

No. 143, Original

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IN THE  
**Supreme Court of the United States**

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STATE OF MISSISSIPPI,  
*Plaintiff,*

v.

STATE OF TENNESSEE, CITY OF MEMPHIS, TENNESSEE,  
AND MEMPHIS LIGHT, GAS & WATER DIVISION,  
*Defendants.*

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**On Bill of Complaint**  
**Before the Special Master, Hon. Eugene E. Siler, Jr.**

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**DEFENDANTS' JOINT REPLY IN SUPPORT OF THEIR MOTION TO  
EXCLUDE THE TESTIMONY OF DR. RICHARD SPRUILL**

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## TABLE OF CONTENTS

	Page
TABLE OF AUTHORITIES .....	ii
GLOSSARY .....	iii
I. INTRODUCTION .....	1
II. ARGUMENT .....	1
A. Dr. Spruill’s Testimony Should Be Excluded Under Daubert Because It Provides An Unhelpful And Unreliable Definition Of An Intrastate Resource .....	1
B. Dr. Spruill’s Analysis Of Dr. Brian Waldron’s Work Demonstrates That He Is Not Objectively Applying Scientific Principles.....	5
C. Dr. Spruill’s Qualifications And Background Opinions Do Not Cure The Unreliability Of His Testimony .....	8
CONCLUSION .....	12
CERTIFICATE OF SERVICE	

## TABLE OF AUTHORITIES

	Page
CASES	
<i>Adams v. Laboratory Corp. of Am.</i> , 760 F.3d 1322 (11th Cir. 2014).....	5
<i>Claar v. Burlington N.R.R. Co.</i> , 29 F.3d 499 (9th Cir. 1994) .....	3
<i>Daubert v. Merrell Dow Pharm., Inc.</i> , 509 U.S. 579 (1993).....	1, 2
<i>Johnson v. Manitowoc Boom Trucks, Inc.</i> , 484 F.3d 426 (6th Cir. 2007).....	7
<i>Kumho Tire Co. v. Carmichael</i> , 526 U.S. 137 (1999) .....	5, 8
<i>United States v. Glover</i> , 265 F.3d 337 (6th Cir. 2001).....	9
<i>United States v. Mitchell</i> , 365 F.3d 215 (3d Cir. 2004).....	2
<i>Woods v. Lecureux</i> , 110 F.3d 1215 (6th Cir. 1997).....	9
RULES	
Fed. R. Evid. 702 .....	1, 4, 9
OTHER MATERIALS	
James H. Criner & William Scott Parks, <i>Historic Water-Level Changes and Pumpage from the Principal Aquifers of the Memphis Area, Tennessee: 1886-1975</i> . USGS Water-Resources Investigations Report (1976), <a href="https://pubs.er.usgs.gov/publication/wri7667">https://pubs.er.usgs.gov/publication/wri7667</a> .....	6, 8
J.E. Reed, <i>Analog Simulation of Water-Level Declines in the Sparta Sand Mississippi Embayment</i> : USGS Hydrologic Atlas, 1972, <a href="https://pubs.usgs.gov/ha/434/plate-1.pdf">https://pubs.usgs.gov/ha/434/plate-1.pdf</a> .....	6

## GLOSSARY

Aug. 2016 Op.	Memorandum of Decision on Tennessee’s Motion to Dismiss, Memphis and Memphis Light, Gas & Water Division’s Motion to Dismiss, and Mississippi’s Motion to Exclude, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (U.S. Aug. 12, 2016) (opinion of Special Master) (Dkt. No. 55)
Miss. Br.	Plaintiff’s Response to Defendants’ Joint Motion to Exclude the Testimony of Dr. Richard Spruill, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (U.S. Nov. 20, 2018) (Dkt. No. 86)
MLGW	Memphis Light, Gas & Water Division
Nov. 2018 Op.	Memorandum of Decision on Defendant’s Motion for Summary Judgment, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (U.S. Nov. 29, 2018) (opinion of Special Master) (Dkt. No. 93)
Spruill Dep.	Deposition of Richard K. Spruill, Ph.D., P.G. (Sept. 28, 2017)
Spruill July Rep.	Expert Report Addendum #1 of Richard K. Spruill, Ph.D., P.G. (July 31, 2017)
Spruill June Rep.	Expert Report of Expert Report of Richard K. Spruill, Ph.D., P.G. (June 30, 2017)
USGS	United States Geological Survey
Waldron Aug. Rep.	Sur-Rebuttal Expert Rebuttal Report of Brian Waldron, Ph.D. (Aug. 30, 2017)

## I. INTRODUCTION

The Special Master should exclude the testimony of Mississippi's expert Dr. Richard Spruill because he did not apply scientific principles in an objective way. *First*, Dr. Spruill's theory of what makes a groundwater resource "intrastate" is unreliable and unhelpful because it cannot be applied in a principled way beyond this litigation. *Second*, Dr. Spruill did not apply scientific principles objectively because he used a different standard in evaluating evidence here than in his ordinary work. Contrary to Mississippi's position, Dr. Spruill's education and experience do not eliminate these fundamental flaws in his opinion. Mississippi otherwise fails to address Defendants' arguments that Dr. Spruill's testimony should be excluded under the principles of *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), and Federal Rule of Evidence 702.

## II. ARGUMENT

### A. **Dr. Spruill's Testimony Should Be Excluded Under *Daubert* Because It Provides An Unhelpful And Unreliable Definition Of An Intrastate Resource**

The Special Master should not admit Dr. Spruill's testimony under Federal Rule of Evidence 702, which serves as a guide in these proceedings. Rule 702 requires that an expert's opinion be helpful, be based on sufficient facts, be the product of reliable methods, and be a reliable application of the methods to the facts of the case. Dr. Spruill's testimony about what constitutes an intrastate aquifer in

this case is inherently unreliable because it is a results-driven analysis that cannot be tested and therefore is not “derived by the scientific method.” *Daubert*, 509 U.S. at 590, 593; *see also United States v. Mitchell*, 365 F.3d 215, 235 (3d Cir. 2004). Dr. Spruill opined that an “intrastate groundwater resource” is a resource in which “under natural conditions” (1) “the majority of groundwater in an aquifer enters the groundwater system by recharge within a specific state”; (2) “that water flows VERY slowly through the aquifer within that same state”; and (3) “the water remains in the state for a VERY long period of time before ultimately being discharged from the groundwater system.” Ex. 22 (Spruill July Rep. 37). Dr. Spruill further opined that classifying a resource as intrastate also required analyzing “the advantages and disadvantages of such a classification.” *Id.*

When pressed at his deposition, Dr. Spruill was not able to quantify any of the criteria of his definition of an intrastate aquifer. Instead, he simply testified that the Middle Claiborne Aquifer at issue here satisfied each of the prongs. *See, e.g.*, Ex. 20 (Spruill Dep. 71:8-14) (stating that a small portion of water under the first element refers to “[a] percentage like that which is flowing from Tennessee to Mississippi today, which is small”); *id.* at 66:1-23 (opining that the majority of the water in the Middle Claiborne beneath Mississippi resides there long enough to satisfy his third criterion). It appears that Dr. Spruill developed his definition of an intrastate resource so that he could make the groundwater here fit that definition. The

scientific method prohibits such results-driven theories.<sup>1</sup> See, e.g., *Claar v. Burlington N.R.R. Co.*, 29 F.3d 499, 502-03 (9th Cir. 1994).

Moreover, Dr. Spruill’s theory of what makes a resource intrastate cannot be tested. Dr. Spruill testified that all groundwater in the world moves slowly enough, and remains in a state long enough, to meet two of his three criteria. Ex. 20 (Spruill Dep. 59:6-11, 63:11-21). In fact, he opined that, based on his definition, “there really aren’t *any* interstate aquifers.” *Id.* at 42:16-17 (emphasis added). He refused to answer any hypotheticals applying his theory of an intrastate aquifer to other resources. *Id.* at 117:13-123:20. He even refused to consider how his test would apply to the Aquifer at issue based on newer research that suggested the existence of different pre-development conditions. *Id.* at 78:1-83:9. Dr. Spruill’s fourth criterion – the “advantages and disadvantages” of classification as an intrastate resource – is entirely subjective and obviously result-driven. An untestable theory that cannot be applied objectively to other scenarios is not scientific and cannot be helpful to a factfinder.

Mississippi does not defend the reliability of Dr. Spruill’s definition of an intrastate aquifer. Instead, it attempts to revive its failed contention that the Special

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<sup>1</sup> The results-driven nature of Dr. Spruill’s theory is further emphasized by the fact that this definition of an intrastate resource first appears in his rebuttal report and is in tension with the definition of an interstate resource that appears in his opening report.



Master should consider the hydrology of the Aquifer separately from the geology of the Aquifer (*see* Aug. 2016 Op. 32; Nov. 2018 Op. 13-14) by asserting that Dr. Spruill’s theory “most certainly is not a definition of an ‘intrastate or interstate *aquifer*’” – rather, it is a definition of an intrastate “*groundwater resource*.” Miss. Br. 10 (emphases added).<sup>2</sup> The Special Master expressly rejected Mississippi’s attempts to “distinguish between the geology of the Aquifer – the ‘larger Sparta Sand formation [that] crosses State borders’ – and the groundwater it claims is part of the Aquifer but would never have entered Tennessee absent pumping.” Aug. 2016 Op. 31. And he recently reaffirmed that Mississippi’s “line-drawing finds no support in the case law.” Nov. 2018 Op. 14. The Special Master ordered an evidentiary hearing “on the limited issue of whether the *Aquifer and the water* constitutes *an* interstate resource.” Aug. 2016 Op. 36 (emphases added).

Moreover, this alleged distinction has no bearing on whether Dr. Spruill’s theory is reliable and whether the Special Master should admit it under Federal Rule of Evidence 702. Contrary to Mississippi’s argument (at 10-11), Defendants’

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<sup>2</sup> This is a distinction without a difference. An aquifer is a groundwater resource. An aquifer is a “formation that contains sufficient saturated permeable material to yield usable quantities of water to wells and springs.” S17. Thus, by definition, an “aquifer” must include the geological material and the water saturating it. An unsaturated geological formation is not an aquifer. Ex. 21 (Spruill June Rep. 7) (“Aquifers consist of groundwater hosted by unconsolidated sedimentary deposits.”). And, in an aquifer, groundwater does not exist apart from the geological formation that is its matrix. *Id.* at 4, 6.

critiques of Dr. Spruill's theory are not based on some misunderstanding of what term he was defining. *See supra* note 2. Rather, Dr. Spruill's opinions should be excluded because he could not quantify or apply his criteria for what constitutes an intrastate groundwater resource beyond his claim that the Middle Claiborne Aquifer is such a resource. And he was unable to test his theory by applying it to other groundwater flow patterns. Thus, even if Dr. Spruill was opining on the definition of an intrastate "groundwater resource" and that definition is different than the definition of an intrastate aquifer, his theory of "intrastateness" is unreliable, unhelpful, and not the product of the scientific method.

**B. Dr. Spruill's Analysis Of Dr. Brian Waldron's Work Demonstrates That He Is Not Objectively Applying Scientific Principles**

Dr. Spruill's opinions in this case also are inadmissible because he applied different principles in this litigation than in his ordinary scientific research, demonstrating a lack of objectivity. An expert must "employ[] in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999). Courts should be particularly hesitant to admit litigation-driven opinions that do not display that rigor. *See, e.g., Adams v. Laboratory Corp. of Am.*, 760 F.3d 1322, 1333 (11th Cir. 2014). Mississippi's opposition does not address these facts.

Dr. Spruill did not objectively analyze the various pre-development potentiometric surface maps of the Aquifer. He engaged in a litigation-driven

critique of Waldron & Larsen’s 2015 map simply because Dr. Waldron was an expert for the State of Tennessee, and he accepted other potentiometric maps without performing any of the same analysis. Dr. Spruill detailed 15 distinct critiques of Waldron & Larsen’s methods,<sup>3</sup> devoted a 12-page index to criticizing each of the early 1900s-era wells in the Middle Claiborne from which Waldron & Larsen obtained water level information, disagreed with Waldron & Larson’s estimations of contours based on their data, and even sketched out an alternative map.<sup>4</sup>

However, Dr. Spruill did not apply the same scrutiny to pre-development potentiometric maps developed by J.E. Reed in 1972<sup>5</sup> and Criner & Parks in 1976,<sup>6</sup> testifying instead that their maps just “make sense.” Ex. 20 (Spruill Dep. 165:20-166:5). Dr. Spruill admitted at his deposition that he did not “look at the underlying control data that Reed relied on” in generating his map and was not even sure whether dots on the map contained control points or cities. *Id.* at 169:21-170:1,

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<sup>3</sup> Dr. Waldron demonstrated in his sur-rebuttal report why these criticisms were unfounded. *See generally* Ex. 23 (Waldron Aug. Rep. 2-17).

<sup>4</sup> As Waldron explained in his sur-rebuttal, Waldron & Larsen did not ignore a data point in drawing their contours; it simply was beyond the borders of the final map. Ex. 23 (Waldron Aug. Rep. 16)

<sup>5</sup> J.E. Reed, *Analog Simulation of Water-Level Declines in the Sparta Sand Mississippi Embayment*: USGS Hydrologic Atlas, 1972, <https://pubs.usgs.gov/ha/434/plate-1.pdf>.

<sup>6</sup> James H. Criner & William Scott Parks, *Historic Water-Level Changes and Pumpage from the Principal Aquifers of the Memphis Area, Tennessee: 1886-1975*. USGS Water-Resources Investigations Report 76-67 (1976) (“Criner & Parks”), <https://pubs.er.usgs.gov/publication/wri7667>.

171:2-4. Nor could he remember looking at any outside documentation to evaluate the wells included by Criner and Parks. *Id.* at 164:1-12. He did not consider whether either Criner & Parks' or Reed's data justified their contour lines. Instead, Dr. Spruill explained that he accepted these maps because they "were a scientist's best interpretation of groundwater flow patterns on a regional scale" even though they "could be off" or "could be wrong." *Id.* at 170:2-15. And Reed, Criner, and Parks – unlike Dr. Waldron – were not experts for the opposing side. *See id.* at 177:8-10. Dr. Spruill's double standard for evaluating potentiometric maps does not "flow naturally" from his other work. *Johnson v. Manitowoc Boom Trucks, Inc.*, 484 F.3d 426, 434 (6th Cir. 2007). Such lack of objectivity is impermissible, and his testimony should be excluded.

Mississippi does not defend Dr. Spruill's analysis of the pre-development potentiometric surface as reliable and objective. Instead, it offers "a few observations," none of which actually addresses Defendants' arguments. First, Mississippi merely asserts that Dr. Spruill also offered a general critique of Tennessee's experts that was not "litigation driven." Mississippi's argument (at 12-13) that an expert can critique an opponent's expert states the obvious but does not address Defendants' argument. Defendants did not move to exclude Dr. Spruill's testimony simply because he criticized Dr. Waldron's opinion; critiquing another expert is, of course, permissible. Rather, Defendants moved to exclude his testimony

because he applied a drastically different level of scrutiny in analyzing various potential maps of the pre-development potentiometric surfaces, simply because one of the authors of one of the maps was testifying in the case. Similarly, Mississippi misses the point when it argues that Dr. Spruill's criticism of Dr. Waldron's map is documented by references to USGS publications. The concern raised by Defendants is that Dr. Spruill applied inconsistent levels of scrutiny to other maps.

Mississippi's belated claim that Dr. Spruill scrutinized the Waldron & Larsen paper because it was published after the commencement of litigation and because Dr. Waldron's employer's largest single source of funding was from MLGW and the City of Memphis is without merit. For one, Dr. Spruill never articulated this as a basis for his critiques, and it is Dr. Spruill whose opinion must be scientifically valid. Further, the Criner & Parks map – upon which Mississippi's expert relies – also was “prepared in cooperation with the City of Memphis [and] Memphis, Light, Gas and Water Division.” Criner & Parks at i. Ultimately, Dr. Spruill is not “employ[ing] in the courtroom the same level of intellectual rigor that characterizes [his] practice . . . in the relevant field.” *Kumho Tire*, 526 U.S. at 152. Because his opinions are not grounded in the scientific method, they should be excluded.

**C. Dr. Spruill's Qualifications And Background Opinions Do Not Cure The Unreliability Of His Testimony**

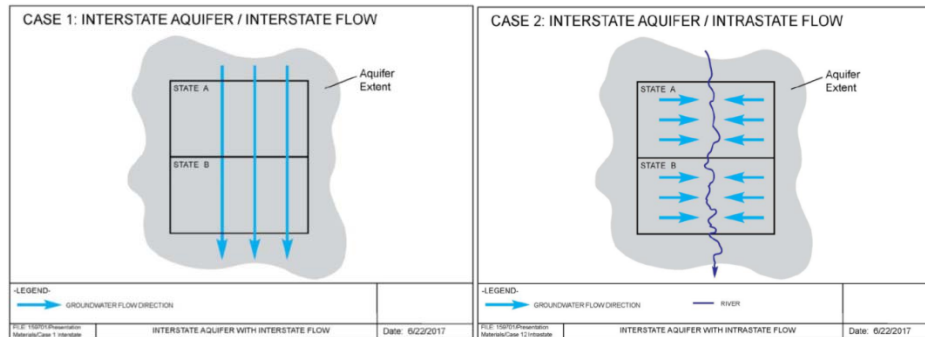
Instead of directly addressing Defendants' arguments, Mississippi focuses on Dr. Spruill's qualifications and other testimony. Defendants do not challenge Dr.

Spruill's qualifications or the accuracy of much of his testimony about general hydrogeology. But these facts do not cure Dr. Spruill's failure to follow the scientific method in developing his theories. Even a "witness who is qualified as an expert . . . may testify in the form of an opinion" only if the testimony meets the requirements of Federal Rule of Evidence 702.

Mississippi claims (at 5) that Dr. Spruill did not offer an opinion on what constitutes an interstate resource because it is a legal question. That is incorrect. As explained in Defendants' Joint Opposition to Mississippi's Motion To Exclude Defendants' Experts, the question whether the Aquifer is an interstate groundwater resource is a question of mixed fact and law on which experts may properly testify. The question whether the Aquifer is interstate is a hydrogeological question as much as a legal one; it is not a legal term of art with "a separate, distinct and specialized meaning in the law different from that present in the vernacular." *Woods v. Lecureux*, 110 F.3d 1215, 1220 (6th Cir. 1997) (emphasis omitted). It involves the application of "common sense" to the hydrogeological facts. *United States v. Glover*, 265 F.3d 337, 345 (6th Cir. 2001).

And, contrary to Mississippi's assertions (at 9), Dr. Spruill's opinions about the proper definition of an intrastate groundwater resource were a key component of his proffered testimony. In both of his reports and his deposition, Dr. Spruill opined about what constitutes an interstate groundwater resource. Dr. Spruill's opening

report contained two hypothetical scenarios involving “interstate” aquifers, in which the aquifer extends beneath multiple States, with different patterns of groundwater flow.



Ex. 21 (Spruill June Rep. 33-34). Mississippi cannot merely dismiss these as “hypothetical illustrations.” Miss Br. 10. Dr. Spruill explicitly claimed that these examples of *interstate aquifers*<sup>7</sup> “are applicable to this litigation” and analogized the flow patterns (represented by the blue arrows) in Case 1 to an interstate river and Case 2 to an intrastate river. Ex. 21 (Spruill June Rep. 33-34). Dr. Spruill then offered a four-part definition of an intrastate resource in his rebuttal report “based on the fate of water in the groundwater system under natural conditions.” Ex. 22 (Spruill July Rep. 37).

Spruill’s theory of what constitutes an interstate or intrastate groundwater resource is the core of his proffered testimony because it influences what other

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<sup>7</sup> Dr. Spruill testified that he defined the aquifer in both Case 1 and Case 2 as “interstate” because “it underlies” or “exists beneath” “both states.” Ex. 20 (Spruill Dep. 106:16-107:9, 110:18-111:9).

evidence he analyzed. In his opening report, Dr. Spruill's entire discussion of the various pre-development potentiometric surfaces flowed directly from his theory that pre-development flow patterns are the "fundamental question" of defining an "interstate aquifer" with "intrastate flow." Ex. 21 (Spruill June Rep. 34). His extensive critiques of Dr. Waldron's pre-development potentiometric surface map in his rebuttal report are only relevant because of Dr. Spruill's theory that an intrastate resource should be defined by intrastate flow. Similarly, Dr. Spruill's unreliable theory of what constitutes an interstate resource drives his critiques of Dr. Larson's report. *See, e.g.*, Ex. 22 (Spruill July Rep. 28) ("The fact that this groundwater would *eventually* naturally leave Mississippi many thousands of year after it initially entered the subsurface by recharge has no practical application to the issue of whether the groundwater is a natural resource within the territory of the state of Mississippi."). Because the Special Master specifically ordered "an evidentiary hearing on the limited issue of whether the Aquifer and the water in it constitutes an interstate resource," Aug. 2016 Op. 36, the parties cannot offer evidence about every hydrogeological aspect of the Aquifer. Dr. Spruill's theory of what constitutes intrastate groundwater is not a peripheral point confined to a few pages; it is the foundation of his opinions and testimony. Because the foundation of Dr. Spruill's opinions is unreliable, all of his opinions flowing from it are equally unreliable and should be excluded.



## CONCLUSION

The Special Master should exclude Dr. Spruill's testimony because it is not a proper application of the scientific method.

Respectfully submitted this 7th day of December 2018,

s/ David C. Frederick

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**CERTIFICATE OF SERVICE**

Pursuant to Paragraph 3 of the Special Master's Case Management Plan (Dkt. No. 57), I hereby certify that all parties on the Special Master's approved service list (Dkt. No. 26) have been served by electronic mail, this 7th day of December 2018.

/s/ David C. Frederick

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