q. Yes.

16 A. Right. Well, that would be the changes in Districts 4
17 and 5 -- or -- yeah, exactly.

18 Q. Now, you've been retained by the Wise Plaintiffs in
19 this case, correct?

20 A. Yes.

21 Q. And it's your understanding the Wise Plaintiffs are
22 challenging only Districts 4 and 5, correct?

23 A. That's my understanding.

24 Q. And a few of your plans make changes to other
25 districts, as well, correct?

1 A. Correct.

2 Q. So Cervas 5, 6, and 7, also make changes to District
3 6; is that right?

4 A. Yeah. That's correct.

5 Q. And Cervas 8, also, makes changes to Districts 3 and
6 6; is that right?

7 A. Correct.

8 Q. Now, you record in this table the number of total
9 county splits; do you see that line?

10 A. Yes.

11 Q. And this shows that the 2025 map does better than the
12 2022 map on that measurement, correct?

13 A. Correct.

14 Q. And your plans also do better than the 2022 map on
15 that metric, as well, right?

16 A. Correct.

17 Q. And all of your plans perform better on the number of
18 total county splits than the 2022 map, right?

19 A. Correct.

20 Q. Now, you, also, have the number of counties split,
21 it's the next line down; do you see that?

22 A. Yes.

23 Q. I've sometimes seen this referred to as the number of
24 split counties; would that be the same?

25 A. Yes.

1 Q. Okay. And a few of your plans have more split
2 counties -- Cervas 1, 2, 5, and 6 -- than the 2025 plan,
3 correct?

4 A. Correct.

5 Q. And your plans don't, necessarily, split the same
6 counties as the 2025 plan, correct?

7 A. Not necessarily.

8 Q. For example, your Cervas 5 through 8 split Clay
9 County, but the 2025 plan does not, correct?

10 A. Correct.

11 Q. And this is also true of the adjusted maps that you --
12 you got from the other expert and you equalized the population,
13 correct?

14 A. Yeah. I don't remember the details of 'em, but I'm
15 sure that's true.

16 Q. Sure. But those maps made splits --

17 A. May or may not, yeah.

18 Q. Okay. And I believe you said your Cervas 6, 7, and 8
19 make Jackson County whole; is that correct?

20 It may be on the next page of your report.

21 A. Yeah. I mean, it looks correct from looking at the
22 maps.

23 Q. Okay. And by doing that, you've united western
24 Jackson County, which the Census Bureau classifies as urban and
25 eastern Jackson County which it classifies as rural, correct?

1 A. That's correct.

2 Q. All right. And if we go back to page 7 to your Table
3 1, your plans also have fewer county splits and counties split
4 than the 2022 plan; is that right?

5 A. Yes. That's correct.

6 Q. Okay. And you also have here some data on total
7 municipal splits and municipality split or split municipalities,
8 correct?

9 A. Correct.

10 Q. You did not assess the number of municipal splits or
11 municipalities split when we're talking about municipalities
12 contained wholly within a single county, correct?

13 A. I'm not sure I know what you mean.

14 Q. So let me explain. So some municipalities in Kansas
15 City or in Missouri extend beyond a single county; is that
16 correct?

17 A. Yes.

18 Q. So Kansas City's an example, correct?

19 A. Exactly.

20 Q. Some municipalities are contained wholly within a
21 single county; is that also correct?

22 A. Yes.

23 Q. Okay. And you don't report anywhere on your chart the
24 number of municipal splits of municipalities that are wholly
25 contained within a single county, right?

1 A. No. I didn't do -- I didn't differentiate between
2 that, only those that had no population.

3 Q. And you excluded those from your analysis, correct?

4 A. Yeah.

5 Q. Okay. And you didn't also assess the number of split
6 municipalities in any particular county, correct?

7 A. No.

8 Q. So for example, you don't report the number of split
9 municipalities or municipal splits in Jackson County, correct?

10 A. No, I do not.

11 Q. And your plans also don't, necessarily, split the same
12 municipalities as the 2025 plan, right?

13 A. That's correct.

14 Q. And you would agree that the decision of which
15 municipalities to split or to keep whole is a matter of
16 legislative discussion, correct?

17 A. Again, within the bounds of what is constitutional.

18 Q. Looking at Table 1, your plans also have fewer splits
19 -- fewer municipals splits and municipalities split than the
20 2022 plan, correct?

21 A. Correct.

22 Q. And that's true of all of your plans, correct?

23 A. Yes. I believe so.

24 Q. Let's go to Table 2, which is page 10 of your report.
25 And I want to ask you, briefly, about District 6.

1 So District 6 in the 2025 map becomes more compact than in
2 the 2022 map on the Reock score; is that correct?

3 A. In my plans?

4 Q. It's comparing the 2025 map and the 2022 map on the
5 Reock score, District 6 has become more compact in 2025 --

6 A. Thanks for the clarification.

7 Q. -- is that right?

8 A. Yes.

9 Q. And also on the Polsby-Popper score, District 6 from
10 2022 to 2025 becomes more compact on the Polsby-Popper score; is
11 that right?

12 A. Yes.

13 Q. And according to Table 2, if we look at your plans
14 now, Cervas 1 through 8, on both Reock and Polsby-Popper, most
15 of them on both of those scores make Districts 4 and 5 more
16 compact than District 4 and 5 were in the 2022 plan, right?

17 A. Yes.

18 Q. Let's go, now, to page 12 in your report. And if we
19 start with Heading B, this relates to my first line of
20 questions. Here, you're analyzing whether the 2025 maps non-
21 compact Districts 4 and 5 were necessary to comply with the
22 constitutional requirements of federal law and recognized
23 factors; is that right?

24 A. Correct.

25 Q. And then, you have a further explanation in the

1 sentence below. You assess whether the reduction in compactness
 2 was a minimal or practical deviation necessary to achieve
 3 compliance with those requirements; is that correct?

4 A. Correct.

5 Q. So let's go to the next page. So you look at equal
 6 population, correct?

7 A. Yes.

8 Q. And you compare the 2025 map to your alternative
 9 plans; is that right?

10 A. Correct.

11 Q. And conclude that your alternative plans are more
 12 compact, yet still achieve equal population, correct?

13 A. Yes.

14 Q. So your plans are also more compact than the 2022 plan
 15 and your plans achieve equal population, correct?

16 A. Yeah. Over all, yes. You mean overall?

17 Q. Overall.

18 A. Yeah.

19 Q. Yeah. And that includes in Districts 4 and 5, as
 20 well, correct?

21 A. Correct.

22 Q. Okay. So the 2025 plan -- or the 2022 plan's inferior
 23 compactness or reduced compactness, compared to your alternative
 24 plans, also wasn't necessary to achieve equal population,
 25 correct?

1 A. Well, I didn't analyze any of the plans and districts
2 in the 2022 plan, outside of 4 and 5 or -- yeah, 4 and 5.

3 Q. Sure. So let's --

4 A. So, like, their compactness is not something I've
5 considered as relevant.

6 Q. Let's look at, just, 4 and 5. So you have plans that
7 are more compact than the 2022 plan in Districts 4 and 5,
8 correct?

9 A. Yes.

10 Q. And your plans are equally populated, correct?

11 A. Yes.

12 Q. So the 2022 plan's inferior compactness in Districts 4
13 and 5, compared to your alternative plans, was not necessary to
14 achieve equal population in the 2022 plan, correct?

15 A. Yeah. On that criteria, that seems to be correct.

16 Q. Okay. Now, let's look now at contiguity. Your plans
17 are more compact in Districts 4 and 5 than the 2022 plan and
18 your plans are contiguous, correct?

19 A. Correct.

20 Q. So the 2022 plan's inferior compactness in Districts 4
21 and 5, compared to your alternative plans, also wasn't necessary
22 to achieve contiguity, correct?

23 A. Correct. In that, again, you're talking about the
24 quantitative measures of compactness?

25 Q. Yup.

1 A. The Polsby-Popper and Reock, right?

2 Q. Yes.

3 A. Not the more wholistic?

4 Q. I'm asking you about the measures you used with the
5 Polsby-Popper and Reock, correct.

6 A. Those are the quantitative.

7 Q. Yeah.

8 A. There's also the more wholistic view of compactness.

9 Q. Take your point.

10 A. Okay.

11 Q. But we're talking about Reock, what we see in Table
12 10.

13 A. Okay. Thank you.

14 Q. Okay. And next, you analyze the compactness of other
15 districts and your plans are more compact than the 2022 plan in
16 Districts 4 and 5, as well, as in other districts, correct?

17 A. Yes, correct.

18 Q. And you have, in your plans, achieved compactness in
19 other districts, as well, correct?

20 A. I'm sorry. Repeat the question or restate it.

21 Q. Sure. I don't think we need to. So the 2022 plan's
22 inferior compactness in Districts 4 and 5, compared to your
23 alternative plans, also wasn't necessary due to compactness of
24 other districts in the 2022 plan, correct?

25 A. Yeah. On these quantitative measures, yeah.

1 Q. On the quantitative measures. And if we move to the
2 next factor you consider, which is the Federal Voting Rights
3 Act, again, your plans leave District 1 in place, correct?

4 A. Correct.

5 Q. They make no changes to District 1 compared to 2022,
6 correct?

7 A. That's correct. Or --

8 Q. Or 2025?

9 A. Districts 1 -- 2025. Yeah.

10 Q. Thank you. So the district -- the 2022 plan's
11 inferior compactness in Districts 4 and 5, compared to your
12 alternative plans, also wasn't necessary to comply with the
13 Voting Rights Act, correct?

14 A. Correct.

15 Q. And let's go to the next factor you looked at, which
16 would have been political subdivisions, county splits. And,
17 again, your plans split fewer counties than the 2022 plan,
18 correct?

19 A. Correct.

20 Q. And so the 2022 plan's inferior compactness in
21 Districts 4 and 5, compared to your alternative plans, also
22 wasn't necessary to comply with this county splits factor,
23 correct?

24 A. I'm not sure we can draw that conclusion.

25 Q. I'm going off of what was in your Table 10, which is

1 your Reock and Polsby-Popper scores and the county splits data.

2 What other data would you need to analyze that question?

3 A. Well, I mean, it, just -- I think, you -- the way you
4 asked the question, well, it basically is -- I have to, kind of,
5 think about it, right? Because, I didn't analyze the 2012 plan
6 for compactness against my -- my plans, so there was -- that
7 wasn't the challenge, right? That wasn't -- that was never the
8 goal.

9 Q. I understand you weren't -- I believe, you meant the
10 2022 plan, right?

11 A. I'm sorry. Yes.

12 Q. Yeah. I understand that wasn't what you were asked to
13 do. I'm asking you about the data that's in your report in
14 Table 10.

15 A. Oh, but so can you repeat your question and, maybe, I
16 can --

17 Q. Sure. So the data in Table in 10 says that your plans
18 are more compact than the 2022 plan.

19 A. Table 10?

20 Q. It's on page 10. Sorry. Table -- it's on page 10 --

21 maybe -- Table 2.

22 A. Yes.

23 Q. So you have plans here that are more compact than the
24 2022 plan, correct?

25 A. The data show that you can increase the Reock scores

1 or the Polsby-Popper scores, compared to the 2022 plan. That's
2 correct.

3 Q. So for example, your Cervas Plan 1 is as compact or
4 more compact in every district from the 2022 plan on both Reock
5 and Polsby-Popper, correct?

6 A. Correct.

7 Q. And the same is true of Cervas Plan 2, correct?

8 A. That's true.

9 Q. And then, also, Cervas 7 and 8, correct?

10 A. (Nonverbal response.)

11 Q. And if we were to go flip back to Table 1 on page 7,
12 we see that your plans also -- the plans we just mentioned,
13 Cervas plan 1, 2, 7, and 8 -- also split fewer counties and
14 municipalities than the 2022 plan?

15 A. Right.

16 Q. And so as I understood what you are analyzing in Part
17 B, starting on page 12 -- and if we flip over to where we were,
18 now at the page 14 -- county splits, you're saying that the 2025
19 plans compactness scores on Reock and Polsby-Popper are not
20 necessary to comply with county splits because you drew plans
21 with better Reock and Polsby-Popper scores and fewer county
22 splits, right?

23 A. I don't think we can draw that conclusion. There's
24 nothing controlled in the 2022 map. So, like, those districts
25 that I haven't analyzed, the nonchallenged districts, could have

1 resulted in differences in the Reock and Polsby-Popper scores in
 2 the 2022 map, right? And there's a wholistic -- there's a
 3 wholistic analysis that needs to be done in order to make that
 4 determination -- that determination I made for the Cervas plans
 5 compared to the 2025 plan, but not for the 2022 plan --

6 Q. And you didn't --

7 A. -- wholistically.

8 Q. And you didn't --

9 A. Just reporting the numbers.

10 Q. You didn't examine that for the 2022 plan?

11 A. I did not examine that for the 2022 plan. My
 12 understanding is it's not challenged in this lawsuit.

13 Q. Let's go to page 16, which is Part 8, here. You
 14 mentioned population density.

15 A. Yes.

16 Q. And your -- the way you conceive a population density,
 17 correct me if I'm wrong, is that it allows for -- favors placing
 18 areas of similar population density together in the same
 19 district; is that right?

20 A. In general, yeah.

21 Q. And you didn't consider whether this factor actually
 22 permits or encourages placing areas of different population
 23 densities in the same district, correct?

24 A. That's right.

25 Q. And you don't know what Missouri law is on that, one

1 way or the other, correct?

2 A. I'm not aware.

3 Q. Let's go, now, to page 19 of your report. And this
4 Table 3 reports the percentage of the district population who
5 live in an urban area; is that correct?

6 A. Correct.

7 Q. And according to Table 3, District 5 is a majority
8 urban district in the 2025 plan; is that right?

9 A. The vast majority.

10 Q. Okay. And also District 6 is a majority urban plan in
11 the 2025 map, as well, correct?

12 A. Slight majority.

13 Q. And if we look at District 4 in the 2022 map, it was
14 not majority urban in 2022, correct?

15 A. That's correct; majority rural.

16 Q. And the 2025 plan placed a larger portion of Kansas
17 City in District 4, correct?

18 A. Yes.

19 Q. And that made District 4 majority urban, as well,
20 correct?

21 A. That's right.

22 Q. If we compare that to your plans, Cervas 1 through
23 Cervas 8, your maps all make District 4 majority rural again,
24 correct?

25 A. Yes.

1 Q. I have no further questions. Thank you, Dr. Cervas.

2 A. Thank you.

3 THE COURT: Additional questions for the
4 plaintiff?

5 MR. MULJI: Yes, Your Honor.

6 THE COURT: Go ahead.

7 **REDIRECT EXAMINATION BY MR. MULJI**

8 Q. Doctor Cervas, I want to start with some of the
9 questions you were asked by Mr. Gore, Counsel for Intervenor.

10 Now, he asked you about your articulation of your
11 understanding of what the Missouri Constitution requires when it
12 comes to compactness. And he pointed out to you the language
13 that you wrote about how any departure from compactness needs to
14 be necessary to comply with one of the recognized factors; do
15 you recall that questioning?

16 A. Yes.

17 Q. Now, do you understand that -- that language you used
18 to be any different from, say, the question of whether the
19 departure and compactness in these districts resulted from the
20 application of recognized factors?

21 A. No. It seems to be, like, a synonym, for the same
22 thing.

23 Q. Did your analysis show that, as well?

24 A. Yes.

25 Q. Did -- do you understand your verbiage in your report

1 to be any different from the way you stated things on the stand
 2 today? That whether -- the question being, whether a departure
 3 in compactness in the challenged districts could be explained by
 4 one of the recognized factors?

5 A. That's exactly the way I think I presented my evidence
 6 in my report and in my testimony.

7 Q. Okay. And your analysis was directed at answering all
 8 of these questions?

9 A. That's right.

10 Q. Okay. Did your conclusions about whether there was a
 11 departure from compactness in these challenged districts depend
 12 exclusively on the quantitative measure you reported? Polsby-
 13 Popper, Reock, and then some other ones you analyzed from the
 14 other experts.

15 A. No.

16 Q. Okay. How -- what are some of the other
 17 considerations you -- you had in making the --

18 A. Well, I was made to understand that compactness is
 19 closely united territories. And so we define closely united
 20 territories to include more than just the districts shape and
 21 size, but also to include things like whether it accounted for
 22 urban areas, whether it accounted for population density,
 23 whether it counted for political subdivisions, natural
 24 boundaries, core retention.

25 Q. Now, Mr. Gore and Mr. Sullivan both asked you some

1 questions about the number of county splits in your maps, the
 2 2022 map, the 2025 map; I want to review some of those -- some
 3 of those things, again, with you.

4 MR. MULJI: If we could pull up Plaintiff's
 5 Exhibit 82, again. And if we could, just, zoom in on the
 6 2025 map, if that's possible, please. Maybe, a little bit
 7 further up slightly, thank you.

8 Q. What we're now looking at on the screen, for the
 9 record, a slightly zoomed in version of the 2025 district map
 10 overlaid on counties; is that right?

11 A. Correct.

12 Q. How many times is Jackson County split in 2025?

13 A. It's -- it's split -- you cannot actually see on here,
 14 but it's split into three different districts; Districts 4, 5,
 15 and 6.

16 Q. Okay. And how many times is Boone County split on
 17 this map?

18 A. It's split one time.

19 Q. Okay. So you have the two splits of Jackson County,
 20 one split of Boone County?

21 A. Yes.

22 Q. Okay. Could we go to Plaintiff's Exhibit 86?

23 Before we scroll down anywhere. Doctor Cervas, do you know
 24 what this exhibit is? Plaintiff's Exhibit 86.

25 A. These are maps that I created.

1 Q. Okay. Let's -- if we could scroll down to Cervas --
 2 Cervas 3. And if we could go up one page. There we go. Oh,
 3 sorry, Cervas 3, that's page -- I have that as page 6 of this
 4 exhibit. Okay.

5 Dr. Cervas would you agree that we're now looking at a
 6 depiction of your map, Cervas 3?

7 A. Yes.

8 Q. At the statewide level; this is right?

9 A. Yes.

10 Q. Looking at county lines and county names?

11 A. Yes.

12 Q. Okay. How many times is Jackson County split in this
 13 -- in this map?

14 A. The same. Three different Districts, 4, 5, and 6.

15 Q. How many times is Boone County split?

16 A. Once.

17 Q. This map splits the same number -- same counties the
 18 same number of times between Districts 4 and 5?

19 A. Correct, that's the 2025 map.

20 Q. And did you manage to achieve a greater level of
 21 compactness in Districts 5 and 4 while doing that?

22 A. Yes.

23 Q. If we could scroll down two pages to page 8. We are
 24 now looking at Cervas Map 4; is that right?

25 A. Correct. Correct.

1 Q. And how many times is Jackson County split in this
2 map?

3 A. Also between 4, 5, and 6.

4 Q. And how many times has Boone County split?

5 A. Just one time.

6 Q. The same number of times in the counties --

7 A. Yes.

8 Q. -- as the 2025 map?

9 A. Yes.

10 Q. No further questions, Your Honor.

11 MR. SULLIVAN: Real quick, Your Honor.

12 THE COURT: Sure.

13 **RECROSS-EXAMINATION BY MR. SULLIVAN**

14 Q. Doctor Cervas, the 2022 map splits Jackson County
15 three ways, doesn't it?

16 A. Yes.

17 Q. I don't have any more questions. Thank you.

18 MR. GORE: Nothing, Your Honor.

19 THE COURT: Okay. You can step down. Thank you.

20 THE WITNESS: Thank you. Thank you.

21 THE COURT: Okay. All right. If you can call
22 your next witness, please.

23 MS. ASTARITA: Plaintiffs call Marques Bussey.

24 THE COURT: If you can please raise your right
25 hand.

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MARQUES BUSSEY,

having been sworn by the Court testifies as follows:

THE COURT: Thank you. Have a seat, please.

MS. ASTARITA: Your Honor, this is Julianna Astarita for the Healey Plaintiffs.

DIRECT EXAMINATION BY MS. ASTARITA

Q. Good afternoon, Mr. Bussey.

A. Good afternoon.

Q. Could you please state your full name for the record?

A. Marques Bussey.

Q. Could you spell that, please?

A. Sure. M-A-R-Q-U-E-S, B-U-S-S-E-Y.

Q. Mr. Bussey, are you a registered voter?

A. Yes.

Q. And where are you registered to vote?

A. Kansas City.

Q. Is that where you live?

A. Yes.

Q. Do you pay taxes in Missouri?

A. Yes, I do.

Q. And how long have you lived in Missouri?

A. About 47 years.

Q. How long have you lived in Kansas City?

A. 47 years.

Q. What do you do for work?

1 A. I own a marketing company where I service clients,
2 nonprofits, small businesses, and then, corporations,
3 enterprise, clients abroad, you know, across the country.

4 Q. What congressional district do you live in under the
5 2022 map?

6 A. Fifth District.

7 Q. And what District will you live in under the 2025 map?

8 A. It will be the same, 5th District.

9 Q. Do you see Kansas City as a closely united community?

10 A. Absolutely.

11 Q. Why?

12 A. Kansas City is a united community through our
13 community experiences, also, you know, we fight for the greater
14 good here. And then, we have -- we all attend, like, community
15 events. Like, coming up, everyone knows that St. Patty's Day is
16 a big event where everybody comes from all over the city.

17 Q. And I'm gonna bring up a demonstrative, which we're
18 gonna mark as, I think, it's 302.

19 And do you recognize this as a map of Kansas City?

20 A. Yes.

21 Q. And how do these new district lines map onto your
22 community as you experience it?

23 A. Well, looking at these maps, between Districts 4 and 5
24 and 6, my community will be split. And so in sayin' that, you
25 know, I live in District 5 but I service my community in the 4th

1 District, you know, whether I'm goin' through Troost Avenue,
 2 whether I'm going to Union Station or whether I'm going through
 3 Downtown, Kansas City. And so this map, kind of, puts me --
 4 puts my children's schools outside of my own district, in
 5 District 6 and District 4, is what happens.

6 Q. And could you point out on the map where you live?

7 A. Yes; 28th and Tracy is where I live.

8 Q. Could you point it out on the big screen?

9 A. Oh, I'm sorry. So it's around there, around this
 10 area.

11 Q. Okay. And can you point out where your son's school
 12 is on the map?

13 A. Yes. Happy to. And then, my son's school is right
 14 around here, around this area.

15 Q. And do you know where your daughter's school is on
 16 this map?

17 A. Yes. It's in North Kansas City, so it's over -- it's
 18 definitely District 6, around this area.

19 Q. Okay. And what about businesses that you visit?
 20 Where are those on this map?

21 A. A lot of businesses that I visit in the Troost Avenue,
 22 if we come over here.

23 Q. And do you see the area west of Troost as closely
 24 united with your neighborhood?

25 A. Absolutely.

1 Q. How long would it get -- take you to get to the 4th
2 District from your neighborhood?

3 A. Again, if I'm running, it'd probably take me, about,
4 30 seconds to get there.

5 Q. What about Downtown Kansas City? Is that closely
6 united with your community?

7 A. Absolutely. Absolutely.

8 Q. And could you point out where Downtown Kansas City is
9 on that map?

10 A. Downtown Kansas City is, I believe, around -- around
11 this area.

12 Q. And why do you think that's closely united with your
13 community?

14 A. Well, to be honest, I grew up in Downtown Kansas City.
15 My dad owns a law firm here in Downtown Kansas City. So I've
16 always been in and out of these buildings, City Hall, the
17 courtroom; so this is my neighborhood. You know, I attend
18 regular events, you know, at that -- the T-Mobile center, you
19 know, things of that nature; so downtown is very close to home
20 for me.

21 Q. What about somewhere like Sedalia? Do you consider
22 that closely related with your Kansas City community?

23 A. No. No.

24 Q. And why is that?

25 A. I feel Sedalia, probably, doesn't have the same

1 concerns that we have. Such as, you know, safety in our
 2 neighborhoods, economic opportunities, affordable housing,
 3 things of that nature. You know, and different projects. I
 4 don't believe people in Sedalia are, necessarily, concerned with
 5 the streetcar, to be honest.

6 Q. So do you think Sedalia is closely united to Kansas
 7 City geographically?

8 A. No.

9 Q. How far away is it?

10 A. I would say Sedalia is about a -- about a hour and a
 11 half away.

12 Q. Do you think Sedalia is closely united with Kansas
 13 City culturally?

14 A. Not, necessarily, culturally. In terms, again, in
 15 terms of those events, those citywide events. Let's say, you
 16 know, the things that we're fighting for, you know, whether it
 17 be education, things of that nature, our taxes. You know, just
 18 those kitchen -- those morning kitchen table conversations that
 19 we have. I doubt if they're having the same ones.

20 Q. And you mean about Kansas City, right?

21 A. Yes.

22 Q. What about transportation? Is it closely united with
 23 regard to transportation?

24 A. No. Unless you're taking a Greyhound bus or a train,
 25 potentially. No.

1 Q. Is there public transit that goes to Sedalia?

2 A. Not that I know of.

3 Q. What about somewhere like Jefferson City? Do consider
4 Jefferson City closing united to Kansas City?

5 A. No. Like, I, personally, will visit Jeff City on my
6 way to St. Louis. Not to knock Jefferson City for that nature,
7 but I'm pretty sure there are lots of good people down there,
8 but their interests, probably, would not align with our
9 interests.

10 Q. So you don't think it's closely united geographically?

11 A. No.

12 Q. And what about culturally? Do you feel it's closely
13 united?

14 A. No. I think, again, I want to reiterate, very
15 different interests.

16 Q. And same with transportation?

17 A. Yes.

18 Q. Okay. I think, that's all. Thank you so much.

19 A. Thank you.

20 Q. They might have some questions for you.

21 A. Okay.

22 **CROSS-EXAMINATION BY MR. SUTTON**

23 Q. Hi there, Mr. Bussey. It's nice to meet you.

24 A. Nice to meet you, too.

25 Q. So you testified about your community in Kansas City,

1 correct?

2 A. Yes, sir.

3 Q. And you're not testifying about other areas in the
4 state; is that correct?

5 A. Yes, sir.

6 Q. You're not here to talk about how the map treats
7 communities in Columbia City, correct?

8 A. No, sir.

9 Q. Same about how the map treats communities in St.
10 Louis; is that correct, too?

11 A. Correct, sir.

12 Q. And that's because, in your view, your work, your
13 home, your kids' schools, they're all part of your community; is
14 that right?

15 A. Yes, sir.

16 Q. And so as I understand your testimony, we know this
17 area is a community because it shares certain interests; is that
18 right?

19 A. Yes, sir.

20 Q. And these common interests you've described, like
21 safety, economic opportunity, they're differentiated from other
22 communities; is that right?

23 A. Could you expand upon that?

24 Q. They just make your community unique.

25 A. Yes.

1 Q. And you agree, though, that your community is still a
2 community, right, regardless of how the lines are drawn?

3 A. It is still a community in terms of the people that we
4 talk to, those shared stories, but when you start to divide up
5 it becomes fractured, so economic opportunities, kind of, split
6 that community.

7 Q. Well, say you mentioned your local schools, the new
8 lines don't change where your kids go to school, correct?

9 A. Correct.

10 Q. Okay. And you also testified that Kansas City is a
11 closely united community, correct?

12 A. Correct.

13 Q. You're aware that the 2022 plan also split Kansas City
14 into three districts; is that correct?

15 A. Yes, sir.

16 Q. Okay. Those are all the questions I have for you.

17 Thank you very much.

18 A. Okay. Thank you.

19 THE COURT: Questions for the intervenor?

20 MR. ELLINGER: That was the intervenor.

21 THE COURT: Oh, I'm sorry. You're sitting on the
22 other side of the table. (Laughter.)

23 MR. SUTTON: I'm sorry.

24 THE COURT: Does the State have questions?

25 MR. SULLIVAN: No, Your Honor.

1 THE COURT: Okay. You all switched seats on me
2 there. Okay. All right.

3 Additional questions for the plaintiff?

4 MS. ASTARITA: No.

5 THE COURT: All right. You can step down. Thank
6 you.

7 THE WITNESS: Thank you.

8 THE COURT: If you want to call your next
9 witness.

10 MR. CHEUNG: Your Honor, our next witness is an
11 expert witness whose testimony will be fairly lengthy. We
12 can start part of it now or we can start after lunch.

13 THE COURT: Let's go ahead and get some work done
14 here.

15 MR. CHEUNG: The Wise Plaintiffs call Dr. Ari
16 Stern.

17 THE COURT: Come on up, please. Can you please
18 raise your right hand?

19 **DOCTOR ARI STERN,**

20 having been sworn by the Court testifies as follows:

21 THE COURT: Thank you. Have a seat, please.

22 MR. CHEUNG: Your Honor, Ming Cheung from the
23 ACLU. I'm using some demonstrative slides, excuse me, with
24 Dr. Stern. Would Your Honor like a copy?

25 THE COURT: Sure. Does the other folks have a

1 copy, as well, hopefully?

2 MR. CHEUNG: We did send them copies.

3 THE COURT: Okay.

4 MR. CHEUNG: Your Honor, I also have a binder for
5 Dr. Stern. It contains the slides and the expert reports
6 in his case.

7 THE COURT: Okay.

8 THE WITNESS: Is this from, mostly, previously?

9 MR. CHEUNG: Yes. Yes.

10 THE WITNESS: Okay. Thank you.

11 MR. CHEUNG: I think this a laser pointer, if
12 want to do that.

13 THE WITNESS: I don't think I need that.

14 THE COURT: And do you have the -- do you want to
15 just mark the entire PowerPoint that you have here? I
16 don't care, as long as we can identify it.

17 MR. CHEUNG: Yes. We can do that. What number
18 are we?

19 MS. KHANNA: 303.

20 MR. CHEUNG: 303.

21 THE COURT: Okay. We'll just mark the entire
22 PowerPoint as 303.

23 MR. CHEUNG: Thank you, Your Honor.

24 **DIRECT EXAMINATION BY MR. CHEUNG**

25 Q. Good morning, Dr. Stern.

1 A. Good morning.

2 Q. Doctor Stern, what do you do for work?

3 A. I'm a professor of mathematics at Washington
4 University in St. Louis.

5 Q. How long have you been at WashU?

6 A. I've been at WashU for 14 years; since 2012.

7 Q. What is the focus of your academic research?

8 A. My academic research focuses on applied and
9 computational mathematics. And within that, specifically, I
10 look at the development of scientific computing algorithms and
11 their relationship to geometry.

12 Q. And can you give us a brief overview of your
13 educational background?

14 A. Sure. I did my undergraduate work at Columbia
15 University in New York, where I majored in mathematics. I also
16 stayed on and got a Masters in mathematics of finance also from
17 the mathematics department at Columbia. After that, I did my
18 PhD in applied and computational mathematics at Caltech --
19 California Institute of Technology.

20 After finishing my PhD, I did three years of postdoctoral
21 training doing postdoctoral research and also teaching in the
22 Department of Mathematics at the University of California, San
23 Diego. And immediately thereafter, I joined the faculty of
24 WashU in 2012.

25 Q. Doctor Stern, when did you first become involved with

1 redistricting?

2 A. I first became involved in redistricting in 2017.

3 Q. And how did you get involved?

4 A. I got involved because, at that time, there was some
5 interest among researchers and mathematics, computational and
6 social sciences, in developing some quantitative techniques to,
7 actually, quantify some of the techniques that arose in
8 redistricting cases and questions of how to measure what
9 constitutes a gerrymander.

10 And I connected with Professor Moon Duchin, who's one of
11 the leading mathematicians in this area, who was at the -- at
12 Tufts, now at University of Chicago, who organized a workshop
13 and also a smaller group of academics to work on these problems.
14 So that's how I got involved in 2017, and I've been involved in
15 since.

16 Q. Have you had any academic publications related to
17 redistricting since then?

18 A. I've had one, which was the, I guess, the publication
19 listed in the first bullet here called, Aggregating Community
20 Maps. That was presented at the SIGSPATIAL Conference in 2022
21 and published in the peer-reviewed proceedings of that
22 conference, and that was relating to some questions involving
23 the identification of communities of interest and possible
24 applications to redistricting.

25 Q. Your CV also lists a collaboration with the MGGG

1 Redistricting Lab. What is your involvement there?

2 A. So the MGGG Redistricting Lab is this group of
3 academics that was organized by Professor Moon Duchin, as I
4 mentioned, originally at Tufts when she founded this
5 redistricting lab, now at University of Chicago. And I've been
6 involved in a number of conferences, workshops, trainings,
7 collaboration on technical reports, as well as this peer-
8 reviewed publication with members of that lab.

9 I've also been involved, in some extent, in the development
10 of the GerryChain software, which I used in my analysis in this
11 case and previously, and that software was originally developed
12 with the MGGG Redistricting Lab by a team that included one of
13 my former PhD students.

14 Q. Prior to this case, have you done any redistricting
15 work in Missouri?

16 A. Not as an expert, but I did do some analysis and
17 submitted written testimony to the redistricting commissions
18 around questions of State legislative redistricting, so the
19 State, Senate, and House Districts, and that was this most
20 recent redistricting cycle.

21 Q. And in terms of your expert witness experience, have
22 you previously worked on a case in New York?

23 A. Yes, I have.

24 Q. And did you testify as an expert witness in that case?

25 A. Yes, I did.

1 Q. How similar was the methodology that you used in that
2 case compared to this one?

3 A. So the methodology was quite similar. There were
4 different questions at issue there. That case was mainly
5 looking at questions related to partisan and racial
6 gerrymandering, but the general methodology was the same, which
7 was to generate a large ensemble of alternative maps to use as a
8 baseline, and then compare the enacted map in question against
9 the properties of the ensemble maps.

10 Q. Okay. Thank you.

11 MR. CHEUNG: Your Honor, at this time, pursuant
12 to the parties stipulation, we would offer Dr. Stern as an
13 expert on applied and computational mathematics,
14 redistricting, and ensemble analysis.

15 MS. HUNKER: No objection from State Defendants,
16 Your Honor.

17 MR. ELLINGER: No objection from Intervenors.

18 THE COURT: Okay. Similar to last time, I think,
19 you can jump into opinion questions and if they feel like
20 you're going past those areas, I'm sure they'll object.

21 MR. CHEUNG: Thank you, Your Honor.

22 Q. Doctor Stern, did you produce an initial report, as
23 well as a rebuttal report in this case?

24 A. Yes, I did.

25 Q. And just for the record, the initial report has been

1 admitted as Exhibit 21 and the rebuttal report is Exhibit 22.

2 Doctor Stern, broadly speaking, what is the scope of your
3 analysis in this case?

4 A. So the scope of my analysis was focused on the region
5 covered by Congressional Districts 4 and 5 in the 2025 map;
6 which, in my report, I also sometimes refer to as the Missouri
7 First Map, because that was one of the names it was given; I use
8 these interchangeably.

9 So I was asked to look at the region covered by CD4 and 5
10 and to assess to what degree CD4 and 5 are as compact as they
11 may be, compared to other boundaries that could have been drawn
12 between CD4 and CD5. Excuse me. So I was asked to assess
13 whether these two districts were as compact as may be, compared
14 to alternative maps that kept the other six districts the same.

15 Q. And did you also look at whether any deviation from
16 compactness could be explained by some other factors?

17 A. Yes. So in addition to simply looking at compactness
18 in that sense, I was also asked to look at whether deviations
19 from compactness could be explained by other redistricting
20 criteria.

21 Q. And what is the primary method that you used for your
22 analysis on those questions?

23 A. So the primary method is what is often called ensemble
24 analysis. So the idea is to use a computer algorithm to
25 randomly produce a large set of alternative maps, and then for

1 anything that you might wish to measure about the map in
2 question, you can compare that to the measurements of the
3 ensemble maps and see where it falls compared to the ensemble on
4 whatever property you might wish to measure.

5 So you can see how it differs, for example, from the
6 average ensemble map, and you can also see where the enacted map
7 ranks compared to the ensemble; whether it's near the middle or
8 whether it lies off to the extremes.

9 Q. And Dr. Stern, how many maps did your algorithm draw
10 for your ensemble analysis?

11 A. So I created two separate ensembles, and each ensemble
12 consisted of 100,000 maps. The primary ensemble I used for most
13 of my report was one of these ensembles that had a population
14 deviation tolerance of plus and minus one percent. I also
15 created a completely separate ensemble of another hundred
16 thousand maps that had a smaller population deviation tolerance
17 just to test the effect of that choice of perimeter.

18 Q. For the maps that you drew for your ensemble, which
19 boundary lines are you redrawing as compared to the 2025 map?

20 A. So the ensemble maps I considered only change the
21 CD4/CD5 boundary lines. So the remaining six districts and any
22 other boundary lines are left untouched, so this is only looking
23 at changes to CD4 and CD5 without changing any of the other
24 districts.

25 Q. From an analytical perspective, are there any

1 advantages to limiting the redraw to that single boundary line
2 between CD4 and CD5?

3 A. Yes, there are. Among these advantages are that -- it
4 focuses sort of controls for any other factors the legislature
5 may have considered elsewhere in the State, and it ensures that
6 any changes are only within CD4 and CD5 and not, for example,
7 trading off compactness in these districts against some other
8 boundary line on the other side of the State. So it really
9 focuses the scope without, possibly, sacrificing any of the
10 other considerations that were used to draw the other boundary
11 lines.

12 Q. Other than being limited to a CD4 and CD5 area, are
13 there any other parameters or restraints that you built into
14 your algorithm?

15 A. Yes, there are. So the algorithm at each step takes
16 the region covered by CD4 and CD5 and randomly splits it into
17 two districts. The algorithm was passed a parameter so that in
18 doing so it avoided splitting counties to the extent possible,
19 and that ensured that county splitting -- that the number of
20 county splits was no more than one, which was the number of
21 county splits in the Missouri First Map.

22 Additionally, all of the maps that are drawn have
23 contiguous districts. So in each of my ensemble maps the
24 randomly drawn CD4 and CD5 are contiguous. And these -- the
25 splitting was also conducted in such a way that the districts

1 are approximately population balanced. So in the first and main
2 ensemble that I presented results on, the population was allowed
3 to deviate from an exact population split by plus or minus one
4 percent. In the second ensemble, I tightened that to plus or
5 minus 0.1 percent.

6 Q. And why did you do two ensembles with different
7 population tolerances?

8 A. Well, I wanted to check whether the results from my
9 initial ensemble were particularly sensitive to that choice of
10 one percent population tolerance and whether those results might
11 be different if one were to reduce the population tolerance, so
12 that was to test that effect.

13 Q. Okay. We'll get into the specifics of that later, but
14 at a high level, did you find that there was a significant
15 difference between the two population tolerances?

16 A. No, I did not.

17 Q. Did you impose any compactness requirements or targets
18 on the maps being drawn by your algorithm?

19 A. No, I did not. I did not impose any particular
20 compactness goal or supply any compactness parameters to the
21 ensemble. And there are some algorithms out there where people
22 can try to hit a particular compactness target or compactness
23 distribution in the ensemble and I didn't put my thumb on the
24 scale in any way by supplying any additional parameters.

25 And I also didn't do any filtering after the fact of

1 weeding out more or less compact maps to try to achieve a
2 particular goal. I just let the algorithm do its thing.

3 Q. Did you design the algorithm to draw the most compact
4 maps possible?

5 A. No, I did not.

6 Q. So after your algorithm generates the maps, did you
7 review the maps to ensure that there's a wide range of maps
8 being drawn?

9 A. Yes, I did.

10 Q. And looking at Slide No. 7, here. What is the larger
11 map on the right?

12 A. So the larger map on the right is the enacted 2025
13 map, which I also call the Missouri First Map.

14 Q. And what are the maps on the left?

15 A. The maps -- let me mention, of course, this is, just,
16 a detail of the Missouri First Map, only looking at the region
17 covered by CD4 and CD5, of course.

18 On the left, this is a sampling of districting maps taken
19 from the random ensemble across a range of a particular
20 compactness measure called cut edges, which I'm sure we'll talk
21 a little bit about theater. What this shows is going from the
22 lowest number of cut edges in the top left, which is, according
23 to this metric, the most compact, down to the least compact in
24 the bottom right; it shows a wide range of compactness observed
25 in the ensemble.

1 We can see in the upper left, we have a -- one district,
2 which is drawn in light blue, very tightly drawn around Jackson
3 County and the Kansas City area. And as the number of cut edges
4 increases and compactness decreases, we see this light blue
5 district spreading out to more and more neighboring counties,
6 until by the time we're all the way in the bottom right, we have
7 a district that is among the least compact, which sprawls across
8 numerous counties and spreads all the way across this region.

9 Q. And if you compare the 2025 map on the right to the
10 range of maps on the left, do you make any observations on that?

11 A. Yes. So the -- in this sampling it, basically, falls
12 between the two least compact maps in the large box at left.

13 The number of cut edges is 792, which places the Missouri First
14 Map at 97.6 percent in the ensemble and that is about halfway
15 in-between these last two maps', 95th percentile and 100th
16 percentile in terms of compactness.

17 So it's at the -- definitely, at the non-compact end of the
18 spectrum.

19 Q. When you're drawing a hundred thousand maps, could
20 there be duplicates that are draw by random chance?

21 A. Yes, that can happen, as you said, by random chance.

22 Q. Can you give us an analogy for how that might happen?

23 A. Sure. A simple analogy would be if you're throwing
24 dice and you roll it many times, you would expect to see the
25 same number come up more than once. That's not evidence, by

1 itself, that the dice are unfair. An example that has -- so,
2 obviously, there are more than six possibilities for maps.

3 Another example would be if you're trying to do -- to
4 determine the probability of getting a full house in poker. One
5 way you could do that would be by dealing random hands over and
6 over again, you do this thousands or even millions of times, and
7 you would expect that just by random chance, sometimes you would
8 deal a hand that you'd seen before. And again, as long as the
9 random process is sound, the presence of duplicates is not, by
10 itself, a problem.

11 Q. And, in your opinion, does the existence of duplicates
12 undermine the conclusions that you draw from your ensemble
13 analysis?

14 A. No, it doesn't.

15 Q. And, in your experience, is it typical practice when
16 conducting an ensemble analysis to toss out duplicates from the
17 random distribution?

18 A. Generally not, because that would change the
19 distribution in a way that might affect the results and, to my
20 knowledge, that is typically not done.

21 THE COURT: I'll jump in there, and now we can go
22 ahead and we'll take a lunch break. It's 12:14. We'll try
23 to resume at 1:15, if that works for everybody?

24 MR. CHEUNG: Yes, Your Honor.

25 MS. HUNKER: Yes, Your Honor.

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MR. CHEUNG: Thank you, Judge.

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THE COURT: Okay. We'll see you in a bit. Thank

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1 LAW CLERK: All rise. Division 11 is back in
2 session. Please be seated and maintain order.

3 THE COURT: Good afternoon, everybody. Looks like
4 everybody's ready to resume.

5 MR. CHEUNG: Good afternoon, Judge.

6 THE COURT: All right. Feel free to just jump right
7 into it.

8 MR. CHEUNG: Thank you.

9 DR. ARI STERN,

10 resumed the stand and testified:

11 DIRECT EXAMINATION(continued)

12 BY MR. CHEUNG:

13 Q. Good afternoon, Dr. Stern.

14 A. Good afternoon.

15 Q. What computer algorithm did you use draw your maps?

16 A. I used an algorithm called ReCom, which is short for
17 recombination.

18 Q. And is the ReCom algorithm related to a gerry trained
19 software that you mentioned earlier?

20 A. Yes, it is. It's the algorithm the GerryChain uses
21 to randomly split and draw the maps that were used in the
22 ensemble.

23 Q. As compared to other algorithms that can be used to
24 draw maps are there any advantages to using ReCom?

25 A. Yes, there are. So ReCom is a type of algorithm

1 called a mark out chain monte carlo algorithm. And previous
2 one's that have been used have the disadvantage of often
3 drawing very bizarrely shaped pathological districts. So on
4 the left here we have an earlier algorithm called Flip, that as
5 you can see it doesn't look anything like we would expect a
6 normal districting map to look. The districts are very noisy
7 and fractured and fragmented.
8 There's almost like television static was, I think,
9 the analogy I used in my report. On the other hand, ReCom
10 shown at right draws districts that more resemble typical what
11 we would expect in sort of human drawn maps to look like. This
12 sort of plumper regularly shaped districts as opposed to the
13 very bizarrely shaped districts that we see on the left from
14 the Flip algorithm.

15 Q. The bizarrely shaped maps on the left would you
16 consider those to be less compact than the average human drawn
17 map on the right?

18 A. Yes. I would consider them to be extremely non-
19 compact. Far more non-compact than even the least compact map
20 that we're talking about here.

21 Q. How do you know that the ReCom method has not given
22 too much weight to compactness when it avoids drawing extremely
23 non-compact maps like those on the left?

24 A. Well, if the algorithm overweighted compactness we
25 would expect to see some sort of tradeoff with another

1 traditional redistricting criteria. So if compactness were
2 given too much weight we would expect to see more compact
3 districts that are somehow worse in other regards. And across
4 the various alternative and traditional redistricting criteria
5 I looked at no such a tradeoff was observed. In fact, these
6 ensemble maps were generally more compact and performed better
7 on traditional redistricting criteria.

8 Q. Dr. Stern, where did you obtain the geographic and
9 population data used in your algorithm?

10 A. So the geographic and population data was -- thank
11 you. I downloaded directly from the US Census from official
12 data sources.

13 Q. Let's turn to your understanding of compactness in
14 Missouri. What is your understanding of how compactness is
15 defined here?

16 A. So counsel in this case told me a little bit about
17 the Pearson v. Koster decision, and how compactness is
18 interpreted in illegally in Missouri. So my understanding is
19 that compactness does not just refer to the physical shape and
20 size of a district. It refers to the concept of closely united
21 territory. And as I interpreted closely united territory
22 includes factors including the geographic proximity of
23 different territories that are combined and through district
24 historical unity of their representation in previous
25 districting lines as well as territory that's united by

1 existing political boundaries, including the unity of counties
2 and municipalities and so on.

3 Q. You touched on this a little bit, but what do you
4 understand the term closely united territory to mean?

5 A. I understand closely united, as I mentioned, to mean
6 that the territory should be in geographical proximity and also
7 consider these other unifying factors such as historical unity
8 of representation and unity under existing political
9 boundaries.

10 Q. And is it your understanding that the compactness
11 requirement in Missouri allows some deviation from compactness?

12 A. Yes, that's my understanding.

13 Q. What is your understanding of the type of deviation
14 that is allowed?

15 A. My understanding is that the deviations -- that
16 minimal and practical deviations from compactness are permitted
17 in order to satisfy other traditional and recognized
18 redistribution criteria so that one may sacrifice a bit of
19 compactness in order to better comply with these factors, such
20 as population equality, and density, contiguity, compliance
21 with federal law such as the Voting Rights Act. Adherence to
22 natural boundary lines, political subdivisions, and historical
23 boundary lines.

24 Q. As part of your work in this case, did you control
25 for those recognized factors in your analysis?

1 A. Yes, I controlled for and considered all of these
2 factors.

3 Q. So turning to the opinions you've reached in this
4 case, how does the 2025 map treat Jackson County and Kansas
5 City?

6 A. Sure. So my analysis shows that when we look at the
7 splits of Jackson County and Kansas City, in addition to,
8 looking at whether or not they are split and how many times
9 it's instructive to look at how the population is split and how
10 much of the population is kept intact versus separated from one
11 another into CD4 and CD5 separately. I found that the 2025 map
12 splits Kansas City and Jackson County each more severely than
13 about 99 percent of the ensemble maps. And additionally, in
14 addition to splitting them severely the largest intact portion
15 of population for Jackson County is separate -- in a separate
16 district than the largest intact portion in Jackson County
17 contrary to the historical unity where both the largest piece
18 of Jackson and the largest piece of Kansas City were united in
19 CD5.

20 Q. In terms of the standard measures of compactness, how
21 does the 2025 map compare to your ensembles?

22 A. So I found that across a wide range of compactness
23 measurements looking both at the properties of the CD4, CD5
24 boundary line, as well as the shapes of the district that
25 result from drawing that boundary the 2025 map is consistently

1 non-compact compared to the ensemble. And this is consistently
2 observed across all of the measures of compactness that I
3 considered.

4 Q. And in your opinion, can the non-compactness of CD4
5 and CD5 be explained by a tradeoff to comply with some other
6 redistricting consideration?

7 A. No, it cannot. All of the other redistricting
8 considerations I considered in my report would not explain why
9 CD4 and CD5 are not as compact as they may be.

10 Q. So turning to your analysis of compactness and
11 focusing on your territory you had mentioned earlier that the
12 severity of a split. What do you mean by the severity of a
13 split?

14 A. So by looking at the severity of the split, for
15 example, we can observe that Jackson County is split between
16 CD4 and CD5 in the Missouri First Map. But just knowing that
17 it is split does not tell us the size of the population
18 affected by the split. So some possible splits might keep the
19 vast majority of the counties population intact while only
20 splitting off a relatively small number of residents into a
21 different district. Others splits would crack the county
22 nearly in half across two districts. And the latter would be
23 considered more severe in terms of keeping a much smaller
24 portion of the population intact in a district.

25 Q. Your report discusses the split of Kansas City

1 between CD4 and CD5. How many people are split off into CD4?

2 A. So what I mentioned in my report is that there have
3 in the past been other three-way splits of Kansas City. Kansas
4 City is also split three ways under the Missouri First Map
5 between CD4, 5, and 6. However, in the historical maps going
6 back to 1992 there's typically only very negligible number of
7 residents, if any, placed into CD4. So in 1992, there were
8 only 42 Kansas City residents in CD4. In 2012, it was 197, and
9 then 2022 it was a 104.

10 So nearly all of the Kansas City population was
11 divided between two districts of CD5 and CD6 with the vast
12 majority being placed in CD5. By contrast in the 2025 map, we
13 have a very severe three-way split of Kansas City. And in
14 particular, as I mentioned, previous districting plans that
15 split Kansas City three ways tended to put fewer than 200
16 people into CD4 from Kansas City. In the 2025 map, it's over
17 126,000, with only a 174,000 or so being kept intact in CD5.

18 Q. On slide 13 here, is the map being shown a closeup of
19 the Kansas City area under the 2025 map?

20 A. Yes, it is. This looks to be cropped roughly to the
21 boundaries of Jackson County and to show the Kansas City area
22 where it's split between CDs 4, 5, and 6.

23 Q. Can you describe the part of Kansas City that's being
24 split off into CD4?

25 A. Sure. We see here on the very left there is sort of

1 a long skinny. So CD4 is this light blue region. And along
 2 the western edge of this map we see a narrow strip that comes
 3 up from the southern portion of CD4 and reaches up into Kansas
 4 City, and that's the portion that splits off these 126,000
 5 people.

6 Q. But that light blue area looks like a pretty small
 7 area geographically?

8 A. Geographically. It might be relative --

9 MS. HUNKER: Objection, Your Honor. Leading.

10 THE COURT: Sustained. You want to rephrase.

11 Q. (BY MR. CHEUNG) How would you describe the size of
 12 the area being split off into CD4?

13 A. It's a fairly narrow strip. So it doesn't appear
 14 huge on the map, especially if one zooms out to the entire CD4,
 15 CD5 region. However, because of the high population density of
 16 Kansas City compared to other areas covered by the map this
 17 narrow strip is actually able to grab a large number of Kansas
 18 City residents as I mentioned over 126,000.

19 Q. How has Kansas City been treated historically?

20 A. So historically going back to 1992 as I mentioned,
 21 there have been number of three-way splits of Kansas City with,
 22 as I said, only a negligible number of Kansas City residents
 23 being placed into CD4. And the vast majority between about 73
 24 and 84-percent being placed into CD5 and the remainder it looks
 25 like about between 16 to 27-percent or so being placed into

1 CD6. So by contrast in 2025, we see a drastic difference where
2 Kansas City is split into three quite large portions. You see
3 that it's about a 25, 34, 41 split between CD4, CD5, and CD6.
4 And none of these three pieces contains a majority of the
5 residents in Kansas City in contrast to that historical map
6 where CD5 contained a large majority of Kansas City.

7 Q. How does the 2025 maps treatment of Kansas City
8 compare to the maps in your ensemble?

9 A. Compared to the maps in the ensemble it's an extreme
10 outlier. So when I looked at the largest portion -- so in this
11 case I was only looking at the portion of Kansas City that lies
12 within CD4 and CD5 in the Missouri First Map. So my ensemble
13 analysis did not consider because it didn't change the boundary
14 of CD6. I'm only looking at the portion of CD4 and CD5. The
15 median ensemble plan preserves 300,523 Kansas City residents,
16 which is, in fact, the entire population of Kansas City within
17 the CD4, CD5 region.

18 And by contrast, the Missouri First Map the 2025
19 plan, preserves under 175,000 and the largest intact piece. So
20 this was a more severe cracking of the population of Kansas
21 City than over 99.5-percent of the ensemble maps. And in this
22 graphic here the blue bars represent -- sort of the height of
23 these blue bars represent how often in the ensemble a
24 particular intact population portion was observed. As we see
25 the vast majority of these maps are off to the right with by

1 far the tallest bar being the one near 300,000. The Missouri
2 First Map is the yellow line all the way off to the left, which
3 is -- which represents the far lower number than the vast
4 majority than as I've said over 99.5-percent of the ensemble
5 maps.

6 Q. Turning to Jackson County. Historically, how has
7 Jackson County been treated or preserved?

8 A. So historically, again, going back to 1992, there
9 have often been three-way splits of Jackson County between CD4,
10 CD5, and CD6. But in all of the maps prior to 2025, we see
11 between about 85 and 90-percent of Jackson County population
12 being placed into CD5. So by contrast in the 2025 map there is
13 almost a 50/50 split of Jackson County's population between CD4
14 and CD5 with the remainder being placed into CD6.

15 Q. And how does the 2025 map treatment of Jackson County
16 compare to the maps in your ensemble?

17 A. So again, this is similar to the slide we previously
18 saw for Kansas City. The 2025 map in terms of the severity of
19 population splitting and how little population Jackson County
20 keeps intact is more severe than 99.79-percent of the ensemble
21 maps. So here we see a majority of the ensemble maps do not
22 split Jackson County at all between CD4 and CD5. We see that
23 the ensemble median is 701,167 Kansas City residents in the
24 largest intact portion between these two districts, which is
25 the full population of Kansas City within CD4 and CD5. By

1 contrast, the Missouri First Map preserves only 370,868

2 residents in the largest intact portion.

3 And again, we see in the ensemble represented by the
4 blue bars most of them are far off to the right near 700,000,
5 whereas the yellow line corresponding to the Missouri First Map
6 is way off to the left representing a severe outlier.

7 Q. As part of your rebuttal report, did you analyze the
8 extent to which the 2025 map combines Jackson County with other
9 counties?

10 A. Yes, I did. So both CD4 and CD5 in the Missouri
11 First Map combined portions of Jackson County with many other
12 counties ranging across the area covered by CD4 and CD5. So in
13 the Missouri First Map Jackson County is combined with at least
14 14 other counties in each of these districts. So the one of
15 these that has the fewer number of counties is 15 total, so
16 that's Jackson and 14 others. By contrast in the ensemble,
17 typically Jackson County was in one of the two districts was
18 only combined with a couple of its neighbors.

19 And this chart shows that Jackson County was combined
20 with more counties than 99.54-percent of the ensemble maps. So
21 this, again, the Missouri First Map here is an outlier in terms
22 of combining Jackson with a large number of counties sprawling
23 across the region.

24 Q. What's the median number of counties combined with
25 Jackson County in your analysis?

1 A. The median number combined with Jackson County is
2 two. It would be Jackson County, plus two others. That's why
3 the ensemble median says three. It's the total number of
4 counties --

5 Q. Turning to your analysis of the
6 traditional compactness metrics, which metrics did you analyze
7 for your report?

8 A. So I analyzed eleven different metrics. So there are
9 two metrics that measure the length of the CD4, CD5 boundary.
10 So these are metrics that look at compactness properties of the
11 boundary itself. And then there were nine additional metrics
12 to measure the compactness of the individual district shapes.
13 So measure each of CD4 and CD5 with respect to these remaining
14 nine criteria numbered three through 11 here.

15 Q. And turning first to boundary length. Why is
16 boundary length a relevant consideration for compactness?

17 A. So the reason boundary length is a relevant
18 consideration is that shapes generally considered to be compact
19 have shorter boundaries relative to the area they enclose. So
20 if think of a circle, for example. A circle is the most
21 efficient way to enclose area. It's got the shortest boundary
22 length relative to the area it encloses. And it's often been
23 observed that districts that are considered to be non-compact
24 that have sort of tentacles and long snaking regions, those
25 long skinny parts, all of those features tend to increase the

1 length of the boundary.

2 So typically, longer boundary length is associated
3 with less compactness of the resulting district.

4 Q. According to your report you measured a boundary in
5 terms of both miles and in terms of a unit of measurement
6 called a cut edge; is that right?

7 A. That's right.

8 Q. What is a cut edge?

9 A. So a cut edge refers to two adjacent census blocks,
10 that are divided apart from one another by the boundary. So it
11 would be two neighboring blocks. One of which is placed CD4,
12 the other of which is placed is CD5.

13 Q. So is a cut edge a way of measuring the length of
14 boundary using census blocks?

15 A. Yes, it is. It's a way of measuring the size or
16 length of the boundary in a way that is -- has some subtle
17 differences and advantages compared to simply measuring the
18 length of the boundary in miles.

19 Q. What is a census block?

20 A. So a census block is the smallest unit of geography
21 under which the census reports data. They're basically the
22 fundamental unit. It's almost, like, the atoms of all the
23 geographies that the census reports. So everything else from
24 voting districts to counties are made up of census blocks. So
25 they're sort of the finest smallest fundamental units of

1 geography.

2 Q. What is the relationship, if any, between census
3 blocks and population density?

4 A. So more densely populated areas tend to have more and
5 smaller census blocks. Population of census blocks is roughly
6 comparable. And in populated areas such as cities, the blocks
7 tend to be much smaller in size and much more numerous, whereas
8 in more sparsely populated areas the blocks tend to be
9 considerably larger.

10 Q. If a boundary line passes through a more densely
11 populated area, does that line even pass through more census
12 blocks?

13 A. Generally for a given length of boundary, yes. So a
14 mile of boundary cutting through a densely populated area would
15 tend to have to pass through many pairs of adjacent census
16 blocks 'cause there's so many of them. Whereas in a sparsely
17 populated area say the length of boundary, say a mile of
18 boundary, would separate many fewer blocks and result in fewer
19 cut edges.

20 Q. How do census blocks relate to natural boundaries?

21 A. So census blocks are generally designed to follow
22 natural boundaries, including things like rivers, the boundary
23 of the state, as well as other boundaries such as county lines.

24 Q. You had mentioned there being advantages to measuring
25 boundary length and cut edges as opposed to vials. What are

1 those advantages?

2 A. So there are couple of advantages, one of which is
3 that it accounts for population density. If you look at, as I
4 mentioned, the effect of a mile of boundary can be very
5 different depending on whether that mile of boundary is in a
6 sparsely populated or a densely populated area cut edges takes
7 that into account because of the fact that there are more
8 blocks and, therefore, more cut edges in densely populated
9 areas if a boundary goes through them. Another advantage is
10 that cut edges really only looks at whether blocks are
11 separated from one another and not on the sort of the shape of
12 the boundary separating them. So if we have a natural
13 boundary, like, the boundary of the state, or, like, the
14 Missouri River, for example, if we measure the length of the
15 boundary in miles it might appear to be longer than say if you
16 drew straight line but the reason it's longer than a straight
17 line is because it's following this natural boundary. When we
18 look at cut edges it's not penalizing that edge for following a
19 natural boundary because those natural boundaries tend to
20 coincide with census block boundaries.

21 MR. CHEUNG: Turning to slide 23 here. And I can
22 note for the record, that this is a reproduction of PX 84,
23 which has been admitted.

24 Q. (BY MR. CHEUNG) Dr. Stern, do you see a map showing
25 a population density in the Jackson County area?

1 A. Yes, I do.

2 Q. And do you see the congressional district lines on
3 the exhibit?

4 A. Yes, I do.

5 Q. Can you explain where on this map the cut edges
6 metric may have an advantage over other compactness measures?

7 A. So if we look at the map at right, which the 2025 map
8 you'd see the region circled in red here includes that CD4 --

9 that portion of the CD4, CD5 boundary that carves out that
10 narrow strip on the western edge of the state. As we can see

11 -- can I use the laser pointer? Yeah. See this passes through

12 the sort of yellow dots showing population density, so we can
13 see that this boundary passes through an area of high

14 population density. On the other hand, if we were to look at
15 the same length of boundary elsewhere say on the eastern edge

16 of Jackson County or Cass County, that's the same length of
17 boundary passes through much less population. So the cut edges

18 metric would reflect the fact that even though these portions
19 of boundary have the same length they have -- the one on the

20 left circled here has a much larger effect in terms of

21 splitting population and it captures that effect of the

22 boundary.

23 Q. And earlier you had testified to the relationship

24 between cut edges and natural boundaries. Are there any

25 natural boundaries on this map that would be affected by the

1 use -- metric?

2 A. Yes. Here we see -- I mean, we certainly see the
3 boundary going along the Missouri River between CD6 and CDs
4 four and five. That boundary wasn't considered in my analysis
5 but similar natural boundaries. Maybe smaller rivers and
6 streams that are followed by census blocks would be accounted
7 for.

8 Q. In your sample ensemble analysis, what did you find
9 in terms of the length of the CD4, CD5 boundary of the 2025
10 map?

11 A. Well, I found that whether -- regardless of whether
12 one uses the ordinary length in miles or looks at cut edges the
13 length of the CD4, CD5 boundary was much longer than the
14 typical ensemble map. So I found that according to both of
15 these metrics the CD4, CD5 boundary was longer in the 2025 map
16 than over 97.6-percent of the ensemble maps. And again, this
17 was not -- it was not just extreme in this proportion that it
18 was longer than if you look at the magnitude of the difference
19 in length the boundary is twice as long in the Missouri First
20 map than it is in the immediate ensemble plan. So here on the
21 first line of this table we see that the ensemble median length
22 of the CD4, CD5 boundary is about 130 miles compared to 273
23 miles in the 2025 plan. And there's a similar difference in
24 magnitude greater -- over twice as long when measured by cut
25 edges.

1 Q. You mentioned the Missouri First boundary being twice
2 as long as the average ensemble boundary length. Would you
3 consider that difference to be minimal?

4 A. I would not. I would consider it to be large.

5 Q. So turning to the remaining nine measures of
6 compactness that you analyzed. And I hate to make you do this,
7 but could explain to us what those nine metrics are supposed to
8 capture?

9 A. Yeah. Happy to do that. So each of these nine
10 different metrics capture a different aspect of what is
11 considered to be a compact shape. So here I've shown just for
12 comparison in blue CD5 in the Missouri First Map, and
13 illustrated what some of the various compactness metrics are
14 doing to measure the compactness of CD5.

15 Q. Why are there so many different compactness measures?

16 A. There are so many different compactness measures
17 because there's not really one single geometric feature that
18 coincides with what's determined to be compact. There are many
19 different properties of shapes that have been considered
20 compact. And over the years people have proposed different
21 metrics, each of which captures some aspect of compactness that
22 has been recognized and been useful.

23 Q. So I see you grouped these scores into categories.
24 What aspects of compactness are these scores supposed to
25 capture?

1 A. Sure. So I can just walk through these from left to
2 right. So the first two metrics Reock and Population Circle
3 compare the shape of the district to that of the smallest
4 circle that encloses them. So here I've closed the district in
5 a circle that's shaded in black. Reock looks at what
6 proportions of the circles area is taken up by the district.
7 So the area of the district divided by the area of the circle.
8 The Population Circle metric rather than just looking
9 at area, also takes into account population. So it looks at
10 what proportion of the population living in the circle lives in
11 the district. So both Reock and Population Circle are based on
12 comparing the district shape to the shape of a circle either by
13 area or by population. Moving to the right, instead of
14 enclosing the district in a circle we can also enclose it in
15 something called a Convex Hull. And put simply this is just
16 the shape that contains not only all the points in the
17 district, but any straight line path between points in the
18 district.
19 So here we see that, you know, there is a straight
20 line up here that goes between two points in the district that
21 did not past through the district itself, but that is included
22 the Convex Hull. So area Convex Hull looks at what proportion
23 of this shape -- what proportion of this shapes area is
24 contained in the district. Population Polygon sort of similar
25 to Population Circle looks at what proportion of this shapes

1 population is contained in the district. Moving one to the
2 right, there's another metric called Ehrenberg, and this is
3 another metric that compares the district shape to that of a
4 circle, which is usually considered to be a compact shape.
5 Instead of looking at a circle outside the district, it looks
6 at a circle inside the district and asks what proportion of the
7 districts area is taken up by the area of this circle.
8 Moving one to the right, we have three metrics that
9 are based on looking at the perimeter of the district. So one
10 is simply to look at the length of the perimeter in miles. So
11 that's the -- just the length of this black outline here. And
12 Polsby-Popper and Schwartzberg are two different metrics that
13 actually measure essentially an equivalent thing in two
14 slightly different ways, but mathematically they're equivalent.
15 These look at the relationship between the length of the
16 perimeter and the area of the district.
17 And as I mentioned, a circle is the area that -- a
18 circle is the shape that encloses area most efficiently with
19 its perimeter. And Polsby-Popper and Schwartzberg each compare
20 essentially how efficiently the perimeter encloses the area
21 compared to a circle. Last but not least is length width, and
22 that is simply just looking at the length -- the difference
23 between the length of the district and the width of the
24 district. So we put the district in a box and see if it's a,
25 you know, a nice fat square, which would have a perfect length

1 width measurement or if it's a long skinny rectangle, which
2 would be considered less compact.

3 Q. Thank you, Dr. Stern, for your answer to that. For
4 these nine compactness scores is a higher score always better
5 as well?

6 A. Not always. Some of the scores are defined so that a
7 higher score means more compact. Others are defined so that a
8 lower score means more compact.

9 Q. So let's look at the scores where higher indicates
10 better compactness from table five of your report. How do CDs
11 four and five under the 2025 map compare ensemble off of these
12 metrics?

13 A. So I found that across this array of metrics CD4 and
14 five are on average consistently less compact than the ensemble
15 maps. So here for each of these metrics I measured three
16 things. I measured the score for the district with the lowest
17 scores, so the least compact district. The score for the most
18 compact district. And the average of those two scores.

19 So that's why there's three rows for each
20 measurement. And I shaded the cells at right in red showing
21 the percentiles, I shaded them in red when the Missouri First
22 Map was better than the ensemble average. And in green -
23 sorry. I shaded it in red when the Missouri First Map was less
24 compact than the ensemble average. And shaded it in green when
25 it was more compact than the ensemble average. Here we see

1 that if we look at the middle row for each metric they're all
2 shaded red.

3 So the average score of CD4 and CD5 is less compact
4 than between 81.35 and 99.82-percent of the ensemble maps. And
5 all the cells are shaded red, except for one.

6 Q. And how many percentile scores did you report on this
7 chart?

8 A. 18. So 3 times six.

9 Q. So of the 18 scores, there's one score where the 2025
10 map that would perform so compared to the ensemble; is that
11 right?

12 A. Compared to the median ensemble plan, yes.

13 Q. And what do you make of that one out of 17 that's
14 better? One out of eighteen.

15 A. So this occurs with Population Circle. So with
16 Population Circle there is sort of a trade-off here between the
17 more compact district and the less compact of the two
18 districts. So in the 2025 plan, CD4 is slightly more compact
19 than the ensemble on this metric, but CD5 is much less compact
20 than the ensemble. So it's sort of negative sum trade-off
21 where one of the districts is slightly more compact and the
22 other district is significantly less compact. And on average
23 the compactness is worse than, I guess, we see it's 0.18
24 percentile. So that means it's worse than 99.82-percent of the
25 ensemble plan.

1 Q. So let's turn to those scores where a lower score
2 indicates greater compactness. It's table six from your report.
3 How do those districts four and five under the 2025 compare to
4 your proposed ensemble?

5 A. So again, here for each metric I report three
6 numbers. One is the score for the less compact district. One
7 is the score for the more compact district. And the other is
8 the average of the two. And again, I've shaded this in red
9 when the Missouri First Map is less compact than the ensemble
10 average and green when it's more compact. So here we see if we
11 look at the average scores across all three of these the
12 Missouri First Map is less compact than 89.34-percent of the
13 ensemble maps.

14 Q. So here you calculated six scores to report each of
15 the compactness metrics?

16 A. Nine.

17 Q. Sorry. And of the nine how many outperformed the
18 ensemble median?

19 A. Just one.

20 Q. And which one is that?

21 A. This is just looking at the perimeter of the district
22 in miles. And specifically, the one that has the longer
23 perimeter of the two is shorter in the Missouri First Map.

24 Q. What do you make of that comparison?

25 A. Again, here this is a trade-off between making one

1 of the districts perimeters shorter and the other longer. If
2 we compare to the -- if we look at the numbers in the previous
3 two columns, the longer of the two district boundaries is
4 reduced from about 805 miles in the ensemble median. That's
5 only 717 miles in the Missouri First Map. So the longer of the
6 two perimeters is made about 88 miles shorter. However, if we
7 look at the shorter of the two perimeters it's made vastly
8 longer in the Missouri First Map.

9 So the ensemble average for the shorter of the two
10 perimeters is 242 miles, that's increased to over 628 miles in
11 the Missouri First Map. So one of these districts the
12 perimeter is made about 88 miles shorter, but other districts
13 perimeter is made 987 miles longer compared to the ensemble
14 average. So this is, again, I would sort of describe this is a
15 negative sum trade-off. And we see if we look at the average
16 perimeter of the two districts we see that the average
17 perimeter is longer than 97.69-percent of the ensemble maps.

18 Q. So considering all eleven of the compactness metrics
19 you looked at, what is your opinion about the compactness of
20 CDs four and five under the 2025 map?

21 A. My opinion is that across this array of metrics the
22 Missouri First Map is substantially and in some cases extremely
23 less compact compared to the ensemble.

24 Q. Would you describe the difference in compactness
25 between the 2025 districts and your ensemble as minimal?

1 A. No, I would not.

2 Q. In order to assess the compactness of CDs four and
3 five would you compare their compactness scores to historical
4 congressional maps?

5 A. No, I would not compare those compactness scores.

6 Q. Would you compare their compactness scores to
7 districts located in other parts of the state or from another
8 state?

9 A. No.

10 Q. Would you compare their compactness scores to other
11 types of electoral districts such as State Senate Districts?

12 A. No, I wouldn't.

13 Q. Why wouldn't you make those comparisons?

14 A. Well, the reason, as I mentioned, the meaning of
15 these compactness scores is highly context dependent. So each
16 of these scores tells us something about the shape of the
17 district. But there is a lot more that needs to be considered
18 to evaluate compactness than merely the shape of the district.

19 One needs to consider, for example, where that shape is placed
20 on the map and what the effect of those boundaries lines is.

21 So looking at just the shape, especially across different
22 jurisdictions or different geographical areas or different
23 types of districts is an inappropriate comparison because it
24 neglects all those other factors that one must consider.

25 Q. Do you recall if intervenor's expert, Dr. Hood, had

1 suggested possible cutoff scores for determining whether a
2 district --

3 A. Yes, I do. Dr. Hood cited -- in his report cited an
4 academic article that he claims proposes a threshold that's a
5 cutoff for compactness according to the Reock and Polsby-Popper
6 scores.

7 Q. Did you review that article that was cited in
8 Dr. Hood's report?

9 A. Yes, I did.

10 Q. And in your opinion, did Dr. Hood accurately
11 characterize the article he cited?

12 A. No. In my opinion, he misrepresented the article.
13 And in fact, the authors of the article state explicitly that
14 these numbers should not be taken as a threshold or cutoff. So
15 they caution explicitly against the interpretation paperwork
16 that Dr. Hood advanced.

17 Q. So let's turn to potential explanations for why CDs
18 four and five under the 2025 map are not compact. Did you
19 consider whether political subdivisions adhered to political
20 subdivision boundaries explains the non-compactness of CDs four
21 and five?

22 A. Yes, I did consider that.

23 Q. What are the types of political subdivisions that you
24 considered?

25 A. So I considered counties, municipalities, and census

1 VTDs. These are census voting districts and their geographical
2 units that roughly correspond to precincts, wards, and things
3 like that.

4 Q. We've already talked about the split of Jackson
5 County specifically. Looking at the splits of all counties in
6 this CD4 and CD5 region, how does the 2025 map compare to the
7 ensemble?

8 A. Right. So in addition to looking just at Jackson
9 County, I wanted to see whether perhaps the Missouri First Map
10 had been drawn to better preserve intactness of county
11 population overall. Perhaps at the expense of a single county,
12 like, Jackson. So I measured that by looking at each county or
13 portion thereof in the CD4, CD5 region and looking at what its
14 largest intact portion of population was between CD4 and CD5,
15 and adding that up across all the counties. So this gave sort
16 of a total number of intact county population. And I found
17 that similarly to what we saw just for Jackson County alone if
18 we look at overall county intactness the Missouri First Map
19 leaves less county population intact than well over 99-percent
20 of the ensemble maps.

21 So here we see that if we look at the total, which is
22 the bottom line of this table as well this chart at the right,
23 the median ensemble plan has intact county population across
24 all counties of about 1.5 million. Whereas the Missouri First
25 Map is only just over 1.2 million. So a difference of nearly

1 300,000 county residents that are split off from the majority
2 of their fellow county residents by comparison.

3 Q. And turning to preservation of municipal lines. Do
4 Looking at the splits of all municipalities and not just Kansas
5 City, how does that 2025 map compare to your ensemble?

6 A. Right. So I did the same thing with the
7 municipalities that I did with the counties. In addition to,
8 looking at Kansas City, I also looked across all municipalities
9 or portions thereof in CD4 and CD5. For each municipality, I
10 looked at the largest intact population between the two
11 districts, and I added this up over all municipalities. And I
12 found that, again, this is the bottom row of the table and as
13 well as the histogram the Missouri First Map keeps less
14 municipal population intact across all municipalities than
15 about 99-percent of the ensemble maps.

16 Q. You mentioned voting precincts. How does the 2025
17 map compare to your ensemble on the splitting of precincts?

18 A. So I looked at the splitting of census VTDs, which is
19 the official geography that most closely approximates the idea
20 of precincts, wards, and so forth. So I found that the 2025
21 map splits more VTDs between CD4 and CD5 than all 100-percent.
22 Right. All 100,000 of the ensemble maps. So the median
23 ensemble plan splits no VTDs at all. And as we can see from
24 these blue bars at right there are some plans that split one or
25 two or three or four VTDs that really drops a lot from three to

1 four, whereas the Missouri First Map splits 18 VTDs.

2 Q. Does preserving county lines and municipality lines
3 or building precinct lines explain why CDs four and five under
4 the 2025 map are not compact?

5 A. No, it did not.

6 Q. Did you also consider whether an adherence to
7 historical congressional boundaries can explain the
8 non-compactness of CDs four and five?

9 A. Yes, I did. So I applied the same methodology that I
10 just described for counties and municipalities. I also applied
11 that to 2022 and 2012 congressional districts. So what I did
12 is I looked at all the congressional districts or the portions
13 thereof in the CD4, CD5 region looked at the largest intact
14 portion of their population between the new 2025 CD4 and CD5,
15 and added that up across all the congressional districts. And
16 for both 2012 and 2022 districts, the Missouri First Map keeps
17 less of these districts populations intact than almost
18 99-percent of the ensemble maps.

19 Q. Does it adherence to historical congressional
20 boundaries explain why CDs four and five under the 2025 map are
21 not compact?

22 A. No, it does not.

23 Q. Turning to whether compliance of federal law can
24 explain non-compactness here. Dr. Stern, are you familiar with
25 the concept of racial gerrymandering?