

IN THE
Supreme Court of the United States

STATE OF MISSISSIPPI,
Plaintiff,

v.

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

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

**DEFENDANTS' JOINT MOTION IN LIMINE
TO PRECLUDE MISSISSIPPI FROM ARGUING THAT
THERE ARE TWO AQUIFERS AT ISSUE**

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GLOSSARY

Compl.	Complaint, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (U.S. filed June 6, 2014)
<i>Hood</i> Compl.	Complaint, <i>Hood ex rel. Mississippi v. City of Memphis, et al.</i> , Civil Action No. 2:05CV32-D-B (N.D. Miss. filed Feb. 1, 2005)
Joint Statement	Plaintiff’s and Defendants’ Joint Statement of Stipulated and Contested Facts, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (U.S. filed Feb. 28, 2018) (Dkt. No. 64)
Mississippi’s 5th Cir. Br.	Brief for Appellant, <i>Hood ex rel. Mississippi v. City of Memphis, et al.</i> , No. 08-60152 (5th Cir. filed May 13, 2008)
MLGW	Memphis Light, Gas & Water Division
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)
Pl.’s Resp. to Defs.’ Proposed Facts	State of Mississippi’s Response to Defendants’ Proposed Statement of Facts (Jan. 29, 2018)
Pl.’s Resp. to RFA	State of Mississippi’s Responses to City of Memphis, Tennessee, and Memphis Light, Gas & Water Division’s First Set of Request for Admissions (Jan. 20, 2017)
Resp. to D__	In the Joint Statement, D__ refers to the facts submitted by Defendants that Mississippi purports to dispute. Resp. to D__ refers to Mississippi’s response to Defendants’ fact, which often indicates Mississippi’s agreement with a portion of the fact, and is therefore cited in the Motion and the Reply.

Spruill July Rep.	Expert Report Addendum #1 of Richard K. Spruill, Ph.D., P.G. (July 31, 2017)
Spruill June Rep.	Expert Report of Richard K. Spruill, Ph.D., P.G. (June 30, 2017)
Wiley Dep.	Deposition of David Wiley, <i>Mississippi v. Tennessee, et al.</i> , No. 143, Orig. (Sept. 26, 2017)
Wiley Dec. 2006 Rep.	Preliminary Report on Diversion of Ground-Water From DeSoto and Marshall Counties Mississippi Due to Memphis Area Pumpage (prepared by Leggette, Brashears & Graham, Inc.) (Dec. 31, 2006)
Wiley May 2007 Rep.	Report on Diversion of Ground Water from Northern Mississippi Due to Memphis Area Well Fields (prepared by Leggette, Brashears & Graham, Inc.) (May 2017) (expert report of David A. Wiley)
Wiley June Rep.	Update Report on Diversion and Withdrawal of Groundwater from Northern Mississippi Into the State of Tennessee (prepared by Leggette, Brashears & Graham, Inc.) (June 30, 2017) (expert report of David A. Wiley)

Pursuant to Section I(C)(1) of the Special Master’s Corrected Pre-Hearing Scheduling Order (Dkt. No. 69), Defendants State of Tennessee, City of Memphis, Tennessee, and Memphis Light, Gas & Water Division (“MLGW”) (collectively, “Defendants”) respectfully move the Special Master to prohibit Plaintiff, State of Mississippi, Plaintiff’s witnesses, and Plaintiff’s counsel from testifying, introducing evidence, inquiring on cross-examination, or otherwise arguing that there are two aquifers at issue in this case, rather than one.

I. INTRODUCTION

The Special Master has identified the “threshold issue” for the evidentiary hearing as “whether the Aquifer is an interstate resource.” Op. 36. There is only one Aquifer at issue. As Mississippi admitted in discovery, that Aquifer “underlies several states, including Mississippi, Tennessee, and Arkansas.” Ex. 14 (Pl.’s Resp. to RFA No. 1).¹ Since filing its first lawsuit² against the City of Memphis and MLGW for the alleged wrongful taking of groundwater, Mississippi and its experts have used several names interchangeably to refer to the Aquifer at issue, including: “Memphis Sand Aquifer,” “Sparta Sand Aquifer,” and “Memphis

¹ For simplicity, this refers only to Mississippi’s Response to the City of Memphis and MLGW’s Requests for Admission. The State of Tennessee also served a Request for Admission on the State of Mississippi, which is not pertinent to this Motion.

² *Hood ex rel. Mississippi v. City of Memphis*, 533 F. Supp. 2d 646 (N.D. Miss. 2008), *aff’d*, 570 F.3d 625 (5th Cir. 2009).

Sparta Aquifer.” *See infra* Part II(B). In Mississippi’s 2005 complaint, Mississippi referred to the Aquifer as the “Memphis Sand Aquifer,” and, in its current complaint, Mississippi uses the name “Sparta Sand.” It always has been the case, however, that Mississippi has used these different names to refer to the single aquifer at issue in this dispute – a continuous hydrogeological resource that lies beneath and provides water to Mississippi and Tennessee.

After the close of discovery in this case, Mississippi reversed course by asserting for the first time (and after more than 10 years of litigation) that “[t]he Sparta Sand and the Memphis Sand are *distinct formations* and *distinct aquifers* in the Middle Claiborne geological unit” that are “hydraulically connected.” Resp. to D25 (emphases added). According to Mississippi’s new position, “[t]he Memphis Sand only appears in Tennessee, extreme northwestern Mississippi, Missouri, and Arkansas; and the Sparta Sand only appears in Mississippi, Louisiana, and Kentucky.” Ex. 15 (Pl.’s Resp. to Defs.’ Proposed Facts at 2).

As explained below, Mississippi’s new “two aquifer” theory is directly contrary to what Mississippi previously conceded to be a fact: there is only one Aquifer at issue, and that one Aquifer is a resource that underlies Mississippi, Tennessee, and other States. Mississippi’s “two aquifer” theory is not supported by the factual record or either of Mississippi’s expert witnesses. Nevertheless,

Defendants anticipate that Mississippi will try to introduce evidence or raise arguments concerning its new “two aquifer” theory at the hearing.

The Special Master should preclude Mississippi from arguing or introducing evidence intended to support their “two aquifer” theory because (1) Mississippi should be bound to its response to a Request for Admission, in which it conceded that there is only one Aquifer at issue and that Aquifer extends beneath Mississippi and Tennessee; and (2) Mississippi’s attempt to raise a new factual argument until after the close of discovery violates the Special Master’s Case Management Order.

II. ARGUMENT

A. Mississippi Has Conceded That There Is One Aquifer At Issue, Which Lies Beneath Both Mississippi And Tennessee

The foundation of Mississippi’s “two aquifer” argument is that the Sparta Aquifer does not extend into Tennessee. Mississippi should be prevented from raising that argument because, as noted above, in its response to a Request for Admission, Mississippi has admitted “that the general geologic formation known as the Sparta Sand underlies several states, including *Mississippi, Tennessee* and *Arkansas.*” Ex. 14 (Pl.’s Resp. to RFA No. 1) (emphases added). That fact has, therefore, been “conclusively established.” Fed. R. Civ. P. 36(b); *see* Dkt. No. 57 (Case Management Plan) ¶ 4(b) (adopting, as modified, Rule 36). Accordingly, Mississippi is bound by its Rule 36(b) response and should not be permitted to now argue that the Aquifer at issue does not underlie Mississippi and Tennessee. *See*

Bender v. Xcel Energy, Inc., 507 F.3d 1161, 1168 (8th Cir. 2007) (“[A]s a general rule, admissions made in response to a Rule 36 request for admissions are binding on that party.”); *Armour v. Knowles*, 512 F.3d 147, 154 n.13 (5th Cir. 2007) (“The binding nature of judicial admissions conserves judicial resources by avoiding the need for disputatious discovery on every conceivable question of fact. Once a fact is formally admitted and thereby set aside in the discovery process, the party requesting an admission is entitled to rely on the conclusiveness of it.”); *Victory Carriers, Inc. v. Stockton Stevedoring Co.*, 388 F.2d 955, 959 (9th Cir. 1968) (holding that there is a binding effect conferred on responses to requests for admission).

Notably, Mississippi’s Response to RFA No. 1 is entirely consistent with the allegations in its Complaint where it expressly alleges that the Sparta Sand extends beneath Mississippi *and Tennessee*. See Compl. ¶ 22 (“MLGW’s wells mechanically pump groundwater from the Sparta Sand formation, *which extends into western Tennessee*.”) (emphasis added); *id.* ¶ 41 (alleging that “[t]he geologic formation in which the groundwater is stored *straddles two states*”) (emphasis added); *id.* ¶ 50 (“[t]he Sparta Sand formation *underlies both Mississippi and Tennessee*”) (emphasis added). Mississippi’s own allegations confirm that there is

only one aquifer at issue and that the aquifer underlies both Mississippi and Tennessee.³

Allowing Mississippi to reverse its substantive position, especially at this late date, would render its Rule 36 admission of no consequence. The purpose of requests for admission is to “avoid[] the need” for “discovery on every conceivable question of fact,” *Armour*, 512 F.3d at 154 n.13, and provide a basic set of agreed-upon facts on which parties may rely. Mississippi has not provided any justification for its reversal of position, and it should be bound by its formal Response to RFA No. 1 under Rule 36.

³ In the district court litigation, Mississippi also asserted that the Aquifer extended beneath Mississippi and Tennessee. However, in that case, Mississippi referred to the Aquifer as the Memphis Sand. *See Hood* Compl. ¶ 11 (Mississippi alleges that “[t]his is an interstate groundwater action” concerning “the portion of the Memphis Sand Aquifer underlying Mississippi lands”); *see also* Mississippi’s 5th Cir. Br. 1 (“Mississippi claims that Memphis and MLGW have wrongfully diverted and misappropriated groundwater owned by the State, and taken from within its territorial boundaries from the Memphis Sand Aquifer, an interstate underground body of water.”); *id.* at 3 (“The ground water was taken from a portion of a subterranean reservoir underlying Desoto County, Mississippi, known as the Memphis Sand Aquifer (‘the aquifer’).”). Finally, both the district court and the Fifth Circuit acknowledged that there was only one aquifer at issue and that aquifer existed beneath Tennessee, Mississippi, and other States. *See Hood*, 533 F. Supp. 2d at 648 (“[T]he Memphis Sands or Sparta aquifer lies under several States including the States of Tennessee and Mississippi.”); *id.* (“The subject aquifer”); *id.* at 649 (“Memphis Sands aquifer”); *Hood ex rel. Mississippi v. City of Memphis*, 570 F.3d 625, 627 (5th Cir. 2009) (“The Aquifer is located beneath portions of Tennessee, Mississippi, and Arkansas.”); *id.* (“[t]he Aquifer is the primary water source for both DeSoto County, Mississippi, and the city of Memphis, Tennessee”).

B. By Waiting Until After The Close Of Discovery To Assert That There Were Two Aquifers At Issue, Rather Than One, Mississippi Has Violated The Special Master's Case Management Order

This litigation has been governed by a series of Case Management Orders. *See, e.g.*, Dkt. Nos. 57-62, 65-69. In accordance with the Special Master's Case Management Order, the parties exchanged expert reports on June 30, 2017, and rebuttal reports on July 31, 2017 (Dkt. No. 58); the five experts identified by the parties were all deposed by the end of September 2017; and discovery closed on September 30, 2017 (Dkt. No. 59).

The first time Mississippi suggested that there were two aquifers at issue (*i.e.*, that the Memphis Sand and Sparta Sand were two distinct aquifers) was on January 29, 2018, in its Response to Defendants' Proposed Statement of Facts, in which it raised the following objections:

The Memphis Sand only appears in Tennessee, extreme northwestern Mississippi, Missouri, and Arkansas; and the Sparta Sand only appears in Mississippi, Louisiana, and Kentucky.

Ex. 15 (Pl.'s Resp. to Defs.' Proposed Facts at 2). On February 27, 2018, Plaintiff stated the following in opposition to Defendants' fact D25:

The Sparta Sand and the Memphis Sand are distinct formations and distinct aquifers in the Middle Claiborne geographical unit.

Resp. to D25.

That new position, however, directly conflicts with the testimony and opinions of both of Mississippi's expert witnesses.⁴ Mississippi's experts testified that there is only one Aquifer at issue and that the Aquifer underlies parts of Mississippi, Tennessee, and other States. For example, Mississippi's expert, David Wiley testified:

Q. (BY MR. DAVID BEARMAN) Mr. Wiley in your report you use the term "Sparta Sand" and you also use the term "Sparta/Memphis Sand." I want to make sure that we're talking about the same aquifer. Is that right?

A. Yes, we are.

Q. I think on one of your diagrams it is labeled "Middle Claiborne Aquifer." That's the same aquifer also, right?

A. Yes, the Memphis Sparta Sand is in the Middle Claiborne Aquifer.

Q. And you've read the report by David Langseth, and he used the term "Memphis Sparta Sand Aquifer" or "MSSA." Do you remember that?

A. Yes.

Q. That is the same aquifer?

A. Yes.

Q. I think Dr. Spruill wrote a report. Have you read that?

A. Yes.

Q. He used the term "Sparta Memphis Sand." That's the same aquifer also, right?

A. Yes.

⁴ Defendants are contemporaneously moving to exclude the testimony of Mississippi's experts on other grounds. That Mississippi's experts contradict Mississippi's own two-aquifer position reinforces the unreliability of their opinions. It also demonstrates that, even if those experts are allowed to offer their opinions, there is no evidentiary support for Mississippi's new two-aquifer theory.

...

Q. So for purposes of the deposition we'll assume that the term "aquifer" is the Memphis Sand Sparta Aquifer. Okay?

A. Okay. If I have a question about that to clarify, I'll ask.

Q. OK. We agree, I think that the extent of the aquifer is pretty well agreed upon by scientists, don't we?

A. Yes.

...

Q. ... You agree that the Memphis Sparta Aquifer is a primary source of fresh water for Northwest Mississippi and Shelby County, right?

A. Yes.

Q. And you agree that the Memphis Sparta Aquifer lies beneath several states, right?

A. Yes.

Q. It lies beneath Tennessee?

A. Yes, it does.

Q. Portions lie beneath Mississippi?

A. Yes.

Q. Portions lie beneath Arkansas?

A. Yes.

Q. Portions lie beneath Kentucky?

A. Yes.

Q. Among other, right?

A. The other – I believe there are several others.

Q. Missouri?

A. Missouri.

Q. I can't remember if I said Louisiana.

MR. ELLINGBURG: Alabama and Louisiana.

A. Louisiana.

...

Q. You agree that before pumping began in the Memphis Sparta Aquifer, that there was some water that recharged into the aquifer in Mississippi and naturally flowed into that part of the aquifer beneath Tennessee, right?

A. There is – yes, there is a small – was a small part of the recharge that came in the outcrop in Mississippi that flowed into Tennessee.

Q. And that was natural movement was without any influence from pumping, right?

A. That's right.

Ex. 9 (Wiley Dep. 9:14-10:12, 10:24-11:8, 12:13-13:12, 14:18-15:5).⁵

Mississippi's other expert witness, Richard Spruill, referred to the Aquifer at issue in his reports by different names, used interchangeably, including the following:

⁵ See also Ex. 7 (Wiley June Rep. 9) (“The Sparta Sand is a distinct geological formation and primary source of groundwater in northwest Mississippi and Shelby County, Tennessee.”); *id.* at 5 (referring to the “confined Sparta Sand formation beneath northwest Mississippi and southwest Tennessee”); *id.* at 6 (referring to the “Sparta Sand in Tennessee”); *id.* at 10 (“The Sparta Sand is one of the principal and most productive aquifers in Shelby County, Tennessee, and northwestern Mississippi.”); *id.* at 13 (discussing water levels “in the Sparta Sand in Shelby County, Tennessee,” and “in the Sparta Sand under northern DeSoto County”); *id.* at 14 (describing the groundwater model used by Mississippi's experts as including “the hydrogeology of the Sparta Sand and the Fort Pillow aquifers in the Memphis, Tennessee and northwestern Mississippi area”); *id.* at 16 (noting that the “Sparta Sand outcrops to the east in Tennessee and Mississippi”) (all emphases added).

- “Sparta-Memphis Sand (aka, the Sparta Sand, Memphis Sand, Memphis Aquifer, and other variations)”⁶
- “The Sparta-Memphis Sand, also known as the Middle Claiborne Aquifer or the Memphis Aquifer”⁷
- “Sparta-Memphis Sand (aka, Memphis Aquifer or Middle Claiborne Aquifer)”⁸
- “Sparta-Memphis Sand (aka, SMS, Sparta Sand, Memphis Sand, Sparta Aquifer, Memphis Aquifer, Middle Claiborne aquifer, among others)”⁹

Appendices A through C contain additional examples of Mississippi’s expert witnesses’ confirming that there is only one Aquifer at issue and that the Aquifer underlies both Mississippi and Tennessee.

Mississippi should not be allowed to materially change its position after the close of discovery. “[L]itigants have an ‘unflagging duty to comply with clearly communicated case-management orders.’” *Tower Ventures, Inc. v. City of Westfield*, 296 F.3d 43, 46 (1st Cir. 2002) (quoting *Rosario-Diaz v. Gonzalez*, 140 F.3d 312, 315 (1st Cir. 1998)). Mississippi has ignored the Case Management Order at its “[own] peril.” *Id.* at 45-46 (quoting *Rosario-Diaz*, 140 F.3d at 315). *See also Bradford v. DANA Corp.*, 249 F.3d 807, 809 (8th Cir. 2001) (“[W]e do not take case management orders lightly, and will enforce them.”).

⁶ Ex. 1 (Spruill June Rep. 1).

⁷ *Id.* at 2.

⁸ *Id.* at 4.

⁹ Ex. 2 (Spruill July Rep. 1).

Mississippi's attempt to allege new facts in support of a novel theory at this late date is a violation of the discovery cut-off deadline. Dkt. No. 59. Because Mississippi waited to raise its "two aquifer" theory until after experts had submitted their reports, after expert depositions were taken, and after the close of discovery, Defendants will be unfairly prejudiced if Mississippi is allowed to present its new theory at the hearing. Defendants have had no opportunity prior to the hearing to engage in discovery regarding this new allegation, including by serving additional interrogatories or requests for admission on Mississippi or deposing Mississippi's expert witnesses concerning the basis for the "two aquifer" theory. And Defendants' expert witnesses have had no opportunity to consider or analyze it in their reports.

Defendants reasonably relied on the Special Master's Case Management Orders. The Special Master should enforce his Case Management Orders and not permit Mississippi to offer new factual allegations or raise new arguments – here, the position that the Memphis Sand and Sparta Sand are two distinct aquifers – after applicable deadlines have expired.

III. CONCLUSION

There is only one Aquifer at issue in this case. The names "Middle Claiborne," "Sparta Sand," "Memphis Sand," and "Memphis-Sparta" all refer to

the same hydrogeological resource – *the* Aquifer that underlies parts of eight States including Mississippi and Tennessee.

Mississippi’s “two aquifer” theory is contrary to the undisputed record evidence and the facts “conclusively established” by Mississippi’s response to requests for admission. Mississippi’s “two aquifer” theory also comes too late. Allowing Mississippi to change its position after the close of discovery would be highly unfair and prejudicial to Defendants.

For the above reasons, the Special Master should hold that Mississippi may not assert its “two aquifer” theory at the evidentiary hearing.

Respectfully submitted this 1st day of November 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 1st day of November 2018.

/s/ David C. Frederick

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APPENDIX A

Throughout these proceedings, Mississippi’s experts have referred to the Aquifer at issue by a variety of names – all used interchangeably to refer to the same aquifer that underlies north Mississippi and west Tennessee (among other States). For example:

NAME USED FOR AQUIFER	CITATION TO EXPERT REPORTS
“Memphis Sand or Sparta aquifer”	Wiley Dec. 2006 Rep. 1
“Memphis Sand aquifer or Sparta aquifer”	Wiley Dec. 2006 Rep. 2, 4
“Memphis Sand Aquifer”	Wiley May 2007 Rep., Figure 6
“Middle Claiborne Aquifer”	Spruill June Rep. 35
“Memphis Sand”	Wiley May 2007 Rep., Figures in Appendix C
“Sparta Sand”	Wiley June Rep. 9 Spruill June Rep. 1, 16
“Sparta/Memphis Sand Aquifer”	Wiley June Rep. 9 & Figure 4
“Sparta-Memphis Sand”	Spruill June Rep. 2, 3
“Sparta-Memphis Sand aquifer”	Spruill June Rep. 1
“Sparta-Memphis Sand (aka, the Sparta Sand, Memphis Sand, Memphis Aquifer, and other variations)”	Spruill June Rep. 1
“The Sparta-Memphis Sand, also known as the Middle Claiborne Aquifer or the Memphis Aquifer”	Spruill June Rep. 2
“Sparta-Memphis Sand (aka, Memphis Aquifer or Middle Claiborne Aquifer)”	Spruill June Rep. 4
“Sparta-Memphis Sand (aka, SMS, Sparta Sand, Memphis Sand, Sparta Aquifer, Memphis Aquifer, Middle Claiborne aquifer, among others)”	Spruill July Rep. 1
“Sparta-Memphis Sand (aka, Middle Claiborne aquifer)”	Spruill July Rep. 7
“Middle Claiborne Aquifer (aka, SMS or Memphis Aquifer)”	Spruill July Rep., Figures 1, 2, 3, 4

APPENDIX B

A comparison of the expert reports submitted by David Wiley on behalf of Mississippi in 2007 and 2017 shows numerous examples in which Wiley’s two reports contained the same language – the only difference was that, in 2007, Wiley called the Aquifer the “Memphis Sand Aquifer” and, in 2017, Wiley called it the “Sparta Sand Aquifer.”

WILEY’S MAY 2007 EXPERT REPORT	WILEY’S JUNE 2017 EXPERT REPORT
<p>The Memphis Sand aquifer is one of the principal aquifers and the most productive aquifer in the Memphis area. In Mississippi, this aquifer is referred to as the Sparta aquifer. p.7.</p>	<p>The Sparta Sand is one of the principal and most productive aquifers in Shelby County, Tennessee, and northwestern Mississippi. p.10</p>
<p>As mentioned earlier in this report in the BACKGROUND section, Memphis began using the Memphis Sand aquifer, which is the principal aquifer in the region, as a municipal water supply in 1886. p.9</p>	<p>As discussed in the BACKGROUND section of this report, Memphis began using the Sparta Sand as its municipal water supply in 1886. p.12</p>
<p>The USGS has also prepared ground-water elevation maps of the potentiometric surface for the Memphis Sand aquifer that show the declining water-level conditions across the southwest Tennessee and northwest Mississippi area. p.9</p>	<p>The USGS has also prepared groundwater elevation maps of the potentiometric surface for the Sparta Sand that shows the declining water-level conditions across the southwest Tennessee and northwest Mississippi [sic]. p.12</p>
<p>This is a regional ground-water model constructed by Brahana and Broshears to determine changes in regional flow from pre-development time to 1980 due to changes in pumpage in Memphis Sand and Fort Pillow aquifers. p.13</p>	<p>This is a regional groundwater model constructed by Brahana and Broshears to determine changes in regional flow from pre-development time to 1980 due to changes in pumpage in Sparta/Memphis Sand and Fort Pillow aquifers. p.14</p>

<p>The [Brahana & Broshears] report includes the hydrogeology of the Memphis Sand and the Fort Pillow aquifers in the Memphis, Tennessee area. p.13</p>	<p>The [Brahana & Broshears] report includes the hydrogeology of the Sparta Sand and the Fort Pillow aquifers in the Memphis, Tennessee and northwestern Mississippi area. p.14</p>
<p>The model grid consists of three-layers, which are, from top to bottom: a) Fluvial Deposits; b) Memphis Sand Aquifer; and c) Fort Pillow Aquifer. p.13</p>	<p>The model grid consists of three-layers, which are, from top to bottom: a) Fluvial Deposits; b) Sparta Sand Aquifer; and c) Fort Pillow Aquifer. p.14</p>
<p>Based upon the Brahana Model, our own independent flow net analysis, potentiometric surface mapping, ground-water modeling, and our review of studies by other reputable scientists and water policy analysts (as discussed herein), it is our opinion that (1) Memphis area pumpage, primarily by MLGW, has altered the natural flow path and created a cone of depression in the Memphis Sand aquifer resulting in the diversion of Mississippi's ground water p.25</p>	<p>Based upon the original Brahana Model, potentiometric surface mapping, updated groundwater modeling by LBG, and our review of studies by other reputable scientists and water policy analysts (as discussed herein), it is our opinion that Memphis area pumpage, primarily by MLGW, has altered the natural flow path and created a cone of depression in the Sparta Sand, resulting in the diversion of Mississippi's groundwater. p.20</p>
<p>It is clear from our review of a number of technical reports described previously that a large cone of depression of the potentiometric surface for the Memphis Sand aquifer has been developed as a result of ground-water pumpage from the Memphis, Tennessee area. p.23</p>	<p>It is clear from our review of a number of technical reports described previously that a large cone of depression of the potentiometric surface for the Sparta/Memphis Sand aquifer has been created by the groundwater pumpage in the Memphis, Tennessee area. p.19</p>
<p>For this project, water-level conditions of the Memphis Sand aquifer were of primary interest. p.17</p>	<p>For our analysis, water-level conditions of the Sparta Sand were of primary interest. p.14</p>
<p>Figure 31 contained in this report, shows the potentiometric surface at the end of the 1980 stress period in the Memphis Sand aquifer. p.18</p>	<p>Figure 13 contained in this report, shows the potentiometric surface at the end of the 1980 stress period in the Sparta/Memphis Sand aquifer. p.14</p>

During the post-development stage, i.e., in the year 1980, the potentiometric surface in the Memphis area was significantly altered due to pumpage in the **Memphis Sand aquifer** . . . as evidenced by the shapes of the contours on the figure. p.18

During the post-development state, i.e., in the year 1980, the potentiometric surface in the Memphis area was significantly altered due to pumpage in the **Sparta/Memphis Sand aquifer** as evidenced by the shape of the contours on the figure. p.14

APPENDIX C

The following statements appear in Mississippi's experts' reports:

- “Memphis Sand aquifer, as it is referred to in Tennessee, and the Sparta aquifer, as it is referred to in Mississippi”¹
- “The confined Sparta Sand formation beneath northwest Mississippi and southwest Tennessee is a discrete geological formation which has existed for thousands of years.”²
- “the Eocene-age Middle Claiborne Group that host the Sparta-Memphis Sand aquifer system in northwestern Mississippi and southwestern Tennessee”³
- “Sparta-Memphis Sand (aka, Memphis Aquifer or Middle Claiborne Aquifer) in northwestern Mississippi and southwestern Tennessee”⁴
- “Middle Claiborne Group in northwest Mississippi and southwest Tennessee”⁵
- “Sparta-Memphis Sand in northwestern Mississippi and southwestern Tennessee”⁶
- “The terms Middle Claiborne Aquifer or Memphis Aquifer are considered synonymous with the SMS for purposes of this expert report.”⁷
- “In the vicinity of the Mississippi-Tennessee border and generally near the City of Memphis, the middle of the Claiborne Group is dominated by sand deposits that are identified as the Sparta-Memphis Sand.”⁸

¹ Wiley Dec. 2006 Rep. 5.

² Wiley June Rep. 5.

³ Spruill June Rep. 1.

⁴ Spruill June Rep. 4.

⁵ Spruill June Rep. 4.

⁶ Spruill June Rep. 11.

⁷ Spruill June Rep. 16.

⁸ Spruill June Rep. 17.

- “Sparta-Memphis Sand aquifer system in northwestern Mississippi and southwestern Tennessee”¹⁰
- “Sparta-Memphis Sand in both Tennessee and Mississippi”¹¹
- “Middle Claiborne aquifer in the trans-border region”¹²
- “The Sparta Sand is a distinct geological formation and primary source of groundwater in northwest Mississippi and Shelby County, Tennessee.”¹³
- “The Memphis Sand aquifer is one of the principal aquifers and the most productive aquifer in the Memphis area. In Mississippi, this aquifer is referred to as the Sparta aquifer.”¹⁴
- “The Sparta Sand is one of the principal and most productive aquifers in Shelby County, Tennessee, and northwestern Mississippi.”¹⁵
- “The primary source of fresh water supply for most of northwest Mississippi and the Memphis, Tennessee areas is the deep confined Sparta Sand formation, referred to as the Memphis Sand in Tennessee within the Claiborne Geological Group.”¹⁶
- “The Sparta-Memphis Sand, also known as the Middle Claiborne Aquifer or the Memphis Aquifer, is an important source of potable groundwater within northwestern Mississippi and southwestern Tennessee.”¹⁷
- “The Sparta-Aquifer Sand is the most productive source of high-quality groundwater available in the states of Mississippi and Tennessee.”¹⁸

¹⁰ Spruill July Rep. 1.

¹¹ Spruill July Rep. 3.

¹² Spruill July Rep. 34.

¹³ Wiley June Rep. 9.

¹⁴ Wiley May 2007 Rep. 7.

¹⁵ Wiley June Rep. 10.

¹⁶ Wiley June Rep. 5.

¹⁷ Spruill June Rep. 2.

¹⁸ Spruill June Rep. 3; Spruill July Rep. 2.