

**BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION**

**IN THE MATTER OF: GEORGIA POWER
COMPANY'S EIGHTH SEMI-ANNUAL
VOGTLE CONSTRUCTION MONITORING
REPORT**

DOCKET NO.29849

PUBLIC DISCLOSURE

**DIRECT TESTIMONY
AND EXHIBITS
OF
PHILIP HAYET**

**ON BEHALF OF THE
GEORGIA PUBLIC SERVICE COMMISSION
PUBLIC INTEREST ADVOCACY STAFF**

AUGUST 8, 2013

1 I. INTRODUCTION

2 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

3 A. Philip Hayet, 215 Huntcliff Terrace, Atlanta, Georgia, 30350.

4 Q. WHAT IS YOUR OCCUPATION AND BY WHOM ARE YOU EMPLOYED?

5 A. I am an Electrical Engineer, and I am President of Hayet Power Systems Consulting
6 (“HPSC”).

7 Q. WHAT CONSULTING SERVICES DOES HPSC PROVIDE?

8 A. HPSC provides consulting services related to electric utility system planning, resource
9 analysis, production cost modeling, and utility industry policy issues.

10 Q. PLEASE SUMMARIZE YOUR EDUCATION AND QUALIFICATIONS.

11 A. I graduated from Purdue University in 1979 with a B.S. degree in Electrical Engineering,
12 and the Georgia Institute of Technology in 1980 with an M.S. degree in Electrical
13 Engineering, with a specialization in Power Systems. I have over thirty years of
14 experience in the electric utility industry. More detail regarding my educational
15 background and professional qualifications, as well as my appearances in regulatory
16 proceedings, can be found in Exhibit STF-Hayet-1.

17 Q. HAVE YOU PREVIOUSLY TESTIFIED AT THE GEORGIA PUBLIC SERVICE
18 COMMISSION (“GPSC” OR THE “COMMISSION”)?

19 Yes, I have testified at the GPSC on several occasions on behalf of the Public Interest
20 Advocacy Staff (“Staff”). I testified in the following fuel cost proceedings: Docket Nos.
21 22403 (FCR-18), 23540 (FCR-19), 26794 (FCR-20), 28945 (FCR-21), 33302 (FCR-22),

1 AND 35277 (FCR-23).I testified regarding Georgia Power Company's ("Georgia Power"
2 or the "Company") and Savannah Electric's 2004 Integrated Resource Plan ("IRP") in
3 Docket Nos. 17687 and 17688, and in Docket No. 24505 regarding Georgia Power's 2007
4 IRP. I testified concerning Georgia Power's Application for Certification of Vogtle Units
5 3 and 4 (Docket No. 27800), and Georgia Power's Semi-Annual Vogtle Construction
6 Monitoring Reports in this same docket (Docket No. 29849, herein referred to as "VCM
7 Report"). In 2011, I testified concerning Georgia Power's Decertification, Power
8 Purchase Agreement ("PPA"),and IRP Update Proceeding (Docket No. 34218), and
9 concerning Georgia Power's Wholesale Block Capacity Certification Proceeding (Docket
10 No. 26550). Most recently, in 2013, I testified in Georgia Power's 2013 IRP Proceeding
11 (Docket No. 36498).

12 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING AND WHAT ISSUES WILL YOU**
13 **BE ADDRESSING IN THIS PROCEEDING?**

14 A. I am appearing as a witness for Staff, and I will discuss my review of Georgia Power's
15 economic evaluations that it developed for its 8thVCM Report,which was filed on
16 February 28, 2013. I will also present Staff's independent economic evaluations.

17 **Q. PLEASE SUMMARIZE YOUR FINDINGS AND RECOMMENDATIONS.**

18 A. Staff's findings and recommendations are as follows:

- 19 1. Staff continues to have the same concern in this Vogtle Construction Monitoring
20 ("VCM")case, which is that the Company's natural gas price forecast is overstated and
21 contributes to the Company deriving overly optimistic estimates of the benefits of the
22 Vogtle Construction Project ("Project"). Staff relies on lower natural gas price forecasts,

1 which results in much lower economic benefits on a cost-to-complete basis.¹

- 2
- 3 2. The Company continues to emphasize that, since the Certification Proceeding, it has
4 identified additional benefits that improve the economic benefits to ratepayers. However,
5 the Company's analysis fails to also include detriments to the Project that have been
6 identified since certification. These detriments negatively impact the economic benefits
7 to ratepayers.
- 8
- 9 3. Staff recommends that the Company be required to continue to perform a set of
10 threedelay scenario sensitivities of 12, 24, and 36 months from the Company's most
11 current expected Commercial Operation Dates ("COD") for each unit of the Project.
- 12
- 13 4. For the first time since the Project began, the Company disclosed in its 7th VCM Report
14 that it is "usual" for a Project such as this to have a contingency of between 20 and 25
15 percent. Staff believes that the Company should have provided this information sooner to
16 the Commission.
- 17

18 **II. GEORGIA POWER'S VOGTLE PROJECT ECONOMIC EVALUATION**

19

20 **Q. PLEASE BRIEFLY DESCRIBE THE COMPANY'S ECONOMIC EVALUATION**
21 **METHODOLOGY.**

- 22 A. The Company used the same methodology that it used in prior VCM filings. The
23 Company compared revenue requirements associated with a long-term expansion plan
24 containing the new Vogtle nuclear units to the cost of an alternative expansion plan, with
25 an identical amount of combined cycle gas turbine ("CCGT") capacity. In the case with
26 the new Vogtle units, the revenue requirements include fixed and variable costs
27 associated with the expansion plan, including the *cost of completing*, operating, and

¹ A "cost-to-complete" analysis ignores costs already incurred ("sunk cost") and only considers the remaining or prospective cost of the Project when performing an economic evaluation against alternative generation options. This is the appropriate analysis because under certain circumstances Georgia law allows the Company to recover all prudently incurred sunk costs from ratepayers if the Project is halted.

1 maintaining the Vogtle 3 & 4 units. Only the costs of completing the Project are
2 included, since costs previously spent are recoverable from ratepayers under certain
3 circumstances whether the Project is completed or not. In the alternative CCGT case, all
4 fixed costs including construction cost of the units, and variable costs are included in the
5 analysis since the replacement CCGT units would have to be built entirely new.

6
7 The Company used its Strategist production cost model to derive optimal expansion plans
8 over the planning horizon for both the Project and the CCGT cases. Strategist also
9 derived the variable production and the fixed capital related revenue requirements
10 associated with the long-term expansion plan additions, other than the capital related
11 revenue requirements associated with the Project or the replacement CCGT units.
12 Capital related revenue requirements for the Project and replacement CCGT units were
13 derived using a capital revenue requirement financial model that the Company developed,
14 known as the SAM model. Costs and savings of the Project include remaining Project
15 capital and financing costs, decommissioning costs, operating and maintenance expenses
16 (“O&M”), nuclear fuel cost, spent nuclear fuel storage costs, and Production Tax Credit
17 (“PTC”) savings. The ultimate economic evaluation comparison is the difference in the
18 present value of revenue requirements (“PVRR”) between the Vogtle case and the CCGT
19 case, with a benefit occurring if the PVRR of the Vogtle case is lower than the PVRR of
20 the CCGT case.

21 **Q. WHAT CASES DID GEORGIA POWER STUDY IN THIS FILING?**

1 A. Georgia Power performed four sets of nine analyses, with each set reflecting different
2 delay scenarios. The first set includes the Company's new in-service date assumption,
3 which the Company refers to as the 21-month delay scenario (from April 1, 2016 and
4 April 1, 2017 to December 31, 2017 and December 31, 2018).² As required by the
5 Commission's Order in the 7th VCM, the Company performed three additional sets of
6 delay cases, including delays of 24, 36 and 48 months. Including these three additional
7 delay scenarios, the Company performed 36 analyses, and the results were reported in
8 Tables 14.1 through 14.5 in the 8th VCM Report. As in the 7th VCM analysis, the
9 Company performed nine analyses based on different natural gas and CO₂ costs (3
10 natural gas cases - Low, Moderate, and High, and 3 CO₂ cases - \$0/Ton, \$10/Ton, and
11 \$20/Ton).

12 **Q. HOW MUCH HAS BEEN SPENT THROUGH THE END OF THE 8TH VCM**
13 **PERIOD (ENDING DECEMBER 31, 2012) ON CONSTRUCTION AND**
14 **FINANCING COST?**

15 A. According to Table 8.1, on page 42 of the 8th VCM Report, \$2.6 billion has been
16 invested in the Project (Capital + Financing costs) through the end of December 2012.
17 Based on the Company's updated estimate of \$6.85 billion for Total Project Cost, the
18 cost-to-complete the Project is approximately \$4.28 billion.

19 **Q. IS \$4.28 BILLION THE AMOUNT THE COMPANY USED IN ITS ECONOMIC**
20 **ANALYSIS AS THE COST-TO-COMPLETE THE PROJECT?**

²April 1, 2016 and April 1, 2017 are the original In-Service Dates of the Vogtle units.

1 A. No. The Company used \$3.4 billion in its economic evaluations. One cause of the
2 difference in these amounts relates to sunk costs that are excluded from the economic
3 analysis. Since sunk capital costs are excluded from the cost-to-complete economic
4 analysis, any future financing costs that are expected to result from sunk capital costs are
5 also excluded from the economic analysis. A second cause of the difference in these
6 amounts relates to a timing difference. The \$4.28 billion reflects the remaining actual
7 Project budget as of January 1, 2013, while the cost-to-complete figure in the Company's
8 economic analysis always derived based on costs beginning one day following the filing
9 date of the VCM, which in this VCM was March 1, 2013. Therefore, the Company
10 forecasted costs that would be paid between January 1 and February 28, 2013, and
11 excluded those costs from the cost-to-complete economic evaluations. Another reason
12 for the difference in cost is that marginal financing rates are slightly higher than average
13 embedded financing rates. Long-term marginal financing rates are used for debt and
14 preferred stock in the economic evaluations, while average embedded financing rates are
15 used in the budgets for planning purposes. \$3.4 billion was the remaining cost-to-
16 complete total Project amount used in the 21-month delay case. Additionally, \$3.5
17 billion, \$3.8 and \$4.2 billion were used in the 24, 36, and 48-month delay scenarios,
18 respectively.

19 **Q. WHAT PLANNING ASSUMPTIONS DID GEORGIA POWER UPDATE SINCE**
20 **THE 7TH VCM FILING?**

21 A. As has been the Company's practice in its February VCM filings, the Company updated

1 major planning assumptions, including the following:

- 2 • Load Forecast;
- 3 • Fuel Forecast;
- 4 • CO2 Forecast;
- 5 • Nuclear Fuel Forecast;
- 6 • Marginal Debt and Preferred Stock Financing Assumptions;
- 7 • Vogtle 3 & 4 Construction Costs;
- 8 • Pre-COD O&M Expense;
- 9 • Post-COD O&M Expense;
- 10 • Post-COD Capital Additions.

11
12 **CO₂ and Natural Gas Forecasts**

13 **Q. DID STAFF HAVE ANY CONCERNS WITH THE COMPANY'S CO₂**
14 **MODELING IN THE LAST VCM CASE?**

15 A. Yes. In the 7th VCM case, Staff accepted the Company's assumptions for its CO₂ cases,
16 \$0/Ton, \$10/Ton, and \$20/Ton beginning in 2015; however, Staff expressed a concern
17 that the 2015 start date was early given the status of proposed legislation at the time.

18 **Q. HAS THE COMPANY MODIFIED ITS STARTING DATE ASSUMPTION FOR**
19 **CO₂ COSTS IN THE 8TH VCM CASE?**

20 A. Yes. The Company's latest assumption is for CO₂ impacts to begin in 2017 in the
21 \$10/Ton case, and in 2020 for the \$20/Ton case.

22 **Q. IS STAFF STILL CONCERNED THAT THE COMPANY'S NATURAL GAS**
23 **PRICE FORECASTS ARE OVERSTATED?**

24 A. Yes. The Company's latest natural gas price forecasts are the same as those used in its

1 2013 IRP proceeding (Docket No. 36498). I filed joint testimony with Mr. Randall
2 Falkenberg in that proceeding, and we found that the Company's gas price forecasts were
3 inflated, most likely because the Company relied on a single source, Charles River
4 Associates ("CRA"), for its natural gas price forecasts. I have compared the CRA
5 forecasts to other forecasts that the Company provided, which were from:

6 [REDACTED]
7 [REDACTED]
8 [REDACTED]
9 [REDACTED]
10 [REDACTED]

11
12 Using all of these forecasts as a reference, my conclusion is that the Company's Low,
13 Mod and High gas forecasts are inflated.

14 **Q. HOW DO YOU ADDRESS THE ISSUE OF THESE GAS PRICE FORECASTS?**

15 A. I addressed the gas forecasts the same way that Mr. Falkenberg and I addressed them in
16 the 2013 IRP proceeding. I continue to believe that the Company's High gas forecast is
17 an outlier, and have eliminated it. I believe that the Company's Moderate gas price
18 forecast is also too high, and instead used it as Staff's High forecast. Correspondingly, I
19 used the Company's Low gas forecast as Staff's Mod forecast, and I developed a new
20 Low gas forecast based on the method I used in the prior VCM proceedings. I averaged
21 together multiple Henry Hub forecasts,³ to create the Staff Low forecast, including the

³ Henry Hub is the most commonly used reference trading point for natural gas, and most forecasts are stated relative to that trading point. The actual price that a utility will pay for natural gas will include additional delivery

1 Company's CRA Low, Energy Ventures Analysis ("EVA") Low, and the Energy
2 Information Administration ("EIA") 2013 Annual Energy Outlook forecasts.

3 **Q. PLEASE PRESENT STAFF'S FORECASTS.**

4 A. Figure 1 compares the Company's Henry Hub forecast (CRA B2013) to Staff's forecast
5 and the EIA 2013 Reference forecast, which appears to be even lower than Staff's Low
6 forecast.⁴

7

8

and other pipeline fees that are required to transport the gas from Henry Hub to the plant location. Generally those delivery fees are relatively small compared to the cost of natural gas at Henry Hub.

⁴ The graph also includes a line showing NYMEX Henry Hub Futures Prices that settled on 7/26/2013. Since it is consistent with Staff's Low forecast, it was not labeled on the graph to avoid overcrowding.

1 **Figure 1**
2 **Begin Trade Secret**

3 **Redacted In Its Entirety**

4 **End Trade Secret**

5 **Economic Evaluation**

6 **Q. PLEASE DISCUSS THE RESULTS OF STAFF'S ECONOMIC EVALUATION.**

7 A. Staff re-evaluated the Company's current 21-month delay case using Staff's natural gas
8 price assumptions. The following table compares the Company's latest In-Service Date
9 case results (December 2017/December 2018, 21-month delay case) on a cost-to-
10 complete basis, to Staff's results using its revised gas price assumptions. Expected value
11 results are presented based on the respective weighting factors that the Staff and the

1 Company have relied on throughout these VCM proceedings. The Company's results
 2 match those found in Table 14.1 of the Company's 8th VCM Report.

3
 4 In both sets of analyses it is assumed the Units operate for 60 years based on the
 5 availability rates assumed by the Company. If the Units actually operate for less than 60
 6 years, or the availability rates turn out to be overly optimistic, then correspondingly the
 7 forecast of economic benefits will be less than what is shown in Tables 1 – 4 below.

8
 9 **Table 1**

10

Combined Cycle Natural Gas versus Nuclear								
Cost to Complete Analysis								
NPV (1007MW) \$ Millions Revenue Requirement Difference								
(Positive indicates CC is more expensive)								
	GPC (21 Mo. Delay)				STAFF (21 Mo. Delay)			
	0\$/Ton CO ₂	10\$/Ton CO ₂	20\$/Ton CO ₂		0\$/Ton CO ₂	10\$/Ton CO ₂	20\$/Ton CO ₂	
High Gas	4,759	5,900	6,887	0.33	2,178	3,841	5,028	0.25
Moderate Gas	2,178	3,841	5,028	0.33	686	2,659	3,864	0.50
Low Gas	686	2,659	3,864	0.33	-146	1,855	2,375	0.25
Weights	0.333	0.333	0.333		0.250	0.500	0.250	
Average Value	3,978				2,535			

11
 12
 13 Due to Staff's slower natural gas price forecast, Staff's net benefit results are significantly
 14 lower than the Company's. For example, Staff's Low Gas - \$0 CO₂ case, indicates that
 15 the cost to complete the Project is greater than the cost of building new CCGT units.
 16 However, on an expected value basis, both the Company's and Staff's cases indicate that

1 it is still economic to continue the Project.

2 **Q. WERE ADDITIONAL SENSITIVITY CASES PROVIDED?**

3 A. Yes, pursuant to the Commission's Order in the 7th VCM, the Company also provided
4 24, 36 and 48 month delay scenarios.

5 **Q. WHAT DELAY SCENARIOS DID STAFF DEVELOP?**

6 A. Staff developed three alternative delay scenarios using Staff's alternative gas price
7 forecasts. The starting point for these alternative delay scenarios was the [REDACTED]
8 [REDACTED] Schedule. The [REDACTED] Schedule was selected
9 because it is the only schedule from the [REDACTED] that has a [REDACTED] and
10 assumes [REDACTED]. Given the Consortium's difficulties remaining on
11 schedule to date, and the challenges of the remaining Project activities that are outlined in
12 the joint testimony filed by Dr. Jacobs and Mr. Roetger, an assumption of no acceleration
13 appeared reasonable to Staff.

14
15 The [REDACTED] Schedule, referred to as the "minimum" delay case, has
16 Unit 3 delayed to [REDACTED] and Unit 4 delayed to [REDACTED]. Staff's next case, the
17 "base" delay case, delayed the in-service dates by one year to September 2019 and June
18 2021, respectively. Finally, a third case, the "worst case" was performed that delayed the
19 in-service dates by one more year to September 2020 and June 2022, respectively. Each
20 of these delay cases included higher capital and financing costs.

21 **Q. WHAT ARE THE IMPACTS OF THE THREE ADDITIONAL DELAY**

SCENARIOS THAT THE COMPANY AND STAFF CONDUCTED?

A. Tables 2, 3 and 4 compare the Company’s and Staff’s results for the different delay scenarios, again based on a cost-to-complete basis.

Table 2⁵

Combined Cycle Natural Gas versus Nuclear								
Cost to Complete Analysis								
NPV (1007MW) \$ Millions Revenue Requirement Difference								
(Positive indicates CC is more expensive)								
	GPC (36 Mo. Delay)				STAFF (Min Delay - 29/38 Mo. Delay)			
	0\$/Ton CO₂	10\$/Ton CO₂	20\$/Ton CO₂		0\$/Ton CO₂	10\$/Ton CO₂	20\$/Ton CO₂	
High Gas	4,016	5,076	6,093	0.33	1,426	2,709	4,179	0.25
Moderate Gas	1,553	3,114	4,320	0.33	14	1,860	3,097	0.50
Low Gas	140	1,995	3,231	0.33	-829	832	1,627	0.25
Weights	0.333	0.333	0.333		0.250	0.500	0.250	
Average Value	3,282				1,697			

⁵ When two numbers are shown in the table for the number of months of delay, the first number refers to Vogtle 3 and the second refers to Vogtle 4.

1

Table 3

Combined Cycle Natural Gas versus Nuclear								
Cost to Complete Analysis								
NPV (1007MW) \$ Millions Revenue Requirement Difference								
(Positive indicates CC is more expensive)								
	GPC (48 Mo. Delay)				STAFF (Base Delay - 41/50 Mo. Delay)			
	0\$/Ton CO ₂	10\$/Ton CO ₂	20\$/Ton CO ₂		0\$/Ton CO ₂	10\$/Ton CO ₂	20\$/Ton CO ₂	
High Gas	3,362	4,368	5,373	0.33	939	2,137	3,598	0.25
Moderate Gas	1,003	2,481	3,674	0.33	-414	1,342	2,575	0.50
Low Gas	-354	1,416	2,643	0.33	-1,259	616	1,125	0.25
Weights	0.333	0.333	0.333		0.250	0.500	0.250	
Average Value	2,663				1,225			

2

3

Table 4

Combined Cycle Natural Gas versus Nuclear				
Cost to Complete Analysis				
NPV (1007MW) \$ Millions Revenue Requirement Difference				
(Positive indicates CC is more expensive)				
	STAFF (Worst Delay - 53/62 Mo. Delay)			
	0\$/Ton CO ₂	10\$/Ton CO ₂	20\$/Ton CO ₂	
High Gas	398	1,525	2,958	0.25
Moderate Gas	-910	771	1,976	0.50
Low Gas	-1,756	77	553	0.25
Weights	0.250	0.500	0.250	
Average Value	661			

4

5

6

7

Tables 2, 3, and 4 indicate that the impact of Staff's lower fuel costs and delays will lead to lower benefits than those represented by the Company's scenarios. The following is a

1 comparison of only expected value benefits for the delay scenario comparisons.

2 **Table 5**

Combined Cycle Natural Gas versus Nuclear			
Cost to Complete Analysis			
Expected Value Results			
NPV (1007MW) \$ Millions Revenue Requirement Difference			
(Billions of Dollars)			
GPC Delay	GPC Vogtle	Staff Delay	Staff Vogtle
Months	Benefit	Months	Benefit
21	\$3,978	21	\$2,535
36	\$3,282	29 / 38	\$1,697
48	\$2,663	41 / 50	\$1,225
		53 / 62	\$661

3
4 **Q. WHAT DO YOU CONCLUDE FROM THESE DELAY SCENARIOS?**

5 A. In interpreting these results, it is first important to understand what these results
6 represent. These results are part of an economic evaluation performed to determine
7 whether to continue with the Project or to halt it and build combined cycle units. In this
8 evaluation a comparison is made of the revenue requirement from expenditures necessary
9 to complete construction and operate Vogtle 3 & 4 to the revenue requirement of
10 alternative combined cycle units of the same capacity. All things being equal, the
11 alternative with the smaller revenue requirement is more economic.

12
13 Based on the Company and Staff results in Table 5, it appears that the Project is still
14 economic under these scenarios on a cost-to-complete basis, and is lower in cost than the

1 next best alternative, which would be to shut down the Project and begin to build new
2 CCGT units. While these results indicate that the Project should continue, Staff's results
3 indicate that it may not deliver the economic benefits asserted by the Company. For
4 example, in the 21-month delay case, the Company determined that the Project would
5 provide approximately \$4 billion in benefits on an expected value basis, while Staff's
6 analysis using lower gas price forecasts indicates the Project would provide \$2.5 billion,
7 which is approximately 38% lower than the Company's estimate. Staff's estimates under
8 different delay scenarios also indicate that the Project is expected to provide significantly
9 lower benefits than the Company's estimates.

10
11 **Q. WHEN DOES THE VOGTLE PROJECT BECOME ECONOMIC UNDER A**
12 **COST-TO-COMPLETE ANALYSIS?**

13 A. The Project becomes economic in the year that the *cumulative* PVRR of the case with the
14 Vogtle Project becomes less than the cumulative PVRR of the case with alternative
15 combined cycle units. The following graph compares cumulative PVRR results for the
16 Company's 21-month delay scenario to each of the delay scenarios that Staff developed
17 based on its cost-to-complete analyses. Given the large number of cases, only the
18 Moderate Gas - Moderate CO2 (\$10/Ton) cases were included on the graph for each
19 delay scenario. The results presented indicate the Project is economic under all of these
20 delay scenarios and the break even points for the scenarios range from [REDACTED] (Company)
21 to [REDACTED] (Staff Max Delay - 53/62 month delays).

1 **Q. DOES THE COST-TO-COMPLETE ANALYSIS REFLECT THE ENTIRE**
2 **REVENUE REQUIREMENT THAT WILL BE COLLECTED FROM**
3 **RATEPAYERS?**

4 A. No. The cost-to-complete analysis does not include the revenue requirement associated
5 with sunk costs that will be collected from ratepayers. An examination must be made of
6 the entire lifecycle (construction and operating periods) revenue requirements for each
7 generation alternative to determine the entire revenue requirement that will be collected
8 from ratepayers.

9 **Q. HAS STAFF PREPARED AN ANALYSIS USING TOTAL LIFECYCLE**
10 **REVENUE REQUIREMENTS THAT WILL BE COLLECTED FROM**
11 **RATEPAYERS UNDER THE COMPANY'S CURRENT FORECAST AND**
12 **STAFF'S THREE DELAY SCENARIOS?**

13 A. Yes.

14 **Q. WHAT IS THE PURPOSE OF THIS ANALYSIS?**

15 A. The purpose of this analysis is to provide the Commission additional information
16 regarding the economics of the Project. As compared to the cost-to-complete analysis,
17 this lifecycle revenue requirement analysis captures all revenue requirements that
18 ratepayers will be expected to pay, including sunk cost revenue requirements.

19 **Q. PLEASE SUMMARIZE STAFF'S RESULTS UNDER THIS ANALYSIS.**

1 A. Staff's analysis determined that the Project is clearly uneconomic when compared to
2 combined cycle units under the Company's 21-month delay scenario, and the Project is
3 even more uneconomic under Staff's delay scenarios.

4 **Q. HAS STAFF PREPARED A GRAPH, SIMILAR TO FIGURE 2 ABOVE, USING**
5 **TOTAL PROJECT COSTS, INCLUDING COSTS ALREADY SUNK IN THE**
6 **PROJECT?**

7 A. Yes. The following graph Figure 3 contains Total Project Costs including costs already
8 spent to date. This is essentially the analysis that was performed at the certification
9 proceeding, but it reflects the most current assumption of the total cost to construct and
10 finance the Project, and considers current forecasts of natural gas prices, which are
11 significantly lower than they were at certification.

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21

1 **Begin Trade Secret**

2 **Figure 3**

3 **Redacted In Its Entirety**

4 **End Trade Secret**

5 The graph indicates that using the latest Total Project Cost, fuel and CO2 cost
6 assumptions, the Project would not be economic, and if a decision had to be made today
7 to build a new nuclear project, it would not be justified on the basis of these results. The
8 last value to the right of each line represents the excess revenue requirement (on a NPV
9 value basis) that the Project expansion plan would require to be collected from
10 ratepayers, versus what would be collected based on a combined cycle expansion plan.

1 These results show that additional delays and corresponding increases in costs result in a
2 significant negative economic benefit.

3

4 **Additional Benefits**

5 **Q. IN ITS TESTIMONY, DID THE COMPANY DISCUSS HOW CUSTOMER**
6 **BENEFITS HAVE CHANGED SINCE THE SEVENTH VCM REPORT?**

7 A. Yes, it did. In prior VCM proceedings the Company has testified that the Project will
8 have a more favorable impact on customers than forecast at certification. The Company
9 asserted that through actions it has taken, it has been able to secure additional benefits
10 associated with the Project that were not accounted for at the time of certification. In this
11 proceeding, the Company states that "...the Company continues to report the projected
12 2016 value of approximately \$2.0 billion related to certain other customer benefits
13 resulting from activities associated with Vogtle Units 3 and 4."⁶ As Staff has stated in
14 prior testimony, this presents an incomplete picture and requires clarification.

15 **Q. WHY DOES STAFF BELIEVE THE COMPANY'S ASSERTIONS PRESENT AN**
16 **INCOMPLETE PICTURE AND REQUIRE CLARIFICATION?**

17 A. While it may be true that the Company did not incorporate or identify in its economic
18 evaluation at certification all of the benefits that it now believes exist, it is also true that
19 there are now detriments that the Company did not incorporate or identify in its economic
20 evaluation performed at certification. These detriments include the cost overrun of \$737

⁶ Direct Testimony Kyle Leach and David McKinney, June 28, 2013, page 23 at 11.

1 million on the Project, and much lower natural gas costs, which reduce the economic
2 benefit of the Project significantly.

3 **Q. WHAT ADDITIONAL BENEFITS HAS THE COMPANY ADDRESSED IN THE**
4 **8TH VCM FILING?**

5 A. The additional benefits it addressed include:

- 6 • Use of CWIP vs. AFUDC financing;
- 7 • The Department of Energy (“DOE”) Loan Guarantee;
- 8 • Additional Production Tax Credits (“PTC”);
- 9 • EPC Agreement Amendment 3 ("Amendment 3"); and,
- 10 • Interest savings.

11 **Q. WHAT ARE YOUR CONCERNS REGARDING THE COMPANY'S CLAIM OF**
12 **ADDITIONAL BENEFITS ASSOCIATED WITH THESE ITEMS?**

13 A. With respect to the DOE Loan Guarantee and Production Tax Credit items, it is fair to
14 represent those items as potential benefits that were not incorporated (although they were
15 identified and discussed) in the economic evaluation performed at certification. It is
16 appropriate for the Company to point out that those are potential benefits that may result,
17 although it has still chosen not to incorporate those benefits in its current cost-to-
18 complete economic evaluations, in an attempt to be conservative.

19

20 In the case of CWIP, Amendment 3, and Interest savings, while those are certainly items

1 that were not incorporated or identified at certification, they have since been fully
2 reflected in the Company's on-going cost-to-complete economic evaluations. However, it
3 should be noted that lower interest costs would also benefit alternative generation
4 economics. Furthermore, if the Company chooses to emphasize the benefit of those
5 unidentified items at certification, then in the interest of fairness, the Company should
6 also identify the detriments to the Project economics that have arisen since certification,
7 such as much lower natural gas fuel costs and higher Project capital and financing costs,
8 which increase ratepayer bills.

9 **Q. IS THERE A WAY THE COMPANY COULD PROVIDE A FAIR ANALYSIS**
10 **CAPTURING ALL ADDITIONAL BENEFITS AND DETRIMENTS SINCE**
11 **CERTIFICATION?**

12 A. Yes. Figure 3, above, contains an analysis that captures the impact of all Project costs
13 since the start of the construction of the units. Figure 3 includes the impact of the
14 additional detriments (lower fuel costs, higher capital and financing costs) that the
15 Company has ignored in its assertion of additional benefits, and the Company could
16 provide a similar graph, but include the additional benefits that it believes have not been
17 captured in the analysis. Since CWIP, Amendment 3 and Interest savings are already
18 captured in the economic evaluations that underlie the results presented in Figure 3, the
19 Company could add in the impact of the DOE Loan Guarantee and the additional
20 Production Tax Credit benefit, which are the other Additional Benefits that are not
21 accounted for in the analysis.

1

2 **Contingency**

3 **Q. IN THE 7TH VCM REPORT, THE COMPANY STATED THAT A TYPICAL**
4 **CONTINGENCY FOR A PROJECT THIS SIZE SHOULD BE BETWEEN 20**
5 **AND 25 PERCENT.⁷ DID STAFF PERFORM AN EVALUATION USING DATA**
6 **FROM THE 1ST VCM TO ASSESS THE IMPACT OF A 20 TO 25 PERCENT**
7 **CONTINGENCY?**

8 A. Yes. Staff has performed additional evaluations from the 1st VCM cost-to-complete
9 analysis to identify the breakeven point between continuing with the Project or building
10 alternative combined cycle units. Staff performed one analysis based strictly on the data
11 and economic evaluations that were performed at the time of the 1st VCM. In that
12 analysis, the breakeven point occurred at a 27 percent cost overrun of the Total Project
13 Cost, on an expected value basis.

14
15 A second analysis was also performed based on additional gas forecasts that Staff
16 developed at the time of the 1st VCM. Staff did not use those forecasts at the time to
17 perform economic evaluations, but used them as part of a graphical comparison of fuel
18 costs, and to encourage the Company to update gas price forecasts in future VCM filings.
19 Staff has now used those gas forecasts in an economic evaluation performed recently, but

⁷ See Section II - Facility Investment Overview, part E, page 34

1 with all other data identical to what had been used at the time of the 1st VCM filing.⁸
2 The breakeven point of that analysis occurred at a 20 percent cost overrun of the Total
3 Project Cost, on an expected value basis. Both analyses recently performed indicate that
4 the Project could have incurred a cost overrun within, or above, the range of 20 to 25
5 percent and still have been economic. While these results indicate the Project was still
6 economic, the margin for error, however, would have been reduced. I am not in a
7 position to speculate whether that smaller margin for error would have caused the
8 Commission to consider more cost control, oversight, or other customer protection
9 measures.

10
11 **Other Issues**

12 **Q. DO YOU HAVE ANY RECOMMENDATIONS REGARDING FUTURE**
13 **ECONOMIC ANALYSES THAT THE COMPANY PERFORMS?**

14 A. Yes. Staff recommends that the Company continue to perform three delay sensitivity
15 scenarios in future VCM filings. Delay scenarios of 12, 24 and 36 months should be
16 performed using the latest COD dates for the Units in all future VCM filings.

17 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

18 A. Yes it does.

⁸ At the time of the 1st VCM, Staff created a new low gas forecast consistent with an EIA 2009 Annual Energy Outlook forecast. Staff also created a new high forecast that was midway between the Company's High forecast and the Company's SCS 2009 forecast.

BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION

IN THE MATTER OF: GEORGIA POWER
COMPANY'S EIGHTH SEMI-ANNUAL
VOGTLE CONSTRUCTION MONITORING
REPORT

DOCKET NO.29849

EXHIBIT
STF-Hayet-1

RESUME OF PHILIP HAYET

EDUCATION/CERTIFICATION

M.S., Electrical Engineering, Georgia Institute of Technology, 1980
B.S., Electrical Engineering, Purdue University, 1979
Cooperative Education Certificate, Purdue University, 1979
Registered as a Professional Engineer in the State of Georgia, 1987
Member National Professional Engineering Society

EXPERIENCE

Mr. Hayet has provided consulting services to Public Utility Commissions, State Energy Offices, Consumer Advocate Offices, Electric Utilities, Global Power Developers, and Industrial Companies for over thirty years. Mr. Hayet's expertise covers a number of areas including utility system planning and operations, market price forecasting, Integrated Resource Planning, renewable resource evaluation, transmission planning, demand-side analysis, and economic analysis. In 1995, Mr. Hayet began his own utility consulting firm, Hayet Power Systems Consulting ("HPSC"), and has worked for customers in the United States, and internationally in Australia, Japan, Singapore, Malaysia, the United Kingdom, and Vietnam. In addition to continuing to work for HPSC, in 2000, Mr. Hayet began working on a non-exclusive basis for the consulting firm of J. Kennedy & Associates, Inc. to provide support for projects requiring utility resource planning analysis and software modeling expertise.

Prior to 1995, Mr. Hayet worked for fifteen years at Energy Management Associates, now Ventyx, where he provided consulting services and client service support for the widely used utility system planning software models, PROMOD IV and STRATEGIST. Clients included various electric utilities, governmental agencies, and private industry. Mr. Hayet helped to design some of the features that exist within the PROMOD IV and STRATEGIST systems, such as the competitive market modeling features in STRATEGIST.

Mr. Hayet has conducted numerous consulting studies in the areas of Renewable Resource Evaluation, Renewable Portfolio Standards Evaluation, Green Pricing Tariff Development, Electric Market Price Forecasting, Generating Unit Cost/Benefit Analysis, Integrated Resource Planning, Demand-Side Management, Load Forecasting, Rate Case Analysis and Regulatory Support. A list of recent projects is included below.

SPECIFIC EXPERIENCE

Projects Since 2000 - Hayet Power Systems Consulting, Atlanta, GA – President

RESUME OF PHILIP HAYET

- Filed Direct testimony December 2012 at the Georgia Public Service Commission concerning Georgia Power's Seventh Semi-Annual Vogtle Construction Monitoring Report (Docket 29849-U).
- Filed Direct Testimony July 2012 at the Kentucky Public Service Commission regarding Big Rivers Certification to perform environmental upgrades in compliance with MATS and CSAPR EPA regulations. (Case No. 2012-00063).
- Submitted Direct Testimony May 2012 at the Georgia Public Service Commission concerning Georgia Power's Sixth Semi-Annual Vogtle Construction Monitoring Report (Docket 29849).
- Submitted Direct Testimony May 2012 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing (FCR-23 - Docket 35277).
- Assisted in the evaluation of Rocky Mountain Power's request for certification of environmental upgrades at the Naughton 3 unit in Wyoming on behalf of the Wyoming Industrial Energy Consumers (Docket No. 20000-EA-400-11).
- Submitted Direct Testimony November 2011 at the Georgia Public Service Commission concerning Georgia Power's evaluation of environmental upgrades pertaining to MATS EPA regulations, to decertify two aging coal units, to acquire PPA resources, and to have approved its IRP Update, on behalf of the Georgia Public Service Commission Staff (Docket 34218).
- Submitted Direct Testimony November 2011 at the Georgia Public Service Commission concerning Georgia Power's request to certify the reacquisition of wholesale block capacity, on behalf of the Georgia Public Service Commission Staff (Docket 26550).
- Submitted an Initial and Rebuttal Expert Report (April and June 2011, respectively) on behalf of the Department of Justice in US District Court, Civil Action No. 2:10-cv-13101-BAF-RSW.
- Filed Direct Testimony June 2011 at the Georgia Public Service Commission concerning Georgia Power's Fourth Semi-Annual Vogtle Construction Monitoring Report Period Ending December 31, 2011 (Docket 29849-U).
- Filed Direct testimony April 2011 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing (FCR-22) (Docket 33302).
- Filed Direct testimony December 2010 at the Georgia Public Service Commission concerning Georgia Power's Third Semi-Annual Vogtle Construction Monitoring Report Period Ended June 30, 2010 (Docket 29849-U).
- Filed Direct testimony June 2010 at the Georgia Public Service Commission concerning Georgia Power's Second Semi-Annual Vogtle Construction Monitoring Report Period Ended December 31, 2009 (Docket 29849-U).

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- Filed Direct testimony January 2010 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing (FCR-21) (Docket 28945).
- Filed Direct testimony October 2009 at the Georgia Public Service Commission concerning Georgia Power's First Semi-Annual Vogtle Construction Monitoring Report Period Ended June 30, 2009 (Docket 29849-U).
- Filed Direct and Sur-rebuttal testimony in September and October 2009, respectively at the Utah Public Service Commission concerning PacifiCorp's 2009 Rate Case with regard to net power costs (Docket 09-035-23).
- Assisted the Utah Office of Consumer Services to evaluate PacifiCorp's 2008 IRP (Docket 09-2035-01).
- Assisting the Georgia Public Service Commission Staff to investigate the acquisition of additional coal and combustion turbine capacity currently wholesale capacity (Docket 26550).
- Testified on Georgia Public Service Commission Staff concerning Georgia Power's Certification request for the Vogtle 3 and 4 Nuclear units (Docket 27800).
- Testified on behalf of the Utah Committee of Consumer Services concerning PacifiCorp's 2008 request to acquire the Chehalis Combined Cycle Power Plant based on a waiver of the RFP solicitation process (Docket 08-035-35).
- Submitted testimony on behalf of the Utah Committee of Consumer Services concerning PacifiCorp's 2007 Rate Case with regard to net power costs (Docket 07-035-93).
- Testified in April 2008 in front of the Georgia Public Service Commission regarding Georgia Power's November 2006 Fuel Cost Recovery filing (Docket 26794-U).
- Assisted the Georgia Public Service Commission Staff to evaluate Georgia Power's 2007 IRP filings (Docket 24505-U).
- Conducted an investigation of the Southern Company interchange accounting and fuel accounting practices on behalf of the Georgia Public Service Commission (Docket 21162-U).
- Testified in January 2007 in front of the Georgia Public Service Commission regarding Georgia Power's November 2006 Fuel Cost Recovery filing (Docket 23540-U).
- Assisted the Utah Committee of Consumer Services to evaluate PacifiCorp's 2007 IRP.
- Provided regulatory support to the Utah Committee of Consumer Services concerning PacifiCorp's 2006 Rate Case with regard to net power costs (Docket 06-35-01).
- Testified in May 2006 in front of the Georgia Public Service Commission regarding Georgia Power and Savannah Electric's March 2006 Fuel Cost Recovery filing (Docket 22403-U).

RESUME OF PHILIP HAYET

- Assisted the Utah Committee of Consumer Services by evaluating PacifiCorp's 2005 IRP and assisted in writing comments that were filed with the Commission.
- Assisted the Utah Committee of Consumer Services by participating in a collaborative process to develop an avoided cost tariff for large QFs.

Projects Since 2000 - J. Kennedy and Associates, Inc. Atlanta, GA – Director of Consulting

- Filed Direct Testimony (December 2012) in Entergy's retail proceeding at the LPSC regarding termination of Cross-PPAs (Docket No. U-29764).
- Filed Direct Testimony (December 2012) regarding Entergy's request for certification of a 28 MW PPA for renewable energy capacity (waste heat) in accordance with the LPSC's Renewable Energy Pilot (Docket U-32557).
- Filed Direct Testimony (September 2012) regarding Dixie Electric Member Cooperative's Ten year Power Supply Agreement U-32275.
- Filed Direct Testimony (March 2012) regarding Entergy's change of control filing to move to the Midwest ISO in LPSC Docket 32148.
- Filed Direct Testimony (September 2011) in support of a settlement agreement at the Louisiana Public Service Commission regarding the reasonableness of Cleco's CCPN to upgrade its Madison 3 coal unit to accommodate biomass fuel in accordance with the LPSC's Renewable Energy Pilot in Docket U-31792.
- Filed Direct (January 2011) and Cross-Answering (February 2011) Testimony at FERC regarding the reasonableness of Entergy's 2009 production costs that were used to develop bandwidth payments in Docket ER09-1350.
- Testified at FERC regarding an LPSC complaint that Entergy violated provisions of its System Agreement related to individual operating company sales in FERC Docket EL09-61.
- Testified at FERC regarding the reasonableness of Entergy's 2008 production costs that were used to develop bandwidth payments in Docket ER08-1224.
- Filed testimony at the Public Utilities Commission of the State of Colorado, in October 2009 concerning Black Hills/Colorado's CPCN application to construct two LMS 100 natural gas combustion turbine units. Docket No. 09A-415E
- Testified in front of the Minnesota Public Service Commission, September 2009 concerning Minnesota Power's Request for Approval to Purchase Square Butte's 500 kV DC transmission line, and to restructure a coal based power purchase agreement. MPUC Docket No. E015/PA-09-526
- Testified in front of FERC, July 2009, concerning the Louisiana Public Service Commission's complaint regarding Entergy's 2007 rough production cost equalization compliance filing in the System Agreement Case in FERC Docket No. ER08-1056.

RESUME OF PHILIP HAYET

- Worked with the Louisiana Public Service Commission in a collaborative effort to implement a Green Pricing Tariff for Entergy Gulf States Louisiana, Entergy Louisiana, CLECO, and SWEPCO. Coordination is required between the utility, power developers, other customers, and Commission Staff. (Docket No. R-28271)
- Assisted the Louisiana Public Service Commission Staff with a rulemaking to design Integrated Resource Planning (“IRP”) rules. (Docket No. R-30021)
- Assisted the Louisiana Public Service Commission Staff with a rulemaking for the opportunity to implement a Renewable Portfolio Standard in Louisiana. (Docket No. R-28271 Sub-Docket B)
- Filed Testimony at FERC in Jan 2009, concerning the 2007 System Agreement Rough Production Cost Equalization production cost equalization compliance filing in the System Agreement Case in FERC Docket No. ER08-1056.
- Testified in front of the Wisconsin Public Service Commission in 2008 regarding WPL’s certification proceeding concerning the Nelson Dewey CFB coal-fired generating unit. (6680-CE-170).
- Testified at FERC in July 2008, concerning the Louisiana Public Service Commission’s complaint regarding Entergy’s 2006 rough production cost equalization compliance filing in the System Agreement Case in FERC Docket No. ER07-956.
- Testified in front of the Wisconsin Public Service Commission in 2008 regarding WEPCO’s request to implement environmental upgrades at its Oak Creek Power Plant in Docket 6630-CE-299.
- Assisting the Louisiana Public Service Commission Staff with the review and evaluation of Cleco Power’s 2008 Short Term RFP and its 2010 Long-Term RFP.
- Provided regulatory support on behalf of the Louisiana Public Service Commission Staff concerning jurisdictional separation of Entergy Gulf States in Docket No. U-21453.
- Provided regulatory support on behalf of the Louisiana Public Service Commission Staff concerning the potential benefit of Transmission upgrades in Docket No. U-25116.
- Provided regulatory support on behalf of the Louisiana Public Service Commission concerning a FERC complaint regarding power purchase contracts in FERC Docket No. ER03-753-000.
- Provided regulatory support on behalf of the Louisiana Public Service Commission Staff in a retail proceeding evaluating the benefits of possibly retiring some of Entergy’s gas-fired units. Docket No. U-27136 (Subdocket A).
- In 2002 – 2003, provided regulatory support on behalf of the Louisiana Public Service Commission’s FERC complaint regarding cost allocation issues between the Entergy Operating Companies in the FERC Docket No. EL01-88-000.

RESUME OF PHILIP HAYET

- In 2002 – 2003, provided regulatory support on behalf of the Louisiana Public Service Commission Staff in a retail proceeding concerning Entergy's billing practices. Docket No. U-25888
- In 2000 – 2001, provided regulatory support on behalf of the Louisiana Public Service Commission's intervention in Entergy's proposed System Agreement modifications in the FERC Docket No. ER00-2854-000.

Other Projects Conducted Since 1996

- Provided assistance in 2004 to the Utah Committee of Consumer Services to analyze a series of power purchase agreements and special contracts between PacifiCorp and several of its industrial customers.
- Assisted the Georgia Public Service Commission Staff to evaluate Georgia Power and Savannah Electric's 2004 IRP filings. Also, testified in front of the Georgia Public Service Commission in that proceeding.
- Provided regulatory support to the Utah Committee of Consumer Services regarding PacifiCorp's 2003 Utah General Rate Case Docket # 03-2035-02.
- Worked on behalf of the Oregon Public Utility Commission to Audit PacifiCorp's Net Power Costs per a Settlement Agreement accepted by the Public Utility Commission of Oregon in its Order No. 01-787. Audit report in Docket No. UE-116 filed July 2003.
- Worked on behalf of the Utah Committee of Consumer Services to provide guidance and assist in the analysis of PacifiCorp's 2002 Integrated Resource Plan.
- Worked on behalf of the Utah Committee of Consumer Services to help analyze PacifiCorp's restructuring proposals.
- Testified in front of the Utah Public Service Commission in regards to PacifiCorp's Utah General Rate Case Docket # 010-035-010
- Submitted an expert report in August 2002 in the United States District Court for the Middle District of North Carolina in the Civil Action No. 1:00 CV 1262, United States v. Duke Energy Corporation. The case concerned compliance with the 1977 Clean Air Act and the report concerned generation resource planning and production cost modeling issues.
- Provided general rate case assistance in other hearings in Oregon, Washington and Wyoming
- Modeled the Singapore Power Electricity System and analyzed the benefits of dispatching a new oil-fired unit within the system.

RESUME OF PHILIP HAYET

- Modeled the Australian National Energy Market to develop market based energy price forecasts on behalf of an Independent Power Producer in Australia
- Analyzed the benefit of purchasing existing gas-fired steam turbine units within the Australian market
- Developed market price forecasts for South Australia as part of the evaluation of a new gas fired combined cycle unit
- Modeled the Vietnam Electricity System as part of a project to develop Least Cost Expansion plans for Vietnam
- Assisted in the evaluation of a large gas-fired combined cycle plant in Vietnam
- Assisted in the development of Market Price Forecasts in several regions of the US. These forecasts were used as the basis for stranded cost estimates, which were filed in testimony in a number of jurisdictions across the country.
- Helped to analyze the rate structure and develop an electricity price forecast for the Metropolitan Atlanta Rapid Transit Authority (MARTA) in Atlanta, Georgia
- Testified regarding the reasonableness of PacifiCorp's determination of Net Power Cost as part of a rate case proceeding in Utah
- Provided rate case support opposing PacifiCorp's rate increases in both Oregon and Washington State. Performed alternative power cost modeling using software simulations
- Critiqued the IRP filings of 5 utilities in South Carolina on behalf of the South Carolina State Energy Office
- Conducted research regarding ISO Tariffs and Operations for the PJM Power Pool, the California ISO, and the Midwest ISO on behalf of a Japanese Research.
- Performed research on numerous electric utility issues for 3 Japanese research organizations. This was primarily related to deregulation issues in the US in anticipation of deregulation being introduced in Japan.

1991 to **EDS Utilities Division, Atlanta, GA**
1996: **Lead Consultant, PROSCREEN (Now STRATEGIST) Department**

- Managed a client services software team that supported approximately 75 users of the STRATEGIST electric utility strategic planning software.
- Participated in the development of STRATEGIST's competitive market modeling features and the Network Economy Interchange Module
- Provided client management direction and support, and developed new consulting business opportunities.

RESUME OF PHILIP HAYET

- Performed system planning consulting studies including integrated resource planning, DSM analysis, marketing profitability studies, optimal reserve margin analyses, etc.
- Based on experience with PROMOD IV, converted numerous PROMOD IV databases to STRATEGIST, and performed benchmark analyses of the two models.

**1988 to 1991: Energy Management Associates (EMA), Atlanta, GA
Manager, Production Analysis Department**

- Served as Project Manager of a database modeling effort to create an integrated utility operations and generation planning database. Database items were automatically fed into PROMOD IV.
- Supervised and directed a staff of five software developers working with a 4GL database programming language.
- Interfaced with clients to determine system software specifications, and provide ongoing client training and support

**1980 to 1988: Energy Management Associates (EMA), Atlanta, GA
Senior Consultant, PROMOD IV Department**

- Provided client service support to EMA's base of over 70 electric utility customers using the PROMOD IV probabilistic production cost simulation software.
- Provided consulting services in a number of areas including generation resource planning, regulatory support, and benchmarking.

PUBLICATIONS

Authored "The Developing Vietnamese Power System", which will appear in an upcoming addition of Power Value Magazine

Co-Authored "The European Electricity Market", which appeared in the June 2000 edition of Hart's Energy Markets

Authored "Singapore's Developing Power Market", which appeared in the July/August 1999 edition of Power Value Magazine

Co-authored "The New Energy Services Industry – Part 1", which appeared in the January/February 1999 edition of Power Value Magazine.

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Co-authored and Presented “Evaluation of a Large Number of Demand-Side Measures in the IRP Process: Florida Power Corporation’s Experience”, Presented at the 3rd International Energy and DSM Conference, Vancouver British Columbia, November 1994

Co-authored “Impact of DSM Program on Delmarva’s Integrated Resource Plan”, Published in the 4th International Energy and DSM Conference Proceedings, held in Berlin, Germany, 1995

TESTIMONY AND EXPERT WITNESS APPEARANCES

Filed Direct testimony December 2012 at the Georgia Public Service Commission concerning Georgia Power’s Seventh Semi-Annual Vogtle Construction Monitoring Report (Docket 29849-U).

Filed Direct Testimony (December 2012) in Entergy's retail proceeding at the LPSC regarding termination of Cross-PPAs (Docket No. U-29764).

Filed Direct Testimony (December 2012) regarding Entergy's request for certification of a 28 MW PPA for renewable energy capacity (waste heat) in accordance with the LPSC's Renewable Energy Pilot (Docket U-32557).

Filed Direct Testimony (September 2012) regarding Dixie Electric Member Cooperative's Ten year Power Supply Agreement U-32275.

Filed Direct Testimony July 2012 at the Kentucky Public Service Commission regarding Big Rivers Certification to perform environmental upgrades in compliance with MATS and CSAPR EPA regulations. (Case No. 2012-00063).

Filed Direct testimony May 2012 at the Georgia Public Service Commission concerning Georgia Power’s Sixth Semi-Annual Vogtle Construction Monitoring Report (Docket 29849-U).

Filed Direct Testimony (May 2012) at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing (FCR-23 - Docket 35277).

Filed Direct Testimony (March 2012) regarding Entergy’s change of control filing to move to the Midwest ISO in LPSC Docket 32148.

Submitted Direct testimony November 2011 at the Georgia Public Service Commission concerning Georgia Power's request to decertify two aging coal units, to acquire PPA resources, and to have approved its IRP Update, on behalf of the Georgia Public Service Commission Staff (Docket 34218).

Submitted Direct testimony November 2011 at the Georgia Public Service Commission concerning Georgia Power's request to certify the reacquisition of wholesale block capacity, on

RESUME OF PHILIP HAYET

behalf of the Georgia Public Service Commission Staff (Docket 26550).

Filed Direct Testimony (September 2011) in support of a settlement agreement at the Louisiana Public Service Commission regarding the reasonableness of Cleco's CCPN to upgrade its Madison 3 coal unit to accommodate biomass fuel in accordance with the LPSC's Renewable Energy Pilot in Docket U-31792.

Submitted an Initial and Rebuttal Expert Report (April and June 2011, respectively), on behalf of the Department of Justice in US District Court, Civil Action No. 2:10-cv-13101-BAF-RSW.

Filed Direct testimony June 2011 at the Georgia Public Service Commission concerning Georgia Power's Fourth Semi-Annual Vogtle Construction Monitoring Report Period Ending December 31, 2011 (Docket 29849-U).

Filed Direct testimony April 2011 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing (FCR-22) (Docket 33302).

Filed direct testimony (January 2011) and Cross Answering Testimony (February 2011) at FERC regarding the reasonableness of Entergy's 2009 production costs that were used to develop bandwidth payments in Docket ER09-1350.

Filed direct testimony December 2010 at the Georgia Public Service Commission concerning Georgia Power's Third Semi-Annual Vogtle Construction Monitoring Report Period Ended June 30, 2010 (Docket 29849-U)

Filed direct testimony June 2010 at the Georgia Public Service Commission concerning Georgia Power's Second Semi-Annual Vogtle Construction Monitoring Report Period Ended December 31, 2009 (Docket 29849-U)

Testified at FERC in 2010 regarding an LPSC complaint that Entergy violated provisions of its System Agreement related to individual operating company sales in FERC Docket EL09-61.

Filed direct testimony January 2010 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing in Docket No. 28945.

Filed testimony at FERC December 2009 regarding the reasonableness of Entergy's 2008 production costs that were used to develop bandwidth payments in Docket ER08-1224.

Filed Direct testimony December 2009 at the Georgia Public Service Commission concerning Georgia Power's First Semi-Annual Vogtle Construction Monitoring Report Period Ended June 30, 2009 (Docket 29849-U)

Filed Direct and Surrebuttal testimony in September and October 2009, respectively at the Utah Public Service Commission concerning PacifiCorp's 2009 Rate Case with regard to net power costs (Docket 09-035-23)

Filed testimony at the Public Utilities Commission of the State of Colorado, in October 2009 concerning Black Hills/Colorado's CPCN application to construct two LMS 100 natural gas

RESUME OF PHILIP HAYET

combustion turbine units. Docket No. 09A-415E

Testified in front of the Minnesota Public Service Commission, September 2009 concerning Minnesota Power's Request for Approval to Purchase Square Butte's 500 kV DC transmission line, and to restructure a coal based power purchase agreement. MPUC Docket No. E015/PA-09-526

Filed testimony on behalf of the LPSC Staff in July 2009, concerning SWEPSCO and CLECO's application to acquire the Oxbow Mine to supply the Dolet Hills Power Station in LPSC Docket No.U-30975.

Testified at FERC in July 2009, concerning the Louisiana Public Service Commission's complaint regarding Entergy's 2007 rough production cost equalization compliance filing in the System Agreement Case in FERC Docket No. ER08-1056.

Filed Testimony December 2008 at the Georgia Public Service Commission concerning Georgia Power's Certification request for the Vogtle 3 and 4 Nuclear units (Docket 27800)

Filed Testimony November 2008 at the West Virginia Public Service Commission concerning their fuel cost recovery filing (Docket 08-15-11-E-61)

Testified in front of the Wisconsin Public Service Commission in September 2008 regarding WPL's certification proceeding concerning the Nelson Dewey CFB coal-fired generating unit. (6680-CE-170).

Testified at FERC in July 2008, concerning the Louisiana Public Service Commission's complaint regarding Entergy's 2006 rough production cost equalization compliance filing in the System Agreement Case in FERC Docket No. ER07-956.

Testified in front of the Wisconsin Public Service Commission in 2008 regarding WEPCO's request to implement environmental upgrades at its Oak Creek Power Plant in Docket 6630-CE-299.

Filed direct testimony April 2008 at the Georgia Public Service Commission concerning Georgia Power's Fuel Cost Recovery Filing in Docket No. 26794 (FCR-20).

Testified in October 2007 in front of the Louisiana Public Service Commission regarding ClecoPower's 2008 Short Term RFP in Docket No.U-30334.

Testified in June 2007 in front of the Georgia Public Service Commission regarding Georgia Power's 2007 Integrated Resource Planning Study.

Testified on behalf of the Georgia Public Service Commission Staff.in Docket No. 24505-U.

Filed testimony in Apr 2007 regarding the reasonableness of PacifiCorp's determination of Utah jurisdictional Net Power Costs in PacifiCorp's General Rate Case Docket 07-035-93.

Testified in January 2007 in front of the Georgia Public Service Commission concerning Georgia

RESUME OF PHILIP HAYET

Power's November 2006 fuel Cost Recovery Filing in Docket No. 23540-U.

Testified in November 2006 in front of the Louisiana Public Service Commission concerning transmission issues associated with the audit of Entergy Louisiana's Fuel Adjustment Clause Filings (Docket U-25116).

Filed Testimony in August 2006 in front of the Louisiana Public Service Commission concerning jurisdictional separation of EntergyGulf States in Docket No. U-21453

Testified in May 2006 in front of the Georgia Public Service Commission regarding Georgia Power and Savannah Electric's March 2006 Fuel Cost Recovery filing (Docket 22403-U).

Testified in Apr 2006 in front of the Utah Public Service Commission regarding PacifiCorp Certification request to expand the Blundell Geothermal Power Station (Docket -05-035-54). Related to Mid-American Energy Holding's Acquisition of PacifiCorp.

Filed Testimony in July 2005 regarding PacifiCorp's Avoided Cost proceeding (03-035-14).

Filed Testimony in December 2005 regarding the reasonableness of PacifiCorp's determination of Utah jurisdictional Net Power Costs in PacifiCorp's General Rate Case (Docket 04-035-42).

Testified in March 2005 in front of the Utah Public Service Commission regarding whether the Stipulation that had previously been agreed to concerning PacifiCorp's Schedule 38 avoided cost tariff was still valid for the remaining unsubscribed capacity available under the Stipulation's cap.

Testified in November 2004 in front of the Utah Public Service Commission regarding an industrial customer's request for both a special economic development tariff and a large QF tariff. Testimony was provided on behalf of the Utah Committee of Consumer Services in Docket No. 03-035-19 (Special Contract) and No. 03-035-38 (QF proceeding).

Testified in August 2004 in front of FERC on behalf of the Louisiana Public Service Commission concerning a complaint that had been filed against Entergy concerning a series of affiliate power purchase agreements FERC Docket ER03-583-000.

Testified in June 2004 in front of the Georgia Public Service Commission regarding Georgia Power and Savannah Electric's 2004 Integrated Resource Planning Studies. Testimony was provided on behalf of the Georgia Public Service Commission Staff. Georgia Docket Nos. 17687 and 17688.

Testified in May 2004 in front of the Utah Public Service Commission concerning the development of a large QF avoided cost methodology. Testimony was provided on behalf of the Utah Committee of Consumer Services in Docket 03-035-14.

Testified in July 2003 in front of FERC in support of the Louisiana Public Service Commission's complaint regarding cost allocation issues amongst the Entergy Operating Companies in the FERC Docket Number EL01-88-000.

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Submitted an expert report in August 2002 in the United States District Court for the Middle District of North Carolina in the Civil Action No. 1:00 CV 1262, United States v. Duke Energy Corporation.

Testified in July 2002 on behalf of the Utah committee for consumer services regarding a special contract for an industrial consumer in support of a settlement agreement in a PacifiCorp Utah proceeding in Docket Number 02-035-02.

Provided testimony in the Fall of 2001 in front of FERC on behalf of the Louisiana Public Service Commission's intervention in Entergy's proposed System Agreement modifications in the FERC Docket No. ER00-2854-000.

Testified in July 2001 regarding the reasonableness of PacifiCorp's determination of Utah jurisdictional Net Power Costs in PacifiCorp's General Rate Case Docket 01-035-01

Testified in September 1998 regarding the reasonableness of PacifiCorp's determination of Utah jurisdictional Net Power Costs as part of a Settlement Proceeding in PacifiCorp's rate case Docket Number 97-035-01.