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Tennessee Valley Authority
1101 Market Street
Chattanooga, TN 37402
Via Overnight Mail and Email to arfarless@tva.gov

Re: TVA Must Prepare an Environmental Impact Statement for the Allen Fossil Plant Emission Control Project (Project Nos. 2013-33 & 2015-28) to Consider New and Omitted Information Regarding Risk of Arsenic Contamination to Memphis Sand Aquifer

Dear Ms. Farless:

On behalf of Protect Our Aquifer and the Tennessee Chapter of the Sierra Club (collectively, “Conservation Groups”), we are writing to demand that the Tennessee Valley Authority (“TVA”) fulfill its obligation pursuant to the National Environmental Policy Act, 42 U.S.C. § 4321 *et seq.* (“NEPA”), to supplement its previous environmental analysis and prepare an environmental impact statement (“EIS”) regarding the utility’s plan to pump millions of gallons of water per day from the Memphis Sand Aquifer (“Aquifer”) less than half a mile from the leaking, unlined, contaminated coal ash pit at the Allen Coal Plant (“Pumping Plan” or “Plan”). TVA must prepare an EIS to address significant new and omitted circumstances and information regarding the risk of contamination of the Memphis Sand Aquifer—the primary drinking water source for the City of Memphis. This information includes evidence of historic and current groundwater contamination at the Allen Coal Plant, as well as TVA and U.S. Geological Survey reports identifying shallow groundwater in vicinity of the Allen Coal Plant as having a high potential for leaking into the Aquifer. TVA did not consider this information when it selected the Pumping Plan in the Supplemental Environmental Assessment (“SEA”) TVA prepared in 2016.¹

We also write to highlight the reasonable alternatives that exist to TVA’s Pumping Plan, which must be analyzed in an environmental impact statement before TVA begins to implement the Plan. Engaging in a good-faith process and subjecting the Pumping Plan to public scrutiny is not only required by federal law, it is also essential to restoring the public trust. TVA has repeatedly refused and continues to refuse to provide the public, the Tennessee Department of Environment and Conservation, and the Shelby County Groundwater Board, with timely access to key environmental information evaluating the risk of contamination of the Aquifer associated with the Pumping Plan. TVA must immediately move to prepare an EIS and engage in public

¹Attachment 1: TVA, Allen Fossil Plant Emission Control Project Supplemental Environmental Assessment (Apr. 2016) [hereinafter SEA].

discussion of the Pumping Plan and other alternatives for providing cooling water at the Allen Gas Plant.

Protect Our Aquifer is a Tennessee non-profit dedicated to supporting the protection and conservation of the Memphis Sand Aquifer for the benefit of present and future generations.² Protect Our Aquifer formed in the wake of TVA's unilateral decision to obtain cooling water for the Gas Plant water from the Aquifer, and the organization has been instrumental in providing information to the public about the Pumping Plan and other risks to the Aquifer. The Sierra Club is the largest and most influential grassroots environmental organization in Tennessee, with more than 105,000 members and supporters across the state. The Sierra Club works to safeguard the health of our communities, protect wildlife, and preserve our remaining wild places through grassroots activism, public education, lobbying, and litigation. Conservation Groups previously challenged the well permits for two of the wells TVA drilled at the Allen Gas Plant and has continued to advocate for TVA to revisit its decision to implement the Pumping Plan.³

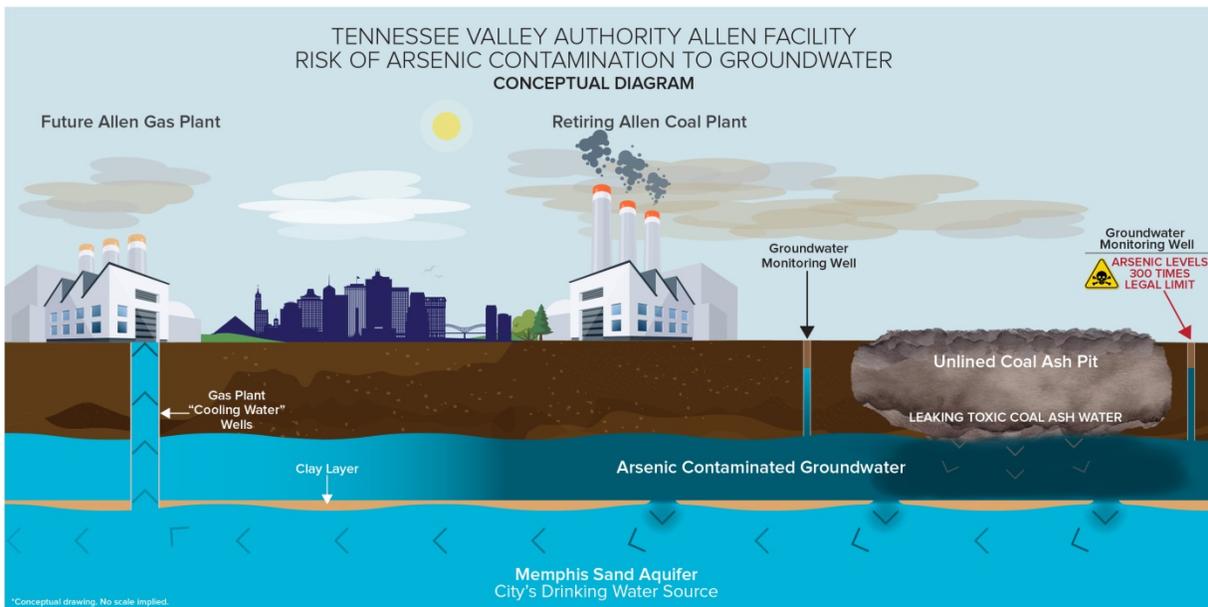
Summary

Protect Our Aquifer and Sierra Club demand that TVA supplement its environmental analysis and prepare an EIS for the Pumping Plan as required by NEPA before selecting an option for cooling water at the Allen Gas Plant. As this letter explains, in its previous environmental analyses, TVA failed to address the Pumping Plan's significant impacts on the Memphis Sand Aquifer, the primary source of drinking water for the City of Memphis. In fact, in its Supplemental Environmental Analysis ("SEA"), the utility omitted data showing that the unlined, leaking pit where it stores coal ash at its nearby Allen Coal Plant had contaminated groundwater with arsenic. Nor did the SEA discuss a TVA-authored report showing that the utility knew of the high potential for contaminated groundwater to leak into the Aquifer. The public did not have an opportunity to bring this information to TVA's attention because TVA did not circulate its SEA for public comment.

TVA is also required to supplement its environmental analysis and prepare an EIS based on significant new circumstances and information that emerged after TVA completed the SEA. In July 2017, TVA disclosed to the public that it had detected high levels of arsenic, fluoride, and lead in the groundwater under the East Pond, a coal ash pit at the Allen Coal Plant. TVA's detection of arsenic and other contaminants triggered a remedial investigation by the Tennessee Department of Environment and Conservation ("TDEC"). Like Protect Our Aquifer and the Sierra Club, TDEC has been particularly concerned about the risk of contamination leaking into the Aquifer, or being pulled into the Aquifer when TVA turns on its wells under the Pumping Plan. The risk posed by the Pumping Plan is illustrated by this diagram:

² Attachment 2: Protect Our Aquifer: Mission, <http://protectouraquifer.org/>.

³ Attachment 3: Sierra Club, Tennessee Chapter: Background and Links Regarding TVA's Planned Use of the Memphis Sand Aquifer to Cool It's New Power Plant in Memphis (Aug. 13, 2016), <https://www.sierraclub.org/tennessee/blog/2016/08/background-and-links-regarding-tvas-planned-use-memphis-sand-aquifer-cool-its>.



As TDEC's remedial investigation itself indicates, the nature of the Pumping Plan's impact on groundwater is highly controversial, requiring TVA to prepare an EIS pursuant to its own regulations. TVA must also prepare an EIS because the Pumping Plan threatens to violate or exacerbate violations of Federal, State, and local laws that protect Memphis' clean water. In particular, TVA is operating the East Pond as an open dump in violation of the federal Coal Ash Rule, and the Pumping Plan threatens to violate TVA's obligation to remedy rather than exacerbate its groundwater pollution. TVA is also violating the Clean Water Act, its NPDES permit, and the Tennessee Water Quality Control Act by allowing coal ash pollution to enter groundwater. The Pumping Plan threatens to exacerbate this pollution. Finally, TVA is threatening to violate the Shelby County Groundwater Ordinance by putting wells into service less than half a mile from a RCRA corrective action site under the federal Coal Ash Rule and state Remedial Investigation.

TVA must consider the new and omitted information set forth in this letter, and supplement its previous analyses by preparing an EIS to evaluate the environmental impacts associated with a range of reasonable alternatives for providing cooling water at the Allen Gas Plant. New information indicates that planned upgrades at the nearby Maxson Waste Water Treatment Plant may make recycled graywater a reasonable alternative. In addition, new information suggests that MLGW has obtained easements or has the ability to obtain easements that would enable it to provide additional water supply to TVA.

For the reasons set forth below, TVA must rethink the Pumping Plan and provide the public with an opportunity to comment on the options available to TVA in light of the risk of contamination of the Memphis Sand Aquifer.

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I. Factual Background.

A. The Memphis Sand Aquifer, the primary source of drinking water for the City of Memphis, is vulnerable to contamination.

Memphis sits on the banks of the Mississippi River, but its drinking water comes from another source: the Memphis Sand Aquifer.⁴ Until the late 19th Century, Memphians' drinking water was drawn from surface water and cisterns, but yellow fever epidemics left the city looking for a better, more sustainable source.⁵ The Memphis Sand Aquifer was discovered in 1887; ever since, it has provided Memphians with the "sweetest water in the world,"⁶ a true "buried treasure."⁷

The discovery of the Memphis Sand Aquifer was a public health win for the city. But because the Aquifer is vulnerable to contamination, there is no guarantee the water will remain pure. Since the mid-20th century, in fact, the U.S. Geological Survey has identified existing and potential risks to the Memphis Sand Aquifer.⁸ The U.S. Environmental Protection Agency has identified dozens of sites in Memphis potentially eligible for listing on the Superfund National Priorities List,⁹ many of which may pose a risk of groundwater contamination. EPA studies also

⁴Attachment 4: Water Quality Report 2016, *Memphis Water: Pure and Abundant* (Memphis Light Gas & Water), <http://www.mlgw.com/images/content/files/pdf/WaterQualityReport2016.pdf>. MLGW also obtains water from the Fort Pillow formation. *Id.* "The Memphis Sand Aquifer is the most productive aquifer in the region, providing approximately 98 percent of the total pumpage to the City of Memphis in 1980 (Brahana and Broshears 2001), and it remains the primary supply in the area." Attachment 5: Stantec, TVA Allen Fossil Plant Remedial Investigation Work Plan, at § 3.5 (Sept. 15, 2017) [hereinafter "RI Work Plan"].

⁵ Water Quality Report 2016, *Memphis Water: Pure and Abundant* (Memphis Light Gas & Water), <http://www.mlgw.com/images/content/files/pdf/WaterQualityReport2016.pdf>.

⁶ *Id.* Attachment 6: "Dr. Jerry L. Anderson, Director of the Ground Water Institute at the University of Memphis [is] a nationally known expert in the field. Memphis has the 'sweetest, most wonderful tasting water in the world,' he said, in part because of the presence of so few minerals that the water can be used with little treatment when it is withdrawn from underground. "Memphis Water Termed 'Sweetest in the World,'" WaterWorld, <http://www.waterworld.com/articles/print/volume-19/issue-11/washington-update/memphis-water-termed-sweetest-in-the-world.html>.

⁷ Attachment 7: Tom Charlier, "The Memphis Sand aquifer: A buried treasure," Memphis Commercial Appeal (Dec. 16, 2017), <https://www.commercialappeal.com/story/news/environment/2016/12/16/memphis-sand-aquifer-buried-treasure/93814278/>.

⁸ *E.g.*, Attachment 8: Parks & Lounsbury, "Summary of Some Current and Possible Future Environmental Problems Related to Geology and Hydrology at Memphis, Tennessee" (USGS 1976); Attachment 9: Graham & Parks, "Potential for Leakage Among Principal Aquifers in the Memphis Area, Tennessee" (USGS 1986) [hereinafter USGS 1986]; Attachment 10: Branaha, Parks & Gaydos, "Quality of Water from Freshwater Aquifers and Principal Well Fields in the Memphis Area, Tennessee" (USGS 1987).

⁹ *See, e.g.*, Attachment 11: Hazardous Waste: Information on Potential Superfund Sites (U.S. General Accounting Office, Nov. 1998).

show that the Upper Memphis Sand is close to the land surface near Memphis,¹⁰ meaning that it is more susceptible impacts from surface pollution.

In August 2016, the Memphis City Council began taking measures to more actively protect the Aquifer, passing a resolution that stated, in part, that “it is in the best interest of the citizens of Memphis and Shelby County that the Tennessee Valley Authority should carefully consider using the Mississippi Alluvial Aquifer rather than our precious Memphis Sand Aquifer.”¹¹ Further recognizing the special role that the drinking water aquifer plays in the life of the city, in January 2018, the Memphis City Council approved a 5-year, \$5 million study to study the Memphis Sand Aquifer.¹² One council member described this study as an effort to protect the city’s “21st Century gold.”¹³

And, for the past year, the Shelby County Health Department has been re-writing its groundwater ordinances to better protect groundwater resources.¹⁴

B. TVA announced plans to construct and operate the Allen Gas Plant after agreeing to shutter the Coal Plant in settlement of a Clean Air Act enforcement case.

In 2011, TVA settled a lawsuit to address the air pollution caused by its fleet of coal-burning power plants.¹⁵ As part of the settlement, TVA agreed to retire the Coal Plant by December 2018.¹⁶ In July 2014, TVA released a draft Environmental Assessment to the public

¹⁰ Attachment 12: EPA, Office of Research and Development, “Mississippi Embayment Regional Ground Water Study,” at pp. 31, 139-40 (2011).

¹¹ Attachment 13: Toby Sells, “Jones Opposes TVA Wells with Resolution Tuesday,” MEMPHIS FLYER (Aug. 23, 2016), <https://www.memphisflyer.com/NewsBlog/archives/2016/08/23/jones-opposes-tva-wells-with-resolution-tuesday>.

¹² Attachment 14: Tom Charlier, “Council approves water hike, rejects gas and power increases,” MEMPHIS COMMERCIAL APPEAL (Jan. 9, 2018), <https://www.commercialappeal.com/story/news/2018/01/09/council-approves-water-hike-rejects-gas-and-power-increases/1016194001/>.

¹³ *Id.*

¹⁴ Attachment 15: Tom Charlier, “Shelby board to rewrite rules to protect Memphis Sand aquifer,” MEMPHIS COMMERCIAL APPEAL (Aug. 11, 2017), <https://www.commercialappeal.com/story/news/2017/08/11/shelby-board-rewrite-rules-project-memphis-sand-aquifer/555411001/>; Attachment 16: Tom Charlier, “Shelby County drafts stricter rules to protect groundwater,” MEMPHIS COMMERCIAL APPEAL (Feb. 16, 2018), <https://www.commercialappeal.com/story/news/2018/02/16/shelby-county-drafts-stricter-rules-protect-groundwater/343740002/> (“Zerwekh [administrator of the environmental health services bureau of the Health Department] said the controversy surrounding the TVA wells helped alert officials to the need for changes to the “old, antiquated” regulations so that proposed wells are sufficiently scrutinized to protect groundwater resources.”)

¹⁵ Attachment 17: *Sierra Club & Protect Our Aquifer v. Shelby County Groundwater Quality Control Board, Shelby County Health Department, & Tennessee Valley Authority* (“*Sierra Club*”), No. 17-cv-2114-SHL-dkv (W.D. Tenn.) [Doc. 19-13 at PageID 1178]; TVA, Allen Fossil Plant Emission Control Project Final Environmental Assessment, 1 (Aug. 2014) [hereinafter “Final EA”].

¹⁶ Final EA, 1.

and provided for 37 days of comment¹⁷ on TVA's decision to retire the Coal Plant and build the Gas Plant.

One of the issues addressed in the Environmental Assessment was the source of water needed to operate the Gas Plant. Because the Gas Plant captures the hot exhaust from burning gas and uses the captured condensed steam to run another turbine,¹⁸ the Gas Plant needs millions of gallons of water, also known as "cooling water," to function.¹⁹

In the August 2014 Final Environmental Assessment, TVA selected as its preferred alternative using gray water ("recycled water") for cooling the Gas Plant.²⁰ TVA defined "gray water" as "non-potable treated wastewater . . . [that] has 98 percent of waste removed."²¹

C. TVA has apparently taken no steps to clean up its legacy pollution at the retiring Allen Coal Plant.

Since the 1960s, TVA has operated the Allen Coal Plant along the shore of the Mississippi River to produce electricity in the Memphis area.²² TVA dealt with the ash that was left over at the Coal Plant—ash that contains toxic chemicals like arsenic and lead—by mixing it with water and dumping it in unlined pits in the ground next to the River known as the East Ash Disposal Area ("East Pond")²³ and the West Ash Impoundment.²⁴ Periodically, to contain the waste, TVA simply raised the earthen dikes.²⁵

¹⁷ Attachment 18: *Sierra Club*, Doc. 19-14 at PageID 1371.

¹⁸ See Attachment 19: "How a Combined Cycle Power Plant Works" (TVA), <https://www.tva.gov/Energy/Our-Power-System/Natural-Gas/How-a-Combined-Cycle-Power-Plant-Works>.

¹⁹ See Attachment 20: TVA, Finding of No Significant Impact, Allen Fossil Plant Emission Control Project—Groundwater Wells (Apr. 29, 2016) [hereinafter "2016 FONSI"].

²⁰ Final EA, at §§ 2.1.2.2.2, 2.5.

²¹ Final EA at 11.

²² In 1965, TVA leased the Allen Coal Plant from Memphis Light Gas & Water. Attachment 21: Lisa M. Beard, "Summary of Groundwater Data at Allen Fossil Plant, 1988," at 4 (TVA 1989) [hereinafter "1988 Groundwater Summary"]. In 1984, TVA purchased the Allen Coal Plant from the City of Memphis and Memphis Light, Gas & Water. Memorandum of Agreement, Deed and Bill of Sale (1984) (discussing ownership interests and easements).

²³ See Attachment 22: TVA, Environmental Investigation Plan, Allen Fossil Plant, Rev. 0, at p. 8 (noting that TVA began sluicing slag to the northeast corner of the East Ash Disposal Area beginning in 1967).

²⁴ Until 1978, the West Ash Impoundment received sluiced fly ash and boiler slag full-time; sluice lines temporarily re-routed to West Ash Impoundment in 1992-93 while work was done on East Impoundment; continued to intermittently receive ash until 2015. Attachment 23: TVA, Draft Environmental Impact Statement, Ash Impoundment Closure Programmatic EIS, Part II—Site-Specific NEPA Review: Allen Fossil Plant, at § 1.1 (Dec. 2015).

²⁵ Attachment 24: 1976-78: East Ash Disposal Area temporarily taken off-line and East Dike constructed to approx. elevation of 237 feet. Stantec, "Liner Demonstration East Ash Disposal Area, EPA Final Coal Combustion Residual (CCR) Rule, TVA Allen Fossil Plant," at 6 (Oct. 6, 2016) [hereinafter Allen CCR Rule Liner Demonstration].

For decades, too, TVA has known about elevated levels of arsenic in the shallow groundwater near the plant.²⁶ In 1988, TVA installed 5 wells known as the “P-Series” wells: P-1 through P-5.²⁷ P-1 was installed as the “background well.”²⁸ None of these wells were “installed such that the screen/sand pack interval intercepts the clay in the confining unit.”²⁹

| Well Description for Wells Installed 1/12-2/28/1988 ³⁰ |
|---|
| Well P-1: total depth 59.3' Ground surface elevation 216.80 ft-msl [mean sea level] |
| Well P-2 total depth 70.3' Ground surface elevation 230.45 ft-msl [mean sea level] |
| Well P-3 total depth 90.3' Ground surface elevation 231.1 ft-msl [mean sea level] |
| Well P-4 total depth 80.3' Ground surface elevation 219.37 ft-msl [mean sea level] |
| Well P-5 total depth 69.3' Ground surface elevation 219.79 ft-msl [mean sea level] |

In 1988, the Tennessee Valley Authority Engineering Laboratory authored a report entitled, “Summary of Groundwater Data at Allen Fossil Plant, 1988.”³¹ The report indicated that, “The Memphis Sand Aquifer, the primary drinking water source for the city of Memphis, is believed to be separated from the alluvial aquifer by the Jackson Formation.”³² Borehole data, according to the report, indicated that the Jackson Formation consists “*primarily* of bluish-grey silty clay.”³³ However, in one boring it was found to have “an 8-foot lens of gravel and sand.”³⁴

²⁶ See Attachment 25: “Alternate Source Demonstration: Arsenic Concentrations in Groundwater: TVA Allen Fossil Plant” (TVA 2013) [hereinafter Alternate Source Demonstration].

²⁷ Alternate Source Demonstration. P-6 was later installed in 2010. *Id.*

²⁸ Attachment 26: TVA, *Groundwater Monitoring Report: May 2017* at 1 (TVA).

²⁹ “With the exception of monitoring well P-6, none of the downgradient wells were installed such that the screen/sand pack interval intercepts the clay in the confining unit.” Alternate Source Demonstration, 4-5.

³⁰ Attachment 27: Allen Fossil Plant Well Logs.

³¹ 1988 Groundwater Summary. Notably, TVA’s Expert at the Shelby County Groundwater Board permit appeal hearing included a list of documents he reviewed before preparing his report, and it does not include the 1988 Groundwater Summary report. See Attachment 28: Opinion of Donald Brice (AECOM), at 2-3 (Nov. 28, 2016).

³² 1988 Groundwater Summary. at 11 (Executive Summary).

³³ *Id.* (emphasis added).

³⁴ *Id.* Accord Attachment 29: TVA, Final Environmental Assessment: Development of Ash Management Strategy Allen Fossil Plant, at 12 (Aug. 2006) (“The alluvial aquifer is separated from the deeper Memphis sand aquifer by a clay aquitard associated with the Jackson and Upper Claiborne formations. Overall thickness of the Jackson clay varies from 0-360 feet regionally. Several deep borings completed at the ALF site encountered Jackson aquitard at depths between 114-144 feet, although none fully penetrated the unit. Aquitard penetrations ranged from 4-40 feet and generally indicated the formation consists of silty clay with occasional thin lenses of silt, sand, lignite, and gravel.”).

In 1996, TVA noted that its coal yard drainage basin, which was constructed in 1992 to contain the storm water runoff from the coal yard area, was designed to discharge into the East Pond, but that there had never been a discharge from the pond since its construction.³⁵

In 2011, TVA's Office of Inspector General concluded that the Coal Plant has a history of arsenic levels above the maximum contaminant level of 10 µg/L as well as elevated levels of boron and sulfate, which indicate "probable ash impoundment releases and migration" and were "historically higher than the background data."³⁶ The OIG report also informed that, "According to TVA personnel, these levels have not been reported to TDEC because the testing was not required."³⁷

In 2013, TVA hired a consultant to explain the arsenic pollution at the Coal Plant. TVA's consultant concluded that the elevated arsenic surrounding TVA's coal ash ponds was not clearly TVA's fault.³⁸ It does not appear, though, that TVA ever told TDEC about the P-Series arsenic exceedances until late 2016,³⁹ except to reveal exceedances in well P-6 in 2012 in conjunction with its plan to investigate "natural levels of arsenic."⁴⁰

In 2014, TVA discontinued the "voluntary (*e.g.*, non-regulatory) monitoring program) . . . for budgetary reasons."⁴¹ When the P-6 exceedances were disclosed and the public expressed

³⁵ Attachment 30: Dike Stability/Quarterly Red Water Seep Inspection (Oct. 28, 1996)

³⁶ Attachment 31: Office of the Inspector General (TVA), *Final Report – Inspection 2009-12991 – TVA's Groundwater Monitoring at Coal Combustion Products Disposable Areas*, at 7 (June 21, 2011)[hereinafter 2011 Inspector General Report] ("At the time of the last testing, Allen's arsenic levels did not exceed the Maximum Contaminant Level (MCL), which was 50 ug/L.10 The Maximum Contaminant Level for arsenic was lowered to 10 ug/L later that year and remains at 10 ug/L today. According to TVA's groundwater monitoring report, Allen has had a history of arsenic levels above the Maximum Contaminant Level of 10 ug/L, dating back to 1988, but no levels exceeded the Maximum Contaminant Level in place at the time of the testing. Testing has not been performed at Allen since the Maximum Contaminant Level was lowered. Specifically, when comparing Allen's arsenic to the current Maximum Contaminant Level of 10 ug/L, levels in two of the last five biannual sampling events met or exceeded the current Maximum Contaminant Level. Elevated levels of boron and sulfate indicated probable ash impoundment releases and migration. Concentrations of arsenic, boron, and sulfate in that well have been historically higher than the background data.").

³⁷ *Id.*

³⁸ Alternate Source Demonstration, § 5.0.

³⁹ 2011 Inspector General Report, 7.

⁴⁰ Attachment 32: June 29, 2012 Letter from TVA to TDEC, available at http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=9034:34051:::NO:34051:P34051_PERMIT_NUMBER:TN0005355 (entered into NPDES permit dataviewer as "July 2, 2012 Letter"). See also Attachment 33: July 12, 2017 Email from TDEC to TVA ("To avoid any future confusion regarding the significance of arsenic findings at the site, the Division has no formal record of officially receiving the subject ASD for formal review and comment. Therefore, the validity of the report's findings that the arsenic detected above the MCL was from another source, or naturally occurring has not been accepted by the Division at this time.").

⁴¹ Attachment 34: July 28, 2017 Letter from TVA to TDEC (attaching *Groundwater Monitoring Report: May 2017*, at 1 (TVA)).

concern, TDEC's Director of Solid Waste Management responded, in part, that, "[B]ecause of arsenic levels reported in excess of Maximum Concentration Levels (MCL), I am requesting that the Division of Water Resources require continuous/periodic groundwater monitoring at the Allen Fossil Plant for the facility until the causation has been determined and the hazards have been adequately mitigated by treatment and/or design."⁴²

TVA's groundwater monitoring data that pre-existed the decision to build the Gas Plant suggest that TVA knew about a legacy of pollution at the retiring Allen Coal Plant, but did not analyze it in the SEA.

D. Without public notice or disclosing contamination risks, TVA switched course and unilaterally determined to use cooling water sourced from the City of Memphis' drinking water aquifer to run the Gas Plant.

In response to public comments on the 2014 Environmental Assessment, TVA confirmed that it planned to use recycled gray water from its neighbor, the Maxson Wastewater Treatment Plant ("Maxson Plant" or "Maxson"), for condenser cooling water.⁴³ In fact, TVA described its decision to use the recycled water as "an opportunity to reduce the use of natural resources in the Memphis area," because, according to TVA, "The proximity of the proposed facility to the Maxson WWTP makes the use of gray water feasible for all uses that are currently fulfilled by McKellar Lake water."⁴⁴ TVA therefore left no doubt in the public's mind that TVA's plan was viable. Indeed, the Gas Plant requires only a small fraction of the available recycled water generated each day at Maxson:

*The proposed gas plant would use approximately 4-8% of the gray water available from the WWTP. TVA would treat the gray water as necessary for use in the gas plant and would return approximately 1-2% of the treated water back to the WWTP. Currently the WWTP produces over 100 million gallons per day (MGD). The maximum that TVA would use is approximately 7-10 MGD.*⁴⁵

In 2016, TVA changed course.⁴⁶ While using gray water was still technologically feasible, a consultant hired by TVA concluded that using recycled wastewater would be more expensive than potable water.⁴⁷

⁴² Attachment 35: December 6, 2012 Letter from TDEC to Conservation Groups re Section 113(h) Complaint.

⁴³ Final EA at 223.

⁴⁴ *Id.*

⁴⁵ Final EA at 223.

⁴⁶ See Attachment 36: *Sierra Club*, Doc. 19-12 at PageID 971 (Michael Stiefel (TVA) talks to Greg Parker (Shelby County Health Department) about TVA's desire to drill wells for process water for the Allen Combined Cycle Plant, explaining, "The initial plan for providing cooling water and boiler makeup water was to utilize treated effluent (graywater) from the T.E. Maxson Sewage treatment facility. Economic evaluations of this approach indicate that using graywater would cost approximately 3 to 5 times as much as using potable water or withdrawing and treating

Revisiting its available alternative sources for cooling water, TVA issued an SEA in 2016, without public notice or opportunity for comment.⁴⁸ The SEA evaluated three alternatives to supply the cooling water for the Gas Plant:

1. “No Action,” under which TVA would obtain gray water from, and discharge waste water to, the Maxson Plant, as proposed and described in the 2014 Environmental Assessment;
2. Installation of five wells into the Memphis Sand Aquifer; and
3. Purchasing potable water from Memphis Light, Gas & Water.⁴⁹

Without disclosing or analyzing groundwater contamination at the nearby Allen Coal Plant or the vulnerability of the Aquifer in the vicinity of the Plant, TVA determined that the use of groundwater extraction wells, which would withdraw water from the Memphis Sands Aquifer, would have no significant environmental impacts.⁵⁰

E. TVA obtained water well permits from Shelby County for the Gas Plant without disclosing the arsenic contamination at the Coal Plant.

Its deficient SEA in hand, TVA obtained permits to drill wells into the Memphis Sand Aquifer from Shelby County.⁵¹ Just as TVA appears not to have alerted TDEC to the elevated arsenic levels in the groundwater at Coal Plant, TVA also appears not to have revealed the arsenic problems to the Shelby County Health Department when it applied for its cooling water well permits in 2015 and 2016.⁵²

groundwater. This is because more extensive treatment to reduce the levels of ammonia and other constituents will be needed than was originally anticipated.”).

⁴⁷ Attachment 37: Kiewit Study, “KP-TVA-0225 - TVA Allen Water Treatment Study.”

⁴⁸ SEA, 11.

⁴⁹ 2016 FONSI, 1.

⁵⁰ *Id.*

⁵¹ Attachment 38: WP-16-020, WP-16-034, WP-16-047. E.g., *Sierra Club*, Doc. 19-12 at PageID 940, 944-45; Doc. 19-13 at PageID 1107. Each of the permits state, “No authority is granted by this permit to construct, operate or maintain any well in violation of any law, statute, ordinance, rule or regulation of Memphis and Shelby County, Tennessee.” Doc. 19-12 at PageID 960, 962. TVA obtained its first water well construction permits from Shelby County on January 7, 2016. TVA obtained its first water well construction permits from Shelby County on January 7, 2016. However, TVA had to abandon this well due to a “collapse,” Doc. 19-12 at PageID 956. Subsequently, TVA’s “drilling and subsurface investigator” drilled an 820-foot deep exploratory boring just south of the Coal Plant. Doc. 19-13 at PageID 1107.

⁵² In November 2016, the Shelby County Health Department sent a memo to the Shelby County Groundwater Quality Control Board, which responded to the Sierra Club’s arguments, and stated, in part, “**To the extent that groundwater contamination is discovered in the future**, those issues can be addressed through the Department’s enforcement of the Rules’ Inspection and Enforcement and Penalties provisions (Sections 8 and 16).” Attachment

In mid-2016, after TVA had already obtained three of the five permits it desired, the community found out about TVA's changed plans.⁵³ The public and their elected officials were deeply concerned to learn that "TVA has diverged from its previously-announced plans to utilize gray water . . . and has instead decided to pursue the use of fresh water from the Memphis Sands Aquifer . . . a precious interstate resource that provides millions of Americans with fresh, famously palatable drinking water."⁵⁴ Around this time, U.S. Representative Steve Cohen memorialized a meeting he had with TVA's CEO, Bill Johnson, on the subject:

In our meeting, you expressed your reluctance to commission an additional study to review specifically the potential for water-quality changes as a result of TVA's proposed use of groundwater at the Allen Combined-Cycle Plant, indicating that as a former trial lawyer you were uncomfortable with commissioning such a study amid local scrutiny. . . . You agreed that the USGS could likely conduct a study to review the potential for contamination of groundwater in the Memphis Sand Aquifer, but indicated that TVA would be interested in requesting such a study only on the contingency that public scrutiny lessens.⁵⁵

Other efforts were undertaken by TVA to educate critics of the Pumping Plan.⁵⁶ However, after taking a tour of MLGW's infrastructure and visiting the site of TVA's wells,

39: Shelby County Health Department's Response to Sierra Club's Appeal to TVA Well Permits, *Sierra Club*, Doc. 19-17 at PageID 1869 (emphasis added),

⁵³ "On July 20, 2016, Sierra Club staff learned that a Supplemental Environmental Assessment (SEA) was conducted in April but that the public, including the approximately 1,500 people and organizations that had commented on the original EA, was not notified in any way that it was being done. It was not even posted on its own NEPA compliance page for the Allen Fossil Plant Emission Control Project. Upon learning that an SEA was available, Sierra Club Staff inquired with TVA as to where it could be found. The next day TVA directed Sierra Club Staff to the aforementioned webpage where it was NOT to be found the day before. Sierra Staff checked the Wayback Machine (historical snapshots of websites) and confirmed that it was not there in April." Attachment 40: <https://www.sierraclub.org/tennessee/blog/2016/08/background-and-links-regarding-tvas-planned-use-memphis-sand-aquifer-cool-its>.

⁵⁴ Attachment 41: August 29, 2016 Rep. Cohen Letter to TVA CEO Johnson, <https://cohen.house.gov/sites/cohen.house.gov/files/documents/8.29.2016%20Letter%20to%20President%20Johnso%20n.pdf> [hereinafter October 18, 2016 Cohen Letter] See also Attachment 42: October 18, 2016 Rep. Cohen Letter to TVA CEO Johnson, <https://cohen.house.gov/sites/cohen.house.gov/files/documents/10.18.2016%20Letter%20to%20President%20Johns%20on.pdf> [hereinafter October 18, 2016 Cohen Letter].

⁵⁵ Attachment 43: February 3, 2017 Rep. Cohen Letter to TVA CEO Johnson, <https://cohen.house.gov/sites/cohen.house.gov/files/documents/2.3.2017%20Letter%20to%20President%20Johnson.pdf>.

⁵⁶ Attachment 44: Bill Dries, "State Sens. Harris, Kelsey Critical of TVA Water Wells", MEMPHIS DAILY NEWS (Jan. 26, 2017), <https://www.memphisdailynews.com/news/2017/jan/26/harris-and-kelsey-critical-of-tva-water-wells/print>.

State Senator Brian Kelsey told the Memphis Daily News, “I feel more convinced now that drilling these wells was not the best way to provide water to the TVA plant.”⁵⁷

In late 2016, the Sierra Club appealed TVA’s final two well construction permits issued by the Shelby County Health Department.⁵⁸ The appeal related only to the final two well permits because, without having had notice of the first three permits, the deadline to appeal had already passed to challenge them.⁵⁹ In November 2016, the Shelby County Groundwater Control Board and an appointed hearing officer heard the Sierra Club’s appeal, which was subsequently denied.⁶⁰

Conservation Groups then filed a Petition for Writ of Certiorari in the Shelby County Chancery Court to challenge the Board’s decision to uphold the county’s issuance of TVA’s well permits, claiming that the Board’s decision to issue permits to TVA was contrary to the Board’s Rules and Regulations.⁶¹ TVA removed the case to federal court and moved to dismiss the appeal, claiming procedural defects (*i.e.*, that the petition filed in Chancery Court was not sworn to within 60 days).⁶² The district court concluded that the appeal became final on February 5, 2017 such that the petition filed on February 1 and verified on February 9, 2017 was untimely.⁶³ The court did not reach the merits of the appeal.

Despite the public outcry and the availability of other sources of cooling water, TVA has continued to fight to use what it considers “free” drinking water as industrial cooling water. But as described below, new circumstances and information regarding the risk of contamination of the Aquifer require TVA to prepare an environmental impact statement (“EIS”), including a full analysis of available alternatives, before selecting a source of cooling water to operate the Allen Gas Plant.

⁵⁷ *Id.*

⁵⁸ See Attachment 45: *Sierra Club*, Doc. 29 at PageID 2108.

⁵⁹ Attachment 46: Appeal filed by Sierra Club, https://www.sierraclub.org/sites/www.sierraclub.org/files/sce/tennessee-chapter/20161004_SierraClub_TVA_Well_Permits_Appeal.pdf.

⁶⁰ Attachment 47: *Sierra Club*, at Doc. 7-2 (Shelby County Health Department cover letter enclosing Final Order of Shelby County Groundwater Control Board).

⁶¹ Attachment 48: Tom Charlier, “Environmentalists sue to block TVA wells in Memphis aquifer,” MEMPHIS COMMERCIAL APPEAL (Feb. 1, 2017), <https://www.commercialappeal.com/story/news/environment/2017/02/01/environmentalists-sue-block-tva-wells-memphis-aquifer/97295656/>.

⁶² Attachment 49: *Sierra Club*, Doc. 30 at PageID 2125-27 (noting that on December 5, 2016, a “Final Order” was entered and signed by the Hearing Officer; on December 7, 2016, a copy of the Final Order was sent by certified mail to Sierra Club’s representative, who received it on December 19, 2016; the petition was verified on February 9, 2017).

⁶³ Attachment 50: *Sierra Club*, Doc. 30 at PageID 2131.

II. TVA must prepare an EIS to analyze groundwater quality impacts associated with the Pumping Plan and a reasonable range of alternatives to the Plan.

A. To ensure no-regrets, informed federal action under NEPA, agencies like TVA are required to prepare supplemental environmental analyses when significant new circumstances or information emerges.

NEPA is “our basic national charter for protection of the environment.”⁶⁴ Other environmental statutes focus on particular media (like air, water, or land), specific natural resources (such as wilderness areas or endangered plants and animals), or discrete activities (such as mining, introducing new chemicals, or generating, handling, or disposing of hazardous substances). In contrast, NEPA applies broadly “to promote efforts which will prevent or eliminate damage to the environment.”⁶⁵

NEPA has “twin aims. ‘First, it places upon [a federal] agency the obligation to consider every significant aspect of the environmental impact of a proposed action. Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process.’”⁶⁶

To accomplish its goal of informed decision-making, NEPA requires agencies to disclose and analyze potential environmental impacts associated with any “major federal action,”⁶⁷ which means any action which has the potential to significantly affect the environment.⁶⁸ Courts have found the commencement of operation of an already-constructed project to constitute remaining “major federal action” subject to the requirements of NEPA.⁶⁹

NEPA “emphasizes the importance of coherent and comprehensive up-front environmental analysis to ensure informed decisionmaking to the end that ‘the agency will not act on incomplete information, only to regret its decision after it is too late to correct.’”⁷⁰

NEPA requires an agency to prepare a supplemental EIS if: “(i) The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or

⁶⁴ 40 C.F.R. § 1500.1(a).

⁶⁵ National Environmental Policy Act § 2, 42 U.S.C. § 4321.

⁶⁶ *Kern v. Bureau of Land Mgmt.*, 284 F.3d 1062, 1066 (9th Cir. 2002) (quoting *Balt. Gas & Elec. Co. v. Natural Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983)) (internal quotations and citations omitted, alteration in original).

⁶⁷ 42 U.S.C. § 4332(C); 40 C.F.R. § 1508.18.

⁶⁸ 40 C.F.R. §§ 1508.18; 1508.27.

⁶⁹ See *Chem. Weapons Working Grp. Inc. v. U.S. Dep't of Army*, 935 F. Supp. 1206, 1217 (D. Utah 1996), *aff'd sub nom. Chem. Weapons Working Grp., Inc. (CWWG) v. U.S. Dep't of Army*, 111 F.3d 1485 (10th Cir. 1997) (quoting *Marsh*, 490 U.S. at 374).

⁷⁰ *Blue Mountains Biodiversity Project v. Blackwood*, 161 F.3d 1208, 1216 (9th Cir. 1998).

(ii) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.”⁷¹ An agency is required to “prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement. . . .”⁷² If changed circumstances or new information will affect the environment “in a significant manner or to a significant extent not already considered, a supplemental EIS must be prepared.”⁷³ TVA’s NEPA implementing procedures require it to supplement an environmental assessment (EA) in the same circumstances.⁷⁴

A supplemental EIS is also appropriate to correct significant omissions in the original draft.⁷⁵ “Informed public participation in reviewing environmental impacts is essential to the proper functioning of NEPA.”⁷⁶ An environmental analysis that omits significant information prevents both the public and the decisionmaker from making an informed decision.

As the Supreme Court has explained, it would be incompatible with NEPA’s key purpose of informed federal decisionmaking for the “blindness to adverse environmental effects” to be restored prior to the completion of agency action simply because the relevant proposal has received initial approval.”⁷⁷ In ordering supplemental analysis based on significant new circumstances, the Court of Appeals for the Ninth Circuit has observed, “Without supplemental analysis of impacts...the public would be at risk of proceeding on mistaken assumptions.”⁷⁸

An agency must also consider its own guidelines implementing NEPA in determining whether to prepare an environmental impact statement rather than an environmental assessment.⁷⁹ TVA’s NEPA guidelines require the agency to prepare an EIS when the environmental impact of a major action “is expected to be highly controversial.”⁸⁰ In the context of NEPA, the long-standing definition of “controversial” is derived from judicial opinions.

⁷¹ 40 C.F.R. § 1502.9(c)(1).

⁷² 40 C.F.R. § 1502.9(c)(1).

⁷³ *Marsh v. Oregon Nat. Res. Council*, 490 U.S. 360, 374 (1989).

⁷⁴ Attachment 51: TVA, Procedures for Compliance with the National Environmental Policy Act, § 5.3.6 [hereinafter TVA NEPA Implementing Procedures] (“If new information concerning action modifications, alternatives, or probable environmental effects becomes available, the initiating office, in consultation with the Environmental Quality Staff and the Office of General Counsel, will consider preparing a revision or supplement to the EA based on the significance of the new information.”)

⁷⁵ *Idaho Sporting Cong. Inc. v. Alexander*, 222 F.3d 562, 567 (9th Cir. 2000).

⁷⁶ *League of Wilderness Defenders/Blue Mountains Biodiversity Project v. Connaughton*, 752 F.3d 755, 761 (9th Cir. 2014).

⁷⁷ *Marsh*, 490 U.S. at 371.

⁷⁸ *League of Wilderness Defenders*, 752 F.3d at 761.

⁷⁹ 40 C.F.R. §§ 1501.4(a); 1508.9.

⁸⁰ TVA NEPA Implementing Procedures § 5.4.1.

These opinions hold that “controversial” means “a substantial dispute as to the size, nature, or effect of the action.”⁸¹ A substantial dispute about the size, nature, or effect of the action may exist without reference to the agency’s methodology or data, and may be based on simple facts on the ground, including but not limited to community concern and existing and new data and reports that were not adequately considered by the agency.⁸²

TVA’s NEPA guidelines also require the agency to prepare an EIS when a major action “will have a significant effect on the quality of the human environment.”⁸³ Under NEPA, an agency must evaluate the significance of environmental impacts, including the significance of new information relevant to those impacts, using several factors,⁸⁴ including, but not limited to:

- Potential impacts on public health and safety;
- Unique characteristics of the geographic area;
- The controversial nature of the effects on the environment;
- The degree of uncertainty about the effects, or the degree to which the effects involve unique or unknown risks;
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment; and
- Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.⁸⁵

If a major action does not fall into the category of actions for which an agency must prepare an EIS, it may evaluate the significance of potential impacts in an environmental assessment or supplemental environmental assessment. If, after preparing a supplemental environmental assessment, an agency finds that significant environmental impacts are likely, the agency must prepare an environmental impact statement.⁸⁶

⁸¹ *Rucker v. Willis*, 484 F.2d 158, 162 (4th Cir. 1973); *Hillsdale Env’l Loss Prevention, Inc. v. U.S. Army Corps of Eng’rs*, 702 F.3d 1156, 1181 (10th Cir. 2012); *Wetlands Action Network v. United States Army Corps of Eng’rs*, 222 F.3d 1105, 1122 (9th Cir. 2000), abrogated on other grounds by *Wilderness Soc. v. U.S. Forest Service*, 630 F.3d 1173 (9th Cir. 2011).

⁸² In its proposed revisions to its NEPA procedures, TVA impermissibly attempts to narrow the definition of “controversial” to refer only to “scientifically supported commentary that casts substantial doubt on the agency’s methodology or data, but does not mean commentary expressing mere opposition.” This is not the definition that applies to TVA currently, and, as Conservation Groups argued in response to the proposal, it is contrary to law and arbitrary. Attachment 52: Letter from Conservation Groups re TVA Proposed Rule, Procedures for Implementing NEPA, 10-12 (September 6, 2017) [hereinafter Conservation Group Comments on TVA Proposed NEPA Rule].

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ See 40 C.F.R. § 1508.27 (defining “significantly”).

⁸⁶ 40 C.F.R. § 1501.4(c).

B. Neither the 2014 EA nor the 2016 SEA analyzed groundwater quality impacts associated with operating on-site cooling water wells.

As described in Section I.D above, TVA's previous NEPA analyses for the Allen Gas Plant did not evaluate the potential for on-site cooling water wells to pull contaminated shallow groundwater into the Aquifer. The 2014 EA defined the project to include the use of gray water from the Maxson Treatment Plant and a *de minimis* amount of treated water from MLGW.⁸⁷ Although the EA briefly discussed groundwater, it did not contemplate the use of on-site groundwater wells for cooling, and therefore it did not analyze any potential impacts to groundwater quality that would be associated with drawing water directly from the Memphis Sand Aquifer.⁸⁸

TVA prepared the 2016 SEA specifically to analyze impacts associated with its Pumping Plan to draw water directly from the Memphis Sand Aquifer on site, rather than use gray water from the nearby Maxson Plant.⁸⁹ However, the analysis in the SEA focused exclusively on the potential impacts of the Pumping Plan on groundwater *quantity*.⁹⁰ As described in Section II.D below (omitted information), at the time, TVA knew that (1) the Allen Fossil Plant was located in an area known to have a thin or non-existent clay confining layer between the shallow aquifer and the Memphis Sand Aquifer; and (2) the shallow groundwater under the East Pond was contaminated with arsenic and other pollutants. But TVA did not disclose or analyze either of these facts about the existing environment in its SEA. Instead, the agency concluded, without analysis, that it did not need to study the potential impacts to groundwater quality because it would comply with applicable laws:

...TVA will adhere to and support all appropriate standards and requirements (including licensing and permitting) associated with well installation and groundwater usage, as to prevent contamination of groundwater during well installation or operation. Accordingly, no significant impacts to groundwater quality are expected to occur for any of the proposed alternatives.⁹¹

A report prepared by the United States Geological Survey ("USGS") to support TVA's SEA expressly disclaimed having performed any analysis of risks to groundwater quality posed by the proposal:

⁸⁷ 2014 Final EA, 4, 68-69.

⁸⁸ *Id.*

⁸⁹ 2016 SEA, 1-3.

⁹⁰ *Id.* ("[T]he analysis below is appropriately limited to groundwater supply or quantity.")

⁹¹ *Id.*

This report does not address the potential effects of water leakage from the shallow aquifer on groundwater quality in the Memphis aquifer.⁹²

The USGS nevertheless observed, in its discussion, that contamination risks to the Aquifer were a distinct possibility:

The potential effect of the withdrawals at the Allen plant site on water levels in the shallow aquifer as well as the potential for water-quality changes due to the leakage of water from the shallow aquifer near the Allen plant site cannot be fully evaluated with the available data. Simulated declines in the overlying shallow aquifer at the Allen site were less than 1 ft; however, water-quality changes in the Memphis aquifer due to the leakage of water from the shallow aquifer have been noted in nearby Memphis Light, Gas and Water Division well fields at Davis and Allen.”⁹³

In fact, as discussed below in Section II.D, existing TVA reports had also previously identified the contamination risk. But in the SEA, TVA did not disclose or analyze its own reports or the risk of contamination of the Aquifer posed by its Pumping Plan.

TVA did not circulate the draft SEA and FONSI for public comment. The public therefore had no opportunity to provide TVA with additional information regarding existing contamination and local hydrogeology at and near the Allen facilities.

C. After TVA issued its Finding of No Significant Impact for the SEA, new circumstances and information emerged related to the risk of contaminating the Memphis Sand Aquifer.

In July 2017, TDEC notified the public that TVA had reported contaminants in its groundwater wells along the perimeter of the East Pond above the relevant groundwater protection standards—in some cases, *300 times* the groundwater protection standard. Shockingly, TVA waited *six months* before disclosing this information to TDEC.⁹⁴ The new information reported by TDEC included the following chart:⁹⁵

⁹² Attachment 53: Haugh, Connor J., Evaluation of Effects of Groundwater Withdrawals at the Proposed Allen Combined-Cycle Combustion Turbine Plant, Shelby County, Tennessee, U.S. Geological Survey, Scientific Investigations Report 2016-5072, 1 (2016) [hereinafter USGS 2016].

⁹³ USGS 2016, 7.

⁹⁴ At the same time, TVA was defending its groundwater well permits before the Shelby County Groundwater Board and in court. Cf. Attachment 54: *Sierra Club*, Doc. 30: Order Granting Respondents’ Motions to Dismiss (noting that on February 27, 2017, TVA moved to dismiss the Conservation Groups’ petition for judicial review of the Groundwater Board’s final order to issue well permits to TVA).

⁹⁵ TDEC, TVA Allen Fossil Plant –Site Information: Discovery of Arsenic in Ground Water Monitoring Wells, 3 (July 11, 2017) [hereinafter Allen Fossil Plant-Site Information].

Table 1. Arsenic Levels in the TVA ALF Ground Water Monitoring Wells near the TVA ALF East Ash Surface Impoundment

| | MW 202 | MW 203 | MW 204 | MW 210 | MW 212 | MW 213 |
|---------------|--------|--------|--------|--------|--------|--------|
| November 2016 | 177 | 3900 | 46 | < 10 | 11.6 | 31.6 |
| January 2017 | 176 | 3230 | 42.8 | < 10 | 12.2 | 16.4 |
| February 2017 | 199 | 3220 | 36.8 | 10.6 | 15.4 | 15.1 |
| March 2017 | 245 | 3620 | 49.9 | < 10 | 14.5 | 11.4 |
| April 2017 | 197 | 2890 | 49.1 | < 10 | < 10 | < 10 |
| May 2017 | 235 | 3560 | 56.9 | < 10 | < 10 | < 10 |

Results are in parts per billion
The Drinking Water Limit for Arsenic is 10 ppb

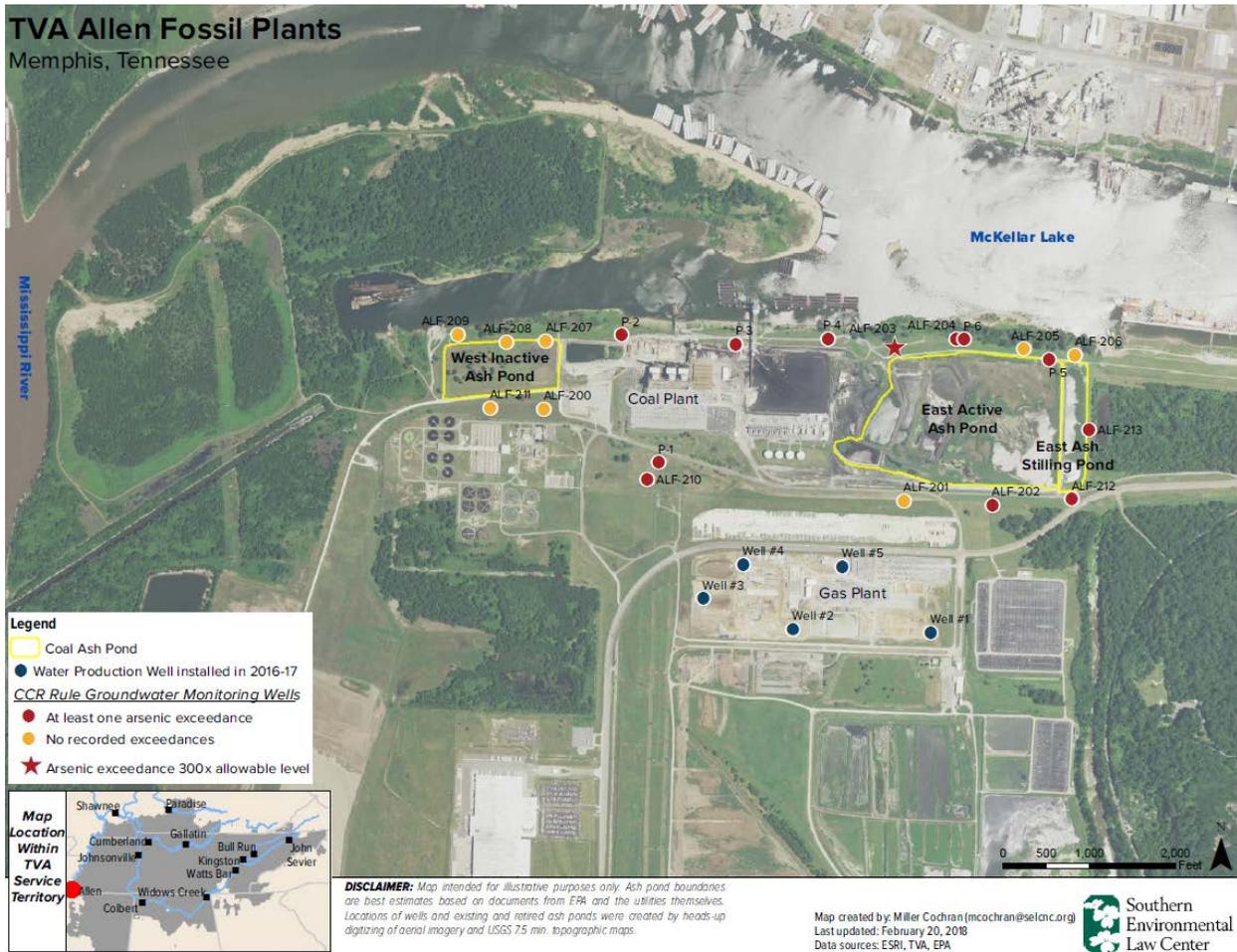
In addition to extremely high levels of arsenic, TVA also reported significant exceedances of groundwater protection standards for lead and fluoride.⁹⁶ Arsenic, lead, and fluoride are all coal ash indicator pollutants identified in Appendix IV to the federal Coal Ash Rule as triggering the need for corrective action to remedy the contamination.⁹⁷

The contaminated wells along the perimeter of the leaking, unlined East Pond are located very close to the cooling water wells TVA has installed at the nearby Allen Gas Plant and intends to operate pursuant to the Pumping Plan. This proximity is illustrated in the following map:⁹⁸

⁹⁶ *Id.*

⁹⁷ See Appendix IV to 40 C.F.R. Part 257.

⁹⁸ See Attachment 55: TVA, Environmental Investigation Plan, Allen Fossil Plant Revision, 1 (TVA Dec. 8, 2017) (Appendix P: Groundwater Monitoring Data) (identifying arsenic exceedances).



Based on the new information TDEC received regarding groundwater contamination at the Allen Coal Plant, TDEC invoked its authority under the Commissioner’s Order and state law to require TVA to perform a remedial investigation.⁹⁹ TDEC required an expedited investigation because of TVA’s plans to operate the cooling water wells at the Allen Gas Plant so close to the contaminated groundwater under the East Pond.¹⁰⁰ TDEC specifically required TVA to investigate the potential for the contamination to migrate from the shallow aquifer into the Memphis Sand Aquifer.¹⁰¹

To address TDEC’s concerns, TVA’s consultants provided a survey of existing information and proposed to perform a 24-hour pump test to begin assessing whether there are

⁹⁹ Attachment 56: Letter from Steve Goins, TDEC to TVA (July 18, 2017) (outlining requirements for remedial investigation) [hereinafter TDEC Letter re: RI Requirements].

¹⁰⁰ *Id.*

¹⁰¹ *Id.*

windows in the clay confining layer under the contaminated East Pond.¹⁰² At the same time, the consultants acknowledged that mapping the subsurface would require additional study that could not be completed before TVA's planned start date for operating the gas plant.¹⁰³

TVA nevertheless continued to insist that it could move forward with operating the Gas Plant before the remedial investigation was complete.¹⁰⁴ After SELC sent a letter raising concerns about TVA's plans,¹⁰⁵ TVA agreed that it would not operate the cooling water wells until the remedial investigation is complete.¹⁰⁶ But the utility continues to insist that it may ultimately operate the wells, without having analyzed the new information under NEPA. TDEC's remedial investigation, which includes studies being conducted at both the Coal plant and the Gas plant, constitutes new circumstances relevant to impacts to groundwater quality associated with TVA's proposal to operate the on-site cooling water wells.

Further, although the remedial investigation ordered by TDEC is still pending, TVA's own documents developed during the investigation indicate significant uncertainty regarding whether there is a continuous clay liner that will protect the Memphis Sand Aquifer from the Coal Plant contamination now and in the future. In particular, TVA has reported that it did not encounter a clay layer when drilling one of the deep monitoring wells it proposed to install as part of the investigation.¹⁰⁷ "During drilling, a lower confining unit was encountered during advancement of every deep monitoring well except for ALF-212."¹⁰⁸ And despite having performed the 24-hour pump test in October, TVA has repeatedly delayed releasing the results to TDEC or the public.¹⁰⁹

¹⁰² RI Work Plan, at Appendix E.

¹⁰³ *Id.*

¹⁰⁴ Attachment 57: August 23, 2017 Letter from TVA to TDEC re "Allen Fossil Plant CCR Constituents in the Upper Most Aquifer and Use of Cooling Water Wells Installed into the Memphis Sands Aquifer" ("TVA does not plan to utilize ACC cooling water wells for plant operations until we have additional data to support safe use.").

¹⁰⁵ Attachment 58: October 24, 2017 Letter from SELC to TDEC re: Inadequacy of TVA Allen Fossil Plant Remedial Investigation Work Plan Proposal re: Allen Combined Cycle Production Wells" [hereinafter SELC Letter re: Inadequacy of RI Work Plan].

¹⁰⁶ Attachment 59: November 27, 2017 Letter from TVA to TDEC re "Allen Combined Cycle Plant (ACC) – Use of Production Wells" ("TVA will not sue the production wells at the Allen Combined Cycle Plant before the completion of the Remedial Investigation, and TVA will rely on the results of the Remedial Investigation to guide TVA's actions thereafter.").

¹⁰⁷ Attachment 60: September 15, 2017 Spreadsheet ("TVA ALF RIWP TDEC Comments").

¹⁰⁸ Attachment 61: September 15, 2017 Spreadsheet ("TVA ALF RIWP TDEC Comments"). *See also* Sept. 14, 2017 Email from Robert Wilkinson (referencing the fact that no confining layer was encountered at ALF-212: "TVA are proposing an additional stratigraphic boring at an adjacent location (STN 212). How deep are they planning on advancing the new boring? What was the depth of the clay that was encountered at the other deep wells? Do they have any confidence that they will encounter the clay at this location?").

¹⁰⁹ Attachment 62: Figure 7, ALF Remedial Investigation Schedule (initial pump test results submitted to TDEC October 27, 2017 or November 1, 2017); Attachment 63: Figure 7, ALF Remedial Investigation Schedule (initial pump test results submitted to TDEC on January 31, 201[8]); Attachment 64: Figure 7, ALF Remedial Investigation

Nor did TVA disclose or analyze the impact of the Pumping Plan in light of:

- Neighboring sites' contamination, such as the documented elevated arsenic levels at the Maxson wastewater treatment plant;¹¹⁰ or
- The proximity to the Allen Plants of other facilities requiring pollution permits and RCRA/Superfund sites.¹¹¹

These developments constitute additional new information relevant to environmental impacts associated with TVA's proposal to operate the cooling water wells.

D. New circumstances and information about the risk of contamination to the Aquifer also includes information TVA *omitted* from the EA and SEA.

TVA has known for several years that the groundwater under the East Pond has been polluted with arsenic and other contaminants. From 2011-2014 and beginning again in 2016,¹¹² TVA engaged in voluntary groundwater monitoring at the Allen coal plant. Arsenic levels regularly exceeded the groundwater protection standard, but at the time TVA apparently did not believe it needed to inform TDEC of the contamination.¹¹³ After TDEC ordered an investigation of coal ash contamination at all of TVA's coal plants in Tennessee, TVA reported the arsenic contamination to TDEC in a slide presentation in late September 2016.¹¹⁴ The levels of contamination TVA had been recording did not approach the levels TVA subsequently reported in July 2017. Nevertheless, at the time it prepared the SEA, the utility nevertheless had long been aware of contamination exceeding groundwater protection standards at the site and apparently had done nothing to disclose them or remedy them, as illustrated by the following slide from TVA's September 2016 presentation:

Schedule (initial pump test results submitted to TDEC on March 6, 2018); Attachment 65: Toby Sells, "Aquifer Test Results Still Not Available to Public," MEMPHIS FLYER (Jan. 30, 2018).

¹¹⁰ Since 1995, "groundwater monitoring data for the T.E. Maxson South Wastewater Treatment Plant have documented consistent concentrations of arsenic higher than 200 µg/L in shallow alluvial groundwater" Attachment 66: RI Work Plan, at § 4.1.

¹¹¹ Attachment 67: Rules and Regulations of Wells in Shelby County, <https://www.shelbycountyttn.gov/DocumentCenter/View/768> ("A well cannot be sited or placed in service within a half-mile of the designated boundaries of a listed federal or State Superfund site or Resource Conservation and Recovery Act corrective action site, unless the well owner can make a demonstration that the well will not enhance the movement of contaminated groundwater or materials into the shallow or deep aquifer.")

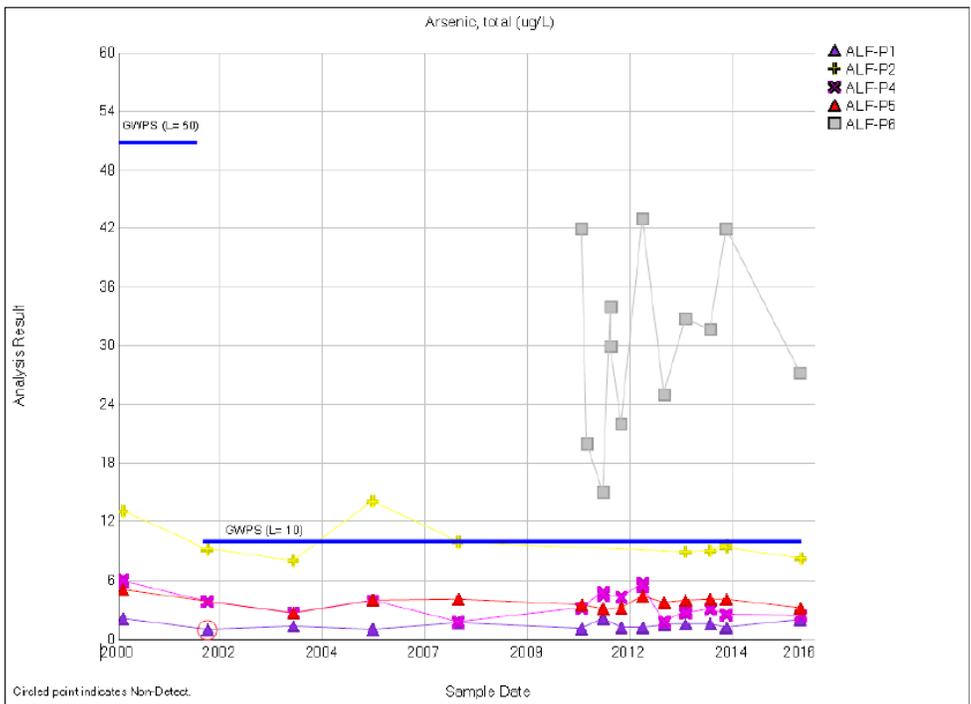
¹¹² Attachment 68: TVA, Allen Fossil Plant Multisite Order Presentation, Slide 58 (September 28-29, 2016), .

¹¹³ 2011 Inspector General Report, 7.

¹¹⁴ TVA Allen Fossil Plant Multisite Order Presentation, Slide 58 (September 28-29, 2016).



i.3 GW monitoring results



Information requests shown above in red are from discussions with TDEC. Slide contents contain TVA's response.

TVA has also been aware for decades that the area near the Allen Fossil Plant is highly likely to have windows in the clay confining layer that would allow contaminated shallow groundwater to flow into the Aquifer. A report from 1989 titled “Summary of Groundwater Data at Allen Fossil Plant” includes this statement:

Although there is a sparsity of data in the plant area, the [USGS] report indicated that [the Allen Fossil Plant] is located in a region where the Jackson Bed is thin or absent and contains very little clay. Therefore, the potential for leakage from the overlying beds is apparently very high.¹¹⁵

The report analyzed groundwater samples taken from wells drilled in several places around the Allen Coal Plant and concluded:

¹¹⁵ 1988 Groundwater Summary, 3.

[G]roundwater pollution of the alluvium aquifer may be occurring and contamination of underlying formations is still a possibility. The groundwater flow in the alluvium is in the general direction of the Allen well field.¹¹⁶

This report indicates that TVA has been aware of the risk of its coal ash pollution entering into the Aquifer since at least 1988. Yet TVA did not disclose or analyze this risk in the SEA.

In addition, USGS reports that had been published decades before TVA prepared its SEA, and are publicly available through simple internet searches, also identified the area as high risk for leakage from the shallow aquifer into the Aquifer. For example, a 1986 USGS report¹¹⁷ identified the Mississippi Alluvial Plain area along the Mississippi River where the Allen Plant is located as one of four large areas (illustrated as hatched areas on the figure below) considered to have a “high potential” for leakage from the shallow water table aquifer directly into the Memphis Sand Aquifer.

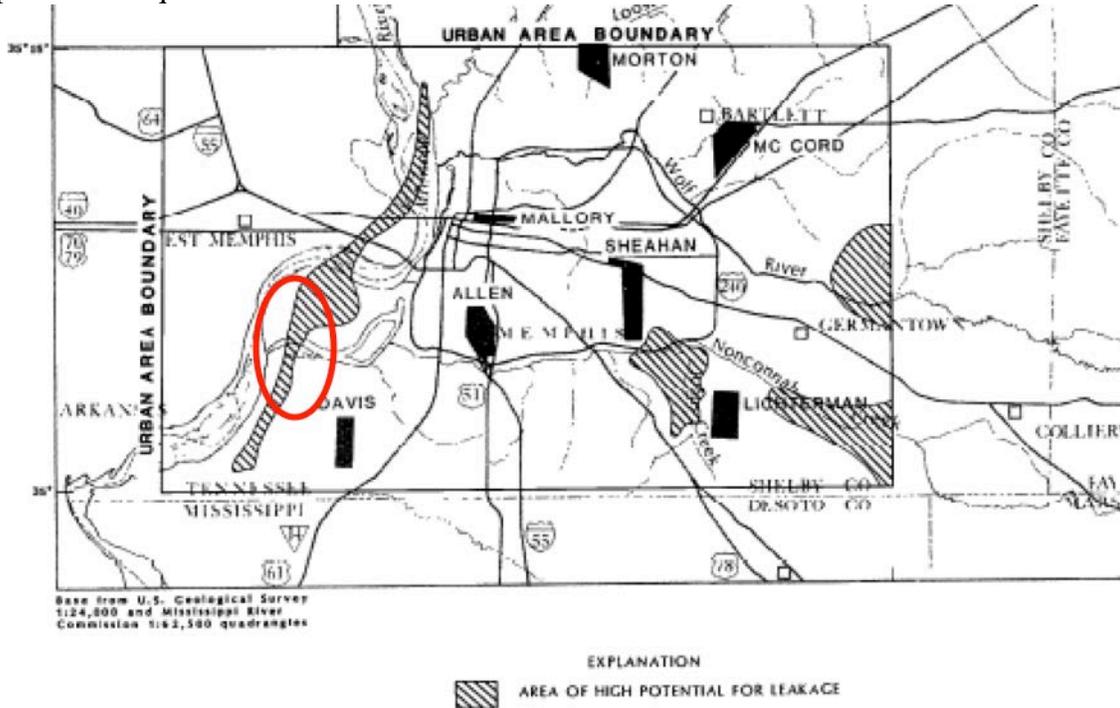


Figure 21.--Areas of high potential for downward vertical leakage from the water-table aquifers to the Memphis Sand in the Memphis urban area.

The Allen Plant area of the Mississippi Alluvial Plain is very near - if not within – an elongated “belt” of high leakage potential identified by the USGS parallel to the Mississippi River, as illustrated above. The USGS concluded that these areas have a high potential for leakage because the confining layer is locally “thin or absent,” and that a “high potential exists

¹¹⁶ *Id.* 13.

¹¹⁷ USGS 1986, 37-38.

for the movement of water from the water table aquifers *directly* into the Memphis Sand.”¹¹⁸ The 1986 USGS report also reported that the area across McKellar Lake just north of the Allen Plant Site had a “zero” thickness of a confining layer above the Memphis Sand Aquifer. That area of zero thickness is less than 1 mile north of the Allen Plant. The “zero” thickness area is illustrated below:

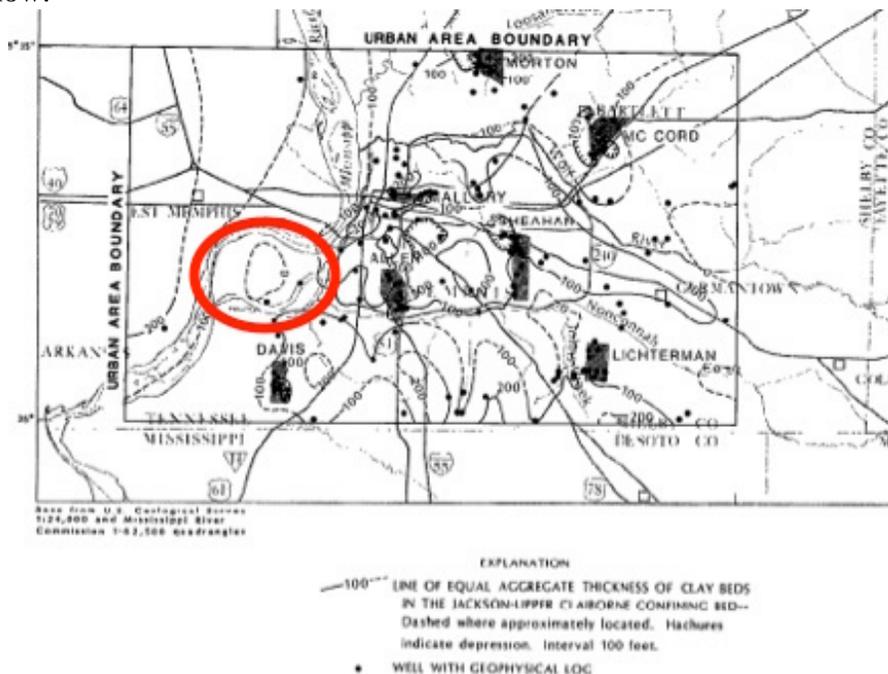


Figure 4.--Aggregate thickness of clay beds thicker than 10 feet in the Jackson-upper Claiborne confining bed in the Memphis urban area.

The USGS also concluded that even where the confining layer is present, the geologic formation includes multiple beds of clay, silt, sand, and minor lens of lignite and that “locally, individual beds may not be aerially extensive.”¹¹⁹ Further, the USGS concluded that because the confining layer contains so much fine sand and sandy silt, that a “better indicator of aerial differences in its ability to retard the movement of water between the water-table aquifers and the Memphis Sand is the *aggregate* thickness of clay beds within the unit.”¹²⁰

The USGS concluded that leakage is already occurring as a direct result of pumping from the Memphis Sand Aquifer in the active public water supply well fields and that “vertical downward leakage occurs from the water table aquifer through the confining beds to the Memphis Sand in MLGW (Memphis Light Gas and Water) well fields.”¹²¹

¹¹⁸ *Id.* 37.

¹¹⁹ *Id.* 9.

¹²⁰ *Id.*

¹²¹ *Id.* at 37.

A 1995 USGS report identified additional areas that lack a clay confining layer just south of the Allen Coal Plant.¹²² The report concluded, based on actual boring data, that there is no confining layer south of the Allen Plant along an area of the Mississippi Alluvial Plain, in which the Allen Plant is located. The USGS concluded that the confining layer “locally is absent.”¹²³ The USGS concluded that “the absence of the confining unit beneath the Mississippi Alluvial Plain just west of the well field (Davis Field) provides a direct pathway for water in the alluvial aquifer to enter the Memphis aquifer.”¹²⁴

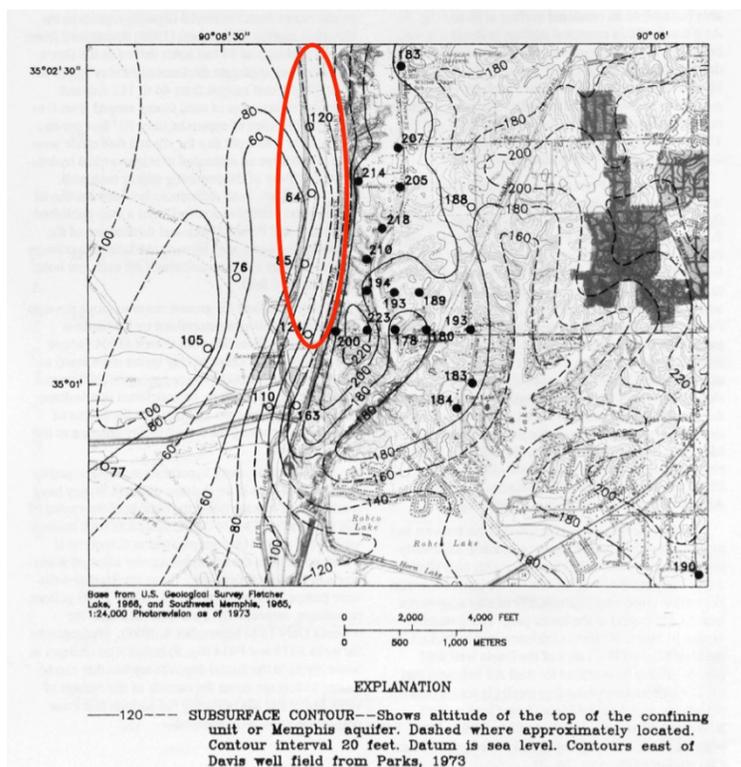
Another significant finding of the 1995 report is that the Memphis Sand Aquifer beneath the Mississippi Alluvial Plain is closer to the ground surface (*i.e.*, very shallow) when compared to other Memphis urban areas because of the undulations of the underlying geologic structure. The USGS concluded that the estimated top of the Memphis Sand Aquifer or the thin layer of the Cook Mountain Formation is approximately 100 to 120 feet above mean sea level (MSL) south of the Allen Plant, as illustrated below.¹²⁵

¹²² Attachment 69: Parks, William S., June E. Mirecki, and James A. Kingsbury, Hydrogeology, Ground-Water Quality, and Source of Ground Water Causing Water-Quality Changes in the Davis Well Field at Memphis, Tennessee, U.S. Geological Survey, Water Resources Investigations Report 94-4212, 1 (1995) [hereinafter USGS 1995].

¹²³ *Id.* at 1.

¹²⁴ *Id.*

¹²⁵ *See id.*, Figure 8, at 16.



Despite the significant findings in the 1986 and 1995 USGS reports relevant to the potential for contamination to travel from shallow groundwater into the Aquifer, the 2016 analysis conducted by USGS for TVA does not provide further analysis of contamination potential. Although USGS cites the 1995 report as a reference in its 2016 evaluation, it expressly states that its analysis does not address the risk of contamination through leakage from the shallow aquifer into the Aquifer.¹²⁶

TVA omitted all of the significant information described above regarding groundwater quality and the risk of contamination of the Aquifer from the SEA, including its history of arsenic contamination at the Allen Coal Plant as documented in several years of the utility's own groundwater monitoring reports and its awareness of the high potential for leakage of that contamination into the Aquifer as documented in the utility's own 1988 report. TVA also omitted information regarding the high potential for leakage of shallow groundwater into the Aquifer contained in publicly-available USGS reports, one of which was expressly referenced but not analyzed by the 2016 USGS report commissioned by TVA. As explained in Section II.E below, this information is significant and indicates that the Pumping Plan will have significant groundwater quality impacts. Accordingly, TVA must prepare an EIS to analyze this significant, omitted information.

¹²⁶ 2016 USGS, at 7.

E. The new circumstances and information relevant to groundwater contamination are significant and highly controversial, requiring TVA to prepare an EIS.

Even a cursory review of the significance factors TVA is required to consider under NEPA shows that the new circumstances and information described in Section II.C-D of this letter trigger an obligation to supplement TVA's environmental analyses and prepare an EIS, in order to evaluate the Pumping Plan and reasonable alternatives for providing cooling water at the Allen Gas Plant. In particular, the nature of the impacts is also highly controversial and uncertain, warranting the need for the detailed scrutiny and heightened public participation opportunities provided by an EIS. TVA's Pumping Plan also threatens violations of Federal, State, and local laws imposed for the protection of the environment.¹²⁷ Given the local hydrogeology, the proposal may also have significant cumulative impacts, by drawing contaminated shallow groundwater from other sites within the cone of depression created by operating the cooling water wells. Finally, the new circumstances and information also show that the proposal would threaten a unique local resource—the Aquifer—which also serves as Memphis's only drinking water source. For any and all of these reasons, described in more detail below, TVA must prepare an EIS for its proposal.

1. The nature of the Pumping Plan's impact on groundwater is highly controversial, requiring TVA to prepare an EIS pursuant to its own regulations.

As explained above in Section II.A, TVA's own regulations implementing NEPA require it to prepare an EIS when the environmental impact of a major action "is expected to be highly controversial."¹²⁸ In the NEPA context, courts have interpreted "controversial" to mean "a substantial dispute as to the size, nature, or effect of the action."¹²⁹

The new and omitted circumstances and information detailed in Section II.C-D demonstrate that the nature of the Pumping Plan's impact on groundwater quality in the Aquifer is highly controversial. Indeed, after TVA belatedly disclosed the high levels of contamination in the East Pond, TDEC became so concerned about the Pumping Plan's impact on the Aquifer that it has required TVA to investigate the impact and complete a three-dimensional contaminant transport and groundwater flow model before TVA implements the Pumping Plan.¹³⁰ Emails among TDEC staff at the time of public disclosure of the exceedingly high arsenic contamination at the Allen Coal Plant including the following statements:

¹²⁷ See 40 C.F.R. § 1508.27 (defining "significantly").

¹²⁸ TVA NEPA Implementing Procedures § 5.4.1.

¹²⁹ *Rucker v. Willis*, 484 F.2d 158, 162 (4th Cir. 1973); *Hillsdale Env'l Loss Prevention, Inc. v. U.S. Army Corps of Eng'rs*, 702 F.3d 1156, 1181 (10th Cir. 2012); *Wetlands Action Network v. United States Army Corps of Eng'rs*, 222 F.3d 1105, 1122 (9th Cir. 2000), abrogated on other grounds by *Wilderness Soc. v. U.S. Forest Service*, 630 F.3d 1173 (9th Cir. 2011).

¹³⁰ TDEC Letter re: RI Requirements.

[T]here is evidence for connectivity between the shallow alluvial aquifer at the Allen Plant and the Memphis Sands Aquifer due to the potential erosion/absence of the confining layer, and, there is a potential pathway for migration of contaminants that needs to be investigated and assessed.¹³¹

Given that TVA may begin use of the 3 Colling [sic] Water wells that are installed into the Memphis Sands, TDEC needs to move quickly to understand the ground water contamination, potential for use of the Cooling Water wells to drawdown the Uppermost Aquifer, the extent of contamination (horizontally and vertically) in the Uppermost Aquifer, etc.¹³²

Under pressure from the public and local officials,¹³³ TDEC also obtained agreement from TVA not to implement the Pumping Plan until its investigation is complete.¹³⁴ TVA waited six months even to disclose the high levels of contamination,¹³⁵ and, once it did so, continued to insist that it could implement its Pumping Plan without further investigation of the impact on the Aquifer. In fact, TVA's communications staff represented to reporters and the public that there was no concern about the migration of contaminants into the Aquifer:

TVA spokesman Scott Brooks said the agency is cooperating with TDEC. The discovery of the pollution, however, won't affect the agency's plans to pump water from the Memphis Sand to cool the natural gas-fired, \$975 million Allen Combined Cycle Plant, which is set to replace the nearby coal-burning plant in June 2018, he said. The shallow aquifer in which the contaminants showed up is not connected to the shallow [aquifer] and above the dense clay over Memphis Sand. "The wells that were tested don't go below the clay barrier," Brooks said.¹³⁶

TDEC has identified the risk to the Aquifer and required TVA to conduct an investigation, over TVA's insistence that there was no problem. In other words, a substantial

¹³¹ Attachment 70: July 11, 2017 Email from Wilkinson (TDEC).

¹³² Attachment 71: July 13, 2017 Email from Head (TDEC): "Ground Water Investigation at the TVA Allen Fossil Plant."

¹³³ Attachment 72: Bill Dries, "Harris Calls for Suspension of TVA Well Permits," MEMPHIS DAILY NEWS (July 24, 2017), <https://www.memphisdailynews.com/news/2017/jul/24/harris-calls-for-suspension-of-tva-well-permits/> (describing letter Sen. Harris sent to the Shelby County Groundwater Board); SELC Letter re: Inadequacy of RI Work Plan.

¹³⁴ Attachment 73: August 23, 2017 Letter from TVA to TDEC re "Allen Fossil Plant CCR Constituents in the Upper Most Aquifer and Use of Cooling Water Wells Installed into the Memphis Sands Aquifer"; Attachment 74: November 27, 2017 Letter from TVA to TDEC re "Allen Combined Cycle Plant (ACC) – Use of Production Wells".

¹³⁵ TVA Allen Fossil Plant Site Information.

¹³⁶ Attachment 75: Tom Charlier, "High levels of arsenic, lead found beneath Tennessee Valley Authority plant," MEMPHIS COMMERCIAL APPEAL (July 12, 2017), <https://www.commercialappeal.com/story/news/2017/07/12/high-levels-arsenic-lead-found-beneath-tennessee-valley-authority-plant/470096001/>.

dispute exists between TDEC and TVA as to the size, nature, or effect of the Pumping Plan on the Aquifer.¹³⁷

This in itself demonstrates that the Pumping Plan's impacts are highly controversial.

Other indications that a substantial dispute as to the size, nature or effect of the Pumping Plan in light of the new and omitted circumstances and information detailed in Section II.C-D include, but are not limited to, the following:

- The well permit appeal and subsequent litigation regarding two of the wells, in which Conservation Groups attempted to bring forward some of the omitted history of contamination at the Allen Coal Plant and evidence of the lack of a confining layer in the area;¹³⁸
- Letter from State Senator Lee Harris demanding that the Shelby County Groundwater Board revoke TVA's well permits in light of the high levels of contamination reported at the Allen Coal Plant;¹³⁹
- Letters and statements from U.S. Representative Steve Cohen demanding answers from TVA regarding the Pumping Plan;¹⁴⁰
- Additional statements by public officials as described in Section II.E, above, including Congressman Cohen reporting that TVA CEO Bill Johnson refused to analyze impacts of the Pumping Plan on groundwater quality until "public scrutiny" subsided;
- The Shelby County Groundwater Board convening a public meeting to address citizen concerns regarding the risk of TVA's contaminated groundwater being pulled into the Aquifer¹⁴¹ and deciding to rewrite the local groundwater ordinance in the aftermath of TVA's permit approval;¹⁴² and

¹³⁷ In a recently-obtained February 2018 letter reporting November 2017 groundwater monitoring results for selected wells, including high levels of arsenic in Well P6, TVA again asserts that exceedances of arsenic groundwater protection standards are due to "naturally occurring" arsenic. *See* Attachment 75a: Letter from TDEC to TVA re: Tennessee Valley Authority (TVA)-Allen Fossil Plant (ALF)-Groundwater Monitoring Report for August and November 2017 Sampling Events for Wells in the Vicinity of NPDES Permitted Ash Ponds, 1 (February 14, 2018); Attachment 75b, TVA, Groundwater Monitoring Report August and November 2017 Sampling Events, prepared by Ronda L. Hooper (February 14, 2018). This claim is additional evidence of a substantial dispute as to the size, nature, or effect of impacts on groundwater quality.

¹³⁸ Attachment 76: *Sierra Club*, at Doc. 24-1 (Index to Administrative Record) and Doc. 19-11 (Transcript of Hearing).

¹³⁹ Attachment 77: Bill Dries, "Harris Calls for Suspension of TVA Well Permits," MEMPHIS DAILY NEWS (July 24, 2017).

¹⁴⁰ August 29, 2016 Cohen Letter *See also* October 18, 2016 Cohen Letter.

¹⁴¹ Attachment 78: Local 24 News, Conservationists Meet With Shelby County Groundwater Control Board On Water Safety (August 24, 2017). <http://www.localmemphis.com/news/local-news/conservationists-meet-with-shelby-county-groundwater-control-board-on-water-safety/797510652>.

¹⁴² Tom Charlier, "Shelby County drafts stricter rules to protect groundwater," MEMPHIS COMMERCIAL APPEAL (Feb. 16, 2018), <https://www.commercialappeal.com/story/news/2018/02/16/shelby-county-drafts-stricter-rules->

- Media interest in the impact of the Pumping Plan on the Aquifer, cited throughout this letter.

For all of these reasons, the effects of the Pumping Plan on the water quality of the Aquifer are highly controversial and warrant the need for the detailed scrutiny and heightened public participation opportunities provided by an EIS.

2. The Pumping Plan threatens violations of Federal, State, and local law or requirements imposed for the protection of the environment.

By allowing the leaking, unlined East Pond to pollute shallow groundwater, TVA is already violating several laws imposed to protect the environment, including the federal Coal Ash Rule, the Clean Water Act, the Tennessee Water Quality Control Act, and the Shelby County Groundwater Ordinance. Implementing the Pumping Plan threatens to exacerbate or cause additional violations of law as described in this section.

- i. TVA is operating the East Pond as an open dump in violation of the federal Coal Ash Rule, and the Pumping Plan threatens to violate TVA's obligation to remedy rather than exacerbate groundwater pollution.*

The federal Coal Ash Rule “establishes minimum national criteria for purpose of determining which solid waste disposal facilities and solid waste management practices do not pose a reasonable probability of adverse effects on health or the environment...”¹⁴³ The Coal Ash Rule applies specifically to existing coal ash surface impoundments.¹⁴⁴ A coal ash surface impoundment that does not meet the minimum national criteria set forth in the Coal Ash Rule is an open dump prohibited by the federal Resource Conservation and Recovery Act.¹⁴⁵

[protect-groundwater/343740002/](#) (“Zerwekh [administrator of the environmental health services bureau of the Health Department] said the controversy surrounding the TVA wells helped alert officials to the need for changes to the “old, antiquated” regulations so that proposed wells are sufficiently scrutinized to protect groundwater resources.”)

¹⁴³ 40 C.F.R. § 257.50.

¹⁴⁴ *Id.*

¹⁴⁵ *See* 42 U.S.C.A. § 6907(a)(3); *Id.* § 6944(a)-(b).

ii. TVA is operating the East Pond as an open dump in violation of the federal Coal Ash Rule.

The Coal Ash Rule imposes special obligations and restrictions on unlined surface impoundments.¹⁴⁶ In particular, the Coal Ash Rule requires an existing, unlined surface impoundment to cease accepting coal ash waste and close within six months of detecting certain coal ash contaminants above groundwater protection standards. The language of the Rule provides:

... if at any time after October 19, 2015 an owner or operator of an existing unlined CCR surface impoundment determines in any sampling event that the concentrations of one or more constituents listed in appendix IV to this part are detected at statistically significant levels above the groundwater protection standard established under § 257.95(h) for such CCR unit, within six months of making such determination, the owner or operator of the existing unlined CCR surface impoundment must cease placing CCR and non-CCR wastestreams into such CCR surface impoundment and either retrofit or close the CCR unit in accordance with the requirements of § 257.102.¹⁴⁷

TVA has determined that the East Pond at the Allen Coal Plant is an unlined surface impoundment within the meaning of the Rule.¹⁴⁸ Accordingly, the special restrictions for unlined surface impoundments apply to the East Pond.

As described in Section II.C above, beginning in November 2016, TVA detected high levels of arsenic, fluoride, and lead, in the groundwater in its CCR Rule monitoring system at the East Pond. Arsenic, fluoride, and lead are Appendix IV constituents under the Coal Ash Rule.¹⁴⁹ TVA continued to detect similar groundwater exceedances through at least May 2017. The groundwater protection standard for arsenic is 10 ppb.¹⁵⁰ TVA's groundwater monitoring detected exceedances for arsenic ranging from 11.4 ppb to 3,900 ppb.

Pursuant to the Coal Ash Rule, TVA was required to cease placing coal ash and non-coal ash wastestreams into the East Pond no later than May 2017, six months after TVA detected arsenic above the applicable groundwater protection standard.¹⁵¹ TVA was also required to begin

¹⁴⁶ 40 C.F.R. § 257.101.

¹⁴⁷ 40 C.F.R. § 257.101(a).

¹⁴⁸ Allen CCR Rule Liner Demonstration.

¹⁴⁹ See Appendix IV to 40 C.F.R. Part 257.

¹⁵⁰ The groundwater protection standard for arsenic is established with reference to the maximum contaminant limit established for arsenic. See 40 C.F.R. § 257.95(h)(1) ("For constituents for which a maximum contaminant level (MCL) has been established under §§ 141.62 and 141.66 of this title, the MCL for that constituent"); see also § 40 C.F.R. § 141.62(a) (establishing MCL for arsenic at .01 mg/l).

¹⁵¹ 40 C.F.R. § 257.101(a). There are a couple of exceptions to the six month timeframe for ceasing to dispose of CCR in an unlined impoundment after detection of Appendix IV constituents above groundwater protections

closure of the East Pond no later than May 2017.¹⁵² To the best of our knowledge, TVA has not ceased placing coal ash into the East Pond and has not begun closing the leaking, contaminated, unlined pit. TVA was also required to post notification of the exceedances of Appendix IV constituents on its CCR compliance website within 60 days after detection.¹⁵³ It has not posted any such information.¹⁵⁴

In addition, TVA was required to begin an assessment of corrective measures for the contamination at the East Pond within 90 days of detection of Appendix IV constituents, complete that assessment and select a remedy within 90 days, and begin implementing the corrective action program within 90 days of selecting the remedy.¹⁵⁵ TVA is required to post to its public Coal Ash Rule compliance website notification of the initiation of corrective action assessment, selection of remedy, and any notification that the remedy has been completed.¹⁵⁶ To the best of our knowledge, TVA has not initiated corrective action at the East Pond, despite its obligation to do so pursuant to the Coal Ash Rule.

TVA is also subject to a Commissioner's Order that provides state oversight by TDEC with regard to TVA's compliance with the Coal Ash Rule.¹⁵⁷ The Commissioner's Order imposes penalties for failure to comply with the requirements of the Coal Ash Rule as follows: "FIVE THOUSAND DOLLARS (\$5,000) for each noncompliance and ONE THOUSAND DOLLARS (\$1,000) for each day until the noncompliance is remedied."¹⁵⁸ TVA should therefore be accruing penalties for violating the requirements described above, beginning in May 2017 and continuing to the present with respect to the requirements that (1) TVA cease placing coal ash in the East Pond and (2) begin closure of the East Pond, and beginning in January 2017 for TVA's failure to post notice of its November 2016 exceedances and begin corrective action (for each exceedance required to be reported), and continuing for each month in which new exceedances were detected but not reported, addressed through corrective action, or posted to TVA's Coal Ash Rule compliance website.

standards. These exceptions apply where a utility meets the criteria for alternative closure under 40 C.F.R. §257.103. However, these exceptions require notification of intent to comply using alternative closure—placed in records within six months of the triggering event and posted publicly 30 days later. 40 C.F.R. §§ 257.103(c)(1) and 257.107(d), (i)(10). TVA has not placed any such notifications on its website.

¹⁵² *Id.*

¹⁵³ 40 C.F.R. § 257.107 (d), (h)(6).

¹⁵⁴ Attachment 79: Screenshot, TVA Allen Coal Combustion Residuals (February 20, 2018), available at <https://www.tva.gov/Environment/Environmental-Stewardship/Coal-Combustion-Residuals/Allen#>.

¹⁵⁵ *See* 40 C.F.R. §§ 257.96-98.

¹⁵⁶ *See* 40 C.F.R. 257.96-98; 257.107(h)(7)-(10).

¹⁵⁷ Attachment 80: TDEC, Commissioner's Order No. OGC15-0177 (September 9, 2015), Section VII.D, VIII.

¹⁵⁸ *Id.* § VIII(b).

iii. The Pumping Plan would threaten additional violations of the federal Coal Ash Rule.

Having established that TVA is operating an open dump, should have begun closing the dump more than half a year ago, and is subject to penalties under state requirements, we now turn to the question of how the Pumping Plan threatens additional violations of the federal Coal Ash Rule. Because of TVA's arsenic and other groundwater exceedances, the Coal Ash Rule requires TVA to initiate and implement corrective action and close the East Pond. TVA has proposed to cap the East Pond in place.¹⁵⁹ The Coal Ash Rule includes performance standards for closure in place that include, among other things, closing the impoundment in a manner that will "control, minimize or eliminate, to the extent feasible, post-closure... releases of CCR, leachate, or contaminated run-off to the ground or surface waters...." The Pumping Plan threatens to violate this requirement by pulling contaminated groundwater into the Aquifer. Rather than remedying the pollution, the Pumping Plan would potentially facilitate the migration of contaminated groundwater into the City's drinking water source. For this reason, if TVA wants to implement the Pumping Plan, it must close the East Pond by removing the coal ash consistent with the requirements for closure by removal.¹⁶⁰ Even if TVA abandons the Pumping Proposal, as it should, closure by removal may be necessary at the East Pond to meet the performance standards in the Rule.

In certain circumstances, a utility can extend the six month timeframe for ceasing to dispose of CCR in an unlined impoundment after detection of Appendix IV constituents above groundwater protections standards. These exceptions apply where a utility meets the criteria for alternative closure under 40 C.F.R. §257.103. However, these exceptions require notification of intent to comply using alternative closure—placed in records within six months of the triggering event and posted publicly 30 days later.¹⁶¹ TVA has not placed any such notifications on its website.¹⁶²

Even if the alternative closure provision applied at the East Pond, TVA would still be required to begin the corrective action process required by the CCR Rule.¹⁶³ The corrective action remedy must, among other things, "be protective of human health and the environment," and "control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to this part into the environment." Just as the Pumping Plan would threaten to violate the closure-in-place performance standards, it would

¹⁵⁹ Attachment 81: Stantec, Closure and Post-Closure Plan, East Ash Disposal Area, EPA Coal Combustion Residuals Rule, TVA Allen Fossil Plant, Memphis Tennessee § 2,2 (October 12, 2016).

¹⁶⁰ 40 C.F.R. § 257.102(c).

¹⁶¹ 40 C.F.R. §§ 257.103(c)(1) and 257.107(d), (i)(10).

¹⁶² Screenshot, TVA Allen Coal Combustion Residuals (February 20, 2018), available at <https://www.tva.gov/Environment/Environmental-Stewardship/Coal-Combustion-Residuals/Allen#>.

¹⁶³ 40 C.F.R. §§ 257.103(a)(1)(iii); (b)(1)(ii).

also threaten to violate these requirements for corrective action under the federal Coal Ash Rule by pulling contaminated groundwater into the city's drinking water source.

For all of these reasons and based on the new circumstances and information described in Section II.C-D, the Pumping Plan threatens to violate the federal Coal Ash Rule and therefore warrants additional analysis in an EIS.

- iv. TVA is violating the Clean Water Act, its NPDES permit, and the Tennessee Water Quality Control Act by allowing coal ash pollution to enter groundwater, and the Pumping Plan threatens to exacerbate this pollution.*

As described in Section I.C above, for decades TVA has “managed” its coal ash pollution by allowing some of the coal ash to settle to the bottom of massive leaking, unlined pits filled with water. The settled coal ash, mixed with water, creates coal ash sludge. Pursuant to the federal Clean Water Act and the Tennessee Water Quality Control Act, TVA maintains a NPDES permit for the East Pond. The 2007 NPDES permit contains the following provision at p. 5:

...Sludge or any other material removed by any treatment works must be disposed of in a manner which ***prevents it entrance into or pollution of any surface or subsurface waters***. Additionally, the disposal of such sludge or other material must be in compliance with the Tennessee Solid Waste Disposal Act, TCA 68-31-101 et seq. and the Tennessee Hazardous Waste Management Act, TVA 68-46-101 et seq.¹⁶⁴

This condition, known as the “Removed Substances” provision of the permit, prohibits TVA from disposing of its coal ash in a way that will allow coal ash to enter into groundwater or the nearby river. The Removed Substances provision protects groundwater and surface water from pollution caused by coal ash sludge “disposed of” in the leaking, unlined pits themselves, in addition to any other locations where TVA might dispose of its coal ash.¹⁶⁵

The East Pond—the leaking, unlined pit TVA uses for wastewater treatment at Allen—contains coal ash sludge that was “removed” during treatment. For many years, TVA has detected coal ash contaminants, including arsenic above the groundwater protection standard, in the groundwater beneath the East Pond. Yet as described in Section II.D, TVA omitted this information from the SEA. The groundwater monitoring results TVA provided to TDEC in May 2017 also detected arsenic and other coal ash contaminants above groundwater protection

¹⁶⁴ Attachment 82: NPDES Permit No. TN0005355, TVA Allen Fossil Plant (issued November 30, 2007), 7.

¹⁶⁵ *Tennessee Clean Water Network v. Tennessee Valley Authority*, 2017 WL 3476069, *56 (August 4, 2017) (holding that discharge of coal ash directly from an ash pond into groundwater and surface water violates Removed Substances provision of TVA's permit for the Gallatin Fossil Plant).

standards.¹⁶⁶ But TVA has not disclosed or analyzed this information in any supplemental environmental analysis under NEPA. TDEC has previously informed TVA that:

The migration of untreated/partially treated wastewater from a surface impoundment into groundwater is not an NPDES authorized discharge. The NPDES Program was never intended to permit the discharge of wastewater or partially treated wastewater from the bottom of a wastewater treatment unit into groundwater.¹⁶⁷

As described above, settled coal ash and water create coal ash sludge—a form of untreated wastewater. Thus, according to the plain language of the Allen NPDES Permit and TDEC’s own previous statements, TVA’s current NPDES permit does not authorize the entry or discharge of coal ash sludge into groundwater.

The entry or discharge of coal ash sludge into groundwater is not authorized by the Allen NPDES Permit, and in fact constitutes violation of the Tennessee Water Quality Control Act¹⁶⁸ in addition to violations of the Permit and the Clean Water Act. The NPDES requirements, as well as the TWQCA, apply to this pollution. As discussed above, TVA’s current NPDES permit does not authorize TVA to place or discharge coal ash pollution into groundwater. Indeed, the NPDES Permit requires settled coal ash sludge to be “disposed of in a manner which *prevents* its entrance into or pollution of any surface or subsurface waters.”¹⁶⁹ The Department itself has taken the position that the NPDES permit does not authorize the entrance or discharge of pollutants into groundwater through the bottom of TVA’s leaking, unlined pits.

¹⁶⁶ T Allen Fossil Plant –Site Information, 3.

¹⁶⁷ Attachment 83: Letter from Chuck Head, TDEC, to Terry Cheek, TVA (May 15, 2017); *see id.* (“As TDEC considers the pending TVA Gallatin NPDES Permit Renewal Application, and for any previous NPDES permits TDEC has issued, the NPDES permit does not authorize discharge of wastewater or partially treated wastewater into groundwater.”)

¹⁶⁸ The TWQCA defines “waters” to include water “on or beneath the surface of the ground.” Tenn. Code Ann. § 69-3-103(44). The Tennessee Water Quality Control Act, which is to be “liberally construed,” prohibits all persons—including federal agencies—from discharging a pollutant into groundwater without a permit. Tenn. Code Ann. §§ 69-3-120, 69-3-103(26); 69-3-103(27) (defining “pollutant” as “sewage, industrial wastes, or other wastes”); § 69-3-103(10) (defining “discharge of a pollutant” as the “addition of pollutants to waters from a source”). More specifically, without a valid permit, is unlawful to alter the state’s waters, Tenn. Code Ann. § 69-3-108(b)(1); operate certain equipment in a way that “will likely cause an increase in the discharge of wastes into the state’s waters,” Tenn. Code Ann. § 69-3-108(b)(4). Tenn. Op. Atty. Gen. No. 01-105 (Tenn. A.G., 2001 WL 770922; discharge industrial or other wastes into the state’s waters or to a place “from which it is likely that the discharged substance will move into waters,” Tenn. Code Ann. § 69-3-108(b)(6); or discharge industrial¹⁶⁸ or other waste¹⁶⁸ “into a well or a location where it is likely that the discharged substance will move into a well . . . or the underground placement of substances that may affect the waters of the state,” Tenn. Code Ann. § 69-3-103(15), (23), -208(b)(8).

¹⁶⁹ *Id.*, 1, 3 (Emphasis added.)

The Pumping Plan would not remedy these violations of laws that protect Memphis' clean water. Instead, the Pumping Plan threatens to exacerbate these violations by facilitating the migration of TVA's existing unlawful pollution into the city's drinking water source. The Pumping Plan may also threaten violation of the Tennessee Safe Drinking Water Act and Underground Injection Control.¹⁷⁰ These threats warrant additional scrutiny of the Pumping Plan in an EIS.

- v. ***TVA is threatening to violate the Shelby County Groundwater Ordinance by putting wells into service less than half a mile from a RCRA corrective action site.***

TDEC is usually responsible for the issuance of water well drillers' licenses and permits,¹⁷¹ but "any county operating under a county charter form of government, may enact, by . . . resolution . . . enforceable requirements not less stringent than the standards adopted by the state pursuant to this chapter." Tenn. Code Ann. § 19-10-112(a). As recognized by the district court in Conservation Group's appeal of the well construction permits, Shelby County has employed this authority to create the Shelby County Groundwater Quality Control Board.¹⁷² The Board's purpose is twofold: to "secure, protect, and preserve" groundwater in Shelby County and to "abate existing pollution of the groundwater and to plan for the future use of the groundwater . . . [in] the best interests of all of its citizens."¹⁷³

Pursuant to its delegated authority, the Board promulgated rules and regulations, which include permitting requirements for well drillers.¹⁷⁴ The rules also set forth minimum siting criteria.¹⁷⁵ Conservation Groups challenged the siting of the wells in the permit appeal, but no court heard the merits of their arguments.

Even if one assumes that the wells were properly permitted in 2016, which we do not, new information shows that the five wells installed by TVA are now in violation of the Shelby County Groundwater rules. Most significantly, the rule providing: A water well cannot be **sited or placed in service** within a half-mile of the designated boundaries of a listed federal or State Superfund site or Resource Conservation and Recovery Act corrective action site, unless the well

¹⁷⁰ E.g., Tenn. Code Ann. § 68-221-711(8) (prohibiting "The heavy pumping or other heavy withdrawal of water from a public water system or its water supply source in a manner that would either interfere with existing customers' normal and reasonable needs or threaten existing customers' health and safety"). Cf. Rules of Tennessee Department of Environment and Conservation Water Supply Division, Chapter 0400-45-45-06, <http://publications.tnsosfiles.com/rules/0400/0400-45/0400-45-06.20140505.pdf>.

¹⁷¹ See Tenn. Code Ann. § 69-10-102; Tenn. Code Ann. § 19-10-112(b).

¹⁷² Attachment 84: *Sierra Club*, Doc. 30 at PageID 2126.

¹⁷³ Attachment 85: Shelby County Ordinance § 42-71.

¹⁷⁴ See Attachment 86: Shelby County Ordinance § 42-74(1); Shelby County Well Regulations, <https://www.shelbycountyttn.gov/DocumentCenter/View/768>.

¹⁷⁵ Shelby County Well Regulations, § 5.02.

owner can make a demonstration that the well will not enhance the movement of contaminated groundwater or materials into the shallow or deep aquifer.¹⁷⁶

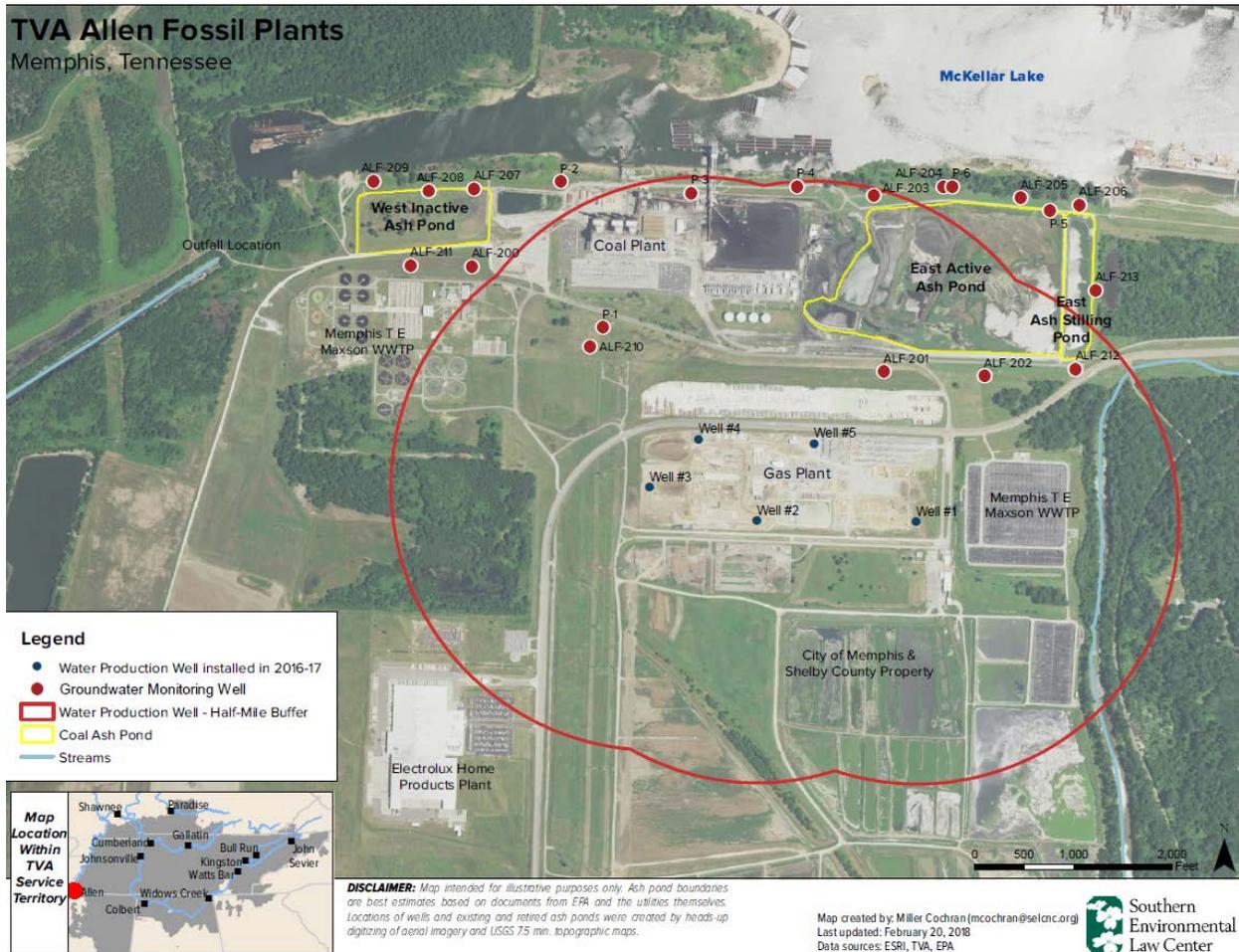
As shown in the map below, the water production wells are with ½ mile of the Coal Plant, East Ash Pond, CCR Rule monitoring network, and Remedial Investigation site. As described in Section II.E.2 above, TVA's East Ash Pond is a federal RCRA corrective action site. TVA reported exceedances of Appendix IV coal ash constituents, which triggered its obligation to initiate corrective action under the federal Coal Ash Rule, which is a rule promulgated pursuant to the solid waste provisions of RCRA.¹⁷⁷ Even if the alternative closure provision applied at the East Pond, TVA would be required to begin a corrective action process under the CCR Rule.¹⁷⁸ TVA is also subject to a Commissioner's Order, which was issued pursuant to the State of Tennessee's remedial authority and provides for state oversight by TDEC with regard to TVA's compliance with the Coal Ash Rule.¹⁷⁹ Under either theory, the wells cannot be "placed in service."

¹⁷⁶ Shelby County Well Regulations, §§ 4.01, 5.02(E) (emphasis added).

¹⁷⁷ See 42 U.S.C. § 6907(a)(3); *Id.* § 6944(a)-(b).

¹⁷⁸

¹⁷⁹ Commissioner's Order, Section VII.D, VIII.



The rules also provide that all wells shall be maintained in a condition whereby they are not a hazard to health or environment nor a source of potential contamination to the groundwater aquifers.¹⁸⁰ The Pumping Plan cannot satisfy this requirement, either.

Because the Pumping Plan threatens to violate Federal, State, and local laws enacted to protect the environment, TVA must prepare an EIS for the Plan to analyze the new and omitted information related to groundwater quality and the risk to the Aquifer.

3. Additional significance factors also require TVA to prepare an EIS for the Pumping Plan.

The new and omitted circumstances and information described in Section II.C-D also require TVA to prepare an EIS based on consideration of additional significance factors. First,

¹⁸⁰ Shelby County Well Regulations, § 5.02(C). Cf. Shelby County Ordinance § 42-108(b) (“No water well shall be located close enough to any existing or proposed well in the county that would materially affect the static head of water from the underground strata of any such well or proposed well.”)

the new and omitted information shows that the Pumping Plan threatens a unique local resource—the Aquifer¹⁸¹—in a manner not previously disclosed analyzed in TVA’s NEPA documents for the Plan. This fact speaks both to the context and the degree to which the Pumping Plan would impact unique local geography.¹⁸²

The Aquifer also serves as Memphis’s only drinking water source, which means the Pumping Plan threatens to affect public health.¹⁸³ This is particularly concerning because, given the local hydrogeology, the Pumping Plan may have significant cumulative impacts, by drawing contaminated shallow groundwater from other sites within the cone of depression created by operating the cooling water wells.¹⁸⁴ The Allen facilities are in a heavily industrial area, and TVA must analyze whether there are other sites with contaminated groundwater in areas likely to have windows in the clay layer that protects the Aquifer. The Pumping Plan could pull contamination from these sites into the Aquifer, just as it may pull contaminated groundwater from the Allen Coal Plant. The potential for an action to have a significant cumulative impact is a factor to be considered in determining whether an action is significant and requires additional environmental analysis.¹⁸⁵

In addition, for many of the same reasons that the impact of the Pumping Plan is highly controversial, see Section II.E.1, its impacts are also “highly uncertain or involve unique or unknown risks.”¹⁸⁶ Finally, TVA’s decision to move forward with the Pumping Plan despite the risk to the City’s drinking water source “may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.”¹⁸⁷ Indeed, TVA has proposed to exempt all future decisions to drill and withdraw groundwater from analysis under NEPA.¹⁸⁸ That TVA appears not to have considered the risk of contamination to the City’s drinking water source from its own leaking, unlined ash pit, despite decades of evidence that suggested that risk, does not give the public confidence in TVA’s ability to identify and analyze significant risks associated with groundwater withdrawals the utility might plan to make in the future.¹⁸⁹

¹⁸¹ See Section XX, explaining Aquifer’s unique status as the “sweetest water in the world.”

¹⁸² 40 C.F.R. § § 1508.27(a) and (b)(3).

¹⁸³ *Id.* § 1508.27 (b)(2).

¹⁸⁴ 2016 USGS, 3-6.

¹⁸⁵ *Id.* § 1508.27 (b)(7).

¹⁸⁶ *Id.* § 1508.27 (b)(5).

¹⁸⁷ *Id.* § 1508.27 (b)(6).

¹⁸⁸ Attachment 87: TVA, Proposed Categorical Exclusion Supporting Documentation, 3-186 to 3-191 (June 8, 2017).

¹⁸⁹ SELC, et al., Comments re: TVA, PROPOSED RULE, PROCEDURES FOR IMPLEMENTING THE NATIONAL ENVIRONMENTAL POLICY ACT, 82 FED. REG. 26,620 (JUNE 8, 2017), 107-112 (September 6, 2017). *See also* Attachment 88: Garcia, Amanda and S. Banbury, “Memphis Aquifer Belongs to the Public, Not TVA,” Memphis Commercial Appeal, September 26, 2017,

F. Significant new circumstances and information regarding alternatives to TVA’s Pumping Plan—including using MLGW water or gray water from Maxson Plant—also require analysis in an EIS.

Over objections from conservation groups including the Sierra Club, TVA decided to spend more than a billion dollars on a new Gas Plant.¹⁹⁰ The utility claims, however, that it cannot bear the purported cost it would take to source cooling water from a source other than the city’s drinking water aquifer.¹⁹¹

Other reasonable alternatives exist for providing the Gas Plant’s cooling water. Specifically, new information with respect to the quality of gray water from the Maxson Plant and MLGW’s capacity to provide sufficient cooling water is available. Further, even if we assume cost is the controlling factor for TVA’s decision-making, this new information suggests TVA’s cost estimates for its alternatives are based on incorrect information. Circumstances regarding alternatives to using the wells—including using MLGW water or gray water from Maxson WWT plant—have changed.

1. The City of Memphis is improving the Maxson Plant, making the gray water alternative (the most environmentally sensitive alternative) even more cost-competitive.

In the 2014 Environmental Assessment, TVA explained its decision to use gray water as “an opportunity to . . . reduce[e] the use of valuable natural resources in the area.”¹⁹² TVA subsequently “found out about a couple of constituents, ammonia and phosphate, that created treatment issues for us.”¹⁹³ At the 2016 permit appeal hearing, TVA’s witnesses insisted that the

<http://www.commercialappeal.com/story/opinion/contributors/2017/09/26/memphis-aquifer-belongs-public-not-tva/704405001/>.

See, e.g., Attachment 89: Southern Alliance for Clean Energy et al., Comments on Allen Fossil Plant Emission Control Project Draft Environmental Assessment (Aug. 7, 2014) (discussing alternatives, including a smaller gas plant and noting that, “Renewable energy and energy efficiency reduce air pollution, carbon emissions, water consumption and waste generation, not to mention reduction of upstream environmental impacts associated with production of natural gas (effects of which are not discussed in the Draft EA).”). Alternatives to aquifer water include (1) potable water supplied by MLGW, (2) surface water, (3) gray water from the Maxson Plant, and (4) groundwater in the shallow aquifer.¹⁹¹ *E.g.*, Attachment 90: *Sierra Club*, Doc. 19-11 at PageID 703-04. Of course, TVA’s analysis does not include costs associated with risks of impacts to the City’s drinking water aquifer.

¹⁹¹ *E.g.*, Attachment 90: *Sierra Club*, Doc. 19-11 at PageID 703-04. Of course, TVA’s analysis does not include costs associated with risks of impacts to the City’s drinking water aquifer.

¹⁹² 2014 Final EA at 28. *Accord id.* at 206 (“The TVA Act directs TVA to deliver low-cost, reliable power to the Valley while also promoting economic prosperity and the wise use and conservation of the natural resources of the region.”). *See also* Attachment 91: 2014 EA at 74 (noting that gray water would account for 80% of the Gas Plant’s needs).

¹⁹³ *Sierra Club*, Doc. 19-11 at PageID 705. *Accord id.* at Doc. 19-11 at PageID 686 (“So once the project was approved by our board in August of 2014, we began taking water samples and started doing some detailed analysis. At that time, we saw high levels of ammonia and phosphates primarily, generically called nutrients in the

need to treat the Maxson Plant's gray water for ammonia and phosphate made it too costly an option.¹⁹⁴ Notably, though, TVA's consultant's cost analysis was predicated on the need to chemically treat the Maxson Plant's effluent.¹⁹⁵ The capital expenses were relatively similar; without the annual expense of chemical feed to treat the gray water, the operating expenses were also within a similar range.¹⁹⁶

The gray water alternative was therefore economically unattractive from TVA's perspective, not technologically infeasible. Indeed, TVA's consultant concluded that, "To utilize the water for cooling tower makeup, treatment options include ammonia reduction, biological treatment/disinfection, solids removal, alkalinity reduction, and potentially softening."¹⁹⁷

Since then, in November 2017, the City of Memphis broke ground on upgrades to the Maxson Plant.¹⁹⁸ Upgrades will include disinfection structures and a return activated sludge re-aeration basin.¹⁹⁹ It therefore appears that at least some of the treatment options identified by TVA's consultant as ideal for Gas Plant cooling water are akin to (or potentially fall within the scope of) improvements now underway at the Maxson Plant.

industry."); *id.* at PageID 741 ("The ammonia and the phosphate probably give us the greatest issues in a cooling tower application.").

¹⁹⁴ Attachment 92: *Sierra Club*, Doc. 19-7 at PageID 403 [Doc. 19-7 at PageID 403] (After TVA decided to pursue aquifer water rather than gray water, TVA explained that, "Under the TVA Act, TVA is required to provide least cost power for all consumers in the Tennessee Valley. . . . After detailed engineering, it was determined that gray water was not a least cost option.").

¹⁹⁵ Attachment 93: *Sierra Club*, Doc. 19-12 at PageID 1059; Doc. 19-11 at PageID 686-87 (p. 128:4-10). Kiewit Study on water treatment options for Allen- Addendum. Doc. 19-12 at PageID 1061 et seq.

¹⁹⁶ *Sierra Club*, Doc. 19-12 at PageID 1059.

¹⁹⁷ *Sierra Club*, Doc. 19-12 at PageID 1030. *Cf. id.* at PageID 1033 ("The primary concern in the water supply is ammonia.").

¹⁹⁸ See Attachment 94: <http://www.commercialappeal.com/story/news/2017/11/02/rehab-project-disinfect-wastewater-memphis-treatment-plant/823194001/>.

¹⁹⁹ See Attachment 95: T.E. Maxson Upgrades Site Plan, <http://maxsonupgrades.com/project-overview/>; City of Memphis Letter to TDEC (Nov. 3, 2017) re "Disinfection Compliance Schedule Progress Report No. 8 ("CDM Constructors, Inc. submitted a proposal to the City on 3-7-2017 to construct the Maxson Disinfection Facility and related improvements as outlined in Package 1. A contract to perform this work was executed on 7-27-2017. Bidding for subcontracted services were advertised on 10-24-2017 and are expected to be opened 11-20-17 in early December. Ground breaking ceremonies for the project took place on 11-2-2017. Construction of the Maxson Disinfection Facility and other related improvements is expected to commence in late 2017 with completion by late 2019."), http://environment-online.tn.gov:8080/pls/enf_reports/f?p=9034:34051:::NO:34051:P34051_PERMIT_NUMBER:TN0020729. "In 2012, the City began negotiating a new NPDES permit for the Maxson WWTF. As part of this process, the State of Tennessee required the City to implement disinfection. The City retained CDM Smith to evaluate available disinfection technologies at the facility. . . . In November 2015, CDM Smith was retained by the City of Memphis to design and construct the process and disinfection improvements as outlined in the 2013 reports." Attachment 96: CDM Smith, T.E. Maxson WWTF Process Upgrades: Conceptual Design Report, at 1-1, 1-2 (June 2016).



The City of Memphis is exploring ways to further improve the nutrient concentrations of its gray water. Just last month, the consulting firm in charge of the Maxson Plant's upgrades produced to the City an "Ammonia Optimization Plan," which evaluated several approaches to achieve nitrification (reduce ammonia and nutrients in the gray water), including "dual carbonaceous and nitrifying trickling filters, expanding the aerations tanks to change the process from solids contact to nitrifying activated sludge, and post nitrification of clarified secondary effluent."²⁰⁰

Even if the upgrades at Maxson will not be completed when TVA plans to begin operating the Allen Gas Plant, the utility should consider an alternative that would phase out reliance on purchases of water from MLGW and transition to the use of gray water over time. Given improvements that are being and will continue to be made to the Maxson gray water, the EIS should consider the use of gray water for cooling water in light of these new circumstances and information.

In addition, to the extent that TVA believes additional treatment of the gray water is necessary, TVA should explore an alternative that would include partnering with the City of

²⁰⁰ Attachment 97: CDM Smith, T.E. Maxson WWTF Process Upgrades Package 2B: Preliminary Engineering Report, at B-2 (Jan. 2018).

Memphis to further improve the Maxson Plant, as TVA has done with the City's biogas project.²⁰¹ The co-benefit of improving effluent into the Mississippi River and reducing the Gas Plant's environmental impacts on the aquifer make this an opportunity for TVA to recommit to its mission of environmental stewardship by protecting Memphis' clean water.

2. New information suggests MLGW is or will soon be able to provide all of the water TVA needs.

TVA's asserts that, on average, it will need 3.5 MGD of water to run the Gas Plant with "up to [7.2 MGD] for peak operation during short periods on the hottest days of the year."²⁰² The 2016 Supplemental EA therefore ruled out MLGW as a "viable" alternative to supply the Gas Plant with cooling water because MLGW could not supply the "peak system needs."²⁰³

However, by November 2016, TVA acknowledged that MLGW had increased its ability to supply TVA with water to "[5 MGD] at max continuous use"²⁰⁴ and "[6.5 MGD] for short intermittent periods."²⁰⁵ In other words, MLGW can now provide virtually all of the water demanded by TVA. MLGW's increased capacity constitutes new information that must be analyzed in an EIS.

Additional new information suggests that MLGW may be closing the gap entirely. For example, in August 2017, MLGW was granted easements for water pipeline(s) across railroad tracks in the vicinity of the Gas Plant.²⁰⁶ And in January 2018, TVA CEO Bill Johnson told the Memphis City Council that, "We are currently using MLGW water to test the plant and, if the time comes that that's what we need to run it, then we will[]." ²⁰⁷

²⁰¹ "TVA is investing up to \$20 million in infrastructure at both the Allen CC site and in upgrades to the city of Memphis equipment in order to reliably deliver the methane gas to the Allen CC site." Attachment 98: TVA, Turning Memphis Wastewater into Energy, <https://www.tva.com/Newsroom/Turning-Memphis-Wastewater-into-Energy>.

²⁰² 2016 SEA at 1, 2. According to the 2014 Environmental Assessment, operation of the Gas Plant would have required 7-10 MGD of water. 2014 Environmental Assessment at 14.

²⁰³ 2016 FONSI at pp. 1-2. In October 2015, according to TVA, MLGW reported that it could only supply up to 2,800 gpm [4 MGD]. *Sierra Club*, Doc. 19-11 at PageID 673. However, by November 2016, TVA represented that the Gas Plant's average need is "about 2400 GPM. Our peak need is 5,000 GPM." Doc. 19-11 at PageID 673.

²⁰⁴ *Sierra Club*, Doc. 19-11 at PageID 689.

²⁰⁵ Attachment 99: *Sierra Club*, Doc. 19-15 at PageID 1443. *See also id.* at Doc. 19-11 at PageID 707 (MLGW tells TVA it can supply up to 4,500 gallons per minute). Notably, despite TVA's insistence that the peak capacity water rate is a determining factor for its decisions, as part of the Remedial Investigation, USGS and the University of Memphis only assumed that the "projected annual average daily pumping rate of 2,500 gpm [3.6 MGD]." Since they are not using the higher rate, the study's ability to address the impacts of the Gas Plant's activities on the aquifer is diminished. (September 12, 2017: Attachment to Email; 722529b8cb65e38c22592486).

²⁰⁶ *See, e.g.*, Tom Leatherwood, Shelby County Register of Deeds, Instrument Nos. 18001156, 18001157.

²⁰⁷ Attachment 100: Michelle Corbet, "TVA CEO regrets Memphis aquifer decision," MEMPHIS BUSINESS JOURNAL (Jan. 24, 2018) ("When Tennessee Valley Authority CEO Bill Johnson visited the Memphis City Council Tuesday,

Despite MLGW's ability to provide TVA with all of the water TVA claims it needs, this alternative to should still be fully analyzed because it does not moot all of the impacts of concern to the aquifer (*i.e.*, both conservation and contamination impacts). TVA's impact on the Aquifer likely remains if TVA buys water from MLGW. Whether TVA pumps directly from the Aquifer or buys water from MLGW, the city's drinking water source is impacted. For example, USGS concluded that the 30-year average withdrawal from the Gas Plant will impact the Davis Well Field, MLGW's closest drinking water intake field.²⁰⁸ This could mean that if MLGW withdraws water for the Gas Plant at the rates TVA demands, the long-term impacts could reach the Allen Fossil Plants' property. Therefore, before selecting MLGW water as the preferred alternative, TVA should analyze whether, if it obtains drinking water from MLGW for the lifetime of the Gas Plant, it will induce contamination from the Coal Plant or other sources of contamination.²⁰⁹

III. Conclusion

For all of the foregoing reasons, TVA must supplement its previous environmental analyses and prepare an EIS for the Pumping Plan as required by NEPA. In the event that TVA selects a different alternative for cooling water, it must still consider the new and omitted information set forth in this letter and prepare an EIS to evaluate the environmental impacts associated with a range of reasonable alternatives for providing cooling water at the Allen Gas Plant.

Conservation Groups respectfully request a response to this letter by no later than March 16, 2018.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Amanda Garcia', followed by a long horizontal line extending to the right.

Amanda Garcia
Anne Passino
Attorneys

he admittedly wished for a do-over regarding the TVA's decision to bypass Memphis Light, Gas and Water with its new natural gas plant.”), <https://www.bizjournals.com/memphis/news/2018/01/24/tva-ceo-regrets-memphis-aquifer-decision.html>.

²⁰⁸ 2016 USGS.

²⁰⁹ Cf. 2016 FONSI (“Under most conditions, simulated water level changes in the Memphis Sands aquifer from the proposed groundwater withdrawal create an anticipated cone of depression result in a reduction in the potentiometric surface of 7 ft at the plant site and 4 ft within approximately 1 mi (2,590 ac area) from the proposed groundwater wells. Under more extreme and less likely conditions, the reduction in the potentiometric surface at the plant was expected to be 11 ft.”).

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Attachments provided via ShareFile and CD.

Attachments

1. TVA, Allen Fossil Plant Emission Control Project Supplemental Environmental Assessment (Apr. 2016).
2. Protect Our Aquifer: Mission, <http://protectouraquifer.org/>.
3. Sierra Club, Tennessee Chapter: Background and Links Regarding TVA's Planned Use of the Memphis Sand Aquifer to Cool It's New Power Plant in Memphis (Aug. 13, 2016), <https://www.sierraclub.org/tennessee/blog/2016/08/background-and-links-regarding-tvas-planned-use-memphis-sand-aquifer-cool-its>.
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5. Stantec, TVA Allen Fossil Plant Remedial Investigation Work Plan, at § 3.5 (Sept. 15, 2017).

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<https://www.commercialappeal.com/story/news/environment/2016/12/16/memphis-sand-aquifer-buried-treasure/93814278/>.
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<https://www.commercialappeal.com/story/news/2018/01/09/council-approves-water-hike-rejects-gas-and-power-increases/1016194001/>.
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<https://www.commercialappeal.com/story/news/2017/08/11/shelby-board-rewrite-rules-project-memphis-sand-aquifer/555411001/>.
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<https://www.commercialappeal.com/story/news/2018/02/16/shelby-county-drafts-strict-rules-protect-groundwater/343740002/>

17. *Sierra Club & Protect Our Aquifer v. Shelby County Groundwater Quality Control Board, Shelby County Health Department, & Tennessee Valley Authority* (“*Sierra Club*”), No. 17-cv-2114-SHL-dkv (W.D. Tenn.) [Doc. 19-13 at PageID 1178]
18. *Sierra Club*, Doc. 19-14 at PageID 1371.
19. “How a Combined Cycle Power Plant Works” (TVA), <https://www.tva.gov/Energy/Our-Power-System/Natural-Gas/How-a-Combined-Cycle-Power-Plant-Works>.
20. TVA, Finding of No Significant Impact, Allen Fossil Plant Emission Control Project—Groundwater Wells (Apr. 29, 2016).
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22. TVA, Environmental Investigation Plan, Allen Fossil Plant, Rev. 0.
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25. “Alternate Source Demonstration: Arsenic Concentrations in Groundwater: TVA Allen Fossil Plant” (TVA 2013)
26. TVA, *Groundwater Monitoring Report: May 2017* at 1 (TVA).
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30. Dike Stability/Quarterly Red Water Seep Inspection (Oct. 28, 1996).
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33. July 12, 2017 Email from TDEC to TVA.
34. July 28, 2017 Letter from TVA to TDEC (attaching *Groundwater Monitoring Report: May 2017*, at 1 (TVA)).
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37. Kiewit Study, “KP-TVA-0225 - TVA Allen Water Treatment Study.”
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41. August 29, 2016 Rep. Cohen Letter to TVA CEO Johnson, <https://cohen.house.gov/sites/cohen.house.gov/files/documents/8.29.2016%20Letter%20to%20President%20Johnson.pdf>
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