

**BEFORE THE
Mississippi Public Service Commission**

Encouraging Stipulation of Matters in Connection with
the Kemper County IGCC Project

Docket No. 2017-AD-112

**Direct Testimony of
Jeremy I. Fisher, PhD**

**On Behalf of
Sierra Club and Steps Coalition**

PUBLIC VERSION

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1 **1. INTRODUCTION AND PURPOSE OF COMMENTS**

2 **Q Please state your name, business address, and position.**

3 **A** My name is Jeremy I. Fisher. I am a Principal Associate with Synapse Energy
4 Economics, Inc. (“Synapse”), which is located at 485 Massachusetts Avenue,
5 Suite 2, in Cambridge, Massachusetts.

6 **Q Please describe Synapse Energy Economics.**

7 **A** Synapse Energy Economics is a research and consulting firm specializing in
8 energy and environmental issues and policies for electricity sector issues,
9 including fossil generation, efficiency, renewable energy, ratemaking and rate
10 design, restructuring and market power issues, and environmental regulations.

11 **Q Please summarize your work experience and educational background.**

12 **A** I’ve worked in electricity system energy planning for a decade, evaluating and
13 helping to shape resource plans, performing planning on behalf of states and
14 municipalities, helping regulators navigate environmental rules, and assisting
15 states craft or revise resource planning rules. I lead the resource planning group at
16 Synapse, which engages in the assessment of planning processes across a wide
17 cohort of states and regions.

18 I have provided consulting services for a wide variety of public sector and public
19 interest clients, including the U.S. Environmental Protection Agency (“EPA”), the
20 National Association of Regulatory Utility Commissioners (“NARUC”), the
21 National Association of State Utility Consumer Advocates (“NASUCA”),
22 National Rural Electric Cooperative Association (“NRECA”), the energy offices
23 and public utility commissions of Alaska, Arkansas, Michigan, and Utah, the
24 Commonwealth of Puerto Rico, Tennessee Valley Authority Office of Inspector
25 General (“TVA OIG”), the California Division of Ratepayer Advocates
26 (“CADRA”), the California Energy Commission (“CEC”), the Regulatory

1 Assistance Project (“RAP”), the Western Grid Group, the Union of Concerned
2 Scientists (“UCS”), Sierra Club, Earthjustice, Natural Resources Defense Council
3 (“NRDC”), and other organizations.

4 I have provided testimony in electricity planning and general rate case dockets in
5 California, Georgia, Idaho, Indiana, Kansas, Kentucky, Louisiana, Nevada, New
6 Mexico, Oklahoma, Oregon, Puerto Rico, Utah, Washington, Wisconsin, and
7 Wyoming.

8 I hold a doctorate in Geological Sciences from Brown University, and I received
9 my bachelor degrees from University of Maryland in Geology and Geography.

10 My full curriculum vitae is attached as Exhibit JIF-1.

11 **Q On whose behalf are you providing comments in this case?**

12 **A** I am providing comments on behalf of Sierra Club and the Steps Coalition.

13 **Q Have you previously provided testimony to or testified before the Mississippi
14 Public Service Commission previously?**

15 **A** No, I have not.

16 **Q Have you engaged in other states on long-term resource planning issues?**

17 **A** Yes. I have been involved in numerous long-term resource planning dockets,
18 including integrated resource plans (“IRP”), CPCN, and prudence reviews in rate
19 case dockets. I have provided training to federal regulators on resource planning
20 practice and issues. I recently led an intensive statewide planning process on
21 behalf of the Michigan Public Service Commission (“MPSC”) and continue to
22 work on behalf of the Puerto Rico Energy Commission (“CEPR”) towards the
23 development of state-of-the-art IRP Rules.

1 **Q What is the purpose of your testimony?**

2 **A** My testimony seeks to establish the value of Mississippi Power Company's
3 ("MPC" or "Company") combined cycle ("CC") plant at the Kemper site, now
4 operating exclusively on natural gas, known as the Kemper CC. I address the
5 background of if MPC sought to build Kemper CC, or led the Commission to
6 believe that Kemper CC was ever in the best interests of ratepayers. I address if
7 MPC has built a comparable facility to state-of-the-art natural gas combined cycle
8 ("NGCC") facilities, and the ratepayer value attributable to the Kemper CC.

9 **Q Please provide an overview of your position in this docket.**

10 **A** This proceeding is designated as a settlement docket. The purpose of this docket
11 is to have MPC, the Staff and the intervening parties explain the bases for their
12 settlement proposals, and possibly come to a stipulation that would endorse an
13 agreed upon proposal. While an independent docket of this nature is not a usual
14 means of proceeding in matters involving utility cost recovery and rate setting, it
15 is certainly understandable in this complex situation, which is to my knowledge
16 without real precedent. A settlement proceeding takes into account the strengths
17 and weaknesses of each party's case, while not amounting to a full adjudication of
18 the underlying issues. The purpose of my testimony is to propose to the
19 Commission some ways of evaluating the parts of the Kemper plant proposed for
20 inclusion in rates, and the reasonableness of MPC's settlement proposal.

21 The Commission's evaluation of the settlement proposals should be informed by
22 the fact that the present state of the Kemper matter is without precedent on a
23 number of matters.

24 Kemper plant is, of course, without precedent as a technology. At the time
25 Kemper was proposed, the technology had never been used at commercial or
26 utility scale, there were no other comparable demonstration projects, and the
27 proposed cost was substantially higher than other generation technologies. Today,

1 the plant built at Kemper is not the project that was proposed by the Company,
2 and the Company has faced numerous hurdles in bringing the plant into operation.

3 The Company's portrayal of alternative options is without precedent. In the initial
4 2009 CPCN, MPC portrayed a lignite-fueled Kemper plant as the **only** reasonable
5 option for MPC's customers. Mississippi Power's counsel stated that "if they're
6 going to have a low cost, nonvolatile, steadily-priced fuel that results in energy at
7 the lowest possible cost over 40 years, then this [Kemper IGCC] is the only
8 choice that we have."¹ MPC denigrated natural gas as extraordinarily risky and
9 high cost. Anthony Topazi, then President of MPC, asserted to the Commission
10 that "natural gas is the most volatile commodity for fuel that we can use,"² and
11 Mississippi Power's counsel quoted a Duke Power executive comparing natural
12 gas to crack cocaine.³ Of course, MPC has, through the building of this singular
13 plant, reversed direction and now seeks to demonstrate that a natural gas based
14 future is lower cost and lower risk for consumers.

15 MPC's handling of costs is unprecedented. The Commission's 2010 order
16 approving the certificate for the plant was very cognizant of the risk that Kemper
17 posed for the ratepayer, and imposed a number conditions, including capital cost
18 caps and operational guarantees. After the Mississippi Supreme Court invalidated
19 the issuance of the CPCN for Kemper in 2012, the Commission issued a new
20 decision which again approved Kemper, but maintained the protections in the
21 original order. However, shortly after this decision was issued, the Commission
22 learned that the Kemper project had exceeded the \$2.4 billion "soft" cost cap set
23 by the Commission. This was one in a long series of escalating cost estimates for
24 the plant. While cost overruns are not unknown in generating facility
25 construction, the massive scale of the Kemper overruns is unique.

¹ Kemper Phase II transcript at 2372.

² Kemper Phase II transcript at 1052.

³ Kemper Phase I transcript at 40.

1 Finally, this particular situation is unprecedented because MPC's settlement
2 proposal is seeking full reimbursement (and as explained later in my testimony,
3 somewhat more than full reimbursement) for a generating asset that was planned
4 and designed for one use – integrated operation with a synthetic gas production
5 plant – but is now being proposed for a different use for which it was never
6 intended or proposed – operation on natural gas.

7 The generating unit at the Kemper site is not an efficient, state-of-the-art NGCC;
8 instead, it's a series of pipes and collection of materials that cobble together the
9 elements of an NGCC. The question for the Commission in this docket is how to
10 assure a fair outcome to Mississippi ratepayers and MPC.

11 In its direct testimony in this case, MPC has stated that under a traditional rate
12 proceeding it would seek to place a substantially larger group of assets associated
13 with the Kemper project into rates - including land explicitly used for gasification
14 purposes. There is no clear precedent for an integrated project of this type, with
15 strict regulatory conditions on cost and performance, being largely abandoned, but
16 with a modest part of the project being placed in service as an entirely different
17 type of unit with different performance characteristics.

18 The fairest path forward is that Kemper should not be evaluated at cost, but rather
19 at value provided to customers – as if MPC were procuring an existing plant on
20 behalf of their customers. This is, in fact, what MPC is doing: a new facility of a
21 type previously not contemplated by the CPCN or any other need-based
22 proceeding is now available, and MPC seeks to procure that facility for
23 ratepayers. Ratepayers should pay for the value of that facility, but no more than
24 its fair value.

1 **2. MPC HAD NO INTENTION OF BUILDING AN NGCC AT KEMPER**

2 **Q What is the Company's position on type of generator that is now operating at**
3 **the Kemper site?**

4 **A** For the purposes of this testimony, I will refer to the operational Kemper County
5 combined cycle plant, fired exclusively on natural gas, as the Kemper CC. I will
6 refer to other turnkey natural-gas combined cycle plants as NGCCs.

7 The Company calls the operational plant the "Kemper CC," distinguishing it as a
8 distinct subcomponent of the larger, non-operational Integrated Gasification
9 Combined Cycle ("IGCC") site. The Company explains that the definition of the
10 Kemper CC includes the specification of "fueled on natural gas."⁴ However, in
11 the most recent 2017 Viability Analysis, the Company refers to the Kemper CC in
12 its current arrangement as an "NGCC" or natural gas combined cycle plant.⁵

13 **Q Was it MPC's intent to build an NGCC when it applied for a Certificate of**
14 **Public Convenience and Necessity in 2009?**

15 **A** No. The Company sought to establish a need for a coal-based IGCC, stating its
16 "economic evaluation and analysis clearly indicates that the Kemper County
17 IGCC Project is the most economic self-build generation resource to meet MPC's
18 identified need."⁶

⁴ See, for example, Direct Testimony of Moses H. Feagin, footnote 6 on page 4. "Kemper CC and its related assets and associated Transmission include the Kemper CC fueled on natural gas; all transmission facilities, including two (2) 230 kV lines and substations supporting the Kemper CC; and the treated effluent and natural gas pipelines. The Kemper CC and related assets were placed in service August 9, 2014, and the associated Transmission facilities were placed in service upon completion during 2012 and 2013."

⁵ MPSC Docket 2016-AD-0161, discovery CVX 1-84_Supplemental_Attachment J-1_Confidential (2017 Viability Analysis) Tab Summary_ Kemper NGCC. Summary tabs attached as Exhibit JIF-2.

⁶ MPSC Docket 2009-UA-0014 Phase 2 Direct Testimony of F. Sherrell Brazzel. December, 2009. Page 9 at 10-12.

1 The Company specifically sought alternatives to natural gas, stating that its
2 solicitation process had been designed to screen out “volatile” natural gas
3 options.⁷

4 Early in the screening process, the Kemper County Integrated
5 Gasification Combined Cycle Project (Kemper County IGCC
6 Project or Project) was identified as an attractive solid-fuel option
7 relative to the other self-build alternatives being evaluated,
8 including natural gas generation. Consistent with the Company's
9 stated fuel diversity objectives, the market test was designed to
10 find other solid-fuel market alternatives or natural gas market
11 alternatives with guaranteed fuel stability that would be
12 competitive with the best self-build alternative.

13 During that proceeding, when pressed about the potential of relying on natural gas
14 and building a turnkey NGCC plant, the Company rebuffed the idea stating that a
15 reliance on natural gas for this project was likely to result in high and unstable
16 costs. On behalf of the Company, Witness Frank Clemente, stated that the
17 procurement of natural gas generation was an inferior solution relative to the
18 IGCC project,⁸ concluding:

19 Based on both experience and current developments, it is far more
20 likely that natural gas problems in both the United States and
21 Mississippi will get worse rather than improve, or even stay the
22 same. Both of the choices facing the Commission are costly in the
23 near term. However, over the long term, a resource that provides
24 some prospect of price stability is to be desired.⁹

⁷ MPSC Docket 2009-UA-0014, Phase 1. Direct Testimony of Garey C. Rozier, page 9 at 13-23.

⁸ MPSC Docket 2009-UA-0014, Phase 2. Rebuttal Testimony of Frank Clemente. Page 2 at 13 to page 3 at 2.

⁹ MPSC Docket 2009-UA-0014 Phase 2 Rebuttal Testimony of Frank Clemente. Page 23 at 13-17.

1 The Company very clearly selected against an NGCC option during the CPCN
2 proceeding, and in every instance since.

3 **Q Did the Company build Kemper to operate on natural gas as its exclusive**
4 **fuel source?**

5 **A** No. Kemper was built as a coal gasifying facility with components of a traditional
6 combined cycle plant structured into the facility. The Company consistently
7 rejected the conversion of the evolving IGCC facility to an exclusively natural-
8 gas fired facility, stating that the costs and risks of operating Kemper as a CC
9 were overwhelmingly high.

10 Responding to an independent audit of the Company's 2012 Viability Analysis by
11 URS, the Company stated that the conversion was not reasonable:

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED]

17 [REDACTED]

18 [REDACTED]

19 [REDACTED]¹⁰

20 **3. KEMPER CC IS SUB-PAR RELATIVE TO MODERN NGCCs**

21 **Q Is the Kemper CC a turnkey NGCC plant?**

22 **A** No. The Kemper CC comprises a series of components within the larger, non-
23 operational IGCC project, which – when operated independently of the remainder
24 of the IGCC – has similar characteristics to an NGCC.

¹⁰ 2013-UA-0189 - URS Viability Review - 20140523-CONFIDENTIAL-Rozier Exhibit GCR-7-REB:
October 2, 2012: URS Kemper IGCC Project Viability Review: Exhibit A. Attached as Exhibit JIF-3.

1 As stated by Company witness Kimberly Flowers in the 2009 CPCN,
2 Generation technologies, such as the Kemper County IGCC
3 Project, are not a simple, off the shelf purchase of one component.
4 Instead, a generating plant is a collection of large, engineered
5 equipment, such as boilers, steam turbines or gas turbines that are
6 piped and wired together with other components to produce
7 electricity in a cost effective and reliable manner.¹¹

8 The IGCC, in particular, is an extremely complex collection of non-combined
9 cycle equipment that are intrinsically interconnected with the Kemper CC.

10 **Q Does Kemper operate as a state-of-the-art NGCC?**

11 **A** No. Kemper operates below the efficiencies, and above the emissions rates, of
12 modern NGCCs, and it operates *much* less efficiently than other NGCCs built by
13 Southern Company in the last 17 years.

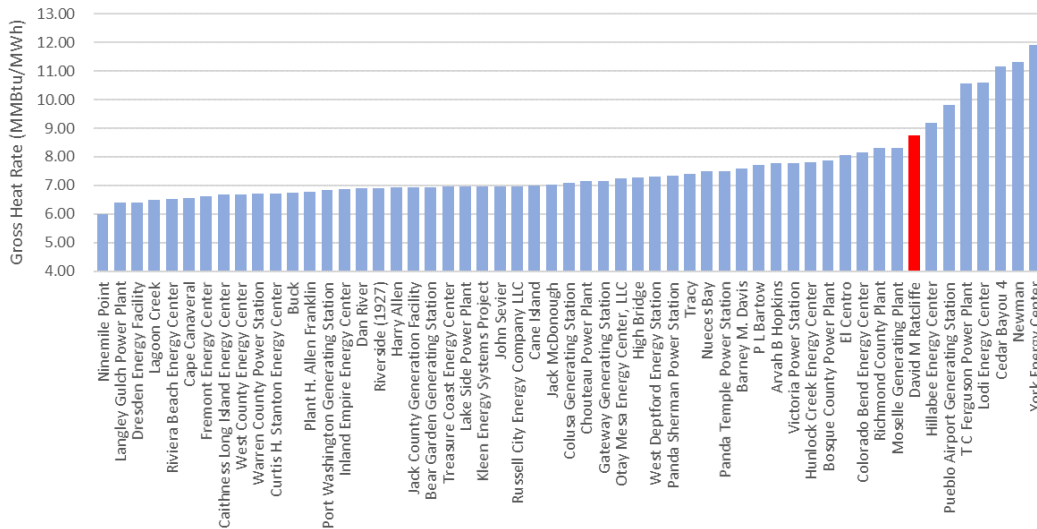
14 Kemper is not optimized to run as an NGCC. Kemper CC ranks in the 13th
15 percentile of gross heat rates¹² – or the eighth worst heat rate of all fifty-five
16 combined cycle plants built since 2008, as shown in Figure 1 below. Kemper's
17 average gross heat rate is 8.74 MMBtu/MWh. The top 10 NGCCs average a gross
18 heat rate of 6.5 MMBtu/MWh, or 26% better than Kemper. Notably, the data
19 upon which this estimate is based likely overstates the efficiency of Kemper (i.e.
20 the value should be yet higher) as it includes both natural gas consumed for
21 electric generation and coal used in the gasifier, but not used for generation
22 purposes.

¹¹ MPSC Docket 2009-UA-0014, Phase 1. Direct Testimony of Kimberly Flowers, page 42 at 10-14

¹² Calculated as heat input (MMBtu) divided by gross generation (MWh) as reported to US EPA Clean Air Markets Database (CAMD) under the Continuous Emissions Monitoring (CEMS) program from 2014-2016, inclusive.

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Figure 1. Gross heat rates (MMBtu/MWh) for non-CHP combined cycle plants built since 2008.¹³



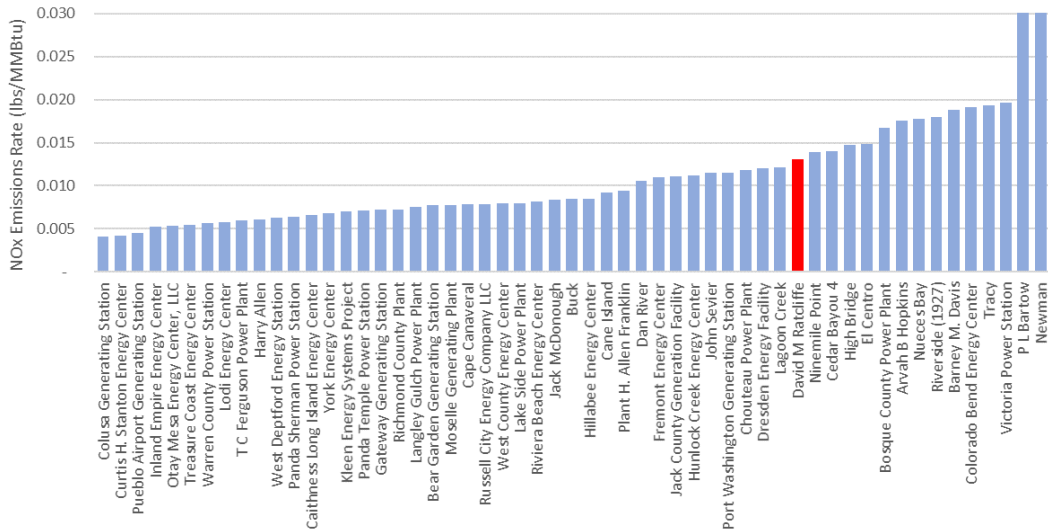
3

4 Kemper also has higher emissions than modern NGCCs. Again, comparing
 5 Kemper against the fifty-five combined cycle plants built since 2008, as shown in
 6 Figure 2, below, we find that Kemper CC is in the 26th percentile for emissions of
 7 oxides of nitrogen (NO_x), a criteria air pollutant and ozone precursor. With
 8 emissions in excess of 0.013 lbs NO_x/MMBtu (or about a half ton of NO_x per day
 9 at 50% capacity factor), Kemper has emissions 2½ times worse than the top ten
 10 performers in service since 2008.

¹³ Source: heat input and gross generation from US EPA CAMD data. Unit characteristics (operational year, CHP status, and combined cycle designation) from EIA Form 861, 2016 Early Release. Note that CAMD records Kemper CC as the David M. Ratcliffe station, the name assigned to Kemper in 2011 but not maintained as a recorded name in most other records.

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Figure 2. NOx emissions rates (lbs NOx/MMBtu) for non-CHP combined cycle plants built since 2008.¹⁴



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In the CPCN leading to Kemper, MPC claimed that Southern Company had a track record of building highly cost-effective NGCCs from 2000-2007 through Southern Company Services, Inc. (SCS).¹⁵ Kemper CC operates well below the efficiencies of Southern Company’s other plants of an earlier vintage. Kemper’s net heat rate¹⁶ on natural gas alone is 7.6 MMBtu/MWh, or nearly 7% higher than even early-vintage NGCCs built by Southern Company 2000-2007.¹⁷

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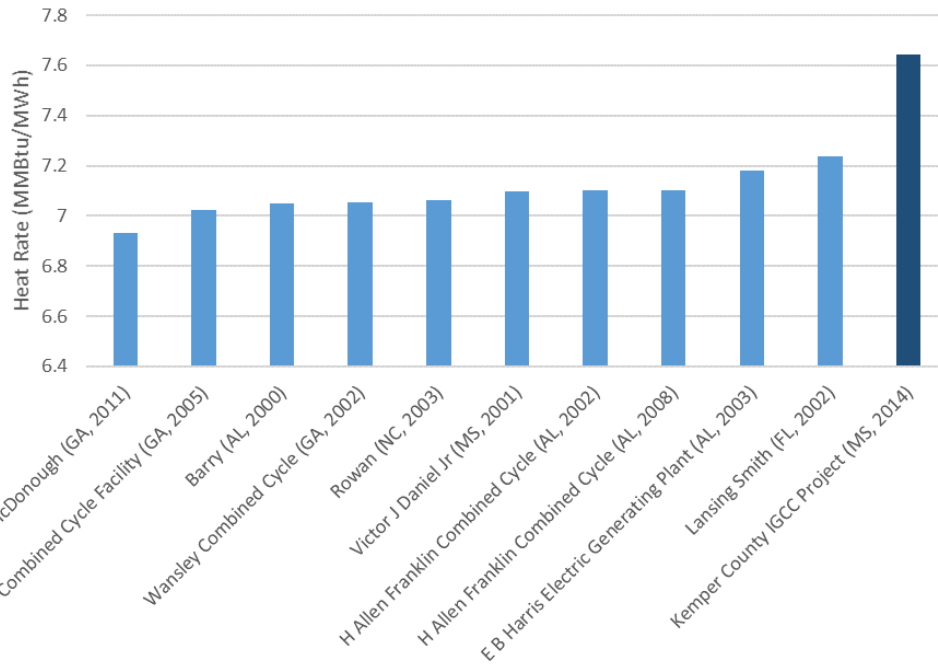
¹⁴ Source: NOx emissions and gross generation from US EPA CAMD data. Unit characteristics (operational year, CHP status, and combined cycle designation) from EIA Form 861, 2016 Early Release. Note that last two plants listed, PL Bartow (Duke, Florida) and Newman (El Paso, Texas), have emissions rates above the y-axis, at 0.031 and 0.108 lbs/MMBtu, respectively.

¹⁵ MPSC Docket 2009-UA-0014, Phase 2. Rebuttal Testimony of Thomas Anderson, page 5 at 7-16.

¹⁶ Calculated as the heat input (MMBtus) per net generation (MWh), distinguished from gross generation as the output as the busbar, after internal electric consumption.

¹⁷ The net heat rate in this case is lower because it only considers the natural gas burned for electrical generation.

1 **Figure 3. Heat rate of Kemper CC on natural gas**



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4 **Q Are Kemper CC’s variable operations and maintenance (O&M) costs on par**
 5 **with other NGCCs in Southern Company’s fleet?**

6 **A** No. MPC affirms that Kemper’s O&M budget is \$11 million higher than the
 7 NGCC at Plant Daniel due to “non-typical items that are needed for the Kemper
 8 CC,”¹⁸ and fundamental differences in the design of Kemper. These “non-typical
 9 items” include water treatment trailers for the excessive water used by the
 10 Kemper when operating on gas, a “waste water treatment plant [which] is
 11 significantly more complex than the discharge method used at [NGCC Plant]
 12 Daniel,” and substantially larger facilities “than what would be found for other
 13 CC units or plants.”¹⁹

¹⁸ MPSC Docket 2016-AD-0161. Discovery response to GCS 3-13. March 3, 2017. Attached as Exhibit JIF-4.

¹⁹ *Id.* Also described in 2017-AD-0112 Direct Testimony of Bruce C. Harrington, page 9 at 13-22.

1 MPC discusses that it expects to reduce the unique variable O&M costs associated
2 with the Kemper IGCC build after 2018, when it will eliminate contract operators,
3 upgrade its water treatment facilities, and reduce other contracts. However, O&M
4 costs that are associated with the unique Kemper build will remain \$6.5 million
5 higher per year than would otherwise be expected for an NGCC.²⁰

6 **Q Is it fair to assess the Kemper CC as equivalent to a state-of-the-art NGCC?**

7 No. Kemper's purpose, design, efficiency, emissions, and variable costs are not
8 on par with state-of-the-art, or even just recent NGCCs built by Southern
9 Company and other generation owners.

10 Instead of owning and operating an NGCC, the Company has used components of
11 the non-operational IGCC to create a proxy to an NGCC with non-standard – and
12 non-optimal – components and operations.

13 **4. KEMPER CC'S ALLOCATED COST IS WELL IN EXCESS OF ITS VALUE**

14 **Q Should the Commission be bound to provide MPC the full allocated cost of**
15 **the Kemper CC facility?**

16 **A** No. The Company has identified components of the Kemper IGCC facility it
17 believes should be allocated as a standard cost of service plant. However, because
18 the facility contains much more equipment, additional facilities, and structures
19 than would ordinarily be found at an efficiently planned and built NGCC, the
20 Company has needed to make decisions about items it believes are attributable to
21 the plant as a gas-fired facility.

22 To the extent that MPC has identified costs well in excess of the cost of a new
23 greenfield NGCC, I believe that the Company's approach verges on gold plating.
24 Allowing the Company to recover its allocated costs sends the signal that the
25 Commission does not require the Company to build efficiently constructed

²⁰ MPSC Docket 2017-AD-112. Discovery request GCS 1-4. September 18, 2017. Attached as Exhibit JIF-5.

1 generation. Had the Company sought to build a sub-par gas-fired NGCC at costs
2 substantially higher than contemporary units, the Commission would have
3 certainly rejected this approach. The Company did not seek, and was not
4 approved to build, an appropriately sited gas-fired combined cycle plant. It has
5 not built a standard NGCC, and the plant that is built is sub-par.

6 MPC should not be permitted to recover costs in excess of the value of the plant it
7 now operates and seeks to recover in rates. Effectively, the Company now comes
8 before the Commission with a different resource than was either expected or
9 approved. The equivalent paradigm is that MPC has the opportunity to procure a
10 new resource that has not come before MPSC in a docketed proceeding
11 previously, and seeks recovery on the purchase price of that resource. The correct
12 purchase price is the fair market value of the resource, and no more.

13 There are three approaches that the Commission might consider with respect to
14 the value of Kemper CC.

- 15 1. The Commission can pay MPC for the cost of an equivalent NGCC, using
16 proxies as guidance. This option conservatively favors the Company as
17 this compares Kemper CC to an optimally-constructed new plant.
- 18 2. The Commission can pay the fair market value of Kemper CC as if it were
19 authorizing MPC to purchase the plant from a third-party provider or
20 developer.
- 21 3. The Commission can reimburse MPC for the cost of Kemper CC less the
22 lost ratepayer value of having pursued Kemper CC rather than a new plant
23 site.

24 I discuss all three of these valuations below.

1 **Q What is the Company's allocated cost for the Kemper NGCC?**

2 **A** The Company has assigned \$1,185,999,076 for Kemper (gross plant in service),²¹
3 with \$847,275,571 allocated to MPC retail ratepayers.²² This is approximately the
4 same amount as estimated in the last viability analysis, at [REDACTED], performed
5 by the Company in January 2017.²³ Providing [REDACTED] for retail customers,²⁴ the
6 allocated Kemper costs are approximately at \$1,272/kW. Notably, this assessment
7 includes incremental transmission to reach the Kemper site; excluding those costs,
8 is \$765 million on an allocated basis, or \$1,149/kW.

9 **Q What was the estimated cost of a new NGCC at the time that MPC elected to**
10 **pursue the IGCC project?**

11 **A** At the time the project was being launched – from 2011-2013, energy industry
12 analysts assessed a range of prices for new gas-fired combined cycle power
13 plants, ranging from \$850/kW to \$1095/kW (converted to 2017\$). As shown in
14 Confidential Figure 4, below, the allocated costs for Kemper CC are above all of
15 these contemporary estimates.

²¹ Exhibit ___(MHF-2) Traditional Revenue Requirement. Page 2, Allocations. Total Gross Plant in Service.

²² *Id.*

²³ MPSC Docket 2016-AD-0161, discovery CVX 1-84_Supplemental_Attachemnt J-1_Confidential (2017 Viability Analysis) Tab Summary_ Kemper NGCC, cell C27.

²⁴ MPSC Docket 2016-AD-0161, discovery CVX 1-84_Supplemental_Attachemnt J-1_Confidential (2017 Viability Analysis) Tab Strategy (Lig-CC), Section (D) Case 2: Kemper NGCC Summer Capacity Rating (natural gas) (MW).

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The Company's forward-looking estimate for the cost of an NGCC was at the lower end of industry estimates. Southern Company has asserted that it is able to build NGCCs significantly below national averages. In the CPCN testimony of 2009-UA-0014, Company witness Mr. Thomas Anderson stated the following:

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Our studies have shown that SCS [Southern Company Services, Inc.] provides [engineering and procurement] services at a cost below that of comparable third-party engineering firms. This

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²⁵ Sources: Assumptions to AEO 2012, Table 8.10

[https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554\(2012\).pdf](https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554(2012).pdf)

Assumptions to AEO 2013, Table 8.2. May 2013.

[https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554\(2013\).pdf](https://www.eia.gov/outlooks/aeo/assumptions/pdf/0554(2013).pdf)

EIA April 2013. Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants. Table 1. Updated estimates of power plant capital and operating costs.

https://www.eia.gov/outlooks/capitalcost/pdf/updated_capcost.pdf

Lazard Levelized Cost of Energy 6.0, 7.0, and 8.0 (2011-2013)

Cost of New Entry Estimates for Combustion-Turbine and Combined-Cycle Plants in PJM. August 24, 2011. Prepared for PJM. Table 2. Recommended Gas CC CONE for 2015/2016.

Edison Electric Institute. January 2011. Potential Impacts of Environmental Regulation on the U.S. Generation Fleet. Appendix A.

1 model has been in use for decades, and was the same model used
2 to build Southern Company's fifteen combined cycle units and
3 eleven simple cycle units between 2000 and 2007. **This model has**
4 **consistently led to installed costs per kW of new generation**
5 **that are significantly below national averages.**²⁶

6 The Company reinforced these assurances. In his February 1, 2010 statement to
7 the Commission in the Kemper CPCN docket, Anthony Topazi stated that the
8 company's construction costs for new generation were 20-30% below the national
9 average.²⁷

10 In the February 2012 viability study, MPC assessed the cost of a new NGCC
11 build for June 2017 operation would be \$█/kW (2011\$),²⁸ or \$█/kW in
12 2017\$. The Company's estimates have only fallen in the last five years: in the
13 most recent MPC viability study from January 2017, a "new and clean" 568 MW
14 NGCC is \$█/kW (2017\$).

15 **Q Are the Company's estimates from 2012 in line with the costs of recently**
16 **constructed NGCCs?**

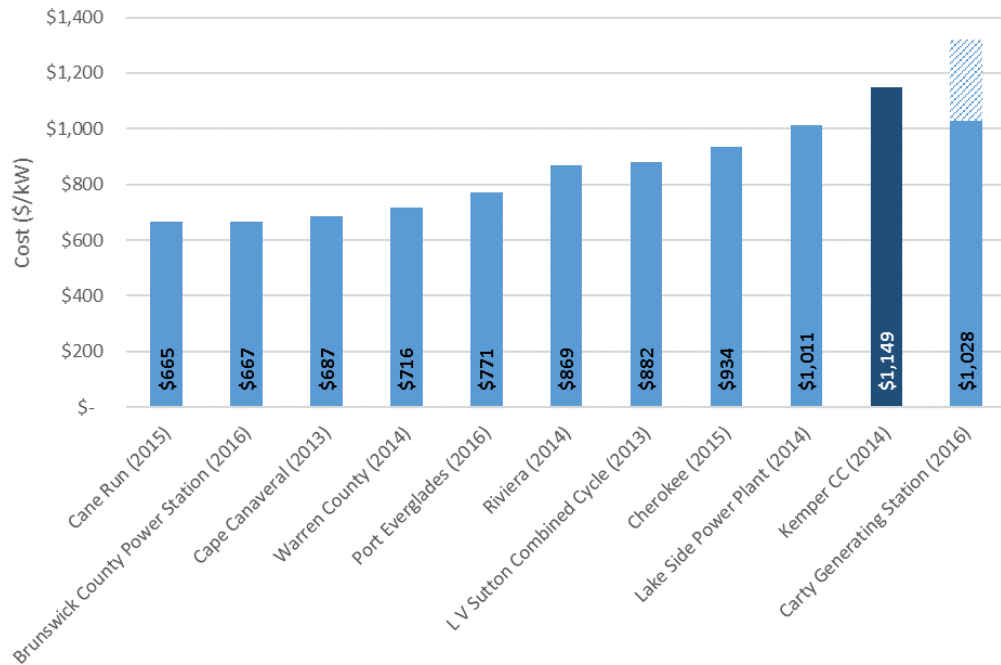
17 Yes. I was able to pull the total plant in-service costs of ten comparably-sized
18 NGCCs built between 2012 and 2016 with publicly-disclosed costs, and compare
19 their total costs to the allocated Kemper CC costs. The average cost of NGCCs
20 built between 2012 – 2016 was \$823/kw, or about 28% lower cost than Kemper
21 CC, as shown in Figure 5, below.

²⁶ MPSC Docket 2009-UA-0014, Phase 2. Rebuttal Testimony of Thomas Anderson, page 5 at 7-16.
Emphasis added.

²⁷ Transcript Kemper Phase II hearings, pp. 1065-1066.

²⁸ CVX 1-84_Supplemental_Attachment E-2_Confidential, tab Capital Costs, cells E93 (total combined cycle capital costs) and R4 ("alternative summer peak" for NGCC). Cost is █/kW accounting for development and certification costs.

1 **Figure 5. Costs for NGCCs built between 2012 and 2016, and Kemper CC.²⁹**



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3 The costs allocated to the Kemper CC by MPC would still render it the highest
 4 cost gas-fired combined cycle plant built in the last five years. The exception to
 5 this is Portland Gas and Electric’s Carty station, in which the utility contractor –
 6 Abeinsa – ran overbudget, was found to have performed low quality work, and
 7 was subsequently removed from the project and sued.³⁰ For that station, Figure 5
 8 shows the contracted cost and the overrun, separately.

9 **Q What is your assessment of the cost of a new NGCC contracted for 2017**
 10 **delivery?**

11 **A** Based on the historic estimated costs of an NGCC and the actual construction cost
 12 of recent NGCCs, I think an estimate of \$850/kW is reasonable and consistent

²⁹ Sources: FERC Form 1 (2016), plant in-service cost (total plant); various other press releases and business journal sources. Kemper CC costs exclude transmission.

³⁰ “PGE gets new \$660M power plant running in the nick of time.” Portland Business Journal. July 29, 2016. <https://www.bizjournals.com/portland/blog/sbo/2016/07/pge-gets-new-660m-power-plant-running-in-the-nick.html>

1 with both the Company's 2012 assessments and actual construction costs for
2 equivalent plants.

3 Scaled to the equivalent of Kemper CC's allocation to MPC ratepayers, a new
4 NGCC would have cost \$566 million. MPC proposes to recover \$765 million, or
5 35% more than an equivalent NGCC.

6 **Q You stated that another mechanism of determining a fair price for Kemper**
7 **CC would be to perform a valuation. What mechanism would you use to**
8 **perform such a valuation?**

9 **A** The fair market value of an existing generation station is the price that a merchant
10 buyer would be willing to pay for the plant – irrespective of incurred cost. Such
11 valuations are not restricted to market transactions alone, but are performed
12 regularly by vertically integrated utilities when assessing the value of utility-
13 owned generation against new generation or market purchases.

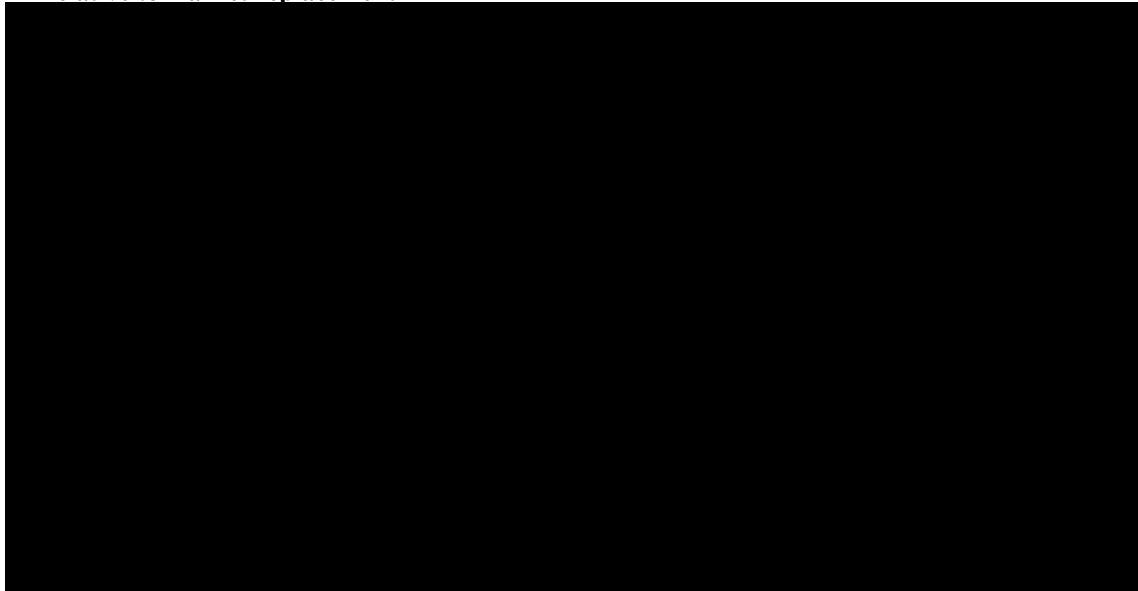
14 A merchant would realize two primary value streams from a generator in
15 Southern Company's service territory: an energy value and a capacity value. A
16 reasonable analysis could simply assess the expected net revenue from energy and
17 capacity bilateral sales accounting for fuel, maintenance, and ongoing capital
18 costs. Such a valuation does not consider the sunk capital from the initial
19 investment. The net present value of this stream of net revenues over the expected
20 life of the plant is one estimate of the market value of the plant.

21 While Southern Company clearly maintains this data, and uses components of it
22 in the Strategist-based Viability Analyses, it does not report enough information
23 to compare Kemper CC against market equivalency over the life of the plant.³¹

³¹ The economic viability studies do include elements of market purchases and sales, but only in an incremental basis of the IGCC relative to a greenfield NGCC. In addition, the cost (or price) of market energy is not reported directly, but is instead reported as the difference between the cost of MPC's system less Kemper under the IGCC and NGCC scenarios. It is not clear that this would be a reasonable representation of wholesale market cost equivalency in Southern Company's service territory.

1 For illustrative purposes, however, we can assess the net market revenues that
2 would have been accrued to Kemper CC in 2014-2016, based on publicly
3 available information and the Company's 2017 Viability Analysis.

4 **Confidential Table 1. Net revenues for Kemper NGCC in 2014-2016 (whole plant)**
5 **relative to market replacement**



6
7 Overall, Kemper CC provided just over \$13 million in value to MPC ratepayers
8 from 2014-2016. At the current levels of O&M and wholesale energy prices,
9 Kemper provides very little incremental customer value and unless maintenance
10 costs drop substantially, or the market price of energy recovers without
11 substantially impacting Kemper's fuel costs, this story is likely to be the same

³² EIA Form 861

³³ SC-MPC 1-6 Attc A

³⁴ Capacity factor in 2014 pro-rated for 220 operating days

³⁵ EIA Form 923 (2014-2016)

³⁶ Calculated

³⁷ EIA Form 923, Fuel Receipts

³⁸ Calculated: hourly reported net generation from SC-MPC 1-6 Attc A multiplied by system lambda as reported in FERC Form 714 for Southern Company

³⁹ Based on MPC 2017 Viability Analysis (CVX 1-84 Supplemental Attachment J-1, Summary Inputs) for Kemper NGCC, assumed to be for 136 incremental MW relative to IGCC, multiplied by 740 full plant nameplate.

⁴⁰ Calculated, fuel price * heat input

⁴¹ SC-MPC 1-08 Attachment A

⁴² Not reported

1 over the life of the plant. As a general principal, however, wholesale energy costs
2 are likely to remain proportional to gas prices as long as gas plants set the margin
3 – and will likely fall proportionally to gas prices as renewable energy increasingly
4 keeps the cost of wholesale energy low. The prospects for a market recovery that
5 would drive up the relative economics of Kemper CC are extremely limited.

6 **Q What is the third method that the Commission could chose to value the**
7 **contribution of the Kemper CC?**

8 **A** The third method that could be considered by the Commission in this case is to
9 value the Kemper CC as the allocated cost, less the lost ratepayer value for having
10 pursued the Kemper site as opposed to an alternative plant. The concept
11 underlying this valuation method is equivalent to a straight disallowance on the
12 basis of an imprudence finding. While the prudence finding itself is based on a
13 lack of appropriate planning or poor execution and management, the assessment
14 of damages is based on the concept of making the ratepayers whole – in other
15 words, the ratepayers should pay no more than they would have had the utility
16 acted in their best interests from the start.

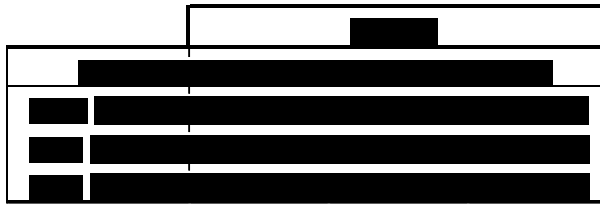
17 Since utility capital expenditures are long-lived and have system-wide
18 implications, forward-looking system planning is required to assess the
19 implications of an imprudent decision against lower cost alternatives that could
20 have, or should have, been pursued. In this case, MPC has developed a model it
21 believes to be robust and reliable, and that allows the Commission to assess the
22 implications of a lower cost future.

23 In the 2017 Viability Analysis,⁴³ the Company assessed the net present value
24 (NPV) of the Kemper IGCC, the Kemper CC run on natural gas, and an
25 alternative greenfield NGCC at Sweatt, just outside Meridian, MS. In the
26 Viability Analysis, the Company compares the IGCC against the Kemper CC, and

⁴³ MPSC Docket 2016-AD-0161, discovery CVX 1-84_Supplemental_Attachemnt J-1_Confidential (2017 Viability Analysis)

1 the IGCC against Sweatt. In our case, however, the IGCC is no longer under
2 consideration, and therefore we can compare Kemper CC against Sweatt.
3 Reviewing the cases in which “committed” costs are excluded (appropriate for a
4 valuation, not cost-based, study), we find that Kemper CC is anticipated to cost
5 \$ [REDACTED] million through 2056 (2016\$ NPV)⁴⁴ while the Sweatt NGCC (online in
6 2022) would have resulted in \$ [REDACTED] million through 2056. The difference
7 between these cases is an expected ratepayer loss of \$ [REDACTED] million by having
8 pursued the Kemper CC over the Sweatt NGCC. The full array of ratepayer losses
9 can be reviewed in Confidential Table 2, below.

10 [REDACTED] per NGCC vs. Sweatt
11 NGCC, derived from 2017 Viability Analysis. Million 2016\$, NPV 2017-2056.



12
13 Deducting expected ratepayer losses from the actual costs incurred to build
14 Kemper CC, we arrive at a value of approximately \$530 million.⁴⁵ MPC proposes
15 to recover \$765 million, or 44% more than its damage-assessed value.

16 **Q What is your conclusion with respect to the value of the Kemper CC?**

17 **A** At the end of the day, ratepayers should be willing to pay no more than \$530-
18 \$560 million for the Kemper CC, and possibly much less based on its current
19 performance relative to potential market energy and capacity value. The \$530
20 million value is a disallowance-based damages value holding ratepayers harmless
21 relative to a greenfield NGCC. The \$560 million value is the proxy cost of an
22 equivalent state-of-the-art NGCC, as priced in 2012.

⁴⁴ Mid-gas, no carbon price case.

⁴⁵ [REDACTED]

1 **Q Are you recommending that MPC should have simply built a new greenfield**
2 **NGCC in 2012, or should build a new NGCC today?**

3 **A** No. In many respects, this valuation is constrained to a set of false choices,
4 dictated by the actions of the Company. Back when the Company was still
5 applying for CPCN, it made clear that it had constrained its evaluation of future
6 resources to solid fuels and natural gas, as demonstrated in Mr. Rozier's
7 testimony (see quote on page 7, above).

8 The Company's choice to pursue the Kemper IGCC project, and ultimately arrive
9 at the Kemper CC, forwent any option to pursue renewable energy, deeper
10 demand-side management options, or market-based solutions. Any choice to give
11 up the Kemper site, or undergo the conversion to natural gas, needs to be balanced
12 against the ratepayer benefits of pursuing robust clean energy options – a choice
13 that was clearly left off the table by MPC.

14 **Q Mississippi Power witness Schmidt states in his testimony that the differences**
15 **between the Kemper CC and a standalone greenfield CC are the product of**
16 **“decisions that were reasonable and prudent at the time they were made,”**
17 **i.e. when the Kemper CC was intended to be part of the IGCC facility. Mr.**
18 **Schmidt also states that in its December 3, 2015 order in Docket No. 2015-**
19 **UN-80 the Commission has already rejected comparison of the Kemper CC**
20 **to a stand-alone CC. Do you agree with Mr. Schmidt?**

21 **A** No. The Commission is obviously the best judge of what it said or intended by
22 any of its orders. However, the December 3, 2015 order was at a point when MPC
23 was still projecting that Kemper would operate as an IGCC facility. The
24 Commission also stated in that order that it did not "tie its hands in relation to
25 future prudence evaluations," and further stated that if the Kemper plant was
26 incapable of operating sufficiently on syngas, "the Commission retains the
27 authority to revisit the findings made herein and hold MPC responsible to
28 ratepayers for any amounts that the Commission determines should not have been

1 recovered." The situation the Commission referenced is what has in fact
2 occurred.

3 **Q Do you have any other concerns with the Company's case as presented in this**
4 **docket?**

5 **A** Yes. The Company has included in its request for recovery the total cost of the
6 land associated with the Kemper IGCC, including not only the combined cycle
7 property, but the gasification island, the wetlands mitigation area, and the
8 substantial construction laydown associated with the IGCC buildout. It is notable
9 that the property associated with the core operational Kemper CC (including both
10 the plant and cooling towers) occupy just 13.7 acres – or one half of one percent
11 of the total property area claimed by the Company in this case (see Table 3,
12 below).

13 Even generously allocating all common and water treatment lands to the
14 ratepayers, the Kemper CC site only take up 192.3 acres, or 6.5% of the total
15 acreage of the site.

16 **Table 3. Kemper CC Land Area⁴⁶**

Combined cycle	13.7 acres	0.5%
Common	46.1 acres	1.6%
Gasification	178.8 acres	6.0%
Water/water treatment	132.5 acres	4.5%
Wetlands mitigation, general, buffer, construction	2,596.9 acres	87.5%
Total	2,968.0 acres	

17
18 The 193 acre allocation is extremely generous. Modern CCs do not require the
19 substantial water reservoir or treatment area allocated here, or the massive number
20 of outbuildings, trailers, and parking lots built at the Kemper site. Other NGCCs
21 in Mississippi do not require anywhere near the same space.

⁴⁶ MPSC Docket 2016-AD-0161, discovery GCS 2-16. Attached as Exhibit JIF-6.

- 1 • Choctaw County, an 899 MW NGCC, sits on 72 acres, 50 of which are
2 developed.⁴⁷
- 3 • Caledonia, an 800 MW NGCC in Lowndes County, sits on a 45 acre site.⁴⁸
- 4 • Southaven, a 904 MW NGCC in Southaven, sits on a 36 acre site.⁴⁹
- 5 • Magnolia, a 1,004 MW NGCC in Benton County, sits on a 45 acre site.⁵⁰

6 The Company's settlement proposes allocating approximately 25% of the land
7 area, or over 700 acres, to ratepayers. Very little of this land is attributable to a
8 reasonably built NGCC and should not be paid for by ratepayers.

9 **Q Please state your conclusions.**

10 **A**The Company's proposal to recover its cost-based allocation of the Kemper CC is
11 unreasonable. The Company did not plan to build a gas-fired combined-cycle
12 unit, nor did it ultimately construct a standard NGCC. The operational component
13 of the plant built by MPC performs worse than contemporary NGCCs, incurs
14 higher operational costs, and produces higher emissions – and yet the Company
15 proposes to recover costs that are 35% higher than the cost of a state-of-the-art
16 NGCC.

17 I propose that in a reasonable settlement stipulation the Company would recover
18 no more than \$530 to \$560 million for the ratepayer-allocated Kemper CC, a
19 balanced assessment of proxy standard NGCCs and an adjustment to ensure that
20 ratepayers are not penalized by the Company's pursuit of a high-cost, high-risk
21 technology. The Commission may determine that other costs incurred at the
22 Kemper CC plant location are in keeping with the principal of a value-based
23 assessment, and adjust this range accordingly.

⁴⁷ Google Earth. Author's calculation.

⁴⁸ *Id.*

⁴⁹ *Id.*

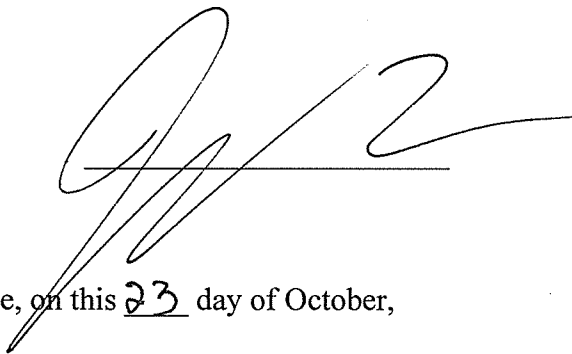
⁵⁰ *Id.*

1 **Q** **Does this conclude your testimony?**

2 **A** It does.

VERIFICATION

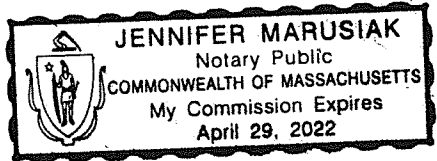
BEFORE ME, the undersigned Notary Public in and for the County of Middlesex, State of Massachusetts, personally came and appeared Jeremy Fisher, who after being duly sworn did depose and declare that the foregoing is his direct testimony in this proceeding and that all of the information and assertions contained therein are true and correct to the best of his knowledge, information and belief.



SWORN TO AND SUBSCRIBED before me, on this 23 day of October, 2017.


NOTARY PUBLIC

My Commission expires _____



CERTIFICATE OF SERVICE

I, Robert B. Wiygul, counsel for STEPS and the Sierra Club, do hereby certify a full, confidential version of STEPS and Sierra Club's Testimony of Jeremy Fisher in the above referenced docket has been served via U.S. Mail, postage prepaid to:

Katherine Collier, Executive Secretary
Mississippi Public Service Commission
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A copy of the redacted "Public Version" filing has been filed with the Commission electronically

to: efile.psc@psc.state.ms.us

and a copy of the filing has been served by electronic mail to the Intervenors on the service list attached hereto as Exhibit "A" and incorporated herein.

This the 23rd day of October, 2017.



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