No. 09-139, Original

In The
Supreme Court of the United States

The State of Mississippi,
Plaintiff,

v.

The City of Memphis, Tennessee,
Memphis Light, Gas & Water Division,
and The State of Tennessee,
Defendants.

On Motion for Leave to File Bill of Complaint in Original Action

THE STATE OF MISSISSIPPI'S REPLY TO BRIEF IN OPPOSITION TO MOTION FOR LEAVE TO FILE BILL OF COMPLAINT OF THE CITY OF MEMPHIS, TENNESSEE AND MEMPHIS LIGHT, GAS & WATER DIVISION

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INTRODUCTION

In the District Court and Fifth Circuit, Defendants, the City of Memphis, Tennessee ("Memphis") and its utility division, Memphis Light, Gas & Water ("MLGW"), consistently argued that the State of Tennessee ("Tennessee") should be joined and that the matter is subject exclusively to resolution by referral to the federal common law doctrine of "equitable apportionment." Now, Memphis and MLGW reverse their position and argue that Mississippi's claims are "contrary to and cannot be reconciled with" the Court's equitable apportionment precedents. Under *New Hampshire v. Maine*, 532 U.S. 742, 749 (2001), the Defendants are barred from asserting, contrary to their prior positions, that equitable apportionment, among other remedies, is not appropriate for resolution of Mississippi's claims should Tennessee be joined.

REPLY TO DEFENDANTS' REASONS FOR DENYING MISSISSIPPI'S MOTION[1]

I. Reply to Defendants' Brief Part I: The Aquifer Ground Water Was Apportioned When State Borders Were Drawn and Equitable

[1] For brevity (and comprehensive treatment of the issues), Mississippi incorporates by reference *The State of Mississippi's Reply to Brief in Opposition of the State of Tennessee to Motion for Leave to File Bill of Complaint in Original Action* filed contemporaneously herewith.

Apportionment is Neither Appropriate Nor the Sole Remedy Available to Mississippi.

Authorities involving disputes "between states" over "interstate surface waters" do not apply. All of Defendants' authorities involve interstate rivers or streams flowing freely across the borders and territory of multiple sovereign states, whereas Mississippi's claims involve subterranean intrastate ground water naturally stored and confined in a dense sand formation or aquifer which was apportioned as between overlying states upon formation of the Union.

Defendants argue that Mississippi has no viable claim against them because the ground water withdrawn by Memphis is merely derivative of Tennessee's share of the water in the aquifer, citing *Hinderlider*. However, the uncontested proof in this cause demonstrates that Defendants, and their consultants and experts, are aware that their actions have caused, and continue to result in, diversion and taking of water from Mississippi that never would have naturally flowed into Tennessee. App., 198a-199a, 202a-204a; Supplemental Appendix annexed hereto ("Supp. App."), 249a-256a, 259a-260a, 265a-266a, 277a-280a. They were aware years before initiation of these proceedings that ground water they were taking was derived from Mississippi's portion of the aquifer and that resolution of the dispute may result in Memphis reducing or even abandoning its reliance on the aquifer as a source for its municipal supply and sales requirements. App., 202a-205a, 210a-214a.

Essentially, Defendants *assume* Tennessee's core sovereign interests are implicated, and then further

assume that Mississippi usurped this Court's original exclusive jurisdiction because, as Defendants contend, the only way to resolve the presumed dispute "between states" is through equitable apportionment.[2] Defendants' authorities, however, relate to surface water shared between states, a key component absent here. Also, whether or not equitable apportionment applies does not negate or conflict with Mississippi's entitlement to an award of damages (and prejudgment interest) and injunctive relief. Equitable apportionment would only come into play if this Court determines that Mississippi does not own and possess dominion over its territorial waters. Even then, because the diverted water has been permanently siphoned into Memphis' ground water storage and will never flow back into Mississippi, App., 57a-61a, there is no "apportionment" that can redress Mississippi's loss of over 400 billion gallons of ground water. For this reason, Mississippi demands money damages for past diversions and injunctive relief to enjoin Defendants' present and future diversions.

Defendants also assert in their Brief in Opposition ("Opp. Br.,") that Mississippi does not own the ground

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[2] Defendants also erroneously advise the Court that equitable apportionment or interstate compacts are the only mechanisms through which disputes involving transboundary waters may be resolved. However, historically other methods have been recognized including litigation. *See* Douglas Grant, *Interstate Water Allocation*, in 8 WATERS & WATER RIGHTS, §§44.01-44.05, 45.01-45.07, 46.01-46.08, 47.01-47.01 & 48.01, 48.03. In fact, modern water law scholars recognize that when conflicts develop among users of water bodies in different states, **ordinary litigation may be the only way ultimately to resolve such disputes.** Joseph L. Sax, *et al.*, *Legal Control of Water Resources* at 874 (4th ed. 2006) (emphasis added).

water at issue, a position clearly refuted by this Court's longstanding state sovereignty precedent.[3] Opp. Br., 14-18. Instead, Defendants argue that Mississippi holds only a usufructory right in its territorial ground waters. Ironically, however, Defendants' primary authorities, *Dycus*, *Sporhase* and *Riverside County*, are completely consistent with Plaintiff's authorities and confirm state ownership and control of the State's ground water, as sovereign and trustee, for the benefit of the people of Mississippi.

Dycus concerns a dispute between *private* riparians, fishermen and landowners, over competing *private* rights of use and enjoyment of a *private* fishing hole. Although state ownership of water was not actually at issue, the *Dycus* court repeatedly emphasized the public ownership of state water resources as juxtaposed to *private* usufructory rights held by the people. 557 So.2d at 498.

Dycus relies heavily on two Mississippi Supreme Court cases which are important to the Court's consideration of this issue: *State Game & Fish Comm'n v. Louis Fritz Co.*, 187 Miss. 539, 193 So. 9 (1940), and *State ex rel. Rice v. Stewart*, 184 Miss. 202, 184 So. 44 (1938). The *Fritz* Court distinguished the *ferae naturae* cases (relied on by Defendants) and declared state ownership of the waters within Mississippi's borders and the State's right under its police powers to protect its natural resources from trespassers. 187 Miss. at

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[3] The numerous authorities from multiple jurisdictions cited by Mississippi in its Motion regarding state ownership have not been addressed, much less refuted, by Defendants. *See generally* Mississippi's Brief in Support of Motion for Leave to File Bill of Complaint in Original Action, 12-16 & App. H, 216a-224a.

564-577; 193 So. at 40-68. In *Rice*, a trespass action against landowners to recover the value of gravel and sand removed from a riverbed, the court acknowledged Mississippi's sovereign title to lands and minerals beneath waters, holding that the State, as trustee for the people, was entitled to recover the value of the sand and gravel that had been dredged for commercial purposes based upon the actual value of the property taken, without any allowance or deductions for labor or expenses incurred in taking and removing it. 184 Miss. at 230-31, 235; 185 So. at 50-52. Defendants' characterization of Mississippi's interest in state waters as *usufructory* is specious.

Defendants' reliance on *California v. The Superior Court of Riverside County* is also misplaced. The case actually confirms state ownership. As stated in *Riverside County*, "this power, of course, derives from the police power conferred by the United States Constitution," acknowledging that the State has the power to control and regulate use for the people of water of the State.[4] 93 Cal. Rptr. 2d, at 285.

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[4] *Riverside County* specifically involved the court's determination that the State's ownership in the context of interpretation of an insurance policy was not sufficient to trigger an "Owned Property Exclusion" provision. Courts in such cases have uniformly held that state ownership is of a possessory and proprietary nature. *See E. I. duPont de Nemours & Co. v. Admiral Insurance Co.*, 196 Del. Super. LEXIS 35 (1996); *North American Philips Corp. v. Aetna Cas. & Surety Co.*, 195 Del. Super. LEXIS 358 (1995); *Spangler Const. v. Indus. Crankshaft*, 326 N.C. 133, 388 S.E. 2d 557, 563 (1990); *Minnesota Mining & Mfg. Co. v. Traveler's Indem. Co.*, 457 N.W.2d 175, 182 (Minn. 1990); *City of Edgerton v. General Cas. Co.*, 172 Wis.2d 518, 493 N.W.2d 768, 783-84 (App. 1992); *Patz v. St. Paul Fire & Marine*, 15 F.3d 699, 705 (7th Cir. 1994).

Defendants' tenuous *Sporhase* argument offers nothing to refute Mississippi law and policy regarding ownership of its ground water. *Sporhase* does not hold that a state's claimed ownership in ground water is a "legal fiction," as something "unreal" or imaginary. Rather, *Sporhase* confirms state-ownership and power to regulate use of ground water under the state's police powers. 458 U.S. at 956. The *Sporhase* Court acknowledges that each state may restrict water within its borders in preference for its own citizens. *Id.*

In *Sporhase*, the Court could not use its equitable apportionment thinking, balancing harms and benefits so as to apportion the resource, as the parties were not states. The Commerce Clause rationale was therefore required. *Sporhase* is a product of the Commerce Clause cases stemming from this Court's decision in *Geer v. Connecticut*, 161 U.S. 519 (1896) (confirming that state could forbid interstate transportation of wildlife within its borders consistent with the Commerce Clause), *overruled on other grounds* by *Hughes v. Oklahoma*, 441 U.S. 322 (1979), cited by Defendants. While overruling *Geer* as to the constitutionality of state prohibitions against interstate shipping, *Hughes* preserved the trust responsibilities set forth in *Geer*. *Id.* at 338. With respect to the continued viability of the state ownership theory, the *Hughes* Court stated that "the whole ownership theory, in fact is . . . but a fiction expressive in legal shorthand of the importance to its people that a State has the power to preserve and regulate the exploitation of an important resource." *Id.* at 334. After *Hughes*, the trust responsibility that accompanied state ownership remained. *See, e.g., Clajon Produce Corp. v. Petera*, 854 F.Supp. 843, 851 (D. Wyo. 1994); *State v. Fertterer*, 841 P.2d 467, 470

(Mont. 1992), *overruled on other grounds* by *State v. Gatts*, 928 P.2d 114 (Mont. 1996); *O'Brien v. Wyoming*, 711 P.2d 1144, 1148 (Wyo. 1986). Defendants' reliance upon *ferra naturae* and Commerce Clause cases is not only misplaced contextually and constitutionally, their authorities actually support Mississippi's state ownership position.

Defendants maintain that this Court can only award damages against a state, not the non-state Defendants. Opp. Br., 18-19. However, this Court's jurisdiction is not affected by the presence of non-state parties where, as here, states are on each side of the controversy. Pet., 17-18. There is no legal or logical difference between an award of money damages in a tort action and such an award based upon other legal theories such as breach of contract, duty or obligation. *Id.*, 18-19. This Court's inherent power to award money damages in a water diversion case is well settled. *Kansas v. Colorado*, 533 U.S. 1, 6, 8-10 (2001); *Virginia v. West Virginia*, 206 U.S. 290, 319 (1907) (Court's jurisdiction exercised in controversies involving monetary claims just as in water diversion and allocation cases).

II. Reply to Defendants' Brief Part II: Mississippi's Complaint Invokes This Court's Broad Inherent Powers to Grant Legal and Equitable Remedies

At the outset, Mississippi's claims for damages and injunctive relief are against non-state Defendants Memphis and MLGW. These entities alone are responsible for the diversion and misappropriation of state-owned ground water from Mississippi. Mississippi has also, however, named Tennessee as a

party *because* it was directed to do so by the Fifth Circuit (affirming the District Court). Mississippi continues to maintain that Tennessee is not a proper Rule 19 party to these proceedings. Even so, should this Court determine that Tennessee is a proper party, Mississippi has stated conditional or alternative claims against Tennessee for, *inter alia*, equitable apportionment.

Defendants contend that Mississippi does not "state a claim" because it does not allege any harm or injury to its use of the aquifer. Defendants' authorities do not relate to pleading requirements, but to the standards for burden of proof. Dismissal in the cases cited by Defendants came only after presentation of witnesses and evidence not sufficiently "clear and convincing" to demonstrate "real and substantial injury." Opp. Br. 20-21. However, Mississippi's Complaint and the materials attached to its Motion provide voluminous detail confirming the real, immediate and serious harm to its substantial interests due to the diversion and permanent loss of over 400 billion gallons of ground water pumped by Defendants, Memphis and MLGW. App., 57a-61a, 63a-104a. Their water extraction operations have completely altered the gradient and flow rate of the ground water, causing aquifer water levels to drop hundreds of feet and depleting the aquifer faster than it can be recharged naturally. *Id.*, 70a-75a, 93a-97a, 100a, 106a-117a. These diversions have caused significant harm and destruction of Mississippi's sovereign interests such that would warrant this Court's exercise of original and exclusive jurisdiction consistent with *Kansas v. Colorado*, *Connecticut v. Massachusetts* and Defendants' other cited authorities should Tennessee be joined as a party.

Defendants' diversions of the ground water at issue are unlawful and inherently wasteful and non-beneficial inasmuch as they are taking Mississippi's territorial water, not ground water residing in or belonging to Tennessee. The diversions have disturbed the steady-state equilibrium of the aquifer and caused a change in flow direction and rate. App., 59a; Supp. App.,246a-252a. The billions of gallons of ground water diverted have been permanently lost. App., 60a-61a. Mississippians have lost the use of this water forever as there is no return flow into the State. Cessation of pumpage by Defendants will not result in return of the diverted water, it will only lessen the taking of future amounts. *Id.* This has reduced the availability of water in storage under Mississippi and converted it to storage under Tennessee for use by Memphis to serve MLGW's wells. The diversions continue at a rate of almost nine billion gallons annually, and this will not stop as long as the cone exists. *Id.*, 59a-61a, 249a-250a.

Whether or not equitable apportionment may be applied as part of the remedy for Mississippi's claims, the allegations of Mississippi's Complaint demonstrate the "real and substantial injury and damage" justifying this Court's exercise of jurisdiction. Mississippi will present "clear and convincing evidence" to prove its injury and damages at trial. Defendants' arguments are premature and their "burden of proof" cases are not applicable at this preliminary state of the proceedings.

III. Reply to Defendants' Brief Part III: Mississippi's Interests in the Aquifer Have Been Permanently and Irreparably Injured.

In furtherance of their "failure to allege injury" theme, Defendants mislead the Court in their discussion of ground water budgets. They state that Mississippi's expert hydrogeologist and representatives of the Mississippi Department of Environmental Quality ("MDEQ") offered statements refuting Mississippi's permanent loss of the diverted ground water. In so doing, they cite to testimony concerning ground water budgets and the influence of recharge and discharge on the maintenance of a constant volume of ground water in storage under natural pre-pumping conditions. Opp. Br., 24-27. In truth, even Defendants' experts agree with Mississippi's experts that the municipal artesian well pumpage by Memphis and MLGW has disrupted the steady-state equilibrium of the aquifer, forever altering the ground water budget and changing the gradient and flow path of the aquifer. *Compare* Supp. App. 245a-250a *with* App. 57a-61a. Defendants' experts acknowledge that the cone of depression resulting from the draw down of the aquifer inexorably siphons water from north Mississippi into Memphis' pumping well fields. Supp. App., 250a-261a, 265a-266a, 277a-280a.

Defendants contend that the removal of Mississippi's ground water from storage is statistically "insignificant." However, Defendants compare the loss of ground water from the small dense isolated sand formation underlying Desoto County, Mississippi with the ground water volumes of the entire aquifer

systems throughout all of Tennessee, Mississippi and Arkansas. Even then, Defendants' experts acknowledge that Mississippi's claims relate only to a discrete segregated intrastate sub-area of the huge Mississippi Embayment and that pumping from other states has no demonstrable impact on the ground water at issue. Supp. App., 258a-259a, 267a-270a, 272a-276a. The only water at issue is that diverted by Defendants from a discrete area of north Mississippi.

Defendants state that "there has been no permanent loss of ground water or threatened shortage thereof," as evidenced by the fact that Mississippi's regulatory agency, MDEQ, has not exercised its permit revocation power or issued "water caution area" notices. Opp Br., 25-26. Suffice it to say that the MDEQ, an intrastate agency, has no extraterritorial regulatory power to either permit or enjoin the aggressive pumping practices of Memphis and MLGW.

Finally, Defendants claim that Mississippi only has a usufructory right in an "interstate aquifer." Opp. Br., 28. They contend Mississippi has alleged no injury to its ability to "use" of "the aquifer." *Id.* In so doing, Defendants purposefully blur the distinction between the State's ownership of ground water and the usufructory rights held by the citizens of the State. Their repeated references to "interstate water" and "interstate aquifer" when discussing the ground water at issue reveal the foundational flaw in Defendants' arguments. As shown in Mississippi's Reply to Respondents' Brief in Opposition to Petition for Writ of Certiorari and its reply to Tennessee's brief opposing the instant Motion, the subject ground water is an intrastate resource residing exclusively within

Mississippi's sovereign territory which would never have flowed into Tennessee under natural conditions. Mississippi, like other sovereign states, owns its territorial waters in trust for its citizens use, and in its Complaint, Mississippi has alleged "real, imminent and serious harm" sufficient to invoke this Court's original jurisdiction.

CONCLUSION

Mississippi respectfully requests that, if this Court denies Mississippi's Petition for Writ of Certiorari, the Court should grant Mississippi's Motion for Leave to File Bill of Complaint in Original Action.

Respectfully submitted,

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THE STATE OF MISSISSIPPI'S MOTION FOR LEAVE TO FILE BILL OF COMPLAINT IN ORIGINAL ACTION - MEMPHIS/MLGW

SUPPLEMENTAL APPENDIX

APPENDIX J

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF MISSISSIPPI
DELTA DIVISION

JIM HOOD, Attorney General, ex rel,
THE STATE OF MISSISSIPPI, Acting
for itself and Parens Patriae for
and on behalf of the People of the
State of Mississippi,

Plaintiff,

Vs. Case No. CIVIL ACTION 2:05CV32D-B
(And Related Cases)

THE CITY OF MEMPHIS, TENNESSEE and
MEMPHIS LIGHT, GAS & WATER DIVISION,

Defendants.

THE DEPOSITION OF JOHN VAN BRAHANA
November 5th, 2007

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[p. 8]

DIRECT EXAMINATION BY MR. CAMERON:

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

A. John Van Brahana.

* * *

[p. 10]

Q. By whom were you retained?

* * *

A. Baker, Donelson, Bearman

Q. What was the scope of or your charge in connection with your duties as a consulting expert? In other words, what services were you asked to provide by the Baker-Donelson Lawfirm?

A. Assessment of technical work that I had done previously, groundwater geology, in the area . . . I had worked in the Memphis area from approximately 1977 on with the US Geological Survey, and in that collaboration I had been involved with groundwater modeling and practical problems that related to movement of water underground in the shallow aquifers, the Memphis Sand and the deeper aquifer.

* * *

[pp. 11-12]

Q. Specifically relating to the sand aquifer?

A. Yes, yes.

Q. Memphis Sand Aquifer?

A. Yes, yes.

* * *

[p. 17]

Q. Are you currently still with the USGS?

A. I'm classified as a research scientist emeritus.

* * *

[pp. 26-27]

Q. [W]ere these studies . . . related more to water quality or contamination issues?

A. They were also interested in the volume of water, quantity . . . .

Q. [W]hat you mean by the "volume of water, quantity," . . . . [?]

A. The assessment of groundwater is based on . . . balancing water budgets. And a water budget is composed of water that infiltrates the surface, that moves vertically downward. Some moves horizontally through the permeable layers of the rock.

Then there is also a component of water volume that is stored within the openings or the voids in the sands of the Memphis Aquifer.

* * *

[pp. 30-31]

Q. What is meant by the term steady-state equilibrium?

A. Steady-state equilibrium is a modeling term. It means that the rates of change are not varying . . . "steady state" means . . . an equilibrium in a simple terms.

Q. [C]an you describe what an equilibrium in the context of . . . a mass of water like the Memphis Sand Aquifer . . . mean[s] . . . ?

A. Equilibrium means the amount of water that is coming in is the same as the amount that is going out and that the gradients . . . the water table . . . are at a state that is, even though they may be still declining, it is a level, steady state or linear relationship . . . .

Q. [C]ould you explain what you mean in relation to the Memphis Sand Aquifer as a groundwater budget?

* * *

[p. 32]

A. Okay. The components of the groundwater flow budget include -- I'll draw an analogy to our checkbooks, how much money do we earn. That's the

amount coming in. That is recharge, that is water that is moving in any kind of amount in versus the amount that goes out. . . . And you need to also consider how much is in storage, how much money you had in your banking account before you started. And you can balance that.

* * *

[pp. 33-37]

Q. So if I had to visualize this aquifer . . . containing groundwater, what would it look like in steady-state equilibrium?

A. The aquifer itself is in a trough. Beneath the trough there are deep rocks that have been fractured and dropped down. They were filled in with these sands and clays. . . It is a thick sequence . . . .

* * *

A. [In] the Memphis Sand Aquifer . . . water flows naturally from points of input or recharge locations to discharge locations, natural discharge locations . . . Most of the water . . . at least initially prior any pumping or any modification under a steady state condition, the water came out in areas underneath in Arkansas . . . .

Q. When you use the word "flow" . . . , would you describe what kind of flow are you talking about?

* * *

A. The proper term in groundwater terminology, "laminar" flow means the water is moving -- it defines "laminar" as one end member. "Turbulent flow" is another. A river flows with turbulent flow because of high velocities. Most groundwater velocities typically are much slower than surface water.

* * *

Q. Are you familiar with the velocity of the flow in the Memphis Sand Aquifer?

A. Yes.

* * *

Q. What is . . . the speed at which the Memphis Sand Aquifer actually flows . . . ?

* * *

Q. I've heard numbers like an inch a day. Would that be a fair statement of the velocity at which generally the water moves in the Memphis Sand Aquifer?

* * *

A. An inch per day with 365, that's three feet a year.

* * *

A. . . . I think it is on the order of three feet per year, some of the slower velocities, that could be.

Q. [I]f I were to try to visualize or see the movement of this water in the sands . . . -- would it be perceptible.

* * *

A. [N]o, it would not be perceptible to human capabilities.

* * *

[pp. 42-43]

Q The "cone of depression" . . . Define that, please, sir.

* * *

A. It . . . is created by constructing a well . . . open to the sand layers. Speaking specifically for the Memphis Aquifer, you pull water out of storage in the well . . . So you have lowered the water level in the well . . . . The cone of depression . . . will go down to a sharp cone shape, a three-dimensional shape. It gets steeper near the well . . . . That cone of depression is what pulls the water. It drives the water into the well.

* * *

[p. 44]

Q. Is that just a function of gravity and pressure?

A. Gravity and pressure drive the flow of groundwater, that's correct.

Q. So any water that surrounds the cone will inexorably flow into the cone?

A. Yes.

Q. Or be drawn into the cone?

A. Yes, it will be drawn . . . .

* * *

[p. 45]

Q. Are you familiar with the fact that there is a cone of depression that . . . centers in Memphis and extends outward into Shelby County and DeSoto County, Mississippi?

A. The drawdown from Memphis, yes, yes.

* * *

[p. 46]

Q. [I]f the cone of depression extends into DeSoto County, Mississippi, from pumpage within the Memphis area, water from Mississippi is flowing into the Memphis area?

A. That's correct.

* * *

[pp. 90-91]

Q. I'm going to read the last paragraph of that page in the record and I'll ask you to explain what this means[:] "From 1886 to 1975 pumpage at Memphis had drawn down the original potentiometric surface by as much as 150 feet in the major pumping center and reversed the original gradient, which was to the

west . . . Flow that moved through the area toward natural discharge points to the south and west before 1886 is now diverted and captured by pumpage at Memphis." Do you see that?

A. I do.

Q. What does it mean that the pumpage from Memphis for the period from 1886 to 1975 had drawn down the original potentiometric surface?

A. The original water table, the non-pumping water table, had sloped toward the west . . . when you start pumping, you superimpose the cone of depression, and you capture water, and that's how water comes in.

* * *

[pp. 95-97]

Q. When you say the drawdown in these well fields had reversed the original gradient . . . what does that mean?

A. That means that the water surface, when it was originally going . . . from the east, the flow was across toward the west, and when you pull the water level down, it is -- there was a gentle slope toward the west. The pulling that water level down by pumping has caused the gradient to be reversed . . . .

* * *

Q. What does the word "diverted" mean?

* * *

A. That means the flow has been changed.

* * *

Q. Then when you state that it is being captured by pumpage at Memphis, what does that mean?

A. That means if the water level is lower . . . the flow follows that elevation at that surface, that potentiometric surface, and you have changed the direction into the pumping centers into the well, into the well fields.

Q. So that it [is] now flowing into the Memphis well fields?

A. Yes.

* * *

[p. 122]

Q. What does that document depict?

A. It depicts the water level of the Memphis Sand . . . .

* * *

Q. Does that document reflect the cone of depression that we've alluded to earlier?

A. It does.

Q. Does the document show the cone of depression extending across the Tennessee-Mississippi border into DeSoto County, Mississippi?

A. It does.

* * *

[p. 130]

Q. [Referring to an exhibit] . . . it states "Should Memphis ever need a source of water to supplement as present supply, the Mississippi River passes by its doorstep carrying tremendous volumes of water." Do you see that?

A. I do.

Q. Were you ever called upon to study the use of Mississippi River water as a source of supply for the City of Memphis, Memphis Light, Gas & Water Division?

A. No.

* * *

[p. 132]

Q. Is it fair to say that MLG&W is the largest pumper of groundwater in the Memphis area?

A. Yes.

Q. The arrows depicted on that document, what do they show?

A. They show flow directions.

Q. Are there arrows on the document marked as Exhibit 15 to your deposition depicting flow of water from the State of Mississippi into the Memphis metropolitan area? Do you see arrows that would --

A. I do.

Q. So there is water flowing, according to that chart, from Mississippi into Memphis?

A. That's correct.

* * *

[pp. 135-137]

Q. There is a reference to flow direction on that document in relation to the Memphis Sand Aquifer, is there not?

A. There is.

Q. What does it say?

A. "Into pumping center."

Q. What does that mean?

A. That means that the water . . . flows into the main pumping well fields of the area, the Memphis metropolitan area.

Q. Which would include MLG&W's well fields, correct?

A. It would include MLG&W's well fields . . . .

* * *

Q. Now . . . as a result of pumping in your study did you determine that as a result of pumping that the flow path had changed from its natural course?

A. Yes.

Q. What was the nature of that change?

A. . . . The flow was across from the southeast toward the northwest, and with the inclusion of pumping, there was a creation of a cone of depression around the major centers of pumping . . . .

* * *

Q. When you prepared your work product for your three-dimensional model, in the course of that work did you determine that water was flowing from the south into the cone of depression northward into the Memphis pumping centers?

A. Yes.

* * *

[pp. 162]

Q. (BY MR. CAMERON) I'll ask you to identify that document for the record, please, sir.

A. This is the potentiometric map of the Memphis Sand in the Memphis area, Tennessee, August, 1978, by David Graham. It is a Water Resources Investigation Open-file Report 79-80.

* * *

[pp. 165]

Q. Does this map, potentiometric surface map, reflect the cone of depression resulting from pumpage in the Memphis area?

A. It does.

* * *

[p. 166]

Q. Does the potentiometric map show the Tennessee-Mississippi boundary?

A. This does.

Q. Does it show the cone of depression expending extending across the Mississippi-boundary?

A. The 200-foot contour line closes across the Mississippi-Tennessee boundary, yes.

* * *

[pp. 172-173]

Q. Who funded the modeling report which is marked as Exhibit 10 to your deposition?

A. The City of Memphis, Memphis Light, Gas & Water Division, the US Geological Survey Water Resources Division, and Tennessee Department of Environment & Conservation . . . .

* * *

Q. [W]hat is achieved by groundwater modeling[?]

A. Groundwater modeling is a tool to take physical laws, in this particular case the physics of water flow, and looking at boundary conditions, looking at factors that influence those, try to develop a water budget, try to evaluate what water levels will be with respect to pumping a particular set of wells or stresses, putting stresses on a system and evaluating what those responses are . . . If a model is done correctly, we should be able to reproduce how much water was pumped.

* * *

[pp. 174-175]

Q. Did you follow standard groundwater model development protocols in the preparation of . . . Exhibit 10?

A. I did.

* * *

Q. They would be described in your report?

A. They are described in the report . . . We measure water levels because the water levels are very important. Those are the effect of human impact in an area. So water-level measurements is important. We do a compilation of the pumping, of the human stresses that are induced in an area . . . All of those

influence the overall cone of depression or the impact of utilizing a natural system.

* * *

[p. 177]

Q. [W]hat is meant by "conceptual model setup"?

A. A conceptual model is . . . a mind picture . . . . [A] conceptual model will be involved with what are the major controlling influences.

* * *

[p. 178]

Q. Or . . . a major stress, like pumpage?

A. Pumpage . . . the pumping centers are part of your conceptual model.

* * *

[pp. 179-180]

Q. This is a simulation . . . of the Memphis Aquifer layers in the Memphis Aquifer. Is this what you are referring to in the grid?

A. Very closely spaced, that's correct.

Q. But the actual study area is the smaller area labeled "Memphis Area"?

A. Yes . . . that's the Memphis metropolitan area around Shelby County . . . Desoto County. That is the area that was the main focus of the people who -- MLG&W was paying for the project . . . . So I . . . focused the results on what was called the Memphis area.

* * *

[p. 202]

Q. Would . . . it be possible to take the contours that are depicted on your Figure Number 7 and do sort of a rough flow net analysis to show the direction of flow and to quantify the volumes?

A. Yes.

* * *

[p. 203]

Q. What direction is it flowing from DeSoto County into Shelby County?

A. From DeSoto County it is flowing . . . toward the northwest.

Q. Into the MLG&W pumping centers?

A. Into the pumping center of metropolitan Memphis.

* * *

[p. 205]

Q. What about with regard to Figure 26 on Page 43 . . . of Exhibit 10?

A. Yes, Figure 26 Exhibit 10.

Q. It flows more northerly?

A. Yeah.

Q. That one that you have just drawn is flowing almost northward?

A. It is almost flowing north, yes.

* * *

[p. 206]

Q. Out of Mississippi into the Memphis area?

A. It is flowing, yes, from Mississippi into the Memphis area.

* * *

Q. And it demonstrates, does it not, based on the flow lines you've just drawn, that water, groundwater, in fact was flowing from Mississippi into the Memphis well fields?

A. There is water . . . moving into the Memphis metropolitan area.

Q. Is that a result of pumpage?

A. Yes.

* * *

[pp. 212-213]

Q. (BY MR. CAMERON) To your knowledge, Dr. Brahana, has MLG&W ever taken any steps whatsoever to reduce the cone of depression so that it would not extend into the State of Mississippi?

A. I don't know the answer to that. I do not know of any.

* * *

Q. (BY MR. CAMERON) To your knowledge, were the deleterious effects you referred to earlier in relation to the aquifer, did those include quantity issues that may arise as between the State of Mississippi and the City of Memphis?

* * *

MR. DAVID BEARMAN: Based on his knowledge from when he was working with the USGS, is that your question? That's fine.

* * *

[p. 214]

Q. Can you identify any specific action taken by MLG&W to mitigate the cone of depression?

* * *

A. I cannot name specific cases . . . So no.

APPENDIX K

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF MISSISSIPPI
DELTA DIVISION

JIM HOOD, Attorney General, ex rel, THE STATE OF MISSISSIPPI, Acting for itself and Parens Patriae for and on behalf of the People of the State of Mississippi,

Plaintiff,

Vs. Case No. CIVIL ACTION 2:05CV32D-B (And Related Cases)

THE CITY OF MEMPHIS, TENNESSEE and MEMPHIS LIGHT, GAS & WATER DIVISION,

Defendants.

THE DEPOSITION OF DAVID LANGSETH
November 19th, 2007

BRIAN F. DOMINSKI, RPR, RMR
ALPHA REPORTING CORP.
COURT REPORTERS
Memphis, Tennessee 38103
(901) 523-9874

[p. 5]

DIRECT EXAMINATION BY MR. CAMERON:

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

* * *

A. David Langseth.

* * *

[p. 6]

Q. (BY MR. CAMERON) What is your profession, Mr. Langseth?

A. I'm a consulting engineer.

* * *

[p. 7]

Q. You've been retained as a testifying expert witness by the defendants, the City of Memphis and Memphis Light, Gas & Water Division, correct?

A. That's correct.

* * *

[p. 17]

Q. What were you asked to do in relation to this litigation?

A. The overall scope . . . was to evaluate the characteristics of the aquifer in question here and the impact of pumping . . . .

* * *

[pp. 70-71]

Q. Do you deny that there has been water that has moved as a result of the cone of depression underlying Memphis from and caused by MLG&W pumping . . . do you deny there has been water that has crossed the boundary from Mississippi into the Memphis area?

* * *

A. . . . I am not denying that pumping in the Memphis area, specifically by MLG&W, has changed the rate at which water is crossing the state boundary line . . . .

Q. [D]o you deny that water is crossing the state border from Mississippi into Memphis as a result of pumping?

A. No, I do not deny that some of the water crossing the border is due to the impacts of pumping.

* * *

[pp. 72-73]

Q. But in that opinion you do not, do you, sir, deny that there has been cross-boundary flow from Mississippi into Memphis?

A. . . . no, I do not deny that pumping by MLG&W has influenced the amount of water crossing the border.

* * *

[pp. 78-79]

Q. You . . . were asked to evaluate the availability of groundwater in the State of Mississippi, right?

A. That's correct.

Q. What specifically were you asked to do in that context?

* * *

A. Well . . . it really means whether or not the pumping by MLG&W has influenced the availability of groundwater to people who want to pump it out of the ground in the State of Mississippi.

Q. These two areas, to evaluate the impact of pumping by MLG&W . . on the aquifer dynamics and availability of groundwater in the State of Mississippi, was that the primary initial task that you identified earlier as being the scope of . . . your role in this litigation?

A. That is the primary area . . . .

* * *

[p. 81]

Q. [W]hen you are talking about "aquifer dynamics," what aquifer are you talking about?

A. The overall review includes the entire Mississippi Embayment Aquifer System, but certainly the focus of this work was then on the Memphis Sands Aquifer . . . .

* * *

Q. Yes, that you consider to be the focused area.

A. Well, the focus area is certainly up in Northern Mississippi, Western Tennessee . . . .

* * *

[pp. 87-89]

Q. Does pumpage in south Mississippi affect the cone of depression that underlies Memphis and DeSoto County?

A. When you ask me is pumping in South Mississippi associated with the cone of depression in some other location, the answer is no. . . .

* * *

Q. So pumping in the south part of Mississippi or in Northern Louisiana does not affect the cone of depression in the Memphis area, correct?

A. . . . pumping by any wells outside of that set of wells you just defined does not affect the cone of depression for the wells that you defined as being part of the wells you are evaluating the cone of depression for.

* * *

[pp. 90-92]

Q. You talked about the fact that you evaluated pumping and the existence of cones of depression in various parts of the Mississippi Embayment, right?

A. That's correct.

Q. And you evaluated pumping in Tennessee, right?

A. That's correct.

Q. And in Arkansas?

A. That's correct.

Q. And in Mississippi?

A. That's correct.

Q. What about Illinois?

A. I don't recall if the model domain goes up to Illinois and whether or not we have pumping in Illinois or not. It may have.

Q. What about Kentucky, how about that?

A. To the best of my recollection, there was some pumping in Kentucky.

Q. Louisiana?

A. I don't think our model domain extended down into Louisiana. That's for the numerical model. I certainly looked in my broader evaluation at pumping in Louisiana.

Q. What about Missouri?

A. To the best of my recollection, there was some pumping in the model domain in Missouri.

Q. Is there any impact or overlap between the cones of depression you evaluated in Kentucky and the cone of depression in the Memphis area?

A. I didn't evaluate that specifically . . . .

Q. Is there any relationship or overlap between the cone of depression or cones of depression you evaluated in Arkansas and the cone of depression in the Memphis area?

A. I didn't do an evaluation that would allow me to say specifically whether there is an overlap between those two.

* * *

[p. 93]

Q. Is it possible to evaluate a specific sub-area of the Mississippi Embayment?

A. Yes, it is . . . .

* * *

[p. 164]

Q. Does pumping in Southern Arkansas or Northern Louisiana affect the cone in the Memphis/DeSoto area? . . . Does it affect the water levels in the Memphis/DeSoto area?

A. I haven't done an evaluation to know if the impacts of that pumping extend all the way to the Memphis area.

APPENDIX L

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF MISSISSIPPI
DELTA DIVISION

JIM HOOD, Attorney General, ex rel, THE STATE OF MISSISSIPPI, Acting for itself and Parens Patriae for and on behalf of the People of the State of Mississippi,	)
Plaintiff,	)
Vs. Case No. CIVIL ACTION 2:05CV32D-B (And Related Cases)	)
THE CITY OF MEMPHIS, TENNESSEE and MEMPHIS LIGHT, GAS & WATER DIVISION,	)
Defendants.	)

THE DEPOSITION OF JOHN B. ROBERTSON
November 27th, 2007

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(901) 523-9874

[p. 7]

DIRECT EXAMINATION BY MR. CAMERON:

Q. Good morning . . . You are John B. Robertson, correct?

A. That's correct.

* * *

Q. What is your profession?

A. I am a hydrogeologist and environmental scientist.

* * *

[p. 9]

Q. [Y]ou have been retained as an . . . expert witness on behalf of the defendants in this cause, correct?

A. That's correct.

* * *

[pp. 31-32]

Q. Are you generally familiar with the claims of the State of Mississippi?

A. General in general, yes.

Q. Are you aware that the State of Mississippi claims that Memphis through pumping by MLGW has caused

water to be -- groundwater to be diverted from the State of Mississippi into the Memphis area?

A. Yes. I'm aware that's the claim.

Q. What geographical area would be your understanding that would be encompassed -- in other words, what geographical area do you believe to be the focus of the claims of the State of Mississippi?

A. Northern Mississippi and the Memphis area in general of Tennessee . . . .

Q. But Western Tennessee, Northwest Mississippi?

A. That's the focus of the Mississippi claim as I understand it.

* * *

[p. 33]

Q. [D]oes pumpage in Northern Louisiana affect the water levels in the Memphis area?

A. It can.

Q. Does it according to the study that you've done?

A. We didn't do an assessment of that, of pumpage in Louisiana.

* * *

[p. 34]

Q. So does pumpage in Kentucky affect the water levels in Memphis?

A. It would have some effect.

Q. Did you quantify the effect of the pumpage in Kentucky on water levels in the Memphis area?

A. We did not specifically quantify that . . . .

Q. Can you define . . . right now what the effect of pumpage in Kentucky is on the water levels in the Memphis area?

A. I cannot . . . .

* * *

[pp. 36-38]

Q. . . . you can't tell me, can you, quantitatively what the effect of pumpage in Missouri is or has been on the Memphis are?

A. No, I cannot.

Q. With regard to pumpage in Alabama, does pumpage in Alabama have any effect on water levels in the Memphis area?

A. It probably has some effect.

Q. But sitting here today, you can't tell me what that effect is quantitatively, can you?

A. No.

Q. Does pumpage in Illinois have any effect on the water levels in the Memphis area? . . . [Y]ou can't tell me what the effect is sitting here today, can you sir?

A. No.

Q. With regard to pumpage in South Mississippi . . . .

* * *

Q. Can you tell me today quantitatively what the effect would be of pumpage in South Mississippi on the water levels in Memphis?

A. No, I can't.

* * *

[p. 39]

Q. Is there pumpage of groundwater in East Tennessee?

A. There probably is but not from this aquifer system.

Q. Is there any pumpage in Central or East Tennessee that impacts the water levels in the Memphis area?

* * *

[pp. 40-41]

A. No . . . I wouldn't expect it to have an effect.

Q. Now, you mentioned Eastern Arkansas. Does the pumpage in Eastern Arkansas have any effect on the water levels in the Memphis area?

A. Yes.

Q. Okay. Have you quantified that effect?

A. I have not.

* * *

[p. 49]

Q. What is the order of magnitude of drawdown impact that reaches the Memphis area from northern Louisiana or Arkansas?

A. I haven't made an assessment of that.

* * *

[p. 50]

Q. So can you tell me what the impact is of pumpage in Northern Louisiana or Eastern Arkansas on the Memphis area?

A. I cannot specifically because that wasn't separated out.

* * *

[pp. 50-51]

Q. [D]o you deny that there is a cone of depression underlying Memphis and extending into the State of Mississippi?

A. No.

* * *

Q. (BY MR. CAMERON) Is there not a cone of depression underlying Memphis that extends into the State of Mississippi?

A. I would say under my review that there is a cone of depression that extends into the northern part of Mississippi.

Q. And isn't it true that that cone of depression has been created and expanded in large part as a result of the pumpage of MLG&W?

A. Well, MLG&W is a major contributor to the drawdown that causes that cone of depression.

Q. Isn't it a fact that MLG&W is the largest pumper in the Memphis area of groundwater from this aquifer system?

A. That's correct.

* * *

[pp. 58-59]

Q. In your work in this case did you do any analysis of any changes in flow direction from Mississippi into the Memphis area as a result of the cone of depression we're discussing?

A. . . . we did a significant amount of modeling of the cone of depression and the effects of all the pumping in the area on flow directions.

Q. Did that analysis demonstrate and confirm that water, groundwater, originating from beneath Mississippi is moving into the Memphis area as a result of MLG&W pumpage?

A. It did indicate that there was MLG&W pumpage that caused an increase in flow into the Memphis area from Northern Mississippi.

* * *

[p. 103]

Q. There is a cone of depression that has resulted in large part from MLG&W pumping that extends from Memphis into Mississippi, correct?

A. Into Northern Mississippi.

Q. That's right. You've agreed to that, right?

A. Yes.

* * *

[pp. 106-108]

Q. (BY MR. CAMERON) Does MLG&W pumpage cause water in the aquifer that is drawn from beneath Mississippi to move into the Memphis area?

A. . . . the answer is yes, the pumpage causes a cone of depression that allows water to move north.

* * *

Q. What does that depict? [Reference to a diagram from Mr. Robertson's expert report]

A. It is a schematic diagram illustrating the concept of a cone depression and movement of water towards a pumping well.

Q. Does the groundwater in the cone of depression get pulled towards a well, the pumping well?

A. Yes.

Q. In a cone of depression, does the water get pulled towards the steepest part of the cone?

A. It gets pulled towards the center of the cone. The center of the cone is generally the steepest part.

Q. Does the groundwater speed up as it moves towards the steepest part of the cone?

A. Yes.

* * *

Q. As to the regional cone of depression, is the steepest part of that cone within Shelby County?

A. Yes.

* * *

[p. 110]

Q. [B]ecause of the cone of depression is the water pulled into the groundwater system beneath Shelby County that would have normally been beneath DeSoto County?

A. Well, yes, it would have been beneath . . . DeSoto County . . . .

Q. But for the MLG&W pumpage, right?

* * *

[p. 111]

A. The direction that it moved was changed because of the pumpage.

Q. So MLG&W pumpage does affect the pathway by which water departs Mississippi, correct?

* * *

A. It does affect the pathway of some of the water, yes.

* * *

[pp. 152-154]

Q. To your knowledge, has MLG&W considered any alternative water supply sources other than the Memphis Sand Aquifer?

A. I don't know.

* * *

Q. Are you aware of whether or not MLG&W has considered any alternative supply facilities other than the existing system?

A. I'm not aware.

Q. Are you aware of whether or not MLG&W has made any cost analyses regarding alternative supply facilities or systems?

A. I don't know one way or the other.

Q. Have you asked for any information regarding alternative supply systems or facilities . . . ?

A. No, I have not. This opinion is based primarily on past practices.

Q. Past practices?

A. Past and current practices.

Q. Past and current practices of MLG&W?

A. Yes.

Q. Is it your testimony today that those past and current practices have not involved any consideration of alternative supply, water supply sources or facilities?

A. I don't know . . . I was looking at how they were managing their current and past resource that was their water supply, which is the Memphis Sand Aquifer.

Q. And so are you saying that the current and past water supply did not involve to your knowledge any consideration by MLG&W of alternative sources or facilities?

A. I don't know whether they did or not . . . .

Q. So you don't know whether MLG&W ever considered the use of surface water such as the Mississippi River for water supply?

A. I don't know.

Q. And you don't know whether MLG&W ever considered relocation of some of its well fields?

A. I don't know.

* * *

[pp. 159-160]

Q. Has MLG&W ever exercised a conscientious effort to take steps to eliminate or mitigate the cone of depression underlying Memphis and extending into Mississippi?

* * *

A. I don't know of any efforts that MLG&W has done to reduce the cone of depression . . . .

* * *

[p. 161]

Q. (BY MR. CAMERON) So has MLG&W made any conscientious effort based on your review and your professional judgment to take steps to change the configuration of the cone of depression so it no longer extends into the State of Mississippi?

A. Not that I know of.